Appendix S Assessment of effects on commercial fishing

Ngāi Tahu Seafood Resources Limited

Hananui Aquaculture Project

Commercial Fishing

Evidence of Nicola Gibbs regarding *Characterisation and assessment of potential impacts on commercial fishing*

Nicola Gibbs
11-19-2025

Introduction

My name is Nicola (Nici) Gibbs.

My role in relation to the Hananui Aquaculture Project ("**HAP**") has been to provide expert evidence in relation to commercial fishing impacts. I wrote the *Characterisation and assessment of potential impacts on commercial fishing* which is provided within **Appendix S** of the application.

This evidence has been prepared to accompany the application by Ngāi Tahu Seafood Resources Limited ("**NTS**") for approvals required for the HAP under the Fast-track Approvals Act 2024 ("**FTAA**"). It has been prepared on the understanding that the process for determining applications under the FTAA does not require a hearing to be held, and accordingly the purpose of this evidence is to confirm that, relative to my area of expertise, the *Characterisation and assessment of potential impacts on commercial fishing* provides an appropriate description of the relevant environment, the proposed activities comprising the effects of the HAP on that environment, and the way those effects are proposed to be managed.

My findings are set out in full in the *Characterisation and assessment of potential impacts on commercial fishing* included within **Appendix S** of the application.

While this application is not being considered by the Environment Court, I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court of New Zealand Practice Note 2023 and that I have complied with it when preparing this evidence. Other than when I state I am relying on the advice of another person, this evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

Qualifications and Experience

I am currently the Director of Fathom Consulting Limited. Founded in late 2011, Fathom Consulting specialises in strategic policy advice and natural resource management with a particular focus on the marine environment.

I graduated from the University of Canterbury with a Masters in Resource Management (1985-1986) and from Victoria University of Wellington with a Bachelor of Science (1982-1984).

I have 39 years of relevant professional experience spanning central government, regional government, and the private sector.

Prior to starting my own consultancy company, I worked for the New Zealand seafood industry for 12 years as General Manager of Policy for the Seafood Industry Council (SeaFIC). Of particular relevance to the HAP, during my time at SeaFIC I led the seafood industry's participation in all Resource Management Act reforms from 1999 to 2011, including the development of new aquaculture legislation. In this role I worked closely with fishing and aquaculture companies and was mindful of the need to ensure that the fishing and aquaculture sectors were each able to

operate and develop in a compatible way. Independently of my role at SeaFIC, in 2009 I was a Ministerial appointee to the Aquaculture Technical Advisory Group which was influential in shaping new aquaculture legislation.

Over the last 14 years, through Fathom Consulting I have provided policy and advisory services to seafood industry representative organisations, government agencies, iwi organisations, regional development agencies, companies operating in the natural resources sectors (fishing, mining, oil and gas), non-profit organisations, Members of Parliament, research providers, and international clients.

Of particular relevance, I have assessed the impacts on commercial fishing of a number of development proposals in the territorial sea and Exclusive Economic Zone. For example, I provided expert evidence for Trans Tasman Resources Ltd in relation to a sand mining application off the Taranaki coast (2013), and for three different oil and gas sector clients in relation to existing and new developments in 2015, 2017 and 2018.

In providing this evidence in relation to commercial fishing interests, I have considered the following matters as relevant to that topic:

- The project description provided by NTS as set out in section 6 of the application;
- The description of the existing environment, the effects of the HAP on that environment and their significance, and the proposed management and mitigation measures to manage those effects all as set out in the assessment of environmental effects accompanying the application;
- The technical assessments of seabed effects (Bennett H, Smeaton M, McGrath E, Newcombe E. 2019), disease risks (Digsfish Services. 2019), potential interactions with sharks (Francis M. 2019), potential effects on wild oysters in Foveaux Strait (Michael, K. 2020), navigational risks (Navigatus. 2025), and effects on wild fish fauna (Taylor, P and Dempster, T. 2021); and
- Fisheries data provided by the Ministry for Primary Industries (MPI) under the Official Information Act, research and reports on impacts on wild oysters completed by Dr Keith Michael, and relevant MPI Fisheries Assessment Reports, Plenary Reports and Aquatic Environment and Biodiversity Reports.

Confirmation of Contents of Report and Proposed Conditions

I confirm that in my opinion the *Characterisation and assessment of potential impacts on commercial fishing* contains an accurate and appropriate description of the environment, the actual and potential effects of the HAP, and the recommended actions to manage those effects within my area of expertise.

I confirm that in my opinion the contents of the *Characterisation and assessment of potential impacts on commercial fishing* may be relied on in making a decision on the approvals sought for

the HAP and confirm that provided effects within my area of expertise are managed as proposed in the application those effects will not be unacceptable and will be managed to a standard that I consider meets good practice.

Nicola Gibbs

19 November 2025

Hananui aquaculture project:
Characterisation and assessment of potential impacts on commercial fishing

Prepared by Nici Gibbs, Fathom Consulting Ltd
for Ngāi Tahu Seafood Resources Ltd
30 September 2025

Contents

Summary

Existing commercial fishing activity within the proposed Hananui Aquaculture Project site includes dredging for Foveaux Strait (Bluff) oysters, blue cod potting, set netting for mixed finfish species, and rock lobster potting. Bottom trawling may have occurred occasionally at the site historically but no bottom trawling has been reported in the last six years. The site is also adjacent to coastal dive fisheries for pāua and kina.

The changes that have been made to the Hananui proposal since it was originally considered in 2022 have reduced the spatial overlap between the proposed site and commercial fishing activity. Marine farm structures and the proposed 200m buffer zones around the farms will nevertheless displace a small amount of commercial fishing activity. For reasons of commercial confidentiality, location-specific fishing data is not available for all species. However, the best available information indicates that the level of spatial displacement of commercial fishing at the proposed site will be minor for all species and fishing methods. Spatial displacement of commercial fishing effort will not have any impacts at a fishery-wide level, although it may have some adverse effects on individual fishers who regularly fish at the site. Effects on individual fishers are anticipated to be no more than minor.

Commercial fishing may also be adversely affected if the environmental effects of marine farm operations cause changes in the distribution, behaviour, physiology or abundance of commercially harvested species. The proposed salmon farm may attract some commercially harvested species and, in particular, may cause localised changes to the distribution of blue cod. Wild-harvested species that are attracted to and become resident at the proposed site may experience behavioural or physiological changes as a result of consuming waste marine farm food. Little information is available about these potential impacts from New Zealand fish farms. However, based on the available information, any such impact is likely to be localised and no adverse effects on the distribution or abundance of commercially harvested species at a population level have been identified. Monitoring of blue cod populations in the vicinity of the proposed site would help improve information on any behavioural or physiological changes in blue cod.

The proposed site, and the location of the farms within the site, is intended to avoid biogenic habitats which may be of particular significance for fisheries management (e.g., as habitats for juvenile finfish or settlement and recruitment of oysters).

Commercial fishers may express concerns about seafood safety and quality issues, diver safety, debris on the seafloor, vessel interactions, and increased local recreational fishing pressure.

Any residual adverse effects on commercial fishing can be avoided, remedied or mitigated through the development of appropriate consent conditions and operational practices, including a monitoring programme for wild fish at the proposed site.

1. Introduction

1.1 Purpose

Ngāi Tahu Seafood Resources (NTS) is seeking approval under the Fast-track Approvals Act 2024 to develop and operate a salmon farm off the northern coast of Rakiura / Stewart Island (the Hananui Aquaculture Project).

The location and site of the project are shown in **Figures 1 and 2**.[1]

An earlier iteration of the Hananui Aquaculture Project was referred to the Environmental Protection Authority (EPA) in November 2022 for consideration under the COVID-19 Recovery (Fast-track Consenting) Act 2020. In August 2023 an expert panel convened by the EPA declined the application. Since that time, NTS has amended and updated the proposal, including changes that address issues raised during the 2022 application.

This report:

- Updates the technical report prepared by Fathom Consulting Ltd in 2021, which described the commercial fisheries in and around the proposed site of the Hananui Aquaculture Project and assessed the potential impacts of the Project on commercial fishing; [2] and
- Incorporates and updates material from the technical report prepared by Dr Keith Michael (NIWA) in 2020 on the potential effects of salmon aquaculture on wild oysters (*Ostrea chilensis*) in Te Ara a Kiwa / Foveaux Strait.[3]

1.2 Structure of report

The report is in two parts:

- The first part contains a description of the commercial fisheries in and around the proposed Hananui site, including the species caught, the fishing methods used, and fishing vessels; and
- The second part assesses the potential impacts of the Hananui Aquaculture Project on commercial fishing, including:
    - Direct effects from spatial displacement of fishing activity;
    - Impacts arising from changes in fish distribution, behaviour or abundance; and
    - Other impacts.

The conclusion includes recommended conditions and operational practices to address any residual impacts on commercial fishing.

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[1] Location map: NABIS (MPI). Proposed site: image provided by NTS.
[2] Fathom Consulting (2021).
[3] Michael, K. (2020).

Figure 1: Proposed location of the Hananui Aquaculture Project (green block)

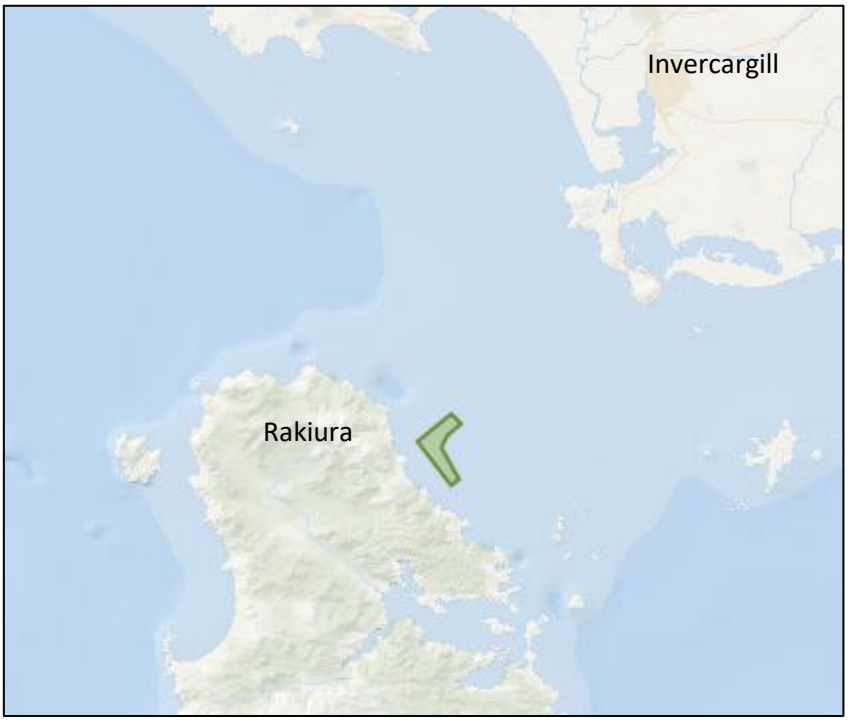
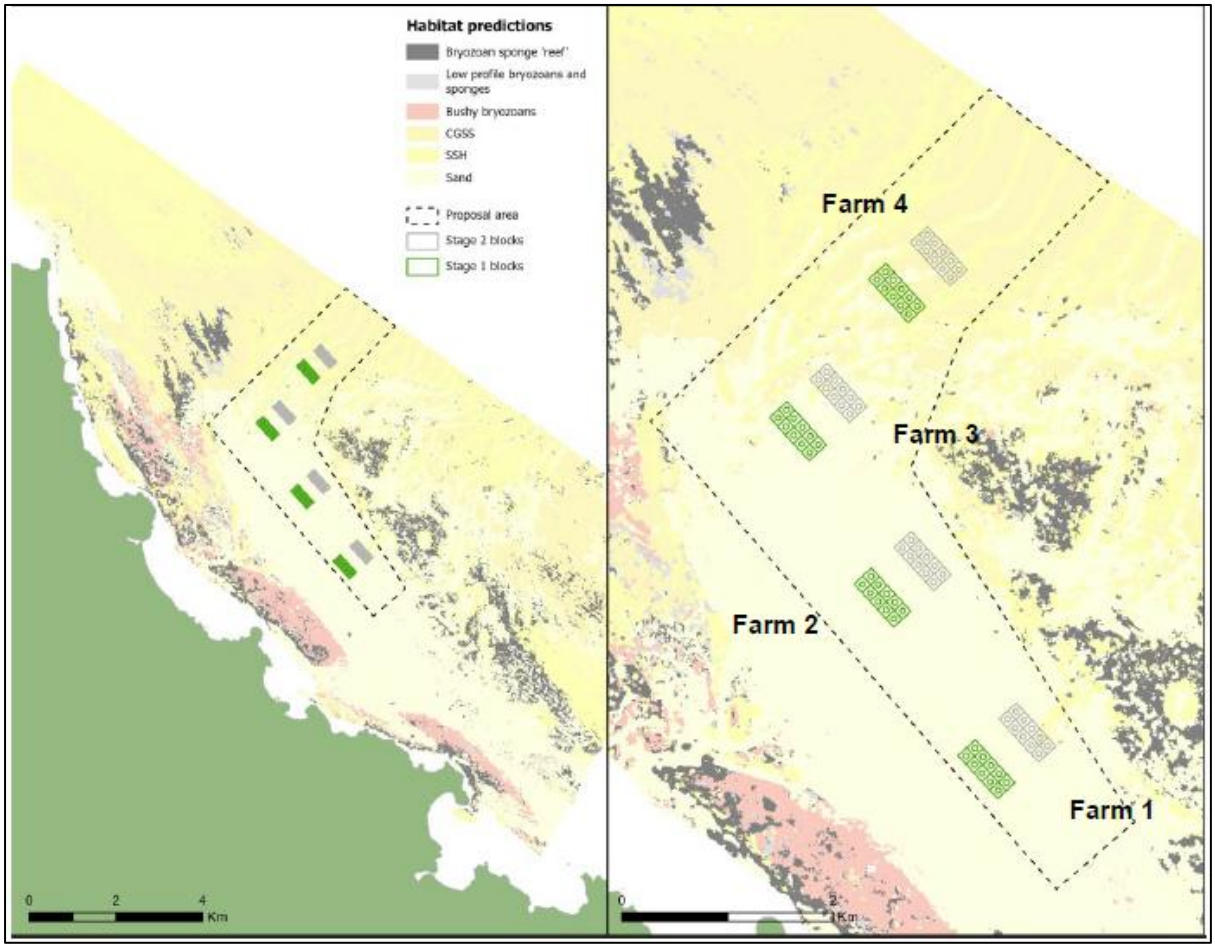


