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RELOCATION OF EXISTING LOWER FLOW MARLBOROUGH SALMON FARM SITES

Prepared for Ministry for Primary Industries

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QUALITY STATEMENT

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Ministry for Primary Industries

Relocation of Existing Lower Flow Marlborough Salmon Farm Sites

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1 Introduction

1.1 Background

Salmon farming has been occurring in the Marlborough Sounds for about 30 years. The New Zealand King Salmon Company Limited (NZ King Salmon) is now the only company farming salmon within the Sounds, with 11 fully consented salmon farming sites[1]. Six of the eleven consented sites are located in lower flow areas that are not ideal for modern salmon farming. Farming in lower flow areas results in more material accumulating on the seafloor, nutrient enrichment, and lower production.

In 2012, the Ministry for Primary Industries (MPI) began a process to identify potential aquaculture space for finfish, mussels and oysters in the Marlborough Sounds to deliver the Crown's Treaty aquaculture obligations to iwi. An initial list of over 100 sites was identified, and this was subsequently refined using constraint mapping of environmental, bio-physical, hydrological, fisheries and RMA constraints. This process demonstrated that suitable space in Marlborough for new salmon farms is extremely limited.

In 2014, local and central government, industry, scientists and the local community worked together to develop the *Best Management Practice guidelines for salmon farming in the Marlborough Sounds: Benthic environmental quality standards and monitoring protocols* (the Benthic Guidelines). The primary purpose of the Benthic Guidelines is to provide clear and consistent requirements for independently conducted annual benthic monitoring and management of existing salmon farms. The Benthic Guidelines specify Environmental Quality Standards, which provide the environmental 'bottom lines' against which effects of salmon farming will be assessed. Following the development of the Benthic Guidelines, NZ King Salmon undertook to progressively implement them for the existing salmon farms (other than those granted in 2013 through the Board of Inquiry process, which already had standards specified).

In 2015, MPI began work with the Marlborough District Council (MDC) and the Department of Conservation to explore options to enable Marlborough salmon farms to comply with the Benthic Guidelines.

In mid-2016, MPI, supported by MDC, convened the Marlborough Salmon Working Group (the Working Group). The Working Group comprised nominated individuals from MPI, Department of Conservation, MDC, Te Tau Ihu Forum, NZ King Salmon, Aquaculture New Zealand, and local community interest groups. The role of the Working Group was to provide non-binding recommendations to government in developing advice on options to implement the Benthic Guidelines, with those recommendations also helping to inform future planning for salmon farming in Marlborough. The Working Group has produced a report outlining a range of views, which is available on the MPI website.

Seven options have been considered for salmon farming in the Marlborough Sounds for lower-flow farms to comply with the Benthic Guidelines since work began in 2012:

- reducing stocking levels (and associated feed levels) at existing lower-flow farms
- waste capture
- seabed remediation
- improving feed efficiency
- land-based aquaculture
- offshore farming
- farm relocation

The only viable options at the present time with current technology are reducing stocking levels (and associated feed levels) at the existing lower-flow farms or relocating the farms to higher-flow sites. Existing lower-flow and higher-flow farms and potential relocation sites are shown in Maps 1 (Figure 1-1) and 2 (Figure 1-2) below.

[1] Fully consented means that consents are held for both occupation of the coastal marine area and discharges to the coastal marine area.

The other five options – waste capture, seabed remediation, improving feed efficiency, land-based aquaculture and offshore farming – are not currently viable if farms are to meet the Benthic Guidelines. However they could have potential for the future.

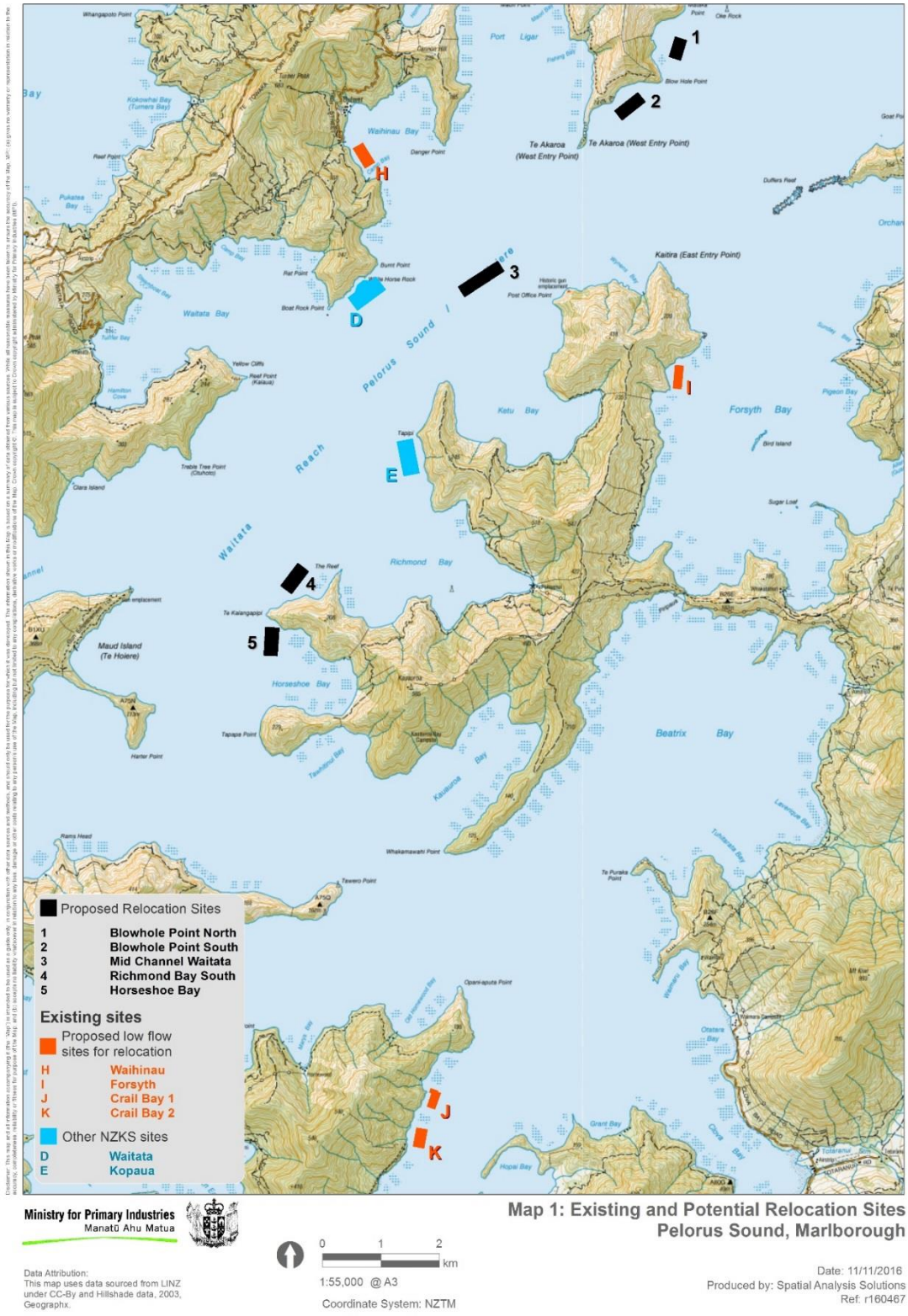


Figure 1-1: Existing and Potential Relocation Sites Pelorus Sound, Marlborough

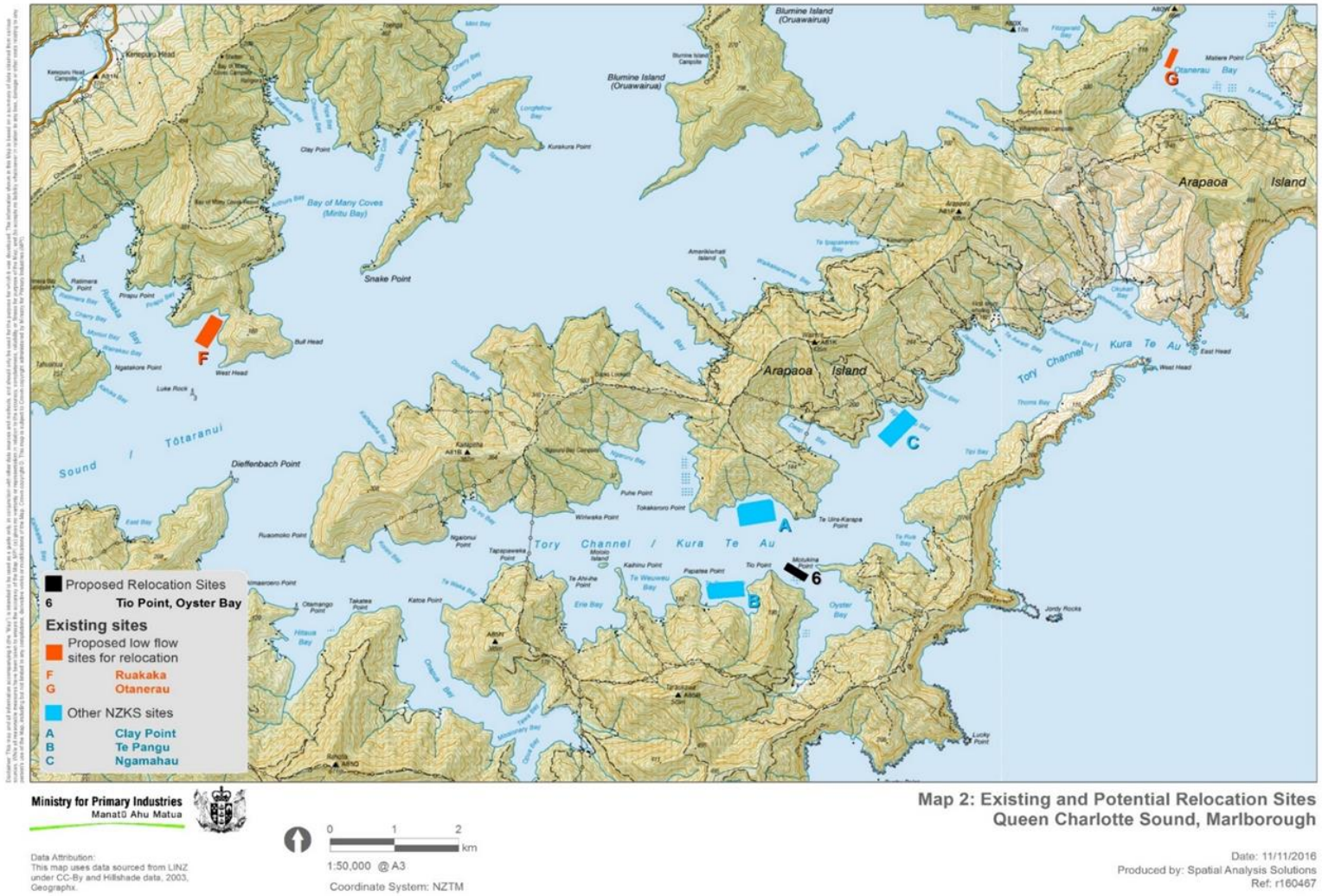


Figure 1-2: Existing and Potential Relocation Sites Queen Charlotte Sound, Marlborough

1.2 Purpose of Document

The purpose of this document is to:

- provide an outline of a proposal to make regulations under sections 360A of the Resource Management Act 1991 (the RMA) to amend the Marlborough Sounds Resource Management Plan to enable relocation of up to six salmon farm sites from existing lower-flow sites to higher-flow sites; and
- summarise the potential effects of relocating farms on the environment of the Marlborough Sounds.

A series of technical reports (as listed in section 4.1 of this summary AEE) have been commissioned to assess the environmental effects at both the existing and the potential sites, and these reports are presented in summary form in this document. An initial assessment of the proposal against the policy requirements of the various statutory documents is also outlined.

1.3 Structure of Document

This document contains the following sections:

Section 2: identifies the issue in relation to the existing sites in lower flow areas.

Section 3: discusses the statutory environment for salmon farming, including relevant legislation, national and regional policies and the current rule framework that applies to the Marlborough Sounds.

Section 4: outlines the potential relocation sites, and typical salmon farming activities that could occur on each site.

Section 5: provides a preliminary outline of the effects that might be expected from salmon farming sites, in order to provide context for the sections that follow. Section 5 outlines the relevant technical reports and the potential effects to provide general information to inform the site specific analysis in sections 6 and 7.

Section 6: contains a site-by-site analysis of the effects on the environment from salmon farming at each of the potential relocation sites in Pelorus Sound. Effects that might occur across the Sound, such as water quality and cumulative landscape effects are discussed separately.

Section 7: contains a site specific analysis of the effects on the environment from salmon farming at the potential Tio Point relocation site in Tory Channel.

Section 8: provides a discussion of potential effects for those matters (e.g. biosecurity and disease) where effects are common across all the potential relocation sites. This discussion provides a broad scale effects assessment, however effects can vary from site to site, and should be considered for each of the sites discussed in sections 6 and 7.

Section 9: contains a summary of the Cultural Impact Assessment work carried out to date by Maximize Consulting.

Section 10: discusses the potential economic effects from the potential relocation proposal.

Section 11: outlines potential changes to the Marlborough Sounds Resource Management Plan that would be necessary to facilitate the relocation of up to six sites in lower flow areas to sites in higher flow areas.

Section 12: outlines the RMA requirements in terms of s360A, s360B and Part 2.

2 Issue

2.1 Best management Practice Guidelines

The NZ King Salmon application to the Environmental Protection Authority (EPA) in 2011 for new salmon farms in Marlborough highlighted the need for co-operation between the aquaculture industry, MDC, iwi and the community when it comes to managing salmon farming and the marine environment.

MDC, NZ King Salmon, scientists and the local community (including the Sounds Advisory Group) worked together in 2014 to develop best practice guidelines to provide guidance on world-leading, best practice salmon farming. Public workshops were held as part of the process, to enable the public to provide input into the development of the guidelines.

The guidelines developed from this process are:

- *Best Management Practice guidelines for salmon farming in the Marlborough Sounds: Benthic environmental quality standards and monitoring protocols,* and
- *Best Management Practice guidelines for salmon farms in the Marlborough Sounds: Operations*.

The Best Management Practice Guidelines provide a framework for farm development and operational management, including detailed directives for assessment of farm effects on the wider environment (such as monitoring and environmental standards). The Best Practice Guidelines set out performance expectations in eight key operational aspects – ecosystem, environmental management, resources, community, community relations, waste, food security, and certification. As such, the Best Practice Guidelines provide a framework for the future development of salmon farming in Marlborough.

The Benthic Guidelines were finalised in November 2014, but have yet to be implemented in full. The Benthic Guidelines have been applied to the existing Te Pangu and Clay Point farms when existing consents were replaced.

2.1.1 Benthic environmental quality standards

The Benthic Guidelines provide guidance on the development and implementation of benthic monitoring programmes and environmental quality standards for salmon farming in Marlborough. Their primary purpose is to provide clear and consistent requirements for benthic monitoring and management of existing salmon sites.

A key element of the Benthic Guidelines is the use of an Enrichment Scale (ES) of 5 (ES5) to set a maximum permitted level of enrichment (‘bottom line’) beneath a salmon farm. At this point, species diversity has declined and the abundance of seabed life such as worms and nematodes is at its maximum. With these organisms turning over and irrigating the seabed, the organic matter from a farm (i.e. uneaten feed and faeces) is able to be processed at the rate it is deposited. Exceeding ES5 means the seabed receives too much organic matter, and this may reduce the availability of oxygen in the seabed sediments. Enrichment levels above ES5 can lead to changes in the type and number of marine species inhabiting the seabed and, in a worst case scenario, can lead to outgassing of methane and hydrogen sulphide.

2.1.2 Current compliance with the Benthic Guidelines

NZ King Salmon undertakes independent monitoring of its salmon farms as required by resource consent conditions. All farms are monitored according to the Benthic Guidelines and results reported to MDC against the relevant consent conditions as a measure of compliance. Additionally, the ES level can be used to assess benthic enrichment against the maximum permitted level of enrichment in the Benthic Guidelines.

Table 2-1 and Table 2-2 provide a summary of farm compliance (at the existing lower-flow sites) against ES5 for the 2012-2015 period.

Table 2-1: Maximum measured ES levels by site for 2012-2015

Maximum Enrichment Stage (95%CI) by consented site for 2012-2015				
	2012	2013	2014	2015
Otanerau	6.15 (0.05)	5.60 (0.4)	5.70 (0)	5.90 (0.4)
Ruakaka	5.37 (0.16)	5.00	5.60 (0.1)	5.30 (0.3)
Waihinau	4.31 (0.1)	5.10 (0.1)	5.40 (0.2)	4.60 (0.2)
Forsyth	4.80 (0.15)	5.60 (0.1)	5.60 (0)	6.00 (0.3)
Crail Bay (x2)	na	na	na	na
Maximum average score refers to the maximum ES average station score across each sampling site beneath a farm. This score is used to assess compliance with ES5.				

Table 2-2: Maximum measured ES levels compared to Benthic Guidelines

Maximum Enrichment Stage (95%CI) assessed per Benthic Guidelines. Actions required:				
	2012	2013	2014	2015
Otanerau	Destocking	Minor	Destocking	Major
Ruakaka	Minor	No action	Major	Minor
Waihinau	No action	Alert	Minor	No action
Forsyth	No action	Major	Major	Destocking
Crail Bay (x2)	na	na	na	na
Alert – Written Management Response Plan Minor – 24 months to compliance, improvement within 12 months required Major – More significant response to bring to compliance required. 12 months improvement Destocking – 4 months or end production cycle.				

No recent monitoring has been undertaken for the two Crail Bay sites as these have been not been used to grow salmon following destocking in 2011.

Given that the existing lower-flow farms have exceeded ES5 during the 2012-2015 period, it is likely that these farms may not be able to be reconsented under current feed discharge rates. Two possible alternatives are considered likely when replacement consents are considered for the existing lower-flow farms in 2021 and 2024:

- a farm successfully obtains a replacement consent, but with conditions to ensure compliance with the Benthic Guidelines; or
- if a farm does not comply with controlled activity status under the Marlborough Sounds Resource Management Plan, replacement consent for a farm is declined and the farm needs to be removed.

2.2 The Proposal

In order to address the effects identified above, the proposal being consulted on is whether the Minister for Primary Industries, exercising aquaculture responsibilities, should recommend regulations to:

- amend the Marlborough Sounds Resource Management Plan to provide for the relocation of up to six existing lower flow salmon farm sites to areas of higher flow

3 Statutory Environment

3.1 Introduction

The RMA, the New Zealand Coastal Policy Statement 2010, the Marlborough Regional Policy Statement 1995, the Marlborough Sounds Resource Management Plan 2003 and the proposed Marlborough Environmental Plan 2016 are all relevant to the potential relocation proposal.

An initial assessment of key policy issues is contained in sections 6, 7, 8, 9 and 12 of this document (prepared on the basis of the information currently available). This initial assessment will be subject to change as the public consultation process progresses, additional information is provided through that process and further discussions occur.

Before the Minister for Primary Industries, exercising aquaculture responsibilities, makes a final decision about whether to recommend making regulations under sections 360A and 360B of the RMA to amend the Marlborough Sounds Resource Management Plan, a full policy analysis against all the relevant objectives and policies in the relevant plans, and the other requirements contained in the RMA will be undertaken. This policy analysis will be based on the technical reports, the initial policy analysis outlined in sections 6, 7, 8, 9 and 12 of this document, the outcomes of public consultation, and the report to the Minister on the comments from public consultation.

3.2 Legislation

A number of acts are relevant to marine farming in general and therefore to any potential relocation of existing salmon farms, including the RMA, the Fisheries Act 1996 and the Maori Commercial Aquaculture Claims Settlement Act 2004.

3.2.1 Resource Management Act 1991

The following sections of the RMA are relevant to the proposal:

- sections 5, 6, 7 and 8 contain the purpose and principles;
- section 32 sets out requirements for evaluation reports;
- sections 63 – 70 set out requirements for regional plans;
- Part 7A sets out relevant provisions relating to the allocation of space in the coastal marine area;
- sections 360A – B set out matters relevant to any recommendation to amend regional coastal plans by regulations.

Each of these sections are discussed in section 12 of this summary AEE.

3.2.2 Other Legislation

If the potential amendments to the Marlborough Sounds Resource Management Plan are made by regulation and resource consent is then obtained for marine farming at a potential relocation site, approval is still needed under the Fisheries Act 1996. Under the Fisheries Act the Ministry for Primary Industries must assess the effects of the proposed marine farming on fishing through the undue adverse effects test (UAE).

After the UAE is done the settlement processes under the Maori Commercial Aquaculture Claims Settlement Act 2004 must be completed. These require the Crown to provide to the trustee under the Settlement Act, assets that are representative of 20% of new aquaculture space. This could be done by way of the provision of authorisations for new space, the payment of a financial equivalent for that space or the entering into of a regional agreement.

3.3 National Policy

The only relevant national policy document relating to the potential relocation proposal is the New Zealand Coastal Policy Statement 2010 (NZCPS).

3.3.1 New Zealand Coastal Statement

The NZCPS guides local authorities in the management of the coastal environment. Section 56 of the RMA sets out the requirement for an NZCPS and outlines that its purpose is to state priorities in order to achieve the purpose of the RMA in relation to the coastal environment.

The NZCPS sits at the same statutory level as other National Policy Statements under the RMA, meaning that all regional policy statements, regional plans, district plans and any regional or district proposed plans or variations must give effect to the objectives and policies contained in the NZCPS.

The NZCPS outlines objectives and policies which aim to give clear direction on the protection and management of the coastal environment. There are seven objectives and 29 policies in the NZCPS. Five objectives and 18 policies are relevant to the potential relocation proposal:

Objective 1: To safeguard the integrity, form, functioning and resilience of the coastal environment and sustain its ecosystems, including marine and intertidal areas, estuaries, dunes and land, by:

- *maintaining or enhancing natural biological and physical processes in the coastal environment and recognising their dynamic, complex and interdependent nature;*
- *protecting representative or significant natural ecosystems and sites of biological importance and maintaining the diversity of New Zealand's indigenous coastal flora and fauna; and*
- *maintaining coastal water quality, and enhancing it where it has deteriorated from what would otherwise be its natural conditions, with significant adverse effects on ecology and habitat, because of discharges associated with human activity.*

This objective links to Policies 1, 3, 4, 5, 6, 7, 11, 12, 13, 15, 21 and 23.

Objective 2: To preserve the natural character of the coastal environment and protect natural features and landscape values through:

- *recognising the characteristics and qualities that contribute to natural character, natural features and landscape values and their location and distribution;*
- *identifying those areas where various forms of subdivision, use, and development would be inappropriate and protecting them from such activities; and*
- *encouraging restoration of the coastal environment.*

This links to Policies 1, 3, 6, 7, 13, 14, 15 and 18.

Objective 3: To take into account the principles of the Treaty of Waitangi, recognise the role of tangata whenua as kaitiaki and provide for tangata whenua involvement in the management of the coastal environment by:

- *recognising the ongoing and enduring relationship of tangata whenua over their lands, rohe and resources;*
- *promoting meaningful relationships and interactions between tangata whenua and persons exercising functions and powers under the Act;*
- *incorporating mātauranga Māori into sustainable management practices; and*
- *recognising and protecting characteristics of the coastal environment that are of special value to tangata whenua.*

This objective links to Policies 2, 6, 7, 11, 12, 13, 15, 17, 21 and 23.

Objective 4: To maintain and enhance the public open space qualities and recreation opportunities of the coastal environment by:

- *recognising that the coastal marine area is an extensive area of public space for the public to use and enjoy;*
- *maintaining and enhancing public walking access to and along the coastal marine area without charge, and where there are exceptional reasons that mean this is not practicable providing alternative linking access close to the coastal marine area; and*
- *recognising the potential for coastal processes, including those likely to be affected by climate change, to restrict access to the coastal environment and the need to ensure that public access is maintained even when the coastal marine area advances inland.*

This objective links to Policies 1, 6, 7, 13, 15, 17, 18, 21 and 23.

Objective 6: To enable people and communities to provide for their social, economic, and cultural wellbeing and their health and safety, through subdivision, use, and development, recognising that:

- *the protection of the values of the coastal environment does not preclude use and development in appropriate places and forms, and within appropriate limits;*

- *some uses and developments which depend upon the use of natural and physical resources in the coastal environment are important to the social, economic and cultural wellbeing of people and communities;*
- *functionally some uses and development can only be located on the coast or in the coastal marine area;*
- *the coastal environment contains renewable energy resources of significant value;*
- *the protection of habitats of living marine resources contributes to the social, economic and cultural wellbeing of people and communities;*
- *the potential to protect, use, and develop natural and physical resources in the coastal marine area should not be compromised by activities on land;*
- *the proportion of the coastal marine area under any formal protection is small and therefore management under the Act is an important means by which the natural resources of the coastal marine area can be protected; and*
- *historic heritage in the coastal environment is extensive but not fully known, and vulnerable to loss or damage from inappropriate subdivision, use and development.*

This objective links to Policies 2, 6, 7, 8, 12, 17, 18, 21 and 23.

The relevant policies noted are:

Policy 1: Extent and characteristics of the coastal environment

Policy 2: The Treaty of Waitangi, tangata whenua and Māori heritage

Policy 3: Precautionary approach

Policy 4: Integration

Policy 5: Land or waters managed or held under other Acts

Policy 6: Activities in the coastal environment

Policy 7: Strategic planning

Policy 8: Aquaculture

Policy 11: Indigenous biological diversity (biodiversity)

Policy 12: Harmful aquatic organisms

Policy 13: Preservation of natural character

Policy 14: Restoration of natural character

Policy 15: Natural features and natural landscapes

Policy 17: Historic heritage identification and protection

Policy 18: Public open space

Policy 21: Enhancement of water quality

Policy 23: Discharge of contaminants

3.4 Regional Policy

Regional authorities are required to prepare Regional Policy Statements (RPS) which provide an overview of a region's resource management issues, and objectives, policies and methods to address those issues.

RPS sit below Regulations and National Environmental Standards, as well as the NZCPS and any other National Policy Statement. An RPS must give effect to those higher order documents. An RPS sits above any regional or district plans, and regional and district plans must give effect to the objectives and policies contained in the RPS for the region.

Marlborough District Council has two RPS that are relevant, the operative Marlborough Regional Policy Statement (MRPS) and the proposed Marlborough Environment Plan (pMEP), which includes regional policy statement provisions. These documents are discussed below.

3.4.1 Marlborough Regional Policy Statement

The MRPS was made operative in 1995 and contains objectives and policies relevant to the potential relocation including:

- Objective 5.3.2 – Coastal marine water quality: which seeks that the water quality in the Coastal Marine Area (CMA) is maintained at a level which provides for the sustainable management of the marine ecosystem.
  - Policy 5.3.5 – Contamination from water-based activities: which seeks to avoid, remedy or mitigate the reduction of coastal water quality by contaminants arising from within the CMA.

Effects on water quality are discussed in sections 6.8 and 7.2.9 of this report.

- Objective 5.3.10 – Coastal marine habitat: which seeks to maintain or enhance natural species diversity and integrity of marine habitats.
  - Policy 5.3.11 – Habitat disruption: which seeks to avoid, remedy or mitigate habitat disruption from activities occurring within the CMA.

Effects on coastal marine habitat are discussed in sections 6, 7 and 8 of this report.

- Objective 7.1.2 – Quality of life: seeks to maintain and enhance the quality of life of people in Marlborough while ensuring that activities do not adversely affect the environment.
  - Policy 7.1.7 – Amenity values: seeks to promote the enhancement of the amenity values provided by the unique character of Marlborough settlements and locations.

Effects on amenity values are discussed in sections 6 and 7 of this report.

- Objective 7.1.9 – Provision for activities: seeks to enable present and future generations to provide for their wellbeing by allowing use, development, and protection of resources provided any adverse effects of activities are avoided, remedied or mitigated.
- Objective 7.2.7 – Subdivision, use and development of the coastal environment: seeks that subdivision, use and development of the coastal environment occurs in a sustainable way.
  - Policy 7.2.8 – Coastal environment: seeks to ensure that subdivision, use and development of the coastal environment is appropriate.
  - Policy 7.2.10 – Allocation of coastal space: seeks that (a) public access and recreational use will be considered when assessing all proposals for development of the CMA, and (d) allocation of space for aquaculture in the CMA will be based on marine habitat sustainability, habitat protection, landscape protection, navigation and safety, and compatibility with other adjoining activities

The proposal as a whole, and the assessments of effects summarised in sections 6 and 7 of this report, address these objectives and policies.

- Objective 7.3.2 – Cultural and heritage values: seeks that buildings, sites, and locations identified as having significant cultural or heritage value are retained for the continued benefit of the community
  - Policy 7.3.3 – Cultural and heritage features: seeks to protect identified significant cultural and heritage features.
- Objective 7.3.5 – Cultural values: seeks to recognise and accommodate the diversity of cultural values that exist within the community.

MPI has commissioned Maximize Consulting to work with local iwi to produce a Cultural Impact Assessment, a full copy of which is available online. Ngati Koata has also prepared their own Cultural Impact Assessment. Effects on European heritage values are discussed throughout section 6 and in section 7.2.6 of this report.

- Objective 8.1.2 – Visual character: seeks to maintain and enhance the visual character of the indigenous, working and built landscapes.
  - Policy 8.1.6 – Natural character of the coastal environment: seeks to preserve the natural character of the coastal environment.

Effects on landscape and natural character are discussed throughout section 6 and in section 7.2.2 of this report.

3.4.2 Proposed Marlborough Environment Plan – Regional Policy Statement provisions

The pMEP was notified in June 2016, with the exception of the aquaculture section which is not yet notified. The pMEP is a combined regional policy statement, regional coastal plan, regional plan and district plan and objectives and policies are identified throughout as to which planning document category they fall into. The regional policy statement objectives and policies relevant to the relocation proposal contained in the pMEP are outlined below. Sections of this report that discuss each of these matters are located in sections 6, 7, 8 and 9 of this report.

Cultural values and tangata whenua

- Objective 3.1 – The principles of the Treaty of Waitangi/Te Tiriti o Waitangi are taken into account in the exercise of the functions and powers under the RMA.
- Objective 3.2 – Natural and physical resources are managed in a manner that takes into account the spiritual and cultural values of Marlborough's tangata whenua iwi and respects and accommodates tikanga Māori.
- Objective 3.3 – The cultural and traditional relationship of Marlborough's tangata whenua iwi with their ancestral lands, water, air, coastal environment, waahi tapu and other sites and taonga are recognised and provided for.
- Objective 3.5 – Resource management decision making processes that give particular consideration to the cultural and spiritual values of Marlborough's tangata whenua iwi.
  - Policy 3.1.1 – seeks to take into account the principles of the Treaty of Waitangi/Te Tiriti o Waitangi and recognise the right of each iwi to define their own preferences for the sustainable management of natural and physical resources where this is not inconsistent with the RMA.
  - Policy 3.1.2 – seeks to ensure that tangata whenua are consulted early in a project to enable their cultural values to be taken into account.
  - Policy 3.1.3 – enables decision makers to ensure tangata whenua iwi values, beliefs and spiritual connections to natural and physical resources are maintained and enhanced where an application for a plan change is likely to affect their relationship with their culture and traditions.
  - Policy 3.1.5 – seeks to ensure iwi management plans are taken into account in resource management decision making processes.

Use of natural and physical resources

- Objective 4.1 – Marlborough's primary production sector and tourism sector continue to be successful and thrive whilst ensuring the sustainability of natural resources.
  - Policy 4.1.2 – seeks to enable sustainable use of natural resources in the Marlborough environment.
  - Policy 4.1.3 – seeks to maintain and enhance the quality of natural resources.
- Objective 4.3 – The maintenance and enhancement of the visual, ecological and physical qualities that contribute to the character of the Marlborough Sounds.
  - Policy 4.3.2 – seeks to identify the qualities and values that contribute to the unique and iconic character of the Marlborough Sounds and protect these from inappropriate use and development.
  - Policy 4.3.3 – seeks to provide direction on the appropriateness of resource use activities in the Marlborough Sounds environment.
  - Policy 4.3.4 – seeks to enhance the qualities and values that contribute to the unique and iconic character of the Marlborough Sounds.
  - Policy 4.3.5 - seeks to recognise that the Marlborough Sounds is a dynamic environment.

Allocation of public resources

- Objective 5.10 – Equitable and sustainable allocation of public space within Marlborough's coastal marine area.

  - Policy 5.10.1 – recognises that there are no inherent rights to be able to use, develop or occupy the CMA.
  - Policy 5.10.2 – 'first in, first served' is the default method for allocation, however when competing demand for coastal space occurs Council may consider the option of introducing an alternative regime.
  - Policy 5.10.3 – where a right to occupy the CMA is sought, the area of exclusive occupation should be minimised to that necessary and reasonable to undertake the activity, having regard to the public interest.

Natural character

- Objective 6.1 – Establish the degree of natural character in the coastal environment.
  - Policy 6.1.2 – the extent of the coastal environment is identified in the Marlborough Environment Plan to establish the areas of land and CMA to which management may need to be applied in order to protect the natural character of the coastal environment from inappropriate use and development.
  - Policy 6.1.4 – seeks to identify those areas of the coastal environment that have high, very high or outstanding natural character.
- Objective 6.2 – Preserve the natural character of the coastal environment, and protect it from inappropriate subdivision, use and development.
  - Policy 6.2.1 – seeks to avoid the adverse effects of use or development on areas of the coastal environment with outstanding natural character values.
  - Policy 6.2.2 – seeks to avoid significant adverse effects of use or development on coastal natural character, having regard to the significance criteria in Appendix 4.
  - Policy 6.2.3 – where natural character is classified as high or very high, avoid any reductions in the degree of natural character in the coastal environment.
  - Policy 6.2.5 – seeks to recognise that development in parts of the coastal environment that have already been modified by past and present resource use activities is less likely to result in adverse effects on natural character.
  - Policy 6.2.6 – in assessing the appropriateness of use or development in coastal environments, regard shall be given to the potential to enhance natural character in the area subject to the proposal.
  - Policy 6.2.7 – in assessing the cumulative effects of activities on the natural character of the coastal environment consideration shall be given to: (a) the effect of allowing more of the same or similar activity; (b) the result of allowing more of a particular effect, whether from the same activity or from other activities causing the same or similar effect; and (c) the combined effects from all activities in the coastal environment in the locality.

Indigenous Biodiversity

- Objective 8.1 – Marlborough's remaining indigenous biodiversity in terrestrial, freshwater and coastal environments is protected.
- Objective 8.2 – An increase in area/extent of Marlborough's indigenous biodiversity and restoration or improvement in the condition of areas that have been degraded.
  - Policy 8.1.3 – having adequate information on the state of biodiversity in coastal environments in Marlborough to enable decision makers to assess the impact on biodiversity values from various activities and uses.
  - Policy 8.3.1 – manage the effects of use and development in the coastal environment by avoiding adverse effects on matters as set out in NZCPS Policy 11(a), where areas are mapped as ecologically significant marine sites, or avoiding remedying or mitigating adverse effects on matters as set out in NZCPS Policy 11(b).
  - Policy 8.3.2 – where use or development requires resource consent, the adverse effects on areas, habitats or ecosystems with indigenous biodiversity value shall be: (a) avoided where it is a significant site in the context of Policy 8.1.1; and (b) avoided, remedied or mitigated where indigenous biodiversity values have not been assessed as being significant in terms of Policy 8.1.1.
  - Policy 8.3.5 – lists a number of effects that, in the context of Policy 8.3.1 and Policy 8.3.2, are to be avoided or otherwise remedied or mitigated.

  - Policy 8.3.7 – within an identified ecologically significant marine site fishing activities using techniques that disturb the seabed must be avoided.

Public Access and Open Space

- Objective 9.1 – The public are able to enjoy the amenity and recreational opportunities of Marlborough's coastal environment and areas of historic interest.
  - Policy 9.1.1 - the following areas are identified as having a high degree of importance for public access and the Marlborough District Council will as a priority focus on enhancing access to and within these areas: coastal marine area, particularly…Queen Charlotte Sound (including Tory Channel).
  - Policy 9.1.7 – seeks to recognise that there is an existing network of marinas at Picton, Waikawa and Havelock, publicly owned community jetties, landing areas and launching ramps that make a significant contribution in providing access for the public to Marlborough's coastal areas.

Heritage Resources

- Objective 10.1 – Retain and protect heritage resources that contribute to the character of Marlborough.
  - Policy 10.1.5 – seeks to avoid adverse effects on the historic heritage values of Category I heritage resources.

Use of the Coastal Environment

- Objective 13.1 – Areas of the coastal environment where the adverse effects from particular activities and/or forms of subdivision, use or development are to be avoided are clearly identified.
  - Policy 13.1.1 – seeks to avoid adverse effects from use and development activities on areas identified as having: (a) outstanding natural character; (b) outstanding natural features and/or outstanding natural landscapes; (c) significant marine biodiversity value; and (d) significant historic heritage value.
- Objective 13.2 – Subdivision, use or development activities take place in appropriate locations and forms and within appropriate limits.
  - Policy 13.2.1 - the appropriate locations, forms and limits of use and development activities in Marlborough's coastal environment are those that recognise and provide for, and otherwise avoid, remedy or mitigate adverse effects on the following values: natural character, the relationship of Maori with their culture and traditions, space for the public to use and enjoy, public access to and along the CMA, coastal ecosystems, water quality and coastal amenity values.
  - Policy 13.2.2 - in addition to the values in Policy 13.2.1, there are a number of different matters that shall be considered by decision makers in determining whether use and development activities in Marlborough's coastal environment are appropriate at the location proposed and of an appropriate scale, form and design.
  - Policy 13.2.4 - attributes that may be considered when assessing any effects on coastal amenity value in a particular location include natural character, biodiversity, public access, visual quality, high water quality, recreational opportunities, structures and activities, open space, tranquillity and peacefulness.
  - Policy 13.2.5 - amenity values of the coastal environment can be maintained and enhanced in a number of different ways.
  - Policy 13.2.6 - in determining the extent to which coastal amenity values will be affected by any particular use and/or development, the following shall be considered: (a) individual and communities values about the area subject to application; (b) the amenity related attributes of the area; and (c) in regard to the changing nature of the coastal environment, the extent to which amenity values would be so affected by the proposed use or development that those values could no longer be maintained or enhanced.
- Objective 13.12a – Minimise the disposal or deposition of organic or inorganic material into the CMA.

3.4.3 Marlborough Sounds Resource Management Plan

The relevant objectives and policies for this proposal contained in the MSRMP are outlined below. Parts of this report that discuss each of these are located in sections 6 and 7 of this report.

2.2 Natural Character

- Objective 1 – The preservation of the natural character of the coastal environment and the protection of it from inappropriate use and development.
  - Policy 1.1 – Avoid the adverse effects of use and development within those areas of the coastal environment which are predominantly in their natural state and have natural character which has not been compromised.
  - Policy 1.2 – Appropriate use and development will be encouraged in areas where the natural character of the coastal environment has already been compromised, and where the adverse effects of such activities can be avoided, remedied or mitigated.
  - Policy 1.3 – To consider the effects on those qualities, elements and features which contribute to natural character, including: coastal landforms, indigenous flora and fauna (and their habitats), water and water quality, scenic or landscape values, cultural heritage values, and habitat of trout.

4.3 Indigenous Vegetation and Habitats of Indigenous Fauna

- Objective 1 – The protection of significant indigenous flora and fauna (and trout and salmon) and their habitats from the adverse effects of use and development.
  - Policy 1.2 – Avoid, remedy or mitigate the adverse effects of land and water use on areas of significant ecological value.

6.1.2 Tangata Whenua and Heritage

- Objective 1 – Recognition and provision for the relationship of Marlborough's Maori to their culture and traditions with their ancestral lands, waters, sites, waahi tapu and other taonga.
  - Policy 1.1 – Recognise and protect sites of significance to tangata whenua.
  - Policy 1.2 – Recognise values important to tangata whenua, including the concepts of mauri, effects on the mana of iwi or hapu, and the ability of tangata whenua to provide manaakitanga.
  - Policy 1.3 – Recognise the role of tangata whenua as kaitiaki in the CMA.
  - Policy 1.4 – Recognise and provide for continued tangata whenua access to, and use, of traditional coastal resources such as maataitai, taiapure and taonga raranga.
  - Policy 1.5 – Maintain and facilitate communication with iwi representatives which ensures that where appropriate, issues of importance to iwi are drawn to the Council's attention.

8.3 Public Access

- Objective 1 – That public access to and along the CMA be maintained and enhanced.
  - Policy 1.3 – To prevent the erection of structures and marine farms that restrict public access in the CMA where it is subject to high public use.

9.2.1 Coastal Marine

- Objective 1 – The accommodation of appropriate activities in the CMA whilst avoiding, remedying or mitigating the adverse effects of those activities.
  - Policy 1.1 – Seeks to avoid, remedy and mitigate adverse effects of the use and development of resources on the CMA on a range of identified values.
  - Policy 1.2 – Adverse effects of use or development in the coastal environment should as far as practicable be avoided. Where this is not practicable, the adverse effects should be mitigated and provision made for remedying those effects to the extent practicable.
  - Policy 1.3 – Exclusive occupation of the coastal area or occupation which effectively excludes the public will only be allowed to the extent reasonably necessary to carry out the activity.

- Policy 1.6 – Ensure recreational interests retain a dominant status over commercial activities that require occupation of coastal space and which preclude recreational use in Queen Charlotte Sound, including Tory Channel, but excluding Port and Marina Zones.
- Policy 1.14 – To enable a range of activities in appropriate places in the waters of the Sounds including marine farming, tourism and recreational and cultural uses.
- Policy 1.17 – Enable the marine farming of salmon by identifying three appropriate sites in the Plan as Coastal Marine Zone 3, where salmon farming is a discretionary activity.

There are a number of relevant schedules in the MSRMP, in particular:

- Appendix B – Schedule of Areas of Ecological Value.
- Appendix D – Schedule of Specifically Identified Marine Farms.

The Schedule of Areas of Ecological Value sets out areas identified as King Shag feeding or breeding areas, along with other areas of ecological value. The Schedule of Specifically Identified Marine Farms sets out the activity status (controlled or discretionary) for marine farming within certain areas and sets out cage area boundaries for salmon farm sites in CMZ3.

3.4.4 Proposed Marlborough Environment Plan – regional plan provisions

As noted in section 3.4.2 of this report, the pMEP is a combined regional policy statement, regional coastal plan, regional plan and district plan. Many of the objectives and policies identified in section 3.4.2 are also regional coastal plan provisions, but are not repeated here. In addition to the objectives and policies outlined in section 3.4.2, the following policies are also relevant to the potential relocation proposal. Sections of this report that discuss each of these matters are located in sections 6, 7 and 8 of this report.

Public Access and Open Space

- Policy 9.1.13 – When considering resource consent applications for activities, or structures in or adjacent to the CMA, the impact on public access shall be assessed.

Use of the Coastal Environment

- Policy 13.12.2 – seeks that the disposal of contaminants or material containing contaminants should be avoided.

There are a number of relevant schedules in the pMEP, including:

- Appendix 1 - Landscape Schedule of Values.
- Appendix 2 - Coastal Natural Character Schedule of Values.

The Landscape Schedule of Values sets out values contributing to areas with outstanding natural features and landscapes and areas with high amenity. The Coastal Natural Character Schedule of Values sets out values contributing to high, very high and outstanding coastal natural character.

4 Proposed Salmon Farming Sites and Operations

4.1 Identification of sites

For a salmon farm to be successful, it needs to be situated in an environment which is relatively sheltered, has a good depth of water, preferably strong water flow, well oxygenated and unpolluted water, and a steady temperature of 12-17ºC.

In 2012, MPI began a process to identify potential aquaculture space for finfish, mussels and oysters in the Marlborough Sounds to deliver the Crown's Treaty aquaculture obligations to iwi. An initial list of over 100 sites was identified, and this was subsequently refined down to 9 sites and then down to 6 sites following constraint mapping using environmental, bio-physical, hydrological, fisheries and RMA constraints. This process demonstrated that suitable space in Marlborough for new salmon farms is extremely limited.

In 2015, MPI began work with MDC and the Department of Conservation to explore options to enable Marlborough salmon farms to comply with the Benthic Guidelines. The initial work to identify suitable aquaculture space for settlement was used as a baseline to identify potential suitable salmon space. Nine potential higher-flow sites (as outlined in Table 4-1) were eventually identified for detailed investigation of their suitability to grow salmon as part of an Assessment of Environment Effects (AEE) process.

Table 4-1: Potential relocation sites

Waitata Reach	Tory Channel
Blowhole North	Tipi Bay
Blowhole South	Motukina
Waitata Mid-Channel	Tio Point
Richmond Bay South	Te Weka Bay
Horseshoe Bay	

A series of independent research investigations were then undertaken, and are summarised in this summary AEE. The full list of investigations and the organisations responsible for each are outlined in Table 4-2.

Table 4-2: Research investigations for potential relocation sites

Research investigation	Provider	Peer review
Navigation	Navigatus Consulting Ltd	
Landscape and natural character	Hudson Associates Landscape Architects	Drakeford Williams Ltd
Recreation and Tourism	TRC Tourism Ltd	
Seabirds	NIWA	
Marine mammals	Cawthorn and Associates	
Pelagic fish	Statfishtics	
Benthic	NIWA Cawthron Institute (Tio Point site)	Catriona McLeod – University of Tasmania
Water quality	NIWA	Cawthron Institute
Discharges (Cu/Zn, greywater)	Cawthron Institute	

Research investigation	Provider	Peer review
Disease	DigsFish	
Biosecurity	Cawthron Institute	
Underwater lighting	Cawthron Institute	
Noise	Marshall Day Acoustics	
Cultural impact assessment	Maximize Consulting Ltd Ngati Koata	
Heritage impacts	HistoryWorks	
Social impacts	Taylor Baines & Associates	Quigley Watts Ltd
Economic analysis	Pricewaterhouse Cooper	EY
Operations	NZ King Salmon	
Engineering	OCEL	

Through the research investigations, significant issues in relation to benthic habitat were identified for the Tipi Bay and Motukina sites, with potentially significant issues also likely at the Te Weka Bay site. Navigation issues were identified at the Motukina site, which was located at the turning point for the interisland ferries and other shipping in Tory Channel. The potential for significant residential amenity effects was identified for the Motukina and Te Weka Bay sites. Cumulative landscape effects were identified for the Tio Point and Motukina sites, in combination with the existing Clay Point and Te Pangu farm sites, meaning that one but not both of Tio Point and Motukina were considered acceptable from a landscape perspective. Continuing with the Tipi Bay, Motukina and Te Weka Bay sites was therefore not considered consistent with the requirements of the RMA.

As a result of the research investigations six potential relocation sites have therefore been identified as preferred from a potential 9 sites. The six potential sites that are the subject of the potential relocation proposal are:

1. Blowhole Point North – Waitata Reach
2. Blowhole Point South– Waitata Reach
3. Waitata Mid Channel – Waitata Reach
4. Richmond Bay South – Waitata Reach
5. Horseshoe Bay – Waitata Reach
6. Tio Point – Tory Channel

The location of the potential relocation sites, the existing sites that could be relocated, and the current zonings of the areas under the MSRMP are shown in Figures 4-1 and 4-2.

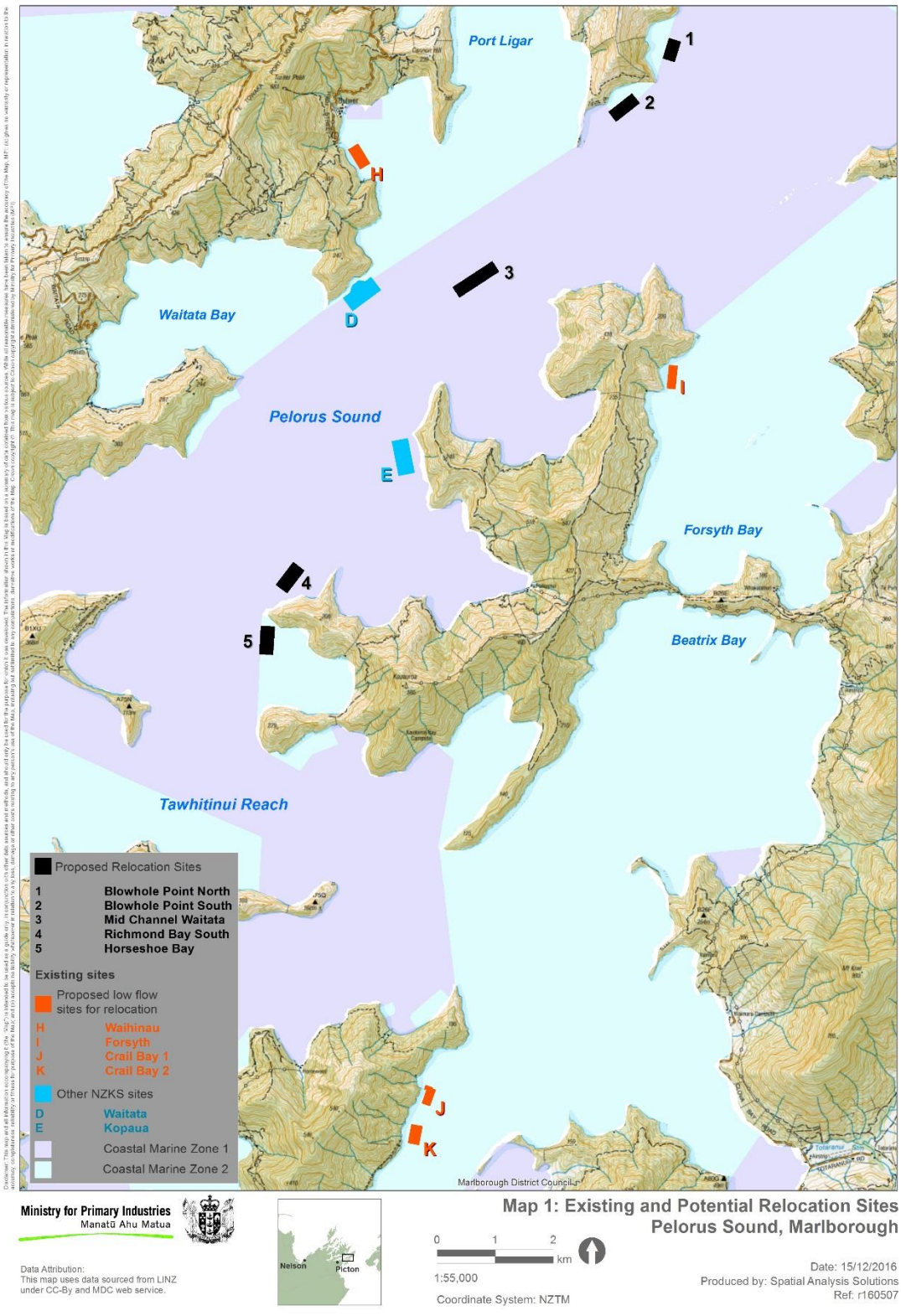


Figure 4-1: Existing and Potential Relocation Sites Pelorus Sound, Marlborough with MSRMP zoning

The current zoning of the potential relocation sites under the MSRMP is outlined in Table 4-3.

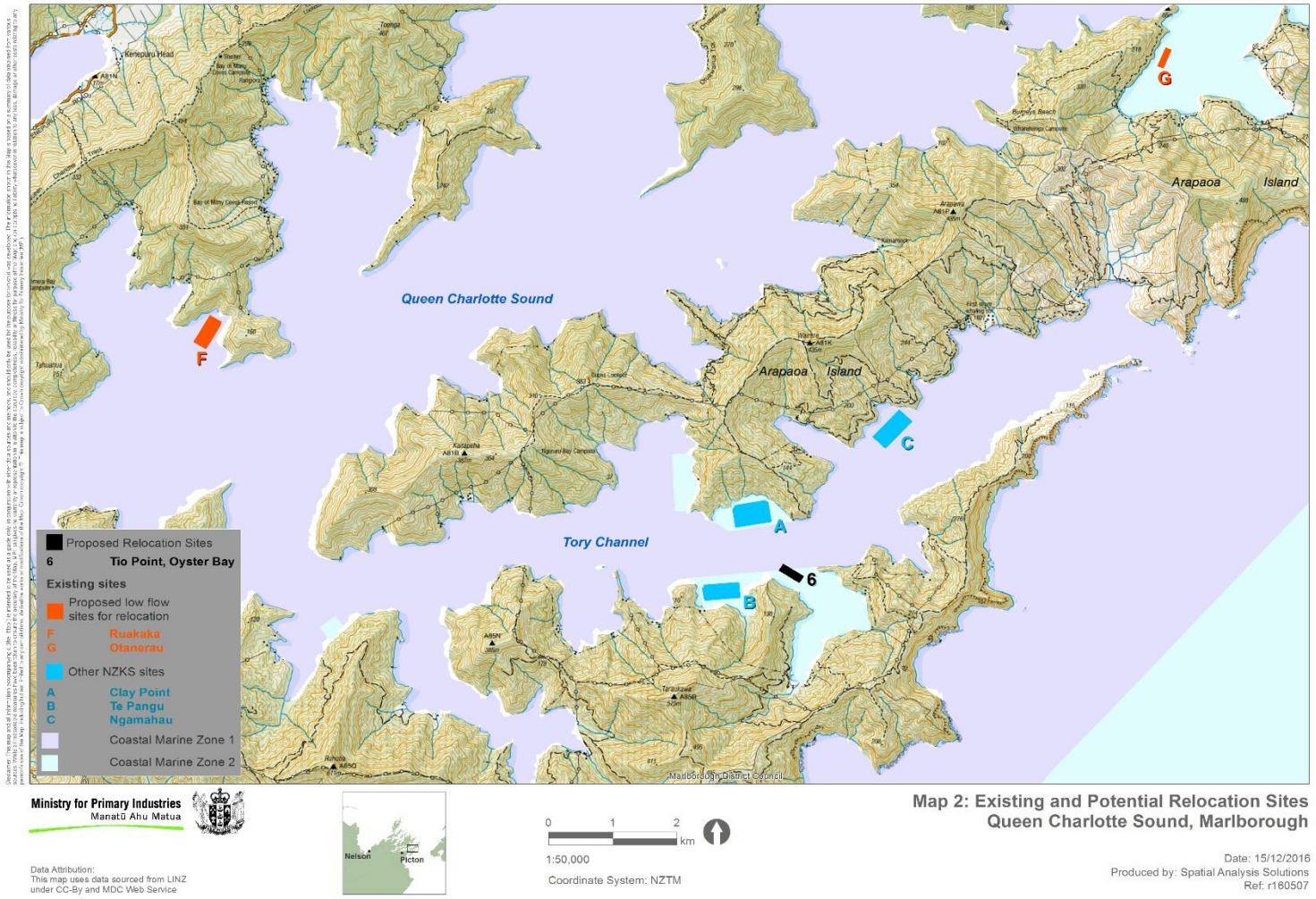


Figure 4-2: Existing and Potential Relocation Sites Queen Charlotte Sound, Marlborough with MSRMP zoning

Table 4-3: MSRMP Zones for potential relocation sites

Site ID	Location	CMZ
#34	Blowhole Point North, Pelorus Sound	CMZ1
#112	Blowhole Point South, Pelorus Sound	CMZ1 (35%) CMZ2 (65%)
#125	Waitata Mid-Channel, Pelorus Sound	CMZ1
#106	Richmond Bay South, Pelorus Sound	CMZ1
#124	Horseshoe Bay, Pelorus Sound	CMZ2
#156	Tio Point, Tory Channel	CMZ1 (30%) CMZ2 (70%)

The potential relocation proposal would require adjustments to be made to the Coastal Marine Zone zoning at each site. The potential adjustments are outlined in section 11 of this report.

4.2 Design and Layout of Proposed Farms

4.2.1 Structures

Any farms that are relocated would be constructed in one of the following designs, dependent on the physical conditions (such as wave height, swell and exposure) at a particular site:

- rectangular steel farm
- rectangular flexible steel platform farm, and
- circular plastic farm.

The rectangular steel farm design is currently utilised on the existing Clay Point and Te Pangu Farms (see Figure 4-3 below). The structure comprises a buoyant steel structure, surrounded by netting to keep out predators and contain the farmed salmon.[2]

Figure 4-3: Rectangular Steel Farm[3]

The rectangular flexible steel platform design is currently utilised on the Waitata and Kopāua Farms (see Figure 4-4). The design has a lower profile, hinged structural assembly (on platforms and mooring mounts) compared to the rectangular steel farm design and uses foam filled plastic structures for buoyancy.[4]

[2] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.11
[3] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p. 12
[4] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.11

Figure 4-4: Rectangular Steel Platform Farm[5]

The circular plastic farm design is made up of plastic tube rings and netting and would be a change from NZ King Salmon's existing, established practices in the Marlborough Sounds (see Figure 4-5 for an example of circular pens, located in Norway). This design is currently used on a farm in Beatrix Bay in the Marlborough Sounds (not operated by NZ King Salmon), and it has previously been used (by a different company) on the Crail Bay sites.

Figure 4-5: Circular Farm Design[6]

Farms established on the potential relocation sites would also (with the exception of the Waitata Mid-Channel site) include a main barge to provide for service and storage of marine farm supplies and facilities as well as an office, living and servicing quarters for those staff staying on the farm sites. At the potential Waitata Mid-Channel site a low profile semi-submersible feed barge is proposed, with no staff facilities. The different types of feed and accommodation barges currently used on salmon farm sites can be seen in Figures 4-3 and 4-4 above. The Waitata Mid-Channel barge would be of a design not used previously in the Marlborough Sounds.

4.2.2 Mooring

All of the farm designs described above are connected to the seabed by a mooring system comprised of tensioned cables or rubber flexi moorings connected to screw anchors.[7] Screw anchors are preferred as this reduces the likelihood of mooring failure and farm breakaway. The circular plastic farm design uses a slightly different mooring arrangement compared to the rectangular farm design. Examples of both types of moorings are provided in Appendix A, and full outlines of mooring designs for each potential relocation site are contained in engineering reports prepared by OCEL Ltd.[8]

[5] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p. 11
[6] Source: Tim Dempster
[7] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.11
[8] See for example OCEL (2016) Engineering Feasibility of the Proposed Salmon Farm at North Blowhole Point Site (34)

Net pens typically occupy 1-1.5ha of surface area, with moorings occupying approximately 10 times greater the area of surface occupation.[9]

The technical reports from OCEL confirm that marine farms of the proposed designs can be safely and securely anchored at each of the potential relocation sites.

4.2.3 Lighting

All farms would have lighting around the net pens (to demarcate their presence), and in buildings and also underwater lighting within the net pens for fish management.

The lighting for demarcating a farm structure is a requirement for navigational and maritime safety. Lighting is designed in accordance with regional plan rules and resource consent standards and also requires approval from the Harbour Master. Generally, lighting will be on each corner of the farm and on its associated structures (any barge for example) and possibly along their length. Lights would flash in a sequence and at a brightness to ensure that the farm structures were visible from at least one nautical mile in most sea conditions. Lighting would also be positioned to prevent glare and ensure that excess reflection of light does not occur.

The interior of the barges would have the same lighting as any residential accommodation, and also external floodlights for any necessary night time work. Figure 4-6 shows barge lighting at 75m (left) and 200m (right).

Figure 4-6: Barge Lighting at Existing Clay Point Farm[10]

Underwater lighting is also required as part of farm management and is used during the shorter daylight months (April through to October) to reduce the risk of early maturation of fish prior to harvest.[11] The physical footprint of this lighting is generally confined to the net pens and mid-water depths. Underwater lighting is centrally located within the net pens, and the external netting and structures helps to shade external light spill.[12] Figure 4-7 shows underwater lighting at the existing Clay Point Farm (left) and at 200m (right).

[9] NZ King Salmon (2016) Operations Report, p. 28
[10] Boffa Miskell (2012) Nightlighting Photographs of Clay Point Salmon Farm
[11] Cawthron (2016) Assessment of Environmental Effects of Underwater Lighting for Salmon Farm Relocation Sites (Letter – Chris Cornelisen), p2
[12] Cawthron (2016) Assessment of Environmental Effects of Underwater Lighting for Salmon Farm Relocation Sites (Letter – Chris Cornelisen), p3

Figure 4-7: Underwater Lighting at Existing Clay Point Farm (left)[13] (right)[14]

4.3 Discharges

Salmon farming results in various discharges to the coastal marine area:

- discharge of salmon feed
- deposition of salmon faeces into the coastal marine area and the benthic environment
- other contaminants – such as greywater.

4.3.1 Feed Discharges

Feed is delivered via feed dispersal units, likely to be using the Akva system, which pushes feed through tubes and spreads it throughout the pen receiving the feed. The rate and quantity of feed is controlled by computer programming, and is monitored underwater to allow for adjusting of feed volumes to minimise wastage.[15]

Feed dispersal is monitored carefully to ensure that wastage is minimal, both because it has the highest potential to result in adverse environmental effects through over-feeding and subsequent excess feed depositing on the seafloor[16] (and because it equates to 60% of the production costs for NZ King Salmon).

Because salmon farming involves the introduction of nutrients to feed the fish, metabolic wastes from fish digestion are also discharged to coastal water.

4.3.2 Other Contaminant Discharges to Water

Greywater is generated on the farms mainly from workers living and working on the barges. This greywater includes domestic wastewater originating from showers and wash basins but excludes toilet water (sewage), which is contained on the barge and removed offsite regularly. NZ King Salmon estimates that greywater is produced on farms at a rate of 100L/ per person per day.

