

**BEFORE COMMISSIONERS APPOINTED BY THE CANTERBURY REGIONAL  
COUNCIL**

**IN THE MATTER** of the Resource Management Act 1991

**AND**

**IN THE MATTER** of applications for resource consents by Lyttelton Port  
Company for capital and maintenance dredging

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**EVIDENCE OF THOMAS HILDEBRAND  
FOR TE HAPŪ O NGĀTI WHEKE, TE RŪNANGA O KOUKOURĀRATA, NGĀI  
TAHU SEAFOOD, AND TE RŪNANGA O NGĀI TAHU**

**2 May 2017**

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## INTRODUCTION

1. My name is Thomas Michael Hildebrand.
2. I am currently employed by Ngāi Tahu Seafood (**NTS**) as a Marine Biologist.
3. I have a BSc, Post graduate diploma and a Master's of Science from the University of Canterbury. I have been working in the seafood industry for over 12 years in various roles from pāua diving to salmon and mussel aquaculture.
4. I am authorised to make this statement of behalf of NTS.
5. I have been a member of and attended the Lyttelton Port Company (**LPC**) Technical Advisory Group (**TAG**) meetings since 2015.

## SCOPE OF EVIDENCE

6. My evidence addresses:
  - a) An overview of NTS and its history;
  - b) The fishing carried out by NTS and quota held by NTS;
  - c) NTS' concerns with the proposed dredging; and
  - d) The ways in which NTS' concerns can be addressed if the Hearing Commissioners are of a mind to grant the resource consents that LPC have applied for.

## EXECUTIVE SUMMARY

7. NTS is working for Ngāi Tahu whānui as a whole, as part of the economic engine that drives tribal development. Seafood is one of the five pillars of the tribal economy that supports the continued growth of Ngāi Tahu. A reduction in the value or sustainability of NTS business will have a direct impact on the tribal bottom-line, and therefore on on-going distributions and projects that provide for whānau and hapū.
8. NTS have commercial fisheries and aquaculture ventures in Banks Peninsula and have concerns about the potential effects of LPC's proposed

dredging activities on those fisheries and aquaculture. Specifically, those fisheries are rock lobster and pāua and mussel aquaculture.

9. If the resource consents are to be granted, NTS is seeking consent conditions that require appropriate on-going monitoring of our fisheries and mussel farm to determine if the capital and future maintenance dredging are having any adverse effects on them. While the conditions agreed with other submitters are helpful, they do not go far enough in terms of monitoring possible effects on mussel farms. In addition, NTS are seeking an environmental bond condition that would cover remedial, restoration, or maintenance work on our fisheries and aquaculture from adverse effects associated with the dredging activities. I understand a bond of this nature was imposed by the Environment Court on the Port Tauranga dredging consents.

### **Ngāi Tahu Seafood**

10. NTS is a wholly owned subsidiary of Ngāi Tahu Holdings Corporation (**NTHC**), the commercial arm of Te Rūnanga o Ngāi Tahu (**Te Rūnanga**), the governing body overseeing the activities of Ngāi Tahu.
11. NTHC manages the financial assets of Te Rūnanga and includes subsidiary groups: Ngāi Tahu Seafood, Ngāi Tahu Tourism, Ngāi Tahu Capital, Ngāi Tahu Farming and Ngāi Tahu Property; together these are the five pillars of Ngāi Tahu tribal economic development.
12. NTS was incorporated in 1988 and was established to manage fishing quota received by Ngāi Tahu following Treaty Settlement with the Crown. Quota assets were an important source of income for Te Rūnanga in the early days following Settlement and continues to be an important revenue generator for the iwi.
13. The ability to continue to expand quota assets is the development right of Ngāi Tahu established during Treaty Settlement. While Treaty Settlement assets provided a necessary foundation for the business, those assets required additional quota to create economic quota parcels for fishing, and a sound business operation that makes sense in the marketplace. As a result of successful management, NTS have been able to purchase additional quota, expanding the company operating and production base. It