Figure 2: Proposed site of the Hananui Aquaculture Project



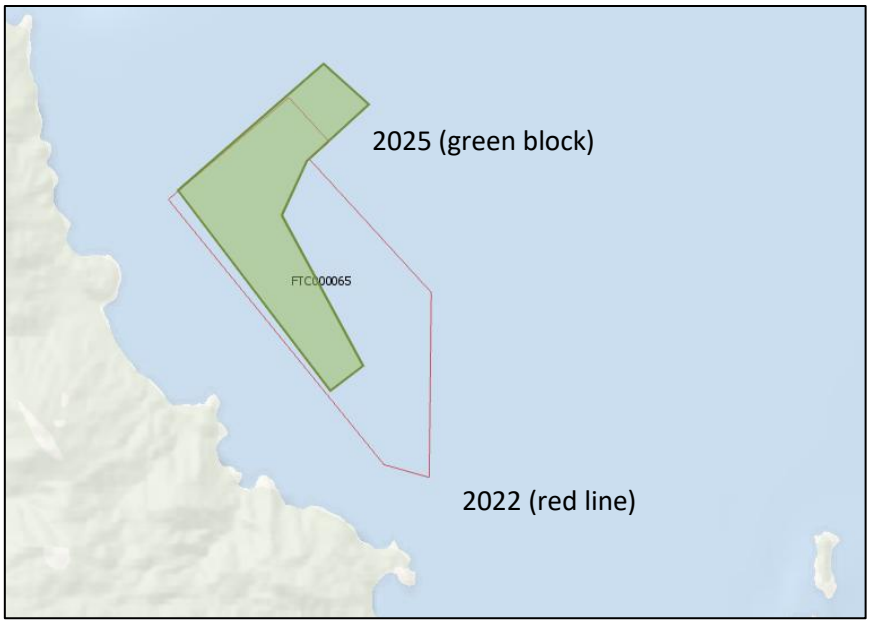
1.3 A note on fisheries data

Some of the fisheries catch and effort data used in this report were provided by the Ministry for Primary Industries (**MPI**) under the Official Information Act 1982 (**OIA**). MPI provided data

- In November 2020, covering the ten fishing years[4] from 2010-11 to 2019-20;[5] and
- In April 2025, covering the seven-year period 2018-19 to 2024-25 (partial year only).[6]

The two data extracts apply to slightly different areas as the Hananui Project's 2022 application was for an area approximately twice the size of the current (2025) application (**Figure 3**).[7]

Figure 3: Comparison of proposed sites, 2022 and 2025



From 1 October 2019, all commercial fishing vessels were required to report their catch electronically, including the location coordinates of the fishing event. Prior to 2019, fishing was reported at different spatial scales depending on the fishing method. While trawling and some set netting were reported by location (at least for the start of the fishing event), other fishing methods, including oyster dredging, pāua diving and rock lobster or cod potting, were reported only at the scale of fisheries statistical areas. The relatively large scale of the statistical areas (particularly for finfish and rock lobster) means it is not always possible to determine whether a reported historical fishing event occurred at or near the proposed site or elsewhere in the relevant statistical area. The fisheries information provided by MPI in 2020 therefore did not allow for a fine-scale assessment of the commercial fishing at the proposed site.

[4] For the purposes of the OIA response, a fishing year begins on 1 October and ends on 30 September.
[5] MPI OIA response, 6 November 2020.
[6] MPI OIA response, 10 April 2025.
[7] Figure 3 map: NABIS.

The updated information provided by MPI in 2025 covers a period that largely coincides with the introduction fine-scale electronic catch and position reporting. However, as most fish stocks at the proposed site are fished by fewer than three permit holders, MPI was not able to provide stock-specific catch data for all commercial fishing at the site. Much of the requested catch data was amalgamated into a generic "other fishstocks" grouping in order to protect commercially sensitive details of the permit holders. Oyster catch at the proposed site was withheld in full on the grounds that fewer than three permit holders operate in this part of the fishery.[8]

MPI's data confidentiality rules mean that, for species other than blue cod, it is not possible to obtain comprehensive information on the commercial fishing that has occurred within the proposed site from reported catch records. Nevertheless, a comprehensive picture can be obtained by examining the fine-scale fisheries data released under the OIA in 2020 and 2025,[9] together with other sources of information

2. Commercial fishing at the proposed Hananui site

2.1 Overview

The proposed site is in the Southland Fisheries Management Area (FMA) known as FMA 5. The coastal boundaries of FMA 5 encompass all waters lying south and west from Awarua Point, South Westland to Slope Point, on the Catlins south-east coast of the South Island and including Te Ara a Kiwa / Foveaux Strait, Stewart Island and all adjacent islands and waters out to the edge of the 200 mile Exclusive Economic Zone (land boundary points shown in **Figure 4**).

Species and fishing methods

In the seven-year period starting from the 2018-19 fishing year, commercial catch was reported within the proposed site for the following fisheries:

- Dredging for Foveaux Strait (Bluff) oysters;
- Potting for blue cod;
- Set netting for mixed finfish species; and
- Potting for rock lobster.

In addition, commercial fishing for the following species is undertaken in the vicinity of the site:

- Bottom trawling for mixed finfish species;
- Diving for pāua; and
- Diving for kina.

The main species and fishing methods are summarised in **Figure 4**[10] and **Figure 5**.

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[8] MPI OIA response, 10 April 2025.
[9] Fisheries catch data from 2020 and 2025 are not directly comparable because the reporting regime changed in 2019 and MPI used different methods to assign catch to particular geographical locations.
[10] Source: MPI website: here

Figure 4: Overview of Commercial Fishing in Southland (FMA 5)

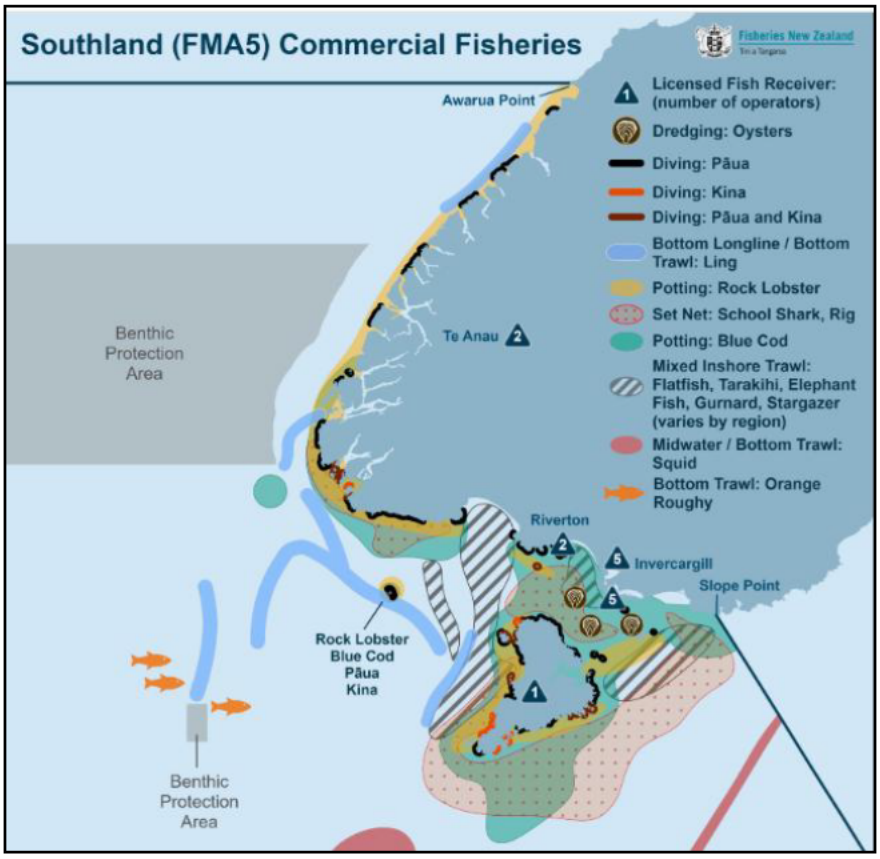

Figure 5: Main species caught at and in the vicinity of the proposed site

Common name	Māori name	Scientific name	Fish stock	Fishing method
Dredge oyster / Bluff oyster	Tio	*Ostrea chilensis*	OYU 5	Dredging
Blue cod	Rāwaru	*Parapercis colias*	BCO 5	Potting
Greenbone/ butterfish	Mararī / kōkariki	*Odax pullus*	BUT 5	Set netting
School shark	Tupere	*Galeorhinus galeus*	SCH 5	Set netting
Rig	Makō	*Mustelus lenticulatus*	SPO 3	Set netting
Spiny dogfish	Koinga	*Squalus acanthias*	SPD 5	Set netting, bottom trawling
Stargazer	Puwhara	*Kathetostoma giganteum*	STA 5	Bottom trawling
Flatfish	Patiki	Various (multi-species stock)	FLA 3	Bottom trawling
Gurnard	Kumukumu	*Chelidonichthys kumu*	GUR 3	Bottom trawling
Barracouta	Makā	*Thyrsites atun*	BAR 5	Bottom trawling
Spiny (red) rock lobster	Koura	*Jasus edwardsii*	CRA 8	Potting
Pāua/abalone	Pāua	*Haliotis iris, H australis*	PAU 5B	Free diving
Kina/sea urchin	Kina	*Evechinus chloroticus*	SUR 5	Free diving

Commercial fishing vessels

The proposed Hananui site is visited on a regular basis by commercial fishing vessels, both for fishing and transiting the area.

Over the past seven years, 27 individual commercial fishing vessels have reported catch in the proposed site. The maximum number of fishing vessels using the site in a single year was 13 vessels (in the years 2019-20 and 2020-21).[11]

In the wider area around the proposed site, a large number of fishing vessels are active in a typical year. For example, in 2018-19 over 100 vessels fished in the Te Ara a Kiwa / Foveaux Strait area, comprising:[12]

- Approximately 20 trawlers and 4 set netters operating in the Southland area;[13]
- 20 rock lobster vessels;
- 11 oyster vessels;
- 4 pāua vessels; and
- 58 other vessels targeting finfish (e.g., cod potting or smaller set net vessels) or kina.

Data from global positioning reports from commercial fishing vessels indicate that fishing vessels transit the area of the marine farm and surrounding areas of Te Ara a Kiwa / Foveaux Strait regularly in the course of their work (**Figure 6**).[14]

Effect of changes to the Hananui proposal, 2022 to 2025

The changes NTS made to the size and location of the proposed Hananui site between the time of the 2022 application and the current (2025) application exclude an area of relatively high fishing effort from the site (**Figure 7**).[15] The proposed site has a significantly smaller potential spatial overlap with existing commercial fishing activity than the 2022 application (which itself had a low level of overlap with commercial fishing activity).

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[11] MPI OIA response, 10 April 2025.
[12] MPI OIA response, 6 November 2020.
[13] The number of trawlers and set netters is an estimate derived from vessel trends for the "mid south" region from the Fisheries of New Zealand website https://fonz.kahawai.org.nz/ . The number of trawlers operating in this area has declined since 2018-19 and is now estimated to be around 6 vessels (see **Figure 20**).
[14] Figure 6 map was provided by Fisheries New Zealand to the EPA expert panel in 2023. The map was prepared as a contribution to the panel's consideration of the potential impacts of the Hananui Aquaculture Project on natural landscape, natural character and amenity issues. Note this map illustrates the 2022 application area only.
[15] Figure 7 map was provided by Fisheries New Zealand to the EPA expert panel in 2023. The original map has been modified with the addition of the 2025 proposed site.

Figure 6: Fishing vessel tracks near the proposed Hananui site, showing the proposed 2022 site (red line) and 2025 site (pink block)

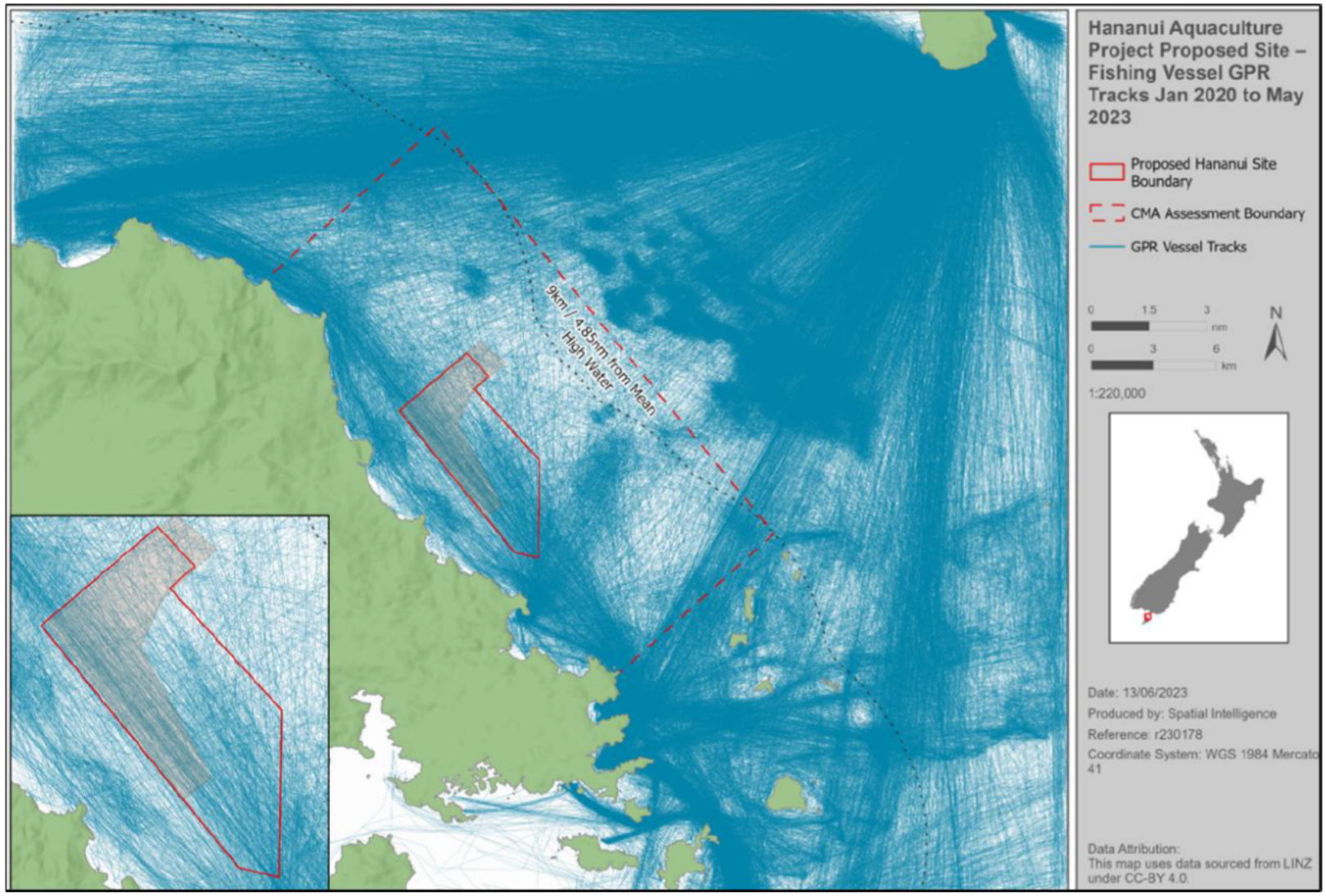
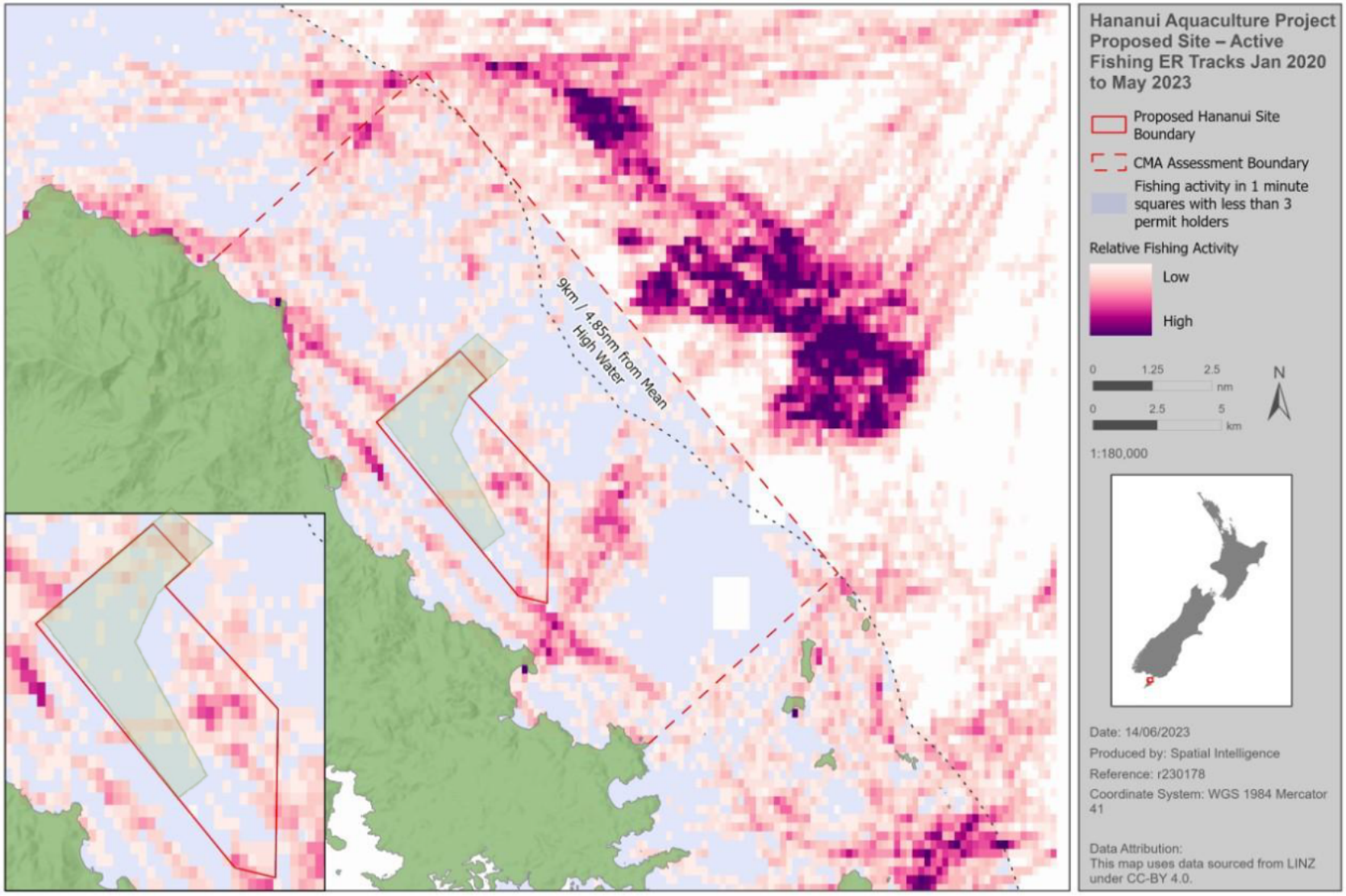