4.4 Mortalities

Mortalities occur with any farming activity. Farm management practices require all dead fish to be removed from the net pens (at least twice weekly) by divers and to be securely stored until collected by service vessels. This ensures that dead fish in the pens do not pose any risk to the farmed fish or water quality.

[13] Cawthron (2016) Assessment of Environmental Effects of Underwater Lighting for Salmon Farm Relocation Sites (Letter – Chris Cornelisen), p7
[14] Boffa Miskell (2012) Nightlighting Photographs of Clay Point Salmon Farm
[15] NZ King Salmon (2016) Operations Report, p. 41
[16] NZ King Salmon (2016) Operations Report, p. 42

5 Background to Technical Investigation

This section provides an initial introduction to the types of effects that can arise from salmon farming in the coastal marine area and the technical investigations that have been commissioned to investigate those effects.

Salmon farming has the potential to cause a variety of different environmental effects. As part of the development of the potential relocation proposal, MPI has commissioned a series of technical investigations to assess the potential effects on the environment, both cumulatively and on a site-by-site basis. Full copies of each of the technical investigations are available online.

Sections 6, 7 and 8 of this report provide an outline of each of the technical investigations undertaken and a discussion of the results. Section 6 provides an assessment of effects for the potential relocation sites located in Pelorus Sound on both a site-by-site basis, and at a Sound-wide scale for effects that are not solely site-specific, but are confined to the Sound or its immediate vicinity (such as water quality, and cumulative effects on landscape and natural character). Section 7 provides the same level of assessment for the potential relocation site in Tory Channel. Section 8 of this report provides an outline of the technical investigations relating to effects that are common to all the potential relocation sites across the Marlborough Sounds. The information in sections 6 and 8 should be considered as a whole when to provide a complete assessment of effects of the potential relocation sites in Pelorus Sound, and the information in sections 7 and 8 should be considered as a whole to provide a complete assessment of effects of the potential relocation site in Tory Channel.

Landscape and Natural Character

Because salmon farms are non-natural structures located in the coastal marine area, they can cause adverse effects on landscape and natural character. These types of effects have been key issues in the consideration of developments within the Marlborough Sounds, including marine farms, in recent years. The natural character of the seabed has also become a relevant consideration when assessing proposals. The effects of the potential relocation proposal on landscape and natural character in relation to both the establishment of salmon farms on the potential relocation sites and the removal of farms from the existing lower flow sites has been undertaken for the potential relocation proposal.

There are two technical reports relevant to the landscape and natural character effects of the proposal:

- Review of Proposed Marine Farm Sites (2016) (the Landscape Report) – prepared by Hudson Associates Landscape Architects in relation to the potential relocation proposal
- Proposed Marine Farm Sites Marlborough Sounds: Peer Review Landscape and Natural Character Assessment – a peer review of the Landscape Report, prepared by Drakeford Williams Limited

Benthic

The primary effects on the seabed from salmon farming arise from the deposition of fish faeces and to a lesser extent uneaten feed, leading to over-enrichment of the seabed due to the high organic content of the deposited particles, and effects on marine life living in or on the seabed (including reduced species diversity and increased abundance of enrichment tolerant species). Effects are typically measured using an enrichment scale derived for the Marlborough Sounds and explained in the Benthic Guidelines. Figure 5-1 provides an illustration of the changes in benthic effects as an area of seabed becomes increasingly enriched.

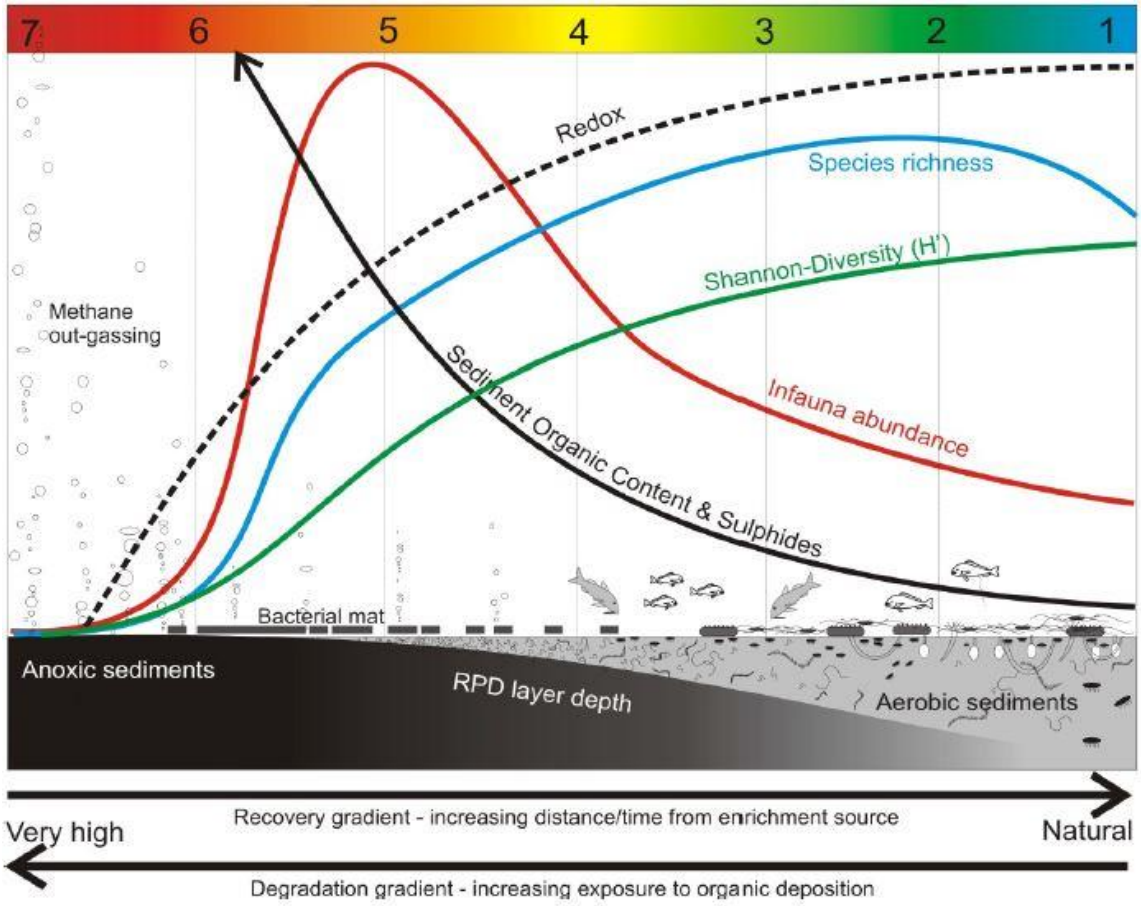


Figure 5-1: Stylised depiction of a typical enrichment gradient[17]

There are four technical reports relevant to the benthic effects of the proposal:

- Benthic Ecological Assessments for Proposed Salmon Farm Sites (2016) - prepared by NIWA in relation to the potential relocation sites in Pelorus Sound.
- Additional Seabed Information for a Finfish Farm Effects Assessment at Tio Point, Oyster Bay, Tory Channel (2016) - prepared by the Cawthron Institute in relation to the Tio Point potential relocation site.
- Peer review of NIWA (2016) report – prepared by Associate Professor Catriona McLeod, University of Tasmania.
- Peer review of Cawthron (2016) report - prepared by Associate Professor Catriona McLeod, University of Tasmania.

Water quality

Salmon farming requires the addition of feed to the water, and waste feed and fish faecal material can cause increased nutrient concentrations in the water column. Effects of increased nutrient concentrations (specifically, nitrogen) arising from the development of the potential relocation sites has been modelled using a complex foodweb model.

There are six technical reports relevant to the water quality effects of the proposal:

- A biophysical model for the Marlborough Sounds Part 1: Queen Charlotte Sound and Tory Channel – prepared in September 2014 for Marlborough District Council
- A biophysical model for the Marlborough Sounds Part 2: Pelorus Sound – prepared in June 2015 for Marlborough District Council
- Modelled water column effects on potential salmon farm relocation sites in Pelorus Sound (the Pelorus report) – prepared by NIWA in 2016

[17] From the Benthic Guidelines (Fig 4, p18). The figure shows generally understood responses in commonly measured environmental variables. The gradient spans from natural or pristine conditions on the right (ES = 1.0) to highly enriched azoic conditions on the left (ES = 7.0).

- Additional salmon farms in Tory Channel, An assessment of effects on water-quality using a biophysical model (the Tory report) – prepared by NIWA in 2016
- Additional salmon farms in Tory Channel, An assessment of effects on water-quality using a biophysical model (Oyster Bay, Tipi Bay and Motukina Point) (the Tory including Oyster report) – prepared by NIWA in 2016
- Peer review of the Marlborough Sounds biophysical model predictions – prepared by the Cawthron Institute in 2016

Seabirds

There are a number of seabirds of conservation concern that were identified in the 2011 report as being commonly reported from eastern Cook Strait and the Marlborough Sounds. Seabirds that are breeding in the Marlborough Sounds are; Pied Shag, Reef Heron, Red-billed Gull, Blue Penguin, Fluttering shearwater, Fairy Prion, and possibly the Black Shag and the Little Shag. However, the assessment of effects for each potential relocation site focusses on King Shags as this species is considered to be of most concern given its distribution, population numbers, feeding habits and threat status.

The potential effects of salmon farming on seabirds include entanglement, exclusion of surface feeders from areas of the Sounds, smothering of benthic habitat beneath farm sea pens, changed abundance of small fish that provide prey for birds, disturbance of bird foraging/ breeding, impairment of digestive tract by foreign objects, and attraction of flying birds to artificial lights.[18] Salmon farms can also provide roosting locations for seabirds.

There are three technical reports relevant to the effects of the proposal on seabirds:

- Assessment of potential environmental effects of the proposed NZ King Salmon expansion on seabirds, with particular reference to the NZ King Shag (2011) – prepared by NIWA for the 2011 NZ King Salmon application.
- Update of Existing Seabird Report with Reference to Relocation of Existing Farms (2016) – prepared by NIWA in relation to the potential relocation proposal.
- Effects of salmon farming in the Marlborough Sounds on the prey of King Shag (2016) – prepared by Statfishtics in relation to the potential relocation proposal.

Marine mammals

Cetaceans (whales and dolphins) and pinnipeds (almost always fur seals and sea lions in the Southern Hemisphere) are responsible for most interactions with salmon farm operations, including damage to gear and fish stocks. Adverse effects to marine mammals from fish farming can include fatal and non-fatal entanglements, injuries, habitat loss or disturbance, and alterations to predator distributions and diet.[19]

There are four technical reports relevant to the effects of the proposal on marine mammals:

- Marine Mammals and Salmon Farms (2011 Marine Mammals report) - prepared for the 2011 NZ King Salmon application to the EPA
- Additional Information on NZ Fur Seal (2011 Fur Seal update) - prepared in response to the EPA's request for further information regarding NZ fur seals
- Marine Mammals Report (2016 Marine Mammals update) - assessing potential effects of the proposed relocation sites on marine mammals
- New Zealand King Salmon Operations Report (2016) – which includes a section on procedures to manage interactions with NZ fur seals.

Fish species

Pelagic fish are the main grouping of finfish species which inhabit the water column in the coastal marine area. In wild fish populations associated with salmon farms overseas, the main impact of the farms on the fish populations has been shown to be through waste salmon feed that falls from the farm.

Consumption of salmon feed by wild fish can affect them in several ways. In some cases wild fish have exhibited increased body condition, which can either increase or reduce their reproductive fitness,

[18] Sagar, P. (2011) Assessment of potential environmental effects of the proposed king Salmon expansion on seabirds, with particular reference to the NZ King Shag, p. 17
[19] Cawthron and Associates (2011) Marine Mammals and Salmon Farms, p2

depending on the quality of the salmon feed relative to their natural diets. Other effects included increased organohalogenated contaminants and heavy metal loadings in wild fish, although the levels were all well below public health limits set for safe consumption by humans.

There are two technical reports relevant to the effects of the proposal on fish species:

- Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigating adverse effect (2011) (2011 Pelagic Fish report) – prepared by Paul Taylor of Statfishtics and Tim Dempster of the University of Melbourne for the 2011 NZ King Salmon application
- Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect (2016) (2016 Pelagic Fish report) – prepared by Paul Taylor of Statfishtics and Tim Dempster of the University of Melbourne specific to the potential relocation of existing lower flow salmon farm sites to higher flow sites

Biosecurity

Aquaculture activities in general can exacerbate the establishment and spread of marine pests and could, as a result, affect the Marlborough Sounds on a regional scale. Generally, marine pests are not only a potential risk to the wider environment, but also the efficiency and health of the salmon and farming operations.[20]

There are three technical reports relevant to the biosecurity effects of the proposal:

- The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Biosecurity (2011 Biosecurity report) - prepared by the Cawthron Institute in August 2011 as part of the original AEE for the 2011 NZ King Salmon Application.
- Biosecurity Assessment for Salmon Farm Relocation Sites (2016 Biosecurity update) – prepared by the Cawthron Institute in 2016, to update the 2011 report.
- New Zealand King Salmon Operations Report (2016) – which includes a section on NZ King Salmon's biosecurity management plan.

Disease

Geographical isolation, existing biosecurity arrangements and the absence of native salmonids means that New Zealand is currently free from many important diseases of salmonids (and other aquatic animals). King salmon were introduced into New Zealand by acclimatisation societies as ova between 1875 and 1907 only, virtually eliminating the risk of introduction of many diseases that have emerged in northern hemisphere salmon in recent years and spread with salmonid farming. King salmon also appears to be innately resistant to many of the disease agents that have been problematic in salmon culture overseas. However, new diseases continue to emerge in aquaculture, and the dynamics of infectious diseases are often related to the density of host populations.

There is one technical report relevant to the disease risk arising from the proposal:

- Updated Disease Risk Assessment – Relocation of Salmon Farms in Marlborough Sounds, New Zealand (2016 Disease risk update) – prepared by Digsfish Services, updating the report prepared as part of the original AEE for the 2011 NZ King Salmon Application.

Navigation

Navigational risks of salmon farms are generally considered in relation to four matters:

- The causes and effects of a large vessel passing close by or impacting a salmon farm
- The risk associated with the potential of a salmon farm to influence the actions of a master or skipper
- The interactions between a small vessel and a salmon farm
- The causes and effects of a farm breaking free and creating a hazard to other vessels and water users.[21]

[20] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Biosecurity, p. 2
[21] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p. 23

To assist with navigational safety and marine farming, Maritime New Zealand has published Guidelines for Aquaculture Management Areas and Marine Farms. Generally, these guidelines note that allowances need to be made for the prevailing currents and sea states, vessel traffic, existing anchorages and refuge sites.[22] Farms and their structures require navigational lighting which aid in identifying a farm's presence to ships and providing for safe navigation around farms and their structures.

The key method used to assess risk involves a qualitative risk study utilising comparisons to known risks for existing farms and other comparable navigational hazards to determine the level of risk to each of the potential relocation sites.

There is one technical report relevant to the navigational risks arising from the proposal:

- Navigation Risk Assessment: Marlborough Salmon Farms (2016 Navigation report) – prepared by Navigatus in relation to the potential relocation proposal.

Residential amenity

Social effects from the presence of salmon farms can arise in relation to the quality of neighbourhood and living space (as in residential amenity and physical access), opportunities for employment and income (in salmon farming itself and in related businesses), access to goods and services that might not otherwise be available, and influences on participation in community. The likelihood of visual, noise, and odour intrusion, as well as the potential for wildlife nuisances and shoreline solid waste effects have been assessed for residences near to the potential relocation sites.

Wildlife nuisances could arise if seals are attracted to the potential relocation sites in exceptional numbers and 'spill over' into adjacent areas frequented by local residents or neighbours, or if seagulls in exceptional numbers roost on nearby jetties.[23] Potential amenity effects could arise from the accumulation of solid waste (matter such as rope or plastic items) on nearby shorelines from salmon farms, although they are unlikely to be the predominant contributor to shoreline waste unless a particular farm is subject to extremely hostile weather conditions.[24]

There are four technical reports relevant to the proposal in relation to effects on residential amenity:

- Plan Change and Resource Consents for New Water Space Social Impact Assessment (2012) - prepared by Taylor Baines & Associates for the 2011 New Zealand King Salmon application.
- Potential Salmon Farm Relocation in Marlborough Social Impact Assessment (2016) - prepared by Taylor Baines & Associates in relation to the potential relocation proposal.
- Peer Review: Social impact assessment on the potential salmon farm relocation in Marlborough (2016) – prepared by Quigley Watts Ltd
- The Social and Community Effects of Salmon Farming and Rearing: A case study of the top of the South Island – prepared by Taylor Baines & Associates and Quigley Watts Ltd. The full report is available at www.mpi.govt.nz/news-and-resources/publications/.

Tourism and Recreation

Tourism and recreation are important in the Marlborough Sounds and activities include a variety of water and land-based pursuits including cruising, fishing, sailing, swimming, kayaking, waterskiing, windsurfing, walking, tramping, biking and wildlife viewing.

Salmon farms may affect recreational and tourism activity in a number of ways in relation to accessibility, amenity values, and cumulative effects. Marine farms located on sites popular with recreational users can physically limit or block access. The location of marine farms also has the potential to affect the amenity value of the recreation and tourism experience, particularly in remote areas. Several marine farms in a particular vicinity would increase the footprint and operational activity and may begin to affect an area's natural character and the amenity values of users.[25] On the other hand, marine farming also has the potential to play a role in the development of tourism products and experiences.[26]

There is one technical report relevant to effects on tourism and recreation from the proposal:

[22] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p. 21-22
[23] Taylor Baines & Associates (2016) Potential Salmon Farm Relocation in Marlborough Social Impact Assessment, p.15
[24] Taylor Baines & Associates (2016) Potential Salmon Farm Relocation in Marlborough Social Impact Assessment, p.16
[25] Tourism and Recreation Conservation Tourism Limited (2016) NZ King Salmon Potential Salmon Farm Relocation in Marlborough Tourism and Recreation Assessment, p. 27
[26] Products focusing on cuisine, general sightseeing, and ecotourism (wildlife viewing) are currently using Ruakaka salmon farm site in the Queen Charlotte Sound as a key component of their operations.

- NZ King Salmon Potential Salmon Farm Relocation in Marlborough Tourism and Recreation Assessment (2016) - prepared by Tourism Recreation Conservation Limited in relation to the potential relocation proposal.

Heritage

Because salmon farming is not a land based activity in the Marlborough Sounds, there will be no direct intrusion, physical damage, or modification of archaeological or heritage sites or areas.[27] No shipwrecks are located in close proximity to any of the potential relocation sites. Potential effects on heritage have therefore been assessed by considering more indirect effects, such as whether the potential sites would have an effect on the ability of archaeological or heritage sites or areas to contribute, in the widest sense, to a full public understanding and appreciation of the history of the Marlborough Sounds.

There are two technical reports relevant to the effects of the proposal on heritage values:

- NZ King Salmon Plan Change: Heritage Report in Respect of Proposed Waitata Reach, Port Gore, Tory Channel and Queen Charlotte Sound Salmon Farm Sites (July 2011) – prepared by HistoryWorks Ltd
- A 2016 update of the 2011 report – also prepared by HistoryWorks Ltd

Lighting

Submerged artificial lighting is used to reduce the risk of early maturation of the fish prior to harvest. Artificial lighting directly affects the physical characteristics of the water column and as a result has the potential to have an effect on a number of biological processes both within and adjacent to cage structures. 'Footprints' of submerged artificial lighting could affect organisms in the water column, including enhancing the attraction and aggregation of some organisms, such as baitfish, during night hours. Fish that enter net pens could become trapped once they become too large to exit the pens through the mesh, and could then be predated upon to a limited extent, depending on the life stage of the salmon.[28]

There are two technical reports relevant to the proposal in relation to the effects of underwater lighting:

- The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Submerged Artificial Lighting (2011 Lighting report) – prepared by the Cawthron Institute in August 2011 as part of the original AEE for the 2011 NZ King Salmon Application.
- Assessment of Environmental Effects of Underwater Lighting for Salmon Farm Relocation Sites (2016 Lighting update) – prepared by the Cawthron Institute in August 2016 to update the 2011 report.

Noise

Salmon farms will typically emit a low level constant sound from the diesel generator which operates 24/7 and intermittent noise from farming activities such as water blasting, net-lifting, feed dispersing and service vessel movements.[29]

There is one technical report relevant to the proposal in relation to the effects of noise:

- Salmon Farm Relocation Noise Effects Assessment (2016) – prepared by Marshall Day Acoustics Ltd in relation to the relocation proposal.

Greywater Discharges

As part of day-to-day operations, salmon farms produce greywater which is then discharged directly into the coastal marine area. Greywater is all domestic wastewater, including from baths, showers, hand basins and washing machines, but excluding toilet wastewater or sewage. All sewage or hazardous discharges are taken off-site and disposed of appropriately.[30]

There are two technical reports relevant to the proposal in relation to effects of greywater discharges:

[27] HistoryWorks (2016) New Zealand King Salmon Relocation Options, p. 2
[28] Cawthron Institute (2011) The New Zealand king Salmon Company Limited: Assessment of Environmental Effects – Submerged Artificial Lighting, p. iii.
[29] Marshall Day Acoustics (2016) Salmon Farm Relocation Noise Effects Assessment, p. 10
[30] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Greywater, Report No. 2021, p. 2

- The New Zealand King Salmon Company Limited: Assessment of Environmental Effects - Greywater (2011 Greywater report) - prepared by the Cawthron Institute in September 2011 as part of the original AEE for the 2011 NZ King Salmon Application.
- Greywater Discharges Assessment for Salmon Farm Relocation Sites (2016 Greywater update) – prepared by the Cawthron Institute in 2016, updating the 2011 report.

Copper and zinc

Copper and zinc both occur naturally in the environment and are essential trace nutrients required by nearly all organisms. However, toxic effects can also arise from both metals if organisms are exposed to them at too high a concentration. Copper is the principal active agent in antifouling paints and can leach into the marine environment or be discharged through abrasive cleaning of structures. Zinc is contained in salmon feed as an additive for fish health, but therefore tends to be discharged in fish faeces.

There are two technical reports relevant to the proposal in relation to effects of discharges of copper and zinc:

- The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Copper and Zinc (2011 Copper and Zinc report) - prepared by the Cawthron Institute in September 2011 as part of the original AEE for the 2011 NZ King Salmon Application.
- Addendum to Assessment of Effects of Copper and Zinc for Salmon Farm Relocation Sites (2016 Copper and Zinc update) – prepared by the Cawthron Institute in 2016, updating the 2011 report.

6 Assessment of effects on the environment – Pelorus Sound

6.1 Introduction

Existing salmon farm sites in Pelorus Sound are located in Crail Bay, Forsyth Bay and Waihinau Bay. The five potential relocation sites are all located within the Waitata Reach or at the entrance to Pelorus Sound.

Waitata Reach is an area of transition between the exposed waters of Cook Strait and the Inner Pelorus Sound. The entrance to Waitata Reach, and the change from the wild open Cook Strait to the inner waters of Waitata is marked by a pair of exposed, rugged headlands – Kaitira and Te Akaroa. Waitata Reach itself can be characterised as an expansive stretch of water about 12kms long, and from 2-3.5kms wide, enclosed to either side by steep landforms which drop to the sea in a series of headlands. Bays of various sizes and small sub-bays are set the length of the Reach. Landforms throughout the Reach are rugged and dramatic, expressive of the still relatively exposed maritime conditions. The Waitata Reach area of Pelorus Sound is wider and open to the elements when compared to much of the Inner Sounds. There are long views up and down the Reach, with the horizon-line being water in the views out towards Cook Strait.[31]

Landform through the Reach is varied, with high hills and areas of extremely low elevation, clearly legible as the tops of ridges inside a drowned valley system. The coastal edge through the Reach is typically rocky and abrupt, with slopes rising steeply and suddenly from the water, and the edge eroded by ongoing coastal processes. Towards the south, as the Reach nears the more sheltered Inner Sounds, narrow beaches start to appear.[32]

Waitata Reach appears as highly natural and feels remote, due to the expansive scale and largely unmodified landform, the large areas of regenerating native vegetation and the sparsely scattered structures, although a productive character is also clearly evident throughout the Reach. There is a mix

[31] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry for Primary Industries, p7.
[32] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry for Primary Industries, p7.

of productive uses including forestry, pastureland, and marine farming, with a high number of mussel farms through the side bays of the Reach and three salmon farms, all serviced regularly by work boats.[33]

The Reach is valued for recreational activities such as boating, fishing and diving, although on the whole it is less well-used for recreation than some other areas of the Sounds (such as Queen Charlotte Sound). Visual amenity is high, with the Reach categorised as a High Amenity Landscape in the 2015 Marlborough Landscape Study.[34]

There are long standing mana whenua, mana moana and tangata whenua associations with Pelorus Sound as a whole, and evidence of early Maori settlement clustered around Port Ligar and Orchard Bay, including a Pa and identified traditional waka routes through the Waitata Reach. There is also evidence of European settlement at Port Ligar, and historic gun emplacements at Post Office Point on the Kaitira Headland and at Maud Island.[35]

Forsyth Bay lies adjacent and to the east of Waitata Reach, opening onto the Reach at the northern end on the seaward side of the Kaitira – Te Akaroa gateway.

The existing social environment within Pelorus Sound consists of farming, forestry, commercial marine activities, and residential settlements. Pastoral farming is mainly concentred in the western and central parts of the outer sounds, around Admiralty Bay, Hamilton Bay, Port Ligar, and Pohuenui Station. There is an extensive patchwork of forestry plantings which exist throughout Pelorus Sound, from Mahau and Kenepuru Sounds to the Outer Sounds. There are some areas of the Outer Sounds where privately-owned land previously in pastoral farming is now being progressively reverted to native vegetation. These areas are the Tui Nature Reserve in Waitata Bay and Te Kopi – Pelorus Wildlife Sanctuary at Port Ligar.[36]

The commercial marine activities include commercial fishing and marine farming. With regards to commercial fishing, shell fishing is not permitted within the inner Pelorus Sound, under The Fisheries (Challenger Area Commercial Fishing) Regulations 1986. There are a number of marine farms, and in particular, mussel farms located within Pelorus Sound. The mussel farming industry has been closely linked to several communities, because of the requirement for people to manage and work the farms, harvest the crop and transport the crop to processing plants. These communities include French Pass, Elaine Bay and Okiwi Bay.[37]

There are a number of clusters of rural residential settlements near the potential relocation sites and a number of tourists and recreational users access these areas. In general Pelorus Sound has less recreational traffic than Queen Charlotte Sound and a more industrial feel to it because of the number of mussel farms and forestry. Recreational activities in this area include camping, kayaking and fishing.[38] At present larger vessels do not enter Pelorus Sound, however, smaller 'expedition' ships have sometimes been permitted to enter.

A number of seabirds are found in the Marlborough Sounds as outlined in Appendix B. Of particular note King Shags breed or roost at a number of colonies in Pelorus Sound or the surrounding area, as identified in Figure 6-1.

[33] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry for Primary Industries, p7.
[34] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry for Primary Industries, p8.
[35] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry for Primary Industries, p8.
[36] Taylor Baines & Associates; Quigley Watts Ltd (2016) The Social and Community Effects of Salmon Farming and Rearing: A case study of the top of the South Island, p78
[37] Taylor Baines & Associates; Quigley Watts Ltd (2016) The Social and Community Effects of Salmon Farming and Rearing: A case study of the top of the South Island, p78
[38] Tourism and Recreation Conservation Tourism Limited (2016) NZ King Salmon Potential Salmon Farm Relocation in Marlborough Tourism and Recreation Assessment, pp 22-23

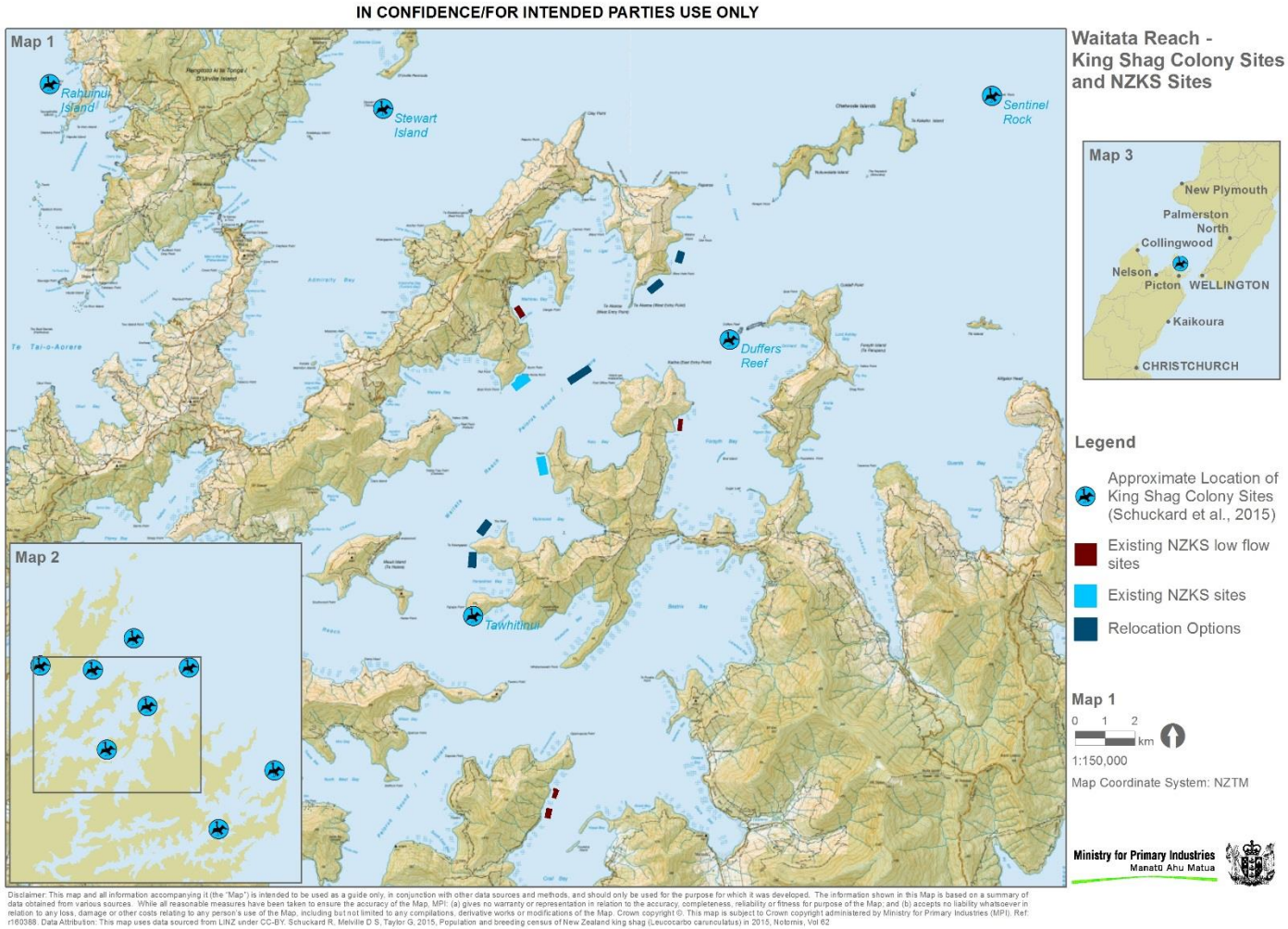


Figure 6-1: King Shag colonies Pelorus Sound

King shags usually nest once a year and, on average, lay 1.8 eggs per pair in a season. The majority of breeding activity occurs between the months of March to December. King Shags will fly up to 25km from a breeding or roosting colony to feed, and obtain their prey by diving and swimming underwater, using their hooked beak to catch prey. They feed primarily on bottom-dwelling fish, and are described as visual foragers.[39]

Site specific values that are likely to be affected have been identified for the Pelorus Sound sites are outlined in Table 6-1 below. More generic effects are discussed in section 8 of this summary AEE.

Table 6-1: Pelorus Sound site specific values likely to be affected

Site	Benthic	Heritage	Landscape & Natural Character	Navigation	Seabirds	Residential amenity	Tourism & Recreation
Blowhole Point North	●		●	●	●		●
Blowhole Point South	●		●		●		●
Waitata Reach (Mid-Channel) South		●	●	●		●	●
Richmond Bay South	●	●	●		●	●	
Horseshoe Bay	●	●	●	●	●	●	

6.2 Blowhole Point North

The Blowhole Point North site is in a wide, open character east facing bay located south of Harris Bay and Oke Rock in the outer Pelorus Sound. The site is not in any area proposed as an area of outstanding natural character, but is inside an area proposed as an Outstanding Natural Landscape (ONL) at a district scale (Outer Sounds Landscape) and a proposed Outstanding Natural Feature (ONF) at the district scale (described as 'the waters between Te Akaroa and Kaitira Headland').[40]

[39] Sagar, P. (2011) Assessment of potential environmental effects of the proposed King Salmon expansion on seabirds, with particular reference to the NZ King Shag, p. 15.
[40] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.17

Figure 6-2: Blowhole Point North[41]

The adjacent landform is largely unmodified and comprises a main headland at the entrance to Pelorus Sound, with steep headland slopes and an abrupt rocky coastal edge.[42] The terrestrial environment is highly modified resulting from the large areas of plantation forestry that currently exist and the pasture with some indigenous regenerating vegetation that occurs mainly on the lower slopes and gullies of the headland.[43] Three existing mussel farms occupy the coastal edge of the bay.

The benthic environment is a sloping seabed with depths of 28-80m, comprising of mud and sand with some gravel and shell.[44] The habitat below the site is home to starfish, sea cucumbers, opalfish, hermit crabs, scallops, as well as clumps of hydroids, algae and ascidians sparsely distributed above the mud.[45] Notable species include paua, kina and anemone on near-shore reefs. There is also an extensive reef at Blowhole Point.[46]

From a navigation and safety perspective, the bay behind the potential Blowhole Point North relocation site could be used as a refuge for vessels during north to northwest wind conditions but overall has a low level of activity.[47]

The site is within the area likely to be used by the main Duffers Reef King Shag colony as a feeding and foraging ground.[48]

A summary of the key effects at the potential Blowhole Point North site is presented in Table 6-2. A discussion of those effects is contained in the sections that follow.

[41] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.16
[42] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 17
[43] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 17
[44] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 17-19
[45] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 20
[46] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 23
[47] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.33
[48] NIWA (2016) Update of Existing Seabird Report with Reference to Relocation of Existing Farms, p9

Table 6-2: Blowhole Point North site summary

BLOWHOLE POINT NORTH						
Biophysical suitability for salmon farming						
Mean current (m/s) for (1) near-bottom & (2) mid-water	Temp (°C)	Depth (m)	Max feed discharge (T)	Cage type	Benthic Footprint (ha)	Surface structure area incl. barge (ha)
(1) 0.12 (2) 0.13	11.9-18.2	28-80	4,500	Polar circles	~15	1.402
• The site is biophysically suitable for growing salmon and modelled to produce approximately 1,980T of annual salmon production within ES5.						
Seafloor habitats and communities						
• The sandy mud seafloor beneath the farm site supports an epifaunal community that is sparse and mostly composed of common taxa. Scattered small biogenic clumps mainly comprising ascidians and hydroids are present. Brachiopods are found at various locations within the site, and scallops are relatively abundant. Reef patches and kelp communities fringing the shoreline provide habitat for paua and kina and blue cod. • The modelled depositional footprint does not extend as far as the extensive reef at Blowhole Point nor to the inshore reef and kelp communities, although monitoring of the seabed in accordance with Benthic Guidelines and monitoring of the nearby reef and inshore areas will be necessary.						
Landscape and natural character						
• The landscape assessment undertaken states that at a site specific scale the landscape values are High-Moderate and natural character values are Moderate, which would change to Moderate and Moderate-Low respectively if a salmon farm was located at the site. The effects of this change are not considered to be significant. • However, the site is within the proposed Outer Sounds Outstanding Natural Landscape and within a proposed Outstanding Natural Feature (described as 'the waters between Te Akaroa and Kaitira Headland'), and the land surrounding the site forms part of the Pelorus Sound 'gateway'. At the scale of these areas the effects would be less than minor.						
King Shag						
• The site is located within 3km of the main Duffers Reef King Shag colony. While water depth at the site ranges from 28-80m, the majority of the net pens would be located in water greater than 50m deep, deeper than preferred King Shag foraging depth.						
Navigation						
• The site is located on a natural navigational route for vessels heading to or coming from north or west of Pelorus Sound. • Skippers passaging from these areas would need to give the site a wider berth than is currently the case. The site therefore potentially presents some navigational risk, but this risk can be managed. • Sufficient room is available between the potential site and the shore if small craft and yachts need refuge during strong west to northwest winds.						
Noise and residential amenity						
• No effects anticipated.						
Key policy issues[49]						
• Landscape and natural character. • Indigenous biodiversity. • Water quality.						

[49] Key policies in relation to cultural effects are identified in section 9 of this report.

6.2.1 Benthic

NIWA's technical investigation of the seabed at the potential Blowhole Point North site is summarised in Table 6-3.

Table 6-3: Blowhole Point North benthic summary

Site	Benthic Environment
Blowhole Point North	• Depths range from 28-80m. • Faunal communities typical of the habitat, including biogenic clumps, brachiopods and scallops which have ecological value in supporting benthic biodiversity in the region. • Infaunal communities included polychaetes, small crustaceans, and bivalve taxa that are common in the region. • Near shore patches of shallow reef and kelp communities. • Extensive reef southwest of the site at Blowhole Point.

6.2.1.1 Effects of seabed deposition

The potential site at Blowhole Point North has been assessed based on a scenario assuming a feed input of 4500 tonnes a year, which resulted in forecast enrichment of below ES5. The extent of the predicted depositional footprint is shown in Figure 6-3. Scallops, brachiopods and other epifaunal taxa considered sensitive to depositional effects would be excluded beneath the sea pen area. Deposition would primarily be concentrated directly beneath the sea pens and is predicted to disperse approximately 360m south of the sea pen area. An area of approximately 15 hectares is forecast to be affected by deposition, with the rate of deposition decreasing from about 12-14kg $m^{-2}yr^{-1}$ (ES5=13kg $m^{-2}yr^{-1}$) closer to the sea pens to about 1kg $m^{-2}yr^{-1}$ (ES3=1kg $m^{-2}yr^{-1}$) at the edges of the footprint as shown in Figure 6-3. The primary deposition footprint does not extend over the bedrock reef at Blowhole Point or the other notable features (including macroalgae beds, small patch reefs, kelp communities and their associated biota) identified inshore of the site.

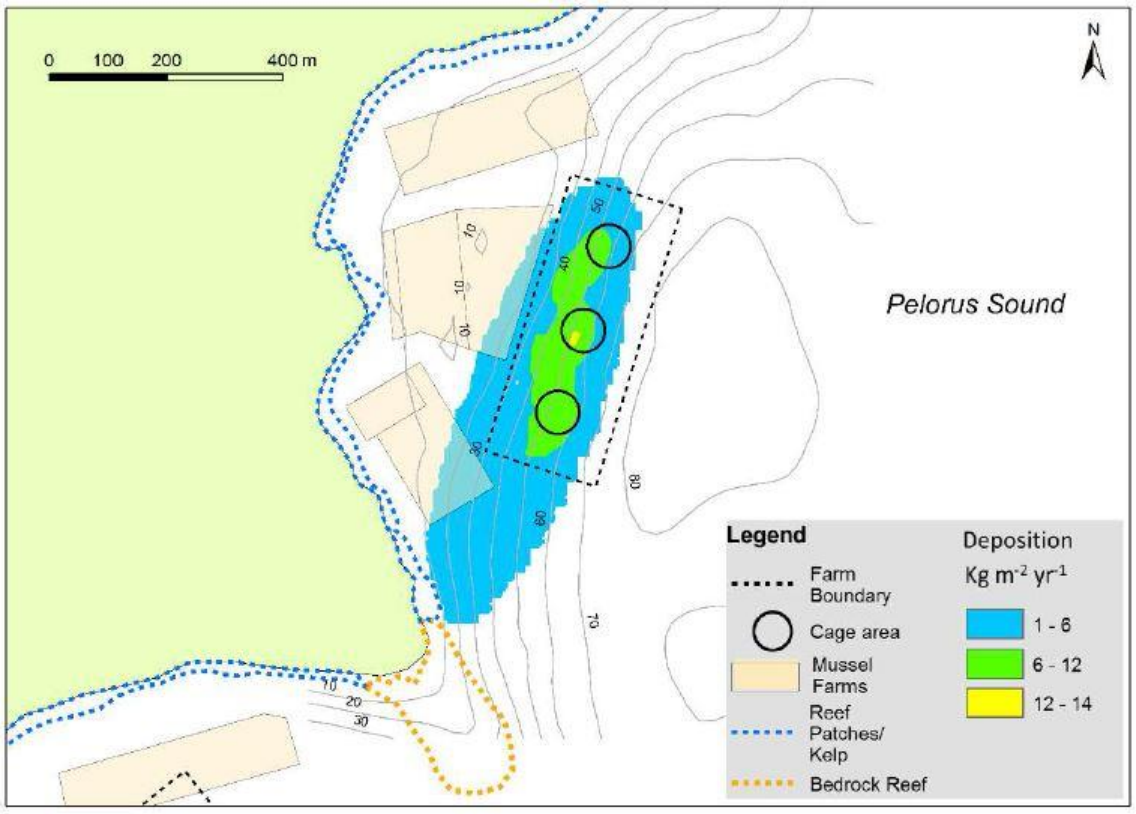


Figure 6-3: Depositional footprint at Blowhole Point North at an annual feed discharge rate of 4500 tonnes

Figure 6-3 shows that the modelled deposition from the potential Blowhole Point North relocation site would overlap with two of the existing mussel farms in the vicinity. Mussel farms can give rise to low level depositional effects, and the cumulative effects of the mussel and salmon farm deposition have therefore been assessed.[50] The results of this analysis are outlined in Figure 6-4. The Cawthron Institute notes that the salmon farm deposition is the main influence on predicted deposition rates, and that the overlap with mussel farm deposition would not result in the overall enrichment stage increasing. The predicted outcomes from the depositional modelling of the potential salmon farm site (as discussed in relation to Figure 6-3) therefore remain the same.

[50] Cawthron Institute (2016) Blowhole Point DEPOMOD overlay for proposed farms

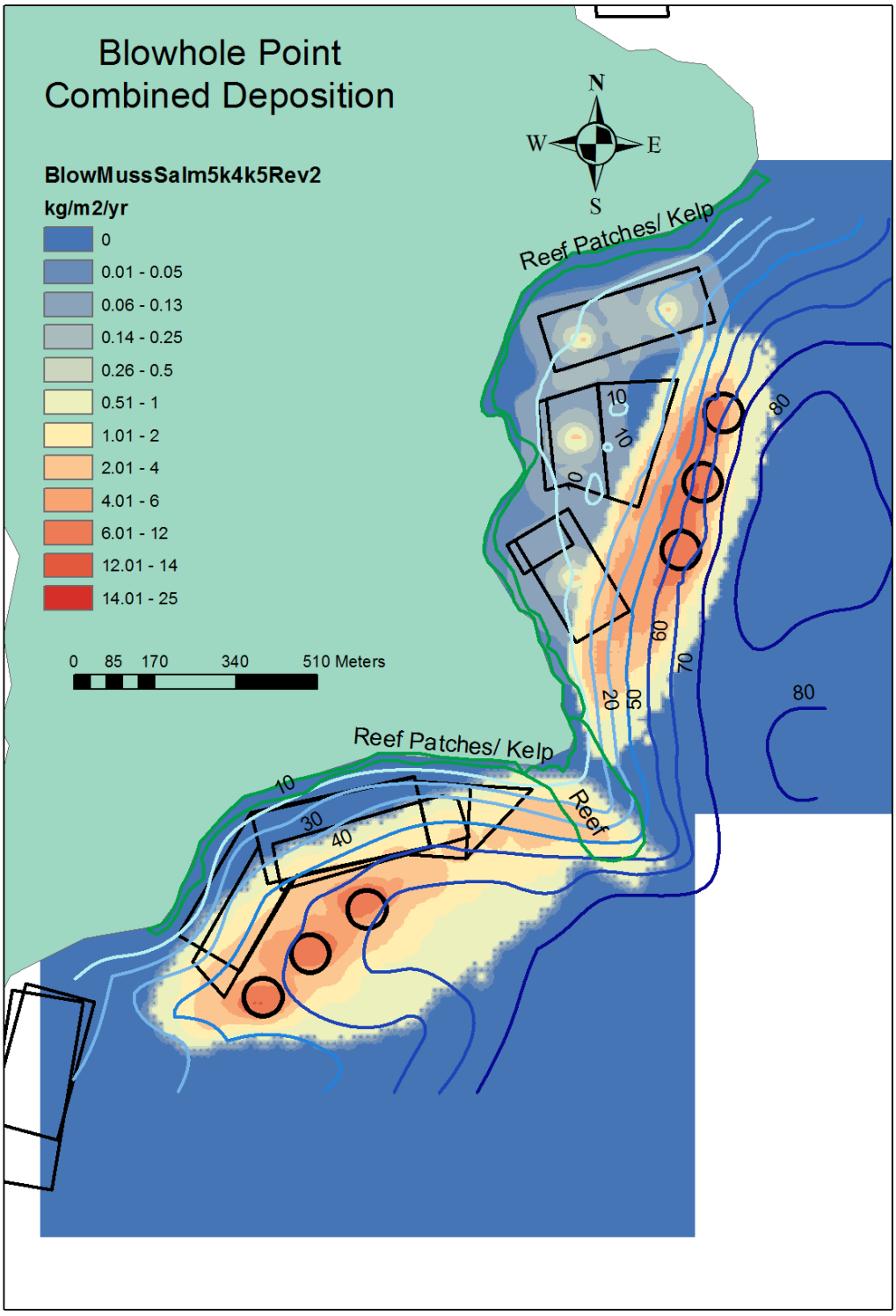


Figure 6-4: Blowhole Point Mussel and salmon farm deposition

6.2.2 Landscape and Natural Character

6.2.2.1 Natural character

A proposal consisting of three circular pens and a barge has been assessed to determine effects on natural character at the potential Blowhole Point North relocation site. The site is located to the northwest of the passage between Te Akaroa and Kaitira Headlands, recognised as the gateway to Pelorus Sound.

Methodology
In order to assess the effects of the proposal at the potential Blowhole Point North relocation site, Hudson and Associates first undertook a baseline evaluation to identify the characteristics and key values at the site in relation to natural character. Values were rated using the NZ Institute of Landscape Architects Best Practice Guide for Landscape Assessment, which sets out a 7 point scale for values, ranging from Very High to Very Low as follows:

Very High/High/High-Moderate/Moderate/Moderate-Low/Low/Very Low

An assessment was then made of the characteristics and key values at the site in relation to natural character if a salmon farm was established at the potential relocation site, and the values rated again, using the 7 point scale outlined above.

The significance of the effects that might arise has then been considered. Natural character values exist at multiple geographic scales, as outlined in 'Natural Character of the Marlborough Coast: Defining and Mapping the Marlborough Coastal Environment' (the Marlborough Natural Character Study), a 2014 study prepared for the Marlborough District Council by Boffa Miskell Limited, Lucas Associates, the Department of Conservation and Landcare Research. Natural character is assessed at five different geographic scales (Levels 1 – 5) in the Marlborough Natural Character Study, as outlined in Appendix C of this report. The area being assessed becoming more localised and confined as an assessment moves from Level 1 to Level 5.

The Marlborough Natural Character Study defined each of these Levels for the Marlborough District. Using the potential Blowhole Point North site and the results of the Marlborough Natural Character Study as an example:

- Level 1 is not identified
- Level 2 is defined as the whole of the Marlborough Sounds
- Level 3 is defined as the whole of Pelorus Sound
- Level 4 is defined in one location - being Pelorus Heads, described as a 'largely unmodified section of coast extending into the entrance to Pelorus Sound to Kaitira and Te Akaroa'. This area would include both the potential Blowhole Point North and Blowhole Point South sites
- Level 5 is not defined for any of the areas where the potential relocation sites are located, but can be considered to be the specific bay in which each site is located

The discussion below outlines the baseline evaluation, the effects that might occur on natural character and the significance of those effects at the different scales at which natural character is assessed.

Assessment

In terms of natural character the landform at the site is largely unmodified, but the coastal margin has been modified and there is a mostly sparse benthic ecology. Natural character is reduced by the presence of pasture and mussel farming, and the current exotic forestry plantings, all of which reduce the perceived naturalness of the area. The site is not considered to meet the threshold to be classified as an area of Outstanding Natural Character in accordance with the NZCPS.[51] Neither the site nor the wider area have been classified as an Area of Outstanding Natural Character in the pMEP.

The current natural character values at the potential relocation site are considered to be Moderate.

There will be adverse effects on natural character as a result of the potential relocation proposal, including some loss of a sense of wildness, remoteness and naturalness, and some reduction in night sky darkness.[52]

[51] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry for Primary Industries, p20.
[52] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry for Primary Industries, p21.

If the potential relocation proposal went ahead at this site, the natural character values would be anticipated to change to Moderate-Low. [53]

In assessing the significance of that change, the Landscape Report notes that the site is not considered highly sensitive to change and that it will be able to receive and absorb the proposed degree of change from a perceptual and sensory point of view. Ensuring that the benthic habitat beneath the site does not exceed ES5 means that potential effects on the existing natural science values are not considered to be significant.[54]

On balance therefore, the Landscape Report concludes that the potential relocation of a salmon farm to this site will not have significant effects on natural character at the Level 4 or Level 5 scale, with effects being mitigated through appropriate structure selection. The visually complex backdrop to the site and the working landscape character are noted as further mitigating factors for any effects. At the broader Level 3 scale the Landscape Report concludes that effects on natural character will not be significant. [55]

Effects on natural character values at a regional and national scale are considered by the Landscape Report to be insignificant.[56]

6.2.2.2 Outstanding Natural Character

The potential Blowhole Point North site is not located in an area of outstanding natural character.

6.2.2.3 Landscape

Methodology
The same methodology as described in section 6.2.2.1 has been used to assess effects on landscape, with the exception of the geographic scale at which effects are considered.

The 2015 'Marlborough Landscape Study: Landscape Characterisation and Evaluation' (the 2015 Landscape Study) prepared by Boffa Miskell Limited identifies landscape values at a 'finer district scale', but this scale means is not clearly defined.

Hudson and Associates, in the Landscape Report, have taken the values described in the 2015 Landscape Study as one set of values to be assessed. Assessment at a more site specific scale has been undertaken, as well as a consideration of landscape values at a regional and national scale.

Effects on landscape have therefore been considered at the following scale for each of the potential relocation sites:

- the site scale
- the district scale (i.e. the landscape values outlined in the 2015 Landscape Study)
- the regional scale
- the national scale (i.e. national level landscape values as identified in the 2015 Landscape Study)

The discussion below outlines the baseline evaluation, the effects that might occur on landscape and the significance of those effects at the different scales at which landscape is assessed.

Assessment

In relation to landscape values, there is a sense of remoteness, expansiveness and exposure to the elements, due to the location of the potential relocation site on the edge of the open sea. However, there is a somewhat working landscape character, due to the presence of pasture, mussel farms, and the fairly extensive block of exotic forestry that currently exists on Te Akaroa Headland. The complex mix of vegetation on land in the vicinity of the site also reduces coherence and visual amenity. The site has some memorability by virtue of being adjacent to the recognised gateway to and from Pelorus Sound. [57]

The natural science values of this area consist of a largely unmodified landform, some modification of the coastal margin with three existing mussel farms, a marine epifaunal community that is sparse and

[53] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p21
[54] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry for Primary Industries, p21.
[55] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry for Primary Industries, p22.
[56] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry for Primary Industries, p22.
[57] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry for Primary Industries, p20.

mostly comprised of common taxa, early-stage regenerating indigenous vegetation on lower slopes and gullies, and modified land cover through pasture and a block of pine plantation that currently exists on the steep slopes behind the site. [58]

The current landscape values are considered to be High-Moderate.

Locating a salmon farm at the potential relocation site will result in a higher number of visible structures at the site than currently exist, with resultant adverse effects on landscape character, including a reduction in perceived naturalness and the sense of remoteness at the site.[59]

If the potential relocation proposal went ahead at this site, the landscape values are expected to be classified as Moderate.[60]

In assessing the significance of that change, the Landscape Report notes that design of the farm structures can mitigate effects, and the farm would be a fit with the site's existing 'working landscape' character. The potential relocation site is not considered highly sensitive to change, due to the visual complexity and low coherence of the backdrop. With the expansive context providing for absorption of the proposal, the site is considered able to accept the proposed degree of change, with only a small reduction in visual amenity.[61]

Subject to further information on cultural values (see section 9 of this report) the Landscape Report concludes that any landscape and visual effects arising from the potential relocation site will not be significant at the site scale, and can be mitigated to an acceptable level. [62]

At the district, regional and national scales the potential Blowhole Point North relocation site lies within areas classified as outstanding. These areas are discussed in the sections that follow.

6.2.2.4 Outstanding Natural Landscapes

At the district scale, the potential relocation site is within the proposed Outer Sounds Outstanding Natural Landscape. The Landscape Report concludes that the effects on the values identified for that landscape will be no more than minor.

Similarly, the Landscape Report concludes that any larger scale regional outstanding values will also not be affected. Regional scale values will be broader again in nature, and at that scale the site forms only a very small part of the context.

At the national scale the Landscape Report also concludes that outstanding values will remain intact. Values at this scale are very broad and the site forms only a very small part of the context at this scale. [63]

6.2.2.5 Outstanding Natural Features

The site is within a proposed Outstanding Natural Feature assessed at the district scale (described as 'the waters between Te Akaroa and Kaitira Headland' in the 2015 Landscape Study), due to its exceptional biophysical and associative values and the very high sensory landscape values. The Landscape Report acknowledges that the headland adjacent to the site has associative values linked to the 'gateway' to Pelorus Sound, but it is considered that the potential relocation proposal will have a less than minor effect on these values due to the expansiveness of the overall landscape context. 64

6.2.2.6 Peer Review

The Landscape Report assessment of the potential Blowhole Point North site was peer reviewed by Drakeford Williams Limited. The peer review reached the same conclusion in terms of both the baseline natural character and landscape rating, and the changed rating as a result of the introduction of a salmon farm to the site. However the peer review did consider that the location of the potential

[58] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.17
[59] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry for Primary Industries, p22.
[60] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.22
[61] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.22
[62] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries,p.22
[63] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.22
[64] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries,p.22

relocation site would reduce the size of the Pelorus gateway and bring working landscape further out into Pelorus Sound and at the entry into Cook Strait.

6.2.3 King Shag

The potential relocation sites in Pelorus Sound are within the foraging distance of King Shags breeding at Duffers Reef (the main colony). The potential Blowhole Point North site would be located 3km from Duffers Reef, 500m closer than the nearest existing salmon farm site (Forsyth Bay). The site would also be within foraging range of King Shag breeding at North Trio and Sentinel Rock.

In addition to proximity, water depth influences the likelihood of a particular site providing feeding habitat for King Shag, as 74% of birds forage within water that is 20-40m deep.[65] The potential Blowhole Point North site has depths ranging from 28-80m, although the majority of the 3 circular net pens proposed at the site would be located in water greater than 50m deep.

This site is not located within an area of ecological value in the MSRMP.

Statfishtics reviewed literature available on the prey species of King Shag, concluding that a number of mainly flatfish comprised a diet for the birds that was strongly dominated by the single species *Arnoglossus scapha*, common name 'witch'. Statfishtics then used a feeding study on NZ flatfish species, as well as benthic reports prepared by NIWA and the Cawthron Institute for the potential relocation sites, to investigate the possible impacts of the proposed site relocations on the prey of flatfish, and ultimately on King Shag. The conclusion was that many likely prey items of witch (and the other fish prey species of King Shag) are available at the potential relocation sites, but that assemblages of these and other potential prey species of witch (and the other fish prey species of King Shag) are not restricted to only areas within the Sounds close to the potential relocation sites.[66]

Any reduction in prey availability to King Shag that might arise from farm relocation is also likely to eventually be offset by habitat recovery below and near to vacated existing farm sites, although this is most likely to occur over a timeframe of several years. Statfishtics notes that the probable speed of recovery is most likely to be a function of the characteristics of the usage of the site (e.g. production levels and the feeding regime employed at the site), and other characteristics of the site, particularly sediment type, but also bottom depth and temperature range. The exact time to full recovery if an existing lower-flow site was vacated is not currently known with certainty, but it would provide some long term benefit to King Shag foraging in those areas.[67]

6.2.4 Tourism and Recreation

The potential Blowhole Point North site would have no direct known impact on recreational users or tourists, with the possible exception of this site being a "special" or secret recreational or fishing spot for fishers.[68]

6.2.5 Navigation

Navigation routes in the area are outlined in the Navigation Report. Vessels transiting the area typically run from headland to headland, and the potential Blowhole Point North floating structure would be located between the adjacent headlands and largely outside the headland to headland line. The site would not interfere with the entrance of vessels to Port Ligar or Forsyth Bay.

In relation to the potential for collision between small vessels and a marine farm, Navigatus has assessed the activity level as low, meaning that there is daily vessel activity in the area. For the potential Blowhole Point North site the estimated reaction time available for a vessel rounding the headlands north and south of the farm would be in the region of 55 seconds.[69] The site would be located on a natural navigational route between the two headlands for vessels heading to or coming from the north or west of Pelorus Sound. Skippers passaging from these areas would need to give the area of the potential relocation site a wider berth than is currently the case, and so it could therefore be argued that the potential site presents some navigational risk.[70] This risk would need to be managed through normal

[65] NIWA (2016) Update of Existing Seabird report with Reference to Relocation of Existing Farms, p. 9
[66] Statfishtics (2016) Effects of Salmon Farming in the Marlborough Sounds on the prey of King Shag, p.7
[67] Statfishtics (2016) Effects of Salmon Farming in the Marlborough Sounds on the prey of King Shag, p.9
[68] Tourism and Recreation Conservation Tourism Limited (2016) NZ King Salmon Potential Salmon Farm Relocation in Marlborough Tourism and Recreation Assessment, p. 29
[69] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.33
[70] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.35

means – namely by inclusion of the site on marine charts and appropriate navigational lighting and marking as well as general local boating education.

Access to the mussel farms within the bay would be somewhat impeded. However, the mussel work boats that would require access routinely operate between mussel farm lines. The existence of a salmon farm in close proximity will therefore not pose a constraint or additional hazard as the masters of these vessels are well able to navigate around the much more navigationally difficult mussel farms with their low visibility and low height above water.[71]

The Navigation Report notes that the bay where the potential Blowhole Point North site would be located could be considered a refuge for small craft and yachts in strong west to northwest winds. Considering that the proposed farm will be at least 150m off the shore, this distance still leaves room for boats to find refuge between the farm and the shore.[72]

6.2.6 Heritage

There are no heritage sites that will be affected by this potential relocation site.

6.2.7 Noise

The predicted noise level at the potential Blowhole Point North site with all farm equipment running (including harvesting) during a normal day would be between 36-41dBLA$_{10}$ measured at the closest shoreline. The lower value in the range represents the modelled case where the noise-making equipment is spread out across the farm and the upper limit represents the case where all the noise-making equipment is clustered at the part of the farm nearest to the shoreline. The predicted noise at this site with only the generator operating, as would be the case at night, is 28dBLA$_{10}$. These levels comply with the noise standards set for the three sites granted through the Board of Inquiry process. Figures 6-5 and 6-6 show the noise prediction contours during the day and night time for both the potential Blowhole Point North and Blowhole Point South sites.[73] As noted in section 6.2.8 there are no residences within the noise contours outlined in the figures below.