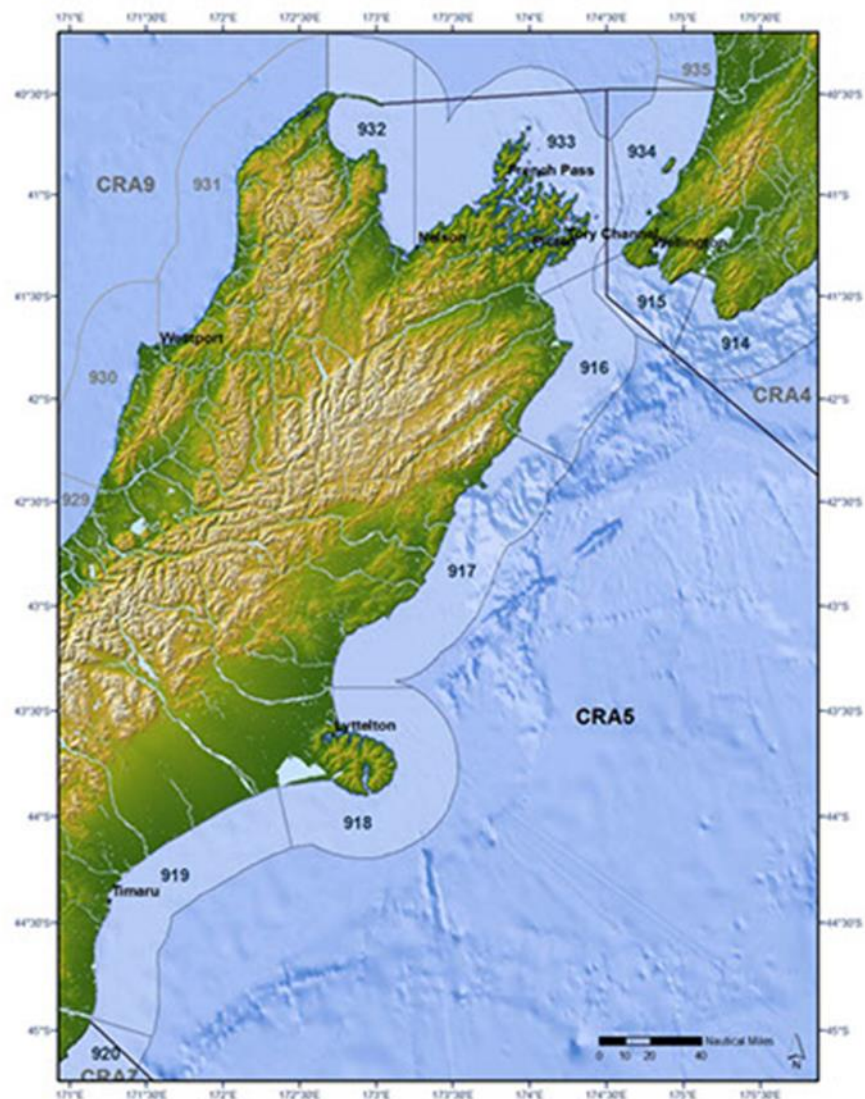
is the foundation of Treaty assets combined with smart purchase decisions that has made NTS into a successful company generating reliable returns for Ngāi Tahu.

14. NTS is today a supplier of seafood to international and domestic markets, under its TAHU brand. The key species currently fished by NTS are kōura (rock lobster), pāua (abalone), rāwaru (blue cod), tio (Bluff oysters) and kūtai (New Zealand Greenshell mussels), which are farmed.
15. All existing Treaty Settlement assets managed by NTS equated to a total quota value of \$181 million. NTS has purchased additional quota which has a total value of \$146 million.
16. From that combined asset base, the net operating surplus before tax, revaluations and other significant items of NTS in the 2015/2016 financial year was \$23 million. NTS has experienced a continued trend of growth in returns over the last 8 years, with consistently strong total returns on investment. NTS is a healthy, growing Ngāi Tahu business, as shown in successive annual reports of Te Rūnanga.
17. However, NTS is more than just a revenue generator for Te Rūnanga. The company provides ongoing opportunities and dependable livelihoods to Ngāi Tahu whānui. Two thirds of the estimated 80 businesses catching NTS fish for market, either directly or through lease operations, are Ngāi Tahu fishers. Businesses run by Ngāi Tahu whānui, numbering approximately 52 operate successfully with NTS leased quota.
18. In keeping with our guiding Ngāi Tahu whakataukī, the opportunities and livelihoods made possible by NTS are sustainable, and able to be passed to the next generation within whānau businesses. In that way, NTS is an important thread in the rich traditions of Ngāi Tahu fishing families.