Figure 7: Commercial fishing activity at the proposed Hananui site, comparing the proposed 2022 site (red line) and 2025 site (green block)

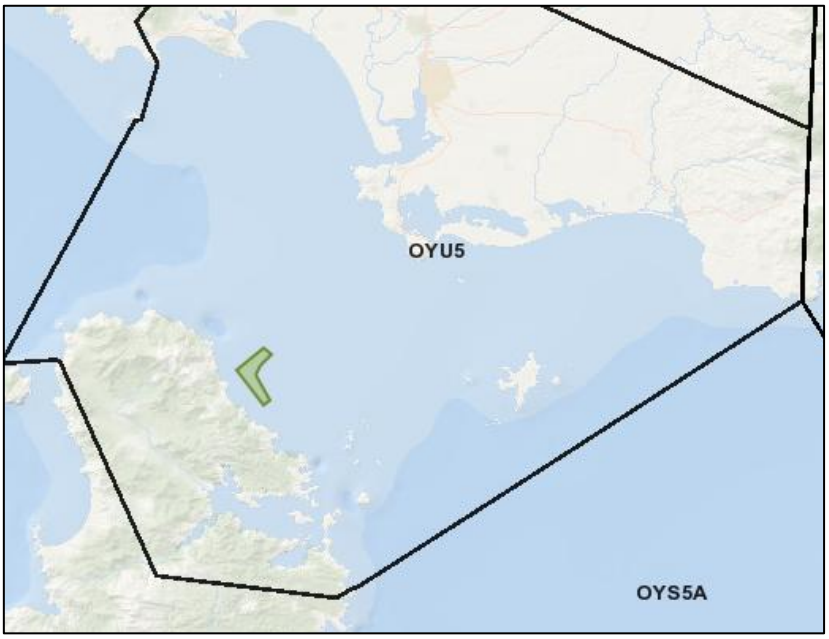


2.2 Foveaux Strait (Bluff) oyster fishery

Dredge oysters are endemic to New Zealand and are highly valued by customary, commercial and recreational fishers. The commercial oyster fishery is seasonal and strictly controlled, with harvesting occurring principally in Te Ara a Kiwa / Foveaux Strait.

The proposed Hananui site is located within the boundaries of the Foveaux Strait (Bluff) oyster fishery which is referred to as Quota Management Area (QMA) OYU 5 (**Figure 8**).[16] The Bluff oyster fishery has been fished commercially for over 150 years and is of high regional and national socioeconomic importance. Around 10 commercial fishing vessels operate regularly in the fishery. It is one of the last remaining truly "wild" oyster fisheries in the world as the stock and oyster habitat are not enhanced in any way.

Figure 8: Foveaux Strait oyster fishery OYU 5, with the Hananui site (green)



The OYU 5 Total Allowable Commercial Catch (TACC) is prescribed in numbers of oysters and is set at 14.95 million oysters (equivalent to 1,475 tonnes). The fishery is traditionally harvested over a six month season from 1 March to 31 August.

Oyster abundance is driven primarily by recurrent oyster mortality from the parasite *Bonamia exitiosa* and variation in recruitment. During epizootics, *B. exitiosa* drastically reduces the size and number of commercial fishery areas, reduces oyster density within the areas, and changes the distribution of oysters and, therefore, the pattern of fishing.[17] Fishing patterns in the oyster fishery have become more localised since 2010, when fishers started to focus on areas that are close to port, with high oyster meat quality. Increasingly, fishers may choose not to fish areas further afield or areas of high oyster densities with low meat quality.[18] Measures implemented by the fishing

[16] Figure 8 map: NABIS.
[17] Michael, K. (2020).
[18] Michael, K. (2020).

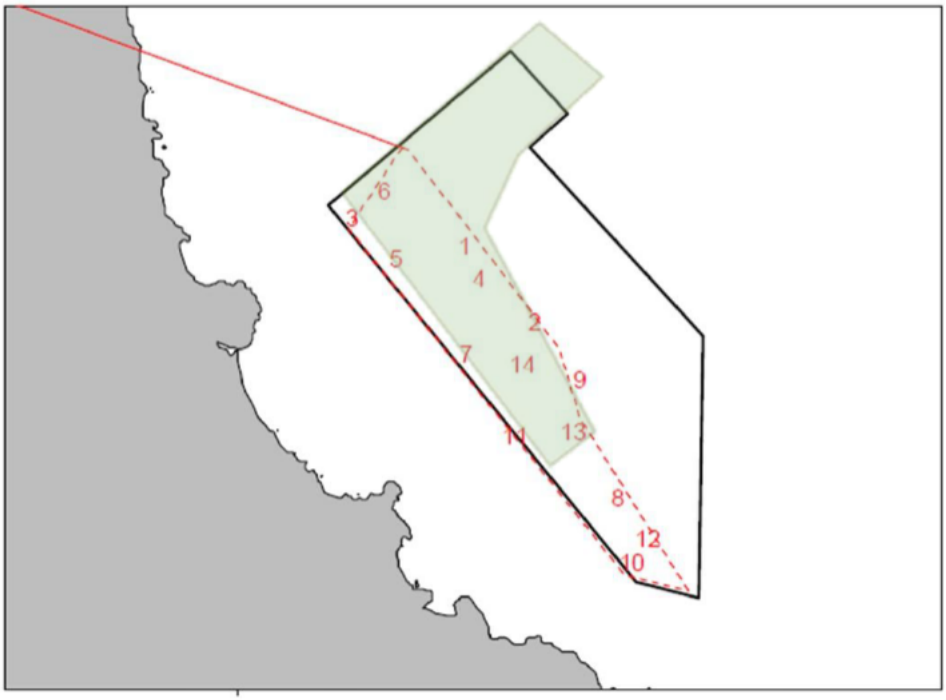
industry such as changes to harvest levels, spatial fishing strategies and closures help to minimise the effects of disease mortality and the spread of infection. MPI considers that the fishery is unlikely to be at or above its management target, but fishing is expected to have no detectable effect on the oyster population in comparison with the impacts of *Bonamia* mortality.[19]

The proposed Hananui site overlaps with the area that has historically been fished by the commercial oyster fleet.

Oyster density at the proposed site

Michael (2020) estimated oyster density within the proposed site by dredge sampling 14 randomly generated survey stations in June 2019. Approximately 8 of the survey stations are within the area of the 2025 proposed site (**Figure 9**).[20]

Figure 9: The proposed Hananui site in 2022 (black lines) and 2025 (green block) and the locations of the fourteen survey stations (red text)



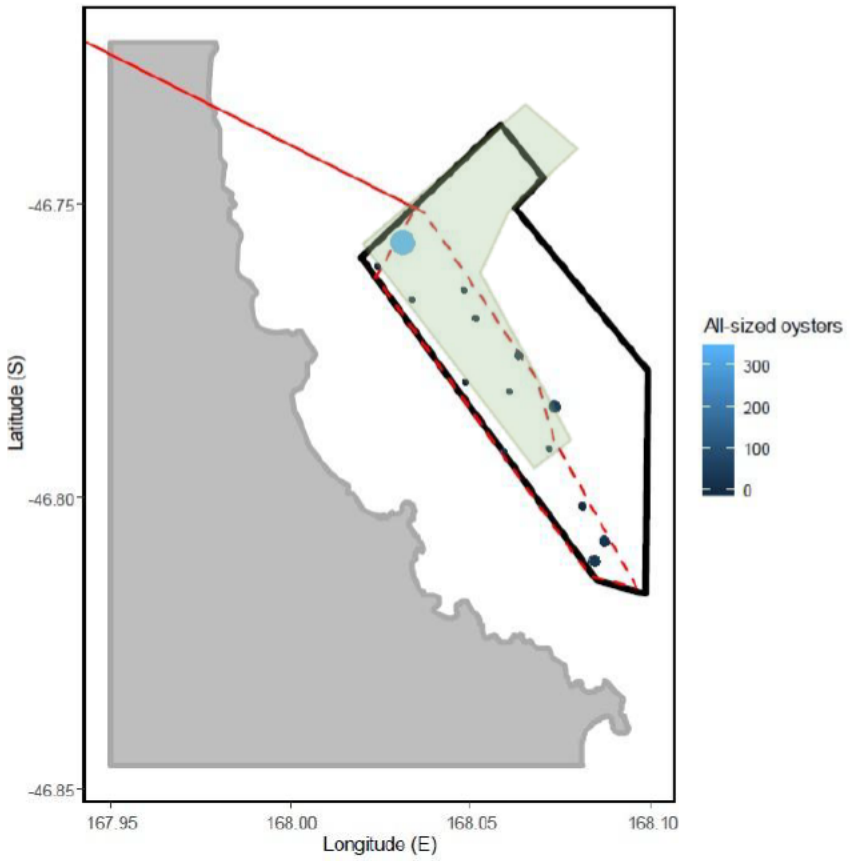
Oysters were found to be sparse in the surveyed area – 43% of all tows resulted in empty dredges and oysters were absent from 57.1% of the tows (stations 1, 3, 4, 5, 11, 13 and 14). The distribution of oysters was patchy and confined to the peripheries of the survey area where the substrate was likely to be less mobile.

Oyster densities were low, except for at station 6 on the western boundary of the site, which had recruit-sized oyster density of 0.05 oysters m^{-2} and all-sized oyster density of 1.56 oysters m^{-2} (**Figure**

[19] Fisheries New Zealand (2024).
[20] Figure 9: Modified from Michael, K. (2020).

10).[21] The mean density of oysters in the survey area (0.15 oysters m^{-2}) was 35.7% lower than the density of oysters in the whole of the Foveaux Strait oyster fishery area (0.23 oysters m^{-2}).

Figure 10: The distribution of all oysters (numbers per tow) within the surveyed area



The survey area comprised mainly mobile sediments which are known to support lower oyster densities than more stable areas. Oyster densities in the surrounding stable biogenic areas (which are excluded from the proposed 2025 Hananui site) are not well estimated and it is possible that oyster density could be higher there.[22]

Overlap with commercial fishing at the proposed site

In the five most recent complete fishing years, no commercial oyster dredging took place within the proposed Hananui site (i.e., 2019-20 to 2023-24). In the 2018-19 fishing year, a single oyster dredge tow took place within the proposed site.[23]

Although the site has not been used in recent years by the oyster fleet, the distribution and abundance of oysters can change in response to levels of *Bonamia* mortality, oyster density and

[21] Figure 10: Modified from Michael, K. (2020).
[22] Michael, K. (2020).
[23] MPI OIA response, April 2025. Catch details for the 2018-19 dredging event were withheld for confidentiality reasons.

oyster meat quality. The historical pattern of fishing at the site may therefore be a relevant indicator of potential future fishing activity.

Michael (2020) used fishers' logbooks to analyse the overlap between the proposed 2022 Hananui Project site and the commercial oyster fishery for the period 2006 to 2018. Logbook data is reported in one nautical mile square grids which cover the area of the fishery. The analysis showed an overlap between the proposed site and the commercial oyster fishery in some years that was occasionally significant. However, there were generally low levels of commercial fishing and catch within the proposed site over this time. Between 2006 and 2018, 0.47% of the total OYU 5 catch was caught in the proposed site. Within the site, no catch was recorded in four of the 13 years and a high of 6.6% of the total catch was recorded in 2007. In the remaining years, between 0.05% and 1.09% of the total catch was reported from the proposed site.

Michael's analysis covered the Hananui site as it was proposed in 2022. Oyster catch figures and percentages would be expected to be lower in the smaller area of the proposed 2025 site.