The following mitigation measures are recommended to reduce any noise effects:

- use of silencers on net lifters and water blaster pumps
- generator houses constructed with silenced ventilation housing
- avoidance of the use of outdoor speakers/radios on farms[74]

[71] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.36
[72] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.36
[73] Marshall Day Acoustics (2016) Salmon Farm Relocation Noise Effects Assessment p.17
[74] Marshal day Acoustics (2016) Salmon Farm Relocation Noise Effects Assessment, p. 14

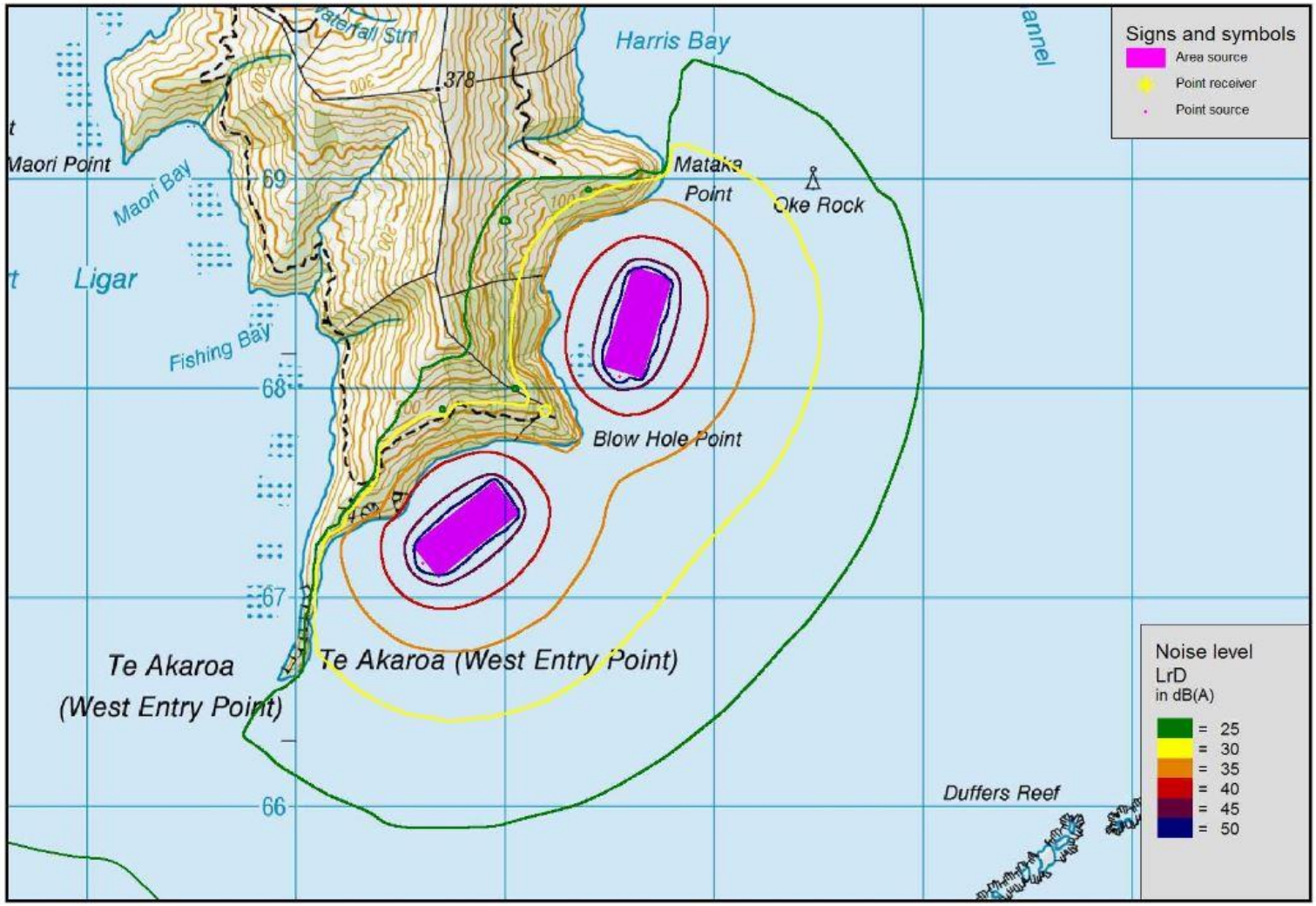


Figure 6-5: Blowhole Point North noise prediction contours (day)

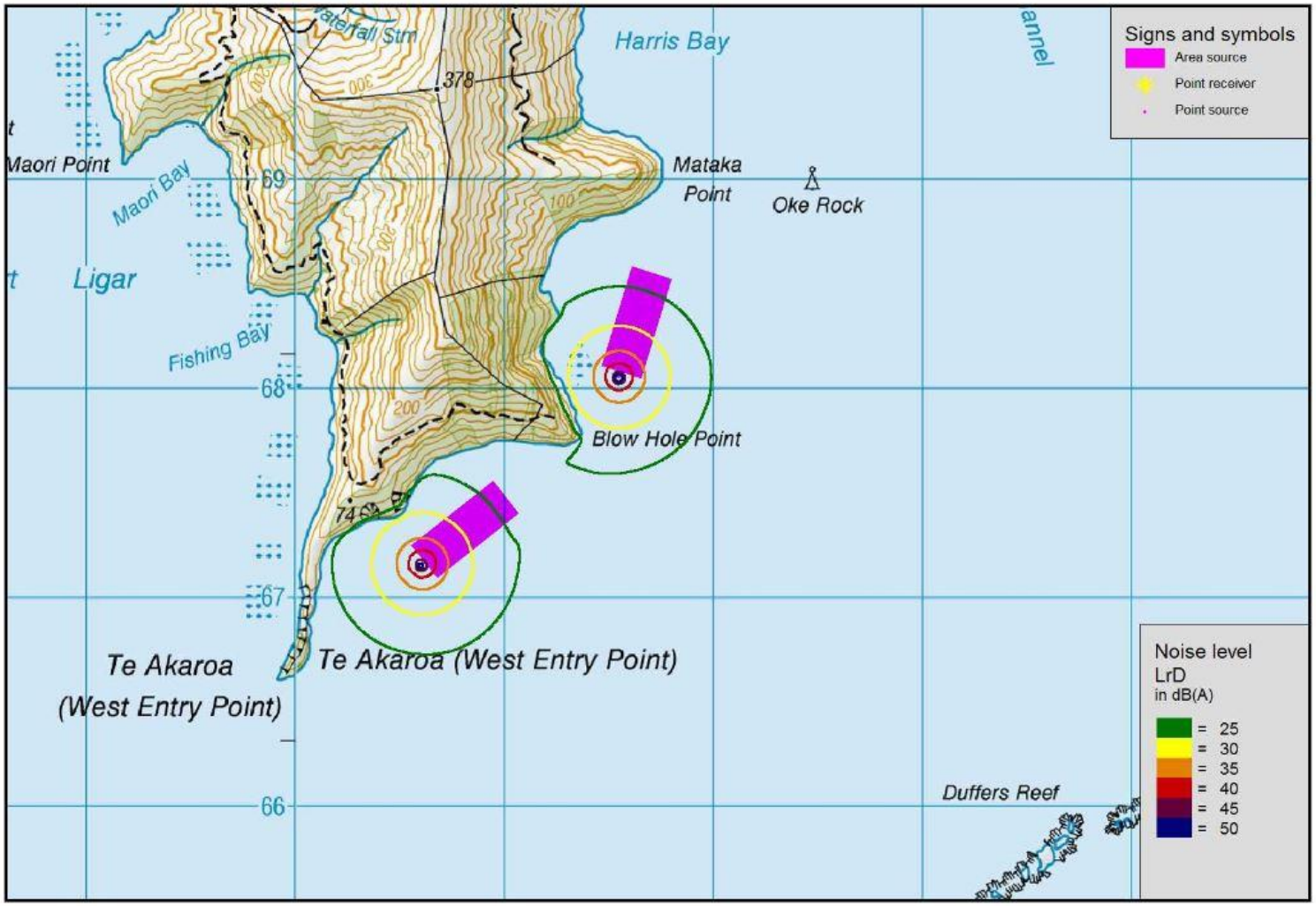


Figure 6-6: Blowhole Point North noise prediction contours (night)

6.2.8 Residential Amenity

There are no dwellings within the Waitata Reach that could have a direct line of sight to the potential relocation site. The only dwellings with a direct line of site are on Forsyth Island, where one dwelling and one lodge are located at distances between 5.4-5.8km away. Dwellings on the farming property adjacent to the potential relocation site and its neighbouring farming property are well masked from views and are located at distances of 3.9km and 4.3km respectively. Overall, the effects of the potential Blowhole Point North site on residential amenity are considered nil to negligible.[75]

6.2.9 Policy Issues

Objectives and policies contained in the relevant statutory documents are outlined in section 3.2 and 3.3 of this summary AEE. Noting that the public consultation process will provide additional information and discussions, an initial identification of key policy issues is provided here. Not all of the objectives and policies outlined in sections 3.2 and 3.3 are discussed here, partly because there is a significant degree of overlap between the provisions in the various documents. Instead, key matters have been selected and discussed.

Key policy issues identified in relation to the potential Blowhole Point North site are outlined in Table 6-4. The policy analysis relating to water quality, which is a key matter under NZCPS Objective 1 and Policies 21 and 23, MRPS Objective 5.3.2 and pMEP Policy 13.2.1 is contained in section 6.7 of this report.

[75] Taylor Baines (2016) Potential Salmon Farm Relocation in Marlborough Social Impact Assessment, p.21

Table 6-4: Summary of policy issues for Blowhole Point North

Policy issue	Examples of relevant provisions	Initial assessment
Indigenous biodiversity	NZCPS Objective 1 and Policy 11 and pMEP Policy 8.3.1 – safeguard the integrity, form, functioning and resilience of the coastal environment, sustain its ecosystems, and avoid *inter alia* adverse effects on threatened species MSRMP Policy 2.2.1.1.3 - consider the effects of an activity on the contribution that indigenous flora and fauna make to natural character pMEP Objective 8.2 - increase the extent of Marlborough's indigenous biodiversity and improve in areas that have been degraded	Principal issues arise from effects on King Shag (relevant to all the policies listed) and effects on indigenous benthic biodiversity (relevant to the MSRMP and pMEP policies) – particularly reef habitat in the nearshore area inshore of the site and indigenous biodiversity on the seabed underneath the potential site. Site is located within flying distance of the main Duffer's Reef King Shag colony, but not sufficiently close that direct disturbance of the birds at the colony would be anticipated. Majority of the net pens proposed for the site would be located in water greater than 50m deep, generally deeper than preferred for King Shag feeding. Overall effects on water quality (see section 6.7 of this summary AEE) will also be relevant as water quality may affect King Shag feeding. Exact determination of effects on King Shag is difficult and further analysis of this issue will be required through the public consultation process (which will involve expert workshops). Depositional modelling indicates that effects on nearshore reef patches and kelp communities, and the reef at Blowhole Point should not be significant, but monitoring will be necessary to confirm this, and adaptive management is recommended to manage any effects.
Natural character and landscape	NZCPS Objective 2 and MSRPS Policy 8.1.6 – preserve the natural character of the coastal environment NZCPS Policies 13 and 15 – avoid adverse effects on outstanding natural features and landscapes and areas of outstanding natural character, avoid significant adverse effects on all other areas and natural character MSRMP Objective 1 and pMEP Objective 6.2 – preserve natural character and protect it from inappropriate subdivision, use and development.	Site is not within an Area of Outstanding Landscape Value in the MSRMP. Site is within a proposed Outstanding Natural Landscape and within a proposed Outstanding Natural Feature in the pMEP. At the scale at which those values have been defined, the Landscape Report currently concludes that the potential relocation site would have less than minor effects on the proposed Outstanding Natural Feature and would not compromise the values of the proposed Outstanding Natural Landscape. The level of effect in relation to the proposed Outstanding Natural Feature will need to be given careful consideration in the context of the requirements of the NZCPS.

Policy issue	Examples of relevant provisions	Initial assessment
	MSRMP Policy 1.1 – avoid adverse effects on areas of the coastal environment predominantly in their natural state and where natural character has not been compromised. pMEP Policies 6.2.1 and 6.2.2 – mirror the requirements of NZCPS Policies 13 and 15.	The site is not in an Area of Outstanding Natural Character. Based on the information currently available, and considering the modified nature of the natural character at the site, the Landscape Report concludes that adverse effects on natural character will not be significant.
Other matters	MSRMP Policy 9.2.1.1.2 – avoid adverse effects of development in the coastal environment, and where this is not practicable, mitigate and provide for effects to be remedied. NZCPS Objective 4 and pMEP Objective 9.1 – public open space and recreational opportunities in the coastal environment. pMEP Policy 13.2.5 – maintenance and enhancement of amenity values.	Many of the technical reports prepared to date identify adverse effects and assess whether they can be avoided. Where they cannot, measures are recommended to mitigate and remedy effects, including through measures such as adaptive management and staged development of the final sites. Recreational use and amenity values for all sites require public input in order to be able to understand the scale of effects.

6.3 Blowhole Point South

The potential Blowhole Point South site is located in a small, enclosed wide-mouthed south-facing bay which is open to the main channel of the entrance to Pelorus Sound – opposite Kaitira headland and the entrance to Forsyth Bay.[76] The site is not in any area proposed as an area of outstanding natural character, but is inside an area proposed as an ONL at a district scale (Outer Sounds Landscape) and a proposed ONF at a district scale (described as 'the waters between Te Akaroa and Kaitira Headland' in the 2015 Landscape Study).[77]

Figure 6-7: Blowhole Point South[78]

The adjacent landform comprises a main headland at the entrance to Pelorus Sound with two spurs which come down from the height of the headland. The spur to the north-east is short and encloses the bay shallowly by dropping suddenly into the sea, while the south-west side encloses the bay in a similar manner and also forms a smaller side-bay to the south before becoming narrower and forming an elongated and thin peninsula, enclosing the bay from the entrance to Port Ligar.[79]

The coastal margin includes a rocky narrow strip of beach at low tide, below largely unmodified slopes from the top of the headland.[80] The vegetation on the land above and surrounding the bay is modified with a mix of plantation forestry, pasture and regenerating indigenous vegetation. This indigenous vegetation is beginning to extend up the slopes.

The benthic environment is a sloping seabed with depths of 38-65m, comprising of sandy muds with some coarse shell material present.[81] The habitat below the site is mainly home to moderately abundant macroalgae and diverse invertebrates including brittlestars and hermit crabs.[82] The potential site overlaps an existing mussel farm, whose presence has influenced the benthic environment, resulting in species such as green lipped mussels and starfish.[83] The environment inshore from the site includes near-shore reefs, muddy sand with patches of shell, and a high diversity of macroalgae. Paua, kina,

[76] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 25
[77] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 25
[78] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 24
[79] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 25
[80] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 25
[81] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 28-30
[82] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 31
[83] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 31

moki, blue cod, butterfly perch, kahawai and kingfish occur at a reef which extends southeast of Blowhole Point.[84] The biota at this site is considered to be moderately abundant.[85]

From a navigation and safety perspective, the bay behind the potential Blowhole Point South site could be used as a refuge for vessels in west to northwest wind conditions but overall has a low level of activity.[86]

A summary of the key effects at the potential Blowhole Point South site is presented in Table 6-5. A discussion of those effects is contained in the sections that follow.

Table 6-5: Blowhole Point South site summary

BLOWHOLE POINT SOUTH						
Biophysical suitability for salmon farming						
Mean current (m/s) for (1) near-bottom & (2) mid-water	Temp (°C)	Depth (m)	Max feed discharge (T)	Cage type	Benthic Footprint (ha)	Surface structure area incl. barge (ha)
(1) 0.15 (2) 0.14	11.9-18.2	38-65	5,000	Polar circles	~20	1.402
• The site is biophysically suitable for growing salmon and modelled to produce approximately 2,200T of annual salmon production within ES5.						
Seafloor habitats and communities						
• Most of the site is positioned over a sandy mud/shell gravel habitat supporting a moderately abundant mixed community of macroalgae and diverse invertebrates. Two species of brachiopods are present, but no dense beds were detected. A large reef extends to the southeast of Blowhole Point and provides habitat for a diversity of macroalgae, and sessile and mobile fauna, and associated reef, demersal and pelagic fish species. This reef, with smaller patches of bedrock, cobble and sand along the shoreline is blue cod habitat. • The modelled depositional footprint extends as far as a portion of the extensive reef at Blowhole Point which indicates that there is potential for some effect on the reef communities. Monitoring of the seabed in accordance with the Benthic Guidelines and monitoring of the nearby reef and inshore areas will be necessary.						
Landscape and natural character						
• The landscape assessment undertaken states that at a site specific scale the landscape values are High-Moderate and natural character values are Moderate, which would change to Moderate and Moderate-Low respectively if a salmon farm was located at the site. The effects of this change are not considered to be significant. • However the site is within the proposed Outer Sounds Outstanding Natural Landscape and within a proposed Outstanding Natural Feature (described as 'the waters between Te Akaroa and Kaitira Headland'), and part of the Pelorus Sound 'gateway'. At the scale of these areas the effects would be less than minor.						

[84] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 38
[85] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 38
[86] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.33

King Shag
• The site is located within 3km of the main Duffers Reef King Shag colony. While water depth at the site ranges from 38-65m, approximately half of the net pens would be located in water at least 50m deep, deeper than preferred King Shag foraging depth.
Navigation
• The site is located on a natural navigational route for vessels heading to or coming from north or west of Pelorus Sound. • The floating structure would be located inshore of the straight line between the nearby headlands and would not interfere with the entrance of vessels to Port Ligar or Forsyth Bay. • Sufficient room is available between the potential site and the shore if small craft and yachts need refuge during strong west to northwest winds.
Noise and residential amenity
• No effects anticipated.
Key policy issues[87]
• Landscape and natural character. • Indigenous biodiversity. • Water quality.

6.3.1 Benthic

NIWA's technical investigation of the seabed at the potential Blowhole Point South site is summarised in Table 6-6.

Table 6-6: Blowhole Point South benthic summary

Site	Benthic Environment
Blowhole Point South	• Depths range from 38-65m. • Mixed community of macro-algae and invertebrates, with some brachiopods. • The site overlaps an existing mussel farm along most of the inshore boundary and in that area the benthic community is influenced by mussels and other biota dropping from the mussel farm structures. • Small patches of reef or cobble and kelp communities inshore of the site. • Infaunal and epifaunal diversity is relatively high at this site. • An extensive reef supporting an associated reef community is located north-east of the site at Blowhole Point

[87] Key policies in relation to cultural effects are identified in section 9 of this report.

6.3.1.1 Effects of Seabed Deposition

The potential site at Blowhole Point South has been assessed based on a scenario assuming a feed input of 5000 tonnes per year, which resulted in a forecast enrichment of below ES5. The extent of the predicted depositional footprint is shown in Figure 6-8 below. In the area directly under the sea pens conspicuous epibiota such as fan shells and hermit crabs would be displaced, and the relatively diverse infaunal community would be modified. Deposition would be mainly focused directly beneath the sea pens and is predicted to move away from the farm towards Blowhole Point. An area of approximately 20 hectares is forecast to be affected by the wider footprint within which deposition can be expected at a rate decreasing from about 12kg $m^{-2}yr^{-1}$ (ES5=13kg $m^{-2}yr^{-1}$) closer to the sea pens to about 1kg $m^{-2}yr^{-1}$ (ES3=1kg $m^{-2}yr^{-1}$) at the edges of the footprint. The extensive reef to the southeast of Blowhole Point provides habitat for macroalgae, sessile and mobile fauna, and associated reef, demersal and pelagic fish. The primary deposition footprint extends over a portion of this reef, which indicates there may be potential for some impacts to communities inhabiting the reef. [88]

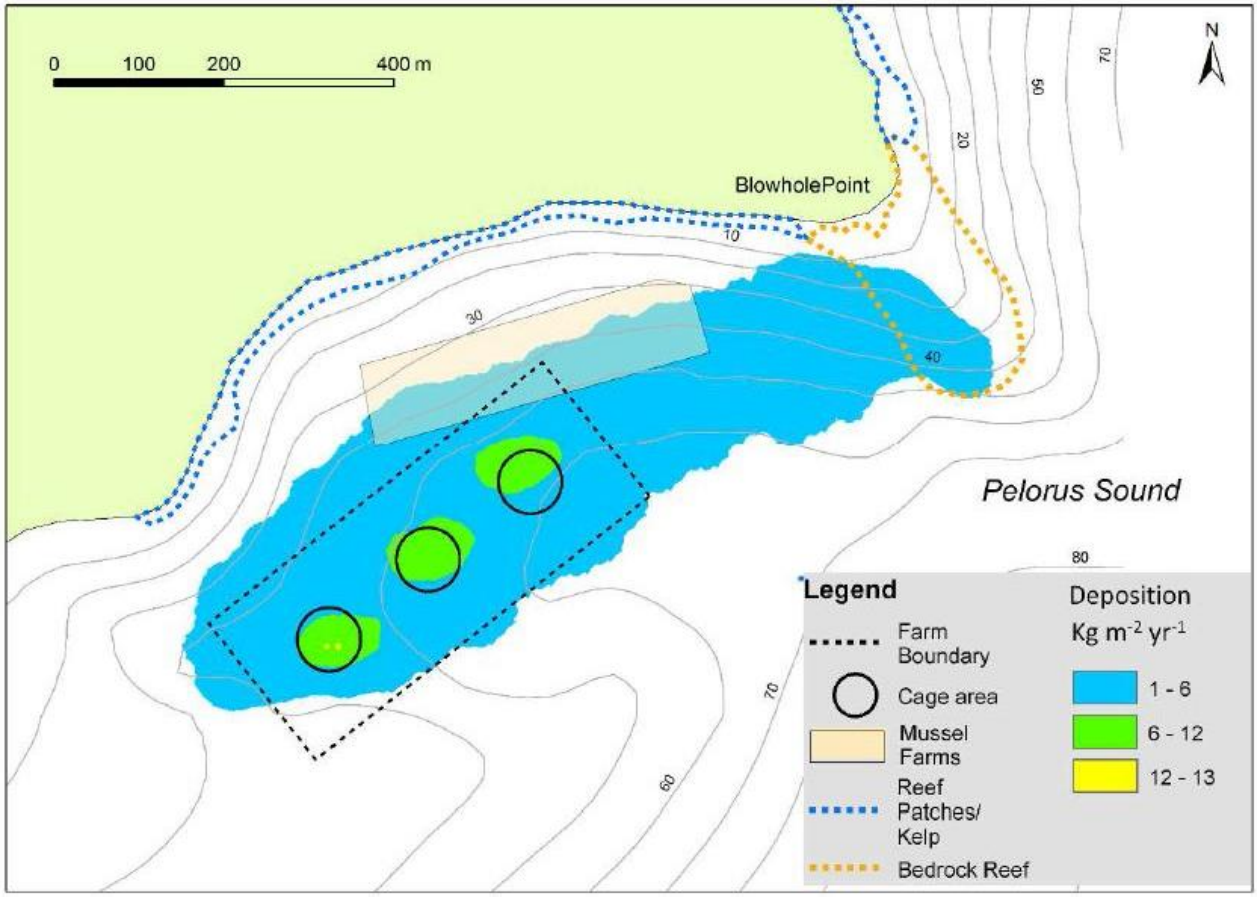


Figure 6-8: Depositional footprint at Blowhole Point South at an annual feed discharge rate of 5000 tonnes

Figure 6-8 shows that the modelled deposition from the potential Blowhole Point South relocation site would overlap with the existing mussel farm in the vicinity. Mussel farms can give rise to low level depositional effects, and the cumulative effects of the mussel and salmon farm deposition have therefore been assessed.[89] The results of this analysis are outlined in Figure 6-9. As with the potential Blowhole Point North relocation site, the Cawthron Institute notes that the salmon farm deposition is the main influence on predicted deposition rates, and that the overlap with mussel farm deposition would not result in the overall enrichment stage increasing. The predicted outcomes from the depositional modelling of the potential salmon farm site (as discussed in relation to Figure 6-8) therefore remain the same.

[88] NIWA (2016) Benthic Ecological Assessment for Proposed Salmon Farm Sites, p.23
[89] Cawthron Institute (2016) Blowhole Point DEPOMOD overlay for proposed farms

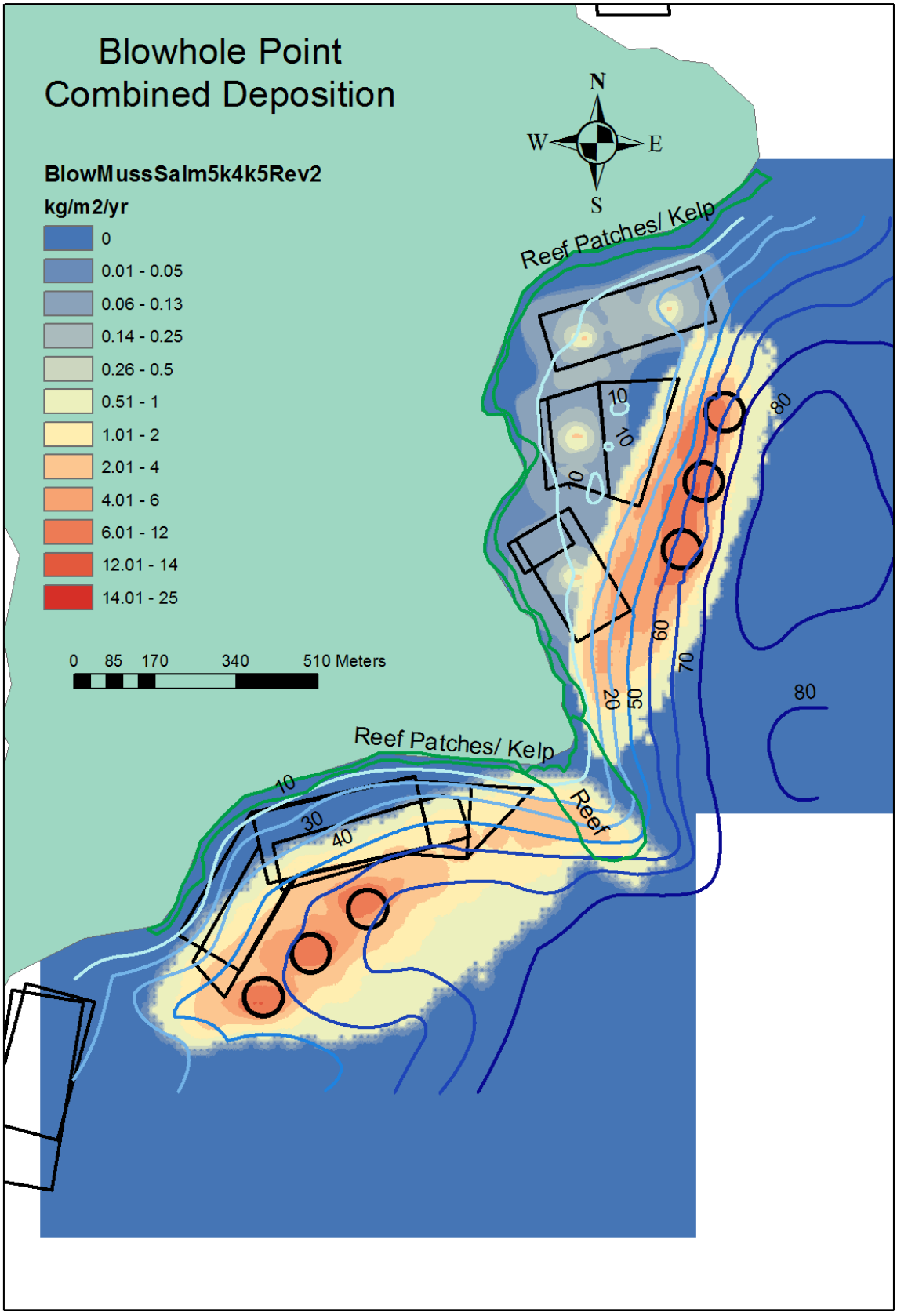


Figure 6-9: Blowhole Point mussel and salmon farm deposition

6.3.2 Landscape and Natural Character

6.3.2.1 Natural Character

A proposal consisting of three circular pens and a barge for servicing the farm (of the more recent architectural design, in a dark recessive colour) has been assessed to determine effects on landscape and natural character at the potential Blowhole Point South relocation site. The site is located to the northeast of Te Akaroa Headland in the Outer Pelorus Sound.

Methodology
A description of the method used to undertake the natural character assessments is contained in section 6.2.2.1 of this report. For the potential Blowhole Point South site:

- Level 1 is not identified in the analysis outlined in the Marlborough Natural Character Study
- Level 2 is defined as the whole of the Marlborough Sounds
- Level 3 is defined as the whole of Pelorus Sound
- Level 4 is defined in one location in the Marlborough Natural Character Study - being Pelorus Heads, described as a 'largely unmodified section of coast extending into the entrance to Pelorus Sound to Kaitira and Te Akaroa'. This area would include both the potential Blowhole Point North and Blowhole Point South sites
- Level 5 is not defined for any of the areas where the potential relocation sites are located, but can be considered to be the specific bay in which each site is located

The discussion below outlines the baseline evaluation, the effects that might occur on natural character and the significance of those effects at the different scales at which natural character is assessed.

Assessment

In terms of natural character the landform is largely unmodified. There is early-stage indigenous vegetation renewal on lower slopes and gullies adjacent to the site, extending well up headland slopes in places. The coastal margin is modified by marine farming, but there is a moderately abundant mixed benthic community at the site. While perceived naturalness at the site is reduced by the land use and modification of the coastal marine area, the landform and expansive seascape still dominate visually. The site is not considered to meet the threshold to be classified as an area of outstanding natural character in accordance with the NZCPS.[90] Neither the site nor the wider area have been classified as an Area of Outstanding Natural Character in the pMEP.

The current natural character values at the potential relocation site are considered to be Moderate.

There will be adverse effects on the perceptual/sensory aspect of natural character, including some loss of a sense of wildness and remoteness, and some reduction in night sky darkness. Effects on natural science values are somewhat elevated at this site compared to the potential Blowhole Point North site, due to potential low-level benthic effects on the reef at Blowhole Point.[91]

If the potential relocation proposal went ahead at this site, the natural character values would be anticipated to change to Moderate-Low.[92]

In assessing the significance of that change, the Landscape Report notes that the site is not considered to be highly sensitive to change, and will be able to receive and visually absorb the proposed degree of change. Overall, it is considered that the effects on perceptual/sensory values will not be significant and can be mitigated by the design of the farm and the modified aesthetic attributes that exist at the site from the modification of the coastal margin. The Landscape Report concludes that, taking into account the higher-flows, presence of existing mussel farming and the character of the proposal and context, the effects of the potential relocation proposal at the Level 4 and Level 5 scale will not be significant. At the Level 3 scale the Landscape Report concludes that effects on natural character will not be significant

[90] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p27
[91] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p28
[92] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.14

due to the broad nature of the values at this scale, where the potential site forms only a small part of the coastal context at the site.[93]

Effects on natural character values at the regional and national scale are not considered to be significant.[94]

6.3.2.2 Outstanding Natural Character

The potential Blowhole Point South site is not located in an area of outstanding natural character.

6.3.2.3 Landscape

Methodology

A description of the method used to undertake the landscape assessments is contained in section 6.2.2.3 of this report.

Assessment

In relation to landscape values, there is a sense of remoteness and expansiveness at the site, due to the location on the edge of the open sea. Perceived naturalness, coherence and visual amenity is currently reduced by the presence of a block of exotic forestry, with the resultant geometric boundary edges of the forestry at odds with the landform. The site has high memorability due to associative values relating to its location and due to the adjacent unusual landform.[95]

The natural science values of this area consist of a largely unmodified landform, some modification of the coastal margin with an existing mussel farm, a moderately abundant mixed benthic community, a reef located 230m northeast of the site boundary, pasture and the edge of a pine plantation on the upper slopes behind the potential relocation site, and early stage regenerating indigenous vegetation on lower slopes and gullies. Natural science values are reduced by the modified coastal margin and modified vegetative land-cover, but the presence of regenerating native vegetation contributes to a slightly higher landscape rating than at the potential Blowhole Point North site.[96]

The current landscape values are considered to be High-Moderate.

The proposal will result in a higher number of visible structures at the site than currently exist, with resultant adverse effects on landscape character, including a reduction in perceived naturalness and the sense of remoteness at the site.[97]

If the potential relocation proposal went ahead at this site, the landscape values are expected to be classified as Moderate.[98]

In assessing the significance of that change, the Landscape Report notes that despite the increase in structures at the site, the resulting adverse effects on visual amenity values will not be significant, particularly taking into account the design of the proposed salmon farm and the capacity of the site, seascape and terrestrial backdrop. The proposal will fit well with the existing working landscape character. The potential relocation site is considered to have some sensitivity to change, but with the visual complexity and low coherence of the backdrop, and the expansive context, the site will be able to accept the proposed degree of change. The Landscape Report considers that on balance, with the mitigation measures proposed, the overall adverse effects on landscape character at the site scale will not be significant.[99]

At the district, regional and national scales the potential Blowhole Point South relocation site lies within areas classified as outstanding. These areas are discussed in the sections that follow.

[93] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p28
[94] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.28
[95] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.27
[96] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.25
[97] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.29
[98] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.29
[99] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.29

6.3.2.4 Outstanding Natural Landscapes

At the district scale, the potential relocation site is within the Outer Sounds Outstanding Natural Landscape. The Landscape Report concludes that the effects on the values identified for that landscape will be no more than minor.

Similarly, the Landscape Report concludes that any larger scale regional outstanding values will not be affected. Regional scale values will be broader again in nature, and at that scale the site forms only a very small part of the context.

At the national scale the Landscape Report also concludes that outstanding values will remain intact. Values at this scale are very broad and the site forms only a very small part of the context at this scale.[100]

6.3.2.5 Outstanding Natural Features

The site is within a proposed Outstanding Natural Feature assessed at the district scale, due to its exceptional biophysical and associative values and the very high sensory landscape values. The Landscape Report acknowledges that the headland adjacent to the site has associative values linked to the 'gateway' to Pelorus Sound, but it is considered that the potential relocation proposal will have a less than minor effect on these values due to the expansiveness of the overall landscape context at this location.[101]

6.3.2.6 Peer Review

The Landscape Report assessment of the potential Blowhole Point South site was peer reviewed by Drakeford Williams Limited. The peer review reached the same conclusion in terms of both the baseline natural character and landscape rating, and the changed rating as a result of the introduction of a salmon farm to the site. However the peer review did consider that the location of the potential relocation site would reduce the size of the Pelorus gateway and bring working landscape further out into Pelorus Sound and at the entry into Cook Strait.

6.3.3 King Shag

The potential relocation sites in Pelorus Sound are within the foraging distance of King Shags breeding at Duffers Reef (the main colony). The potential Blowhole Point South site would be located 3km from Duffers Reef, 500m closer than the nearest existing salmon farm site (Forsyth Bay). This potential site would also be within foraging range of King Shag breeding at North Trio and Sentinel Rock.[102]

In addition to proximity, water depth influences the likelihood of a particular site providing feeding habitat for King Shag as 74% of birds forage within water that is 20-40m deep.[103] The potential Blowhole Point South site has depths ranging from 38-65m with approximately half of the site being located in water depths of at least 50m.

This site is partially located within an area identified in the MSRMP as King Shag feeding habitat.

Effects on prey availability have been discussed at section 6.2.3 of this report.

6.3.4 Tourism and Recreation

This site is adjacent to the Te Kopi Nature Reserve to the western side of the proposed sites. The potential Blowhole Point South site has a similar assessment to the potential Blowhole Point North site, with minimal, if any, impact on tourists or recreational users.[104]

6.3.5 Navigation

Navigation routes in the area are outlined in the Navigation Report. Vessels transiting the area typically run from headland to headland, and the potential Blowhole Point South floating structure would be

[100] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.29
[101] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.29
[102] NIWA (2016) Update of Existing Seabird report with Reference to Relocation of Existing Farms, p.9
[103] NIWA (2016) Update of Existing Seabird report with Reference to Relocation of Existing Farms, p.9
[104] Tourism and Recreation Conservation Tourism Limited (2016) NZ King Salmon Potential Salmon Farm Relocation in Marlborough Tourism and Recreation Assessment, p. 29

located between the adjacent headlands and inshore of the transit line between the nearby headlands. The site would not interfere with the entrance of vessels to Port Ligar or Forsyth Bay.

In relation to the potential for collision between small vessels and a marine farm, the Navigation Report has assessed the activity level as low, meaning that there is daily vessel activity in the area, but not multiple daily activity. For the potential Blowhole Point South site the estimated reaction time available for a vessel rounding the headland north-east of the farm is in the region of 42 seconds, and in the region of 2 minutes for the headland to the south-west of the farm.[105]

The Navigation Report notes that the potential Blowhole Point South site is located in a bay that could be considered a refuge for small crafts and yachts in a strong west to northwest winds as the high ground would provide some shelter. However, the potential relocation site is located at least 150m off shore, allowing sufficient room for boats to seek refuge between the farm and the shore.[106]

6.3.6 Heritage

There is a pa site, which includes pits and intensive terracing, a little less than 1km away from the potential Blowhole Point South site. However the potential relocation site may not be visible from the pa site, which seems to be oriented towards Port Ligar rather than Pelorus Sound. The Heritage Report considers it unlikely that the potential relocation site would offend against wider heritage values and notes that there will be no impact on the ability to investigate any heritage sites. The Blowhole Point South site is located about 2.5km north of a gun emplacement on Post Office Point,[107] at a sufficient distance not to affect viewer perceptions of the area from the gun emplacement. The location of the gun emplacement on private land also means that there is no official public access to that area, further reducing any potential for adverse effects.

6.3.7 Noise

The predicted noise levels at the potential Blowhole Point South site, with all the equipment running (including harvesting), during a normal day would be between 40-45dBL_{A10} measured at the closest shoreline. The lower value in the range represents the modelled case where the noise-making equipment is spread out across the farm and the upper limit represents the case where all the noise-making equipment is clustered at the part of the farm nearest to the shoreline. The predicted noise at this site with only the generator operating, as would be the case at night, is 25dBL_{A10}. These levels comply with the noise standards set for the three sites granted through the Board of Inquiry process.[108]

Figures 6-10 and 6-11 show the noise prediction contours during the day and night time. These figures show the predicted noise contours for both the potential Blowhole Point North and Blowhole Point South sites. As noted in section 6.3.8 there are no residences within the noise contours outlined in the figures below.

Mitigation measures would be as outlined in section 6.2.7.

[105] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.33
[106] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.36
[107] HistoryWorks (2016) New Zealand King Salmon Relocation Options, p.15
[108] Marshall Day Acoustics (2016) Salmon Farm Relocation Noise Effects Assessment p.13

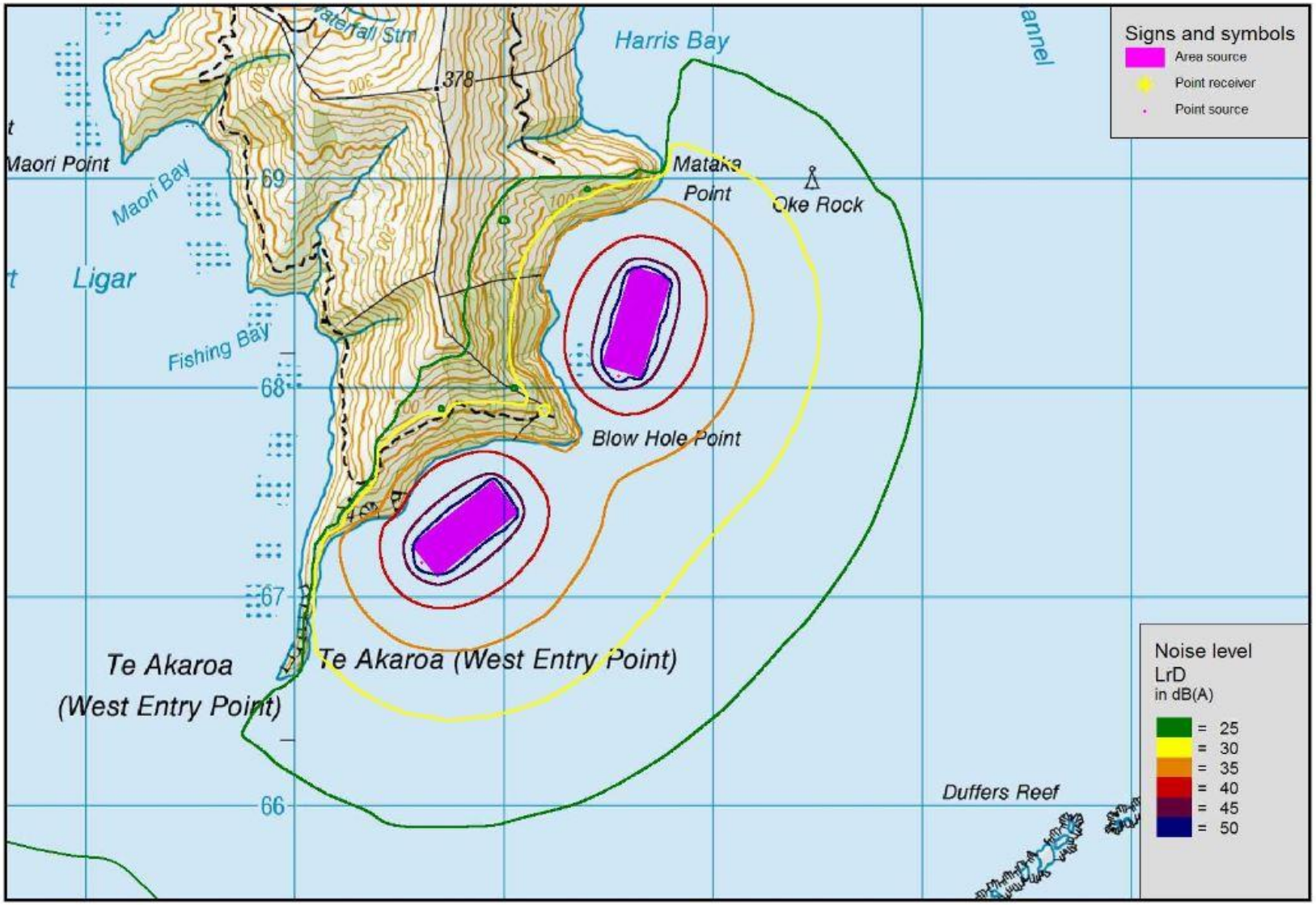


Figure 6-10: Blowhole Point North noise prediction contours (day)

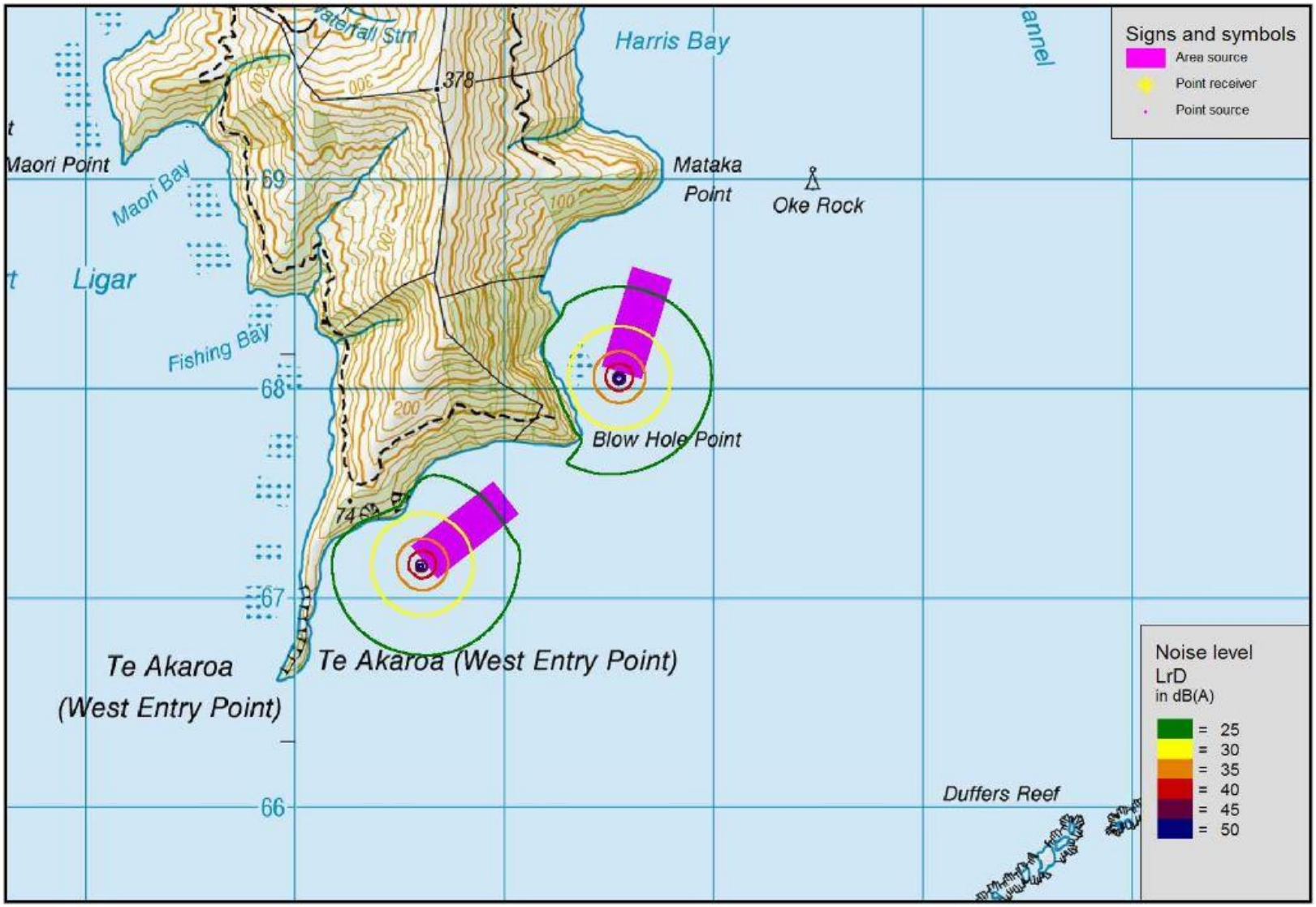


Figure 6-11: Blowhole Point South noise prediction contours (night)

6.3.8 Residential Amenity

There are no dwellings within Waitata Reach that could have a direct line of sight of a salmon farm at this site. There is one dwelling and one lodge on Forsyth Island on the eastern side of Forsyth Bay at distances between 5.3-5.7km away. The overall effects on residential amenity are therefore considered nil to negligible.[109]

6.3.9 Policy Issues

The process used to assess policy issues is described in section 6.2.9 of this summary AEE.

Key policy issues identified in relation to the Blowhole Point South site are outlined in Table 6-7. The policy analysis relating to water quality, which is a key matter under NZCPS Objective 1 and Policies 21 and 23, MRPS Objective 5.3.2 and pMEP Policy 13.2.1 is contained in section 6.7 of this report.

[109] Taylor Baines (2016) Potential Salmon Farm Relocation in Marlborough Social Impact Assessment, p.21

Table 6-7: Summary of policy issues for Blowhole Point South

Policy issue	Examples of relevant provisions	Initial assessment
Indigenous biodiversity	NZCPS Objective 1 and Policy 11 and pMEP Policy 8.3.1 – safeguard the integrity, form, functioning and resilience of the coastal environment, sustain its ecosystems, and avoid *inter alia* adverse effects on threatened species. MSRMP Policy 2.2.1.1.3 - consider the effects of an activity on the contribution that indigenous flora and fauna make to natural character. pMEP Objective 8.2 - increase the extent of Marlborough's indigenous biodiversity and improve in areas that have been degraded.	Principal issues arise from effects on King Shag (relevant to all the policies listed) and effects on indigenous benthic biodiversity (relevant to the MSRMP and pMEP policies) - particularly reef habitat located northeast of the site and indigenous biodiversity on the seabed underneath the potential site. The site is located within flying distance of the main Duffer's Reef King Shag colony, but not sufficiently close that direct disturbance of the birds at the colony would be anticipated. The net pens proposed for the site would be located in water depths between 38-68m, with the majority of the net pens in water deeper than preferred for King Shag feeding. Overall effects on water quality (see section 6.7 of this summary AEE) will also be relevant as water quality may affect King Shag feeding. Exact determination of effects on King Shag is difficult and further analysis of this issue will be required through the public consultation process (which will involve expert workshops). Depositional modelling indicated that effects on reef or cobble and kelp communities inshore of the site, and the reef at Blowhole Point should not be significant, but monitoring will be necessary to confirm this, and adaptive management is recommended to manage any effects.
Natural character and landscape	NZCPS Objective 2 and MSRPS Policy 8.1.6 – preserve the natural character of the coastal environment. NZCPS Policies 13 and 15 – avoid adverse effects on outstanding natural features and landscapes and areas of outstanding natural character, avoid significant adverse effects on all other areas and natural character. MSRMP Objective 1 and pMEP Objective 6.2 – preserve natural character and protect it from inappropriate subdivision, use and development.	The site is not within an Area of Outstanding Landscape Value in the MSRMP. The site is within a proposed Outstanding Natural Landscape and a proposed Outstanding Natural Feature in the pMEP. At the scale at which those values have been defined, the Landscape Report currently concludes that the potential relocation site would have less than minor effects on the proposed Outstanding Natural Feature and would not compromise the values of the proposed Outstanding Natural Landscape. The level of effect in relation to the

Policy issue	Examples of relevant provisions	Initial assessment
	MSRMP Policy 1.1 – avoid adverse effects on areas of the coastal environment predominantly in their natural state and where natural character has not been compromised. pMEP Policies 6.2.1 and 6.2.2 – mirror the requirements of NZCPS Policies 13 and 15.	proposed Outstanding Natural Feature will need to be given careful consideration in the context of the requirements of the NZCPS. Based on the information currently available, and considering the modified nature of the natural character at the site, the Landscape Report concludes that adverse effects on natural character will not be significant
Other matters	MSRMP Policy 9.2.1.1.2 – avoid adverse effects of development in the coastal environment, and where this is not practicable, mitigate and provide for effects to be remedied. NZCPS Objective 4 and pMEP Objective 9.1 – public open space and recreational opportunities in the coastal environment. pMEP Policy 13.2.5 – maintenance and enhancement of amenity values.	Many of the technical reports prepared to date identify adverse effects and assess whether they can be avoided. Where they cannot, measures are recommended to mitigate and remedy effects, including through measures such as adaptive management and staged development of the final sites. Recreational use and amenity values for all sites require public input in order to be able to understand the scale of effects.

6.4 Waitata Mid-Channel

The potential Waitata Mid-Channel site lies in the middle of the channel between Waihinau Bay to the northwest and Post Office Point to the southeast. The site is not in any area proposed as an area of outstanding natural character or within or adjacent to any terrestrial or marine area proposed to be an ONF.[110] The site is within an area proposed as high amenity.

Figure 6-12: Waitata – Mid-Channel[111]

The site is not adjacent to any landforms and sits in the middle of a deep, 12km long channel that runs along the Pelorus Sound/ Waitata Reach.

Water depths at the site are 61-64m and the seabed consists of an almost flat, sandy mud substratum with mild enrichment and indications of poor oxygenation of some areas of deep sediments.[112] The community at this site is almost exclusively faunal (crustaceans, bivalves, starfish, hermit crabs) with no macroalgae recorded, and a sparse invertebrate community of taxa that are generally common in the Marlborough Sounds, with one area of more moderate density near the centre of the potential relocation site. No notable taxa were recorded.[113]

From a navigation and safety perspective, the site is in the middle of a main channel between two landmasses and has a high level of activity.[114] The positioning of the potential Waitata Mid-Channel site has considered navigational constraints to ensure that vessels are able to safely navigate around, and pass the site.[115]

A summary of the key effects at the potential Waitata Mid-Channel site is presented in Table 6-8. A discussion of those effects is contained in the sections that follow.

[110] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 32
[111] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 31
[112] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 39
[113] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 42-48
[114] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.33
[115] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.34

Table 6-8: Waitata Mid-Channel site summary

WAITATA REACH MID-CHANNEL						
Biophysical suitability for salmon farming						
Mean current (m/s) for (1) near-bottom & (2) mid-water	Temp (°C)	Depth (m)	Max feed discharge (T)	Cage type	Benthic Footprint (ha)	Surface structure area (ha)
(1) 0.22 (2) 0.24	10.7-18.5	61-64	7,000	Polar circles	~45	2.29
• The site is biophysically suitable for growing salmon and modelled to produce approximately 4,620T of annual salmon production within ES5.						
Seafloor habitats and communities						
• There are no ecological features of special significance within or in the vicinity of the potential site. Habitats and taxa occur widely in the greater area of Waitata Reach and Pelorus Sound. • As this site is deep and is subject to strong currents, depositional material is likely to be dispersed more widely and the overall enrichment effects are likely to be reduced.						
Landscape and natural character						
• The assessment undertaken states that at a site specific scale the seascape value is High and natural character values are Moderate, which would change to High-Moderate and Low-Moderate respectively if a salmon farm was located at the site. The effects of this change are not considered to be significant.						
King Shag						
• The site is located within 4.5km of the main Duffers Reef King Shag colony. Water depth at the site ranges from 61-64m, deeper than preferred King Shag foraging depth.						
Navigation						
• The site is located within a general route of transiting vessels and close to the general routes of local vessels. • The best possible location of the salmon farm was found to be in the middle of the channel in order to create a greater space for passing vessels. • About the same amount of room as currently available for large vessels in Queen Charlotte Sound would remain on both sides of the Waitata Reach Mid-Channel site, but the Marlborough District Council Harbourmaster has expressed concern about the site.						
Noise and residential amenity						
• No significant effects.						
Key policy issues[116]						
• Landscape and natural character. • Water quality.						

[116] Key policies in relation to cultural effects are identified in section 9 of this report.

6.4.1 Benthic

NIWA's technical investigation of the seabed at the potential Waitata Reach Mid-Channel site is summarised in Table 6-9.

Table 6-9: Waitata Mid-Channel benthic summary

Site	Benthic Environment
Waitata Mid-Channel	• Depths range from 61-64m. • No macro-algae and a sparse invertebrate community, with one denser area of invertebrate community. • No seabed features of particular ecological, scientific or conservation value identified.

6.4.1.1 Effects of Seabed Deposition

The potential site at Waitata Mid-Channel has been assessed based on a scenario assuming a feed input of 12000 tonnes a year, which resulted in forecast enrichment of below ES5, but which exceeds the level used in the water quality modelling. The extent of the predicted depositional footprint is shown in Figure 6-13[117]. The modelling predicts a small area of less than 0.1 hectares below the sea pens where an enrichment level of up to 12kg $m^{-2}yr^{-1}$ (ES5=13kg $m^{-2}yr^{-1}$) may occur. Deposition would be primarily concentrated beneath the sea pens and is predicted to move away from the farm approximately 540m to the northeast and 800m to the southwest. A total area of approximately 45 hectares is forecast to be affected by the wider footprint within which deposition can be expected at rates decreasing from about 12kg $m^{-2}yr^{-1}$ directly beneath the sea pens, to about 1kg $m^{-2}yr^{-1}$ (ES3=1kg $m^{-2}yr^{-1}$) at the outer edges of the footprint. At this site no ecological features, scientific or conservation values of special significance are predicted to be affected as a result of a discharge from a relocated salmon farm.[118] Because the feed level modelled for the depositional modelling exceeds the level used in the water quality modelling, a feed limit of 7000 tonnes per annum is proposed at this site.

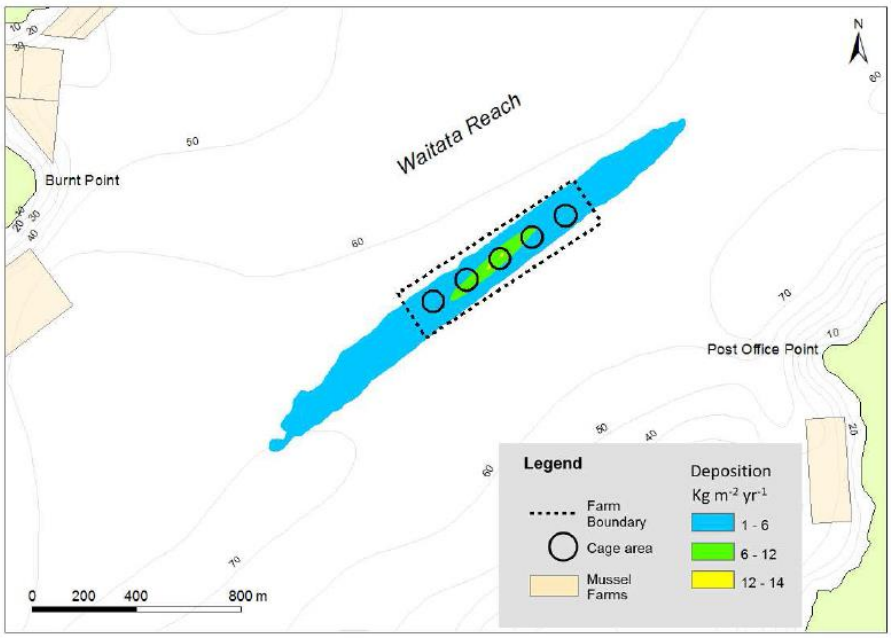


Figure 6-13: Depositional footprint at Waitata Reach Mid-Channel at an annual feed discharge rate of 12000 tonnes

[117] Note that the depositional footprint for the potential Waitata Mid-Channel site is presented at a different scale to the footprints for other potential sites, as the potential extent of the footprint is greater due to the highly dispersive nature of the site.
[118] NIWA (2016) Benthic Ecological Assessment for Proposed Salmon Farm Sites, p.29

6.4.2 Landscape and Natural Character

6.4.2.1 Natural Character

A proposal consisting of five circular pens in a straight line that would be serviced by a low-profile semi-submersible feed barge (circular or similar in appearance and located on the northwestern side of the farm in line with the anchoring buoys) has been assessed to determine effects on landscape and natural character at the potential Waitata Mid-Channel relocation site. The site is located mid-channel in the north of Waitata Reach, and to the south-east of Waihinau Bay.

Methodology

A description of the method used to undertake the natural character assessments is contained in Section 6.2.2.1 of this report. For the potential Waitata Mid-Channel site:

- Level 1 is not identified in the analysis outlined in the Marlborough Natural Character Study
- Level 2 is defined as the whole of the Marlborough Sounds
- Level 3 is defined as the whole of Pelorus Sound
- Level 4 is not defined in the Marlborough Natural Character Study for the area where the potential Waitata Mid-Channel relocation site is located
- Level 5 is not defined for any of the areas where the potential relocation sites are located, but can be considered to be the specific bay or area in which each site is located

The discussion below outlines the baseline evaluation, the effects that might occur on natural character and the significance of those effects at the different scales at which natural character is assessed.

Assessment

Perceptual/sensory values at the site in relation to natural character are influenced by the wider context. This area of the Sound appears highly natural and feels remote, due to the expansive scale and largely unmodified landform, the large areas of regenerating native vegetation and sparsely scattered structures, although a productive character is also clearly evident in the surrounding area. Natural science values at the site itself are not high.[119]

The current natural character values at the potential relocation site are considered to be Moderate.

The Landscape Report concludes that there will be adverse effects on the perceptual/sensory aspect of natural character, including a loss of naturalness and some loss of night sky darkness. Effects on natural science values are not considered to be significant.[120]

If the potential relocation proposal went ahead at this site, the natural character values would be anticipated to change to Moderate-Low.[121]

In assessing the significance of that change, the Landscape Report notes that the distance across the reach at this site, in combination with the design proposed and the surrounding character mean that the expansive context will be able to visually absorb the potential relocation site to an acceptable level. Effects on natural science values are assessed as being not at a significant level. Overall, the Landscape report assessment is that adverse effects on natural character at the Level 4 or Level 5 scale will not be significant, nor will they be significant at the Level 3 scale due to the expansive context of the site. Effects on natural character at the national scale are considered to be insignificant.[122]

6.4.2.2 Outstanding Natural Character

The potential Waitata Mid-Channel site is not located in an area of outstanding natural character.

[119] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.34
[120] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p36
[121] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.36
[122] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.36

6.4.2.3 Landscape

Methodology

A description of the method used to undertake the landscape assessments is contained in section 6.2.2.3 of this report.

Assessment

In terms of landscape values, perceptual/sensory values at the site are very high, whether the site is experienced from on-water or from surrounding landforms, where the site contributes to visual amenity and the experience of the wider natural setting. Associative values (related to the wider context of the reach) have been assessed as moderate, and natural science values (consisting of the mid-channel position which is deep with strong currents, and no benthic features of ecological significance) have been assessed as low.[123]

The current landscape values are considered to be High.

The proposal will result in structures in an area that is currently free of structures. There will be adverse effects on seascape character resulting from the proposal, mainly in terms of a reduction in perceived naturalness.[124]

If the potential relocation proposal went ahead at this site, the landscape values are expected to be classified as High-Moderate.[125]

In assessing the significance of that change, the Landscape Report notes that the design of the structures, the expansive characteristics of the setting and the mixed use character of the nearest landforms all serve to adequately mitigate the effects such that the adverse effects on visual amenity will not be significant. The Landscape Report concludes that the seascape will remain visually dominant for residences, for views from land, and for those in boats further than 0.5 – 1km from the site.[126] Effects from lighting are not likely to be significant for residences, and reduced in significance for boats travelling through the reach, when considered alongside existing lights on mussel farms in the area. The proposed barge has a low profile and a recessive appearance when compared to the net pens and therefore would have a lesser effect on perceptual values than a standard feed and accommodation barge at the site would. The Landscape Report concludes that the adverse seascape and visual effects will not be significant at the site scale.

The site is assessed as a visual amenity landscape at the district level, and the visual amenity value of the site is anticipated to remain High following development of the farm, given that the setting is expansive enough to absorb the visual effects of a farm at the site. Landscape values at a regional scale will not be significantly affected, and at a national scale effects are considered to be insignificant.

6.4.2.4 Outstanding Natural Landscapes

The potential relocation site is not located within an Outstanding Natural Landscape.

6.4.2.5 Outstanding Natural Features

The potential relocation site is not located within an Outstanding Natural Feature.

6.4.2.6 Peer Review

The Landscape Report assessment of the potential Waitata Mid-Channel site was peer reviewed by Drakeford Williams Limited, although the inclusion of a barge at the site had not been determined at the time of the peer review and so has not been subject to review.

In contrast to the Landscape Report, the peer review concluded that the baseline natural character at the site was High because the site is well off-shore and away from coastal margins. A change as a result of the establishment of a salmon farm at the potential relocation site to a Moderate-Low natural character rating would therefore be a larger change than anticipated by the Landscape Report. Hudson

[123] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p34
[124] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p36
[125] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.36
[126] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.36

Associates do not agree with this assessment, and note the lack of any special benthic features in terms of the natural science component of natural character (which carries more weight for a natural character assessment under the methodology adopted in the Landscape Report).

The peer review also considered that this site would be more sensitive to change given the location of the site in the middle of the reach. In response Hudson Associates noted that other factors, such as the wider (visible) productive context, the water depth and high flow rate had contributed to the analysis that the site had a low level of sensitivity to change. There remains an obvious difference in professional opinion about the effects on natural character at the potential Waitata Mid-Channel site.