#### **CRA 5 and Pau 3 Assets**

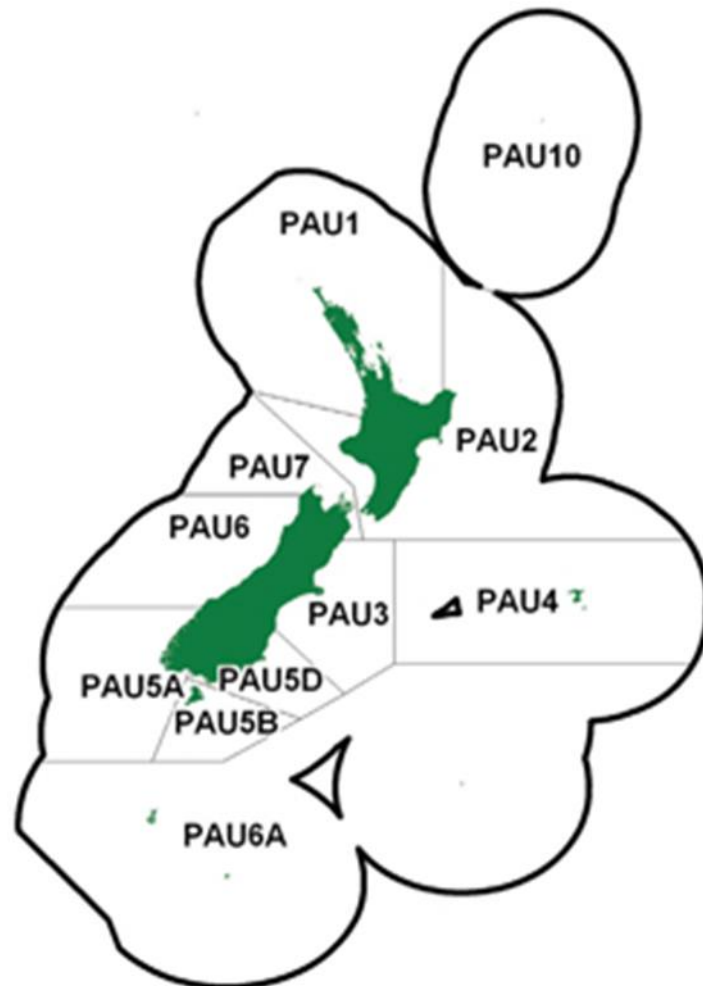
19. Within the combined suite of Treaty Settlement assets and purchased assets are a number of inshore quota holdings within the Banks Peninsula area.

20. The total value of Te Rūnanga quota assets of CRA5 and PAU3 is \$74.5 million, or 23% of total quota assets held by NTS or managed by NTS for Ngāi Tahu Fisheries Settlement Limited (**NTFSL**).
21. Banks Peninsula, is within CRA5 (Figure 1) and PAU3 management areas (Figure 2), the Total Allowable Commercial Catch (**TACC**) for each area is 350 tons and 92 tons. NTS CRA5 and PAU3 assets entitles NTS to catch 89 tons of rock lobster and 7 tons of pāua annually in the above areas.



**Figure 1:** The CRA 5 fishery extends from the western side of the Marlborough Sounds across to Cape Jackson and then southwards to Banks Peninsula. There are three distinct regions of commercial fishing — Picton/Port Underwood, Ward-Kaikoura-Motunau, and Banks Peninsula. Source NZ Rock Lobster Industry.