2.3 Blue cod potting

Blue cod is a bottom dwelling species that is found mainly on light foul (reef edges, shingle/gravel, and biogenic structures) or sand close to rocky outcrops around the New Zealand coast to depths of 150m. The majority of blue cod live and move within a small home range – a tagging experiment in Te Ara a Kiwa / Foveaux Strait found that although some blue cod moved as far as 156km, 60% travelled less than 1km.[24] This relatively high site fidelity makes blue cod vulnerable to declines in local abundance.

The species has been fished commercially since the 1930s, with the majority of commercial catch taken by cod potting in Te Ara a Kiwa / Foveaux Strait, Stewart Island and the Chatham Islands. Blue cod is also of considerable importance for customary and recreational fishers.

The Te Ara a Kiwa / Foveaux Strait cod fishery targets blue cod in the QMA known as BCO 5, which consists of FMAs 5 and 6 (**Figure 11**).[25] The bulk of the blue cod catch is landed into Bluff, Riverton, and Stewart Island ports.

The commercial blue cod catch from BCO 5 was 1,000 – 1,200 tonnes annually in the six years up to and including 2017–18, but subsequently declined to around 800 – 900 tonnes. The decline resulted in a 35% reduction in the TACC from 1,239 tonnes to 800 tonnes in 2020-21 and a further reduction to 580 tonnes in 2024-25. MPI considers that the BCO 5 stock is unlikely to be at or above its management target and that overfishing is likely to be occurring.[26]

Foveaux Strait (fisheries statistical area 025) is an important part of the blue cod fishery (**Figure 12**).[27] On average, about half of the total BCO 5 commercial catch is taken in statistical area 025.[28]

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[24] Fisheries New Zealand (2024).
[25] Figure 11 map: NABIS.
[26] Fisheries New Zealand (2024).
[27] Figure 12: Fisheries of New Zealand website https://fonz.kahawai.org.nz/
[28] Beentjes, M.P. and Miller, A. (2024).

Figure 11: QMA for blue cod (BCO 5)

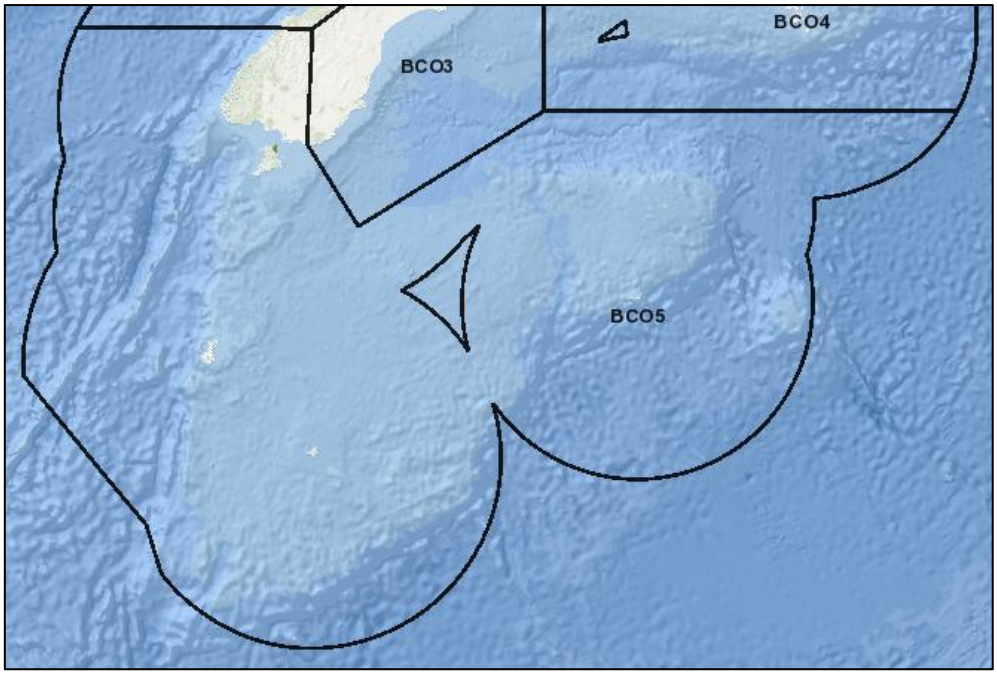
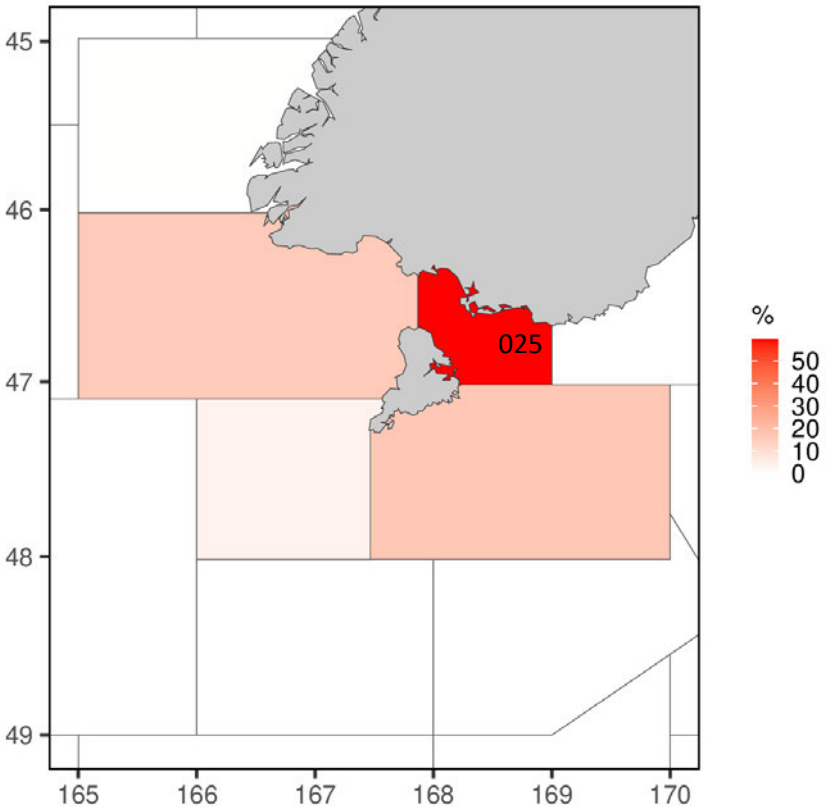


Figure 12: Potting effort for blue cod in FMA 5
(percentage of fishing days spent in each statistical area across all years)



Overlap with commercial fishing at the proposed site

The proposed Hananui site is used every year by commercial cod fishers. The fishing effort within the site declined significantly following the TACC reduction in 2020-21, but over 1 tonne of blue cod was still taken annually from within the proposed site up until 2023-24 (**Figure 13**).[29] The impact of the 2024-25 TACC reduction on commercial catch within the proposed site is not yet apparent.

The proportion of total BCO 5 catch taken from within the proposed site has varied between 1.36% and 0.23% over the past six years.

Figure 13: Blue cod fishing effort and catch at the proposed Hananui site

Fishing year	Number of cod pots lifted within the proposed site	Estimated catch within the proposed site (kg)	Proportion of total BCO 5 catch
2019-20	829	4890.1	1.36
2020-21	351	4158.0	1.21
2021-22	191	1592.0	0.35
2022-23	101	1030.0	0.23
2023-24	217	1891.4	0.69

2.4 Mixed species set net fishery

Set netting at and in the vicinity of the proposed Hananui site targets the following species:

- Inshore sharks such as rig (SPO 3) and school shark (SCH 5); and
- Butterfish (BUT 5).

Smaller amounts of other species are also taken by set netters, including flatfish (FLA 3), spiny dogfish (SPD 5), elephant fish (ELE 5), moki (MOK 5), and trumpeter (TRU 5).

Rig, school shark, and associated species are targeted by set netters around New Zealand's coastal waters. QMAs for the two main species are shown in **Figure 14**.[30] The Stewart Island / Foveaux Strait set net fishery is part of:

- For rig, SPO 3 (comprising FMAs 3, 5 and 6) which has a TACC of 660 tonnes (increased from 600 tonnes in 2021-22). Annual catches have been fluctuating around the TACC and MPI considers that the stock is "about as likely as not" to be at or above its target level of abundance; and

[29] MPI OIA response, 10 April 2025.
[30] Figure 14 maps: NABIS.

- For school shark, SCH 5 (comprising FMAs 5 and 6) which has a TACC of 520 tonnes (reduced from 743 tonnes in 2021-22). Annual catches have been slowly declining and MPI considers that the stock is unlikely to be at or above the management target.[31]

Butterfish (also known as greenbone) are widespread around the New Zealand coast, and feed on kelp beds over shallow rocky outcrops at depths generally shallower than 20m. The main commercial fishery for butterfish is around Cook Strait. The smaller Stewart Island fishery is part of BUT 5, which aligns with FMA 5 (**Figure 15**).[32] BUT 5 has a TACC of 45 tonnes. Catches are variable, but fluctuate around the TACC. No estimates of biomass or stock status with respect to management targets are available.[33]

Figure 14: QMAs for inshore shark species rig (SPO 3) and school shark (SCH 5)

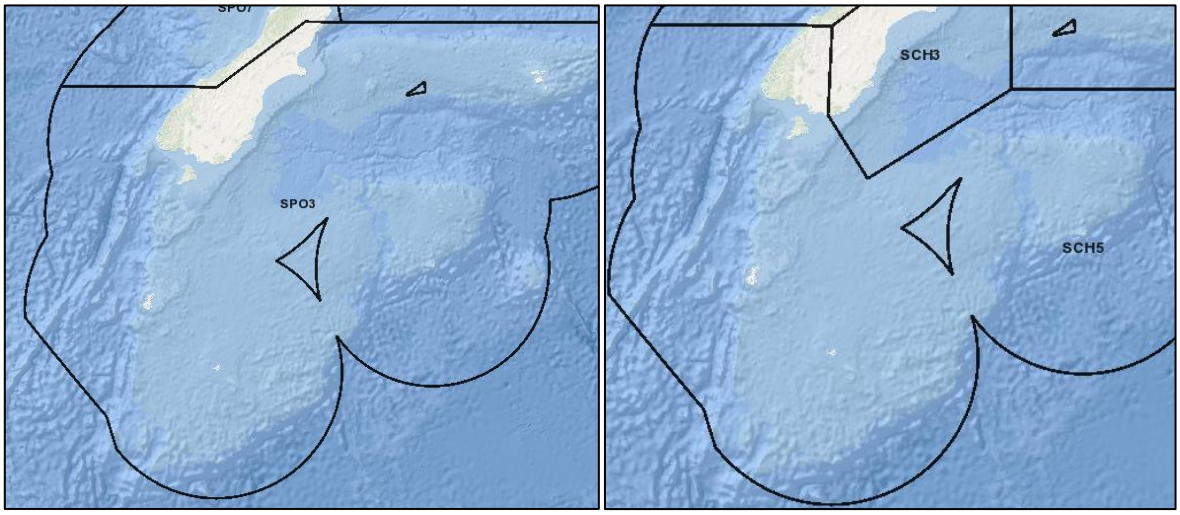
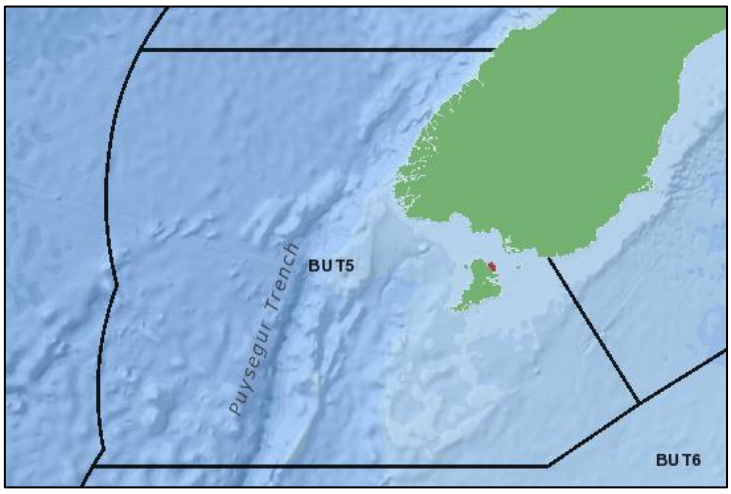


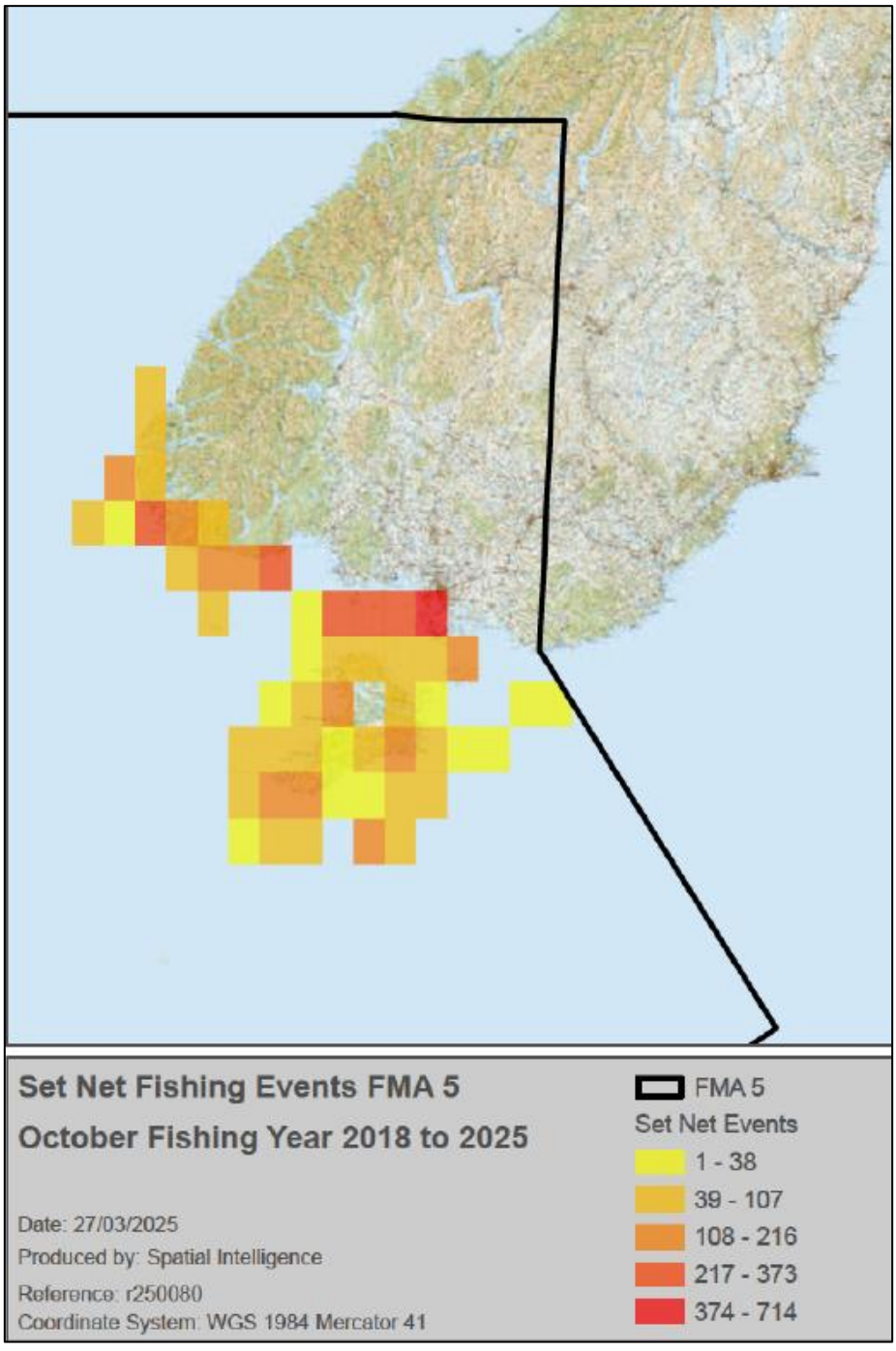
Figure 15: QMA for butterfish (BUT 5)



[31] Fisheries New Zealand (2024).
[32] Figure 15 map: NABIS.
[33] Fisheries New Zealand (2024).