The peer review also concluded that the changes to landscape values would be greater than outlined in the Landscape Report because the site sits well away from the landform and generally would be seen as part of the wider marine landscape, disassociated from landforms either side of the reach. This would change the rating for landscape values to Moderate rather than High-Moderate if a salmon farm was located at the potential relocation site, representing a greater change from the baseline High landscape values assessed by both the Landscape Report and the peer review. Hudson Associates disagrees and notes that while the surrounding landforms may be distant, they still form part of the visual context of the site, and provide its sense of wider enclosure within a productive landscape. There remains an obvious difference in professional opinion about the effects on landscape at the potential Waitata Mid-Channel site.

6.4.3 King Shag

The potential relocation sites in Pelorus Sound are within the foraging distance of King Shags breeding at Duffers Reef (the main colony). The potential Waitata Reach Mid-Channel site would be located 4.5km from Duffers Reef, and would also be within foraging range of King Shag breeding at North Trio and Sentinel Rock.[127]

In addition to proximity, water depth influences the likelihood of a particular site providing feeding habitat for King Shag as 74% of birds forage within water that is 20-40m deep. The Waitata Reach Mid-Channel site is located within open water of depths ranging from 61-64m, so is anticipated to be too deep to provide for King Shag foraging.[128]

This site is not located within an area of ecological value in the MSRMP.

6.4.4 Tourism and Recreation

The main recreation and tourism activities in Waitata Reach are recreational fishing and boating. The Pelorus Mail Boat's Outer Sounds route takes in the bays (Waitata, Richmond, Bulwer and Port Ligar) of Waitata Reach once a week on Fridays. Pelorus Sound does not have the same popularity and high use for recreation and tourism as does Queen Charlotte Sound. The potential Waitata Mid Channel site is located in the centre of the Waitata Channel and as such would be passed by recreational boaties, yachties and small Pelorus Sound day cruises. The site is close to the Tui Nature Reserve which hosts ecotourists. This site will, for some, have a perceived negative impact on the recreational qualities of the area.[129]

6.4.5 Navigation

Navigation routes in the area are outlined in the Navigation Report. The potential Waitata Mid-Channel site is located within a general route of transiting vessels and close to the general routes of local vessels. However, the Navigation Report concludes that the site will not interfere with the entrance of vessels to Port Ligar or Forsyth Bay.[130]

In relation to the potential for collision between small vessels and a marine farm, a headland reaction time is not relevant for the potential Waitata Mid-Channel site as there are no nearby headlands to affect natural visibility of the site. The Navigation Report has assessed the activity level for the potential site as high, meaning approximately 10 vessel movements through the area per day.[131] The exact positioning of the potential site is therefore very important from a navigational perspective, and advice was received from Navigatus when selecting the location for the potential site. The criteria for site location were

[127] NIWA (2016) Update of Existing Seabird report with Reference to Relocation of Existing Farms, p.9
[128] NIWA (2016) Update of Existing Seabird report with Reference to Relocation of Existing Farms, p.9
[129] Tourism and Recreation Conservation Tourism Limited (2016) NZ King Salmon Potential Salmon Farm Relocation in Marlborough Tourism and Recreation Assessment, p. 29
[130] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.34
[131] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.33

avoidance of generalised routes for transiting vessels and providing the greatest flexibility for vessels to pass the farm. The generalised routes for vessels making local trips was not considered a constraint due to the inherent flexibility or routing available for skippers.[132] It was found that the best possible location would be in the middle of the channel in order to create a greater space for passing vessels.

The Marlborough District Council Harbourmaster has identified a concern about navigational safety for cruise ships or large superyachts following a previously defined mid-channel track. Navigatus notes that establishing an alternative passage plan would avoid an issue, and that about the same amount of room would remain on both sides of the potential Waitata mid-channel site as is currently available for large vessels in Queen Charlotte Sound.

6.4.6 Heritage

An archaeological site is located on Te Akaroa which consists of a pa site including pits and intensive terracing. This site is located approximately 2km from the potential Waitata Mid-Channel site. A midden and occupation site is located at Burnt Point which is about 2km from the proposed relocation site. The potential relocation site is also located about 5km to the north of the gun emplacement at Maud Island and about 1km west of the of the gun emplacement at Post Office Point. The potential Waitata Mid-Channel site is in relatively close proximity to Post Office Point, and may therefore compromise onlookers' perceptions and intrude on the 'essential setting' or purpose of the battery (its dominating aspect and clear line of sight) to some extent, [133] although the scale of this effect is likely to be limited by the location of the gun emplacement on private land, with no formalised public access.

6.4.7 Noise

The predicted noise level at the Waitata Reach Mid-Channel site with all the equipment running (including harvesting) during a normal day measured at the closest shoreline is between 25-30dBL_{A10}. The lower value in the range represents the modelled case where the noise-making equipment is spread out across the farm and the upper limit represents the case where all the noise-making equipment is clustered at the part of the farm nearest to the shoreline. The predicted noise at this site with only the generator operating, as would be the case at night, is less than 25dBL_{10}. These levels comply with the noise standards set for the three sites granted through the Board of Inquiry process.[134] As noted in section 6.4.8 there are no residences within the noise contours outlined in the figures below.

Figure 6-14 shows the noise prediction contours during the day.

The 2016 Noise report also considers the cumulative effects of those potential relocation sites that are located either within close proximity to each other or within close proximity to an existing farm (which will remain). In the case of the Waitata mid-channel site, noise contours from the potential relocation site will overlap with noise from the existing Waitata site to the west-south-west. It is concluded that overall, noise levels at the closest dwelling would not increase as a result of farms within close proximity to each other operating at the same time.[135]

Mitigation measures would be as outlined in section 6.2.7.

[132] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.34
[133] HistoryWorks (2016) New Zealand King Salmon Relocation Options, p.16
[134] Marshall Day Acoustics (2016) Salmon Farm Relocation Noise Effects Assessment p.13
[135] Marshall Day Acoustics (2016) Salmon Farm Relocation Noise Effects Assessment, p. 14

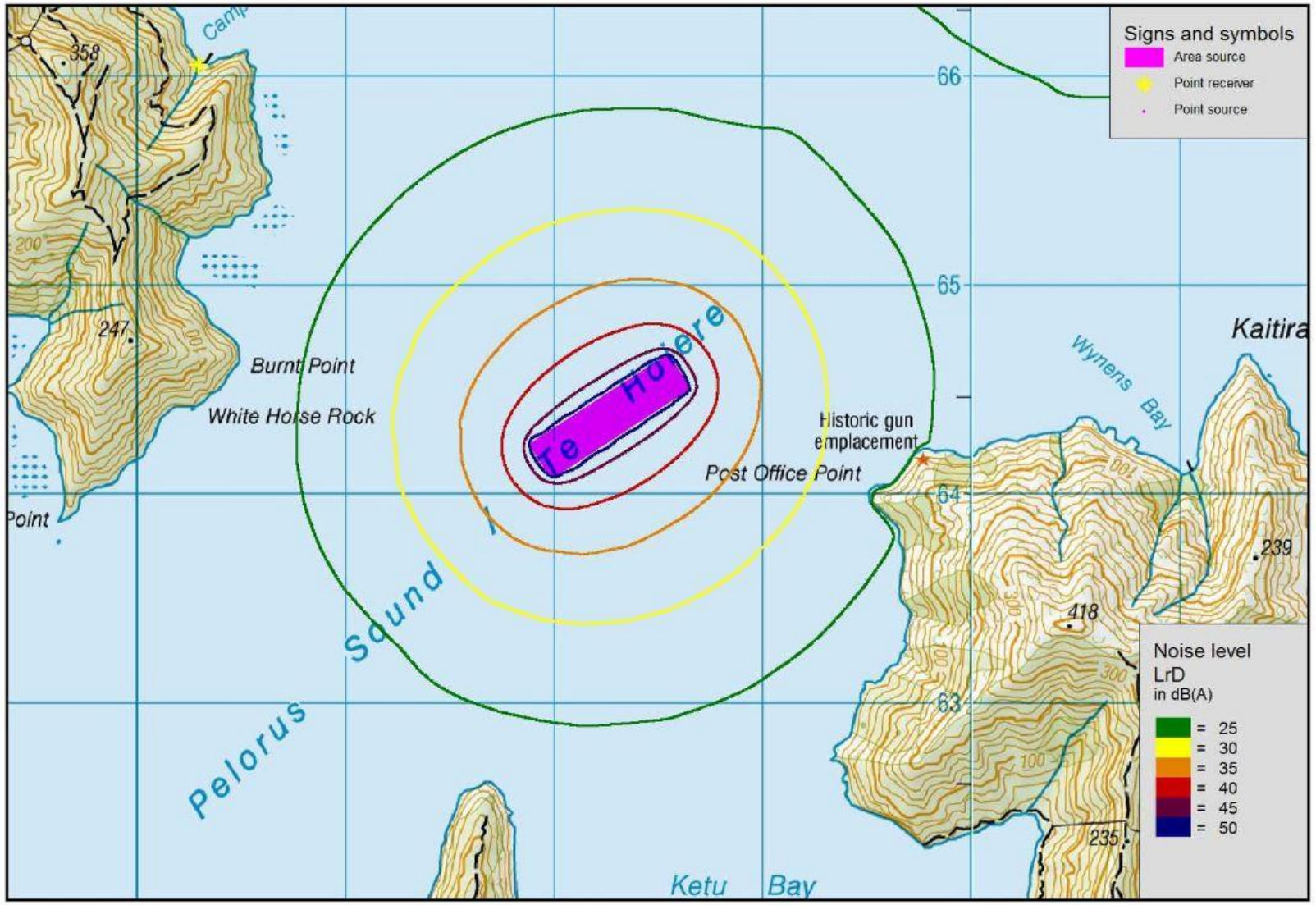


Figure 6-14: Waitata Mid-Channel noise prediction contours (day)

6.4.8 Residential Amenity

There are about 10 dwellings, which include motel cabins on the western side of Waihinau Bay, within direct line of sight within 3.2-3.5km of the potential Waitata Mid-Channel site. There is one dwelling on the northern side of the Waihinau Bay within 3.5km. The eco-lodge (Tui Nature Reserve) and one dwelling which is on an elevated site located approximately 5.7-6.1km away would also be within a direct line of sight. There is one further dwelling located approximately 6.4km away from the potential relocation site. The separation distances suggest that effects on residential amenity will generally be negligible in relation to this site. As the potential site would be exposed to extreme weather from any quarter in its exposed location, the risk of debris being generated occasionally may be slightly greater than other locations if standard sea pens were used,[136] but the use of circular plastic pens should mitigate this risk. Overall the effects of this site on residential amenity are considered to be nil to negligible, with visual effects considered to be minor.[137]

6.4.9 Policy Issues

The process used to assess policy issues is described in section 6.2.9 of this summary AEE.

Key policy issues identified in relation to the Waitata Reach Mid-Channel site are outlined in Table 6-10. The policy analysis relating to water quality, which is a key matter under NZCPS Objective 1 and Policies 21 and 23, MRPS Objective 5.3.2 and pMEP Policy 13.2.1 is contained in section 6.7 of this report.

[136] Taylor Baines (2016) Potential Salmon Farm Relocation in Marlborough Social Impact Assessment, p.22
[137] Taylor Baines (2016) Potential Salmon Farm Relocation in Marlborough Social Impact Assessment, p.22

Table 6-10: Summary of policy issues for Waitata Mid-Channel

Policy issue	Examples of relevant provisions	Initial assessment
Natural character and landscape	NZCPS Objective 2 and MSRPS Policy 8.1.6 – preserve the natural character of the coastal environment. NZCPS Policies 13 and 15 – avoid adverse effects on outstanding natural features and landscapes and areas of outstanding natural character, avoid significant adverse effects on all other areas and natural character. MSRMP Objective 1 and pMEP Objective 6.2 – preserve natural character and protect it from inappropriate subdivision, use and development. MSRMP Policy 1.1 – avoid adverse effects on areas of the coastal environment predominantly in their natural state and where natural character has not been compromised. pMEP Policies 6.2.1 and 6.2.2 – mirror the requirements of NZCPS Policies 13 and 15.	Site is not within an Area of Outstanding Landscape Value in the MSRMP. Site is not within a proposed Outstanding Natural Landscape and not within a proposed Outstanding Natural Feature in the pMEP. The site is located in the middle of Waitata Reach, so will be visible from a number of places. However, the distance across the Reach at this site, in combination with the design proposed and the surrounding character mean that the expansive context will be able to visually absorb the potential relocation site to an acceptable level. Based on the information currently available, and considering the modified nature of the natural character at the site, the Landscape Report concludes that adverse effects on natural character will not be significant. The peer review does not reach a conclusion about the significance of the effects, but does differ in relation to the level of effects that would result on both natural character and landscape from the location of a salmon farm at the potential Waitata Mid-Channel site.
Other matters	MSRMP Policy 9.2.1.1.2 – avoid adverse effects of development in the coastal environment, and where this is not practicable, mitigate and provide for effects to be remedied. NZCPS Objective 4 and pMEP Objective 9.1 – public open space and recreational opportunities in the coastal environment. pMEP Policy 13.2.5 – maintenance and enhancement of amenity values.	Many of the technical reports prepared to date identify adverse effects and assess whether they can be avoided. Where they cannot, measures are recommended to mitigate and remedy effects, including through measures such as adaptive management and staged development of the final sites. Recreational use and amenity values for all sites require public input in order to be able to understand the scale of effects.

6.5 Richmond Bay South

The potential Richmond Bay South site is located adjacent to the headland between Richmond Bay and Horseshoe Bay, northeast of Te Kaiangapipi in Outer Pelorus Sound.[138] The site is not in any area proposed as an area of outstanding natural character, but is adjacent to a terrestrial sub area identified as having high or very high values.[139] The site is also inside an area identified as having high amenity.[140]

Figure 6-15: Richmond Bay South[141]

The adjacent landform is a small headland formed by a ridge coming down in a north-westerly direction which sits between Richmond and Horseshoe Bays. The slopes above the site are steep, rising from a rocky coastal edge with low rocky bluffs.[142]

The land adjacent to the site is largely unmodified and has extensive areas of regenerating bush, but does contain some low-intensity pastoral land, mainly at the top of the headland.[143] A mussel farm is present adjacent to the coast below the headland.

The site is located over a sloping muddy seabed with some sand, and is between 30-56m deep.[144] The habitat below the site is homogenous mud with a sparse invertebrate fauna comprising small tubeworms, feather hydroids, scallops, and small isolated clumps of sponges, ascidians, bivalves and macroalgae becoming more common at the shallower depths[145]. The site also has an abundance of mobile epifauna such as starfish, gastropods, crabs, and kina, again more prevalent in shallower areas.[146] Fish species in the area include blue cod, terakihi, goatfish, opal fish and large schools of spotties.[147]

From a navigation and safety perspective, the bay behind the Richmond Bay South site is not used by vessels and overall has a low (within bay) to medium (proximity to bay) level of activity.[148]

[138] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 39
[139] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 39
[140] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 39
[141] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 38
[142] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 39
[143] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 39
[144] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 49
[145] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 52
[146] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 52
[147] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 57
[148] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.34

The site is within the area used by the main Duffers Reef King Shag colony as a feeding and foraging ground.[149]

A summary of the key effects at the potential Richmond Bay South site is presented in Table 6-11. A discussion of those effects is contained in the sections that follow.

Table 6-11: Richmond Bay South site summary

RICHMOND BAY						
Biophysical suitability for salmon farming						
Mean current (m/s) for (1) near-bottom & (2) mid-water	Temp (°C)	Depth (m)	Max feed discharge (T)	Cage type	Benthic Footprint (ha)	Surface structure area incl. barge (ha)
(1) 0.18 (2) 0.18	10.7-18.5	30-56	5,000	Rectangular	~22	0.933
• The site is biophysically suitable for growing salmon and modelled to produce approximately 2,200T of annual salmon production within ES5.						
Seafloor habitats and communities						
• There are no particularly notable communities or taxa recorded on the muddy seabed in the immediate vicinity of this site. Scallops are relatively abundant. Reef features are located inshore of the farm, but should not be affected.						
Landscape and natural character						
• The landscape assessment undertaken states at a site specific scale the landscape and natural character are both High-Moderate, which would change to Moderate if a salmon farm was located at the site. The effects of this change are not considered to be significant.						
King Shag						
• The site is located within 12km of the main Duffers Reef King Shag colony and 4.5km from the satellite King Shag colony at Tawhitinui. While water depth at the site ranges from 30-56m, the majority of the sea pens would be located in depths of 40-56m, towards the deep end of the range of the preferred King Shag foraging depth.						
Navigation						
• The site is located on a natural navigational route for vessels heading to or coming from Ketu Bay headland to Pohuenui headland, but represents a low risk for vessel collision.						
Noise and residential amenity						
• No significant effects.						
Key policy issues[150]						
• Landscape and natural character. • Indigenous biodiversity. • Water quality.						

[149] NIWA (2016) Update of Existing Seabird Report with Reference to Relocation of Existing Farms, p. 9
[150] Key policies in relation to cultural effects are identified in section 9 of this report.

6.5.1 Benthic

NIWA's technical investigation of the seabed at the potential Richmond Bay South site is summarised in Table 6-12.

Table 6-12: Richmond Bay South benthic summary

Site	Benthic Environment
Richmond Bay South	• Depths range from 30-56m. • No particular notable ecological communities identified, but scallops relatively abundant. • Abundance of mobile epifauna including brittle stars, eleven armed starfish and several species of gastropods, with abundance increasing as the seabed profile shallows to 25m. • Small isolated biogenic clumps composed of hydroids, sponges, ascidians, bivalves, and red and green macro-algae occur in a scattered distribution at depths less than about 40m, becoming larger and more common at shallower depths inshore of the farm site. • Reef habitat 500m north of the site and more minor reef habitat along the shore.

6.5.1.1 Effects of Seabed Deposition

The potential site at Richmond Bay South has been assessed based on a scenario assuming a feed input of 6500 tonnes per year (which exceeds the level used in the water quality modelling) resulting in forecast deposition at levels up to ES5 in an area of 0.2ha in the close vicinity of the sea pens. The extent of the depositional footprint is shown in Figure 6-16. Deposition would be mainly focused directly beneath the sea pens and is predicted to move away from the farm in a west-south-west direction for approximately 900m. An area of approximately 26 hectares is forecast to be affected by the wider footprint within which deposition can be expected at a rate decreasing from 12-13kg $m^{-2}yr^{-1}$ (ES5=13kg $m^{-2}yr^{-1}$) closer to the sea pens to about 1kg $m^{-2}yr^{-1}$ (ES3=1kg $m^{-2}yr^{-1}$) at the edges of the footprint. The notable ecological features including patches of reef and cobble and kelp communities inshore of the site are beyond the predicted footprint of deposition and are unlikely to be affected directly.[151] Because the feed level modelled for the depositional modelling exceeds the level used in the water quality modelling, a feed limit of 5000 tonnes per annum is proposed at this site for the purposes of public consultation.

[151] NIWA (2016) Benthic Ecological Assessment for Proposed Salmon Farm Sites, p.33

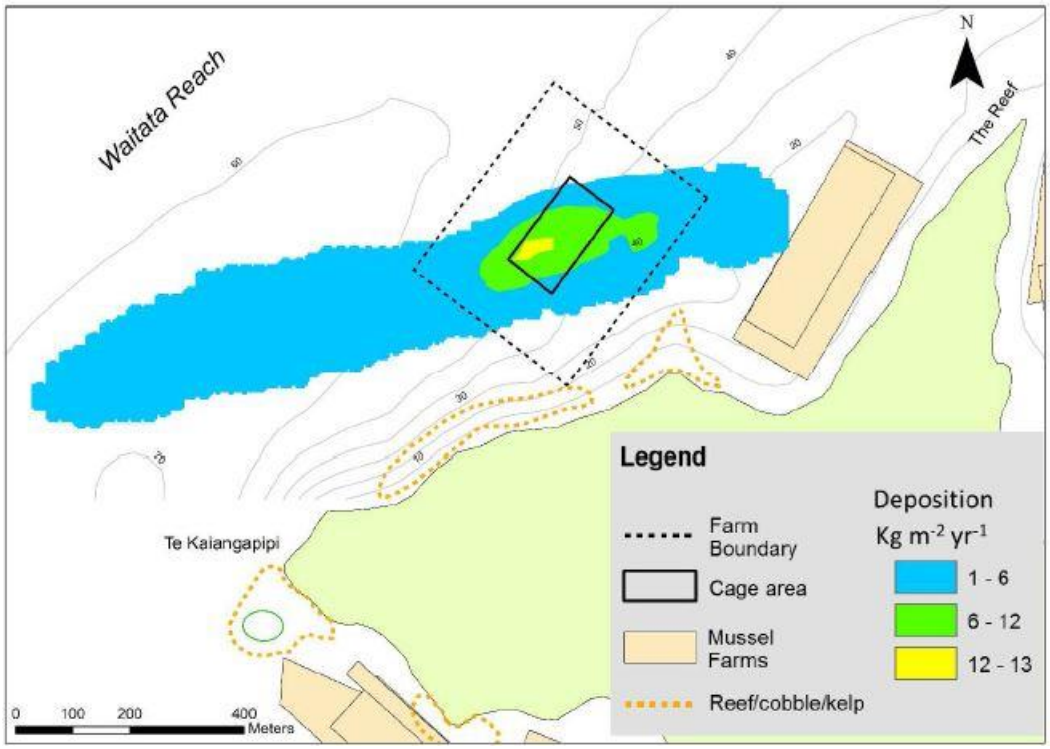


Figure 6-16: Depositional footprint at Richmond Bay at an annual feed discharge rate of 6500 tonnes

6.5.2 Landscape and Natural Character

6.5.2.1 Natural Character

A proposal consisting of a rectangular above-water steel structure with eight net pens, and a service barge moored as close as possible to the landform has been assessed to determine effects on landscape and natural character at the Richmond Bay South site. The site is located north of the headland between Richmond Bay and Horseshoe Bay, and between Te Kaiangapipi and the northern tip of The Reef, at the southeast end of Waitata Reach, Outer Pelorus Sound.

Methodology

A description of the method used to undertake the natural character assessments is contained in Section 6.2.2.1 of this report. For the potential Richmond Bay South relocation site:

- Level 1 is not identified in the analysis outlined in the Marlborough Natural Character Study
- Level 2 is defined as the whole of the Marlborough Sounds
- Level 3 is defined as the whole of Pelorus Sound
- Level 4 is not defined in the Marlborough Natural Character Study for the area where the potential Richmond Bay South relocation site is located
- Level 5 is not defined for any of the areas where the potential relocation sites are located, but can be considered to be the specific bay in which each site is located

The discussion below outlines the baseline evaluation, the effects that might occur on natural character and the significance of those effects at the different scales at which natural character is assessed.

Assessment

In terms of natural character the landform adjacent to the site is unmodified. There is regenerating indigenous scrub over much of the headland slopes, and although coverage is for the most part extensive, it is still in the fairly early stages. There is some modification of the coastal margin by mussel farming and there are no notable marine communities at the site. There is a simplicity and very high

visual coherence to the backdrop slopes, the visually dominant seascape and landform and the expressive coastal edge.[152]

The current natural character values at the potential relocation site are considered to be High-Moderate.

There will be adverse effects on the perceptual/sensory aspect of natural character from the potential relocation proposal at this site, including loss of perceived naturalness, and some reduction in night sky darkness.[153]

If the potential relocation proposal went ahead at this site, the natural character values would be anticipated to change to Moderate.[154]

In assessing the significance of that change, the Landscape Report notes that while it is considered that the site's expansive context will provide for some absorption of the proposal, the open nature of the site on the edge of the Waitata Reach means the proposed structures will be clearly visible. However the Landscape Report concludes that, with the volume of boat traffic being relatively low and mostly work boats, and with the nearby context of Richmond Bay having a working landscape character, adverse effects on perceptual/sensory values would not be significant at the Level 4 or Level 5 scale.[155]

Overall, at the Level 3 scale the Landscape Report concludes that natural character effects at this site would not be significant. Values at this scale at the potential relocation site are broad, and the site is only a very small part of the context at this scale. Effects on natural character at a regional and national scale are considered to be insignificant.[156]

6.5.2.2 Outstanding Natural Character

The potential Richmond Bay South relocation site is not located in an area of outstanding natural character.

6.5.2.3 Landscape

Methodology

A description of the method used to undertake the landscape assessments is contained in section 6.2.2.3 of this report.

Assessment

In relation to landscape values the potential relocation site is at the edge of the main Waitata Reach Channel, and would be experienced as part of the journey through the area rather than as a stopping point in its own right. Visual amenity is relatively high, with adjacent slopes having high coherence, but vividness and memorability is not considered to be high.[157] The natural science values of the area consist of extensive areas of regenerating coastal scrub, unmodified landform, some modification of the coastal margin by an existing mussel farm, and there are no notable marine communities or taxa at this site.[158]

The current landscape values are considered to be High-Moderate.

The relocation of an existing lower flow salmon farm site to the potential Richmond Bay South site would result in a higher number of visible structures at the site than currently exist. The open nature of the site means that structures will be more openly visible, rather than being tucked away, and the simple and coherent backdrop would make visual absorption of the structures more difficult, so there will be some reduction in perceived naturalness at the site.[159]

[152] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.41
[153] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.42
[154] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.42
[155] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.42
[156] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.42
[157] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.41
[158] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.39
[159] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.43

If the potential relocation proposal went ahead at this site, the landscape values are expected to be Moderate.[160]

In assessing the significance of that change, the Landscape Report notes that the expansive context and scale of the adjacent landform would provide for some visual absorption, with the prominence of the proposed structures diminished in comparison to the scale of the wider surroundings. The working nature of the passing boat traffic and the distance to nearby residences mean that the Landscape Report concludes that the adverse visual and landscape effects would not be significant at the site scale.[161]

The Landscape Report also concludes that the landscape and visual effects at the district scale would not be significant, as the potential relocation site would be a fit with the existing character of the wider context, and visual amenity effects and any reduction in perceived naturalness at that scale would be very small. Landscape and visual effects at the regional scale would also not be significant. The level of effects arising would not be anticipated to impact the values that informed the classification of the Marlborough Sounds as outstanding at a national scale.[162]

6.5.2.4 Outstanding Natural Landscapes

The potential relocation site is not located within an Outstanding Natural Landscape.

6.5.2.5 Outstanding Natural Features

The potential relocation site is not located within an Outstanding Natural Feature.

6.5.2.6 Peer Review

The Landscape Report assessment of the potential Richmond Bay South site was peer reviewed by Drakeford Williams Limited. The peer review reached the same conclusion in terms of both the baseline natural character and landscape rating, and the changed rating as a result of the introduction of a salmon farm to the site.

6.5.3 King Shag

The potential relocation sites in Pelorus Sound are within the foraging distance of King Shags breeding at Duffers Reef (the main colony). The potential Richmond Bay South site would be located 12km from Duffers Reef, but 4.5km from the satellite colony at Tawhitinui and within foraging range of King Shag breeding at this site.[163]

In addition to proximity, water depth also influences the likelihood of a particular site providing feeding habitat for King Shag as 74% of birds forage within water that is 20-40m deep. The potential Richmond Bay South site is located within open water of depths ranging from 30-56m, although the sea pens would be located in water 42 – 46m deep, at the deep end of the preferred foraging depth for King Shag.

This site is partially located within a buffer zone within the MSRMP for an area identified for protection of King Shag roosting ground (endangered) at Te Kaiangapipi Point, where the MSRMP notes that the area may develop into nesting colonies, and the use may be periodic. The pMEP however does not identify the site as an Ecologically Significant Marine Site, and the 2015 King Shag census recorded the site as abandoned.[164]

Effects on prey availability have been discussed at section 6.2.3 of this report.

6.5.4 Tourism and Recreation

The potential Richmond Bay South site is on the eastern side of the channel between Maud Island and the extension to the land mass west of Beatrix Bay. As such, this site has a similar impact assessment

[160] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.43
[161] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.43
[162] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.43
[163] NIWA (2016) Update of Existing Seabird report with Reference to Relocation of Existing Farms, p.9
[164] Schuckard, R.; Melville, D.S.; Taylor, G. (2015). Population and breeding census of New Zealand king shag, (*Leucocarbo carunculatus*) in 2015. Notornis 62: 209-218.

to the potential Blowhole Point North and South sites – minimal, if any, impact on tourists or recreational users. [165]

6.5.5 Navigation

Navigation routes in the area are outlined in the Navigation Report. The floating structure of the potential Richmond Bay site would be located inshore of a passage path for a vessel passing from Ketu Bay headland to Pohuenui headland.

In relation to the potential for collision between small vessels and a marine farm, Navigatus has assessed the activity level within Richmond Bay South as low (meaning daily vessel activity) and in the proximity of the bay as medium (meaning multiple daily activity). For the potential Richmond Bay South site the estimated reaction time available for a vessel rounding the headland north-east of the farm at the Reef would be in the region of 1 minute 23 seconds, and in the region of 55 seconds when rounding the headland from south-west of the farm at Te Kaiangapipi. There is also a mussel farm and a prominent reef within the headland to headland line. [166]

6.5.6 Heritage

The potential Richmond Bay South site is located about 2.5km to the east of the Maud Island gun emplacement. The potential relocation site may, to some extent, compromise an onlookers' perception and intrude on the 'essential setting' or purpose of the battery and the heritage values associated with it, such as its dominating aspect and a clear line of sight, however the extent of possible intrusion is limited,[167] particularly considering the small number of visitors annually to Maud Island.

6.5.7 Noise

The predicted noise level at the potential Richmond Bay South site with all the equipment running (including harvesting) during a normal day measured at the closest shoreline is between 40-45dBL_{A10}. The lower value in the range represents the modelled case where the noise-making equipment is spread out across the farm and the upper limit represents the case where all the noise-making equipment is clustered at the part of the farm nearest to the shoreline. The predicted noise at this site with only the generator operating, as would be the case at night, is 28dBL_{A10}. These levels comply with the noise standards set for the three sites granted through the Board of Inquiry process. [168]

Figures 6-17 and 6-18 show the noise prediction contours during the day and night time for both the potential Richmond Bay South site and the potential Horseshoe Bay site. As noted in section 6.5.8 there are no residences within the noise contours outlined in the figures below.

Mitigation measures would be as outlined in section 6.2.7.

[165] Tourism and Recreation Conservation Tourism Limited (2016) NZ King Salmon Potential Salmon Farm Relocation in Marlborough Tourism and Recreation Assessment, p. 29
[166] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.34
[167] HistoryWorks (2016) New Zealand King Salmon Relocation Options, p.15
[168] Marshall Day Acoustics (2016) Salmon Farm Relocation Noise Effects Assessment p.13

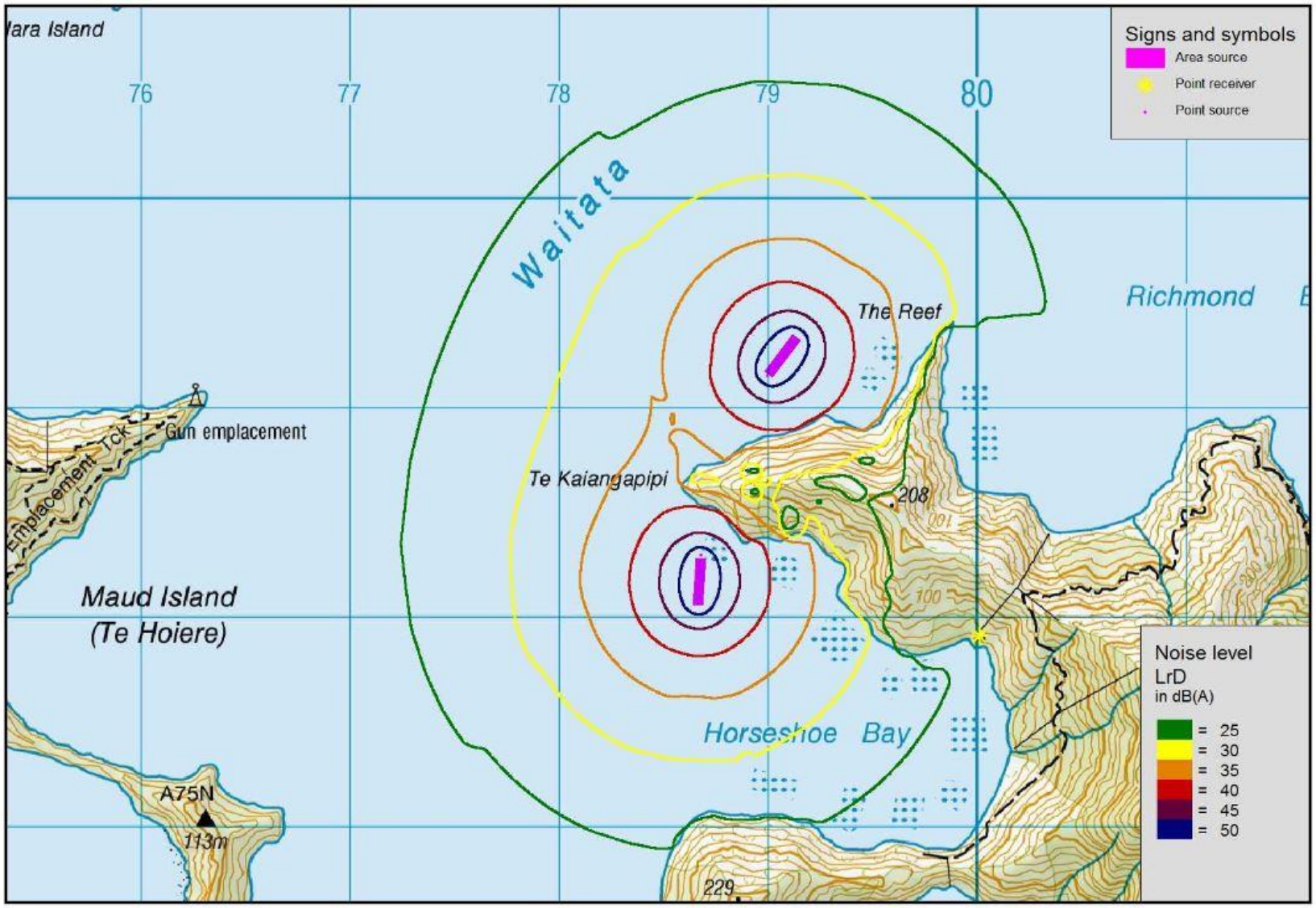


Figure 6-17: Richmond Bay South noise prediction contours (day)

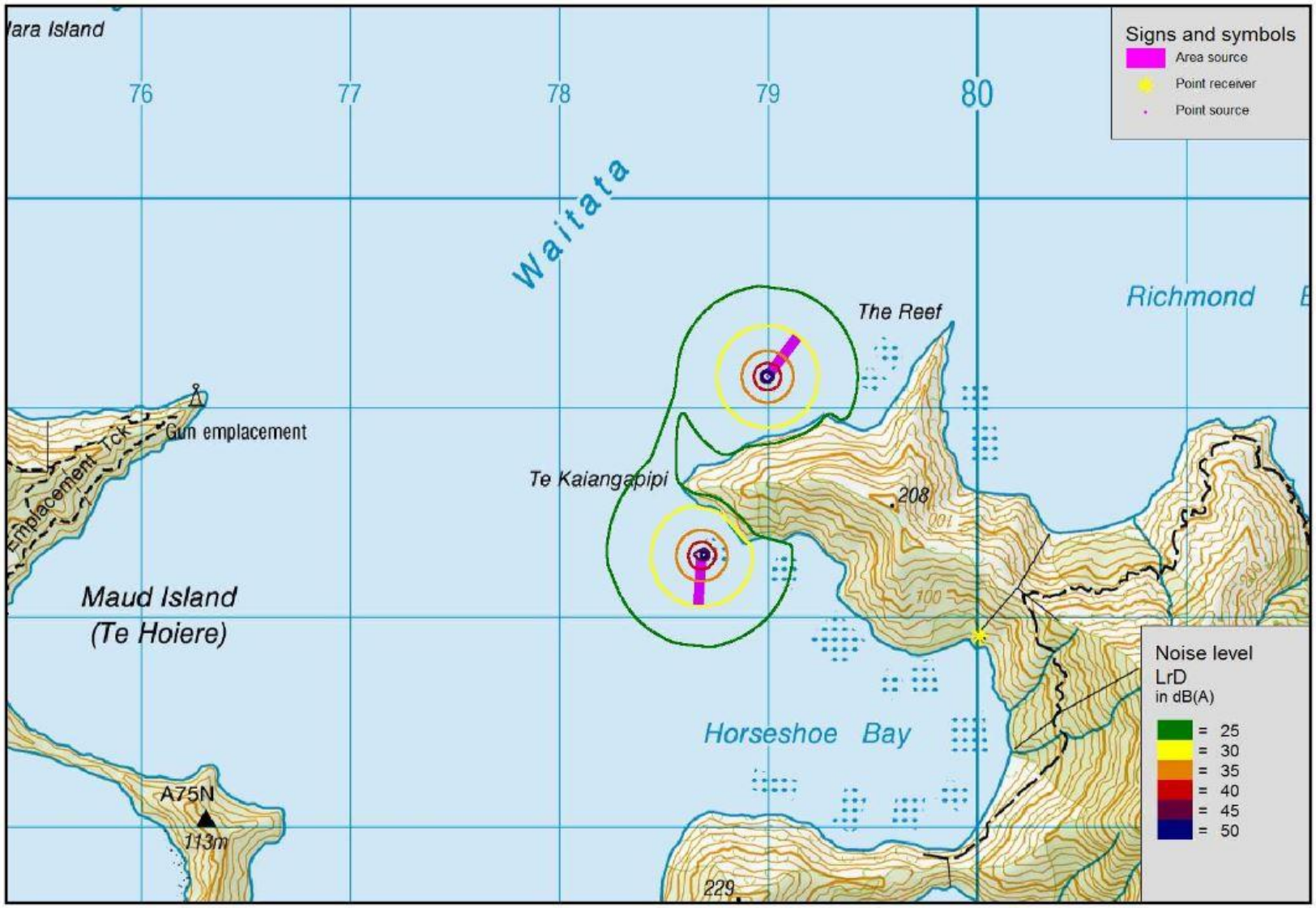


Figure 6-18: Richmond Bay South noise prediction contours (night)

6.5.8 Residential Amenity

The potential Richmond Bay South site is located approximately 600m west of The Reef (headland) at the southern entrance to Richmond Bay, adjacent to the mussel farm in the same embayment, and inside the headland to headland line for Richmond Bay. As there does not appear to be any tracks leading to this embayment it suggests it is not used much for the land-based recreation that takes place on the adjacent farm. The headland slopes are fairly extensively covered with regenerating coastal scrubland. All access is via boat, and barges are used to transfer stock and wool, or farm vehicles for maintenance. The station manager's dwelling is situated at the head of Richmond Bay, as is an accommodation lodge frequented by people interested in pig hunting, fishing, walking and cycling and enjoying the relatively remote environment. The farm has a network of some 80km of tracks suitable for driving, walking or cycling. The closest dwellings are between 3.5-3.9km in distance from the potential relocation site, including the Tui Nature Reserve at an elevated site on the western side of Waitata Reach.[169]

The Tui Nature Reserve and one dwelling which are elevated would be located within a direct line of sight of a salmon farm at the potential relocation site, but at a distance of 3.5km away. Two dwellings (one house and one lodge) are located 3.9km away from the site. There are 4 dwellings at the northern end of Waitata Bay which are within a direct line of sight of the site and are located between 5.7-5.8km away. There is also a cluster of dwellings south of Waiona Bay opposite Maud Island that are 5.8km away from the site and are within its direct line of sight. Overall, the effects of this site on residential amenity are considered to be nil to negligible, with visual effects being minor. [170]

6.5.9 Policy Issues

The process used to assess policy issues is described in section 6.2.9 of this summary AEE.

Key policy issues identified in relation to the potential Richmond Bay South site are outlined in Table 6-13. The policy analysis relating to water quality, which is a key matter under NZCPS Objective 1 and Policies 21 and 23, MRPS Objective 5.3.2 and pMEP Policy 13.2.1 is contained in section 6.7 of this report.

[169] Taylor Baines (2016) Potential Salmon Farm Relocation in Marlborough Social Impact Assessment, p.23
[170] Taylor Baines (2016) Potential Salmon Farm Relocation in Marlborough Social Impact Assessment, p.23

Table 6-13: Summary of policy issues for Richmond Bay South

Policy issue	Examples of relevant provisions	Initial assessment
Indigenous biodiversity	NZCPS Objective 1 and Policy 11 and pMEP Policy 8.3.1 – safeguard the integrity, form, functioning and resilience of the coastal environment, sustain its ecosystems, and avoid *inter alia* adverse effects on threatened species. MSRMP Policy 2.2.1.1.3 - consider the effects of an activity on the contribution that indigenous flora and fauna make to natural character. pMEP Objective 8.2 - increase the extent of Marlborough's indigenous biodiversity and improve in areas that have been degraded.	Principal issues arise from effects on King Shag (relevant to all the policies listed) and effects on indigenous benthic biodiversity (relevant to the MSRMP and pMEP policies) – particularly reef habitat in the nearshore area inshore of the site and indigenous biodiversity on the seabed underneath the potential site. Site is located within flying distance of a potential satellite King Shag colony at Tawhitinui, but not sufficiently close that direct disturbance of the birds at the colony would be anticipated, and the pMEP does not identify the site as an Ecologically Significant Marine Area. The net pens proposed for the site would be located in water depths of between 42-46m, at the deep end of the range preferred for King Shag feeding. Overall effects on water quality (see section 6.7 of this summary AEE) will also be relevant as water quality may affect King Shag feeding. Exact determination of effects on King Shag is difficult and further analysis of this issue will be required through the public consultation process (which will involve expert workshops). Depositional modelling indicates that effects on nearshore reef patches, and reef located 500m north of the site should not be significant, but monitoring will be necessary to confirm this, and adaptive management is recommended to manage any effects.
Natural character and landscape	NZCPS Objective 2 and MSRPS Policy 8.1.6 – preserve the natural character of the coastal environment. NZCPS Policies 13 and 15 – avoid adverse effects on outstanding natural features and landscapes and areas of outstanding natural character, avoid significant adverse effects on all other areas and natural character. MSRMP Objective 1 and pMEP Objective 6.2 – preserve natural character and protect it from inappropriate subdivision, use and development.	Site is not within an Area of Outstanding Landscape Value in the MSRMP. The site is not within a proposed Outstanding Natural Landscape and is not within a proposed Outstanding Natural Feature in the pMEP. Based on the information currently available, the working nature of the passing boat traffic and the distance to nearby residences the Landscape Report concludes that adverse effects on natural character will not be significant.

Policy issue	Examples of relevant provisions	Initial assessment
	MSRMP Policy 1.1 – avoid adverse effects on areas of the coastal environment predominantly in their natural state and where natural character has not been compromised. pMEP Policies 6.2.1 and 6.2.2 – mirror the requirements of NZCPS Policies 13 and 15.	
Other matters	MSRMP Policy 9.2.1.1.2 – avoid adverse effects of development in the coastal environment, and where this is not practicable, mitigate and provide for effects to be remedied. NZCPS Objective 4 and pMEP Objective 9.1 – public open space and recreational opportunities in the coastal environment. pMEP Policy 13.2.5 – maintenance and enhancement of amenity values.	Many of the technical reports prepared to date identify adverse effects and assess whether they can be avoided. Where they cannot, measures are recommended to mitigate and remedy effects, including through measures such as adaptive management and staged development of the final sites. Recreational use and amenity values for all sites require public input in order to be able to understand the scale of effects.

6.6 Horseshoe Bay

The potential Horseshoe Bay site is located on the south-side of the headland between Horseshoe Bay and Richmond Bay, on the northern edge of the bay. The site is not in any area proposed as an area of outstanding natural character, but is adjacent to a terrestrial sub area identified as having high or very high values.[171]

Figure 6-19: Horseshoe Bay[172]

The headland above the site is moderately steep, coming out of a rocky coastal edge which is beach in some places.[173] The land is unmodified with numerous gullies and regenerating indigenous vegetation cover.[174] Horseshoe Bay has a number of mussel farms along the length of the bay.

The site is located over a sloping seabed between 18-45m deep, consisting of mostly mud, with some sand.[175] There is an existing mussel farm which overlaps the site and provides a modified seabed which supports a more diverse and abundant community. Beyond the influence of the mussel farm, the benthic biota is relatively sparse, comprising mostly bivalves, starfish and crabs. Scallops are relatively common and there is a moderately low abundance of infauna. Just to the north of the site, and extending south from Te Kaiangapipi Point, an extensive subtidal reef supports a diverse reef community including macroalgae, sponges, kina, blue cod, terakihi, butterfly perch and kingfish. At the base of this reef there is an unusual shell/rubble habitat with a diverse array of benthic invertebrates including brachiopods. [176]

From a navigation and safety perspective, the bay behind the potential Horseshoe Bay site is used as shelter for vessels (largely recreational vessels) but overall has a low (within bay) to medium (proximity to bay) level of activity.[177]

With regards to seabirds, the site is within the area used by the main Duffers Reef King Shag colony as a feeding and foraging ground.[178]

A summary of the key effects at the potential Horseshoe Bay site is presented in Table 6-14. A discussion of those effects is contained in the sections that follow.

[171] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 46
[172] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 45
[173] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 46
[174] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 46
[175] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 60
[176] NIWA (2016) Benthic Ecological Assessments for Proposed Salmon Farm Sites – Part 1: Benthic Ecological Characterisations, p. 63, 68
[177] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.33
[178] NIWA (2016) Update of Existing Seabird Report with Reference to Relocation of Existing Farms, p. 9

Table 6-14: Horseshoe Bay site summary

HORSESHOE BAY						
Biophysical suitability for salmon farming						
Mean current (m/s) for (1) near-bottom & (2) mid-water	Temp (°C)	Depth (m)	Max feed discharge (T)	Cage type	Benthic Footprint (ha)	Surface structure area incl. barge (ha)
(1) 0.12 (2) 0.11	10.7-18.5	18-45	1,500	Rectangular	~5.5	0.739
• The site appears biophysically suitable for growing salmon, although shallow in parts, and is modelled to produce about 660 t of annual salmon production within ES5.						
Seafloor habitats and communities						
• The cage area and most of the potential farm site is situated over sandy mud seabed. A zone of shell rubble habitat and associated epibiota considered to be an uncommon ecological feature in the context of the Pelorus Sound region is located approximately 90 m north of the northwest corner of the site. Scallops are relatively abundant beneath the cage area and wider site. There is extensive bedrock reef supporting diverse biotic communities in the vicinity, but not within the proposed farm boundaries or predicted footprint of benthic effects • Because this site is surrounded by important benthic areas, monitoring of the seabed in accordance with the Benthic Guidelines and the reef systems will be necessary.						
Landscape and natural character						
• The landscape assessment undertaken states that at a site specific scale the landscape and natural character are both High-Moderate, which would change to Moderate if a salmon farm was located at the site. The effects of this change are not considered to be significant.						
King Shag						
• The site is located within 12km of the main Duffers Reef King Shag colony and 4.5km from the satellite King Shag colony at Tawhitinui. While water depth at the site ranges from 18-45m, the majority of the sea pens would be located in depths of 40m, at the deeper end of preferred King Shag foraging depth.						
Navigation						
• The site is located inshore of a natural navigational route for vessels heading to or coming from both headlands. • Sufficient room is available between the potential site and the shore if small craft and yachts need refuge during strong northeast winds.						
Noise and residential amenity						
• No significant effects.						
Key policy issues[179]						
• Landscape and natural character. • Indigenous biodiversity. • Water quality.						

[179] Key policies in relation to cultural effects are identified in section 9 of this report.

6.6.1 Benthic

NIWA's technical investigation of the seabed at the potential Horseshoe Bay site is summarised in Table 6-15.

Table 6-15: Horseshoe Bay benthic summary

Site	Benthic Environment
Horseshoe Bay	• Depths range from 18-45m. • No particular notable ecological communities identified, but scallops were frequently identified in surveys. • In the northeast portion of the site, beneath an existing mussel farm, aggregations of epibiota and debris that have dropped from mussel lines. • There is an area of cobble and rock habitat north of the proposed farm boundary that supports a diverse community of macro-algae, epifauna including sponges, tubeworms, kina, and fish such as blue cod, snapper and terakihi. • Extensive reef habitat extends south from Te Kaiangapipi headland.

6.6.1.1 Effects of Seabed Deposition

The potential site at Horseshoe Bay has been assessed based on a scenario assuming a feed input of 1500 tonnes a year, which resulted in a forecast enrichment of below ES5. The extent of the predicted depositional footprint is shown in Figure 6-20. Deposition would be primarily concentrated directly beneath the sea pens and is predicted to move away from the farm towards the north of the proposed site for a distance of approximately 210m. An area of approximately 5.5 hectares is forecast to be affected by the wider footprint within which deposition can be expected at a rate decreasing from about 12-14kg $m^{-2}yr^{-1}$ (ES5=13kg $m^{-2}yr^{-1}$) closer to the sea pens to about 1kg $m^{-2}yr^{-1}$ (ES3=1kg $m^{-2}yr^{-1}$) at the edges of the footprint. Deposition is unlikely to have any significant effect on the ecological features adjacent to Te Kaiangapipi headland and the reef and cobble habitats inshore of the northwest corner of the proposed farm are not predicted to be affected by primary deposition.[180]

[180] NIWA (2016) Benthic Ecological Assessment for Proposed Salmon Farm Sites, p.38

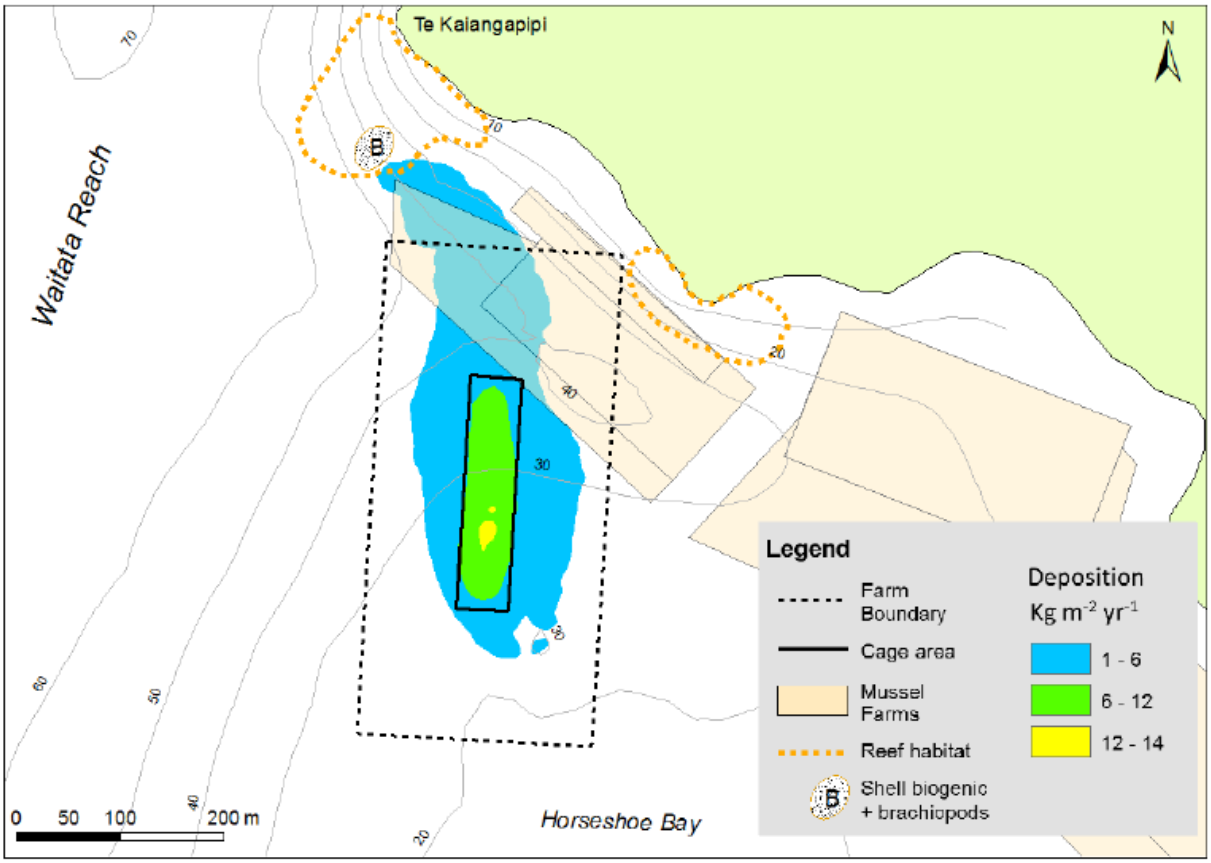


Figure 6-20: Depositional footprint at Horseshoe Bay at an annual feed discharge rate of 6500 tonnes

Figure 6-20 shows that the modelled deposition from the potential Horseshoe Bay relocation site would overlap with the existing mussel farm in the vicinity. Mussel farms can give rise to low level depositional effects, and the cumulative effects of the mussel and salmon farm deposition have therefore been assessed.[181] The results of this analysis are outlined in Figure 6-21. As with the potential Blowhole Point North and Blowhole Point South relocation sites, the Cawthron Institute notes that the salmon farm deposition is the main influence on predicted deposition rates, and that the overlap with mussel farm deposition would not result in the overall enrichment stage increasing. The predicted outcomes from the depositional modelling of the potential salmon farm site (as discussed in relation to Figure 6-20) therefore remain the same.

[181] Cawthron Institute (2016) Blowhole Point DEPOMOD overlay for proposed farms.

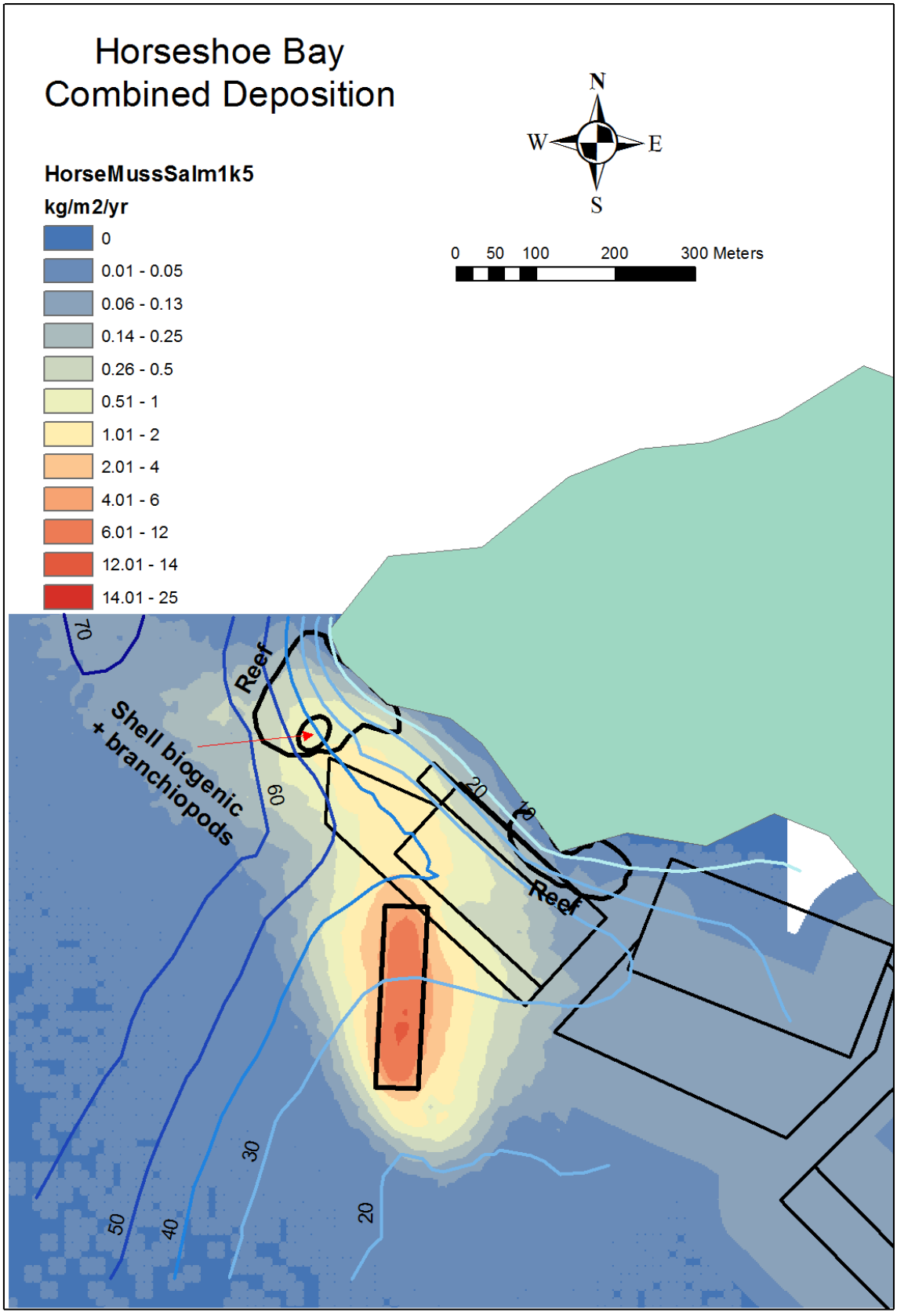


Figure 6-21: Horseshoe Bay mussel and salmon farm deposition

6.6.2 Landscape and Natural Character

6.6.2.1 Natural Character

A proposal consisting of a rectangular above-water steel structure with four net pens, and a service barge assumed to be moored as close as possible to the landform, has been assessed to determine effects on landscape and natural character at the potential Horseshoe Bay relocation site. The site is located on the south side of the headland between Richmond Bay and Horseshoe Bay at the southeast end of Waitata Reach in the Outer Pelorus Sound.

Methodology
A description of the method used to undertake the natural character assessments is contained in Section 6.2.2.1 of this report. For the potential Horseshoe Bay relocation site:

- Level 1 is not identified in the analysis outlined in the Marlborough Natural Character Study
- Level 2 is defined as the whole of the Marlborough Sounds
- Level 3 is defined as the whole of Pelorus Sound
- Level 4 is not defined in the Marlborough Natural Character Study for the area where the potential Horseshoe Bay relocation site is located
- Level 5 is not defined for any of the areas where the potential relocation sites are located, but can be considered to be the specific bay in which each site is located

The discussion below outlines the baseline evaluation, the effects that might occur on natural character and the significance of those effects at the different scales at which natural character is assessed.

Assessment

In terms of natural character, the landform is unmodified adjacent to the site, and there is regenerating indigenous coastal broadleaf forest over much of the headland. However, natural character is reduced by the presence of a high number of mussel farms adjacent to the potential relocation site and in the wider bay.[182]

The current natural character values are considered to be High-Moderate.

There will be adverse effects on the perceptual/sensory aspect of natural character, including loss of perceived naturalness, and some reduction in night sky darkness, although there is already lighting from mussel farms. While the Landscape Report notes that the enclosure provided by the site will shield some of the wider context from adverse effects, effects on natural character will be amplified at the site by the smaller scale of the setting.[183]

If the potential relocation proposal went ahead at this site, the natural character values are expected to be Moderate.[184]

In assessing the significance of that change, the Landscape Report concludes that adverse effects on natural character are not assessed as likely to be significant at the Level 4 or Level 5 scale or at the Level 3 scale where values are broad and the site would only be a very small part of the context. Effects on natural character at the national scale are considered to be insignificant.[185]

6.6.2.2 Outstanding Natural Character

The potential Horseshoe Bay relocation site is not located in an area of outstanding natural character.

6.6.2.3 Landscape

Methodology

A description of the method used to undertake the landscape assessments is contained in section 6.2.2.3 of this report.

[182] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.48
[183] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.50
[184] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.50
[185] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.50

Assessment

In terms of landscape values the site has moderately high natural science values, and a reasonably high level of visual amenity due to the level of perceived naturalness and high coherence. The natural science values at this site consist of extensive regenerating broadleaf coastal vegetation which is moving into secondary stages, a largely unmodified landform, modification to the coastal margin adjacent to the site as well as right along the length of the wider bay, no benthic habitats or communities of particular ecological or conservation value inside the site boundaries, and shell rubble habitat, which is considered uncommon for Pelorus Sound, approximately 90m to the north of the site. The potential relocation site is also located in an area that provides a strong sense of enclosure and shelter, which adds to amenity values, but slopes adjacent to the site are not especially distinctive or memorable.[186]

The current landscape values are considered to be High-Moderate.

The potential relocation of an existing salmon farm to this site would result in a higher number of structures at the site than currently exists. There will be adverse effects on landscape character resulting from the potential relocation site, with a reduction in the perceived naturalness at the site.[187]

If the potential relocation proposal went ahead at this site, the landscape values are expected to be Moderate.[188]

In assessing the significance of that change, the Landscape Report concludes that the overall effects are not considered to be significant at the site scale as the size of the bay means that it would be able to visually absorb the proposal. The scale of the bay and its working character would also act as mitigating factors. The Landscape Report concludes that landscape and visual effects at the district scale would not be significant because of the existing character of the wider context, and the small nature of the reduction in perceived naturalness when compared to the visual amenity at that scale.[189]

6.6.2.4 Outstanding Natural Landscapes

The potential relocation site is not located within an Outstanding Natural Landscape. The Landscape report notes that the effects will not impact on the national scale values that have informed the classification of the Marlborough Sounds as an Outstanding Natural Landscape.[190]

6.6.3 King Shag

The potential relocation sites in Pelorus Sound are within the foraging distance of King Shags breeding at Duffers Reef (the main colony). The potential Horseshoe Bay site would be located 12km from Duffers Reef, but 4.5km from the satellite colony at Tawhitinui and within foraging range of King Shag breeding at this site.[191]

In addition to proximity, water depth influences the likelihood of a particular site providing feeding habitat for King Shag as 74% of birds forage within water that is 20-40m deep. The potential Horseshoe Bay site is located within open water of depths ranging from 18-45m, with the pen area located in water greater than 40m depth.