22. NTS during the 2016/17 season processed approximately 160 ton of rock lobster from CRA5 and generated \$20 million in revenue, this includes crayfish caught in the Bank Peninsula area.
23. New Zealand recently experienced a dramatic over-night loss of marine biodiversity as vast reefs were uplifted following a 7.8 magnitude earthquake (14/11/2016) along the Kaikōura coastline. Causing a month closure of CRA5 and 50% of PAU3 to remain closed until Nov 2017.
24. The long-term effects of the earthquakes on the sustainability CRA5 & PAU3 stocks and fisheries are still relatively unknown. More commercial effort could potentially be focused on The Banks Peninsula area to alleviate pressure during the recovery of Kaikōura fisheries.



**Figure 2:** Map showing the boundaries of the different quota management areas, including Pau3 which extends from North of the Waitaki River to the Clarence River.

### Potential effects

25. LPC's Marine Ecology Assessment (Appendix 15A of the LPC application) states that sediment '*plumes are not predicted to reach shoreline areas....*' However, our expert hydrodynamic modeling witness John Oldman has described in detail the numerous flaws in LPC modeling and the likelihood of sediment moving beyond LPC's modeling predictions.
26. NTS is concerned LPC's proposed dredging operation could add additional stress to pāua, rock lobster and associated habitats. The underlying mechanisms for these stresses is discussed in detail in evidence from Professor Islay Marsden and Associate Professor Chris Hepburn.
27. The LPC application states that the northern coast of Banks Peninsula does not currently represent a very productive pāua fishery (LPC Appendix 15A, Marine Ecology Assessment, page 127). Other Ngāi Tahu witnesses have outlined future efforts to restore Whakaraupō and mahinga kai. NTS shares this same vision for mahinga kai along the northern coast of Banks Peninsula. NTS is concerned that the effects from the proposed dredging will cause loss to cultural and economic opportunities for future generations.
28. The potential importance of the northern Banks Peninsula pāua stocks as a potential source of recruitment for other pāua stocks within Banks Peninsula has not been discussed in the LPC Marine Ecology Assessment. The implications on the surrounding stocks if northern Banks Peninsula pāua stocks decline has also not been discussed. Nor has there been a consideration of how, or if, pāua stocks can recover should they decline as a result of the proposed activity (i.e. capital dredging and also long term maintenance dredging).
29. NTS acknowledges there is a lack of information regarding how Banks Peninsula and Pegasus Bay rock lobster stocks are replenished. Both areas are known for sustaining a population of large rock lobster. Tagging information (CRA 5) and commercial fishing knowledge of rock lobster movement in the above area, has shown rock lobster movement from in-shore habitats to off-shore habitats. In particular, female lobsters go a long way off shore to release their eggs in the September – November period.

30. NTS is concerned about the effects of dumping 18 million cubic metres of benthic sediments over a 1,250 ha area, on the offshore movement of adult rock lobster. NTS is concerned rock lobster could be buried if they pass through/near the proposed disposal areas during the capital and maintenance dredging activities, resulting in the mortality of adult rock lobster and reducing the potential for females to release their eggs.
31. In addition, NTS is concerned that the plumes and increased turbidity will impact phyllosoma and puerulus (Larvae stages of Rock Lobster) survival in the water column and could potentially negatively influence puerulus settlement. Puerulus settlement and rock lobster catch per unit effort (**CPUE**) are important aspects of rock lobster management, particularly when assessing future sustainability of rock lobster stocks. If Puerulus survival, settlement and CPUE is negatively affected as an indirect or direct result of dredging, this this would invoke a management response of either shelving quota, reducing Total Allowable Catch (**TAC**) or closure of CRA5 area. Shelving and cutting quota and the closure of fisheries has a negative impact on NTS profit and in turn, the economic well-being of the tribe and monetary value lost to Ngāi Tahu whānui.
32. NTS consider that the above highlighted concerns have not been adequately addressed in LPC's Marine Ecology Assessment and proposed monitoring program. Consideration of negative impacts of dredging on commercial pāua and rock lobster were absent from LPC's economic assessment. If the Hearing Panel is of a mind to grant the resource consents, NTS considers that phyllosoma and puerulus sampling and rock lobster migration sampling will be essential components of a monitoring package for capital and maintenance consents.