There is a reasonable amount of set net fishing effort in the vicinity of the proposed site and a higher level of effort in Te Ara a Kiwa / Foveaux Strait to the north of the proposed site (**Figure 16**).[34]

Figure 16: Set net fishing effort in FMA 5



[34] Figure 16: MPI OIA response, 10 April 2025.

Overlap with commercial fishing at the proposed site

Within the proposed Hananui site, set netting takes place every year. In the five most recent complete fishing years, starting from 2019-20, the number of annual set net events reported within the site was 4, 5, 7, 6 and 2 events.[35]

MPI was not able to provide updated catch data for set netting within the proposed site for data confidentiality reasons. However, catch data for combined "other fishstocks" (i.e., species other than blue cod) was provided. A significant majority of the reported catch for "other fishstocks" taken within the proposed site is likely to be set net catch (**Figure 17**).[36]

Figure 17: Set net fishing effort and estimated catch at the proposed Hananui site

Fishing year	Number of set net events within the proposed site	Estimated catch within the proposed site (kg)[37]
2019-20	4	4,125.0
2020-21	5	2,196.0
2021-22	7	3,190.5
2022-23	6	3,773.0
2023-24	2	2,767.0

Data provided by MPI in 2020 in relation to the proposed 2022 Hananui site is likely to overestimate the amount of catch that might be taken within the area of the smaller 2025 proposed site. Nevertheless, the 2020 data can contribute to understanding commercial set netting at or near the proposed site. Analysis undertaken in 2020 indicated that:[38]

- For inshore sharks:
  - Reasonable catches of school shark were taken from the site, e.g., 7.3 tonnes in 2018-19, together with smaller quantities of rig (e.g., 3.3 tonnes in 2010-11);
  - Spiny dogfish was taken in large quantities at the site fifteen years ago (over 20 tonnes in 2010-11), but much less was reported in subsequent years; and

[35] MPI OIA response, 10 April 2025.
[36] The majority of the reported catch for "other fishstocks" taken within the proposed site is likely to be set net catch because (a) set netting is the only fishing method aside from dredging and potting that takes place within the proposed site, (b) all oyster catch (dredging) was withheld by MPI and is not included within the "other fishstocks" category, and (c) only one rock lobster potting event (15 pot lifts) occurred within the last six years at the site.
[37] Estimate using reported catch for "other fishstocks".
[38] Fathom Consulting (2020), based on MPI OIA response, 6 November 2020.

- The catch of inshore shark species taken at the site was only a very small proportion of the total catch of each fishstock. Rig catches at the farm site in the ten years prior to 2020 were less than 1% of total SPO 3 catch; school shark catches were less than 1% of SCH 5 catch with the exception of 2018-19 (1.23%); and spiny dogfish catches were less than 1% apart from in 2010-11 and 2011-12 when just over 1% of SPD 5 was taken in the proposed site;

- For butterfish:
  - Set netting for butterfish took place at the site in three of the ten years prior to 2020. Annual catches were relatively small, ranging from 800 kg to 1,620 kg. However, these catches are a reasonable proportion of the total BUT 5 catch – for example, in 2013-14 when 1.62 tonnes of butterfish was caught in the proposed site, this catch represented 4.9% of the total BUT 5 annual catch; and

- For other species:
  - Occasionally the site provided more than 1% of the annual catch of moki or trumpeter, both of which are sometimes caught in set nets in statistical area 025 (Foveaux Strait). Most notably in 2013-14, 580 kg of moki was reported as caught at the proposed site (8.72% of the MOK 5 catch).

2.5 Rock lobster potting

Rock lobsters are found along most rocky coastlines in New Zealand, including around Rakiura / Stewart Island. The rock lobster fishery began to be developed in the 1940s and today is New Zealand's most valuable inshore commercial fishery. Commercial fishing uses the potting method. Rock lobster is also highly valued by customary and recreational fishers.

Of the nine rock lobster management areas, the Stewart Island and Fiordland fishery (CRA 8) is the most productive and valuable. The CRA 8 management area extends from Long Point south to Rakiura / Stewart Island and the Snares, and includes the islands and coastline of Te Ara a Kiwa / Foveaux Strait, northwards to Bruce Bay in Fiordland (**Figure 18**).[39] The proposed Hananui site is in rock lobster fisheries statistical area 924 (Stewart Island).

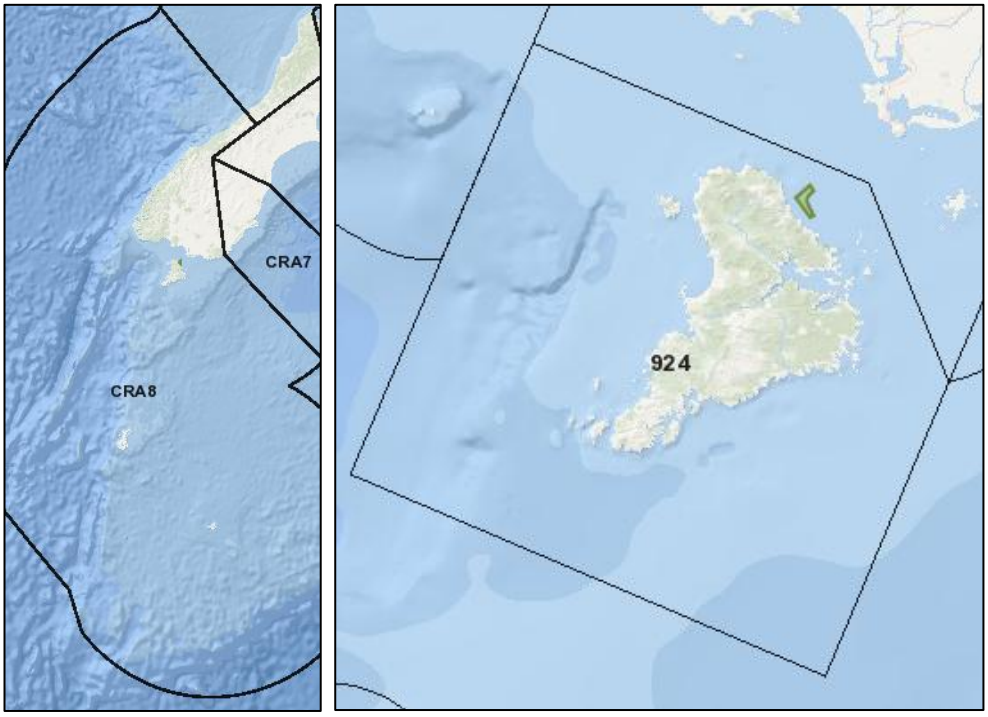
The CRA 8 TACC has increased over the last 20 years in line with assessed increases in abundance. The TACC is currently 1,392 tonnes and MPI considers that the stock is very likely to be above its management target.[40] The number of vessels operating in CRA 8 has been relatively stable at between 61 to 67 vessels in recent years.[41]

Until 2019, rock lobster catch was reported at the scale of rock lobster statistical area 924, which encompasses the entire coastline of Rakiura / Stewart Island. Since the mid-1990s, statistical area 924 has contributed between 12% and 23% of annual landings of CRA 8, with levels near to or below

[39] Figure 18 maps: NABIS
[40] Fisheries New Zealand (2024).
[41] Starr, P.J. (2024).

15% from 2001-02.[42] Over the last ten years, the number of vessels fishing in area 924 has varied between 14 and 20 vessels.[43]

Figure 18: QMA for rock lobster (CRA 8) and rock lobster statistical area 924



Overlap with commercial fishing at the proposed site

Rock lobster potting takes place only very occasionally within the proposed Hananui site. A single rock lobster fishing event (with 15 pot lifts) took place in the period 1 October 2018 to March 2025. Rock lobster catch data at the site has been withheld for reasons of commercial confidentiality.[44]

2.6 Mixed species bottom trawl fishery

Trawlers operating in Te Ara a Kiwa / Foveaux Strait land a variety of species including barracouta, flatfish, blue warehou, gurnard, spiny dogfish and stargazer. The main target species are flatfish and gurnard. Areas of highest fishing effort for bottom trawlers are to the northeast of Stewart Island and in Te Waewae Bay, distant from the proposed Hananui site (see **Figure 19**).[45]

The number of trawlers operating in the Te Ara a Kiwa / Foveaux Strait area has reduced significantly over the last ten years (**Figure 20**).[46]

[42] Starr, P.J. (2024).
[43] Starr, P.J. (2024).
[44] MPI OIA responses, 6 November 2020 and 10 April 2025.
[45] Figure 19: MPI OIA response, 10 April 2025.
[46] Figure 20. Fisheries of New Zealand website https://fonz.kahawai.org.nz/

Figure 19: Bottom trawling effort in FMA 5

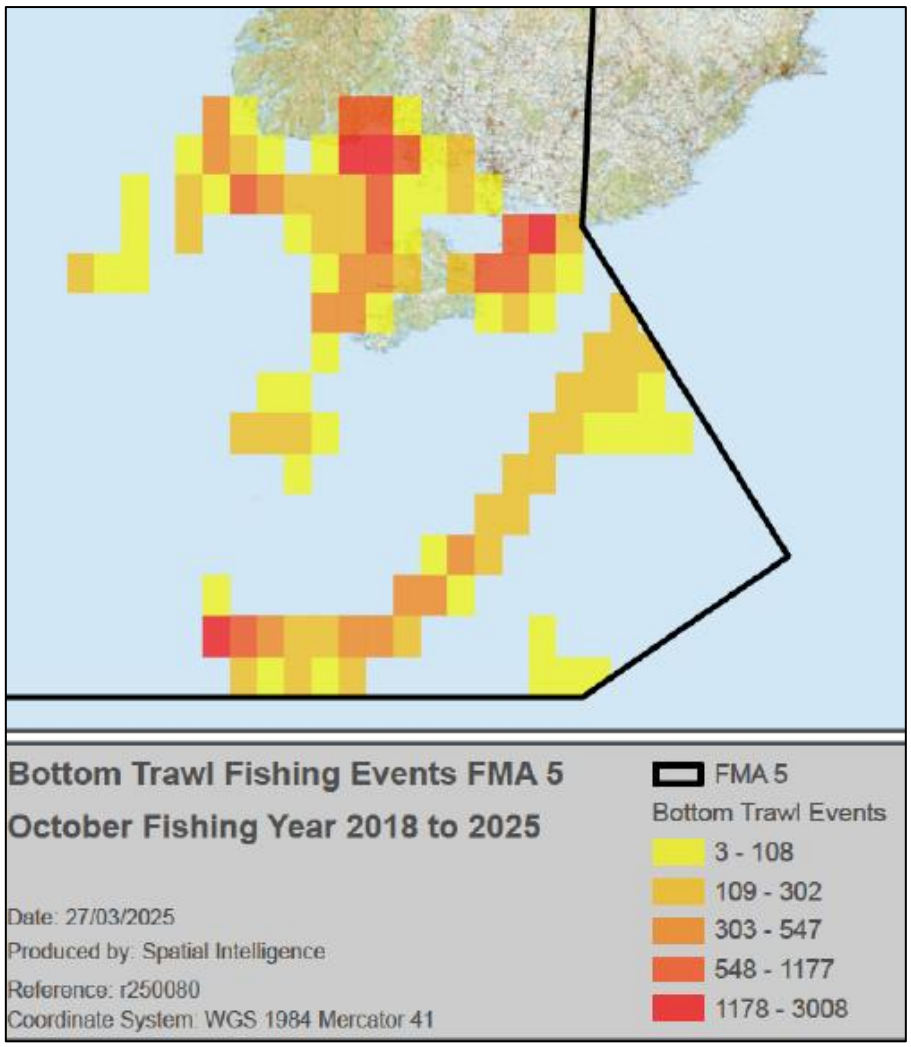
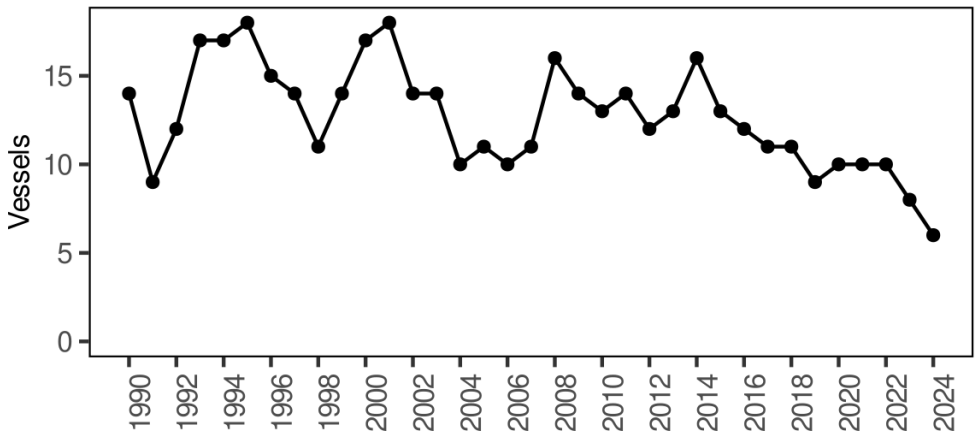