The site is partially located within a buffer zone within the MSRMP for an area identified for protection of King Shag roosting ground (endangered) at Te Kaiangapipi Point, where the MSRMP notes that the area may develop into nesting colonies, and the use may be periodic. The pMEP however does not identify the site as an Ecologically Significant Marine Site, and the 2015 King Shag census recorded the site as abandoned.[192]

Effects on prey availability have been discussed at section 6.2.3 of this report.

[186] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, pp.46, 49
[187] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.51
[188] Hudson Associates landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.51
[189] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.51
[190] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.51
[191] NIWA (2016) Update of Existing Seabird report with Reference to Relocation of Existing Farms, p.9
[192] Schuckard, R.; Melville, D.S.; Taylor, G. (2015). Population and breeding census of New Zealand king shag, (*Leucocarbo carunculatus*) in 2015. Notornis 62: 209-218.

6.6.4 Tourism and Recreation

The potential Horseshoe Bay site is to the south of the potential Richmond Bay South site. This site has a similar assessment to Richmond Bay South – minimal, if any, impact on tourism or recreational users.[193]

6.6.5 Navigation

Navigation routes in the area are outlined in the Navigation Report. The floating structure of the potential Horseshoe Bay site would be located inshore of the passage path of a vessel passing headland to headland.[194]

In relation to the potential for collision between small vessels and a marine farm, Navigatus has assessed the level of activity in Horseshoe Bay as low (meaning daily vessel activity) and in the proximity of the bay as medium (meaning multiple daily vessel activity). For the potential Horseshoe Bay site the estimated reaction time available for a vessel round the headland north of the farm at Te Kaiangapipi is in the region of 36 seconds.[195]

Access to the mussel farms within Horseshoe Bay may be somewhat impeded. However, the mussel work boats that require access routinely operate between mussel farm lines. The existence of salmon farms in close proximity will not pose a constraint or an additional hazard as the masters of these vessels are well able to navigate around the much more difficult mussel farms with their low visibility and low height above water.

The Navigation Report notes that Horseshoe Bay offers some shelter from a north easterly wind, however to achieve this shelter boats would have to anchor close to the shore in water of less than 20m depth. The potential relocation site is located in water depths of greater than 20m, and therefore should not prevent boats using the bay as shelter.[196]

6.6.6 Heritage

There is one archaeological site (a midden) located on the eastern side of Maud Island, but this is about 3km away from the potential Horseshoe Bay site. The site will be located about 2.5km to the east of the Maud Island gun emplacement. The site may, to some extent therefore, compromise an onlookers' perception and intrude on the 'essential setting' or purpose of the battery and the heritage values associated with it (such as a dominating aspect and a clear line of sight). The extent of possible intrusion is limited however,[197] particularly considering the small number of visitors annually to Maud Island.

6.6.7 Noise

The predicted noise level at the potential Horseshoe Bay site with all the equipment running (including harvesting) during a normal day measured at the closest shoreline is between 41-46dBL_{A10}. The lower value in the range represents the modelled case where the noise-making equipment is spread out across the farm and the upper limit represents the case where all the noise-making equipment is clustered at the part of the farm nearest to the shoreline. The predicted noise at this site with only the generator operating, as would be the case at night, is 31dBL_{A10}. These levels comply with the noise standards set for the three sites granted through the Board of Inquiry process.[198]

Figures 6-22 and 6-23 show the noise prediction contours during the day and night time for both the potential Richmond Bay South and Horseshoe Bay sites. As noted in section 6.6.8 there are no residences within the noise contours outlined in the figures below.

Mitigation measures would be as outlined in section 6.2.7.

[193] Tourism and Recreation Conservation Tourism Limited (2016) NZ King Salmon Potential Salmon Farm Relocation in Marlborough Tourism and Recreation Assessment, p. 29
[194] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.35
[195] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.33
[196] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.36
[197] HistoryWorks (2016) New Zealand King Salmon Relocation Options, p.15
[198] Marshall Day Acoustics (2016) Salmon Farm Relocation Noise Effects Assessment p.13

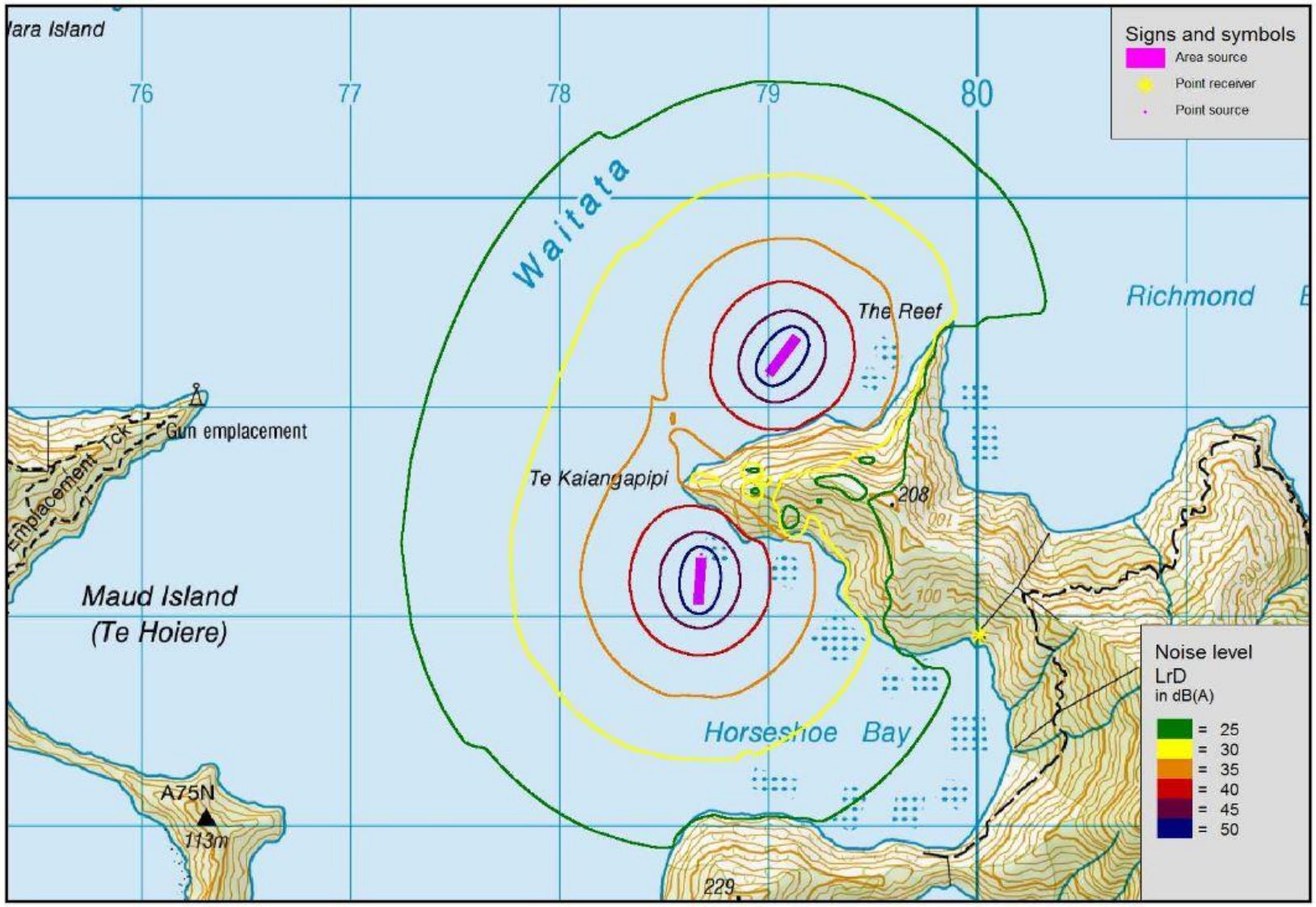


Figure 6-22: Horseshoe Bay noise prediction contours (day)

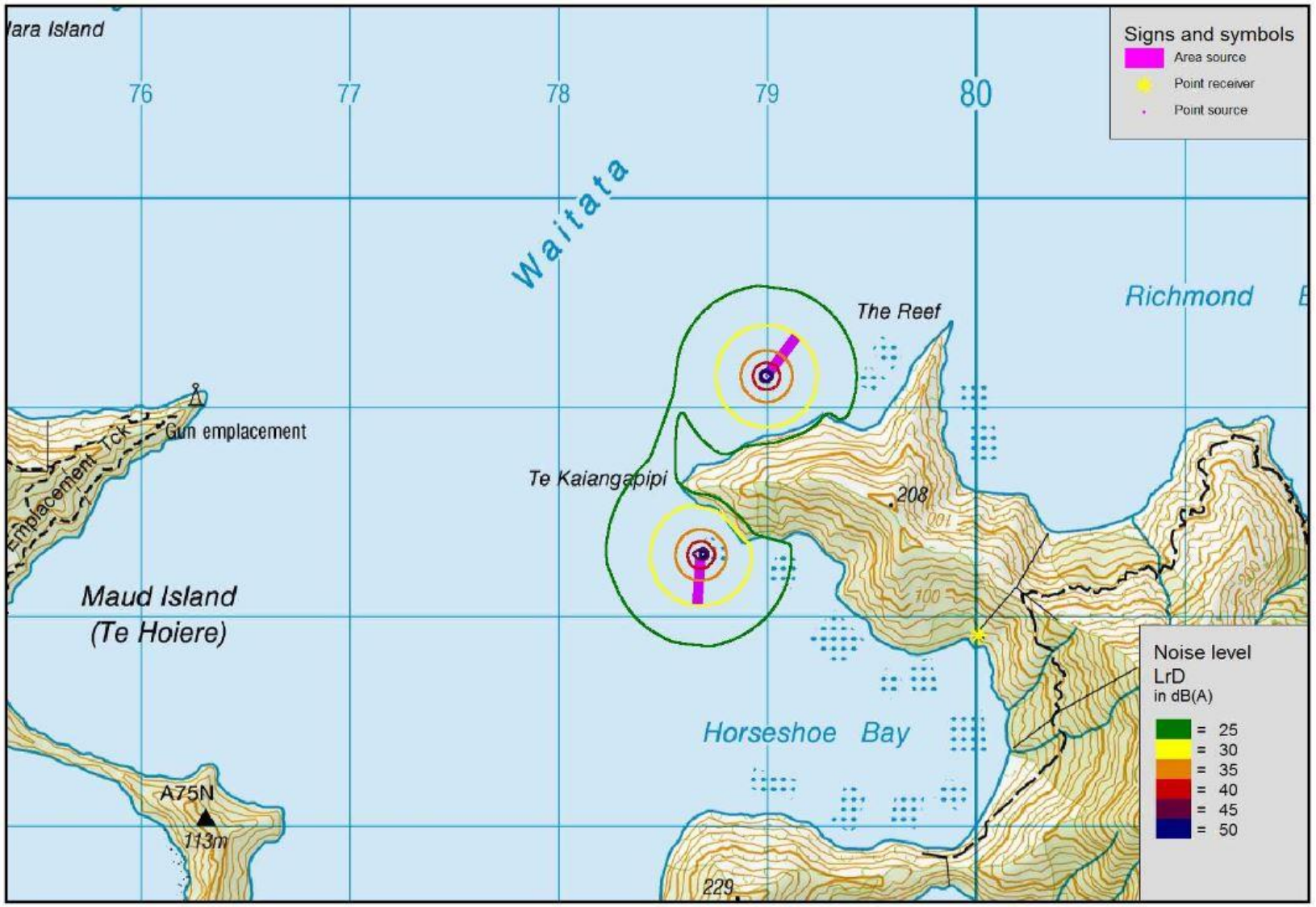


Figure 6-23: Horseshoe Bay noise prediction contours (night)

6.6.8 Residential Amenity

The surrounding area is similar to that discussed for the potential Richmond Bay South site (see section 6.5.8 of this report). The potential Horseshoe Bay site is located adjacent to the privately owned Pohuenui Station which forms the entire eastern shoreline of Waitata Reach. The land is covered in low level regenerating bush and rises steeply, obscuring landward views of the site from most locations on Pohuenui Station itself. Pohuenui is an active sheep farm, with accommodation and recreational activities such as walking, pig hunting, fishing, and cycling.[199] Horseshoe Bay also hosts 10 existing mussel farms. Few dwellings have direct line of site with the nearest being the visitor lodge and staff house on Maud Island at a distance of 3.4km. The eco-lodge (Tui Nature Reserve) and dwelling which are on an elevated site within a direct line of sight are located 4.2km away. The proximity of this concentration of marine farms to the dwelling and foreshore in Horseshoe Bay means that some solid waste is likely to arrive on the foreshore from time to time, although it is less likely to come from salmon farms than from mussel farms, as salmon farms are permanently staffed. As staff are in a position to monitor the shoreline periodically from salmon farms, they can take remedial action as necessary. Overall, the effects of the salmon farm on residential amenity are considered to be nil to negligible, with visual effects and shoreline solid waste effects being minor.[200]

6.6.9 Policy Issues

The process used to assess policy issues is described in section 6.2.9 of this summary AEE.

Key policy issues identified in relation to the potential Horseshoe Bay site are outlined in Table 6-16. The policy analysis relating to water quality, which is a key matter under NZCPS Objective 1 and Policies 21 and 23, MRPS Objective 5.3.2 and pMEP Policy 13.2.1 is contained in section 6.7 of this report.

[199] Taylor Baines (2016) Potential Salmon Farm Relocation in Marlborough Social Impact Assessment, p.17
[200] Taylor Baines (2016) Potential Salmon Farm Relocation in Marlborough Social Impact Assessment, p.24

Table 6-16: Summary of policy issues for Horseshoe Bay

Policy issue	Examples of relevant provisions	Initial assessment
Indigenous biodiversity	NZCPS Objective 1 and Policy 11 and pMEP Policy 8.3.1 – safeguard the integrity, form, functioning and resilience of the coastal environment, sustain its ecosystems, and avoid *inter alia* adverse effects on threatened species. MSRMP Policy 2.2.1.1.3 - consider the effects of an activity on the contribution that indigenous flora and fauna make to natural character. pMEP Objective 8.2 - increase the extent of Marlborough's indigenous biodiversity and improve in areas that have been degraded.	Principal issues arise from effects on King Shag (relevant to all the policies listed) and effects on indigenous benthic biodiversity (relevant to the MSRMP and pMEP policies) – particularly reef habitat extending south from Te Kaiangapipi headland and an unusual biogenic habitat identified 90m northwest of the site. Site is located within flying distance of a potential satellite King Shag colony at Tawhitinui, but not sufficiently close that direct disturbance of the birds at the colony would be anticipated, and the pMEP does not identify the site as an Ecologically Significant Marine Area. The net pens proposed for the site would be located in water depths greater than 40m, at the deep end of preferred King Shag feeding depth. Overall effects on water quality (see section 6.7 of this summary AEE) will also be relevant as water quality may affect King Shag feeding. Exact determination of effects on King Shag is difficult and further analysis of this issue will be required through the public consultation process (which will involve expert workshops). Depositional modelling indicates that effects on the reef and benthic communities should not be significant, but monitoring will be necessary to confirm this, and adaptive management is recommended to manage any effects.
Natural character and landscape	NZCPS Objective 2 and MSRPS Policy 8.1.6 – preserve the natural character of the coastal environment. NZCPS Policies 13 and 15 – avoid adverse effects on outstanding natural features and landscapes and areas of outstanding natural character, avoid significant adverse effects on all other areas and natural character. MSRMP Objective 1 and pMEP Objective 6.2 – preserve natural character and protect it from inappropriate subdivision, use and development.	Site is not within an Area of Outstanding Landscape Value in the MSRMP. Site is not within a proposed Outstanding Natural Landscape and not within a proposed Outstanding Natural Feature in the pMEP. Based on the information currently available, and considering the size of the bay which would be able to visually absorb the farm, the Landscape Report concludes that adverse effects on natural character will not be significant.

Policy issue	Examples of relevant provisions	Initial assessment
	MSRMP Policy 1.1 – avoid adverse effects on areas of the coastal environment predominantly in their natural state and where natural character has not been compromised. pMEP Policies 6.2.1 and 6.2.2 – mirror the requirements of NZCPS Policies 13 and 15.	
Other matters	MSRMP Policy 9.2.1.1.2 – avoid adverse effects of development in the coastal environment, and where this is not practicable, mitigate and provide for effects to be remedied. NZCPS Objective 4 and pMEP Objective 9.1 – public open space and recreational opportunities in the coastal environment. pMEP Policy 13.2.5 – maintenance and enhancement of amenity values.	Many of the technical reports prepared to date identify adverse effects and assess whether they can be avoided. Where they cannot, measures are recommended to mitigate and remedy effects, including through measures such as adaptive management and staged development of the final sites. Recreational use and amenity values for all sites require public input in order to be able to understand the scale of effects.

6.7 Water Quality

The effects of the potential relocation proposal on water quality have been assessed on a Pelorus Sound basis rather than a site by site basis. Salmon farming requires the addition of feed to the water, and waste feed and fish faecal material can cause increased nutrient concentrations in the water column. Nitrogen in the receiving environment (and therefore in the water quality models) behaves in two ways. Salmon farms are sources of ammonium (directly excreted by the fish) and of particulate organic nitrogen (faeces and waste feed) which then degrades into ammonium.[201] Over time, this ammoniacal nitrogen is either utilised by phytoplankton or converted to nitrate by nitrifying bacteria.[202] However, it takes some time for the phytoplankton to fully incorporate the ammonium discharged from any given salmon farm into new biomass. During that time, the water containing both the ammonium and the phytoplankton is likely to be transported away from the farm and subject to mixing through the water column. Any phytoplankton (and therefore chlorophyll) increases attributable to the nutrients released from the salmon farms therefore tend to be greatest at some distance away from the salmon farm.[203]

Chlorophyll concentrations are considered to be a primary indicator when considering overall effects on water quality and are, along with total nitrogen and dissolved oxygen, the subject of consent conditions relating to water quality standards on existing salmon farms within the Sounds. Consent conditions on existing salmon farm sites require that two tiers of response to potential breaches of water quality standards be set. In the case of chlorophyll-a 3.5 mg m^{-3} has been agreed as a provisional water quality standard that acts as a trigger to investigations to determine whether the salmon farms have caused an exceedance of water quality standards, and 5 mg m^{-3} is identified as a level that might indicate the occurrence of a phytoplankton bloom.

6.7.1.1 Scenarios

Because the final relocation proposal is the subject of public consultation and not currently known, a number of different scenarios were modelled to assess effects on water quality in Pelorus Sound as outlined in Table 6-17 below.

Scenario 1 is known as Baseline$_{f2016}$. It includes all currently allocated mussel and salmon farm space. In this scenario, all water-space that has already been allocated for mussel farming was assumed to be occupied. Similarly, all six existing salmon farm sites (Forsyth, Waihinau, Waitata, Kopāua and the two Crail Bay sites) were assumed to be operating, and the other finfish site in Beatrix Bay was included.

While this scenario represents the consented baseline for existing salmon farming sites, in practice the current annual discharge of feed is lower than in the Baseline $_{f2016}$ scenario, as the Waihinau and Forsyth sites have generally been operated alternately in recent years rather than both sites being operational at once, and the two Crail Bay farms have not been farmed recently.

Baseline$_{f2016}$ is based on feed inputs for a hypothetical period between 1 May 2017 and 31 October 2018, using projected monthly production schedules generated specifically for the modelling by NZ King Salmon. Feed levels for each of the scenarios are outlined in Table 1-1 of the Pelorus report. As the Pelorus Sound sites are currently, and would be in the future, not operated as individual sites, but as a complete production system where fish can be moved between sites as necessary during the smolt and grow-out stages, annual feed levels at any given site vary in different scenarios depending on the exact combination of sites. Results from scenarios 2 – 12 were assessed against an original Baseline$_{f2016}$ that contained an error in the projected monthly production schedule. Scenario 13 was run later than the other scenarios, once technical investigations for the six potential relocation sites had been completed and all of the Pelorus Sound sites remained to be considered through public consultation. At the time that Scenario 13 was run, the opportunity was taken to correct the error in the Baseline$_{f2016}$ scenario, and the results of Scenario 13 were compared against this updated Baseline$_{f2016}$. Scenario 13 is the only one that contains all five Pelorus Sound potential relocation sites. Scenario 13 is therefore determined to be the most appropriate of the available modelled scenarios to consider the potential water quality effects from the proposal. Only the results from Scenario 13 are discussed below.

[201] NIWA (2016) Additional salmon farms in Tory Channel: An assessment of effects on water-quality using a biophysical model, p.10
[202] NIWA (2016) Modelled water column effects on potential salmon farm relocation sites in Pelorus Sound, p.33
[203] NIWA (2016) Additional salmon farms in Tory Channel: An assessment of effects on water-quality using a biophysical model, p.10

Table 6-17: Water quality modelling scenarios for Pelorus Sound

	Scenario[204]	1	2	4	5	6	7	8	9	10	11	12	13
Existing consented farms	Waihinau	●											
	Forsyth	●											
	Waitata	●	●	●	●	●	●	●	●	●	●	●	●
	Kopāua	●	●	●	●	●	●	●	●	●	●	●	●
	Beatrix Bay	●	●	●	●	●	●	●	●	●	●	●	●
	Crail Bay 1	●		●	●	●	●						
	Crail Bay 2	●		●	●	●	●						
Potential relocation sites	Blowhole Nth								●	●		●	●
	Blowhole Sth				●			●	●	●		●	●
	Waitata mid-channel		●	●			●	●	●	●	●		●
	Richmond Bay Sth		●	●	●	●		●		●	●	●	●
	Horseshoe Bay					●							●

6.7.1.2 Potential water quality effects in Pelorus Sound

Pelorus Sound has a marked estuarine circulation. Fresher (lower density) water flows outwards to Cook Strait nearer the surface of the water column, while saltier (denser) water tends to flow inward from Cook Strait nearer to the seabed. As the saltier water flows deeper into Pelorus Sound it gradually mixes towards the surface. This estuarine circulation explains the fate of nitrogen discharged from potential salmon farm sites within the model and the water quality effects that are therefore predicted – ammonium excreted from the fish (which does not sink rapidly through the water column) tends to flow out toward Cook Strait, but ammonium from the decay of fish faeces and uneaten feed (both of which sink rapidly to the seabed) tends to flow toward the inner parts of Pelorus Sound, transported by the deeper layer of saltier water.[205]

Unsurprisingly (because it has the largest feed inputs of any of the modelled scenarios) Scenario 13 yields the largest summertime increases in chlorophyll concentrations. The areas of Pelorus Sound where the largest overall increases occur are predicted to be parts of Mahau Sound, Kenepuru Sound and Tawhitinui Reach/Fitzroy Bay. In these areas the average summertime increase in chlorophyll is predicted to be approximately 0.08 – 0.1 mg m^{-3}.[206]

[204] The original scenario 3 was eventually dropped from the modelling work, as the sites included proved to be unacceptable for reasons unrelated to water quality effects. Scenarios 7 – 11 contain two Waitata mid-channel sites (known as NE and SW). As a result of the landscape assessment, a decision was made to combine the two sites into one, with a feed level equivalent to the two original sites. This combined site was include in Scenario 13.
[205] NIWA (2016) Modelled water column effects on potential salmon farm relocation sites in Pelorus Sound, p.34
[206] NIWA (2016) Modelled water column effects on potential salmon farm relocation sites in Pelorus Sound, p.69

Existing Marlborough District Council monitoring in these three areas since July 2012 has shown no chlorophyll concentrations greater than 3.5 mg m^{-3} in near-bed water samples, and 10 exceedances of this level[207] in near-surface water samples. Monthly Marlborough District Council water quality sampling at seven sites throughout Pelorus Sound since July 2012 has resulted in the collection and analysis of 586 water samples. Across all sites and sampling occasions, the 95th percentile (i.e. that level which 95% of samples are equal to or less than) of chlorophyll concentrations is just below 3 mgm^{-3}.

During the spring and summer periods (i.e. those seasons in which the modelling suggests salmon-farm induced chlorophyll enrichment will be greatest), chlorophyll concentrations tend to be greater in the inner parts of Pelorus (at Marlborough District Council monitoring sites PLS-1 (Mahau Sound), PLS-2 (Kenepuru Sound) and PLS-3 (inner Pelorus close to Yncyca Bay)), (see Figure 6-24) and can be summarised as:

- median spring-time chlorophyll concentrations range between 0.8 and 1.5 mg m^{-3} across those three sites
- the 95 percentile spring concentrations range from 1.7 to 3.9 mg m^{-3}
- during summer, the medians range between 0.6 and 2.0 mg m^{-3}
- the 95 percentile summer concentrations range between 1.8 and 4.0 mg m^{-3}

Clearly, the 3.5 mg m^{-3} threshold has been broken on rare occasions in the past, but the historical medians are all well below 3.5 mg m^{-3} (the largest being 2.0 mg m^{-3}). Given that the largest chlorophyll concentration increments projected by the modelling are around 0.1 mg m^{-3}, it is unlikely that breaches of the 3.5 mg m^{-3} threshold will become a frequent event.

NIWA has endeavoured to make a more quantitative estimate of the future frequencies of exceedances at the three inner-most Pelorus Sound sites (i.e. those which have tended to exhibit the highest historical summer chlorophyll concentrations and which are also suggested to be most likely to show chlorophyll increments in response to increased salmon farm loadings). At site PLS-1, 3.5 mg m^{-3} has most frequently been exceeded during the summer months (Jan-March incl.) - about 11% of historical near-surface records for that season. At PLS-2, 3.5 mg m^{-3} has been exceeded most frequently during the autumn months (April-June incl.) - about 13% of occasions in the historical near-surface records for that season. At PLS-3, 3.5 mg m^{-3} has most frequently been exceeded during the autumn months (about 3% of sampling occasions in the historical near-surface data for that site in that season). Bearing in mind that the largest projected chlorophyll increment is circa 0.1 mg m^{-3}, an impression can be gained of the change in frequency with which 3.5 mg m^{-3} will be breached by determining how often 3.4 (=3.5-0.1) mg m^{-3} has been breached in the data which have been gathered to date. Making that comparison, NIWA ventures that the aforementioned approximate frequencies (i.e. 11%, 13%, 3%) will increase to approximately 14%, 14% and 8% respectively. Thus, NIWA concludes that chlorophyll concentrations in excess of 3.5 mg m^{-3} will continue to be comparatively rare in the future.[208]

[207] Over a total of three monitoring sites, so substantially less than 10 exceedances at each monitoring location
[208] NIWA, pers. comm.

Figure 6-24: Marlborough District Council Pelorus Monitoring Sites

Depending on what the final package of potential relocation sites is in Pelorus Sound, it is worth noting that the location of the farms is predicted to have some effects on the location and quantum of enrichment. Placing the relocated farms close to the Cook Strait mouth of Pelorus Sound tends to reduce enrichment within Pelorus Sound, but only because much of the farm-derived nitrogen is exported out into Cook Strait.[209] As a result, the water quality model predicts enrichment of adjacent areas (such as Admiralty Bay and Port Gore) and to a level that can be as great as seen within Pelorus Sound in some of the modelled scenarios, although not to the extent seen in Kenepuru and Mahau Sounds in the summertime. Enrichment of neighbouring areas tends to be greater in winter than during summer.

The water quality model predicts that ammonium concentrations will be lower in the vicinity of the existing lower-flow farms, as they are removed in the majority of the modelled scenarios, consistent with the relocation proposal. While ammonium concentrations are predicted to increase by up to 30% in the immediate vicinity of the potential relocation sites, they are predicted to remain well below the chronic toxicity levels for marine life.[210]

6.7.1.3 Model Limitations

All models have to make assumptions, and include or exclude aspects of reality. Biogeochemical models (like the one used to model water quality effects in Pelorus Sound) typically produce relatively crude representations of the complex bio-geophysical systems under study. Some components of reality are entirely excluded (whether explicitly or implicitly). Other aspects of reality are included, but only in simplified form. A model will not reproduce all details of reality accurately. However, despite their imperfections, such models remain one of the few ways to describe and analyse spatially and temporally diverse real world systems.[211]

The considerable complexities of modelling are discussed in more detail at section 4.1.1 of the Pelorus water quality model report, but the key limitations to be aware of when considering the potential effects on water quality discussed in section 6.7.1.2 are outlined below.

Model resolution

While the model has a nominal horizontal resolution of 200 m, it is designed with the intent of being best able to reproduce system dynamics only at scales somewhat larger than this. The 200 m resolution precludes accurate reproduction of the very steep ammonium and detritus concentration profiles that are likely to exist in the immediate vicinity of each farm.

In addition, the wind model component used to drive the hydrodynamic model component has a resolution of 12.5 km. It is therefore very likely that the real-world winds would not be similar to those generated by the wind model. While the differences between modelled and real-world winds are unlikely to have adverse effects on long term water transport patterns, the instantaneous locations of plumes from the potential relocation sites could be inaccurate, and the patterns of vertical mixing and upwelling/downwelling could sometimes be inaccurate.[212]

Nutrients modelled

The model considers the effects that fish-farms may have upon the lower food-web, but it only considers the role that feed-derived nitrogen may play. It does not consider other nutrients. While this is a potential limitation, the MDC data collected to date indicate that nitrogen is invariably the most limiting nutrient within inner and central Pelorus Sound. The data also indicate that nitrogen will usually be the limiting nutrient in the outer parts of the Sound (i.e. beyond Waitata Reach).[213]

In reality, phytoplankton abundance is determined by much more than just nitrogen input rates (or nitrogen concentrations). To varying degrees, and among a series of other factors, the concentrations of other nutrients, the instantaneous (and historical) light intensities, water temperature, strength of vertical mixing, species composition in the phytoplankton community, differences in grazing pressures from higher levels of the food web, can all influence the evolution of total phytoplankton biomass. Similar complexities apply within all the other components of the real-world food web. The model represents only some of these factors, and even those are represented in simplified form.[214]

[209] NIWA (2016) Modelled water column effects on potential farm relocation sites in Pelorus Sounds, p.35
[210] NIWA (2016) Modelled water column effects on potential farm relocation sites in Pelorus Sounds, p.11
[211] NIWA (2016) Modelled water column effects on potential salmon farm relocation sites in Pelorus Sound, p.60
[212] NIWA (2016) Modelled water column effects on potential salmon farm relocation sites in Pelorus Sound, p61
[213] NIWA (2016) Modelled water column effects on potential salmon farm relocation sites in Pelorus Sound, p61
[214] NIWA (2016) Modelled water column effects on potential salmon farm relocation sites in Pelorus Sound, p62

The model does not consider oxygen. Fish farming will increase the system's demand for oxygen and the fish themselves require oxygen. Oxygen will also be consumed by the biogeochemical processes that convert fish-derived ammonium to nitrate, mineralising the organic matter stemming from the farms (faeces and uneaten food). Clearly it would not be in the fish-farmers' interest to run the farms at stocking rates which would induce local oxygen depletion in the vicinity of the farm. While this doesn't entirely remove the possibility that oxygen depletion might occur in the far-field, the need to maintain adequate oxygen close to the farms is likely to reduce the possibility that oxygen depletion will occur further afield.[215]

Salmon physiology

Some of the salmon physiology data included in the model is based on Atlantic salmon rather than King salmon. As a result the rates of ammonium excretion and faecal production may be too high,[216] which would result in the water quality effects potentially being overstated.

6.7.1.4 Peer Review

The Pelorus Sound water quality modelling has been reviewed by the Cawthron Institute and by a group of technical experts convened by MPI. The review has noted that, while the model is appropriate for a wide range of resource management purposes, direct comparison to an existing system has not been undertaken. The peer review notes that this suggests that the water quality model will be somewhat stretched beyond the conditions for which it has been verified. This may not be an issue, because the environment already experiences large natural variation in nitrogen concentration, and the proposed feed nitrogen inputs are likely to be small compared to natural variation. However, with potential feed inputs of up to seven times the existing feed inputs to Pelorus Sound, the peer review states that supporting evidence is also needed.[217] The peer review also notes that a limitation of the modelling results is that the modelled changes relate to 'existing' maximum consented feed inputs, where actual current feed inputs are less than this (in some cases quite significantly less). The peer review states that a comparison to the existing environment would be relevant to address this.[218]

The peer review, like the model report, notes that biological models cannot fully account for the actual complexities of the real world. Consequently, while the model results may be plausible, the peer review notes that caution in their application is required, particularly if high feed loading scenarios are considered.[219] This caution is reflected in the adoption of an adaptive management approach to the development of the potential relocation sites.

Additional work to address issues raised has been recommended by the peer review:

- a desktop review of information available from other experimental studies, to compare the effects predicted by the models against;
- information from natural variations in nutrient concentrations at a Sounds-wide scale, to ensure that modelling reflects worst case climatic conditions.[220]

6.7.2 Policy Issues

Each of the site specific sections above has included an initial analysis of policy issues. In relation to water quality NZCPS Objective 1 and Policies 21 and 23, MRPS Objective 5.3.2 and pMEP Policy 13.2.1 are relevant, as outlined in Table 6-18.

[215] NIWA (2016) Modelled water column effects on potential salmon farm relocation sites in Pelorus Sound, p63
[216] NIWA (2016) Modelled water column effects on potential salmon farm relocation sites in Pelorus Sound, p64
[217] Cawthron Institute (2016) Peer Review of the Marlborough Sounds Biophysical Model Predictions, p.6
[218] Cawthron Institute (2016) Peer Review of the Marlborough Sounds Biophysical Model Predictions, p.7
[219] Cawthron Institute (2016) Peer Review of the Marlborough Sounds Biophysical Model, p.14
[220] Cawthron Institute (2016) Peer Review of the Marlborough Sounds Biophysical Model, p.16

Table 6-18: Summary of policy issues relating to water quality

Examples of relevant provisions for water quality	Initial assessment
NZCPS Objective 1 – maintain coastal water quality and enhance it where it has deteriorated NZCPS Policy 21 – give priority to improving water quality where it has deteriorated so that it is having a significant adverse effect NZCPS Policy 23 – lists matters to have particular regard to when managing discharges to water in the coastal environment MRPS Objective 5.3.2 – maintain water quality at a level that provides for the sustainable management of the marine ecosystem pMEP Policy 13.2.1 – appropriate development is that which recognises and provides for, and avoids, remedies or mitigates adverse effects on the high level of water quality experienced in Marlborough's coastal waters	Water quality modelling provides an indication of the potential effects on water quality as a result of relocating existing lower-flow sites to higher-flow areas. It suggests that there will not be significant adverse effects on water quality, even if all five potential sites in Pelorus Sound were operating. Recognising that models can only approximate real-world situations, a conservative approach to managing effects on water quality is recommended, with discharges starting at a relatively small proportion of the potential total, and a programme of monitoring, staged development and adaptive management being developed. No areas where water quality has deteriorated to an extent that it is having a significant adverse effect have been identified in the relevant planning documents.

6.8 Pelorus Sound-wide Landscape and Natural Character Effects

6.8.1 Introduction

The Landscape Report, and the sections of this summary AEE, assess effects on natural character and landscape both on a site-by-site basis, and cumulatively (for Waitata Reach and Tory Channel separately). A comprehensive description of this assessment is included in the Landscape Report, including a comparison with the cumulative effects considered by the Board of Inquiry in the 2011 NZ King Salmon applications, and only a high level summary is offered here due to the complexity of the considerations.

6.8.2 Effects

The Landscape Report assesses cumulative effects from three perspectives:

- Simultaneous – where two or more salmon farms are seen at the same time from the same viewpoints
- Successive – where two or more salmon farms are present in views from the same viewpoint, but cannot be seen at the same time as the viewer needs to turn his or her head
- Sequential – where two or more salmon farms are not present in views from the same viewpoint and cannot therefore ever be seen at the same time if the observer moved around the arc of view. For sequential effects to occur the observer has to move through the landscape/seascape area. [221]

In the Waitata Reach area there will be a series of individual locations along the length of the Reach where simultaneous views of up to three salmon farms at a range closer than 3km would be obtained if the potential relocation proposal went ahead and all the potential sites in the Waitata Reach were established. The Landscape Report notes that at a distance of 2-3km a salmon farm is partially visible or a minor part of the view.[222] The most affected location in terms of simultaneous views is likely to be the Tui Nature Reserve property, but while there will be adverse cumulative effects at this location the Landscape Report concludes that they will not be significant due to the backdrop, scale and character of the setting, and the distances of the location from the three salmon farm sites likely to be simultaneously

[221] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.10
[222] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.10

visible (the existing Kopāua site and the potential Richmond Bay South and Horseshoe Bay relocation sites).[223]

The more common cumulative effect through the Waitata Reach is likely to be in relation to successive views, as there will be a number of locations where two or three farms will be within viewing range, but cannot be seen at the same time without the viewer turning his or her head.

The most expansive cumulative effect will occur through sequential views, which would occur as a viewer moved through the Reach by boat. The Landscape Report suggests measures to mitigate the sequential effect of the potential Horseshoe Bay and Richmond Bay South sites, and notes that the expansive nature of the setting at the potential Waitata Mid-Channel site (where, in conjunction with the existing Waitata and Kopāua sites there would be a cluster of farms causing a sequential effect) would be the primary mitigating effect for cumulative sequential effects. A third cluster of farms in terms of sequential cumulative effects would be the two potential Blowhole Point sites. The Landscape Report notes that the cumulative effects of these two sites at the local scale is not considered to be significant, while the effect on the 'gateway' at the district scale would be no more than minor due to the scale of the setting and the low impact on the key values of this wider area.[224]

The separate cumulative effects of simultaneous and successive views of the salmon farm sites are similar in nature to those circumstances assessed through the Board of Inquiry process. The difference between the Board of Inquiry situation and the potential relocation proposal is the more dispersed nature of the sequential effect, with the farms being spread more thinly over 12km rather than concentrated into a 6km length. The Landscape Report notes that the primary mitigation for sequential effects is the overall length of the Waitata Reach (at more than 12km), the broad and dominant scale of the setting and the modifying characteristics that already exist, such as the productive character of the land use that is clearly evident throughout the Waitata Reach. The Landscape Report considers that the current productive features and characteristics remain subservient to the perceived naturalness of the area due to the scale and dominance of the setting, and concludes that the sequential cumulative effect of the potential relocation sites will not alter this weighting.[225]

In relation to the outstanding landscape values mapped at and beyond the gateway to Pelorus Sound, and therefore affecting the consideration of cumulative effects of the Blowhole Point North and Blowhole Point South sites, the Landscape Report concludes that the scale and location of the two potential relocation sites is such that the effects on the key values that cause the area to be identified as outstanding would be no more than minor.[226]

6.8.3 Peer Review

The Landscape Report assessment of cumulative effects on natural character and landscape was peer reviewed by Drakeford Williams Limited. The peer review assessment differs from the Landscape Report in two important respects.

First, the peer review notes that, considering the two potential Blowhole Point sites together, the two sites sit at the boundary of the 'wild' landscape and 'working landscape' (as described in the Landscape Report). The peer review considers that, while the two sites are separated by a small headland, viewed from a distance they would be seen simultaneously or immediately one after the other, and in conjunction with a number of existing mussel farms. The peer review considers that locating salmon farms on the two sites would have an effect on the values of the outstanding natural features and landscapes that are more than low given the high values of the gateway location.[227] The peer review considers that the baseline landscape values rating for the two sites is Moderate, and that with the addition of two farms it would decrease to Low.[228] The Landscape Report has not provided a landscape values rating using the 7-point scale, but has assessed the effects as less than minor. There is an obvious difference in professional opinion in relation to the cumulative effects on landscape in relation to the two potential Blowhole Point sites.

[223] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.11
[224] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.11
[225] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.11
[226] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.11
[227] Drakeford Williams Ltd (2016) Review of Proposed Marine Farm Sites for The Ministry of Primary Industries, p18.
[228] Drakeford Williams Ltd (2016) Review of Proposed Marine Farm Sites for The Ministry of Primary Industries, p46.

Second, the peer review notes that the potential Richmond Bay South and Horseshoe Bay sites are located side by side with only a headland separating them. Viewed from a distance the peer review considered that the two sites could potentially be seen simultaneously or immediately one after the other.[229] The peer review concludes that the cumulative effects of these two farms would be less than the cumulative effects of the two potential Blowhole Point sites due to their location within the Waitata Reach and away from the Pelorus Sound gateway, however their closeness to Maud Island was noted and the potential for any reverse effects was recommended for evaluation.[230] The peer review considers that the baseline landscape values rating for the two sites is High-Moderate, and that with the addition of two farms it would decrease to Moderate-Low.[231] The Landscape Report has not provided a landscape values rating using the 7-point scale, but has assessed the effects as less than minor. There is an obvious difference in professional opinion in relation to the cumulative effects on landscape at the potential Richmond Bay South and Horseshoe Bay sites.

6.8.4 Policy Issues

Policies relevant to landscape and natural character have been identified in sections 6.2 – 6.6 above. As outlined above, on the basis of the information currently available, significant adverse effects on natural character are not anticipated from the cumulative effects of viewing multiple sites within Waitata Reach, and effects on landscape will be no more than minor, although there is a difference in professional opinion in relation to this between the Landscape Report and the peer review.

6.9 Pelorus Sound-wide Navigational Effects

The Navigation Report notes that unlike Tory Channel, Pelorus Sound does not have formally recognised navigational routes with regular users on well-defined or programmed paths. Instead, itinerant recreational users and workboats servicing mussel farms on variable routes dominate activity in the area. Larger vessels will also be itinerant, with either logging vessels passaging to a particular bay for loading, or conceivably a larger cruise vessel potentially entering for a short sightseeing tour before heading back out.[232] Cruise ships do not currently use Pelorus Sound.

Despite the lack of defined navigational routes and significantly less vessel activity than other areas of the Marlborough Sounds, there are commonalities in the way vessels transit through Pelorus Sound, and Navigatus has produced a natural transit map to represent the natural routes taken by vessels in Pelorus Sound (see Figure 6-25). The map is based on the recognised mooring locations, recommended anchorages, transit routes from major locations outside Pelorus Sound and the view of local mariners following the principle of straight line point to point and normal chart or radar assisted navigation.[233] The map has been used to provide guidance on where to site the potential relocation sites in order to avoid as far as possible adverse effects on navigation throughout Waitata Reach.

[229] Drakeford Williams Ltd (2016) Review of Proposed Marine Farm Sites for The Ministry of Primary Industries, p26
[230] Drakeford Williams Ltd (2016) Review of Proposed Marine Farm Sites for The Ministry of Primary Industries, p27
[231] Drakeford Williams Ltd (2016) Review of Proposed Marine Farm Sites for The Ministry of Primary Industries, p46
[232] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.19
[233] [233] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.19

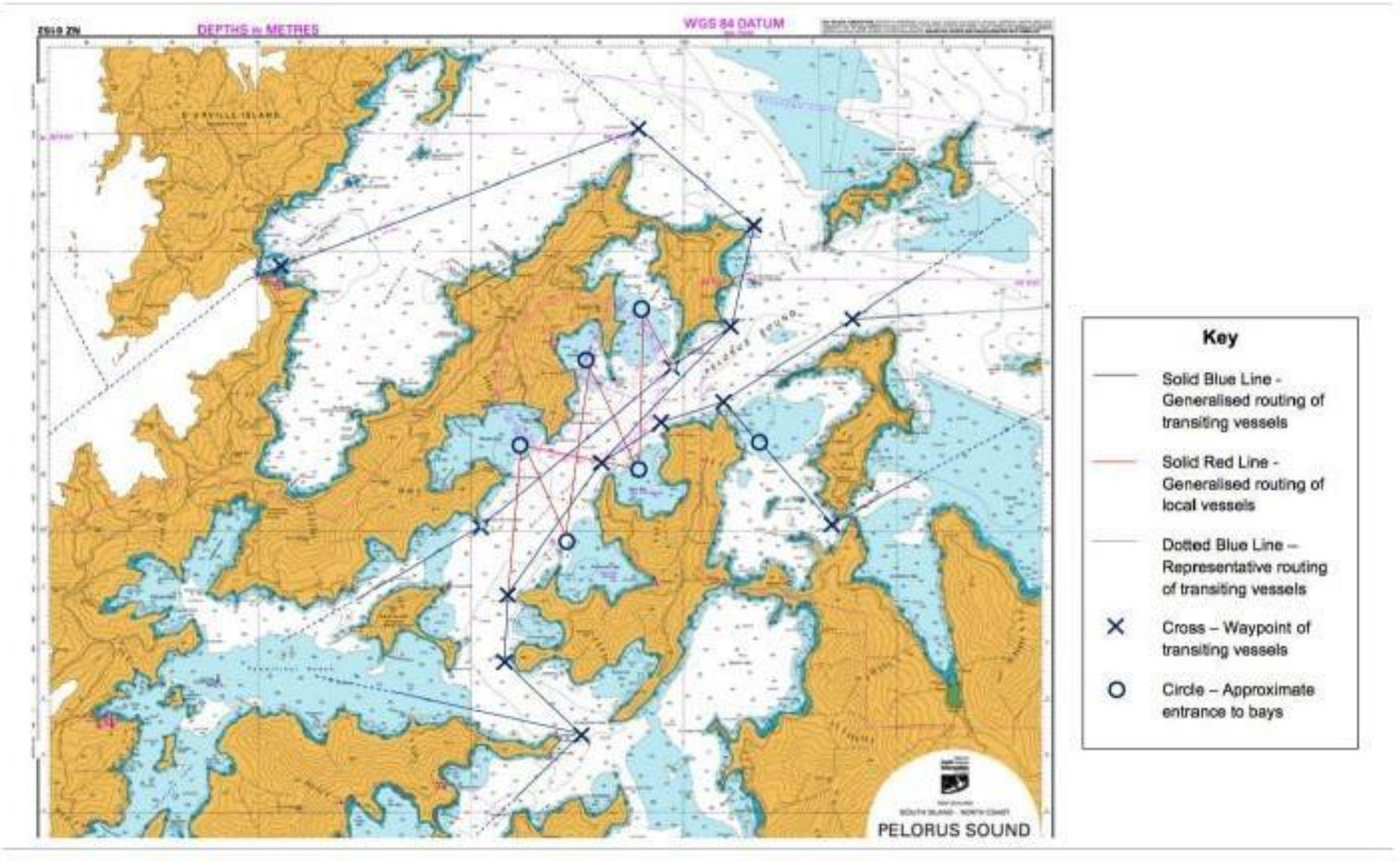


Figure 6-25: Pelorus Sound navigation routes

7 Assessment of effects on the environment – Tory Channel (Tio Point)

7.1 Introduction

Te Kura Te Au/Tory Channel is a deep and narrow channel at the north east end of the Marlborough Sounds, running between the most north eastern part of the upper South Island and Arapaoa Island, connecting to Queen Charlotte Sound. The Tory Channel has a strong tidal current and although largely sheltered from wind, can also act as a funnel for strong winds in certain directions. It is a national transportation route dominated by ferry traffic, and has a number of stakeholders who have an interest in navigational values.[234]

Tory Channel can be characterised as a long narrow stretch of water (1 – 1.5kms wide and roughly 15kms long), strongly enclosed by steep landform, and with a complex shoreline formed by repeated headlands and numerous bays – both deep and shallow – along its length. There are some long views up and down the Channel, but generally the sense of enclosure is dominant. The Channel is part of the Outer Sounds, and serves as the 'gateway' to the South Island from the North. Entry from Cook Strait is through a narrow gap between rocky and dramatic headlands with coastal cliffs and outlying rocks, and is marked by a strong change in character from the open Cook Strait with a wild, remote feel, to a strongly enclosed, much more sheltered and tame working-landscape character.[235]

Tory Channel has both natural and cultural landscape patterns, but the managed character of the land is the defining characteristic. Through the channel there is a complex pattern of pine forestry, buildings, pasture, regenerating native vegetation, wilding pines, and marine farming, all of which detract from feelings of remoteness and naturalness. Mussel farms are in the bays either side of the channel and three salmon farms in the main channel are all serviced regularly by work boats.[236]

There is evidence of early Maori settlement/activity through Te Kura Te Au and the Arapawa Island areas, and it has always been known as having a role as a 'food basket' and 'engine room' for the whole of Totaranui (Queen Charlotte Sound). There are two Maori heritage sites at Te Awaiti Bay. The first whaling station in New Zealand was established in Tory Channel at Te Awaiti and it is reputed to be the first European settlement in the South Island.[237]

The existing social environment within Tory Channel consists of commercial fishing, marine farming, ferry traffic, and residential settlement. With regards to commercial fishing, there are specific exclusions on what can occur within Tory Channel as set out in the Fisheries (Challenger Area Commercial Fishing) Regulations 1986. These include finfishing, drag net fishing for snapper, and trawling. There are about 10 mussel farms that exist along Tory Channel. There are a number of ferries that travel to and from Port Marlborough via Tory Channel. The two inter-islander ferry companies typically operate between 13 and 19 sailings through Tory Channel each day.[238]

There are a number of permanent and non-permanent residents within the Tory Channel area as well as recreational and tourist users. There are limited recreation and tourism facilities in the Tory Channel area but they include the Arapawa homestead (accommodation), a Department of Conservation campground at Ngaruru Bay and casual tourism accommodation in some bays on the southern side of Tory Channel. The area from Tory Channel through to Cape Jackson over 28km away is frequently used by recreational fishers and fishing tourism operators. Tory Channel is located off Queen Charlotte Sound which is a recreational and tourism hub which includes the 71km Queen Charlotte Track (a nationally significant multi-day walk and mountain bike ride), Ship Cove Historic Reserve, Momorangi Bay Scenic Reserve, Karaka Point walkway and Motuara Island.[239]

[234] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.16
[235] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.11
[236] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.11
[237] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.12
[238] Taylor Baines & Associates; Quigley Watts Ltd (2016) The Social and Community Effects of Salmon Farming and Rearing: A case study of the top of the South Island, p78
[239] Tourism and Recreation Conservation Tourism Limited (2016) NZ King Salmon Potential Salmon Farm Relocation in Marlborough Tourism and Recreation Assessment, pp 21-22

Seabirds found in the area are noted in Appendix B. King Shag colonies are located as outlined in Figure 7-1, but are well removed from the potential Tio Point relocation site

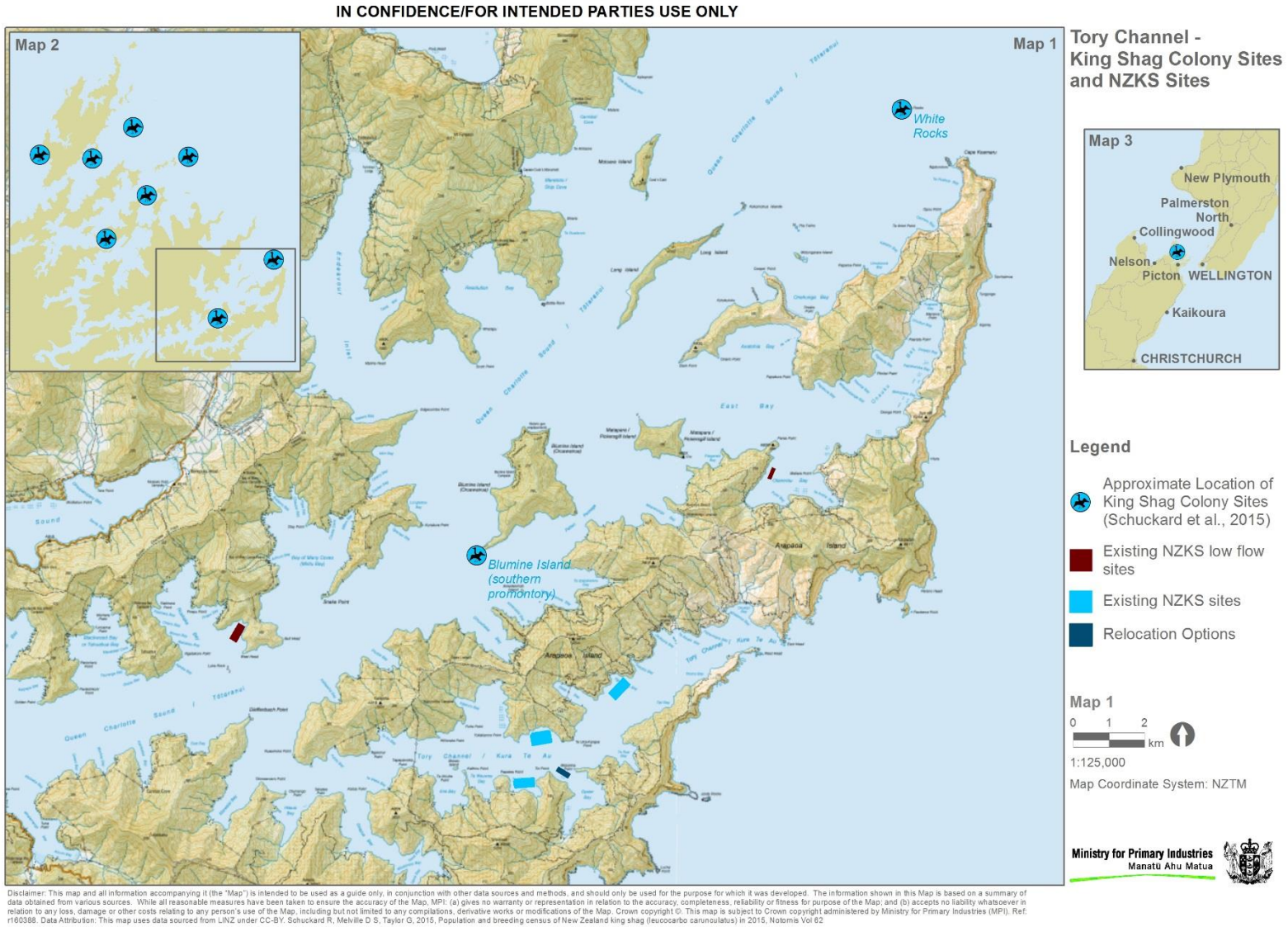


Figure 7-1: King Shag colonies Queen Charlotte Sound/Tory Channel

7.2 Tio Point

The Tio Point site is located on the northeast side of Tio Point which sits between Te Pangu Bay and Oyster Bay in the Tory Channel. The site is not in any area proposed as an area of outstanding natural character, or ONL and the land above the site is not considered to have any high or very high natural values. Tory Channel itself is considered to have high values.[240]

Figure 7-2: Tio Point[241]

The site sits in Tory Channel at the entrance of Oyster Bay and is back dropped to the southwest by Tio Point headland.[242] The coastline adjacent to the proposed site comprises of a rocky coastal edge with a steeply rising indented headland, and rocky coastal cliffs and bluffs along its length.[243] The vegetation on the headland is mainly pine forest with some early-stage regenerating coastal scrub along the lower levels.[244]

There is a consented mussel farm site inshore of the proposed Tio Point site, in about 9-13m of water. The potential relocation site is located seaward of this site in slightly deeper water (26-44m deep). The benthic environment beneath the proposed site is primarily sand/mud and shell hash with a relatively sparse epibiota. Brittlestars and cushion stars are common. Sponges, ascidians, hydroids, bryozoans and macroalgae are also present offshore, though mostly in small biogenic clumps. Inshore reef areas support stands of macroalgae, sponges, ascidians, anemones, bryozoans, hydroids, starfish, kina, sea cucumbers and various reef fishes.[245]

From a navigation and safety perspective, the potential Tio Point site combined with the Oyster Bay wharf has a higher potential interaction with vessels on the main ferry route between the North and South Islands.[246]

Site specific values that are likely to be affected have been identified by the Tio Point site and are outlined in Table 7-1 below. More generic effects are discussed in section 8 of this summary AEE.

[240] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 70
[241] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 69
[242] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 70
[243] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 70
[244] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p. 70
[245] Cawthron Institute (2016) Additional Seabed Information for Finfish Farm Effects at Tio Point, Oyster Bay, Tory Channel, Report No. 2882, p. 12
[246] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.32

Table 7-1: Tio Point site specific values likely to be affected

Site	Benthic	Heritage	Landscape & Natural Character	Navigation	Seabirds	Residential amenity	Tourism & Recreation	Noise	Water quality
Tio Point (#156)	•	•	•	•	•	•	•	•	•

A summary of the key effects at the potential Tio Point site is presented in Table 7-2. A discussion of those effects is contained in the sections that follow.

Table 7-2: Tio Point summary

TIO POINT						
Biophysical suitability for salmon farming						
Mean current (m/s) for (1) near-bottom & (2) mid-water	Temp (°C)	Depth (m)	Max feed discharge (T)	Cage type	Benthic Footprint (ha)	Surface structure area incl. barge (ha)
(1) 0.21 (2) 0.23	13.1-15.9	18-44	1,600	Rectangular	~4.5	0.739
• The site appears biophysically suitable for salmon, although shallow in parts, and is modelled to produce about 704 tonnes of annual salmon production within ES5.						
Seafloor habitats and communities						
• Benthic habitats in the vicinity of the potential site are predominantly sand/mud and shell hash with relatively sparse epibiota. These habitats are widespread in the Sounds. • Epibiota is patchy, with species such as brittle stars and cushion stars common throughout the area, but other species such as ascidians, hydroids, sponges and bryozoans concentrated in clumps. The biogenic clumps present around the potential site do not appear to be as abundant as elsewhere in Tory Channel.						
Landscape and natural character						
• The landscape assessment undertaken states that at a site specific scale the landscape and natural character values are Moderate, which would change to Moderate-Low if a salmon farm was located at the site. The effects of this change are not considered to be significant. • Tory Channel itself is considered to have high values as the entrance to Queen Charlotte Sound.						
King Shag						
• The site is located at least 11km away from the nearest King Shag colony site and the nearest breeding site is at least 25km away. • Water depths at the potential site fall within preferred foraging range of King Shags, but any risk is considered negligible because of the distance to breeding or roosting colonies.						

Navigation
• The site is located near the major ferry route up and down Tory Channel. Although there are navigational risks, these can be adequately mitigated.
Noise and residential amenity
• No significant effects.
Key policy issues[247]
• Landscape and natural character. • Indigenous biodiversity. • Water quality.

7.2.1 Benthic

NIWA's technical investigation of the seabed at the potential Tio Point site is summarised in Table 7-3.

Table 7-3: Tio Point benthic summary

Site	Benthic Environment
Tio Point	• Has inshore boundary depths of 18-31m and offshore boundary depths of 26-44m. • Communities typical of sandy mud and shell hash habitat identified, but all unusual species and habitats either present in low density or at a distance from the proposed site. • Shell hash habitats provide settlement substrate for organisms such as sponges and bryozoans and shelter for mobile invertebrates and fishes, creating biogenic structure in what may be an otherwise 'featureless' habitat. • Reef habitat present at the two headlands and along the coastline inshore of the potential site.

7.2.1.1 Effects of Seabed Deposition

The potential site at Tio Point has been assessed based on a scenario assuming a feed input of 1600 tonnes per year. This predicted that deposition would reach ES5, which is considered to be at the upper level of acceptable benthic effects beneath salmon farms in the Marlborough Sounds. Deposition would be primarily concentrated directly beneath the sea pens and is predicted to move away from the farm in a northwest direction towards the main channel. The total footprint is expected to be approximately 62Ha, with most of this area exposed to less than or equal to ES3.[248] The depositional footprint is likely to include the occasional notable ecological feature (including biogenic clumps, hydroid trees and tubeworm patches), although the majority of the depositional footprint extends to north of the proposed net pens, and away from much of the potentially sensitive inshore reef area and a large tubeworm mound. Even though the majority of the deposition is predicted to move away from the reef area, due to

[247] Key policies in relation to cultural effects are identified in section 9 of this report.
[248] Cawthron Institute (2016) Additional seabed information for a finfish farm effects assessment at Tio Point, Oyster Bay, Tory Channel, p.15

the proximity of the farm it will be important to monitor the reef communities at Tio Point to check for signs of enrichment.[249]

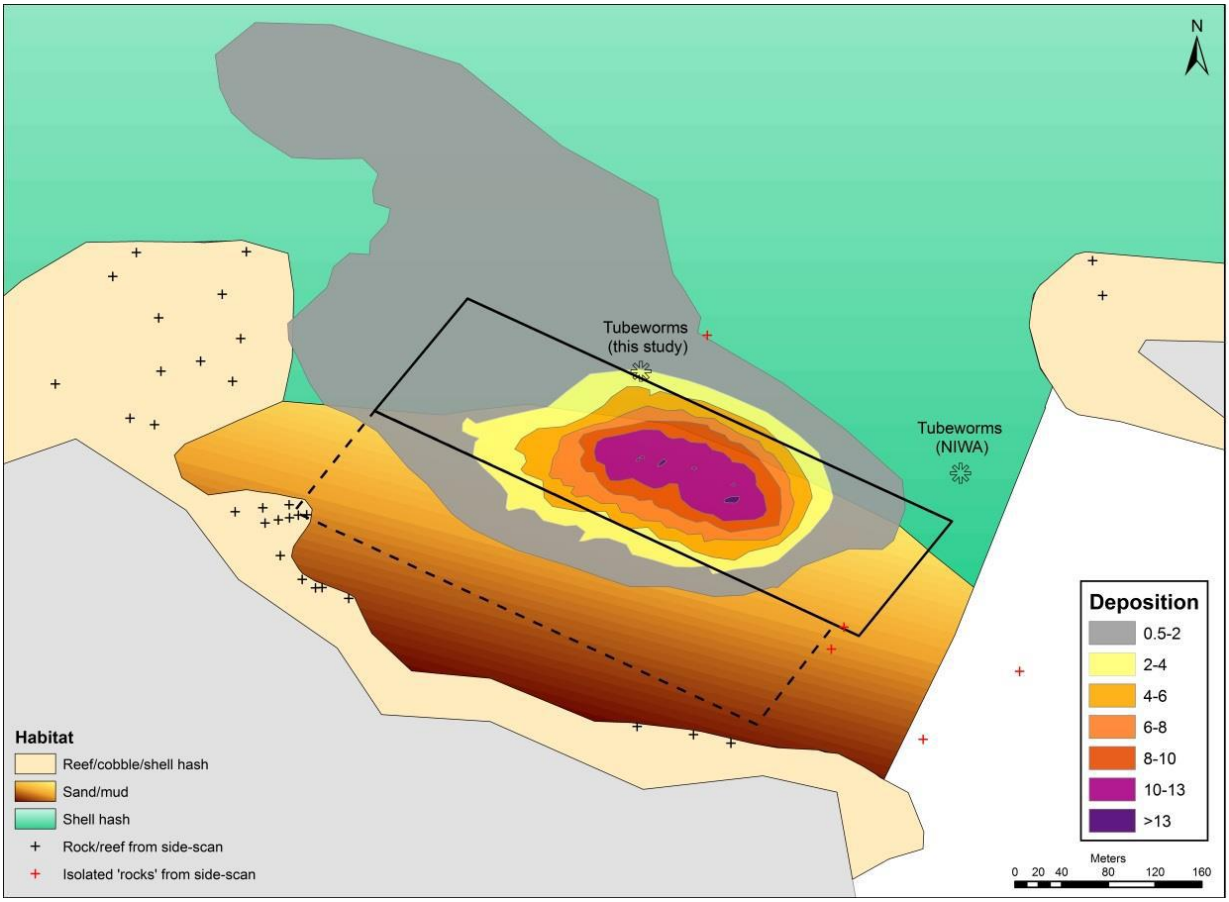


Figure 7-3: Depositional footprint at Tio Point at an annual feed discharge rate of 1600 tonnes[250]

7.2.2 Landscape and Natural Character

7.2.2.1 Natural Character

A proposal consisting of a rectangular steel structure with four netting pens, and barge assumed to be moored as close to land as practicable, has been assessed to determine effects on landscape and natural character at the potential Tio Point relocation site. The site is located to the northeast side of Tio Point, on the south side of Tory Channel between Oyster Bay and Te Pangu Bay, in the Outer Sounds.