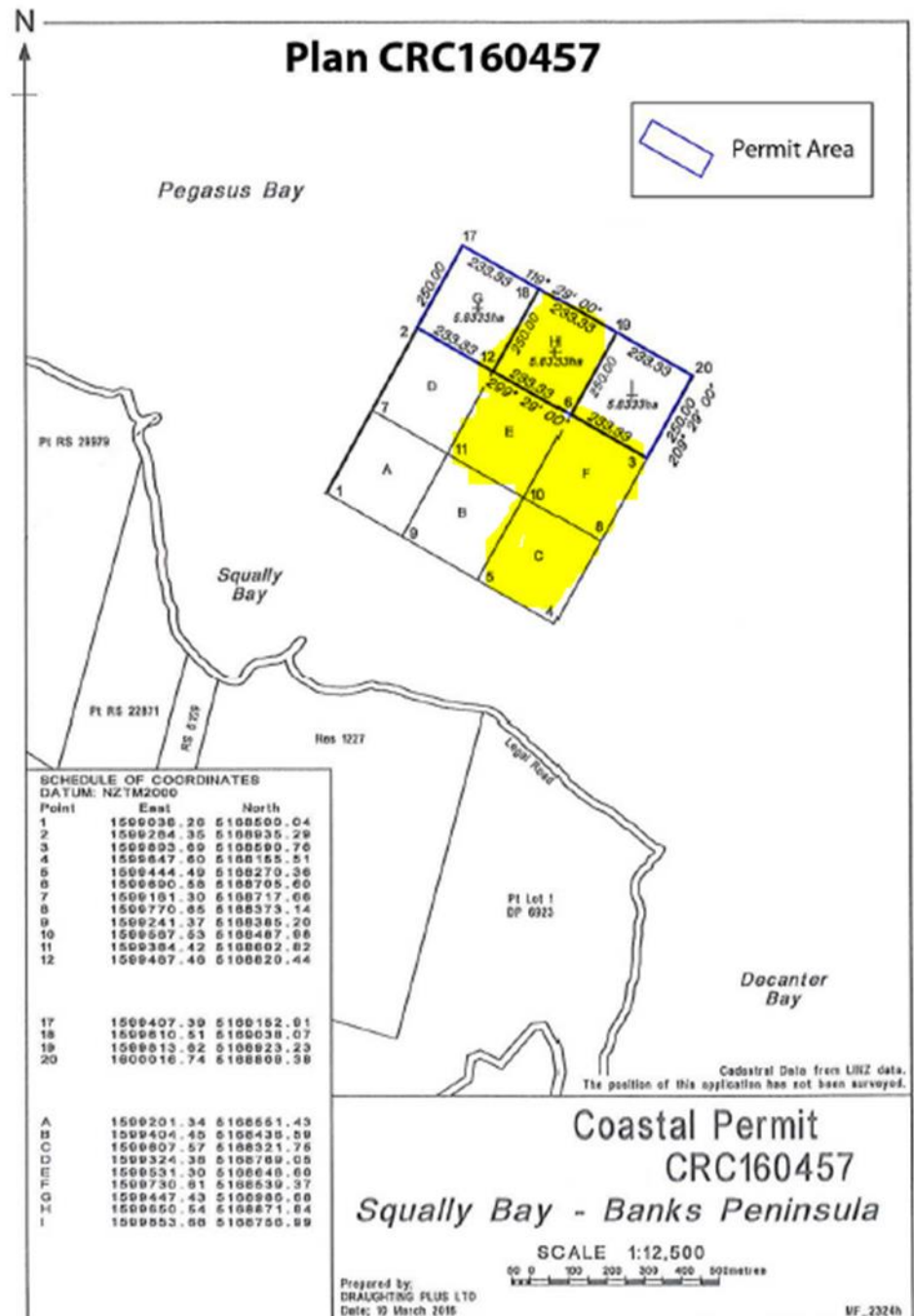
### **Mussel Aquaculture**

33. NTS has invested \$14 million in mussel aquaculture infrastructure and licences throughout the Marlborough sounds, Golden Bay and Banks Peninsula. NTS licences currently produces approximately 3000 tons of mussels and generates \$16 million in revenue annually.