Figure 20: Inshore trawl vessel numbers, south-mid region



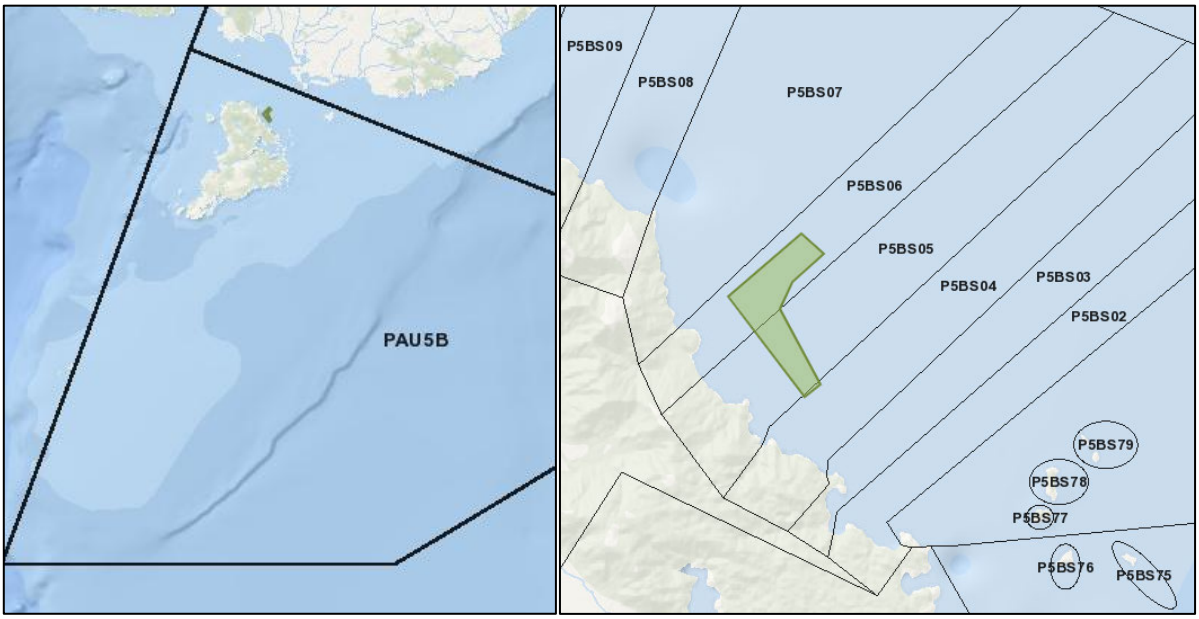
Overlap with commercial fishing at the proposed site

No bottom trawling effort was recorded at the proposed Hananui site during the period 2018-19 to 2024-25.[47] However, data provided by MPI in 2020 indicates that trawling may occasionally have occurred at or near the site in earlier years.[48]

2.7 Pāua fishery

Pāua live on rocky reefs in shallow subtidal coastal habitats. They are widespread around the New Zealand coast, although most of the commercial harvest is taken from the Wairarapa coast, the South Island, and the Chatham Islands. The species has been commercially fished since the 1940s, and is hand-harvested by free diving.[49] Pāua is also highly valued by customary and recreational fishers. The Rakiura / Stewart Island commercial pāua fishery is known as PAU 5B (**Figure 21**).[50]

Figure 21: QMA for pāua (PAU 5B) and pāua statistical areas at the proposed site



In 2018-19 the PAU 5B TACC was increased to 107 tonnes, although the increase did not take effect until a legal challenge was resolved in 2022-23. Commercial landings have been close to the TACC in most fishing years since 1995, although the industry voluntarily reduced commercial harvest levels in

[47] MPI OIA response, 10 April 2025.
[48] MPI OIA response, 6 November 2020. In the ten years prior to 2020, a total of 5 bottom trawl events were reported within the site – i.e., 2 events in 2010-2011, and 1 each in 2013-14, 2015-16 and 2017-18. The data provided by MPI uses a buffer of 1 nautical mile, meaning that a fishing event is considered to be within the proposed site if the buffer around any point for that fishing event intersects the proposed site. This methodology is likely to overestimate the number of historical bottom trawling events in the proposed site, particularly as the 2022 Hananui site was considerably larger than the proposed 2025 site.
[49] On the Chatham Islands diving with SCUBA is allowed.
[50] Figure 21 maps: NABIS.

the period 1999-2000 to 2001-2002. MPI considers that the PAU 5B fish stock is likely to be at or above its management target.[51]

Pāua habitat does not overlap with the proposed Hananui site and no pāua catch has been reported from within the proposed site.

The two pāua statistical areas which overlap with the proposed site (P5BS05 and 06, see **Figure 21**) make a small but regular contribution to the total PAU 5B catch. In the fishing years 2010-11 to 2018-19, these two statistical areas, together with adjacent areas P5BS03 and 04, produced an annual average of 2.234 tonnes of catch.[52] The highest recorded catch during these years was 3.950 tonnes in 2013-14 (i.e., 4.45% of total PAU 5B catch), and the lowest was 1.750 tonnes in 2018/19 (1.96% of total catch). During these years, between 4 and 8 pāua vessels were active in the relevant pāua statistical areas inshore from the proposed site.[53]

2.8 Kina fishery

Kina (sea urchins) are found in shallow coastal waters throughout New Zealand. They are typically harvested by hand gathering from waters less than 10m deep by free diving. The Southland fishery is SUR 5, which aligns with FMA 5 (**Figure 22**).[54]

Figure 22: QMA for kina (SUR 5)

[51] Fisheries New Zealand (2024).
[52] MPI OIA response, 6 November 2020.
[53] MPI OIA response, 6 November 2020.
[54] Figure 22 map: NABIS

Commercial harvest in SUR 5 fluctuates around the TACC of 455 tonnes. Kina is also an important and highly valued species for customary fishers. The status of the SUR 5 stock with respect to its management target is not known.[55]

Kina is harvested at depths that are shallower than the proposed Hananui site, and the fishery is therefore unlikely to overlap with the proposed site. No kina catch was reported from within the proposed site in the period from 2019-20 onwards when fine-scale reporting became mandatory. Prior to 2019-20, commercial kina catch was reported at the scale of statistical areas. General statistical area 025, which surrounds Stewart Island, has provided a small but steady contribution to the total SUR 5 kina harvest.

3. Potential impacts of the Hananui Aquaculture Project on commercial fishing

3.1 How aquaculture can affect commercial fishing

In order to assess the impacts of new aquaculture developments on commercial fishing, it is necessary to first consider in a general sense how new activities may affect stocks that are managed in the quota management system (QMS). Each fish stock in the QMS has 100 million quota shares (referred to formally as Individual Transferable Quota or ITQ). A quota share represents a fixed percentage of the total commercial rights for a fish stock in perpetuity. At the beginning of every fishing year, each quota share generates Annual Catch Entitlement (ACE) which is the right to harvest the equivalent tonnage of the TACC for the stock during that fishing year.

The perpetual and proportional nature of ITQ means that its value is related at least in part to the current abundance of the stock and its perceived future abundance. This concept lies at the heart of the QMS – i.e., stocks that are healthy and well managed (sustainable) will maximise the capital value of ITQ which is the fishing industry's main asset. Quota owners are therefore incentivised to act to safeguard the sustainability of fish stocks and their continued access to fishing grounds.

New activities such as aquaculture can have adverse effects on quota value if they threaten, or are perceived to threaten, the sustainability of a fish stock, access to fishing grounds, or the profitability of fishing. These impacts typically arise in several ways.

Spatial displacement of fishing effort

Firstly, aquaculture can displace fishing effort through physical exclusion by marine farm structures. Because the commercial harvest of QMS stocks is constrained by the TACC, catch that is displaced from part of a QMA will shift to the remaining parts of the QMA, placing additional fishing pressure on the rest of the stock.

The effects of displaced catch are particularly apparent in fisheries that are highly spatially dependent – for example, if the target species has specific habitat requirements which are found

[55] Fisheries New Zealand (2024).

only in parts of the QMA (e.g., pāua live only on rocky reefs), is more or less sedentary (e.g., pāua, rock lobster, oysters), or has high site fidelity (e.g., blue cod). In these fisheries, commercial fishing activity is limited to relatively small areas within the QMA where the species are found. If fishing is displaced from a well-utilised area in a spatially-dependent fishery, the displaced effort cannot simply be absorbed back into the fishery without affecting local abundance and, potentially, the sustainability of the stock.

Relatively small levels of displacement can have adverse effects on the activities of individual operators who fish in the area. For example, a fisher may face increased costs of fishing because they have to travel to alternative fishing grounds, or they may have to purchase additional or different ACE to balance different ratios of catch in a mixed species fishery. Fishing days may be lost if the new fishing site is more exposed, or the alternative site may be less productive. These types of impacts are highly dependent on the characteristics of individual fishing operations and are difficult to predict.

Fishery-wide impacts (i.e., impacts that affect many fishers and quota owners) can be experienced if the displacement of fishing effort is long-term or significant in scale. If the displaced fishing effort compromises the sustainability of the remaining available stock, reductions in the Total Allowable Catch (TAC) and TACC for the stock may be required.

Environmental impacts

Secondly, new marine activities may have adverse environmental effects which alter the distribution, behaviour, physiology or abundance of commercially fished species. These changes can have direct effects on the activities of individual commercial fishers by:

- Increasing the cost of fishing (e.g., fish may avoid an area in response to noise or increased levels of suspended sediment, requiring fishers to travel further distances or spend additional time locating productive areas); or
- Reducing revenue (e.g., the productivity or catchability of a commercially harvested species may be affected, reducing the catch available for fishers).

If environmental changes that affect wild fish species are enduring or large in scale, they may also result in TACC reductions and impacts on quota value.

Other impacts

New activities may have other impacts on:

- Fishing operations – e.g., physical interference or vessel interactions;
- The safety and wellbeing of fishers – e.g., as a result of shifting to a more exposed fishing location; or
- Seafood products – e.g., actual or perceived impacts on seafood quality.

Dealing with these impacts may result in additional costs or reduced revenues for fishers and quota owners and, if the changes are enduring or large scale, quota value may be reduced.

New activities may also create biosecurity threats for wild fish species, for example by increasing the risk of diseases or biotoxins that may affect wild fish. Biosecurity risks to wild fisheries are addressed in other reports commissioned by NTS and are not considered further in this report.

The Hananui Aquaculture Project therefore has three categories of potential impacts on commercial fishing which are discussed further below, as follows:

- Spatial displacement of commercial fishing at the proposed site;
- Environmental changes caused by marine farming operations, which may affect the distribution, behaviour, physiology or abundance of wild fish; and
- Other impacts.

3.2 Spatial displacement of commercial fishing

The Hananui Aquaculture Project would occupy approximately 1,250 hectares of the coastal marine area. Within this area, four marine farms are proposed, with each farm site established in two stages, subject to environmental monitoring between the two stages (as shown in **Figure 2**).

The project will displace existing fishing activity in areas where the marine farm structures and the proposed 200m buffer zones around the farms – an area that is estimated to be 500 hectares in total – overlap with existing commercial fishing activity. The specific areas from which commercial fishing may be displaced will depend on the precise location of the farms within the project area.

Commercial fisheries that directly overlap with the proposed Hananui site, and which may therefore overlap with the proposed areas of the farms are:

- The Foveaux Strait oyster fishery (OYU 5);
- The blue cod fishery (BCO 5);
- The set net fishery (various species); and
- The rock lobster fishery (CRA 8).

The unavailability of multi-year, location-specific fishing data for all species and fishing methods means that it is not possible to estimate the precise impact of spatial displacement for some of these fisheries, but nevertheless a number of observations can be made.

The estimated displacement of commercial fishing activity, based on the best available information, is relatively small for each affected stock, as follows:

- **Oysters**: The proposed site has not been used by the oyster fleet since 2018-19, when a single oyster dredge tow took place in the area. In the years between 2006 and 2018 on average just 0.47% of total oyster catch was taken in the proposed site;[56]

[56] Michael, K. (2020). Based on the boundaries of the 2022 proposal – this figure is likely to be smaller for the 2025 site.

- **Blue cod**: The proposed site is regularly used for blue cod potting, but only a small proportion of total BCO 5 catch is taken from within the site – on average, less than 1% over the last five complete fishing years (see **Figure 13**);
- **Set net stocks**: The site is used for a small number of set netting events each year. Updated data is not available, but data from 2020 indicated that in most years less than 1% of the total catch of the main affected fish stocks (SCH 5, SPO 3, SPD 5, BUT 5) was taken from the proposed site;[57] and
- **Rock lobster**: Location-specific data is not available, but the proportion of catch that may be taken from the proposed site is expected to be very low as only one rock lobster fishing event took place at the site over the past five complete fishing years.

By way of comparison, MPI has previously applied a non-statutory 'rule of thumb' threshold of 5% when assessing whether the catch displaced by a new aquaculture application may have an 'undue adverse effect' on commercial fishing.[58]

The displacement estimates above are based on potential displacement from the entire proposed site. However, it is anticipated that a level of fishing activity may continue to occur at the site in the areas that are not permanently occupied by marine farming structures or buffer zones. In particular, cod potting and rock lobster potting are likely to be readily compatible with marine farming activities within the wider site.

For each of the fisheries that overlap with the proposed site, the establishment of the marine farm will reduce the area available to commercial fishers and will therefore reduce options for individual fishers to spread their fishing effort. This impact is likely to be more significant for those fisheries that are spatially constrained or under pressure for sustainability reasons. In particular:

- The OYU 5 oyster fishery is spatially constrained by *Bonamia* events which also affect the productivity of the fishery on a recurrent basis. However, the overlap between the commercial oyster fishery and the proposed site is low, and Michael (2020) estimates that the lost opportunity for the oyster fishery is likely to be low;[59]
- The biomass of the BCO 5 blue cod fishery has been declining since 2000 and the stock has been subject to two significant TACC reductions, most recently in 2024-25. BCO 5 is considered to be below the default target biomass level. The fishery may therefore be particularly vulnerable to the impacts of displaced catch. However, only a small proportion

[57] Fathom Consulting (2020). Based on the boundaries of the 2022 proposal – this figure is likely to be smaller for the 2025 site.
[58] The "undue adverse effect" assessment is undertaken as a requirement of Part 9A of the Fisheries Act. MPI's "rule of thumb" is first documented in *SMW Consortium (Golden Bay) Limited v The Chief Executive of the Ministry of Fisheries* COA CA431/2011 [10 April 2013] where the chief executive is reported as saying "*I am conscious that other marine farming decisions have tended, over time, towards a nominal 5% threshold on the "undue adverse effect test". I am conscious, however, that this will [be] the first time the chief executive formally indicates a level at which effects become undue*" (para 45). The Court of Appeal ruled that the chief executive "did not err in adopting the five per cent threshold in the circumstances of this case" (para 52).
[59] Michael, K. (2020).

of BCO 5 catch is taken from within the proposed site (less than 1% on average over the last five years).

In my opinion, in no case is the level of displacement sufficiently material as to have impacts that would be experienced at a fishery-wide level (i.e., impacts on fish stock sustainability or quota value). Although no fishery-scale impacts are anticipated, individual fishers may be adversely affected, depending on:

- The extent to which a fisher uses the proposed site and their capacity to adjust their fishing location; and
- The precise location of the farms within the proposed site in relation to favoured fishing grounds.

Given the relatively low level of fishing activity at the site and the availability of alternative fishing grounds elsewhere in Te Ara a Kiwa / Foveaux Strait, I consider that impacts on individual fishers, if any, are likely to be minor. If necessary, further information on individual impacts can be obtained by direct discussion with potentially affected fishers.

3.3 Cumulative spatial displacement

Cumulative spatial displacement occurs when fishing for a particular stock is displaced by more than one factor – in this case, displacement arising from the Hananui Aquaculture Project in combination with displacement by other regulations or activities that restrict the location of commercial fishing. Cumulative spatial displacement may have implications for individual fishers or, if the displacement is significant and enduring, for the fishery as a whole. Cumulative impacts are relevant statutory considerations for Fast-track Approvals Act approvals under the Resource Management Act 1991 and the Fisheries Act 1996.