Methodology
A description of the method used to undertake the natural character assessments is contained in Section 6.2.2.1 of this report. For the potential Tio Point relocation site:

- Level 1 is not identified in the analysis outlined in the Marlborough Natural Character Study
- Level 2 is defined as the whole of the Marlborough Sounds
- Level 3 is defined as the whole of Tory Channel
- Level 4 is not defined in the Marlborough Natural Character Study for the area where the potential Tio Point relocation site is located, although various areas defined at this scale are identified in close proximity to the potential site
- Level 5 is not defined for any of the areas where the potential relocation sites are located, but can be considered to be the specific bay in which each site is located

[249] Cawthron Institute (2016) Additional seabed information for a finfish farm effects assessment at Tio Point, Oyster Bay, Tory Channel, p.20
[250] This diagram is different to the Pelorus Sound benthic diagrams because it was done by the Cawthron Institute while the others were done by NIWA. However, it is important to note that the Cawthron Institute used the same modelling as NIWA and they peer reviewed each other's work to ensure consistency.

The discussion below outlines the baseline evaluation, the effects that might occur on natural character and the significance of those effects at the different scales at which natural character is assessed.

Assessment

In terms of natural character, the slopes on the headland backdrop to the site are rocky and rugged, and run the length of the adjacent coastal edge. The vegetation in the vicinity is dominated by plantation pine forest, with areas of regenerating indigenous vegetation evident.[251]

The current natural character values are considered to be Moderate.

There will be adverse effects on the perceptual/sensory aspect of natural character from the potential relocation proposal, including a reduction in perceived naturalness and reduced visual amenity.[252]

If the potential relocation proposal went ahead at this site, the natural character values are expected to be Moderate-Low.[253]

In assessing the significance of that change, the Landscape Report notes that adverse effects are assessed as not being significant at this site, principally due to the visual attributes and character of the site and the wider context of the receiving environment. Effects on natural science values will be adverse, but not significant, and overall adverse effects on natural character are assessed as not being significant at either the Level 4 or Level 5 scale or at the Level 3 scale. Effects at a regional and national scale are considered to be insignificant.[254]

7.2.2.2 Outstanding Natural Character

The potential Tio Point relocation site is not located in an area of outstanding natural character.

7.2.2.3 Landscape

Methodology

A description of the method used to undertake the landscape assessments is contained in section 6.2.2.3 of this report.

Assessment

In terms of landscape values, the site is part of a working landscape just to the side of a busy transportation route. Visual amenity is not especially high, with the site having a low vividness within its immediate context and low levels of remoteness.[255] The Landscape Report notes the associative values of the site, resulting from physical and spiritual values associated with mana whenua, mana moana and tangata whenua taonga, and the recreational use of the wider Tory Channel area.[256] The natural science values of this area include that it is open to the main channel with an indented coastal edge (rocky and abrupt with coastal cliffs), steep slopes above cliffs in early-stage regenerating native scrub with pine forestry on upper slopes, and a largely unmodified landform.[257] Tory Channel is identified as having high abiotic/biotic values, although this relocation site is excluded from that assessment.

The current landscape values are considered to be Moderate.

The potential relocation proposal would result in new, clearly visible structures at a site where currently no structures are present. Adverse effects on amenity would be heightened for the dwellings and holiday homes located further into Oyster Bay as boat traffic accessing these dwellings would have to actively

[251] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.73
[252] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.74
[253] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.74
[254] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.74
[255] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.73
[256] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.71
[257] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.70

avoid the site when entering the bay, but views of the potential site would not be possible from most of the dwellings.[258]

If the potential relocation proposal went ahead at this site, the landscape values are expected to be Moderate-Low.[259]

In assessing the significance of that change, the Landscape Report concludes that this is not a significant effect mainly due to the existing working landscape/productive character of the backdrop and the wider context of Tory Channel. The proposed structures would therefore not appear out of place in the existing setting, and there is enough visual complexity in the backdrop to allow for good visual absorption of the proposal. The use of dark recessive colours on structures will reduce the visual impact. While there will be loss of dark night sky at the site due to lighting, views of this from any residence will be at a distance of greater than 1km and will apply to a limited audience of one or two dwellings. The Landscape Report concludes that the landscape effects at a district scale will not be significant as the potential relocation site will fit within the existing character of Tory Channel, and visual amenity effects at the district scale will only be small. Regional scale landscape values will also not be significantly affected. [260]

7.2.2.4 Outstanding Natural Landscapes

The potential relocation site is not located within an Outstanding Natural Landscape.

7.2.2.5 Outstanding Natural Features

The potential relocation site is not located within an Outstanding Natural Feature.

7.2.2.6 Peer Review

The Landscape Report assessment of the potential Tio Point site was peer reviewed by Drakeford Williams Limited. The peer review considered that the baseline landscape rating would be High-Moderate (as compared to the Landscape Report's assessment of Moderate), and that the changed rating as a result of the introduction of a salmon farm to the site would be to Moderate (which agrees with the Landscape Report assessment). The peer review did however agree with the Landscape Report in terms of the overall effects on natural character and landscape.[261]

7.2.2.7 Cumulative Effects

In Tory Channel, simultaneous views of the existing Te Pangu and potential Tio Point farm sites would be obtained from the southern side of the channel. Such views would be limited to closer distances due to the intervening landform when approaching from the west, but would be obtained from a longer distance when approaching from the east. From both the east and west views, the sites would be seen against backdrops of rising landform and recessed into bays. Additionally, the Tio Point landform separates the potential Tio Point relocation site from the existing Te Pangu site, preventing both farms being fully seen together except over the very short length of Tory Channel immediately north of both farms.

The Landscape Report concludes that there will be an adverse cumulative effect due to the increased density of farms within the area of the potential Tio Point site, but that the severity of this effect is mitigated by the relatively short distance (less than 3km) over which all three farms (the existing Clay Point site, the potential Tio Point site and the existing Te Pangu site) would be able to be seen together. The productive character of the Channel and dominance of the landform and backdrop also help reduce the severity of the effects to a point where the Landscape Report concludes that they will not be significant in the existing high amenity landscape.[262]

The peer review of the cumulative effects assessment for Tory Channel was based on the inclusion of all four of the potential relocation sites originally proposed (see section 4.1 of this summary AEE), and

[258] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.75
[259] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.75
[260] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.75
[261] Drakeford Williams Ltd (2016) Review of Proposed Marine Farm Sites for The Ministry of Primary Industries, p33
[262] Hudson Associates Landscape Architects (2016) Review of Proposed Marine Farm Sites for the Ministry of Primary Industries, p.13

does not comment on the cumulative effects of only the potential Tio Point relocation site in conjunction with the three existing farms.

7.2.3 King Shag

The potential Tio Point site would be located at least 11km away from the nearest King Shag colony and the nearest breeding site is at least 25km away. Water depths at the potential site fall within foraging range of King Shags, but any risk is considered negligible because of the distance to breeding or roosting colonies.

This site is not located within an area of ecological value in the MSRMP.

7.2.4 Tourism and Recreation

Tory Channel is an area of low recreation and tourism use in comparison to Queen Charlotte Sound and parts of Pelorus Sound. There are no daily small vessel routes and only moderate recreational fishing levels. There are no 'priority recreation sites' managed by the Department of Conservation in the vicinity of the site, with the exception of the Perano Whaling Station (a historic industrial site) and the Katoa Scenic Reserve. There were no specific issues identified for Tio Point in the tourism and recreation assessment, so the general conclusion is that existing land based recreation and tourism facilities will not be affected.[263]

7.2.5 Navigation

There is a major ferry route which travels up and down Tory Channel and the potential Tio Point site is located closer to the normal ferry paths than any other existing farm. The risk associated with the scenario of a large vessel collision with the potential Tio Point site is low, as any collision would be the result of a gross failure of a large vessel to adhere to the recognised navigational route. Maritime New Zealand recommends that farms are at a minimum distance (of 500m) from navigational routes.[264] The potential Tio Point site, although only 285m from the recognised navigation routes is still considered low risk as it is off a headland – which is by far a greater risk for a large vessel to avoid than a marine farm.[265]

The closer proximity of the farm to the ferry path does increase the risk of interaction between the ferry and work boats operating on the seaward side of the farm. The Navigation Report notes that the work boat crews are used to operating in the vicinity of the ferries and, given the lack of incidents, the existing procedures are robust. The MDC Harbourmaster has expressed no significant concerns in relation to the potential Tio Point relocation site.[266] However, to ensure safety, the Navigation Report considers that it would be prudent to explore strengthening procedures designed to ensure a suitable separation between work boats and ferries. Overall, the Tio Point site would only marginally increase any risk to ferries.[267]

In relation to the potential for collision between small vessels and a marine farm, Navigatus has assessed the level of activity in the area of the site as high (meaning approximately 10 vessel movements per day). For the potential Tio Point site the estimated reaction time available for a vessel round the headland west of the farm at Tio Point is in the region of 37 seconds, and in the region of 44 seconds when rounding the headland at Motukina Point.[268]

With regards to farm breakaway, the Navigation Report notes that a farm breakaway event would create a significant hazard, particularly in Tory Channel where there is a high volume of large vessels travelling through the area. Navigatus recommends real time monitoring of position to ensure any farm breakaway event would be able to be notified to appropriate parties as soon as possible so that a response could be initiated, and vessels should be able to respond to a farm breakaway event by altering their course.[269] To prevent a farm breakaway event from occurring, farms and their moorings are designed, constructed, managed and maintained in a manner to avoid mooring breakage.

[263] Tourism Recreation Conservation (2016) NZ King Salmon Potential Salmon Farm Relocation in Marlborough Tourism and Recreation Assessment, p.31
[264] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p. 21
[265] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p. 27
[266] Navigatus, pers comm.
[267] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.25
[268] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p.32
[269] Navigatus (2016) Marlborough Sounds Salmon Farms Navigation Risk Assessment, p. 39

7.2.6 Heritage

There are a number of archaeological sites on the southern shores of Tory Channel between West Head and Tio Point which are in the vicinity of the potential Tio Point site. These include; a pa site (at Motukina Point), midden, terraces, possible terraces, ovens, find spot, a European house site, and modified soil. The majority of these sites would not be affected by a salmon farm at the potential relocation site, except the pa site which is located in close proximity. The remains of this pa are not, however, extensive, consisting of a ditch and bank which cuts off the pa site on the point from the mainland, an associated midden, and further possible ditches, terraces and depressions. Much of the Motukina peninsula is currently obscured by vegetation, including pines and gorse.[270] No significant effects are anticipated from the potential relocation site on the pa site.

7.2.7 Noise

The predicted noise level at the Tio Point site with all the equipment running (including harvesting) during a normal day measured at the closest shoreline is between 42-47dBL_{A10}. The lower value in the range represents the modelled case where the noise-making equipment is spread out across the farm and the upper limit represents the case where all the noise-making equipment is clustered at the part of the farm nearest to the shoreline. The predicted noise at this site with only the generator operating, as would be the case at night, is 30dBL_{A10}. These levels comply with the noise standards set for the three sites granted through the Board of Inquiry process.[271]

Figures 7-4 and 7-5 show the noise prediction contours during the day and night time. The figures below include both the Tio Point site and the Motukina Point site, however the potential Motukina site is not being pursued as part of the proposal. The Tio Point site is the pink rectangle between Tio Point and Motukina Point.

The Noise Report also considers the cumulative effects of those potential relocation sites that are located either within close proximity to each other or within close proximity to an existing farm (which will remain). The relevant potential relocation site in Tory Channel is Tio Point. It is concluded that overall, noise levels at the closest dwelling would not increase as a result of farms within close proximity to each other operating at the same time.[272]

Mitigation measures would be as outlined in section 6.2.7.

[270] HistoryWorks (2016) New Zealand King Salmon Relocation Options, p.5
[271] Marshall Day Acoustics (2016) Salmon Farm Relocation Noise Effects Assessment p.13
[272] Marshal day Acoustics (2016) Salmon Farm Relocation Noise Effects Assessment, p. 14

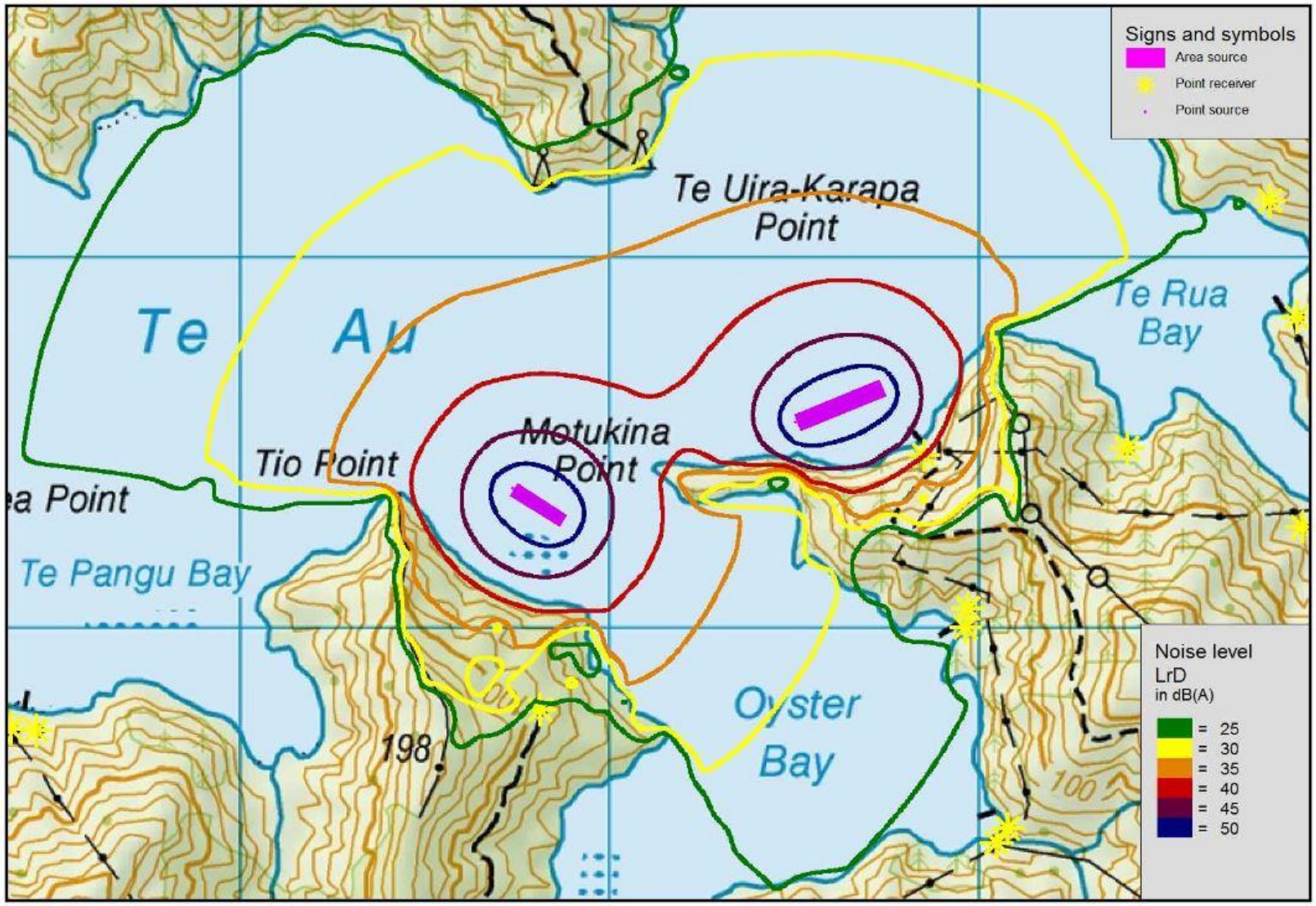


Figure 7-4: Tio Point noise prediction contours (day)

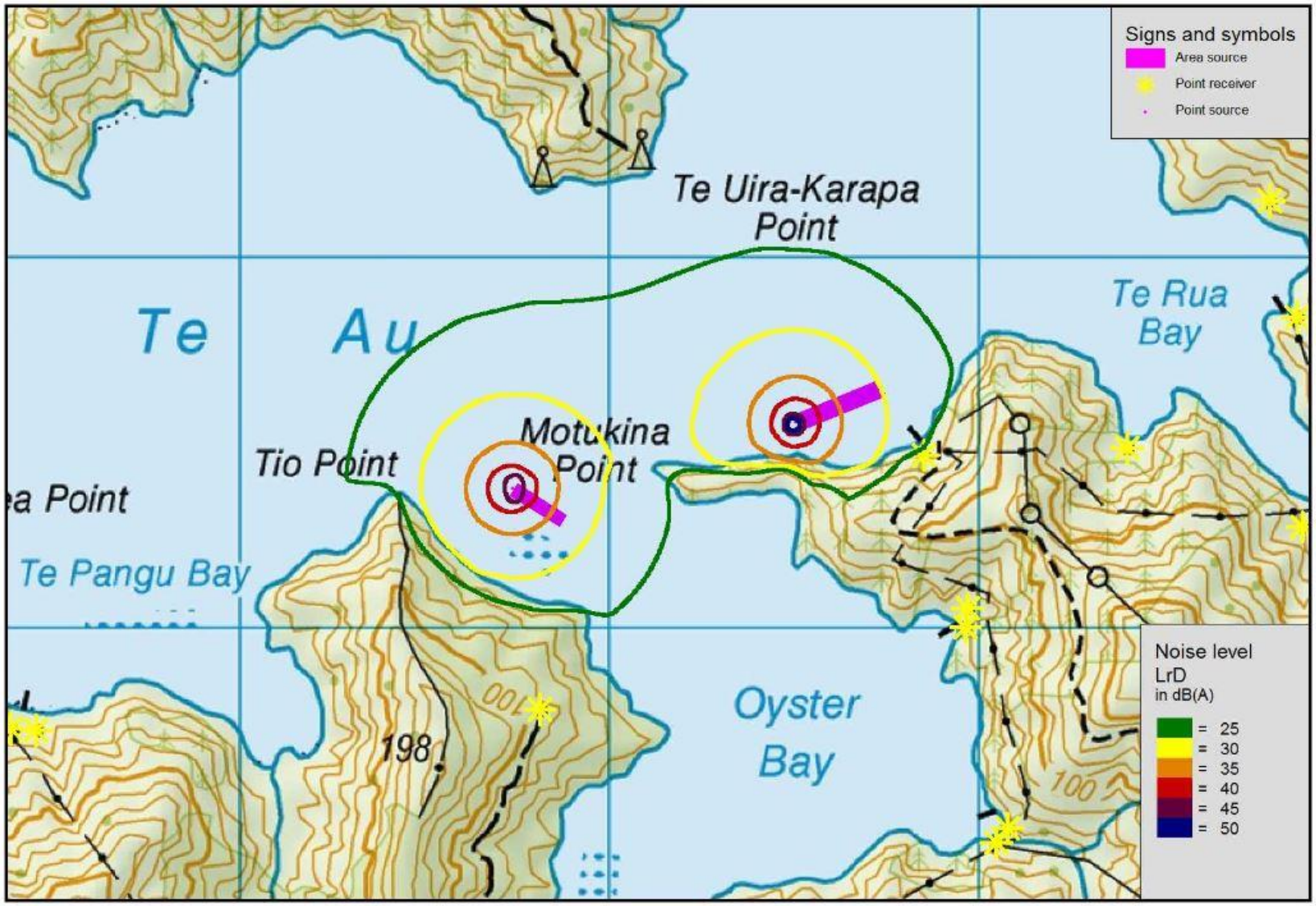


Figure 7-5: Tio Point noise prediction contours (night)

7.2.8 Residential Amenity

There are two dwellings on the north side of Te Rua Bay which are between 1.9-2.1km away from the potential relocation site. There is one dwelling located in a small bay opposite Erie Bay on the north side of Tory Channel which is 3.7km away and within a direct line of sight of the potential relocation site. There is one dwelling in the bay west of Te Iro Bay which is located 5.4km from the site in direct line of sight. There are three dwellings in Okukarri Bay which are 7.1km away but are still in direct line of sight. Overall, the effects of the salmon farm on residential amenity have been assessed as being negligible, with visual effects being minor, and wildlife nuisance effects and shoreline solid waste effects unlikely.[273]

7.2.9 Water Quality

Water quality effects from the inclusion of potential relocation sites in Tory Channel have been modelled using the same type of model as used in Pelorus Sound.

7.2.9.1 Scenarios

A number of different scenarios were modelled for water quality effects in Tory Channel, based on the original proposal that up to four potential relocation sites could be established (see Appendix D for a complete outline of the scenarios modelled in Tory Channel).

Through the series of research investigations undertaken as part of the potential relocation proposal, a decision was made not to continue with three of the potential Tory Channel sites – Tipi Bay, Motukina and Te Weka. Thus, the only remaining candidate farm location is Tio Point (named in the model report as Oyster Bay). Unfortunately, the water quality modelling done to date has not included a scenario where the potential Tio Point site was the only additional site located in Tory Channel.

In terms of Sound-wide annual feed load, a Baseline+Tipi scenario that was modelled comes the closest to the feed discharges that would occur in a scenario where only the potential Tio Point site was added and the existing Otanerau and Ruakaka farms were removed.[274] Unfortunately, the Baseline+Tipi scenario retains the Otanerau and Ruakaka farms but the modelling suggests that a larger fraction of the nutrient stemming from those farms would pass directly out toward Cook Strait (rather than passing through Grove Arm). Thus, whilst the Baseline+Tipi scenario delivers an appropriate quantity of nutrient into the Sound system, it may under-estimate the magnitude of effect that may arise within Grove Arm. A different scenario - Baseline+Motu – was also modelled and delivers feed into Tory Channel at a location which is much closer to the proposed Tio Point farm. However, the food input rate that was applied at Motukina was greater than that modelled for Tio Point (5000 tonne per annum versus 3000 tonne per annum). Furthermore, like Baseline+Tipi, the Baseline+Motu scenario retained farm inputs at Ruakaka and Otanerau. Thus, this scenario is likely to over-estimate any enrichment that might arise from a 'swapped farms + Tio scenario.

A Swapped Farms scenario that was modelled provides yet another (similarly rough) analogue for the Tio Point farm only scenario. Unlike the Baseline+Tipi and Baseline+Motu scenarios, it has the merit of assuming that the existing Ruakaka and Otanerau farms would be removed, but it includes three potential relocation sites (Tipi Bay, Motukina and Te Weka). Nonetheless, the overall annual feed input is greater in this scenario than in the Baseline+Motu one. The Baseline+Motu and Swapped Farms 1 scenarios are both likely to over-estimate the magnitudes of change that might arise from a Tio Point scenario because: (a) much of the relocated food material is delivered into Tory Channel at locations which are closer to Grove Arm than either the potential Tio Point or Tipi Bay sites and (b) both scenarios adopt greater feed loads into Tory Channel (and the entire Queen Charlotte/Tory system) than is envisaged for a Tio Point only scenario (even if the existing Ruakaka & Otanerau farms were to be retained in such a scenario) (Table 7-4).

[273] Taylor Baines (2016) Potential Salmon Farm Relocation in Marlborough Social Impact Assessment, p.34
[274] The Baseline scenario included currently allocated mussel and salmon farm space, with all space assumed to be occupied and all salmon farms operating.

Table 7-4: Tio Point farms scenario feed discharge levels[275]

Farm	Baseline + Tipi	Baseline + Motukina	Swapped Farms 1	Swapped farms with Tio Point only
Otanerau	1616	1616		
Ruakaka	1904	1904		
Clay Point	4368	4368	4368	4368
Te Pangu	4086	4086	4086	4086
Ngamahau	4000	4000	4000	4000
Tipi Bay	2000		2000	
Motukina		5000	5000	
Te Weka			5000	
Tio Point				3000
Total	17,974	20,974	24,454	15,454

Once the final package of potential relocation sites have been confirmed through public consultation the preferred scenario will be run for the water quality model, to confirm the effects on water quality. However, for the purposes of this summary AEE, the effects of the scenarios in Table 7-4 are discussed in section 7.2.9.2 in order to provide some indication of potential water quality effects.

7.2.9.2 Potential Water Quality Effects in Tory Channel and Queen Charlotte Sound

The Queen Charlotte and Tory Channel system consists of drowned river-valleys. The system is 'Y-shaped' – with Tory Channel forming one of the two 'arms' of the Y. Queen Charlotte Sound is comprised of the other 'arm' of the 'Y' and the 'leg' of the 'Y'. The two arms (outer Queen Charlotte and Tory Channel) open onto Cook Straight. Freshwater inputs are small, but a weak estuarine circulation is evident – at least in the inner part of Queen Charlotte (i.e. the 'leg' of the Y): fresher (low density) water tends to flow seaward near the sea surface, whilst saltier (higher density) water flows landward (toward Grove Arm) close to the seabed. The majority of this seawater seems to originate from Tory Channel (rather than the outer part of Queen Charlotte Sound). The estuarine circulation is stronger during the winter months (when rainfall tends to be higher). Nonetheless, Queen Charlotte Sound tends to be more strongly stratified during the summer months (because the long, warm days warm the surface waters – reducing their density). Tidal currents are much stronger in Tory Channel than in Queen Charlotte Sound (especially than in inner Queen Charlotte Sound), and the turbulence generated by these strong tidal currents is sufficient to ensure that the waters of Tory Channel remain vertically well-mixed throughout the year. In addition to the strong tidal currents that flow back and forth through Tory Channel, there is also a weaker, net flow from Cook Strait through Tory Channel and into Queen Charlotte Sound. From there, some of the water flows directly seaward though outer Queen Charlotte Sound, whilst the remainder first flows into inner Queen Charlotte Sound as a part of the estuarine circulation.

In general, the water quality model predicts that for ammonium the largest increases arise in the immediate vicinity of any given farm. The largest summertime changes in phytoplankton abundance are predicted to arise in Onapua Bay and Grove Arm, with larger changes expected in Onapua Bay. During the summer period phytoplankton concentrations are predicted to increase by between 1 and 6% (relative to the baseline) in Onapua Bay and Grove Arm in the scenarios where only one potential farm site is added (Baseline$_{f2016}$ + Tipi, Baseline $_{f2016}$ + Motu and Baseline $_{f2016}$ + Weka). The Baseline $_{f2016}$ + Tipi scenario tends to induce the smallest change.

In the Baseline$_{f2016}$ + Tipi scenario, the time-averaged summertime chlorophyll concentration increase is approximately 0.02 mg m^{-3} in the inner part of Queen Charlotte Sound and around 0.4 mg m^{-3} in Onapua Bay. In the Baseline$_{f2016}$+Motu scenario, the corresponding figures are approximately 0.1 mg m^{-3} and 0.15 mg m^{-3}. In the Swapped Farms 1 scenario, the corresponding figures are approximately 0.2 mg m^{-3} and 0.4 mg m^{-3}. NIWA considers that the degree of enrichment that would arise within inner Queen

[275] Note that the swapped farms with Tio Point only scenario has not been run to date.

Charlotte Sound and Onapua Bay under a Baseline$_{f2016}$+Tio scenario would fall within the ranges indicated in the preceding text. Indeed, if the Otanerau and Ruakaka farms were entirely replaced by a single farm at Tio Point, then the degree of enrichment may prove to be less than that implied by even the Baseline$_{f2016}$ + Motu scenario.

In existing MDC monitoring (of mid-channel locations) in Queen Charlotte Sound (at five locations from July 2011 up to and including March 2015) chlorophyll concentrations of greater than 5 mg m^{-3} have been exceeded on four occasions (all in 2013). Chlorophyll concentrations in 79 of the 90 near-surface water samples from the 2011 – 2015 period have been below 3 mg m^{-3}. In this context, if the increases in chlorophyll concentration were to occur at a time when natural chlorophyll levels in Tory Channel and Queen Charlotte Sound were at just under 3.5 mg m^{-3} or 5 mg m^{-3}, then exceedances of these levels may occur a little more often than they do currently. However, the summertime average chlorophyll concentrations from the MDC monitoring stations in inner Queen Charlotte Sound is 1.24 mg m^{-3}. The Baseline+Tipi scenario under-estimates the change that would arise from a Baseline+Tio scenario whilst the Baseline+Motu and Swapped Farms 1 scenarios may over-estimate it. It is therefore possible to calculate approximate upper and lower bounds on the multi-year summertime average chlorophyll concentrations that might arise under a Baseline+Tio scenario by adding the average chlorophyll increase predicted by the model under the Baseline$_{f2016}$+Tipi and Swapped Farms 1 scenarios to this field estimate of the summertime average (i.e. 1.24 mg m^{-3} for the inner part of Queen Charlotte Sound). This yields a range of approximately 1.26 – 1.44 mg m^{-3} chlorophyll[276]. This is not seen by NIWA as especially extreme relative to the natural variation of summertime chlorophyll measurements, but if persistent, could lead to changes in some aspects of the biological system within the Sound. NIWA's supposition is that any changes that occur in response to an increased phytoplankton and zooplankton biomass would be subtle.[277]

A particular matter to consider in relation to potential water quality effects in Tory Channel is the potential effects on water quality in Onapua Bay, and other side bays along Tory Channel that may have similar characteristics to Onapua Bay. Due to the mid-channel location of MDC monitoring sites and limitations of the model in representing effects at the level of small embayments quantitative water quality effect estimates for locations such as Onapua Bay and Opua Bay cannot be reliably made with the existing information available, although qualitatively, chlorophyll-a changes are considered likely to be greater in Onapua Bay than in Tory Channel. Onapua Bay has developed harmful algal blooms in the past, particularly blooms of the toxic dinoflagellate *Alexandrium catenella*. In all of the additional farm scenarios modelled in the Tory report and the Tory including Oyster report increases of ammonium and phytoplankton were predicted in Onapua Bay. This represents a potential water quality risk in terms of the possibility that Onapua Bay and/or other side bays will act as a seed area from which phytoplankton blooms could spread and that increases in farm derived nutrient in the Tory Channel system will increase the subsequent size and/or length of any exported bloom.[278] A risk assessment will be undertaken prior to a potential farm being established at Tio Point. This risk assessment will consider the cumulative effect of feed levels from the potential Tio Point farm, alongside those from the existing and future discharges from the Clay Point, Te Pangu and Ngamahau farms.

7.2.9.3 Model Limitations and Peer Review

Model limitations discussed in section 6.7 of this report also apply to the Tory Channel/Queen Charlotte Sound modelling, as do the findings of the peer review of the water quality modelling by the Cawthron Institute.

7.2.10 Policy Issues

The process used to assess policy issues is described in section 6.2.9 of this summary AEE.

Key policy issues identified in relation to the potential Tio Point site are outlined in Table 7-5.

[276] The figures are quoted to 2 decimal places only to make the arithmetic-derivation more explicit. This does not imply that either the lower bounds or the upper bounds for the magnitude of change are being predicted with this degree of accuracy or precision.
[277] NIWA (2016) Additional salmon farms in Tory Channel: an assessment of effects on water-quality using a biophysical model (Oyster Bay, Tipi Bay and Motukina Point), p54
[278] NIWA (2016) Additional salmon farms in Tory Channel: an assessment of effects on water-quality using a biophysical model (Oyster Bay, Tipi Bay and Motukina Point), p55

Table 7-5: Summary of policy issues for Tio Point

Policy issue	Examples of relevant provisions	Initial assessment
Indigenous biodiversity	NZCPS Objective 1 and Policy 11 and pMEP Policy 8.3.1 – safeguard the integrity, form, functioning and resilience of the coastal environment, sustain its ecosystems, and avoid *inter alia* adverse effects on threatened species. MSRMP Policy 2.2.1.1.3 - consider the effects of an activity on the contribution that indigenous flora and fauna make to natural character. pMEP Objective 8.2 - increase the extent of Marlborough's indigenous biodiversity and improve in areas that have been degraded.	Principal issues arise from effects on indigenous benthic biodiversity (relevant to the MSRMP and pMEP policies) – particularly reef habitat at each headland at the entrance to Oyster Bay and indigenous biodiversity on the seabed underneath the potential site. Depositional modelling indicates that effects on reef habitat and benthic communities should not be significant, but monitoring will be necessary to confirm this, and adaptive management is recommended to manage any effects.
Natural character and landscape	NZCPS Objective 2 and MSRPS Policy 8.1.6 – preserve the natural character of the coastal environment. NZCPS Policies 13 and 15 – avoid adverse effects on outstanding natural features and landscapes and areas of outstanding natural character, avoid significant adverse effects on all other areas and natural character. MSRMP Objective 1 and pMEP Objective 6.2 – preserve natural character and protect it from inappropriate subdivision, use and development. MSRMP Policy 1.1 – avoid adverse effects on areas of the coastal environment predominantly in their natural state and where natural character has not been compromised. pMEP Policies 6.2.1 and 6.2.2 – mirror the requirements of NZCPS Policies 13 and 15.	Site is not within an Area of Outstanding Landscape Value in the MSRMP. Site is not within a proposed Outstanding Natural Landscape and not within a proposed Outstanding Natural Feature in the pMEP. The Landscape Report concludes that effects would not be significant as a site would fit within the existing character of Tory Channel and visual amenity effects would be small. The site is not located in a proposed Area of Outstanding Natural Character. Based on the information currently available, and considering the modified nature of the natural character at the site and the wider context of Tory Channel, the Landscape Report concludes that adverse effects on natural character would not be significant.
Water quality	NZCPS Objective 1 – maintain coastal water quality and enhance it where it has deteriorated NZCPS Policy 21 – give priority to improving water quality where it has deteriorated so that it is having a significant adverse effect NZCPS Policy 23 – matters to have particular regard to when managing discharges to water in the coastal environment	Water quality modelling provides an indication of the potential effects on water quality as a result of relocating existing lower-flow sites to higher-flow areas. It suggests that there would not be significant adverse effects on water quality on a Queen Charlotte Sound/Tory Channel scale. There are potential issues with the contribution of nutrient discharges to the development of algal blooms in the side embayments on the south side of Tory Channel that would need additional investigation.

Policy issue	Examples of relevant provisions	Initial assessment
	MRPS Objective 5.3.2 – maintain water quality at a level that provides for the sustainable management of the marine ecosystem pMEP Policy 13.2.1 – appropriate development is that which recognises and provides for, and avoids, remedies or mitigates adverse effects on the high level of water quality experienced in Marlborough's coastal waters	
Other matters	MSRMP Policy 9.2.1.1.2 – avoid adverse effects of development in the coastal environment, and where this is not practicable, mitigate and provide for effects to be remedied. NZCPS Objective 4 and pMEP Objective 9.1 – public open space and recreational opportunities in the coastal environment. pMEP Policy 13.2.5 – maintenance and enhancement of amenity values.	Many of the technical reports prepared to date identify adverse effects and assess whether they can be avoided. Where they cannot, measures are recommended to mitigate and remedy effects, including through measures such as adaptive management and staged development of the final sites. Recreational use and amenity values for all sites require public input in order to be able to understand the scale of effects.

8 Non-Site Specific Environmental Effects

8.1 Biosecurity

The 2011 Biosecurity Report covers the more general biosecurity risks related to the introduction of salmon farms into the Marlborough Sounds, while the 2016 biosecurity update considers the risks identified in 2011 in the context of the potential relocation sites.

The 2011 Biosecurity Report identified three separate pathways for biosecurity risks: (1) introduction of marine pests through salmon farm operations; (2) introduction unrelated to salmon farming (fouled vessels); and (3) dispersal from populations in other areas throughout the Marlborough Sounds.[279] In relation to the potential relocation proposal, only the potential biosecurity risks related to the introduction of marine pests through salmon farm operations or as a result of salmon farm operations (for example, seabed enrichment creating an ideal environment for a nearby pest) are considered in this summary AEE.

The 2011 Biosecurity Report broadly identified the following potential biosecurity related environmental effects:

- ecological effects on species or habitats in natural ecosystems, adverse effects on conservation values or fishery resources as a result of changes to natural ecosystems
- physical effects on commercial, recreational or amenity values or on natural character
- effects on mussel aquaculture from introduction or enhancement of problematic fouling species[280]

The potential biosecurity effects resulting from salmon farming are generally considered to be minor and incremental, as biosecurity risks are most likely to arise as a result of pathways outside of NZ King Salmon's control.[281] Effects are classified as minor because:

- the risks being potentially introduced are not novel to the region, and do not involve transfer pathways external to the region
- any risks introduced by NZ King Salmon would likely be small and localised (within the farm area)
- effects are likely to be short term only in the sense that marine pests are likely to eventually spread to suitable habitats in the Marlborough Sounds irrespective of NZ King Salmon activities.[282]

Overall, the 2011 Biosecurity Report concluded that at a regional scale, the incremental biosecurity effect of the NZ King Salmon proposed farms would not be discernible from other existing activities within the region and the biosecurity risks that they pose.[283]

The 2016 Biosecurity update looks to the 2011 Biosecurity report as well as the biosecurity related evidence produced through the Board of Inquiry process. Overall, the 2016 Biosecurity update agrees with the findings of the 2011 Biosecurity Report and reaffirms that:

- biosecurity risks posed by the NZ King Salmon relocated farms do not provide pathways for the introduction of new pest species to the region and are not greater than the biosecurity risks posed by other activities within the region
- farm management and operation practices have the potential to reduce the spread of pest species through on farm surveillance and management
- enrichment in the vicinity of farms (e.g. the seabed beneath them) has the potential to exacerbate the establishment of certain pest species – however this risk is minor in the context of other sources of enrichment or disturbance.[284]

To mitigate the biosecurity risks, the 2011 Biosecurity Report suggests mitigation measures which include management techniques and practices to reduce risks, detect new pests and reduce the size of

[279] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Biosecurity, p. 9
[280] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Biosecurity, p. 19
[281] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Biosecurity, p. 21
[282] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Biosecurity, p. 21
[283] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Biosecurity, p. 22
[284] Cawthron Institute (2016) Biosecurity Assessment for Salmon Farm Relocation Sites (Letter), p4

any potential spread, all to be managed through a specific Biosecurity Management Plan. The 2016 Biosecurity update emphasises the importance of implementing a biosecurity management plan for any relocated sites as well, particularly in light of increased national and regional action relating to the development and implementation of measures to control the spread of marine pests. The 2016 update recognises a biosecurity benefit of the relocation proposal being that NZ King Salmon farms would be clustered into two geographically discrete sub-regions, enabling more effective area-based management of biosecurity risk than occurs when sites are scattered across the Marlborough Sounds.

8.2 Disease

The 2011 Disease Risk Report focused on biosecurity and environmental health risks associated with pathogens and parasites and identified 20 infectious and 13 non-infectious diseases of cultured salmon.[285] With regard to the identified infectious diseases, only four were considered to be a potential hazard and required a detailed risk assessment.[286] The risk assessment undertaken and outlined in the 2011 Disease Risk Report concluded that none of the disease agents were likely to cause significant disease in wild fishes or other aquatic animals, but that it was important to ensure that the expansion of the salmon farming industry in the Marlborough Sounds was well planned in order to avoid disease problems and to effectively manage any new problems that may emerge.[287]

The 2011 Disease Risk Report recommended that the development of the additional farm sites being sought by NZ King Salmon at that time be enabled in order to:

- keep densities of farmed fish at reasonable levels and allow the development of three independent farm management areas
- establish ideal on-water buffer zones that would allow independent management of farm areas in the event of disease outbreaks. [288]

The 2011 Disease Risk Report suggested farm management areas to control and/or manage the spread of disease outbreaks. These farm management areas linked to the original nine sites sought by NZ King Salmon as part of the 2011 applications, of which only three were eventually successful. With regard to the precent proposal, comprising existing higher-flow farms to remain, and the potential relocation sites, they could still be treated as two distinct farm management areas – being the Tory Channel farms and the Pelorus Sound farms could still be created, meaning that the recommendations in the 2011 Disease Risk Report around farm management areas can still apply.

The 2016 Disease Risk Update looks to the 2011 Disease Risk Report and identifies a few changes to its findings:

- there are 21 infectious disease agents as opposed to the 20 identified previously (with the recent emergence of a *Piscirickettsia*-like bacteria)
- a disease outbreak at the Waihinau Farm is noted, likely related to a combination of suboptimal environmental conditions, and infection with *Piscirickettsia*- like bacteria and the endemic opportunistic bacterium *Tenacibaculum maritimum*
- an increased disease risk related to *Piscirickettsia*- like bacteria and its potential impact on wild populations is identified[289]

A detailed risk assessment has been undertaken for *Piscirickettsia*-like bacteria. [290] The 2016 Disease Risk Update concludes that fish mortality almost exclusively occurs in cultured fish during times of stress such as smoltification and high water temperatures.[291] The 2016 Disease Risk Update lists a number of measures that can be taken to reduce the likelihood of *Piscirickettsia*-like bacteria outbreaks, including maximising water quality, using broodstock that have never been exposed to seawater, rearing fish at lower densities, fallowing farm sites and single year class farming. The potential relocation sites would provide better water quality than the current lower-flow sites, and the suggested density and broodstock measures are standard practice for NZ King Salmon. Single year class farming and fallowing are aims

[285] Digfish Services (2011) Environmental Assessment Report – Disease Risks, p. 45
[286] Digfish Services (2011) Environmental Assessment Report – Disease Risks, p. 4
[287] Digfish Services (2011) Environmental Assessment Report – Disease Risks, p. 40
[288] Digfish Services (2011) Environmental Assessment Report – Disease Risks, p. 4
[289] Digfish (2016) Updated Disease Risk Assessment Report – Relocation of Salmon Farms in Marlborough Sounds, New Zealand, p. 4
[290] Digfish (2016) Updated Disease Risk Assessment Report – Relocation of Salmon Farms in Marlborough Sounds, New Zealand, p. 31
[291] Digfish (2016) Updated Disease Risk Assessment Report – Relocation of Salmon Farms in Marlborough Sounds, New Zealand, p. 34

for NZ King Salmon, but the current relatively small number of salmon farming sites currently operational makes implementing these measures difficult.

The 2016 Disease Risk Update concludes that establishment of *Piscirickettsia*- like bacteria in cultured salmon is likely to have mild biological consequences, which would be amenable to control, and would be unlikely to have any noticeable environmental effects. The consequences of any introduction of the bacteria to wild fish stocks in New Zealand is therefore considered to be low.[292] Relocating existing lower-flow farm sites to higher water flow sites is likely to reduce the risks to the environment of *Piscirickettsia*-like bacteria in cultured salmon.

It should be noted that there is a biosecurity response ongoing in the Marlborough Sounds due to salmon mortalities at some salmon farms. A Controlled Area Notice was put in place in April 2016, which places controls on moving salmon stock and farming equipment, unless a permit is obtained from MPI. The Controlled Area Notice set up two Contained Zoned in the outer Pelorus Sound and Queen Charlotte Sound respectively. The potential relocation proposal involves moving farms which are within areas affected by the Controlled Area Notice. If relocation proceeds it would happen within the requirements of the Controlled Area Notice and, where necessary, NZ King Salmon applying to MPI for permits to move equipment within or between Controlled Areas.

The 2016 Disease Risk Update is based on diseases of salmon currently known to occur in New Zealand, and the report acknowledges that new diseases and biosecurity risks can emerge. The potential relocation proposal would allow NZ King Salmon to mitigate these risks to an extent, by allowing establishment of 2 independent farm management areas (Pelorus Sound and Tory Channel) separated by ideal buffer zones. The development of independent farm management areas would also allow NZ King Salmon to enhance its existing biosecurity controls and implement integrated pest management strategies if required. The 2016 Disease Risk Report also concludes that because the density of individual farms in each farm management area would be low by world standards, the increased number of farms within each area (each area would have one more farm than currently if all potential sites were established) would not be a concern provided that water quality and stocking densities remained optimal and the biosecurity practices outlined in the NZ King Salmon biosecurity management plan were maintained. The 2016 Disease Risk Report therefore encourages the relocation of the existing lower-flow sites to higher-flow areas.[293]

8.3 Marine Mammals

The 2011 Marine Mammals Report focuses on pinnipeds (NZ fur seal) and cetaceans (killer whale, Hector's dolphin, dusky dolphin, bottlenose dolphin, southern right whale, and humpback whales). All marine mammals are protected under the Marine Mammals Protection Act 1978.[294]

The 2011 Marine Mammals Report outlines that large whales do most of their foraging in cold, productive, high latitude water and generally fast when migrating, meaning that it is unlikely that large whales would choose to feed near salmon farms.[295] Southern right whales and humpback whales are more likely to travel alone (or with calf) and be at a greater risk of becoming entangled in drifting loose lines.[296] However, as marine farms are connected by taut moorings to the seabed, and moorings are designed, monitored and maintained to ensure they remain taut the finding of the 2011 Marine Mammals Report is that entanglement is unlikely.[297] Salmon farm incident reports to date support this finding.

The 2011 Marine Mammals Report also considers the effects of marine farm noise on marine mammals (particularly on dolphin feeding grounds), but considered that marine farm noise displacing dolphins is unlikely.[298] The presence of salmon farms may attract dolphins as their prey (school fish) are more likely to be around salmon cages due to night lighting and salmon feed.[299]

[292] Digfish (2016) Updated Disease Risk Assessment Report – Relocation of Salmon Farms in Marlborough Sounds, New Zealand, p. 34
[293] Digfish (2016) Updated Disease Risk Assessment Report – Relocation of Salmon Farms in Marlborough Sounds, New Zealand, p. 52
[294] M Cawthorn (2011) Marine Mammals and Salmon Farms, p. 1
[295] M Cawthorn (2011) Marine Mammals and Salmon Farms, p. 9
[296] M Cawthorn (2011) Marine Mammals and Salmon Farms, p. 9
[297] M Cawthorn (2011) Marine Mammals and Salmon Farms, p. 9
[298] M Cawthorn (2011) Marine Mammals and Salmon Farms, p. 9
[299] M Cawthorn (2011) Marine Mammals and Salmon Farms, p. 28

Overall the 2011 Marine Mammals Report concluded that it was highly unlikely that there would be any adverse effects on whales and dolphins as a result of new marine farms being established within the Marlborough Sounds.[300]

With regards to NZ fur seals, the 2011 Marine Mammals Report states that NZ fur seals are present throughout the Marlborough Sounds, and their numbers increase over winter as the seals seek more sheltered haul-out areas.[301] In general, the effect of seals on farms is greater than the effect of farms on seals. Seals will come to a salmon farm for the purpose of feeding and unless predator control is in place around farms will attempt to enter pens to catch the farmed salmon and establish non-breeding haul-outs nearby to enable them easy access to farms.[302] The potential is that seals become reliant on salmon farms as a form of sustenance and become 'less afraid' of humans and human activity in order to access farmed salmon.[303] The best way to manage this is to ensure that seals don't gain access to the salmon in pens and develop this sort of feeding habit.[304]

The 2011 Marine Mammals Report suggests a number of mitigation measures to reduce the ability of seals to get inside pens and to reduce any potential adverse effects on whales, dolphins and seals. These measures are now standard practice on NZ King Salmon farms.[305]

The 2016 Marine Mammals Update reviews the information and findings of the 2011 Marine Mammals Report, outlines relevant updated information and assesses the effects on marine mammals of relocating up to six existing salmon farm sites. The 2016 Marine Mammals Update largely agrees with the 2011 findings and recommendations but notes the following additional points:

- updated information on numbers and seasonality of marine mammals in the Marlborough Sounds is provided
- seal 'incidents' (any incursion into a farm, including entry into predator nets, grow-out nets, climbing onto structures) are outlined from 2014-2016. Four seal deaths have been recorded over this time period, out of a total of 313 seals involved in incidents
- continuing international development of polar circle pens for open sea conditions and improvements to net tensioning have reduced the incidence of seal attacks and dolphin entanglements, and the risk of using polar circles on the potential relocation sites is therefore not high
- if a farm is relocated, seals and to some degree dolphins are likely to follow the farm to its relocation site. Seals are likely to establish nearby haul-out sites in the vicinity of the potential relocation sites
- an additional farm in Tory Channel will increase the potential risk of some interaction with large whales, but the risk of a large whale blundering into a salmon farm remains very low. Dolphins and seals are unlikely to be affected
- the potential Waitata Mid-Channel site should not pose any risks to large whales as its location still provides for sufficient passing space for whales[306]
- a subjective (by necessity in the absence of long term systematic observational data) risk assessment concludes that all risks associated with the potential relocation of existing salmon farm sites will remain very low.

Overall, the 2016 Marine Mammals Update considers that the proposed farm relocations will have an insignificant effect on marine mammals.[307]

8.4 Fish

Pelagic fish are the main grouping of finfish species which inhabit the water column in the coastal marine area.

The 2011 Pelagic Fish Report is a literature review of the relationships between wild finfish species and farmed salmon, as well as assessments and conclusions drawn from fishing surveys and data from the Marlborough Sounds. International literature provides the most appropriate information, partly because

[300] M Cawthorn (2011) Marine Mammals and Salmon Farms, p. 28
[301] M Cawthorn (2011) Marine Mammals and Salmon Farms, p. 11
[302] M Cawthorn (2011) Marine Mammals and Salmon Farms, p. 12
[303] M Cawthorn (2011) Additional Information on NZ Fur Seal, p. 3
[304] M Cawthorn (2011) Additional Information on NZ Fur Seal, p. 4
[305] M Cawthorn (2011) Marine Mammals and Salmon Farms, p. 14
[306] M Cawthorn (2016) Marine Mammals Update, p. 19
[307] M Cawthorn (2016) Marine Mammals Update, p. 23

there is little existing New Zealand specific information relating to these interactions.[308] However, anecdotal evidence from Marlborough farms points toward similar species being present around New Zealand farms as the species present around overseas farms.[309] The 2011 Pelagic Fish Report generally concludes that the pelagic habitat in the Marlborough Sounds is likely to support productive populations of pelagic fish species,[310] with at least 49 different species of fish and sharks recorded in Pelorus Sound and Tory Channel, as outlined in Appendix E.[311]

Wild fish are attracted to finfish farms, often in higher densities than might exist if the farm was not there. For example, yellow-eyed mullet, pilchard, anchovy and jack mackerel have all been observed within the existing NZ King Salmon farms, although on a highly seasonal basis. There are several reasons wild fish are attracted to fish farms, including light, sound, sources of food (both other fish and waste feed from the farms) and the farm structure itself providing a refuge and protection from predators.

Generally, the effects on wild fish populations are related to feed loss, as feed not consumed by the farmed salmon is likely to be consumed by wild fish. Consumption of waste feed can change a wild fish's natural body composition – either increasing or reducing their reproductive fitness, depending on the quality of the waste feed in comparison to their natural diet. Overseas research has shown that increased body condition can increase egg numbers and size in affected fish (saithe and cod in the research undertaken), however, the potential for differences in the fatty acid composition of waste feed versus natural diets may affect egg quality. These effects on egg quality may mean that the increased body condition of wild fish associated with marine farms may not translate into a proportional increase in spawning success, but the exact effects have not been studied in detail to date.[312]

The best way to mitigate effects of waste feed on wild fish populations is to minimise the amount of waste feed discharged from the bottom of the farm's net pens. The amount of feed lost from a salmon farm is likely to vary significantly with location, current speeds and the technology used to provide feed and monitor feed loss. Overseas research suggests that between 1-4% feedloss may occur.[313] NZ King Salmon has used two different techniques to monitor feedloss at the existing Te Pangu and Ruakaka farms, and has concluded that feed loss is generally less than 0.1% at these farms,[314] which would suggests that any effect on wild fish populations from waste feed is likely to be low.[315] In addition, Taylor and Dempster note that wild fish can play a significant role in assimilating nutrient wastes emitted by salmon farms, through the consumption of waste feed. This effect is not included within deposition models such as DEPOMOD and suggests that these models may overestimate sedimentation rates of waste feed and therefore benthic effects.[316]

Other effects of waste feed consumption on wild fish include increased organohalogenated contaminants and heavy metal loadings. Existing evidence from the Marlborough Sounds suggests that if organohalogenated contaminants occur in the tissues of long-lived fish such as blue cod, snapper and spiny dogfish due to extended periods of residence in the vicinity of a salmon farm and feeding on benthic invertebrates underneath a farm, levels are likely to remain below those that would affect either the fish or make them unsuitable for human consumption.[317] Taylor and Dempster recommend monitoring of key contaminants of public health interest in long-lived, bentho-pelagic fish species of recreational, commercial or traditional fishing interest that reside in close proximity to salmon farms.[318]

[308] Taylor, P & Dempster, T. (2011) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 10
[309] Taylor, P & Dempster, T. (2011) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 12
[310] Taylor, P & Dempster, T. (2011) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 9
[311] Taylor, P & Dempster, T. (2016) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 7-8
[312] Taylor, P & Dempster, T. (2016) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 19
[313] Taylor, P & Dempster, T. (2016) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 18
[314] Taylor, P & Dempster, T. (2016) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 19
[315] Taylor, P & Dempster, T. (2011) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 2
[316] Taylor, P & Dempster, T. (2016) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 24
[317] Taylor, P & Dempster, T. (2016) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 23
[318] Taylor, P & Dempster, T. (2011) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 2

Fish feed may contain trace concentrations of mercury and other elements such as zinc, copper, cadmium, iron, manganese, cobalt, nickel and lead. Levels of these elements in current NZ King Salmon feeds are lower than current Australian and European Union standards. Taylor and Dempster identify that there is no consistent evidence that farmed salmon have elevated concentrations of any of these elements compared to wild salmon. In addition, the different diets and daily life of wild fish in the vicinity of salmon farms means that the heavy metal levels in farmed salmon cannot be used to infer likely levels in wild fish.[319] Of the various elements, mercury is of most concern. International research to date has not shown any adverse effects at the levels of mercury detected in wild fish, either in terms of effects on the fish themselves, or effects on human health from consumption.[320]

At least 14 species of sharks are known to occur naturally in the Marlborough Sounds, and 4 of these have been observed close to existing salmon farms. The most common of these is spiny dogfish, with common sightings of bronze whalers, and occasional sightings of blue shark and seven-gilled shark.[321] According to anecdotal information, shark mortalities from entanglement in nets or confinement in nets/pens are rare in New Zealand. Careful management approaches are required to minimise interactions between humans and sharks, and Taylor and Dempster recommend the adoption of best practices identified in South Australia in 2003 to achieve this.[322]

8.5 Lighting

This section of the summary AEE focuses on underwater lighting used to manage fish maturation. Above water lighting associated with navigation is addressed in sections 6 and 7.2.2 Landscape and Natural Character and 6 and 7.2.5 – Navigation, while the effects of lighting in relation to barges on the potential relocation sites are addressed in sections 6 and 7.2.2 Landscape and Natural Character.

Artificial lighting has a potential to affect biological processes within and adjacent to cage structures as it can directly affect the physical characteristics of the water column.[323] Potential ecological effects of underwater lighting can include:

- attraction of organisms such as zooplankton and larval fish to light causing accumulation of these species near and/or within farm structures
- effects on vertical migration of phytoplankton and zooplankton within the water column, and potentially enhanced settlement of organisms attracted by light onto the seabed near farm structures
- attraction of baitfish to the light causing aggregation near and/or within illuminated cages and increasing their visibility to predators – which could lead in turn to increased predation on baitfish by farmed salmon as well as fish and marine mammals (such as seals) outside the cages
- influences on the depth distribution of salmon – increased densities at particular depths could increase the risk of parasitism
- potentially, attraction of birds, resulting in an increase in collision or entanglement risk.[324]

Adverse effects are likely to be highly localised with organisms along the seabed or more than 10-20m from the lighting not being adversely affected.[325] As a result, the 2011 Lighting Report found that the effects of submerged lighting would be no more than minor in terms of the physical effects on the underwater light environment and subsequent biological and ecological (food web) effects.[326] Surveys carried out at the Clay Point and Te Pangu farms revealed no measurable effect on larval fish, and any potential effects on zooplankton were considered likely to be overshadowed by factors other than light, such as tidal currents. No adverse effects on animals such as seabirds and seals were observed during

[319] Taylor, P & Dempster, T. (2016) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 21
[320] Taylor, P & Dempster, T. (2016) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 23
[321] Taylor, P & Dempster, T. (2016) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 26
[322] Taylor, P & Dempster, T. (2016) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 27
[323] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Submerged Artificial Lighting, Report No. 1982, p. 1
[324] Cawthron Institute (2016) Assessment of Environmental Effects of Underwater Lighting for Salmon Farm Relocation Sites, p. 2
[325] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Submerged Artificial Lighting, Report No. 1982, p. 3
[326] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Submerged Artificial Lighting, Report No. 1982, p. 14

the surveys. Baitfish and squid were observed within illuminated pens, potentially due to light attraction.[327]

The 2016 Lighting Update refers to the 2011 Lighting Report and assesses the potential environmental effects of underwater lighting at the potential relocation sites. The 2016 Lighting Update considers that no significant new findings related to the environmental effects of underwater lighting have emerged since 2011, meaning that the findings of the 2011 Lighting Report are still relevant.[328] The 2016 Lighting Update notes that it is likely that there will be some variation in the effects from underwater lighting between the existing lower-flow sites and the potential higher-flow sites. For example, the attractant effects of lights at higher-flow sites would be mitigated by the high current speeds making it difficult for small organisms such as zooplankton to maintain position in close proximity to lights. The level of effects at the potential higher-flow sites is therefore likely to be small and limited to enhanced attraction and aggregation of some organisms, such as baitfish, during night hours within the pens.[329]

Additional considerations to those outlined above relate to biosecurity and the possibility of enhanced risk of disease transmission and spread due to underwater lighting. As some wild fish species may be attracted to lighting, there may be an increased risk of exposure to, transmission and spread of diseases from farmed salmon to wild fish within and around the illuminated sea pens, when comparing this to unlit pens. The relocation of farms to higher-flow areas, combined with biosecurity management best practices, will mitigate risk factors for the emergence of infectious diseases,[330] and should therefore reduce the risk of disease exposure and transmission. There are also possible effects related to fish parasites, such as sea lice, as the use of artificial underwater lighting adds a low risk of host switching for sea lice and infection of the non-native salmon. If farmed salmon were to become a new host, they in turn would present some risk in spreading infections to wild fish. However, this risk is considered low as the surrounding currents will play a larger role in driving zooplankton distribution than artificial lighting, and there is an apparent low susceptibility of salmon to sea lice and an absence of observed occurrences of sea lice associated with farmed salmon in New Zealand (such as at the existing Te Pangu and Clay Point sites).[331]

8.6 Greywater Discharges

At the existing NZ King Salmon farms, the discharge of greywater is a permitted activity under the Marlborough Sounds Resource Management Plan, meaning that no consent has been obtained in the past, nor has any monitoring or data collection relating to greywater discharges from the farms been undertaken.[332] The conclusions therefore made as part of the assessment of effects are based on literature for greywater characterisation, with supplementary site-specific information supplied by NZ King Salmon such as staff numbers on each farm and likely water usage.[333]

It is estimated that the daily production of greywater per person is 100 litres. Typical greywater can have relatively high concentrations of biochemical oxygen demand, chemical oxygen demand, total suspended solids and faecal coliforms.[334] While NZ King Salmon farms can be expected to produce greywater with lower contaminant concentrations due to the use of biodegradable cleaners and hygiene products with lower levels of contaminants on the farms, typical concentrations can be used to predict a potential worst case effect.