34. NTS was recently granted consent to expand the squally bay mussel farm and NTS is in the process developing this farm (Figure 3), which will potentially increase NTS annual production by 30%.

PLAN CRC160457



**Figure 3:** Squally Bay Coastal Permit Map, the Yellow blocks indicate the areas consented by NTS. The un-highlighted blocks are consented to Koukourarata Development Company limited and Pegasus Bay Marine Farm Limited

35. NTS is concerned LPC's proposed dredging could negatively impact spat settlement, mussel growth and condition as outlined by other Ngāi Tahu expert witnesses.
36. If the Hearing Panel is of a mind to granted the resource consent applications, NTS is of the view that direct monitoring of Northern Banks Peninsula mussel farms is essential. This monitoring must be appropriate and sufficient to detect the effects of the activity, if the sediment moves differently to what has been predicted in LPC's modelling.
37. I have read the Written Statement to the Panel dated 20 May 2017 (which I think is supposed to be 20 April 2017) on behalf of Sanford Ltd and the Banks Peninsula Marine Farmers group. NTS is not a member of that unincorporated group. I have also considered the conditions agreed between those parties and LPC, particularly the proposal in condition 8 'Monitoring'. There is no mention of a monitoring program measuring mussel growth rate and mussel condition index (**CI**). I have also considered the conditions agreed between those parties and LPC, particularly the proposal in condition 11.5 (of the capital dredging consent) to have a 'marine farming technical representative' on the Technical Advisory Group, and the proposal in condition 12 to establish an Aquaculture Liaison Group (**ALG**). I note that proposed condition 12.2.2 states that the purpose of the ALG is no more than 'to discuss' the monitoring required by the consent. Despite these two submitters reaching agreement on proposed conditions, NTS remains of the view that the conditions agreed are inadequate to protect NTS' interests in relation to its mussel farm operation.
38. In particular, not including mussel growth rate and mussel CI under condition 8, does not convince me that the proposed ALG can "ensure that any effects on authorised marine farming activities are avoided or remedied", as described in the Written Statement dated 20 May 2017<sup>1</sup>.
39. Rather NTS is supportive of the mussel monitoring program TAG were developing (Appendix 1: mussel monitoring program developed by Shaun Ogilvie and myself and submitted to the TAG meeting of 7 March 2016 which sets out some more details of the monitoring NTS considers necessary). Unfortunately, this monitoring program was unable to be

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<sup>1</sup> Paragraph 12.2.3

finalised before the final TAG meeting and subsequently distributed to mussel farmers for approval. In particular the location of mussel farm reference points, the sizes of mussels to use for measurements of growth or the sample size required to draw valid statistical inferences were not finalised.

40. NTS requests that the Panel allow Ngāi Tahu and LPC experts to finalise the TAG monitoring program prior to the conclusion of this hearing. Once finalised, the monitoring program would then need to be distributed to the mussel farm owners for their consent to have their farms included in the mussel monitoring program.
41. Any negative impact on NTS mussel farming would negatively impact NTS profit and in turn, the economic well-being of the tribe and monetary value lost to Ngāi Tahu whānui.

## **CONCLUSION**

42. NTS have a number of inshore quota holdings within the Banks Peninsula area. NTS is also in the process of expanding the Squally Bay mussel farm. NTS is concerned that the proposed dredging activities by LPC could adversely affect both fisheries.
43. NTS considers that if the proposed resource consents are granted, that appropriate monitoring of Pāua and Rock Lobster fisheries and aquaculture is essential.
44. NTS considers that if consent is to be granted, a bond is required to cover remedial, restoration, or maintenance work from dredging activities and providing for on-going monitoring of long-term effects.