A number of existing or proposed activities are relevant to an assessment of cumulative spatial displacement of commercial fishing in relation to the Hananui Aquaculture Project. However, for the reasons outlined below, I do not consider cumulative spatial displacement to be a significant issue for the Hananui Aquaculture Project.

Set net regulations

Set net fisheries throughout New Zealand have become increasingly constrained as a result of regulated method closures intended to protect Māui and Hector's dolphins.[60] The Rakiura / Stewart Island coast is one of the few areas of the New Zealand coastline where set netting is still able to be used as a fishing method.

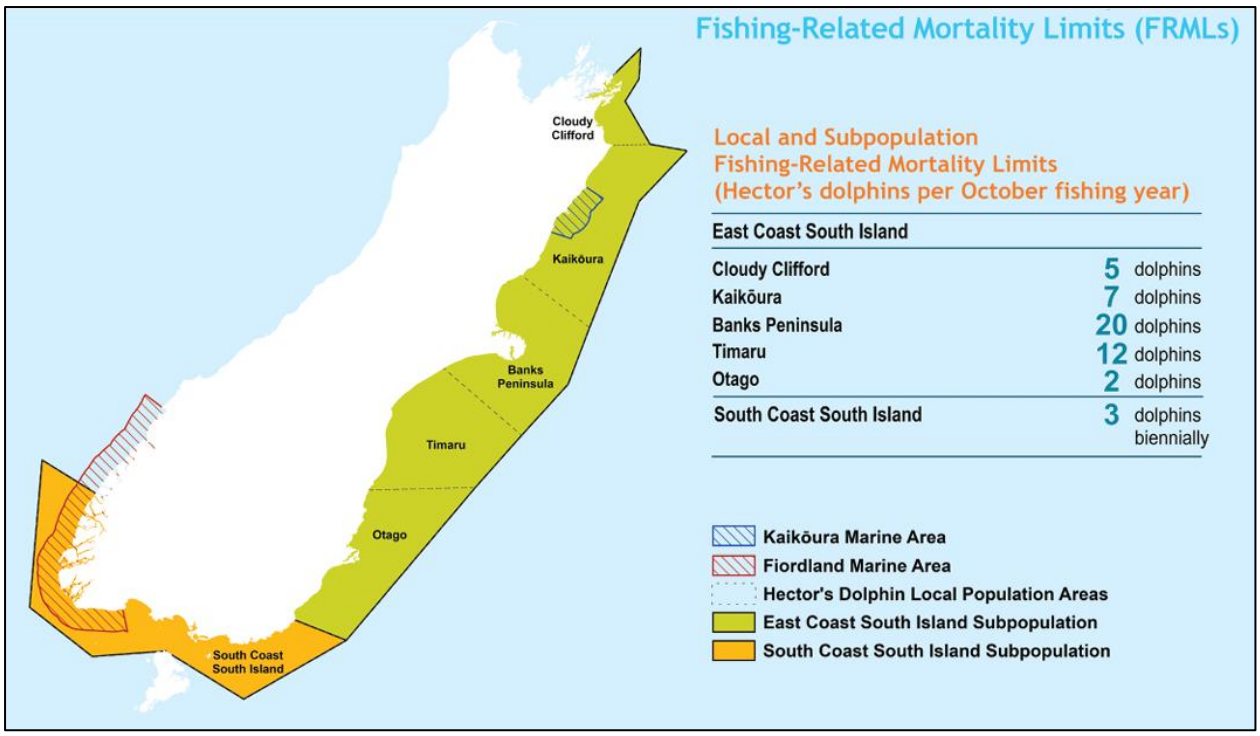
Commercial fishing for rig in SPO 3 may be subject to cumulative spatial displacement from the Hananui project and the dolphin regulations. However, as less than 1% of SPO 3 catch is taken from the proposed site, the level of cumulative impact is likely to be minor. The other fish stocks within

[60] MPI website: https://www.mpi.govt.nz/fishing-aquaculture/sustainable-fisheries/managing-the-impact-of-fishing-on-protected-species/protecting-hectors-and-maui-dolphins/

the proposed site are in different QMAs from those that are affected by the dolphin regulations for set netting and are therefore not affected by cumulative displacement.

In 2022 a new fishing-related mortality limit of three dolphins biennially was introduced for the south coast of the South Island (**Figure 23**).[61] The mortality limit may result in the imposition of additional regulatory measures for set netters to ensure the limit is not exceeded. The area in which the mortality limit applies is adjacent to the proposed site. If additional regulatory restrictions are imposed in this area in future, the restrictions may contribute to cumulative spatial displacement of commercial set netting. However, as noted above, a relatively small proportion of total set net catch is taken from within the proposed site, and the Hananui Project's contribution to cumulative spatial displacement is low in relation to other potential restrictions for set netting.

Figure 23: Fishing-related mortality limits for Hector's dolphins in the South Island



Proposed marine protected areas

In October 2023 the Minister of Conservation announced the establishment of six new marine reserves, in which all fishing would be prohibited, in the south east region of the South Island.[62] The decision to establish the marine reserves is currently subject to judicial review and the reserves have not yet been implemented.

The marine reserves are part of a larger network of marine protected areas (MPAs), which also includes five Type 2 MPAs proposed to be implemented under the Fisheries Act, in which some fishing methods would be prohibited. The marine reserves and Type 2 MPAs would cover a total of

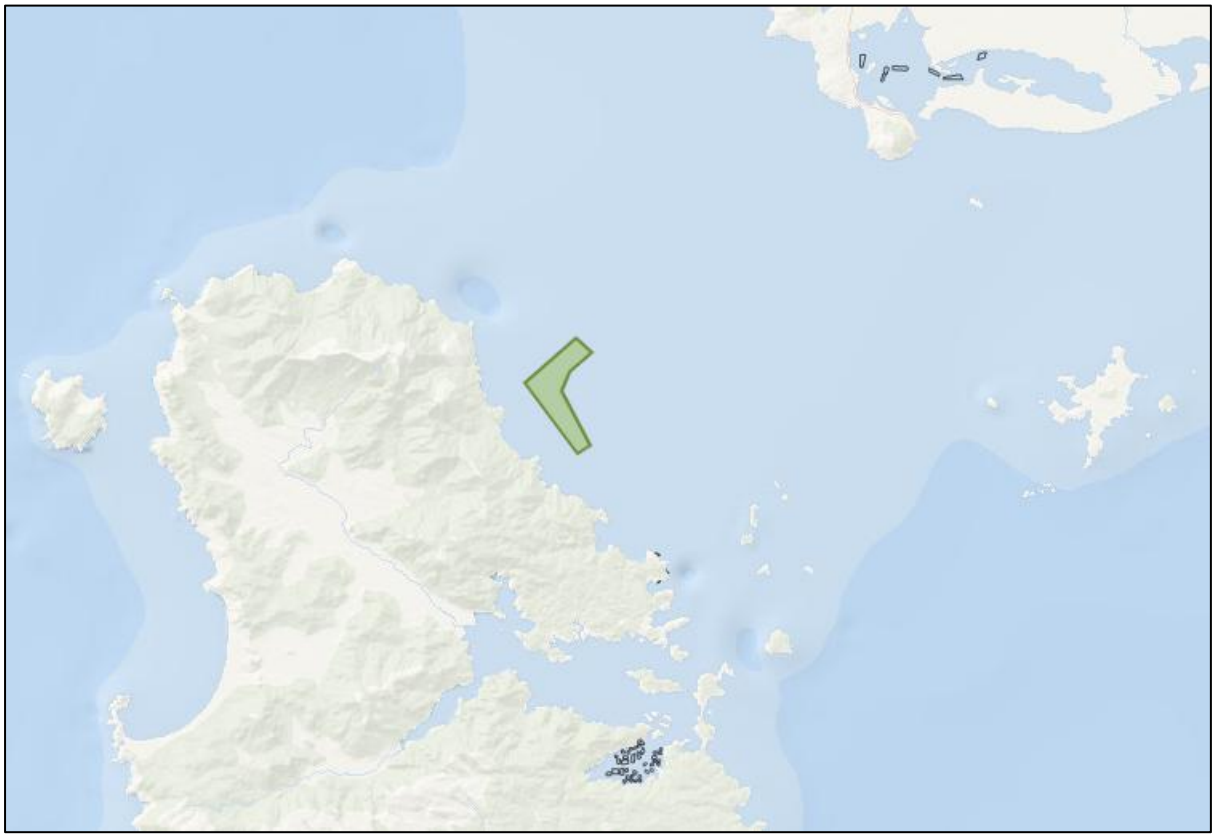
[61] MPI website, ibid.
[62] DOC website: https://www.doc.govt.nz/our-work/marine-reserves-for-the-southeast-of-the-south-island/

1,267 km^2 in the coastal marine area from Waipapa Point northwards to Timaru.[63] The QMAs of most of the species caught at the proposed site do not overlap with the QMAs of stocks affected by the proposed MPAs. If the MPAs are implemented, the cumulative effects on commercial fishing in combination with the Hananui Project would therefore be limited to impacts on the SPO 3 rig fishery and would be minor for the reasons outlined above.

Existing and proposed aquaculture developments

Existing aquaculture consents in Te Ara a Kiwa /Foveaux Strait and around Rakiura / Stewart Island include sites in Bluff Harbour, at Big Glory Bay and near Horseshoe Bay (**Figure 24**).[64] Due to the size and location of these sites (i.e., in bays or harbours, and close to the shoreline) none is likely to contribute to cumulative impacts on commercial fishing together with the Hananui proposal.

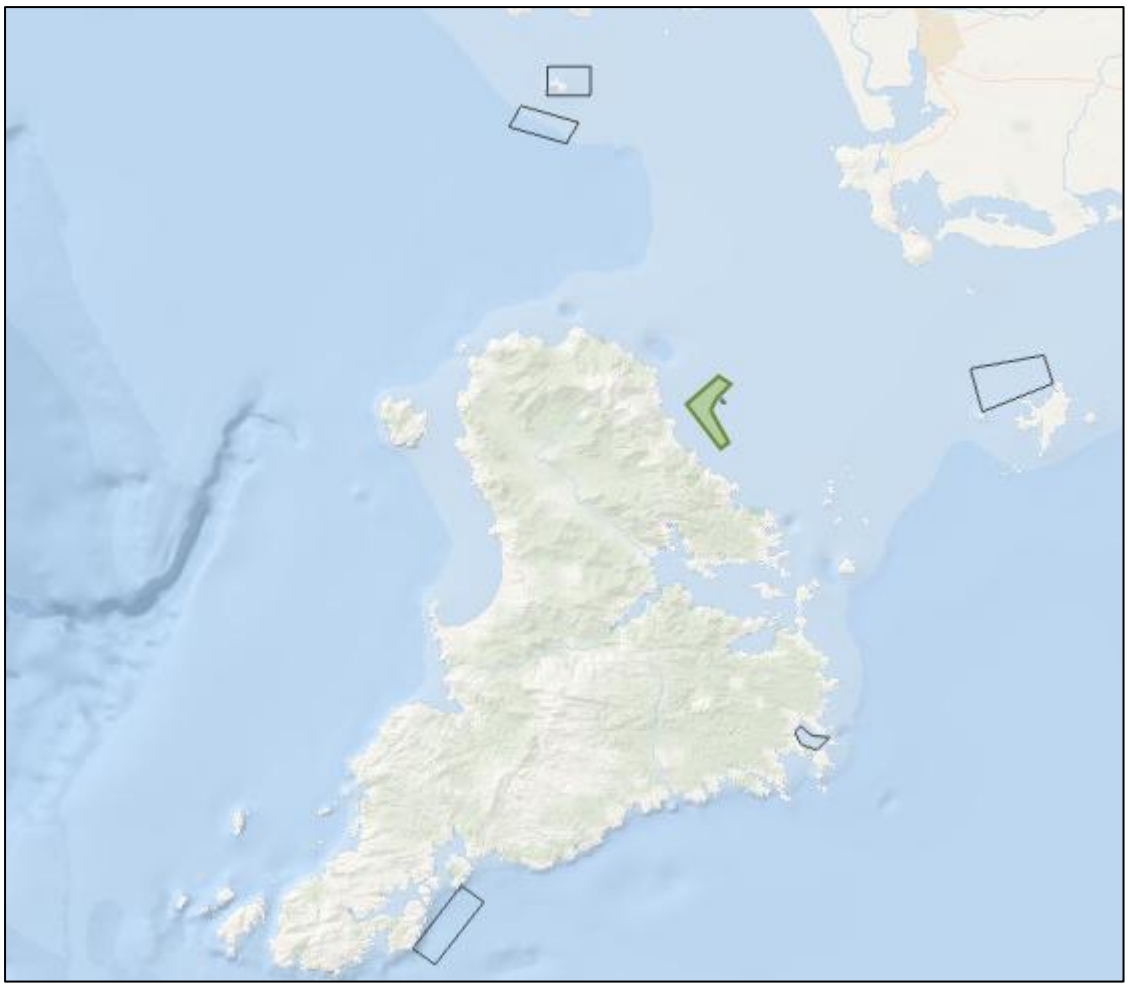
Figure 24: Existing marine farm consents, Te Ara a Kiwa and Rakiura



Six Aquaculture Settlement Areas under the Māori Commercial Aquaculture Claims Settlement Act 2004 have been gazetted in Te Ara a Kiwa /Foveaux Strait and around Rakiura / Stewart Island, including a small area near the proposed Hananui site (**Figure 25**). Ngāi Tahu has exclusive rights to apply for resource consents to undertake marine farming within these areas. If Ngāi Tahu wished to develop any of the Settlement Areas, the cumulative effects of aquaculture on commercial fishing would be considered at the time resource consent applications and Fisheries Act approvals were determined.

[63] Department of Conservation and Fisheries New Zealand (2020).
[64] Figure 24 map: NABIS.

Figure 25: Aquaculture Settlement Areas, Te Ara a Kiwa and Rakiura



In 2020 Sanford Ltd proposed a new aquaculture development on the eastern edge of Te Ara a Kiwa / Foveaux Strait.[65] The current status of this proposal is not known, although it is not listed in the Fast-track Approvals Act. A fishery assessment indicates that the only fishery which overlaps with the proposed Sanford site is the bottom trawl fishery.[66] The Sanford proposal is not an existing activity but, if it were to go ahead, no cumulative impacts on commercial fishing would be expected because the bottom trawl fishery does not overlap in any significant way with the proposed Hananui site.

3.4 Environmental changes affecting wild fish

Changes in the distribution, behaviour, physiology or abundance of wild harvested fish can affect the fishing industry by reducing catch levels, making fish harder to find or harder to catch, increasing the cost of fishing, and reducing profitability.

I have reviewed reports commissioned by NTS and other sources to identify potential changes in the distribution, behaviour, physiology or abundance of wild-caught fish that may arise from the

[65] Sanford Ltd website: https://www.sanford.co.nz/operations/aquaculture/salmon-farming/
[66] Middleton, D A J (2020).

proposed salmon farming activities.[67] Although information on impacts of fish farming in New Zealand on wild fish is limited, the following potential changes that may impact on commercially-harvested species have been identified:

- Adverse effects on important fish habitats (e.g., for juvenile or breeding fish);
- Attraction of wild fish to marine farms;
- Consumption by wild fish of waste marine farm feed; and
- Increased biosecurity risks (parasites, pathogens and biotoxins) to wild fish species.