Based on the above assumptions, the 2011 Greywater Report predicted that the likely environmental effects of greywater discharges from NZ King Salmon farms would not be significant due to the volume, concentration and rate of discharge into a very large expanse of free-flowing water.[335] Furthermore, the report notes that NZ King Salmon has the ability to reduce effects further by using more environmentally

[327] Cawthron Institute (2016) Assessment of Environmental Effects of Underwater Lighting for Salmon Farm Relocation Sites, p. 3
[328] Cawthron Institute (2016) Assessment of Environmental Effects of Underwater Lighting for Salmon Farm Relocation Sites, p. 3
[329] Cawthron Institute (2016) Assessment of Environmental Effects of Underwater Lighting for Salmon Farm Relocation Sites, p. 3
[330] Cawthron Institute (2016) Assessment of Environmental Effects of Underwater Lighting for Salmon Farm Relocation Sites, p.3
[331] Cawthron Institute (2016) Assessment of Environmental Effects of Underwater Lighting for Salmon Farm Relocation Sites, p.4
[332] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Greywater, Report No. 2021, p. 6
[333] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Greywater, Report No. 2021, p. iii
[334] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Greywater, Report No. 2021, p. 3-4
[335] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Greywater, Report No. 2021, p. 16

friendly detergents and products on the farms and reusing greywater for toilet flushing (which is then removed off-site rather than discharged into the coastal marine area).[336]

The 2016 Greywater Update agrees with the findings of the 2011 Greywater Report and supports the conclusions made. The 2016 Greywater Update also notes that as the relocation sites are considered to have higher-flows than the existing sites, the environmental effects of greywater discharges at the potential relocation sites would likely be less due to the more dispersive, higher-flow environments of the relocation sites.[337]

8.7 Copper and Zinc

Both copper and zinc are metals that occur naturally in the environment. They are essential trace nutrients required at low concentrations by nearly all organisms. However, toxic effects can occur where these metals are concentrated in biologically available form at higher concentrations. The principal routes by which copper and zinc can enter the marine environment through salmon farming include: leaching from anti-fouling paint on the surfaces of structures or deposition of paint particulates (copper and some zinc depending on the paint formula); with the release of uneaten food (mainly zinc); and feed eaten by farmed fish and subsequently released in their faecal waste (mainly zinc).[338]

There are a number of potential environmental issues with respect to copper and zinc:

- accumulation of copper and zinc in the sediments beneath and surrounding farms to concentrations which result in a toxic effect on benthic communities;
- persistence of elevated sediment metal concentrations (over significantly longer time-frames than for organic enrichment effects) with potential adverse effects on benthic communities and implications for future site recovery;
- increases in water column concentrations of dissolved copper and zinc to levels which result in a toxic effect to pelagic and demersal biota;
- bioaccumulation of copper and zinc within marine organisms; and
- effects on reef communities in the vicinity of farms either from direct (water column) or indirect (e.g. food web) mechanisms.[339]

By relocating the lower-flow sites to higher-flow sites the potential adverse effects of copper and zinc discharge will be reduced because of the more dispersive, higher-flow environment.[340] The Copper and Zinc Report recommends that sediment concentrations of copper and zinc be the focus of environmental monitoring which will be in the form of an Environmental Monitoring and Adaptive Management Plan. There will also be changes in feed composition or volume to reduce the amount of zinc in feed. Changes in operational practice (net cleaning or handling, use of alternatives to copper-based antifouling) to limit discharge of paint particulates have also occurred recently.[341] The effects of copper and zinc discharges are anticipated to be no more than minor.

8.8 Policy Issues

Specific policies in relation to the matters discussed above do not occur frequently in the planning documents. Some key policies are identified in the table below.

[336] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Greywater, Report No. 2021, p. 17
[337] Cawthron Institute (2016) Greywater Assessment for Salmon Farm Relocation Sites (Letter), p. 3
[338] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Copper and Zinc, p.1
[339] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Copper and Zinc, p.4
[340] Cawthron Institute (2016) Addendum to Assessment of Effects of Copper and Zinc for Salmon Farm Relocation Sites, p. 7
[341] Cawthron Institute (2011) The New Zealand King Salmon Company Limited: Assessment of Environmental Effects – Copper and Zinc, p. 45

Table 8-1: Summary of policy issues identified for non-site specific environmental effects

Issue	Examples of relevant provisions	Initial assessment
Biosecurity	NZCPS Policy 12 – controlling activities that could result in harmful organisms being released or otherwise spread pMEP Policy 8.3.5 – avoid, remedy or mitigate changes that result in increased threats from pests on indigenous biodiversity	A biosecurity benefit has been identified with the relocation proposal resulting in salmon farms in the Sounds being clustered into two separate geographic areas. A biosecurity management plan would be required in order to manage biosecurity risks of any potential relocation site.
Marine mammals	pMEP Policy 8.3.5 – avoid, remedy or mitigate impacts on breeding, feeding or haul out areas for marine mammals	The marine mammals assessment notes that seals are likely to relocate and establish new haul out areas in the vicinity of relocated salmon farms. Dolphins may also relocate to take advantage of fish species attracted to relocated farms. A marine mammal management plan would be required in order to manage any potential effects on feeding or haul-out areas, and to outline procedures in the event of marine mammal interactions such as entanglement or accidental entry to the sea pens.

Policies relating to indigenous biodiversity will also be relevant to effects on marine mammals and fish. Policies relating to water quality will be relevant to the consideration of greywater discharges.

9 Potential Cultural Effects

Maximize Consulting has initiated a Cultural Impact Assessment (CIA) with local iwi on behalf of MPI. Consultation with tangata whenua is ongoing, but a summary to date has been provided by Maximize Consulting and is outlined below.

9.1 Limitations

a) Consultation and engagement with mana whenua, mana moana, tāngata whenua as part of the CIA preparation is ongoing and new issues may emerge.

b) General issues with respect to salmon farming have been well canvassed and expressed through the immediate past NZ King Salmon applications. These general issues and opportunities are discussed below followed by some site specific issues and opportunities.

c) Not all mana whenua, mana moana, tāngata whenua consider or weight every issue or opportunity noted in this section and/or share all the views noted in this section. However, general issues and opportunities are not ascribed to any particular mana whenua, mana moana, tāngata whenua group but used to build up an overall picture of issues and opportunities relevant to this project.

d) Site specific matters require further discussion with the relevant mana whenua, mana moana, and tāngata whenua group(s).

9.2 Summary

The issues and opportunities identified in the literature review and initial round of hui are listed below (NOTE: the term ‘iwi’ is used to include mana whenua, mana moana, and tāngata whenua hapū and iwi in the area).

a) Timeframes, process: A number of iwi highlighted that the time to go through any information provided was too limited. Most noted that they had internal processes to follow in order to confirm a

position with respect to matters such as this project and would be unable to respond in the initial timeframe.

b) Desire to engage directly with MPI: Some iwi expressed a preference to work directly with MPI, including preparing their own CIA, rather than engage fully in an externally facilitated process. Others were comfortable with external involvement, while others preferred a hybrid where an externally prepared CIA was undertaken and the iwi provided more detailed, site specific information.

c) Cultural issues: Cultural issues are a significant area of concern for iwi who have generally noted that their relationship with the coastal and marine environment is of the utmost importance in terms of maintaining relevant customs and traditions associated with the sea. These concerns include, but are not limited to:

- Kaitiakitanga – This project may risk undermining the ability of iwi to undertake kaitiakitanga responsibilities.
- Customary uses and practices – on, in and under the coastal and marine environment. These customary uses and practices are wide ranging and partially explored below.
- Mahinga kai – The project may impact on mahinga kai practices, in an area that has been an Iwi 'food basket' for generations.
- Manaaki tangata – Any activity should be avoided that undermines the ability for Iwi to show hospitality to others, through impacting on or depleting kai resources, would severely impact on the mana/reputation of generations.
- Taonga species – Anything that could impact the mauri of taonga species (e.g. kawau [King Shag], aihe [dolphin], pāua, kōura, kina, and a variety of fish species) should be avoided.
- Traditional and contemporary waka routes – for many, the regular or migratory navigation routes that tūpuna took are important and worthy of preservation. Any use of these traditional and contemporary routes for anything other than waka navigation needs to be carefully considered.

d) Access to waterways: This project may diminish opportunities for acquisition of mooring and access to important areas. Ongoing access to their food basket is critical for iwi identity, customary uses and practices, and ability to manaaki tangata.

e) Te mauri o te wai, water quality: The mauri, or vital life essence and life supporting capability, of the coastal and marine environment is extremely important to iwi. Te mauri o te wai needs to be maintained in perpetuity to sustain and support the coastal and marine environment and abundance of indigenous species.

f) Other ecosystem, environmental effects (including benthic environment): Closely linked to water quality are other environmental effects, including the effect on the benthic environment. Relative to a more natural distribution of fish, there is concern at the concentration of fish in a marine farming context with the accompanying faeces, litter and food requirements and any associated impact on the natural marine biodiversity.

g) Site establishment, disestablishment: Iwi are keen to avoid adverse effects from site establishment and disestablishment and would like to fully understand the rationale for relocating sites, including any community, social and/or political reasons for potential relocation. Some iwi are keen to consider alternative uses for sites that may no longer be used for salmon farming (e.g. other types of marine farming), subject to suitably addressing the effects of any alternative use.

h) Cumulative effect: There is a concern at the cumulative effect of establishing/disestablishing salmon farms, particularly in the context of other activities contributing to the decline of the marine environment. It is insufficient to consider the effects of the establishing/disestablishing farms in isolation of the receiving environment in which these activities occur.

i) Commercial fisheries, effect on aquaculture settlement: Iwi are keen to understand what, if any, impact this project has on their commercial fisheries interests, including the aquaculture settlement, and to ensure that those commercial interests are at least protected. Additionally, there appears no formal opportunity for iwi to participate in or substantively benefit from the results of this project's investigations. This project appears to give NZ King Salmon an unfair advantage over iwi and iwi wish to ensure that this project does not create any further Treaty grievances or breaches for current or future generations to address.

j) Monitoring and review: Iwi are aware that best practice changes over time with advances in knowledge and technology. Monitoring will only be effective if there is an opportunity to review farm operation in the event that it shows less than optimal farm operation. Iwi expect to be involved in any monitoring and to be able to influence any review of farm operation, update to *Benthic Guidelines*, and/or ensuring

compliance with the *Benthic Guidelines.* If not already included, updating the guidelines could also consider mātauranga Māori practices.

k) Opportunities for formal collaboration: Some iwi have varying degrees of interest in exploring opportunities for commercial partnership and/or collaboration. This may also extend to direct investment in a site(s). Some iwi consider it timely to review current and future formal relationships with NZ King Salmon.

l) Site specific issues: that have arisen to date are listed below:

- *General site issues:* Iwi may have specific reasons why one site should be preferred over another site for relocation or disestablishment and this will need to be discussed with iwi further.
- *Site F Ruakaka in Tōtaranui:* Te Ātiawa contend that Ruakaka (Site F) should remain unless there is a compelling reason to dis-establish that site.
- *Site G Otanerau:* Subject to satisfying its concerns, Te Ātiawa were in favour of first removing the Ōtānerau site (Site G).
- *Site 34 in Te Hoiere:* Ngāti Kuia have advised that this site is near a wāhi tapu/site of significance for Ngāti Kuia.
- *Site 42 – Tipi Bay:* This bay was once the site of whaling operations in the area and the future use of this site for salmon farming needs to be discussed further with iwi.
- *Site 47 – Moioioi Island:* Rangitāne advise that Moioioi Island was first inhabited during Ngāi Tara Rangitāne 'fish hook wars' with Ngāi Tahu and there is an urupā in the area.

9.3 Policy Issues

- NZCPS Objective 3 – seeks *inter alia* to recognise and protect characteristics of special value to tangata whenua (MSRMP Policy 6.1.2.1.2 seeks the same).
- NZCPS Policy 2 – take into account the Treaty of Waitangi, recognise the relationship of tangata whenua with the coastal environment, provide opportunities for tangata whenua involvement and take into account a number of matters.
- MSRMP Objective 6.1.2.1 and pMEP Objective 3.3 – recognise and provide for the relationship of tangata whenua with their ancestral lands, waters, sites, waahi tapu and other taonga.
- pMEP Policy 3.1.3 – lists matters decision makers must ensure in relation to effects on the relationship of tangata whenua with their culture and traditions.

Consultation with tangata whenua in relation to cultural values is ongoing – the initial identification of values through cultural impact assessment outlines a number of areas that will need to be considered to ensure the proposal is consistent with the policy framework.

10 Potential Economic Effects

If the six existing lower-flow farm sites were relocated to higher-flow sites, salmon farming would be able to continue at a level of production that would both meet the Benthic Guidelines and continue to deliver significant economic benefits to the community and the Nelson and Marlborough regional economies. Due to the characteristics of the potential relocation sites, farm productivity could be increased while remaining within the environmental limits in the Benthic Guidelines, which would have positive economic impacts. Conversely, salmon farming at the existing lower-flow farm sites in compliance with the Benthic Guidelines would be likely to lead to a decrease in production, with potential negative economic impacts.

PricewaterhouseCoopers (PwC) has been commissioned to undertake an economic analysis to identify likely economic impacts of changes to management of the six existing lower-flow sites, both from swapping sites and from adopting the Benthic Guidelines at each site. The analysis was undertaken using standard input-output analysis using multipliers, and based on data from Statistics New Zealand. Inputs for the analysis were sourced from financial information provided by NZ King Salmon, and from Benthic Guideline compliance information from the Cawthron Institute. Additional data was sourced from the PwC Regional Industry Database.

The analysis has found that 100 tonnes of new net annual salmon production would be expected to lead to approximately $0.45 million in increased Gross Domestic Product (GDP) in the Nelson and Marlborough regional economy, and would support approximately 4.7 FTEs annually.[342] If a direct site-for-site swap was undertaken, without any increased production at the potential relocation sites, the effect on GDP and FTEs is likely to be neutral. As an exact site swap has not yet been defined, and final limits on benthic and water quality effects (which can only be done through adaptive management once consents are granted and the sites initially established) are not known, a total increase in GDP and FTEs as a result of the potential relocation proposal cannot be defined currently. Once the final potential relocation sites are known and the initial feed levels defined, an initial net economic impact will be able to be calculated.

While the total increased GDP and FTEs from operational impacts of the proposal is difficult to calculate currently, the economic impacts of the construction of infrastructure for one potential relocation site can be calculated with more certainty. Assuming that components and supplies for the farm construction are supplied locally, the construction of the infrastructure required for a potential relocation site would produce a one-off GDP impact of approximately $3.2million for the Nelson and Marlborough economy. Construction activities for each site would support approximately 39 FTEs for the region for a year. The total economic impacts of the proposal can then be calculated based on the number of potential relocation sites following public consultation and advice to the Minister for Primary Industry exercising aquaculture responsibilities. If components for the farms are sourced from overseas, the contribution to the local economy would be reduced.[343]

PricewaterhouseCoopers has also analysed the economic effects of operating the existing lower-flow farm sites to comply with the Benthic Guidelines compared to their current operation. The analysis has shown that operating the six existing lower-flow sites as they are currently operated,[344] and without complying with the Benthic Guidelines would provide an estimated annual GDP of $10 million and support an estimated 105 FTEs.[345]

By contrast, by both changing the current operational model[346] and operating the sites to comply with the Benthic Guidelines, GDP of $8.2 million (if lower feed discharge levels are required to comply with the Benthic Guidelines) to $18 million (if higher feed levels are possible) could be obtained and approximately 86 – 188 FTEs could be supported.

However, the economic impacts of operating in compliance with the Benthic Guidelines need to be considered in the context of the commercial viability of the existing lower-flow sites. Both the minimum and maximum feed levels assessed for compliance with the Benthic Guidelines represent a decrease in feed levels at Otanerau and Ruakaka. These decreases affect the commercial viability of the existing lower-flow farm sites, with NZ King Salmon advising that the Otanerau site would only be commercially viable at close to the maximum feed level for compliance with the Benthic Guidelines, and Ruakaka and the two Crail Bay sites not being commercially viable under either scenario. NZ King Salmon has also advised that the Waihinau and Forsyth sites would not be able to operate at the maximum feed level for compliance with the Benthic Guidelines due to potential high mortality levels in summer, and would therefore have to continue to be operated as they currently are.[347]

If the maximum feed levels for compliance with the Benthic Guidelines are possible and commercial viability of the existing lower-flow sites is considered, PricewaterhouseCoopers estimates that the annual GDP generated from the sites would be $6.4 million and that 67 FTEs would be supported, which represent an estimated loss of $3.6 million in annual GDP and 38 FTEs compared to the current operation of the existing lower-flow sites.

Overall, economic impacts will be able to be calculated with some more certainty after the public consultation and the confirmation of sites to be included in the relocation proposal.

[342] PricewaterhouseCoopers (2016) Marlborough Salmon Relocation – Economic Impact Assessment, p.6
[343] PricewaterhouseCoopers (2016) Marlborough Salmon Relocation – Economic Impact Assessment, p.6
[344] Current operations have the Forsyth and Waihinau sites operated together and production swapping from one site to the other, and the two Crail Bay sites not currently being operated.
[345] PricewaterhouseCoopers (2016) Marlborough Salmon Relocation – Economic Impact Assessment, p.6
[346] By operating the two Crail Bay sites, and by operating the Forsyth and Waihinau sites separately with full levels of production occurring on both sites at the same time
[347] PricewaterhouseCoopers (2016) Marlborough Salmon Relocation – Economic Impact Assessment, p.24

11 The Proposal

This section outlines potential changes to the Marlborough Sounds Resource Management Plan that could be made if the potential relocation proposal goes ahead.

Please note: The potential amendments have been prepared as if all six potential relocation sites will go ahead. The decision about how many potential relocation sites will proceed will not be made until after public consultation on the proposal. If fewer than six potential relocation sites are confirmed, the amendments to the Marlborough Sounds Resource Management Plan will be adjusted to reflect this.

Please note: The public consultation process provides an opportunity for the public to comment not only on each of the potential relocation sites, but also on the potential amendments to the Marlborough Sounds Resource Management Plan for any relocation sites. Feedback on any of the provisions outlined in section 11.1 is therefore welcome.

11.1 Potential Changes to the Marlborough Sounds Resource Management Plan

In the material that follows, changes are shown as underlined when they are new text to be inserted in the Marlborough Sounds Resource Management Plan, and as ~~struckthrough~~ when they show text to be deleted. As Appendices D4, D5 and D6 would be wholly new appendices to the Plan, for ease of reading the text has not been shown as underlined.

The potential amendments can be broadly categorised as:

- Changes to the planning maps to reflect new zoning at potential relocation sites
- Additions and deletions to Chapter 9
- Additions to Chapter 35
- A new Chapter 35B
- New appendices D4, D5, D6 and D7[348]

Planning maps:

- change the CMZ 1 or CMZ 2 zoning at each of the potential relocation sites to CMZ4

Chapter 9: Coastal Marine:

9.2 Issue

Restriction of public access to the coastal marine area due to the private occupation of coastal space.

…

The marine farm industry that has developed in the Marlborough Sounds is of significant value to the nation in terms of export earnings, and also to the region in terms of the employment and income flows that are derived from the industry. A substantial infrastructure involving processing facilities, ports, harvesting vessels and a multitude of other services has developed based on the marine farm industry and Sounds communities have been revitalised as a result of the development of the industry. All of that infrastructure is reliant upon marine farming which utilises the coastal marine area. The provisions of the Plan recognise that to maintain the strength of the industry, generally it is essential for resource consents to be able to be renewed to continue those marine farming activities. ~~In addition, expansion~~ of the salmon farming industry has been enabled in three locations where the Plan provides for the establishment of new marine farms for salmon, where adverse environmental effects can be satisfactorily avoided, remedied or mitigated. In addition, relocation of existing salmon farm sites from areas of low water flow to deeper areas with higher water flows has been provided for, subject to comprehensive management of potential adverse effects on the environment.

…

In addition, ongoing research is constantly occurring as to other means of aquaculture production involving species other than the present predominant species of mussels and it is possible that some other species may involve lesser effects on the environment through having less visible surface structures. The current Plan provisions are based on the predominant bi-valve marine farm structures. It

[348] Note that Appendix D7 will provide new planning maps for each of the CMZ4 sites, which will be prepared once any potential relocation sites are confirmed.

may become necessary for those provisions to be re-addressed by plan change as has been achieved for ~~three~~ sites for the salmon farming industry.

9.2.1 Objectives and Policies

…

Policy 9.2.1.1.17:

Enable the marine farming of salmon by:

a) identifying three appropriate sites in the Plan as Coastal Marine Zone 3, where salmon farming is a discretionary activity;

b) providing for the relocation of the following salmon farm sites from low flow areas to appropriate higher flow sites zoned as Coastal Marine Zone 4 in the following priority order (with 1 being the highest priority site to relocate from):

1. Ruakaka
2. Otanerau
3. Waihinau
4. Forsyth Bay
5. Crail Bay MFL48
6. Crail Bay MFL32

…

Policy ~~9.2.1.1.15~~ 9.2.1.1.17 recognises that three sites have been specifically identified to provide for salmon farming, after being assessed as appropriate locations. These sites are zoned in the Plan as Coastal Marine Zone 3. A further six sites have been identified as providing better environmental conditions for salmon farming than the six existing sites listed in the policy. These new sites have been zoned in the Plan as Coastal Marine Zone 4.

9.2.2 Methods of Implementation

Zoning	The coastal marine area is incorporated into ~~three~~ four coastal marine zones (except for port and marina areas). The limits of the Coastal Marine Zones align with the boundary of the coastal marine area, being the: outer limits of the territorial sea; and the line of mean high water springs and where the line crosses a river, as agreed between the Minister of Conservation and the Council in the Memorandum of Agreement dated 4 December 1995 or any subsequent amendments to that agreement. Rules have been incorporated to control activities and structures in these zones. In Coastal Marine Zone 1 the Plan identifies those zones where marine farms are prohibited in accordance with Policies 9.2.1.1.1 and 9.2.1.1.6. These areas are identified as being where marine farming will have a significant adverse effect on navigational safety, recreational opportunities, natural character, ecological systems, or cultural, residential or amenity values. In Coastal Marine Zone 3 and Coastal Marine Zone 4, the Plan identifies ~~three~~ appropriate sites to provide for the development of salmon farming in accordance with Policy ~~9.2.1.1.15~~ 9.2.1.1.17. In addition to the ~~three~~ four coastal marine zones the Plan identifies particular zones for the following activities: • Port and harbour activity; and • Marina activity. Such areas are managed for these activities.
Rules	Rules and resource consents generally provide for activities which require coastal space where the adverse effects of occupation are

avoided, remedied or mitigated in terms of the assessment criteria and standards identified.

Within Coastal Marine Zone 2 out to 50 metres from mean low water mark, and beyond 200 metres from mean low water mark, marine farms are non-complying activities. In those areas marine farming involving fin fish farming may be appropriate and it is recognised that consent may be granted by a resource consent application.

Coastal Marine Zone 4 has been established primarily to provide a mechanism to relocate existing salmon farms from areas of low water flow to deeper areas with higher water flows. In order to ensure that coastal space at existing salmon farm sites is surrendered when applications are made for consents for space within Coastal Marine Zone 4, an allocation rule has been included in Chapter 35B of the Plan.

Rules enable the use of the coastal marine area for defence purposes.

Moorings within the Mooring Management Area are managed via the resource consent process as a restricted discretionary activity as the default management process, unless a Bylaw is in place which provides an alternative management framework.

…

Three specific sites appropriate for new salmon farms have been identified in the Coastal Marine Zone 3. Six specific sites for relocation of existing salmon farms from areas of low water flow have been identified in Coastal Marine Zone 4.

9.3 Issue

Adverse effects of activities on the natural and physical resources of the coastal marine area.

9.3.2 Objectives and Policies

…

Policy 9.3.2.1.12

Salmon farming in the Marlborough Sounds will be managed to achieve the following additional water quality outcomes in the water column:

a) To not cause an increase in the frequency, intensity or duration of phytoplankton blooms (i.e. chlorophyll-*a* concentrations greater than or equal to 5 mg/m^3)

b) To not cause a change in the typical seasonal patterns of phytoplankton community structure (i.e. diatoms vs. dinoflagellates), and with no increased frequency of harmful algal blooms (HABs) (i.e. exceeding toxicity thresholds for HAB species)

c) To not cause reduction in dissolved oxygen concentrations to levels that are potentially harmful to marine biota

d) To not cause elevation of nutrient concentrations outside the confines of established natural variation for the location and time of year, beyond 250m from the edge of the net pens

e) To not cause a statistically significant shift, beyond that which is likely to occur naturally, from an oligotrophic/mesotrophic state towards a eutrophic state

f) To not cause an obvious or noxious build up of macroalgal (e.g. sea lettuce) biomass.

Chapter 35 Coastal Marine Zones ~~One, Two and Three~~

35.3.3 Marine farms for the farming of salmon within Coastal Marine Zone Four

Marine farms and marine farming of salmon on the following sites in Coastal Marine Zone Four:

Blowhole North

Blowhole South

Waitata mid-channel

Richmond Bay South

Horseshoe Bay

Tio Point

are Limited Discretionary Activities[349] provided the activities are as described in 35.3.3.1.

In terms of this Rule, marine farms and marine farming shall include:

a) All structures, activities in the coastal marine area, occupation of the common marine and coastal area, disturbance of or damage to the foreshore or seabed, deposition on the foreshore or seabed, and other ancillary activities and structures, associated with marine farms and marine farming of salmon;

b) All discharges to water or air associated with marine farms and marine farming of salmon, but excluding the discharge of human sewage;

c) The taking and use of coastal water associated with marine farms and marine farming of salmon.

35.3.3.1 Requirements[350]

a) An application shall be lodged pursuant to Rule 35B.2.1.2 for a coastal permit to occupy the site at the same time that any application is lodged under this rule.

b) The consent holder shall comply with all the standards[351] listed in Appendix D4, which include requiring the preparation and implementation of a Baseline Plan and Baseline Report prior to any structure placement and, once the marine farm is operational, an annual Marine Environmental Monitoring – Adaptive Management Plan and an Annual Report. The draft documents will be subject to peer review and approval by the Council.

c) Notwithstanding section 135(1)(a) of the Resource Management Act 1991, the consent holder shall not transfer any part of the consent holder's interest in a coastal permit to any other person without the written approval of the Council. The Council will satisfy itself that the transferee is capable of complying with the standards in the plan and coastal permit relating to the marine farm before approving the transfer.

35.3.3.2 Matters To Which Discretion is Limited

The Council may grant or decline the coastal permit application for a marine farm and marine farming of salmon at a Site in Coastal Marine Zone 4 and, if granted, impose conditions only in respect of the following matters to which the Council has limited its discretion:

a) Effects on values in the coastal environment that are of significance to tangata whenua.

b) The layout, positioning and operation of structures within the Site:

- to ensure continued reasonable public access (including recreational access) in the vicinity of the marine farm;

[349] The Resource Management Act 1991 classifies activities into types – permitted, controlled, restricted discretionary, discretionary, non-complying and prohibited – as described in section 87A. For the avoidance of doubt, a Limited Discretionary Activity in the Marlborough Sounds Resource Management Plan is a restricted discretionary activity under section 87A of the Resource Management Act 1991.

[350] For a restricted discretionary activity, section 87A of the Resource Management Act 1991 states that the activity must comply with the requirements, conditions and permissions, if any, specified in the plan.

[351] For the avoidance of doubt, 'standards' as specified in the Marlborough Sounds Resource Management Plan are 'conditions' under section 87A of the Resource Management Act 1991.

- to address navigational safety, including the provision of navigation warning devices and signs.

c) Structural safety and security of the structures, including the anchoring systems.

d) In support of b) and c), the preparation and contents of one or more plans to be approved by the Council and implemented by the consent holder dealing with the matters in b) and c) at the design, establishment, and operation stages of the development of the marine farm.

e) Effects on water quality caused by a marine farm and marine farming of salmon at Tio Point, particularly on embayments.

f) Definition of the extent of the Zone of Maximum Effects (ZME) and the Outer Limit of Effects (OLE) (consistent with any guidelines established for the management of the benthic effects of salmon farming) for the purposes of ensuring compliance with benthic quality standards.

g) Except at Tio Point, the preparation and contents of a King Shag Management Plan (including a response mechanism if there is a decline in King Shag numbers) which has the objective of avoiding adverse effects of the marine farm on King Shag, being an indigenous taxa listed as threatened in the New Zealand Threat Classification System.

h) The preparation and contents of other management plan(s) as considered desirable by the Council and to be implemented by the consent holder, taking into account the following five management plans which are provided for in Appendix D4, existing management plans for other marine farms operated by the same consent holder and whether they may be amended or amalgamated to cover the required subject matter:

- Marine Mammal and Shark Management Plan
- Biosecurity Management Plan
- Residential Amenity Management Plan
- Wildlife Nuisance Management Plan
- Solid Waste Management Plan.

i) The duration, lapsing and transfer of the coastal permit.

j) Review of coastal permit conditions, including to give effect to any best management practice guidelines for salmon farms in the Marlborough Sounds.

k) Monitoring and reporting requirements.

l) Administrative charges, including any coastal occupation charges.

35.3.3.3 Applications for resource consent under Rule 35.3.3 will be not be publicly notified.

35.4 Discretionary Activities

Application must be made for a Discretionary Activity for the following:

- Any activity listed as a Permitted Activity and either adversely affecting or being affected by any hazard area identified on the Planning Maps as a hazardous area;
- Activities listed as Permitted or Controlled Activities, which do not comply with the Standards specified for those activities, other than marine farms specified as Limited Discretionary Activities in Rule 35.3.1, or swing moorings specified as Limited Discretionary Activities in Rule 35.3.2;
- Commercial activities;
- Discharge of human sewage;
- Discharges to air;
- Discharges to water;
- Occupation of the coastal marine area;
- Structures in the coastal marine area used in the petroleum and chemical industry;

- Disturbance of foreshore and/or seabed, including removal of sand, shingle, shell or other material;
- Marine farms in Coastal Marine Zone Two complying with the standards specified in Rule 35.4.2.9 other than marine farms specified as Controlled Activities in Rule 35.2.5, or Limited Discretionary Activities in Rule 35.3.1;
- Marine farms previously authorised for the farming of species other than salmon in Coastal Marine Zone Four complying with the standards specified in Rule 35.4.2.10A;
- Marine farms in Coastal Marine Zone 1 which are listed in Appendix D2;
- Placement of swing moorings outside Waikawa Bay;
- Swing moorings in Waikawa Bay outside of the Mooring Management Areas and which were either consented to prior to this rule becoming operative or which are for providing access to immediately adjoining properties in Waikawa Bay;
- Reclamation;
- Structures in the coastal marine area more or less parallel to mean high water springs;
- Structures in the coastal marine area oblique or perpendicular to mean high water springs;
- Structures which impound or effectively contain the coastal marine area; and
- Use of surface water within the National Transportation Route
- Marine Farms and Marine Farming in Coastal Marine Zone Three complying with the standards specified in Rule 35.4.2.10.

35.4.2.10A Marine farms for species other than salmon in Coastal Marine Zone Four

Marine farms for the farming of species other than salmon where the marine farm is authorised by a current Coastal Permit as at 16 January 2017, provided that the activity conforms to the following standards.

Standards

a) The standards as listed under Rule 35.4.2.9.

35.4.2.10A.1 Assessment Criteria

35.4.2.10A.1.1 The assessment criteria are those listed under Rule 35.4.2.9.1.

35.4.2.10A.2 Terms

The terms are those listed under Rule 35.4.2.9.2.

35.5 Non-Complying Activities

- Any activity other than a Prohibited Activity which is neither a Permitted, Controlled, or Discretionary Activity shall be deemed to be a Non-Complying Activity;
- Deliberate introduction of exotic or introduced plants into the coastal marine area;
- Depositing material on the foreshore or seabed;
- Discharges to the coastal marine area;
- Marine farms within Coastal Marine Zone Two other than marine farms specified as Controlled Activities in Rule 35.2.5 or Limited Discretionary Activities in Rule 35.3.1 or Discretionary Activities pursuant to Rule 35.4:
  a) inside a line drawn 50 metres from mean low water mark at right angles to a line normal to the nearest part of mean high water mark; or
  b) beyond a line drawn 200 metres from mean low water, at right angles to a line normal to the nearest part of mean high water mark (refer Figure 35.1: Measurement of Marine Farm from Shore).
- Marinas within Waikawa Bay which are located outside the Marina Zone.
- Residential Activity;
- Structures in the coastal marine area more or less parallel to mean high water springs;
- Structures in the coastal marine area oblique or perpendicular to mean high water springs;
- Structures in the coastal marine area used in the petroleum and chemical industry;

- Structures which impound or effectively contain the coastal marine area; and
- Subdivision.
- Marine farms within Coastal Marine Zone 3 other than marine farming provided for under Rule 35.4.2.10.1.
- Marine farms for the farming of salmon within Coastal Marine Zone 4 other than marine farming provided for under Rule 35.3.3, as provided for under Rule 35.5.5;
- Marine farms previously authorised (by a current Coastal Permit as at 16 January 2017) for the farming of species other than salmon within Coastal Marine Zone Four beyond a line drawn 200 metres from mean low water, at right angles to a line normal to the nearest part of mean high water mark (refer Figure 35.1: Measurement of Marine Farm from Shore).

35.5.5 Marine Farms for the farming of salmon within Coastal Marine Zone 4

35.5.5.1 An application shall be lodged pursuant to Rule 35B.2.1.2 for a coastal permit to occupy the site at the same time that any application is lodged under this rule.

35.6 Prohibited Activities – being activities for which no resource consent shall be granted

- Dumping of hazardous waste substances onto land and from onshore into the coastal marine area;
- The dumping of waste and litter from onshore (including shell, offal or any other matter) into the coastal marine area;
- Marine farms in Coastal Marine Zone One other than marine farms specified as Controlled Activities in Rule 35.2.5 or Limited Discretionary Activities in Rule 35.3, or Discretionary Activities not complying with the standards specified for marine farms as Controlled Activities;
- Marine farms in Coastal Marine Zone Two at the sites identified in Appendix D5 once the consents as identified in Appendix D5 (or any subsequent consents issued where the application constituted a renewal of the consents identified in Appendix D5) have been surrendered;
- Marine farms for the farming of finfish within Coastal Marine Zone Two at the sites identified in Appendix D6 once the consents as identified in Appendix D6 (or any subsequent consents issued where the application constituted a renewal of the consents identified in Appendix D6) have been surrendered;
- Marine farms for the farming of salmon within Coastal Marine Zone Four other than marine farming provided for under Rule 35.3.3 or Rule 35.5;
- Marine farms for the farming of species other than salmon within Coastal Marine Zone Four, other than marine farming provided for under Rules 35.4 and 35.5;
- Rafting of logs as a means of transportation.
- The combustion of:
  - materials associated with the recovery of metals from insulated electrical cables; or
  - materials and metals used in motor vehicles; or
  - any other PVC plastic, or rubber tyres, treated timber, or agricultural chemical wastes.
- Use of surface water within that part of Queen Charlotte Sound not on the National Transportation Route by High speed ships, or ships that exceed 500 gross registered tonnes, which are travelling at ship speeds greater than 15 knots.

Chapter 35B

35B.0 Allocation of Space in New Salmon Farming sites

35B.1 Preamble

This section of the Plan provides a specific method for the allocation of rights to occupy coastal space within salmon farming sites listed in Rule 35.3.3.

Part 7A of the Act contains provisions about managing occupation of the common marine and coastal area, including general provisions about authorisations to apply for coastal permits to occupy space. Responsibilities of councils, the Minister of Conservation and the Minister of Aquaculture are also set out in this part of the Act.

The default allocation mechanism for the occupation of space in the common marine and coastal area is the 'first in first served' process that normally applies to resource consent applications. Section 165G of the Act states that 'A regional coastal plan or proposed regional coastal plan may provide for a rule in relation to a method of allocating space in

the common marine and coastal area for the purposes of an activity, including a rule in relation to the public tender of authorisations or any other method of allocating authorisations'. Chapter 35B of the Plan sets out such a rule, for salmon farming sites listed in Rule 35.3.3.

The Marlborough Sounds Resource Management Plan seeks to ensure that salmon farming within the Marlborough Sounds is managed to meet water quality outcomes (Policy 9.3.2.1.12), while enabling marine farming in appropriate places in the waters of the Sounds (Policy 9.2.1.14). Section 5 of the RMA recognises the need to safeguard life-supporting capacity, and to avoid, remedy, or mitigate adverse effects, but also seeks to enable people and communities to provide for their social, economic and cultural wellbeing. Farm sites located in low flow areas can cause adverse effects on the environment if operated at levels that provide a sufficient economic return. Recognising the need to improve environmental outcomes for salmon farming in the Marlborough Sounds while retaining the economic viability of the industry, the rule contained in this section of the Marlborough Sounds Resource Management Plan facilitates the relocation of existing low flow sites to higher flow sites.

35B.2 General Rules

35B.2.1 Alternative Allocation Method for the Right to Apply for Available Water Space in New Salmon Farming Sites

35B.2.1.1 Circumstances under which the Alternative Allocation Method will Apply

Rule 35B.2.1.2 shall only be used for coastal permits for marine farming within the following salmon farming sites:

- Blowhole Point North
- Blowhole Point South
- Waitata mid-channel
- Richmond Bay South
- Horseshoe Bay
- Tio Point

35B.2.1.2 Alternative Allocation Method

Under the circumstances specified in Rule 35B.2.1.1, the right to apply for a coastal permit for salmon farming shall be limited to the person who holds a consent for the corresponding identified site as follows:

[Note: the exact wording is to be determined following public consultation, when the exact potential relocation sites are known and a definite site swap can be defined. If fewer than six relocation sites are still being considered after public consultation, then this rule may look like the second bullet point]

- The application is for the X CMZ4 site and the surrender of consents for the Y CMZ2 site
- The application is for the X CMZ4 site and the surrender of consents for the Y and Z CMZ2 sites

provided that the application conforms with the following standards:

a) Consents for the existing salmon farm sites shall be surrendered and all structures removed from the sites prior to any fish being put in the water at the CMZ4 salmon farming site

b) The area of sea pens on the CMZ4 site does not exceed the previous area of sea pens on the corresponding CMZ2 or CMZ1 site

c) The following priority order of consent surrenders shall apply (with 1 being the highest priority site to relocate from):

1. Ruakaka CMZ1 site
2. Otanerau CMZ2 site
3. Waihinau CMZ2 site

4. Forsyth Bay CMZ2 site
5. Crail Bay MFL48 CMZ2 site
6. Crail Bay MFL32 CMZ2 site

Appendix D4: Standards under Rule 35.3.3.1(b)

General

1. Marine farming shall be limited to the farming of King Salmon (Onchorynchus tshawystcha).

2. All salmon shall be from roe sourced in New Zealand.

Occupancy

3. The occupancy and activity shall be limited to the area shown on the plans in Appendix D7.

   Note: While the occupancy and activity associated with the marine farm and marine farming will occur within the area specified in Condition 3, some effects arising from the activities may be experienced beyond the boundary of this area. For example, the marine farm will be able to be seen and heard from beyond the boundary of the area, and some waste material will travel beyond the boundary.

4. All salmon farm pens (other than temporary pens for transferring salmon to or from the Site) shall be located within the Pen Area Boundary for the relevant Site shown on the plans in Appendix D7.

Noise

5. All marine farming shall be conducted so as to ensure that noise arising from such activities does not exceed the following noise limits when measured no closer than 250 metres from any marine farm surface structure:

0700 hours – 2200 hours Monday to Friday and 0700 hours – 1200 hours Saturday	55 dBA L10
On any day between 0700 hours and 2200 hours	No Lmax limit
At all other times including any public holiday	45 dBA L10, and 75 dBA Lmax

   All marine farming shall be conducted so as to ensure that noise arising from such activities does not exceed the following noise limits when measured at the Notional Boundary of dwellings existing at 16 January 2017:

0700 hours – 2200 hours Monday to Friday and 0700 hours – 1200 hours Saturday	50 dBA L10
On any day between 0700 hours and 2200 hours	No Lmax limit
At all other times including any public holiday	40 dBA L10, and 75 dBA Lmax

6. Noise shall be measured in accordance with NZS 6801:2008. Adjusted levels shall be determined in accordance with NZS 6802:2008. Any construction activities shall meet standards specified in NZS 6803:1999.

7. The following activities shall be exempt from the noise standard contained in Condition 5:
   i) Noise generated by navigational aids, safety signals, warning devices, or emergency pressure relief valves;
   ii) Noise generated by emergency work arising from the need to protect life or limb or prevent loss or serious damage to property or minimise or prevent environmental damage;
   iii) Noise ordinarily generated by the arrival and departure of vessels servicing a marine farm.

8. No outdoor radios or similar external speakers shall be used on any marine farm.

Structures

9. The structures shall be limited to moorings, anchors, ropes, net pens and barges, floats and lights and other necessary navigational aids associated with the farming of the approved species within the boundaries of the area shown on the plans in Appendix D4. All structures shall be situated and secured so as to remain within the boundaries of the consent area at all times.

10. The maximum area of sea pens at each marine farm Site in Coastal Marine Zone 4 shall not exceed:

Blowhole North	1.5 hectares

Blowhole South	1.5 hectares
Waitata mid-channel	2 hectares
Richmond Bay South	1.5 hectares
Horseshoe Bay	0.75 hectares
Tio Point	0.75 hectares

11. The maximum area of surface structures, including barges, across all the marine farm Sites in Coastal Marine Zone 4 shall not exceed 9 hectares.

12. (a) Within the following Sites, there shall be no more than 1 feed/accommodation barge:

Blowhole North

Blowhole South

Richmond Bay South

Horseshoe Bay

Tio Point

(b) Any feed/accommodation barge at a Site listed in condition 12(a) shall have a maximum footprint of 280m^2 and a maximum height of 7.5m above water level when fully laden.

(c) Any feed/accommodation barge at a Site listed in condition 12(a), including its roof and all ancillary features (such as drain pipes) shall be finished in non-reflective materials and painted in a dark colour. Dark coloured curtains, blinds or shutters shall be provided for the windows of rooms used for staff accommodation.

13. At the Waitata Mid-Channel Site there shall be no more than one feed barge that is:

(a) circular or similar in appearance;

(b) no more than 15 metres in diameter;

(c) no more than 3 metres in height above water level at all times;

(d) finished in non-reflective materials and painted in a dark colour.

14. Within the following Sites, only circular net pens shall be used:

Blowhole North

Blowhole South

Waitata mid-channel

15. Net pens and exterior above water metal structures (other than surface walkways) shall be painted or finished in dark recessive colours.

16. Black or similar dark colours shall be used for predator nets, grower nets and bird netting which are normally above-water.

17. Any submerged artificial lighting set up in any net pen shall not be comprised of any more than the luminance of nine 1000 watt halide underwater lights.

18. No mooring line shall be within 4.0 metres of the surface of the water beyond 20.0 metres distance from any part of the surface structures.

Discharge

Initial annual discharge

19. Subject to Condition 20, the initial annual discharge of fish feed within each Site shall not exceed:

Blowhole North	2250T
Blowhole South	2500T
Waitata mid-channel	3500T
Richmond Bay South	2500T

Horseshoe Bay	1000T
Tio Point	1000T

20. The total of the initial annual discharge of fish feed at the Blowhole North, Blowhole South, Waitata mid-channel, Richmond Bay South and Horseshoe Bay farm Sites shall not exceed 6000 tonnes per annum.

Increases in feed discharges in Pelorus Sound if total discharges are less than 6000T/annum

21. While the total of the initial annual discharge of fish feed at the Blowhole North, Blowhole South, Waitata mid-channel, Richmond Bay South and Horseshoe Bay farm Sites remains below 6000 tonnes per annum, any increases in feed discharges shall comply with Conditions 22 to 24.

22. Any increase in feed discharged (from one year to the next) at any Site shall not exceed the relevant step in the Maximum Increase in Feed Discharge specified in Table 1 and shall not result in the total discharge from the Sites exceeding 6000 tonnes per annum.

Table 1: Maximum increase in feed discharge for CMZ4 Sites in Pelorus Sound

Tonnes/Site	BHN	BHS	WMC	RBS	HSB
Increase 1	750	825	1050	825	250
Increase 2	500	550	750	550	125
Increase 3	300	375	350	375	125
Increase 4	350	375	350	375	
Increase 5	350	375		375	

23. The annual tonnage of feed discharged to the marine farm may only be increased where the discharge has been within 85 – 100% of:

(a) the discharge specified under Condition 19; or

(b) the discharge calculated using Table 1;

for a period of at least 3 years prior to any proposal to increase the annual tonnage of feed discharged, and where the requirements of Conditions 36, 38 and 40 (relating to compliance with Environmental Quality Standards) have been met.

24. In any year, the annual discharge of fish feed within each Site shall not exceed:

Blowhole North	4500T
Blowhole South	5000T
Waitata mid-channel	6000T
Richmond Bay South	5000T
Horseshoe Bay	1500T

Increases in feed discharges in Pelorus Sound if total discharges are 6000T/annum or more

25. When the total of the annual discharges of fish feed at the Blowhole North, Blowhole South, Waitata mid-channel, Richmond Bay South and Horseshoe Bay farm Sites has been within 85 – 100% of 6000 tonnes per annum for a period of at least three years any further increases in feed discharges shall comply with Conditions 26 – 28.

26. Any increase in feed discharged (from one year to the next) shall not exceed the relevant step in the Maximum Increase in Feed Discharge specified in Table 1 for each Site, and shall not exceed the increase outlined in the Maximum Overall Increase in Feed Discharge specified in Table 2 for all the Sites in total.

Table 2: Maximum overall increase in feed discharge for CMZ4 Sites in Pelorus Sound

All Pelorus Sound Sites	Overall limit on discharges from all Sites (tonnes/annum)
Start	6000
Feed increase steps	1800

27. The annual tonnage of feed discharged to the marine farm may only be increased where the discharge has been within 85 – 100% of:

    (a) the discharge specified under Condition 19; or

    (b) the discharge calculated using Tables 1 and 2;

    for a period of at least 3 years prior to any proposal to increase the annual tonnage of feed discharged, and where the requirements of Conditions 36, 38 and 40 (relating to compliance with Environmental Quality Standards) have been met.

28. In any year, the annual discharge of fish feed within each Site shall not exceed:

Blowhole North	4500T
Blowhole South	5000T
Waitata mid-channel	7000T
Richmond Bay South	5000T
Horseshoe Bay	1500T

Increases in feed discharges in Tory Channel

29. Any increase in feed discharged (from one year to the next) at any Site shall not exceed the relevant step in the Maximum Increase in Feed Discharge specified in Table 3.

Table 3: Maximum increase in feed discharge for CMZ4 Sites in Tory Channel

	Tio
Increase 1	1000
Increase 2	300
Increase 3	150
Increase 4	150

30. The annual tonnage of feed discharged to the marine farm may only be increased where the discharge has been within 85 – 100% of:

    (a) the discharge specified under Condition 19; or

    (b) the discharge calculated using Table 3;

    for a period of at least 3 years prior to any proposal to increase the annual tonnage of feed discharged, and where the requirements of Conditions 36, 38 and 40 (relating to compliance with Environmental Quality Standards) have been met.

31. In any year, the annual discharge of fish feed at the Tio Point Site shall not exceed 1600 tonnes

Additional discharge conditions

32. Any effects on water quality arising from the process outlined in Conditions 19 – 31 above shall be monitored following the process outlined in Conditions 43 - 45 and using a minimum of six real time monitoring buoys deployed at sites determined using the process outlined in Conditions 43 - 45.

33. A feed log detailing monthly volumes of feed discharge, composition (percentage protein, carbohydrate, lipid, nitrogen and phosphorus) and the location of the discharge shall be established and maintained.

34. The maximum greywater discharge shall not exceed 1.0 cubic metres per day from any Site that contains a feed/accommodation barge. An appropriate system shall be operated at the marine farm to quantify the volume of greywater discharged, which can be measured by proxy (i.e. by measuring the amount of fresh potable water which is brought onto the barge and assuming it is all discharged via the greywater system).

Odour management

35. The consent holder shall, prior to the first discharge of feed to the marine farm, have in place and implement operational procedures to implement best management practices to:

    a) ensure that, as far as practicable, filling of the 'mort' bin (storing dead fish) does not occur during still air conditions;

    b) establish target times for cleaning the grower nets once they have been raised, to minimise the potential for odour from dirty nets;

    c) ensure that, as far as practicable, there is only one grower net being lifted and cleaned at one time, to minimise the potential for odours from this activity.

Environmental quality standards

36. Subject to Condition 37, the marine farms at the Blowhole Point North, Blowhole Point South, Waitata mid-channel, Richmond Bay South and Horseshoe Bay Sites shall be operated at all times in such a way as to achieve the following initial water quality standards (WQS):

    a) concentrations of Chlorophyll-*a* in the receiving water not exceeding 3.5 mg m^{-3};

    b) concentrations of Total Nitrogen in the receiving water not exceeding 300 mg m^{-3};

    c) concentrations of Dissolved Oxygen above an average 70% saturation within 250 metres of the edge of the net pens and an average 90% saturation beyond 250 metres from the edge of the net pens.

    Notwithstanding that these initial water quality standards are specified in the plan, these standards can be updated by the Council through a review of conditions and incorporated within the coastal permit.

    Note: Condition 36 does not apply to the Tio Point Site. Matter of discretion 35.3.3.2(c) provides for water quality effects at the Tio Point Site to be considered when a resource consent is applied for.

37 In the event of any exceedance of the water quality standards outlined in Condition 36 or as updated by the Council, the following steps shall be taken:

    a) A first level response requiring investigation, further monitoring and/or analysis to determine whether the operation of the marine farm is causing the relevant WQS not to be achieved. In that respect:

        i) If dissolved oxygen concentrations do not achieve the WQS specified in Condition 36 an initial investigation to consider differences between far-field control and farm Sites to determine whether further investigation is necessary

        ii) If further investigation is necessary, further monitoring and/or analysis to determine whether the operation of the marine farm is causing the relevant WQS not to be achieved

        iii) Where the farm is shown to be the cause of the exceedance, a second level response as outlined in b).

    b) A second level response requiring a plan of action and subsequent implementation of that plan as soon as practicable, with clear timeframes to reduce effects on the water column and achieve full compliance with the WQS, through reduced stocking on the marine farm following the next harvest of salmon on the marine farm.

38. Subject to Condition 39, the marine farm shall be operated at all times in such a way as to achieve the following average Benthic Quality Standards (BQS) in the seabed:

a) the enrichment stage (ES) score below the net pens, i.e. the Zone of Maximum Effect (ZME), shall not exceed 5.0;

b) no more than one replicate core with no taxa in the ZME;

c) no obvious spontaneous out-gassing of hydrogen sulphide and methane in the ZME;

d) the coverage of the *Beggiatoa* bacteria may not be greater than localised and patchy in distribution in the ZME;

e) the ES score at the Outer Limit of Effect (OLE), shall be less than 3.0 at all times;

f) subject to Condition 39, in the event of any exceedance of the benthic quality standards outlined in Condition 38(a) – (e) a plan of action shall be prepared and implemented as soon as practicable, with clear timeframes to reduce effects on the benthic environment and achieve full compliance with the BQS.

Notwithstanding that these Benthic Quality Standards are specified in the plan, these standards can be updated by the Council through a review of conditions and incorporated within the coastal permit.

Note: Average Benthic Quality Standards are calculated from the results of the number of samples that are taken from monitoring stations within the ZME and the OLE on any one sampling occasion.

39. In the event that the lower 95% confidence level for overall ES is greater than 5.6 then the consent holder must:

a) Remove stock and fallow the Site within 4 months from the date the consent holder became aware of the non-compliance (or 5 months where retesting has occurred), or at the end of the production cycle, whichever is the later; and

b) Not introduce new stock to the farm until the farm is within the relevant BQS; and

c) Ensure at the time of restocking that the stocking plan is appropriate to allow the Site to meet the required BQS in future surveys.

40. Copper and Zinc levels measured in the ZME shall not exceed the Australian and New Zealand Environment and Conservation Council (ANZECC) 2000 Interim Sediment Quality Guidelines High Level (ISQG-High) for the total recoverable fraction of these metals.

Marine Environmental Monitoring, Adaptive Management and Reporting

41. The following plans and reports shall be prepared:

a) Prior to the initial placement of the first structure(s) at the marine farm, a **Baseline Plan**, as outlined in Condition 43 to specify the monitoring and analysis to be undertaken in order that baseline information can be obtained and analysed prior to the initial placement of the first structure(s) at the marine farm;

b) Prior to initial placement of the first structure(s) at the marine farm, a **Baseline Report**, as outlined in Condition 44;

c) For each year of operation of the marine farm, a **Marine Environmental Monitoring – Adaptive Management Plan (MEM-AMP)** to provide a summary of the relevant recommendations from the previous year's Baseline Report or Annual Report, and specify the proposed monitoring and marine farm management actions for the following year. The MEM-AMP may be prepared as one Plan jointly with the MEM-AMP(s) for other marine farms managed by the same consent holder.

d) For each year of operation of the marine farm, an **Annual Report** to provide the details of the monitoring results from the previous year, an analysis of the monitoring results (including in terms of compliance with the EQS), and recommendations for changes to the monitoring and marine farm management actions for the following year. The Annual Report may be prepared jointly with Annual Reports for other marine farms in the same geographic area (being Queen Charlotte Sound/Tory Channel or Pelorus Sound) managed by the same consent holder.

42. An independent person (or persons) with appropriate knowledge and expertise shall be engaged to prepare the **Baseline Plan** and **Baseline Report,** the **MEM-AMP** and the **Annual Report**.

43. The **Baseline Plan** shall include, but not be limited to, the following:

a) Quantitative and qualitative mapping of soft-sediment habitats and communities across the occupancy and activity area specified in Condition 34; and across the ZME and OLE, including replicate data for the primary environmental variables from each of the proposed on-going monitoring stations and at appropriate reference stations;

b) A synthesis and review of all available existing water quality data relevant to the enrichment status of:
- Pelorus Sound
- Tory Channel and Queen Charlotte Sound

in order to provide a historical baseline of water quality conditions;

c) Water column monitoring for nutrient (NH_4-N, $N0_3$-N, $N0_2$-N, DRP, Si, TN and TP) and chlorophyll-*a* concentrations, phytoplankton composition and biomass, salinity, clarity, temperature, turbidity and dissolved oxygen (DO) at the following locations:

i. Near-farm locations within 1 km from the net pens;

ii. Locations within Pelorus Sound and Queen Charlotte/Tory Channel that are expected to have the greatest potential for marine farm-related cumulative enrichment effects (particularly where marine farms are located in proximity to one another and/or as indicated by spatially explicit nutrient modelling or other modelling considered necessary by the Peer Review Panel), except where these areas have already been subject to monitoring under the Baseline Plan prepared for the Waitata, Kopāua and Ngamahau Sites;

iii. Locations further away from marine farms or groups of marine farms in Outer Pelorus Sound and in Queen Charlotte Sound/Tory Channel or relevant surrounding areas that are expected to have progressively lesser marine farm-related cumulative enrichment effects (as indicated by spatially explicit nutrient modelling or other modelling considered necessary by the Peer Review Panel), except where these areas have already been subject to monitoring under the Baseline Plan prepared for the Waitata, Kopāua and Ngamahau Sites;

iv. Locations that are identified as being of high ecological value.

The above water column data shall be collected at least monthly at these locations over one year (this shall be required for up to two years if recommended by the Peer Review Panel) prior to the first discharge of feed to the marine farm, provided that this frequency could be reduced by the Council in whole or in part, depending on the availability of existing water column data (which can suitably substitute). The appropriateness of any reduction is to be specifically considered by the Peer Review Panel (as part of its review of the **Baseline Plan**).

The monitoring stations for this water column monitoring shall be established as long-term monitoring stations for the purposes of undertaking the long-term water column monitoring required by the MEM-AMP. The precise location of the long-term monitoring stations and the range of specific nutrient parameters monitored may, however, be adjusted over time in response to monitoring results under the MEM-AMP and/or in response to modelling considered necessary by the Peer Review Panel.

d) Quantitative and qualitative baseline monitoring (for potential biodepositional effects following marine farm operation) of habitats that support notable biological features within 1km of the marine farm ("reef' monitoring), including any areas of blue cod habitat or any areas identified as customary kaimoana gathering areas, as well as comparable habitats at appropriate reference sites. The monitoring shall be undertaken two times during one year. For the purposes of this condition "notable biological features" shall include but not be limited to areas of significant reef, tubeworm mounds and hydroid colonies.

e) Quantitative and qualitative baseline monitoring (for potential seabed enrichment effects following marine farm operation) at soft sediment sites in neighbouring bays near to, and removed from, the marine farm, chosen based on potential exposure to increased biodeposition including any areas in those bays identified as customary kaimoana gathering areas. This monitoring shall be undertaken at a selection of representative soft sediment sites, which may also double as reference sites for near-farm monitoring (see

Condition 43a), and shall be undertaken two times during one year. The same monitoring may be undertaken for a group of marine farms, as it will provide baseline information for all marine farms in that group.

f) Quantitative and qualitative baseline monitoring (for potential effects on macroalgal biomass from biodeposition and/or nutrient enrichment) of ephemeral macroalgae (e.g. *Ulva* sp.), benthic algal films and perennial algae (e.g. *Hormosira banksii)* percentage cover and the abundance of grazing invertebrates (e.g. cats' eyes snails *(Turbo smaragdus)* and Kina *(Evechinus chloroticus)*) on intertidal and shallow subtidal rock reefs, including any reefs identified as customary kaimoana gathering areas. Monitoring shall be undertaken two times during one year at the following locations:

i. At or near locations expected to have the greatest potential for marine farm related cumulative enrichment effects (either within **1** km of the marine farm or in neighbouring bays);

ii. At or near locations further away from the marine farm or groups of marine farms in locations that are expected to have less marine farm-related cumulative enrichment effects.

44. The **Baseline Report** shall include the following:

a) Presentation of the results from, and analysis of, the baseline monitoring required by the **Baseline Plan,** including the results of the synthesis and review of all available existing water quality data relevant to the enrichment status;

b) Any recommendations as to the specific location or installation of marine farm anchoring structures;

c) Any recommendations regarding ongoing monitoring following the initial placement of the first structure(s) at the marine farm and the first discharge of feed to the marine farm;

45. The **MEM-AMP** shall specify the following:

a) A summary of the recommendations from the **Baseline Report** (in the case of the first **MEM-AMP** for the marine farm) or from the previous year's **Annual Report** regarding marine farm management actions and monitoring (including any increases or decreases in the tonnage of feed to be discharged);

b) The water column monitoring stations;

c) The methods (including the processes to be followed) to be used in assessing water quality;

d) The benthic monitoring stations;

e) The timing of the monitoring of the ZME and OLE;

f) The environmental parameters to be monitored;

g) The monitoring proposed for any identified notable biological features, intertidal or sub-tidal shallow reefs and/or areas identified as customary kaimoana gathering areas, including identifying any long-term and short-term changes in community structure and health;

h) The monitoring proposed:

i) for the effects of submerged artificial lighting

ii) of the size and composition of aggregations of pelagic and demersal fish beneath the marine farm, and

iii) to improve understanding of the potential for key heavy metal and organohalogenated contaminants of public-health interest in long-lived bentho-pelagic fish species of recreational, commercial or customary interest, residing in the near vicinity of the marine farm;

i) A site-specific account of any recommendations or management responses from the previous year; and

j) Detailed sampling methods.

46. The **Annual Report** shall include, but not be limited to, the following:

a) A statement as to the tonnage of feed and nitrogen discharged each month over the previous year;

b) The results of all the monitoring undertaken in the previous year;

c) A comprehensive analysis of the results of that monitoring, including:

i. whether the monitoring information obtained is fit for the purpose of determining the effects from the operation of the marine farm and for determining whether compliance with the EQS specified in Conditions 36, 38 and 40 is achieved;

ii. whether there are any evident trends in terms of effects from the operation of the marine farm.

EQS- Water Column

d) An assessment and conclusions as to whether the WQS specified in Condition 36 have, or have not, been complied with, for the previous year.

e) Recommendations as to any amendments to management practices (including any increases or decreases in the tonnage of feed to be discharged) at the marine farm, in order to ensure that the WQS specified in Condition 36 continue to be complied with. In the case of non-compliance with the WQS, recommendations as to monitoring, analysis and/or management responses in accordance with the requirements of the MEM-AMP.

EQS- Deposition on the Seabed

f) An assessment and conclusions as to whether compliance with the EQS specified in Condition 38 has, or has not, been achieved for the previous year.

g) Recommendations as to any amendments to management practices (including any increases or decreases in the tonnage of feed to be discharged) at the marine farm in order to ensure that the EQS in Condition 38 are complied with.

EQS- Copper and Zinc Levels

h) An assessment and conclusions as to whether compliance with the ANZECC (2000) ISQG-High criteria for copper and zinc set out in Condition 40 has, or has not, been achieved for the previous year.

i) Where the ANZECC (2000) ISQG-Low criteria for copper and zinc have been exceeded, recommendations as to any amendments to monitoring and management actions at the marine farm.

Determination of WQS

j) The Annual Report will include the relevant reviews of the near farm and wider-scale water column and ecosystem monitoring results and of WQS and the associated hierarchy of responses to breaches of the WQS as specified in the MEM-AMP.

k) Following the first three years of operation of the marine farm, the Annual Report may review the initial WQS outlined in Condition 36 and recommend amendments to the WQS. The WQS may then be reviewed through the Annual Report every subsequent three years unless any other Annual Report necessitates earlier review. Any recommended amendment to the WQS shall ensure that the water quality outcomes specified in Policy 9.3.2.1.12 will continue to be met.