**Thomas Hildebrand**

## Appendix 1 - Mussel Monitoring program

*This programme was developed by Shaun Ogilvie and Thomas Hildebrand and submitted to the TAG meeting of 7 March 2016.*

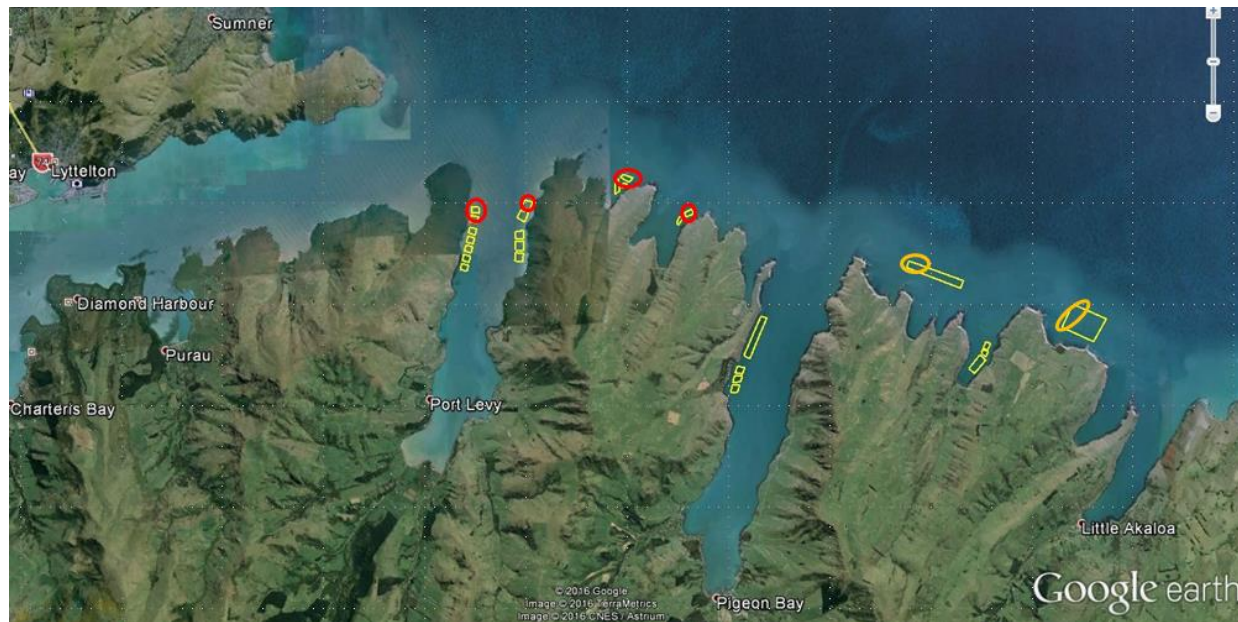
### Question to be addressed:

Is there a significant difference in mussel growth rate and mussel condition index (CI), at each mussel farms in closer proximity to the dredging channel and disposal sites, than at 'control' farm(s) that are further away?

### Design

Table 1 below gives a summary of the estimated effort needed for varying numbers of mussel farms monitored. The actual number of farms monitored would best be negotiated between LPC and the Mussel Farm owners, dependent on resource (people and funding) availability.

For the most extensive proposed design, six Mussel farms have been selected (Figure 1). Four farms, closest distance to the channel and disposal site circled in red as treatment sites, two farms, furthest distance to the channel and disposal site circled in orange as the control sites.



At each of the six farms, the block of mussel lines that are in nearest proximity to the capital dredging channel and disposal site will be used for monitoring mussel growth & condition. Within each block four mussel lines will be randomly chosen. On each line one mussel dropper will be selected and permanently marked at the surface.

On each dropper 50 mussels will be individually labeled, to allow individual identification each sampling trip, at each of three different depth bands (2.5 -3.5m, 5.5m – 6.5m and 8.5m – 9.5m) (150 tagged mussels in total). Labelling is best done using plastic tags, each with a unique identification number. Each tag is attached to the mussel shell using a fast-setting 2-part epoxy glue, such as 'ADOS Rapid Resin', which will remain in place for the life of the mussel.