Effects on important fish habitats

Finfish farms can impact wild fish populations through degradation of their habitat, particularly through biodeposition from fish faeces and waste feed.[68] Under the Fisheries Act, the protection of 'habitat of particular significance for fisheries management' (HPSFM) is an environmental principle that must be taken into account by decision-makers.[69] Although not formally defined, HPSFM are generally taken to mean habitats that are important for critical fish life stages such as juvenile habitat or spawning habitat. The protection of significant habitats of indigenous fauna is also a relevant consideration under the Resource Management Act.[70]

No HPSFM or other habitats that are of particular significance for fish spawning or reproduction have been formally identified in the vicinity of the proposed site.[71] However, specific knowledge of most coastal fish species life histories and habitat usage is "modest",[72] and the absence of formally identified HPSFM does not necessarily mean that important fish habitats are absent from the proposed site.

Michael (2020) notes that the presence of oysters and oyster shells on the seabed are important habitat requirements for settlement and post-settlement survival for oysters. Oyster shells provide the basis for settlement and succession both for oyster larvae and other sessile benthic invertebrates and are the genesis of biogenic reefs in some areas. The habitats in the core part of the area at the proposed site that was surveyed in 2019 had sparse shell deposits and mobile sands, which suggests that recruitment (i.e., settlement of larvae and post-settlement survival) to this area is likely to be low.[73]

The proposed site is adjacent to and includes some patchy areas of biogenic habitat (bryozoan thickets and bryozoan sponge reefs) which are commonly associated with juvenile fish habitat. Bryozoan beds are known to provide habitat for juveniles of commercially-important species such as blue cod and terakihi.[74] In Te Ara a Kiwa / Foveaux Strait, biogenic habitats are also considered to

[67] Bennett et al (2019), Digfish Services (2019), Michael (2020), Stantec (2019), Taylor & Dempster (2021), Ministry for Primary Industries (2013), Morrison et al (2014).
[68] Ministry for Primary Industries (2013).
[69] Fisheries Act section 9.
[70] RMA section 6.
[71] Taylor, P and Dempster, T (2021).
[72] Morrison et al (2014).
[73] Michael, K. (2020).
[74] Taylor, P and Dempster, T (2021).

be an important habitat for bottom-dwelling fishes (in particular blue cod)[75] and complex biogenic habitats which provide substrate stability and structural height above the seabed may also be important for oyster settlement and survival.[76] Benthic deposition of waste from fish farms can potentially damage biogenic reefs and may have other indirect effects such as interference with settlement of Bluff oyster recruits.[77] The proposed Hananui site largely avoids areas of biogenic habitat and the location of marine farms within the site is also intended to avoid areas of biogenic habitat (see **Figure 2**).

Attraction of fish to marine farming structures or operations

Finfish farms create artificial habitats that attract wild fish species seeking foraging habitat, food sources and refuge from predators. Submerged artificial lighting can also enhance the attraction of some wild fish to farm structures in the immediate vicinity of the farm. The attraction of wild fish to marine farms can have both positive and negative effects for the attracted fish. It can result in enhanced predation (e.g., by seals or sharks), and changes in the local distribution and productivity of wild fish populations (by acting either as ecological traps or possible sources for wild fish stocks).[78]

Potential effects of marine farms on wild fish species depend on whether the wild fish become resident, either intermittently or on a permanent basis – and this, in turn, is highly dependent on the level of waste deposition from farming operations. Minimising the amount of uneaten food lost from fish farms is therefore critical for reducing impacts on commercially-harvested wild fish species.

Taylor and Dempster (2021) identify the following commercially-important species (among others) as being potentially attracted to marine farming operations in Te Ara a Kiwa / Foveaux Strait: blue moki, butterfish, leather jacket, gurnard, hapuku, blue cod, giant stargazer, ling, red cod, terakihi, elephant fish, rough skate, smooth skate and blue warehou.[79] The habitat preferences of blue cod and its relatively high site fidelity mean that it may be particularly likely to be attracted to and become resident in the vicinity of marine farms.

If blue cod or other commercially harvested fish species are attracted to the proposed salmon farm and become resident beneath or near the farm, the consequences for commercial fishing include:

- A portion of the stock of the affected species (i.e., fish within and immediately around each marine farm site) will become unavailable to commercial harvesting. Depending on the extent of fish aggregation, this may lead to increased fishing pressure outside the marine farm sites; and
- If the fish that are attracted to the marine farm benefit from that association (e.g., enhanced productivity due to consumption of marine farm feed), the additional productivity may benefit commercial fishing. However, if the aggregated fish are disadvantaged by association with the marine farm (e.g., negative physiological changes leading to reduction

[75] Morrison et al (2014).
[76] Michael, K. (2020).
[77] Digfish Services (2019).
[78] Ministry for Primary Industries (2013).
[79] Taylor, P. and Dempster, T. (2021).

in fish quality, or increased vulnerability to natural predators or recreational fishing pressure), commercial fishing may be adversely affected.

Given the relatively low level of fishing effort in the proposed site, any effects on commercial fishing – whether positive or negative – are likely to be localised and no more than minor.

Consumption of marine farm feed by wild fish

Wild fish that aggregate around a fish farm experience significant changes in their diet. They consume more food than they do in natural habitats and they feed largely on artificial feed lost from the farm pens. Overseas studies have found that the consumption of waste feed by wild fish can alter body condition and reproductive success, with potential positive and negative effects. Physiological changes such as alterations to the levels and types of fats in wild fish can lead to reproductive effects that are positive (e.g., enhanced spawning potential) or negative (e.g., reduced fitness of offspring). [80]

The consequences for commercial fishers in Te Ara a Kiwa / Foveaux Strait will therefore depend on whether there is a net benefit or risk for blue cod and other commercially-harvested species from consuming marine farm feed. There is currently no specific information on how waste feed from existing salmon farms in New Zealand might modify the condition of wild fish (positively or negatively) in the vicinity. [81] Any risk to wild fish in the vicinity of the proposed site can be reduced by careful monitoring and management of feeding operations at the fish farm.

Biosecurity-related impacts

There are two main ways in which biosecurity risks associated with the marine farming operations may affect commercial fishing. Firstly, the presence of the salmon farm could increase the risk that a pest, disease or biotoxin will have significant adverse effects on commercially-harvested species, in particular oysters. These risks are reviewed in other reports prepared for NTS and are not addressed further in this report.

The second category of potential biosecurity impacts on commercial fishing arises from measures that may be required or agreed by discussion between NTS and local commercial fishers to protect farmed salmon from the risk of diseases introduced on the hulls of commercial fishing vessels. The 200m buffer zone is a measure to reduce biosecurity risks and additional voluntary measures may include an agreement for commercial fishing vessels operating at or transiting through the proposed site to have a Clean Vessel Pass issued by Environment Southland under the Fiordland Marine Regional Pathway Management Plan.[82] [83]

[80] Taylor, P. and Dempster, T. (2021).
[81] Ministry for Primary Industries (2013).
[82] Environment Southland (2017).
[83] Ngāi Tahu Seafood Resources (2020).

3.5 Other potential impacts

Seafood safety and quality

Experience in New Zealand and overseas indicates that salmon farming operations may elicit concerns – which may be actual or perceived – about the safety or quality of wild fish harvested in the vicinity of fish farms.

Seafood safety concerns arise in part as a consequence of the detection of elevated levels of metals in the sediments beneath fish farms. For example, monitoring of salmon farm sites in Marlborough has found elevated levels of both copper and zinc.[84] Wild fish at farm sites may therefore develop elevated levels of heavy metals which bioaccumulate in the food chain, such as copper. Wild fish may also consume organohalogenated contaminants (OHCs) – i.e., pollutants commonly found in marine ecosystems and which may occur in trace amounts in the fish-based components of salmon farm feed.[85]

Wild seafood quality concerns associated with use of antibiotics in salmon farming have been raised in other jurisdictions – for example, in Tasmania traces of antibiotics have been found in wild fish.[86] A 2007 risk assessment conducted by Food Standards Australia New Zealand (FSANZ) concluded that there are no public health risks associated with the consumption of Tasmanian farmed salmon and wild fish living in the waters surrounding their cages.[87] Although therapeutants such as antibiotics are not used to any significant extent in marine aquaculture in New Zealand (and approval is not sought for their use in NTS's application), if the use of therapeutants were to increase in New Zealand salmon farming, the Tasmanian experience with environmental monitoring and testing of nearby wild fish will become relevant.

Consumer seafood safety or quality concerns – whether actual (e.g., risk of damage to human health) or perceived (e.g., fear of consuming seafood that may be 'contaminated' or of poorer quality) – have immediate economic consequences for the seafood industry, as well as broader adverse effects on the fishing industry's reputation.

Long lived benthic species of commercial interest are present at the proposed site (e.g., blue cod) and may be attracted to the farm and become resident in the area. However, Taylor and Dempster (2021) conclude that:

- The high flow characteristics of the proposed site should reduce any risks of wild benthic or demersal fish developing elevated levels of heavy metals through bioaccumulation; and
- Levels of any OHC contaminants within the tissues of wild fish that become resident beneath salmon farms are likely to remain below those that would affect the fish themselves and below those considered safe for human consumption.

[84] Ministry for Primary Industries (2013).
[85] Taylor, P and Dempster, T (2021).
[86] Media report, 26 February 2024: here
[87] FSANZ (2007).

MPI's National Chemical Residues Programme includes commercially harvested seafood and provides a mechanism for MPI and the seafood industry to monitor contaminants in selected fish species, if necessary.[88]

Diver safety

Great white sharks and sevengill sharks are attracted to marine farms by the presence of dead fish in pens.[89] While most discussion about shark interactions with marine farming focuses on risks to sharks, the attraction of sharks to areas where dive fisheries operate also increases safety risks to commercial divers operating in pāua and kina fisheries near the proposed site. In the last decade, commercial shark cage diving operations which attract great white sharks to vessels in Te Ara a Kiwa / Foveaux Strait have caused significant safety concerns for pāua divers and the local Rakiura community.

NTS proposes to adopt mitigation measures such as shark exclusion netting around pens (which will not reduce risks to pāua or kina divers) and prompt removal of dead fish from pens so as to reduce predator attraction to the pens.[90] Other shark mitigation and avoidance measures recommended in NTS's shark assessment include:[91]

- Monitoring shark activity near the farm. If this recommendation is adopted, it may reduce risks to commercial pāua and kina divers by enabling NTS to advise divers if and when sharks are observed near the farms; and
- Developing a shark management approach in conjunction with the Department of Conservation. Any such shark management initiatives should be designed not only to reduce risks to sharks, but with the safety of other users of coastal waters in mind.

Debris on the seafloor

Debris (e.g., anchors, or material accidentally dropped on the seafloor at farm sites) left on the seafloor when farms are moved to new locations within the proposed site could interfere with commercial fishing at the site. This risk can be mitigated by the complete removal of all marine farm structures (including accidental debris) if a farm is relocated.

Vessel interactions

The proposed site is well used by commercial fishing vessels (see **Figure 6**). There will be some increased non-fishing vessel movements in the area while the marine farm is being constructed, and ongoing transiting of the area by marine farm service vessels.

During the construction phase, NTS proposes to develop and implement a Maritime Construction Safety Management Plan to manage any risks posed by additional transient vessel activity. On an

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[88] The species and contaminants to be monitored are selected and agreed on a year-by-year basis by MPI and the Seafood Standards Council. See http://www.mpi.govt.nz/food-safety/food-monitoring-and-surveillance/monitoring-programmes-under-the-animal-products-act/seafood-monitoring-programmes/

[89] Stantec (2019), and Francis (2019).

[90] Stantec (2019).

[91] Francis (2019).

ongoing basis, the navigational marking and lighting measures proposed by NTS will enable fishing vessels to avoid the farm structures if fishing in or transiting through the proposed site. Vessel navigation risks are addressed in more detail in the Hananui Aquaculture Project Navigational Risk Assessment.[92]

Increased recreational fishing pressure

Staff working on marine farms are well-placed to undertake recreational fishing when travelling to and from the farm site, or during breaks. A new marine farm may therefore increase recreational fishing pressure in the immediate vicinity of the farm site, and contribute to localised depletion of species such as pāua, rock lobster and kina that are highly valued by commercial, customary and recreational fishers.

Any risks to wild fisheries associated with increased recreational fishing pressure should be managed by a code of practice developed and implemented by NTS.

4. Conclusion

The proposed site overlaps with the Te Ara a Kiwa / Foveaux Strait (Bluff) oyster, blue cod, set net, and rock lobster fisheries and is adjacent to coastal fisheries for pāua and kina and nearby bottom trawl fisheries. Although multi-year, location-specific fishing data is not available for all species, the best available information indicates that the level of spatial displacement of commercial fishing at the proposed site will be minor for all species and fishing methods. Spatial displacement of commercial fishing effort will not have any impacts at a fishery-wide level, although it may have some adverse effects on individual fishers who regularly fish at the site. Effects on individual fishers are likely to be no more than minor.

The proposed salmon farm may attract some commercially harvested species and, in particular, may cause localised changes to the distribution of blue cod. Wild fish such as blue cod that are attracted to the marine farm may experience dietary changes as a result of consumption of waste marine farm feed. These impacts are local in scale, are not expected to result in changes to the distribution or abundance of blue cod or other commercially harvested species at a population level, and are unlikely to result in adverse effects on commercial fishing.

Biogenic habitats, which are considered to be of particular significance for the management of commercially-harvested species (e.g., as habitats for juvenile finfish or settlement areas for oysters), may be affected by deposition from marine farming operations. This risk can be mitigated by placing the farms away from known areas of biogenic habitat.

Commercial fishers may also express concerns about seafood safety and quality issues, diver safety, debris on the seafloor, vessel interactions, and increased recreational fishing pressure.

[92] Navigatus (2025).

Recommended conditions and operational practices

I note that NTS is proposing to minimise adverse effects on wild fish and fish habitats through a number of measures, including:

- Adopting efficient feed management practices to minimise the loss of uneaten food from the fish farms;
- Siting the farms in areas with minimal impacts on biogenic habitat; and
- Relocating the farms to alternative sites if actual effects of deposition on biogenic habitat are worse than those modelled (noting that modelling shows very low levels of deposition on biogenic habitat).

Any residual adverse effects on commercial fishing can be avoided, remedied or mitigated through the development of appropriate conditions and operational practices, including:

i. Developing and implementing a wild fish monitoring programme to improve information on impacts of the farming operation on the distribution and behaviour of wild fish populations (particularly blue cod), including testing under MPI's National Chemical Residues Programme;

ii. Designing shark management initiatives with the safety of harvesters in commercial dive fisheries in mind;

iii. Removing all marine farm structures and debris from the seafloor if a farm is relocated;

iv. Implementing a Maritime Construction Safety Management Plan to minimise navigation risks for fishers during construction;

v. Communicating regularly with commercial fishing representatives as the construction and operation of the fish farms proceeds; and

vi. Developing a code of practice to manage increased recreational fishing pressure arising from construction and operation of the fish farms.

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