The shell length of each mussel will then be measured monthly, for a total of 12 months.

In addition, each month, one dropper will be selected and 20 mussels from each depth band (2.5m -3.5m, 5.5m – 6.5m and 8.5m – 9.5m) will be collected and the condition index will be measured using methodology described by Ogilvie (2000).

*Table 1: Estimated effort to monitor mussel farms.*

<b>Four droppers, three depths =150 mussels only per dropper (=600 per farm)</b>			
<b>Number of Control Farms</b>			2
<b>Number of Treatment Farms</b>			4
<b>1-Off Set-up Process- assume 2 people on the boat, calm conditions</b>	<b>Per farm</b>	<b>Total</b>	
Travel to mussel farms and back	0.5	3	Hours
Locate suitable lines, and randomly select 4 droppers from them	0.5	3	Hours
Lift lines, attach labels to 600 mussels, measure and record length of each	10	60	Hours
	Total	66	Hours
<b>Monthly measurement of mussel length - assume 2 people, calm conditions</b>			
Travel to mussel farms and back	0.5	3	Hours
Locate lines, lift and measure 600 mussels, and record length of each	5	30	Hours
Take 50 mussels for measuring condition index	0.5	3	Hours
Steam mussels and weigh for condition index	0.25	1.5	Hours
	Total	34.5	Hours
<b>Number of Control Farms</b>			1
<b>Number of Treatment Farms</b>			3
<b>1-Off Set-up Process- assume 2 people on the boat, calm conditions</b>	<b>Per farm</b>	<b>Total</b>	
Travel to mussel farms and back	0.5	2	Hours
Locate suitable lines, and randomly select 4 droppers from them	0.5	2	Hours
Lift lines, attach labels to 600 mussels, measure and record length of each	10	40	Hours
	Total	44	Hours
<b>Monthly measurement of mussel length - assume 2 people, calm conditions</b>			
Travel to mussel farms and back	0.5	2	Hours
Locate lines, lift and measure 600 mussels, and record length of each	5	20	Hours
Take 50 mussels for measuring condition index	0.5	2	Hours
Steam mussels and weigh for condition index	0.25	1	Hours
	Total	23	Hours
<b>Minimised Version (Four droppers, one depth only, =50 mussels only per dropper)</b>			
<b>Number of Control Farms</b>			1
<b>Number of Treatment Farms</b>			3
<b>1-Off Set-up Process- assume 2 people on the boat, calm conditions</b>	<b>Per farm</b>	<b>Total</b>	
Travel to mussel farms and back	0.5	2	Hours
Locate suitable lines, and randomly select 4 droppers from them	0.5	2	Hours
Lift lines, attach labels to 200 mussels, measure and record length of each	3.33	13.32	Hours
	Total	17.32	Hours
<b>Monthly measurement of mussel length - assume 2 people, calm conditions</b>			
Travel to mussel farms and back	0.5	2	Hours
Locate lines, lift and measure 200 mussels, and record length of each	1.67	6.68	Hours
Take 50 mussels for measuring condition index	0.5	2	Hours
Steam mussels and weigh for condition index	0.25	1	Hours
	Total	9.68	Hours

To be added:

-Detailed description of the tag label attachment method:

- Label type, and how to make them

- Cement type, needs to be permanent and reliable

- Measurement method, get some waterproof digital logging calipers from Zebra-Tech Ltd.

-Chosen mussel sizes, need to do our best to avoid the real small mussels that will have a crazy growth rate, but also ideally choose lines where the mussels are going to be present for the full 12 months of monitoring

-Work with the Mussel Farmers to work out best process, e.g. timing sampling in with existing trips they have planned to the farms

-Sort out logistics, e.g. how long is the set-up going to take, and how much time will be needed for each monthly sampling trip? How many mussels are going to be sampled each trip

-Can we out-source the condition index work? Sending the mussels in a chilly-bin each month, to them. 240 mussels per month, needing individual CI measurement.

-Set up a statistical analysis method, and get it checked by a biometrician. This could result in a change in the method, e.g. the chosen method orthogonal?