Prior to specifying amendments to the WQS and responses, the consent holder shall consult with the Department of Conservation.

Other Recommendations

l) Where identified as a result of the monitoring, any recommendations for other actions to be undertaken to address potential effects from the operation of the marine farm, including to avoid, remedy or mitigate any significant adverse effects from the operation of the marine farm.

m) Any other recommendations for amendments to the monitoring programme for the following year.

47. Prior to finalising the plans and reports specified in Condition 41, they shall be provided in draft form to the Peer Review Panel under Condition 51 for its review, assessment, recommendations and reports, consistent with its approach to those Sites. Particular regard shall be had to any recommendations from the Peer Review Panel in finalising the plans and reports. The plans and reports shall identify how this has been done, if any recommendations have not been adopted and the reasons why.

48. Having had particular regard to any recommendations from the Peer Review Panel, the following final plans and reports shall be provided to the Council:

    a) The **Baseline Plan**;

    b) The **Baseline Report;** and

    c) Any **Annual Report** which includes:

        i. any proposals for changes in any WQS;

        iii. any increase in the maximum annual tonnage of feed that may be discharged to the marine farm, consistent with Conditions 19 - 31.

    The monitoring and analysis required in terms of the **Baseline Plan** shall not be commenced until the **Baseline Plan** has been approved by the Council.

    No structure(s) shall be placed on the marine farm until the **Baseline Report** has been approved by the Council.

    No change may be made to any WQS, and there shall be no increase in annual tonnage of feed that may be discharged to the marine farm, until the relevant aspects of the **Annual Report** that includes that/those recommendation(s) is approved by the Council.

49. Other than as specified in Condition 48, having had particular regard to any recommendations from the Peer Review Panel, the following plans and reports specified in Condition 41 shall be provided to the Council, in accordance with the following timing:

    a) The first MEM-AMP - following the provision of the Baseline Report to the Council and prior to the first discharge of feed to the marine farm;

    b) Each subsequent annual MEM-AMP- by 31 July each year;

    c) The Annual Report - by 30 April each year.

50. Monitoring, analysis, marine farm management and other actions shall be undertaken in accordance with the Baseline Plan and the current provisions of the MEM-AMP for that year. The monitoring, and analysis shall be undertaken by a person or persons with appropriate knowledge and expertise.

Peer Review

51. The **Baseline Plan**, the **Baseline Report**, each **MEM-AMP** and each **Annual Report** shall be provided to a Peer Review Panel, comprised of not less than three or more than five persons appointed by the Council and paid for by the consent holder, at least two of whom shall be scientists who, between them, have experience across the following scientific areas - marine seabed and water column ecology, and evaluating enrichment-related effects - and who are recognised by their peers as having such experience, knowledge and skill, which shall report on the following matters:

    a) its review of the **Baseline Plan**, its assessment as to the adequacy of the water quality data and the monitoring proposed to achieve the requirements of Condition 43 and whether the actions and methods are in accordance with good practice, and any recommendations regarding changes to the monitoring proposed or any requirement for further modelling;

    b) its review of the **Baseline Report**, its assessment as to whether it adequately responds to the results of the monitoring undertaken in terms of the **Baseline Plan** and achieves the requirements of Condition 44 and any recommendations regarding changes to the conclusions and recommendations contained in the **Baseline Report**;

    c) its annual review of the **MEM-AMP**, its assessment as to the adequacy of the monitoring and marine farm management and other actions proposed to achieve the requirements

of Condition 45 and whether the actions and methods are in accordance with good practice, any recommendations regarding changes to the monitoring proposed or any requirement for further modelling, and a review of and recommendations for any changes to, the hierarchy of responses to breaches of the WQS;

d) its annual review of the **Annual Report**, its assessment as to whether it adequately responds to the results of monitoring undertaken in terms of the previous **MEM-AMP** and achieves the requirements of Condition 46 and any recommendations regarding changes to the conclusions, recommendations and other matters specified in the **Annual Report**. This shall specifically include a review of, and any recommendations for changes to, amended WQS suggested in the **Annual Report**;

e) prior to any increase in the annual tonnage of feed discharged from the marine farm, confirmation that the requirements of Conditions 23, 27 and 30 have been complied with, and any associated recommendations regarding changes to the monitoring proposed or any requirement for further modelling;

f) confirmation that the requirements of Conditions 36 – 40 have been complied with;

g) any other matters it considers appropriate in fulfilling its purposes;

h) any recommendations as to whether it considers any particular condition(s) should be subject to review in accordance with sections 127 and 128 of the Act.

52. Copies of all reports from the Peer Review Panel shall be provided to the consent holder and the Council. These shall be public documents and shall be published on the consent holder's website within four weeks of its receipt from the Peer Review Panel by the consent holder.

Management plans

53. A Marine Mammal and Shark Management Plan shall be prepared, in consultation with the Department of Conservation, and implemented and complied with. This plan shall be provided to the Council prior to the initial placement of the first structure(s) at the marine farm. The objectives of the Marine Mammal and Shark Management Plan shall be to:

(a) minimise the adverse effects on marine mammals and protected sharks from the operation of the marine farm;

(b) minimise the interaction of sharks with the marine farms;

(c) determine how the operation of the marine farm will be managed adaptively to avoid, remedy and mitigate adverse effects on marine mammals and protected sharks;

(d) ensure that the best practicable option is adopted to avoid entanglement or entrapment of marine mammals and sharks, having regard to best international practice, ongoing research and allowing for technological improvements in net design and construction;

(e) establish a monitoring programme to assess the effectiveness of the Marine Mammal and Shark Management Plan; and

(f) establish reporting and response procedures in the event of marine mammal and protected shark entrapment, entanglement, injury or death.

54. The **Marine Mammal and Shark Management Plan** shall include, but not be limited to, the following details:

(a) minimising the potential for sharks and marine mammals to enter the marine farm net pens through the use of predator-resistant materials in net pen construction and predator exclusion nets enclosing the marine farm net pen structures and extending sufficiently high above the water around the marine farm to exclude such predators, but no higher;

(b) limiting the maximum mesh size of any predator netting to 200mm (the internal measurement when the net is stretched in the direction of the long diagonal of the meshes);

(c) ensuring predator nets are sufficiently tensioned and maintained at that tension at all times so as to avoid entanglement of marine mammals or large sharks;

(d) ensuring the twine diameter of the predator net is of a sufficient gauge to:

i. be detected acoustically by dolphins; and

ii. avoid the entanglement of marine mammals or large sharks;

(e) predator net maintenance requirements, including:

i. standards and scheduling;

ii. repairing holes and tears immediately;

iii. avoiding predator nets being left open over night or for extended periods of time;

iv. avoiding forming entrapment pockets in predator nets;

(f) procedures for auditing marine farm security following any marine mammal gaining access beyond a predator net, and taking all practical steps to correct any faults found;

(g) procedures to ensure visual surface marine mammal surveys are conducted prior to major net maintenance work and that nets are not opened, removed or shifted if dolphins are observed within 2km of the marine farm;

(h) procedures for capture and release of any entrapped or entangled marine mammal and protected shark species;

(i) procedures for the retrieval, storage and transport of dead marine mammals and protected shark species for formal identification and autopsy purposes;

(j) staff training requirements, including identification of protected shark species;

(k) ensuring there is no feeding of marine mammals and sharks;

(l) ensuring dead fish are removed promptly from the fish pens;

(m) ensuring anchor warps are maintained under sufficient tension to prevent possible entanglement of cetaceans and large sharks;

(n) ensuring all lines associated with the marine farm are secured at all times, and that any loose lines are secured and/or retrieved promptly;

(o) ensuring that all nets are removed from marine farm structures that are left fallow, untended or are abandoned;

(p) ensuring all net and cordage debris, plastic strapping and other marine farm, domestic or other non-biodegradable waste is collected, retained and disposed of at an approved solid waste facility onshore, and that if any loose debris does enter the water around the marine farm, it is retrieved from the seabed, water column or foreshore promptly;

(q) reporting requirements to the Marlborough District Council and the Department of Conservation, and in particular:

i. a minimum of annual summary reports of all incidents involving marine mammals and protected sharks becoming entangled or entrapped at a marine farm;

ii. immediate reporting (within 24 hours) of any incident where a marine mammal or protected shark may be injured or killed;

iii. reporting (within one week) of actions undertaken to remedy any unforeseen events such as a marine mammal or protected shark becoming entrapped or entangled at a marine farm.

The Marine Mammal and Shark Management Plan shall be reviewed, to ensure best practice, by an appropriately qualified person at 5-yearly intervals and provided to the Council.

55. A Biosecurity Management Plan shall be prepared, in consultation with the Ministry for Primary Industries, and implemented and complied with, with the objectives of minimising the risk of spreading marine pests and disease agents as a result of the establishment and operation of the marine farm.

56. The **Biosecurity Management Plan** shall include on-farm, as well as vector-based, management measures to reduce the risk of spread, including:

(a) Methods to manage vectors that could spread marine pests and disease agents to or from marine farms;

(b) Routine practices to manage fouling of nets and structures;

(c) A passive surveillance regime to facilitate early detection of unusual or suspicious organisms associated with marine farm structures;

(d) An effective disease surveillance regime for salmon stock;

(e) The use of husbandry and harvesting methods consistent with best practice for the minimisation of disease risk;

(f) On-farm management measures to prevent, control or contain biosecurity risks to the extent practicable.

The Biosecurity Management Plan shall also specify the parties to be notified should any new biosecurity risk from marine pests or disease agents be identified at the marine farm. These parties shall include landowners and tourism/recreation businesses within 1 km of the marine farm.

57. The **Biosecurity Management Plan** shall be reviewed, to ensure best practice, by a person or persons appropriately qualified in marine biosecurity and aquatic animal diseases, and provided to the Council prior to the initial placement of the first structure(s) at the marine farm. The Plan shall be reviewed at least annually by the consent holder and an independent auditor appropriately qualified in marine biosecurity and aquatic animal diseases, to ensure that the management practices specified in the Plan are consistent with Condition 55 and 56. Any revisions to the Plan shall be provided to the Council within one month following completion of the revisions.

58. The following management plans shall be developed, provided to the Council prior to the initial placement of the first structure(s) at the marine farm, and then implemented and complied with:

(a) A **Residential Amenity Management Plan** to minimise the risk of neighbours experiencing significant reductions in residential amenity due to off-site visual, noise and odour and other effects from the marine farm. This shall include a requirement that there be no firearms at the marine farm at any time, nor on any vessel associated with the marine farm and operated by the consent holder. This shall include the identification of a specific liaison person to be the point of contact with neighbours and any local residents association for the purposes of disseminating information relating to the operation of the marine farm and to respond to any issues or concerns raised.

(b) A **Wildlife Nuisance Management Plan** to minimise the risk of neighbours experiencing significant reductions in amenity values due to wildlife nuisances attributable to the marine farm.

(c) A **Solid Waste Management Plan** to minimise the risk of reductions in neighbouring amenity values caused by the accumulation of solid waste debris along the shoreline resulting from the marine farm.

These Plans may be combined together or form part of a wider management plan, provided the matters referred to are addressed in any such document.

59. Notwithstanding conditions 53 to 58 above, existing management plans for marine farms in CMZ3 may be updated and submitted to Council for marine farms in CMZ4.

Appendix D5

Prohibited activity status in terms of Rule 35.6 Coastal Marine Zone 2

Location	Schedule of site co-ordinates					MDC consent reference
	NZTM Map Grid			Latitude	Longitude	
	Point	East	North			
Otanerau [MDC site 8396] (Fig D5.1)	1 2 3 4	2620688 2620896 2620712 2620504	6003735 6003649 6003206 6003292	41°10.111'S	174°19.156'E	U040217 U080726 U160039 MPE763 MFL446
Waihinau [MDC site 8085] (Fig D5.2)	A B C D	2590085 2590253 2590463 2590294	6028317 6028422 6028084 6027977	40°56.920'S	173°57.187'E	U080726 MFL456
Forsyth Bay [MDC site 8110] (Fig D5.3)	1 2 3 4	2595593.1 2595742.3 2595703.8 2595554.5	6024616.0 6024601.5 6024205.4 6024217.9	40°58.946'S	174°01.062'E	U040412 U080726 MFL239
Crail Bay MFL048 [MDC site 8513] (Fig D5.4)	1 2 3 4 Centroid TrigN	2591347.50 2591447.65 2591589.05 2591468.27 2591468.27 2591794.33	6011921.32 6012204.12 6012154.04 6012037.68 6012037.68 6013229.78			U090660 U060533 U130781 MFL48

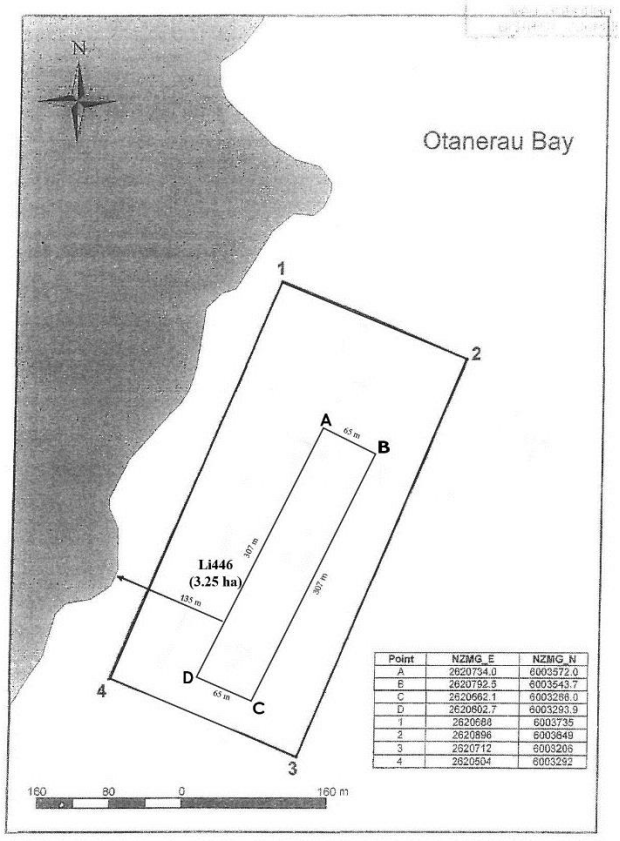


Figure D5-1: Otanerau site diagram

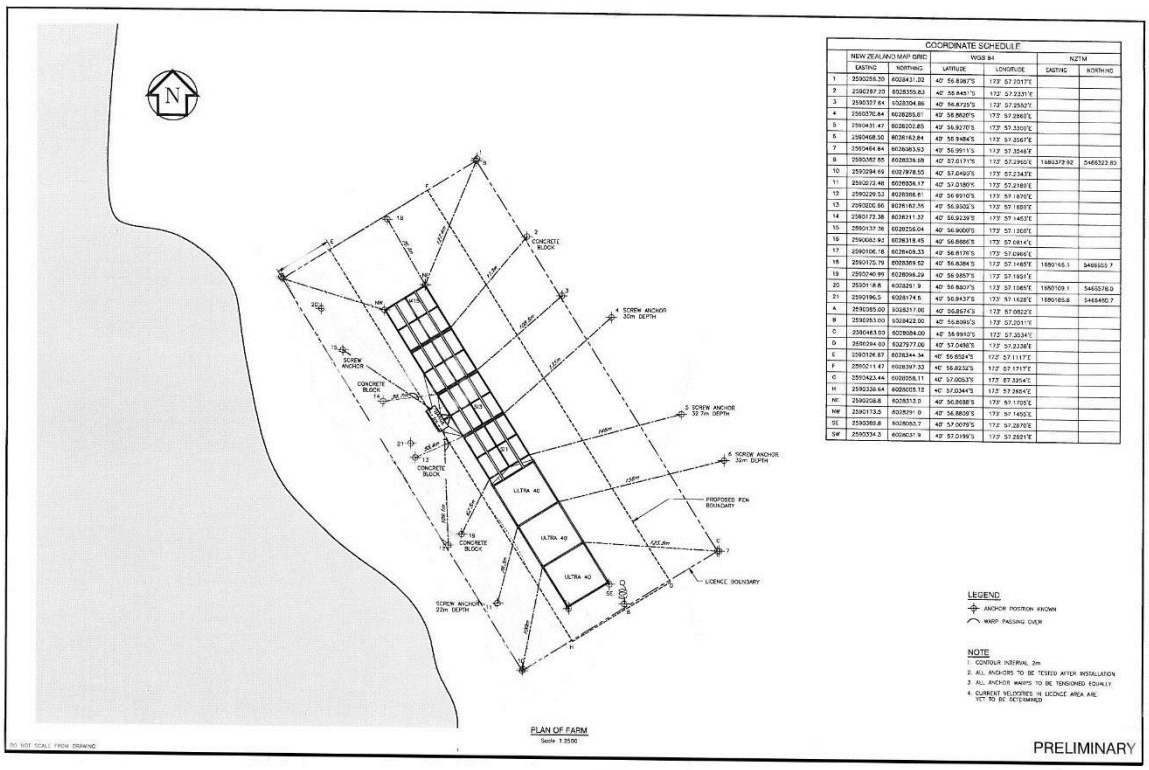
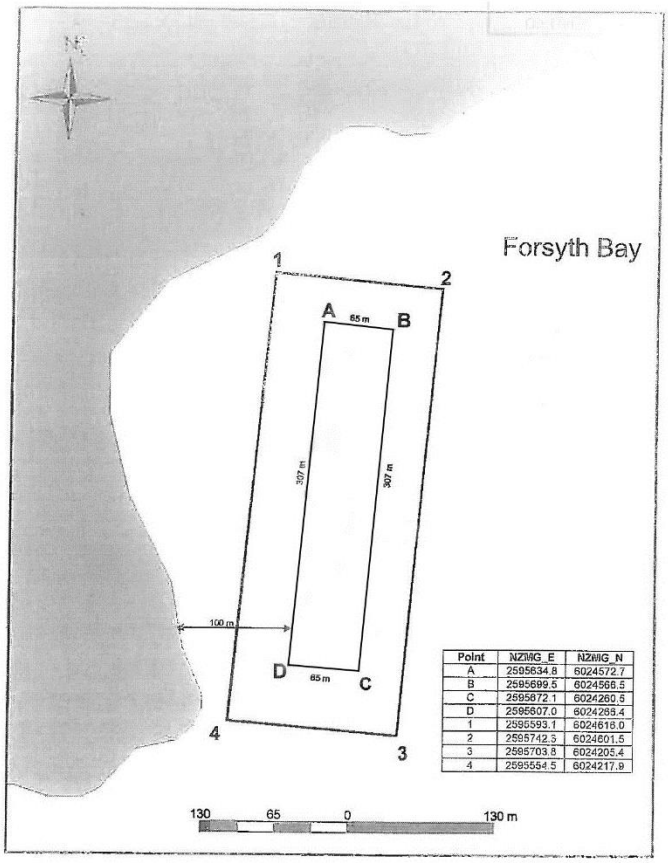


Figure D5-2: Waihinau site diagram



Point	NZTM_E	NZTM_N
A	2595634.8	6024572.7
B	2595699.5	6024566.5
C	2595672.1	6024260.5
D	2595607.0	6024265.4
1	2595593.1	6024618.0
2	2595742.3	6024601.5
3	2595703.8	6024205.4
4	2595554.5	6024217.9

Figure D5-3: Forsyth Bay site diagram

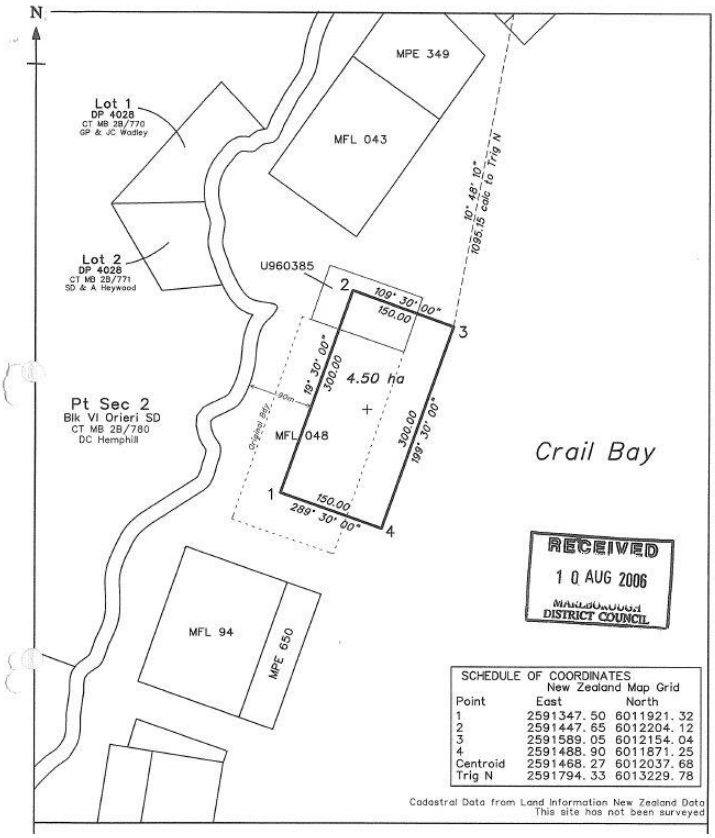


Figure D5.4: Crail Bay MFL048 Site diagram

Appendix D6

Prohibited activity status in terms of Rule 35.6 Coastal Marine Zone 2

Location	Schedule of site co-ordinates					MDC consent reference
	NZTM Map Grid			Latitude	Longitude	
	Point	East	North			
Crail Bay MFL032 [MDC site 8515] (Fig D6.1)	2 3 5 6 Centroid A	2591107.99 2591170.65 2591361.82 2591299.16 2591230.95	6011234.53 6011559.30 6011528.74 6011203.98 6011361.13			U090634

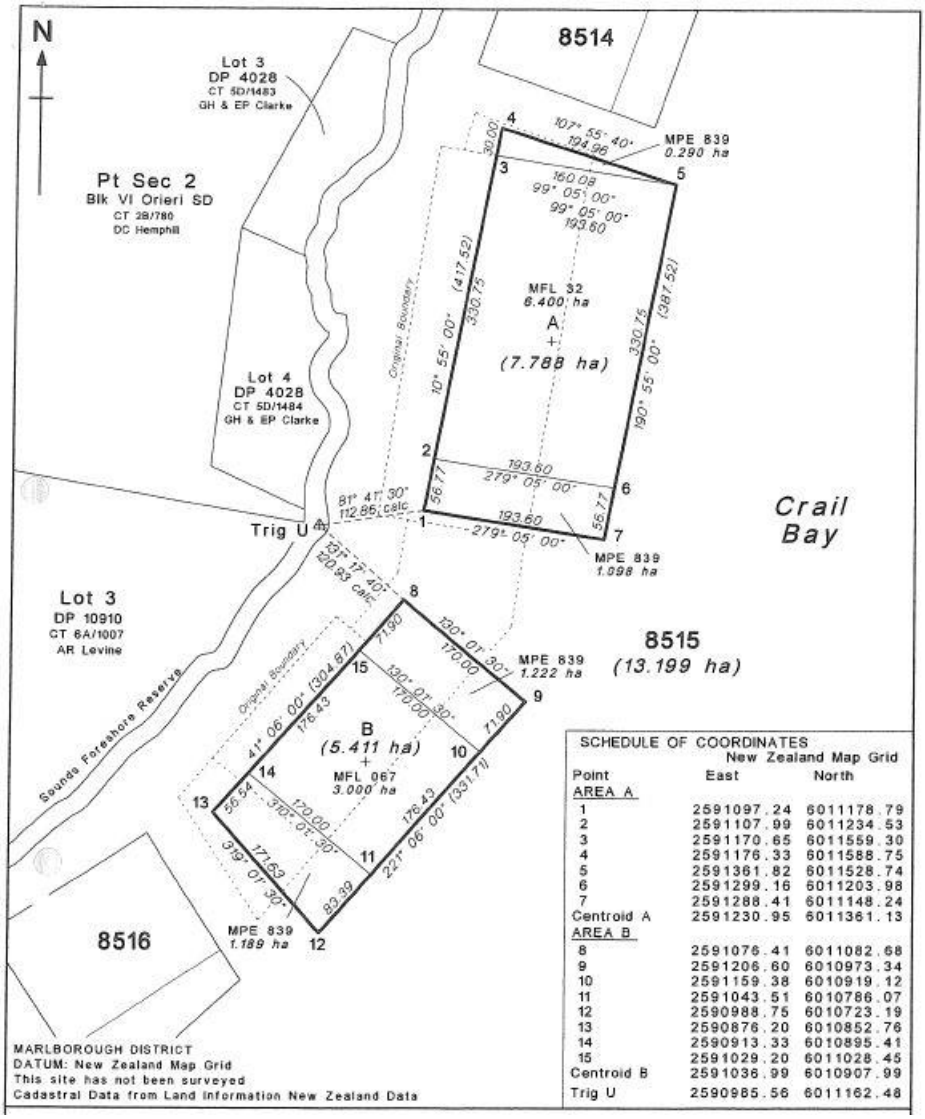


Figure D6.1: Crail Bay MFL032 Site diagram

11.2 Background to potential amendments to the Marlborough Sounds Resource Management Plan

This section provides explanatory material relating to the development of some of the potential amendments to the Marlborough Sounds Resource Management Plan. It should be read in conjunction with section 11.1 of the summary AEE. Where reference is made to changes being recommended, this should be read in the context of 'recommended if the potential relocation proposal proceeds'.

Chapter 9: Issue 9.2 and associated text

Minor amendments are recommended to the explanatory text to Issue 9.2 to make reference to the potential relocation proposal.

Policy 9.2.1.1.17

Policy 9.2.1.1.17 as currently written was included in the Marlborough Sounds Resource Management Plan as a result of the 2011 applications by NZ King Salmon. The suggested amendments provide a similar level of explanation for the inclusion of Coastal Marine Zone 4. Policy 9.2.1.1.17 also outlines the suggested priority order for the existing lower flow salmon farm sites to relocate. Comment is being sought through public consultation on the priority that has been assigned to existing sites.

Explanatory text for Policy 9.2.1.1.17 is also recommended. There is an error in the current explanation, with an incorrect policy reference included, and it is suggested that this be corrected as well.

9.2.2 Methods of Implementation

Minor amendments are recommended to the explanations of the Zoning and Rules methods, in order to make sure they reflect the effects of the potential relocation proposal on those provisions.

Policy 9.3.2.1.12

Water quality objectives for the management of salmon farming within the Marlborough Sounds were set through the Board of Inquiry process. They provide the overall objective for the management of water quality effects, and set the high level framework for the development of an adaptive management approach to water quality. Including water quality outcomes equivalent to those objectives in the Plan provides overall guidance for consent applications for marine farming of salmon in Coastal Marine Zone 4.

Rule 35.3.3: Description and activity classification

Rule 35.3.3.1 has been prepared as if all six potential relocation sites will go ahead. The decision about how many potential relocation sites will proceed will not be made until after public consultation on the proposal. If fewer than six potential relocation sites are confirmed, the amendments to the Marlborough Sounds Resource Management Plan will be adjusted to reflect this.

An activity status of restricted discretionary (known in the Marlborough Sounds Resource Management Plan as Limited Discretionary) has been recommended for public consultation. Through the technical investigations that have been carried out to date it has been agreed that an adaptive management and staged development approach needs to be applied to the relocation sites, with confirmation through monitoring that feed discharge levels defined in relation to the management of benthic and water quality effects are correct. This adds a layer of complexity to the management of the sites that suggests that a discretionary activity status of some type should be applied.

However, it is important to recognise that one of the primary aims of the public consultation process on the potential relocation proposal is to establish whether potential sites should remain to be considered by the Minister. If effects at any site are not considered to be acceptable following public consultation, the site would be removed from the proposal, rather than being left to be considered at the consent stage. This means that for the sites that remain only a reduced number of issues may not be able to be fully resolved through the public consultation process. On this basis, a restricted discretionary activity classification has been recommended at this stage.

Rule 35.3.3.1: Requirements

For a restricted discretionary activity, section 87A of the Resource Management Act 1991 states that an activity must comply with the requirements, conditions and permissions, if any, specified in the plan. While the terminology differs from that typically used in the Marlborough Sounds Resource Management Plan, Rule 35.3.3.1 specifies the requirements that a consent holder must be prepared to comply with in order to be able to apply for a consent as a restricted discretionary activity.

Three requirements are specified:

- that an application must also be made under Rule 35B.2.1.2. This rule sets an allocation method for space in Coastal Marine Zone 4 which requires that salmon farming space in Coastal Marine Zone 2 is surrendered as part of the application process. The rule has been recommended to give effect to the relocation purpose of the proposal
- that a series of standards (listed in Appendix D4) are complied with as part of the operation of any consent issued under Rule 35.3.3. These standards have been developed based on the conditions imposed on the Waitata, Kopāua and Ngamahau sites granted through the Board of Inquiry process, with some adjustment to recognise changes in good practice since that time, including for example, the development of the Benthic Guidelines
- that a transfer of the consents for a particular Coastal Marine Zone 4 site from one consent holder to another cannot occur unless the Marlborough District Council has satisfied itself that the recipient of the transfer will also be apply to comply with the standards in the Plan. This is in order to ensure that the consent continues to give effect to its original restricted discretionary activity status.

Rule 35.3.3.2: Matters of discretion

Confined matters of discretion have been recommended, recognising that the standards in Appendix D4 (that any applicant under this rule must comply with) cover a wide range of matters. Of particular note, water quality effects in relation to the potential Tio Point relocation site remain a matter of discretion because of the potential effects on side bays and embayments on the southern side of Tory Channel discussed in section 7.2.9 of this summary AEE.

Rule 35.3.3.3: Notification

In recognition of the process that is being followed for the potential relocation proposal, and the objective to deal with as many issues through the public consultation process as possible, the rule contains a clause that public notification of consent applications will not occur. Limited notification (or the obtaining of written approvals from affected parties), including requirements under statutory acknowledgements for tangata whenua, is provided for, in recognition that localised effects may still require assessment at the consent stage.

Rule 35.4: Discretionary activity for existing mussel farms

At the potential Blowhole Point South and Horseshoe Bay sites, existing mussel farms that are currently located in Coastal Marine Zone 2 may become zoned Coastal Marine Zone 4 if the potential relocation proposal goes ahead. Amendments recommended to Rule 35.4 would ensure that if these farms are located within 50 – 200 metres from the low water mark there is a consenting pathway provided to them equivalent to that which exists for mussel farms in Coastal Marine Zone 2.

Neither of the existing mussel farms is able to comply with the requirements of Rule 35.2 and qualify for controlled activity status.

Rule 35.5: Non-complying activities

Two non-complying activities are recommended for inclusion in the Marlborough Sounds Resource Management Plan if the potential relocation proposal goes ahead.

The first rule covers marine farms for the farming of salmon in Coastal Marine Zone 4 that is not provided for under Rule 35.3.3. As the standard under Rule 35.5.5.1 is that any consent applicant must be relocating from an existing identified site in Coastal Marine Zone 2, the net effect of Rule 35.5 when compared to Rule 35.3.3 is that if a consent applicant does not want to comply with the standards listed in Appendix D4, the activity becomes non-complying. The Marlborough District Council would retain the discretion to publicly notify the application and to impose any consent conditions that fall within its functions and powers under the RMA.

The second non-complying rule provides an equivalent to the Coastal Marine Zone 2 rule for marine farming outside the 'coastal ribbon' to ensure that marine farming of species other than salmon is being provided for consistently throughout the Plan.

Rule 35.6: Prohibited activities

Three prohibited activities are recommended for inclusion in the Marlborough Sounds Resource Management Plan. Two of the rules relate to ensuring that once the existing lower flow salmon farm sites on Coastal Marine Zone 2 sites are relocated no further salmon farming can occur on those sites. Where the sites are owned by NZ King Salmon, the proposal is that those sites not be used for marine farming again. One of the existing lower flow salmon farm sites (the Crail Bay MFL032 site) is farmed by

a consent holder other than NZ King Salmon for mussel farming. The second prohibited activity rule recommended for inclusion provides that only salmon farming on that site would be prohibited, in order to ensure that existing mussel farming operations could continue.

The third prohibited rule is recommended for inclusion to make it clear that, if specific space in Coastal Marine Zone 1 and 2 cannot be surrendered as part of an application for space in Coastal Marine Zone 4, then no application is permitted.

Chapter 35B

As noted above, this rule sets an allocation method for space in Coastal Marine Zone 4 which requires that salmon farming space in Coastal Marine Zone 2 is surrendered as part of the application process. The rule has been recommended to give effect to the relocation purpose of the proposal.

It is important to note that the exact wording for the introduction to Rule 35B.2.1.2 is to be determined following public consultation, when the exact potential relocation sites are known and a definite site swap can be defined. If fewer than six relocation sites are still being considered after public consultation, then more than one existing low flow site may be relocated to one potential relocation site, and the rule would be more likely to be drafted as in the second bullet point.

Appendix D4

Appendix D4 lists the standards that would apply to marine farms seeking consent under Rule 35.3.3.1 as a restricted discretionary activity. As noted earlier, these standards have been developed based on those that were applied to sites consented through the Board of Inquiry process, with some adjustments to account for recent changes in good practice.

Of particular note:

- Standards 10 and 11 specify the surface area of sea pens and surface structures at the Coastal Marine Zone 4 sites. These areas are specified to ensure that the relocation proposal objective of no increase in the surface area of structures for salmon farming in the Marlborough Sounds is achieved.
- Standard 14 is specified on the basis that the landscape assessment for the potential relocation proposal has been prepared on the basis of circular plastic net pens being used at these three sites. These types of pens assist to mitigate adverse landscape and natural character effects.
- Standards 19 to 31 set out initial feed discharges, increases and overall maximums for each potential relocation site. As was done through the Board of Inquiry process, the limits outlined in Standard 19 have been set based on benthic effects. For the potential relocation proposal, an additional Standard has been included for the Pelorus Sound sites, to manage overall effects on water quality.

  The overall initial feed limit is currently recommended to be set at 6000 tonnes per annum. This figure has been considered in light of the Board of Inquiry process, which determined that two additional sites (Waitata and Kopāua) discharging at 4500 tonnes per annum initially were acceptable in addition to a modelled discharge of 9000 tonnes per annum from the existing salmon farm sites in Pelorus Sound. This gave a total initial feed discharge of 13,500 tonnes. Imposing an initial water quality limit of 6000 tonnes would give a total of 10,500 tonnes when combined with the Waitata and Kopāua site discharges, and is therefore a more conservative starting point than the Board of Inquiry adopted.

  The initial feed levels under Table 1 in Standard 22 are set at half of the maximum feed levels at which seabed enrichment is not expected to exceed ES5.0, in order to be conservative. This approach has been checked against the Board of Inquiry approach and has been found to be more conservative for all of the sites (see Appendix F).

  The maximum feed levels under Standard 24 for when overall discharges in Pelorus Sound are below 6000 tonnes per annum are set based on the benthic modelling, and represent figures at which seabed enrichment is not expected to exceed ES5.0. This approach is consistent with the approach the Board of Inquiry took to maximum feed levels. The exception is the Waitata mid-channel site, where the maximum feed level is set at the initial feed limit established for water quality purposes in order to ensure overall effects on water quality are managed. When discharges of up to 6000 tonnes per annum have been shown to not result in unacceptable benthic and water quality effects, the maximum discharge at the Waitata Mid-Channel site can rise to 7000 tonnes per annum under Standard 28. This level is significantly less than has been modelled as resulting in seabed enrichment that would not exceed ES5.0.

A number of approaches have been considered to the feed increase steps defined in Table 1 (Standard 22) and Table 2 (Standard 26).

In relation to Table 1, the Board of Inquiry process defined feed increases on the basis of classifying the sites as either highly dispersive or not, and providing a feed increase step for each type of site (1000T and 500T respectively). These feed increase steps represent a 33% increase on the initial levels at each type of site. Insufficient information is readily available from the Board of Inquiry process to be able to repeat the exercise for the potential relocation sites. There has been a broad level discussion with the scientists involved in both the current process and the Board of Inquiry process about whether feed increase steps should be included in the plan change, and if so, how they should be defined. The general advice is that feed increase steps should be included, as they provide a more definite framework for managing benthic effects, and recognise the desire to get as much certainty through the plan process.

Two ways of defining feed increases in the plan have been considered – defining 33% feed increase steps (which is the overall effect of the Board of Inquiry process), or further refining this approach to recognise the advice from scientists that, if thresholds are known, it is preferable to take smaller steps the closer you approach a threshold. The approach recommended is the latter and consists of:

- a starting feed level equal to half of the maximum feed level
- a first increase of 33% of that initial level, consistent with the current plan in percentage terms
- further steps are then defined on the basis of the difference between the existing feed level at the time an increase is being sought and the final maximum feed level – for most of the sites the first two of these further steps are 33%, and then the final difference between an existing feed level and the final maximum level is divided into two final increase steps
- an illustration may help to explain this, using the Blowhole South site

Start	2500T (half of the 5000T maximum level)
Increase 1	825T (33% of 2500T) The total discharge after increase 1 is then 3325T
Increase 2	550T (5000T max – 3325T current discharge = 1675T: 33% of this is 552T) The total discharge after increase 2 is 3875T
Increase 3	375T (5000T max – 3875T current discharge = 1125T: 33% of this is 371T) The total discharge after increase 3 is 4250T (note that the increase step has been rounded up to make the maths easier for the final two steps)
Increase 4	375T (5000T max – 4250T current discharge = 750T: 50% of this is 375T)
Increase 5	375T The remaining feed necessary to get to the maximum feed level of 5000T

While undeniably complicated, it offers an approach that scientific advice is most comfortable with in terms of smaller increases the closer to the benthic threshold of ES5.0 the overall discharge gets. It also introduces a further layer of conservatism to the Board of Inquiry process.

Slight variations to this overall scheme are suggested at the two smaller sites (Horseshoe Bay and Tio Point). The starting point at these sites is slightly higher due to economic viability reasons, so fewer steps are needed to get to the maximum feed level. For these two sites enough steps have still been built in to provide suitable checks and balances as the site is gradually developed.

An overall feed increase to manage effects on water quality is contained in Table 2. 1800 tonnes is recommended as an increase for a number of reasons:

- the 6000 tonnes initial cap, provides for two or three sites to be developed at the same time. 1800 tonnes is very slightly less than the total of the first increase steps for individual sites in three site combination scenarios that have been run to test the approach
- recognising that sites might be developed in a staggered fashion 1800 tonnes provides enough flexibility for one site to develop to full capacity and then another to be introduced. For example, NZ King Salmon might develop the Waitata Mid-Channel site to 6000 tonnes and then want to start another site. An 1800 tonne increase would then allow Horseshoe Bay to be developed at its initial feed level, or it would allow one of the other sites to be developed at somewhat below its initial feed level. 1800 tonnes also provides enough flexibility for two or more sites to be gradually developing and increasing as per Table 1.
- for the two Board of Inquiry sites in Pelorus Sound, the combined total of the initial feed levels is 4500 tonnes. This was seen as suitable from both a water quality perspective and a benthic perspective. The increases specified in the Plan for the Board of Inquiry sites allow a total increase of 1500 tonnes across the two sites. This is 33% of the total initial feed level of 4500 tonnes. For the potential relocation sites, the total initial feed level to control water quality effects is recommended to be 6000 tonnes. 1800 tonnes is 30% of the total initial feed level for water quality of 6000 tonnes, so is a more conservative approach.
- for the two Board of Inquiry sites in Pelorus Sound, the final combined total of feed discharges is 10,000 tonnes. The total increase of 1500 tonnes each time is 15% of this. For the potential relocation sites the final combined total of feed discharges is 23,000 tonnes. The water quality increase step of 1800 tonnes is just under 8%, so is a more conservative approach

The feed increases would also be carefully managed through the staged development and adaptive management process outlined in Standards 41 - 51, which clearly notes that a process would apply of either confirming increases or requiring decreases, based on the results of monitoring.

- Initial water quality standards have been specified in Standard 36, consistent with those currently applying to the Waitata, Kopāua, Ngamahau and Te Pangu sites, but also tying the standards to processes requiring standards to be subject to regular review and updating. The dissolved oxygen standard has been amended slightly to reflect recommendations contained in the 2015/2016 Annual Water Quality Recommendations for Ngamahau and Te Pangu Salmon Farms (Cawthron, 2016). Standard 36 is subject to Standard 37, which sets out the procedures to be followed in the event of exceedance of the water quality standards, and therefore recognise that some exceedance is possible (but that steps will be taken to return the marine farm site to compliance with Standard 36). The water quality objectives currently specified on the Waitata, Kopāua, Ngamahau and Te Pangu consents are not recommended for inclusion in the conditions. The objectives have been included in Policy 9.3.2.1.12, as noted earlier
- The Benthic Quality Standards specified in Standard 38 reflect the development of the Benthic Guidelines in 2014. These guidelines supersede the approach taken in the Board of Inquiry process to setting benthic quality standards (see conditions 39 and 40 of the consents for the Waitata site). Standard 38 is subject to Standard 39, which sets out the procedures to be followed in the event of exceedance of the benthic standards, and therefore recognise that some exceedance is possible (but that steps will be taken to return the marine farm site to compliance with Standard 38).

11.3 Addressing Effects Identified for the Potential Relocation Sites

Sections 6 – 10 of this summary AEE identify and assess a variety of different environmental effects. While a number of the effects would be addressed in determining whether sites should proceed following public consultation, Table 11-1 identifies where the potential amendments to the Marlborough Sounds Resource Management Plan address each of these effects. Effects in Table 11-1 are listed in the order in which they appear in the summary AEE rather than in a perceived order of importance.

Table 11-1: Effects addressed by potential amendments to the Marlborough Sounds Resource Management Plan

Potential effect	Potential amendment to MSRMP that addresses effect[352]
Landscape and natural character	• overall inclusion of site in final proposal • standards 12 - 16
Benthic effects	• overall inclusion of site in final proposal • matter of discretion f) • matter of discretion j) • matter of discretion k) • standards 19 – 31 • standards 38 and 39 • standard 40 • standards 41 – 51
Effects on King Shag	• overall inclusion of site in final proposal • matter of discretion g)
Tourism and recreation	• overall inclusion of site in final proposal • matter of discretion b) • matter of discretion d)
Navigation	• overall inclusion of site in final proposal • matter of discretion b) • matter of discretion c) • matter of discretion d) • standard 18
Heritage	• overall inclusion of site in final proposal
Noise	• overall inclusion of site in final proposal • standards 5 - 8
Residential amenity	• overall inclusion of site in final proposal • matter of discretion h) • standard 35 • standard 58
Water quality	• overall inclusion of site in final proposal • matter of discretion e) • matter of discretion j) • matter of discretion k) • standards 19 – 31 • standard 32 • standard 33 • standards 36 and 37 • standards 41 – 51
Biosecurity	• overall inclusion of site in final proposal • matter of discretion h) • standards 55 – 57
Disease	• overall inclusion of site in final proposal
Marine mammals	• overall inclusion of site in final proposal • matter of discretion h) • standards 53 – 54

[352] Note: matter of discretion refers to matters of discretion listed in Rule 35.3.3.3. Standards refers to standards listed in Appendix D4.

Potential effect	Potential amendment to MSRMP that addresses effect[352]
Fish	• overall inclusion of site in final proposal • matter of discretion k) • standard 45(h)
Underwater lighting	• standard 17 • standard 45(h)
Greywater discharges	• standard 34
Copper and zinc	• standard 40
Cultural effects	• overall inclusion of site in final proposal • matter of discretion a)

12 Resource Management Act 1991 s360A and B

Sections 360A and s360B of the RMA enable the Minister of Aquaculture to recommend a regulation that amends a regional coastal plan in relation to aquaculture. Sections 360A and 360B set out a number of requirements in relation to a recommendation from the Minister, including that:

- any amendment must not be inconsistent with, and is subject to, the other provisions of the RMA, including Part 7A (s360A(2)(b));
- the Minister must have regard to the provisions of the regional coastal plan that will be affected by the proposed regulations (s360B(2)(a));
- before making a recommendation, the Minister must have consulted with other Ministers, any regional council affected by the proposed regulations and the public and iwi authorities;
- before making a recommendation, the Minister must be satisfied that:
  - the proposed regulations are necessary or desirable for the management of aquaculture activities in accordance with the Government's policy for aquaculture in the coastal marine area (s360B(2)(c)(i));
  - the matters to be addressed by the proposed regulations are of regional or national significance (s360B(2)(c)(ii));
  - the regional coastal plan to be amended by the proposed regulations will continue to give effect to (s360B(2)(c)(iii))–
    - any national policy statement; and
    - any New Zealand coastal policy statement; and
    - any regional policy statement; and
  - the regional coastal plan as amended by the proposed regulations will not duplicate or conflict with any national environmental standard
- an evaluation report for the proposed regulations has been prepared in accordance with section 32 of the RMA and the Minister has had particular regard to that report when deciding whether to recommend the making of regulations (s360B(2)(d))

Each of these matters will be considered prior to the Minister making any decision about whether to recommend making regulations to amend the Marlborough Sounds Resource Management Plan. The discussion that follows provides some initial information on these matters.

12.1 Other Provisions of the Act

Part 2 of the RMA (sections 5 – 8) is relevant to any proposal to amend the Marlborough Sounds Resource Management Plan. In exercising his function to make a recommendation under sections 360A-C, the Minister must recognise and provide for the matters contained in section 6 of the RMA, have particular regard to the matters identified in section 7 of the RMA, and take into account the

principles of the Treaty of Waitangi under section 8 of the RMA. As any regulation would be made under the RMA, it must also be consistent with the purpose of the RMA, as outlined in section 5.

Section 5, and those parts of sections 6 – 8 that are considered relevant to the potential relocation proposal are outlined in section 3 of this summary AEE.

In relation to section 5:

- the social, economic and cultural wellbeing of the people and communities of the Marlborough Sounds has been considered throughout the process of commissioning technical investigations and selecting the six potential relocation sites that are being consulted on. Public consultation will help to further inform the Minister on the effects of the proposal on social, economic and cultural wellbeing
- life-supporting capacity, the needs of future generations and avoiding, remedying and mitigating any adverse effects have been the focus of a number of the technical investigations

In relation to section 6:

- the natural character of the coastal environment and effects on outstanding natural features and landscapes are assessed in the Landscape report
- significant habitats of indigenous fauna include feeding habitat for King Shag (as discussed in the Seabird Report and the Pelagic Fish Report) and the inshore reefs and notable ecological features outlined in the Benthic Report
- the relationship of Maori and their culture and traditions is continuing to be considered through the preparation of a Cultural Impact Assessment and ongoing consultation with tangata whenua

In relation to section 7:

- kaitiakitanga is continued to be considered through the preparation of a Cultural Impact Assessment and ongoing consultation with tangata whenua
- intrinsic values and the maintenance and enhancement of the quality of the environment has been evaluated in a number of the technical investigations (for example, in relation to water quality and benthic effects) prepared as part of the process to date
- efficient use and development of natural and physical resources and any finite characteristics of natural and physical resources underpin the selection of potential relocation sites and a number of the technical investigations (for example, the economic assessment, the benthic and water quality investigations) prepared as part of the process to date

The site discussions in sections 6 and 7 of this summary AEE, and the general effects discussion in section 8 of this summary AEE also address the matters listed above.

Through ongoing consultation with tangata whenua the proposal is being undertaken in accordance with the requirements of section 8 of the RMA.

A full assessment of the final proposal against the requirements of Part 2 of the RMA will be undertaken following public consultation and will be provided to the Minister to inform his decision about whether to recommend the making of a regulation.

Other provisions of the RMA that are considered to be relevant are section 32, and sections 63-70. Section 32 requires an evaluation of the extent to which the objectives of a proposal are the most appropriate way to achieve the purpose of the RMA, and an evaluation of whether the provisions of the proposal are the most appropriate way to achieve the objectives. A section 32 evaluation is a requirement under s360B(2)(d) before the Minister can make a recommendation to amend a regional coastal plan by regulation, and will be completed once public consultation has informed the proposal and a final proposal can be determined. Gathering of information to inform the section 32 evaluation has been ongoing throughout the preparation of the technical investigations and this summary AEE, and will continue through the public consultation process.

Sections 63-70 of the RMA set out the requirements for regional plans. The potential amendments to the Marlborough Sounds Resource Management Plan have been prepared to be consistent with the requirements of those sections of the RMA, and will continue to be evaluated as a result of public consultation.

12.2 The Regional Coastal Plan

The operative regional coastal plan for the Marlborough Sounds is contained within the Marlborough Sounds Resource Management Plan. The relevant provisions are outlined in section 3.4.2 of this summary AEE and have been considered in preparing the potential amendments to the Plan outlined in section 11.1.

12.3 Consultation

The public consultation process for the potential relocation proposal is outlined in the Consultation Document which can be found on the MPI website.

12.4 Government Policy for Aquaculture

The Government's policy for aquaculture is set out in the New Zealand Coastal Policy Statement 2010, the Aquaculture Strategy 2012,[353] and the Natural Resource Business Growth Agenda 2015,[354] and can be summarised as follows:

i. To recognise the significant existing and potential contribution of aquaculture to the social, economic and cultural well-being of people and communities by:
   (a) Including in regional policy statements and regional coastal plans provision for aquaculture activities in appropriate places in the coastal environment, recognising that relevant considerations may include:
      a. The need for high water quality for aquaculture activities; and
      b. The need for land-based facilities associated with marine farming;
   (b) Taking account of the social and economic benefits of aquaculture, including any available assessments of national and regional economic benefits; and
   (c) Ensuring that development in the coastal environment does not make water quality unfit for aquaculture activities in areas approved for the purpose;
ii. To support well-planned and sustainable aquaculture growth;
iii. To improve productivity while reducing environmental impact; and
iv. To support aquaculture development regionally.

Aquaculture policy cannot be seen in isolation however. It forms part of the Government's broader policy for use of the coastal marine area as articulated in the NZCPS. The Resource Management Act requires any regulations to continue to give effect to the NZCPS and this will be a critical matter for further assessment following consultation.

12.5 Regional or National Significance

While the regional and/or national significance of the issue will be determined following public consultation, the issue is of sufficient significance that it has been determined that consultation on a proposal is appropriate.

12.6 Other Statutory Documents

There are no national policy statements, other than the New Zealand Coastal Policy Statement, that are relevant to the potential relocation proposal.

The relevant provisions of the New Zealand Coastal Policy Statement are outlined in section 3.3.1 of this summary AEE. The relevant provisions from the Marlborough Regional Policy Statement 1995 are outlined in section 3.4.1 of this summary AEE. An initial assessment of the key policy matters has been undertaken and is outlined in sections 6, 7, 8 and 9 of this summary AEE. This initial assessment provides some indication of potential issues that will need to be addressed, but public consultation will provide further information to assist this assessment. A full analysis of the consistency of the final proposal with the New Zealand Coastal Policy Statement will be undertaken following public consultation

[353] Government's Aquaculture Strategy and Five-Year Action Plan to Support Aquaculture. 2012. http://www.fish.govt.nz/NR/rdonlyres/20A0ED89-A20B-4975-9E63 6B302187840D/0/AQUAStrat5yrplan2012.pdf
[354] Building Natural Resources Chapter 4: Business Growth Agenda, Towards 2025. Ministry of Business, Growth and Employment, 2015 http://www.mbie.govt.nz/info-services/business/business-growth-agenda/pdf-and-image-library/towards-2025/BGA%20Natural%20Resources%20Chapter.pdf.

and provided to the Minister to help inform his decision about whether to recommend the making of a regulation to amend the Marlborough Sounds Resource Management Plan.

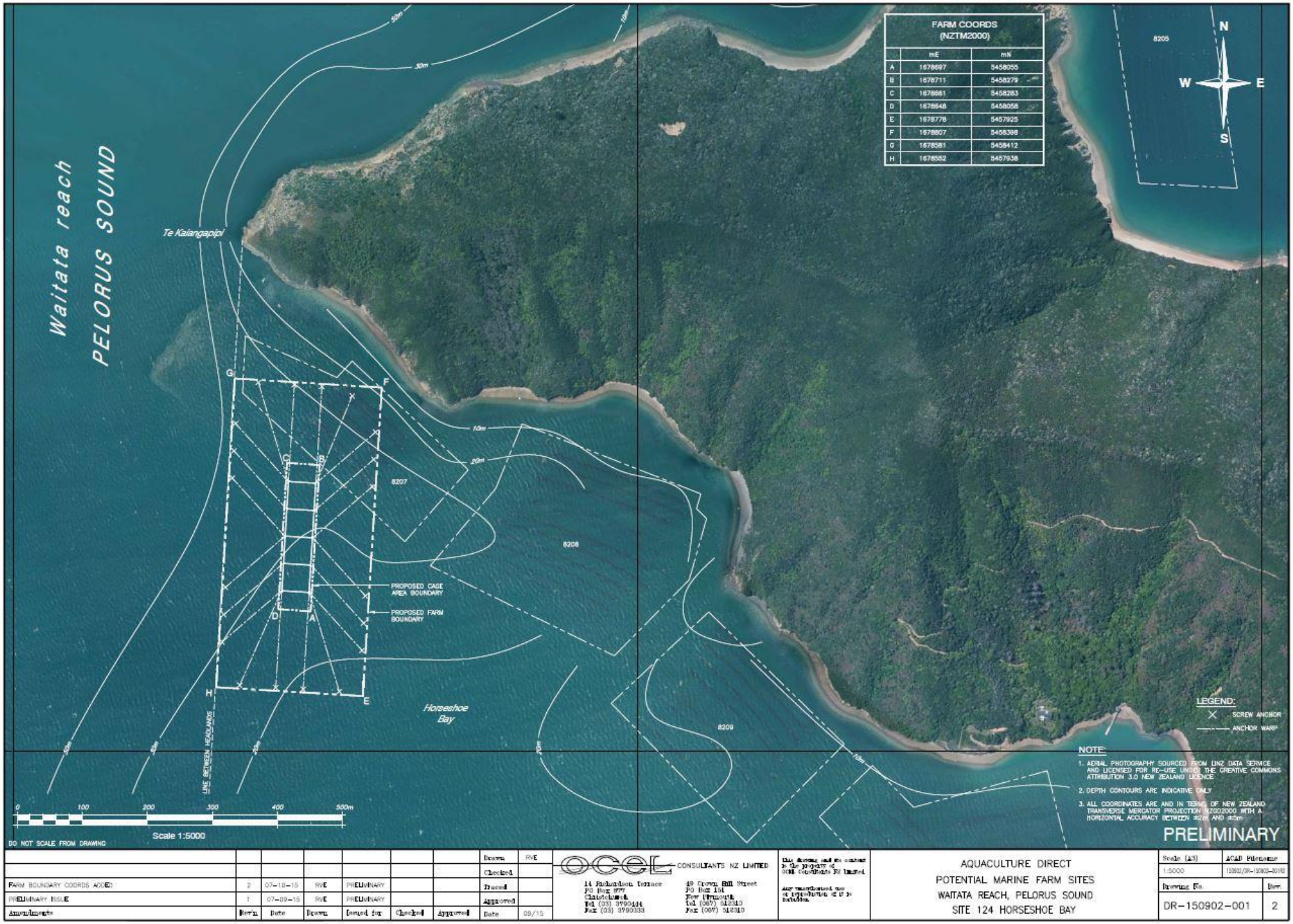
There are no national environmental standards that are relevant to the potential relocation proposal.

12.7 Summary

Each of the matters listed in sections 360A-C of the RMA that are relevant to the Minister's consideration of whether to recommend the making of a regulation to amend the Marlborough Sounds Resource Management Plan have been considered in developing the potential relocation proposal to date. A final determination of any of the matters has not been made, as it will be informed by public consultation.

Appendices

Appendix A Mooring Diagrams


Waitata reach
PELORUS SOUND
Te Kalangapipi
Horseshoe Bay
LINE BETWEEN HEADLANDS
PROPOSED CAGE AREA BOUNDARY
PROPOSED FARM BOUNDARY
8205
8207
8208
8209
50m
30m
10m
20m
FARM COORDS (NZTM2000)
mE mN
A 1678697 5458055
B 1678711 5458279
C 1678661 5458283
D 1678648 5458058
E 1678778 5457925
F 1678807 5458396
G 1678581 5458412
H 1678552 5457938
N
W E
S
LEGEND:
SCREW ANCHOR
ANCHOR WARP
NOTE:
1. AERIAL PHOTOGRAPHY SOURCED FROM LINZ DATA SERVICE AND LICENSED FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 3.0 NEW ZEALAND LICENCE.
2. DEPTH CONTOURS ARE INDICATIVE ONLY
3. ALL COORDINATES ARE AND IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR PROJECTION NZTM2000 WITH A HORIZONTAL ACCURACY BETWEEN ±2m AND ±5m
PRELIMINARY
0 100 200 300 400 500m
Scale 1:5000
DO NOT SCALE FROM DRAWING
FARM BOUNDARY COORDS ADDED 2 07-10-15 RVE PRELIMINARY
PRELIMINARY ISSUE 1 07-09-15 RVE PRELIMINARY
Amendments Item Date Drawn Issued for Checked Approved Date
Drawn RVE
Checked
Traced
Approved
Date 09/15
CONSULTANTS NZ LIMITED
14 Richardson Terrace PO Box 877 Christchurch Tel (03) 3990444 Fax (03) 3990333
48 Crown Hill Street PO Box 104 New Plymouth Tel (069) 512810 Fax (069) 512810
AQUACULTURE DIRECT
POTENTIAL MARINE FARM SITES
WAITATA REACH, PELORUS SOUND
SITE 124 HORSESHOE BAY
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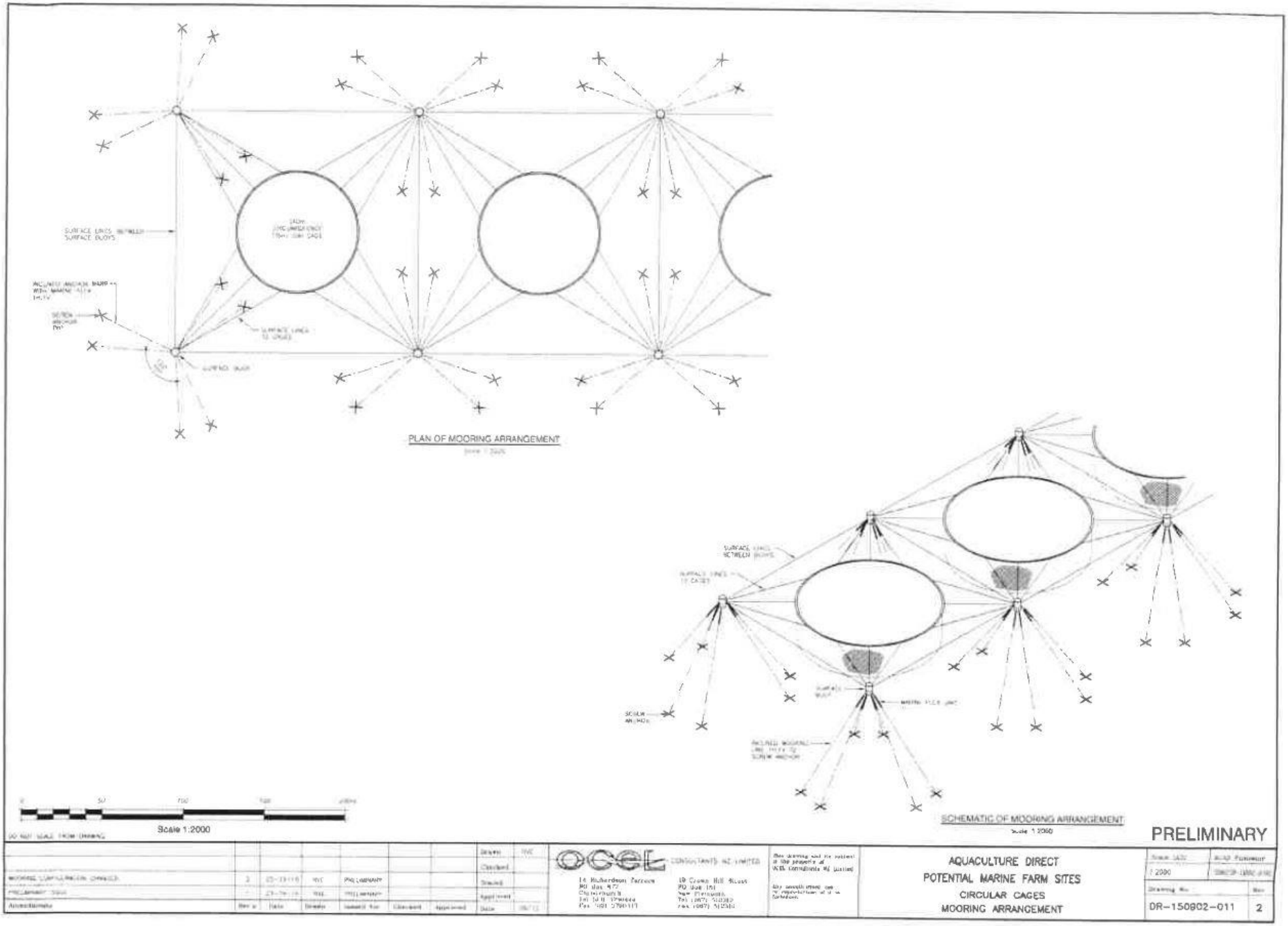
ACAD Filename
Drawing No. DR-150902-001
Rev. 2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SCHEMATIC OF MOORING ARRANGEMENT
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POTENTIAL MARINE FARM SITES
CIRCULAR CAGES
MOORING ARRANGEMENT
DR-150902-011
2

Appendix B Seabirds in Marlborough

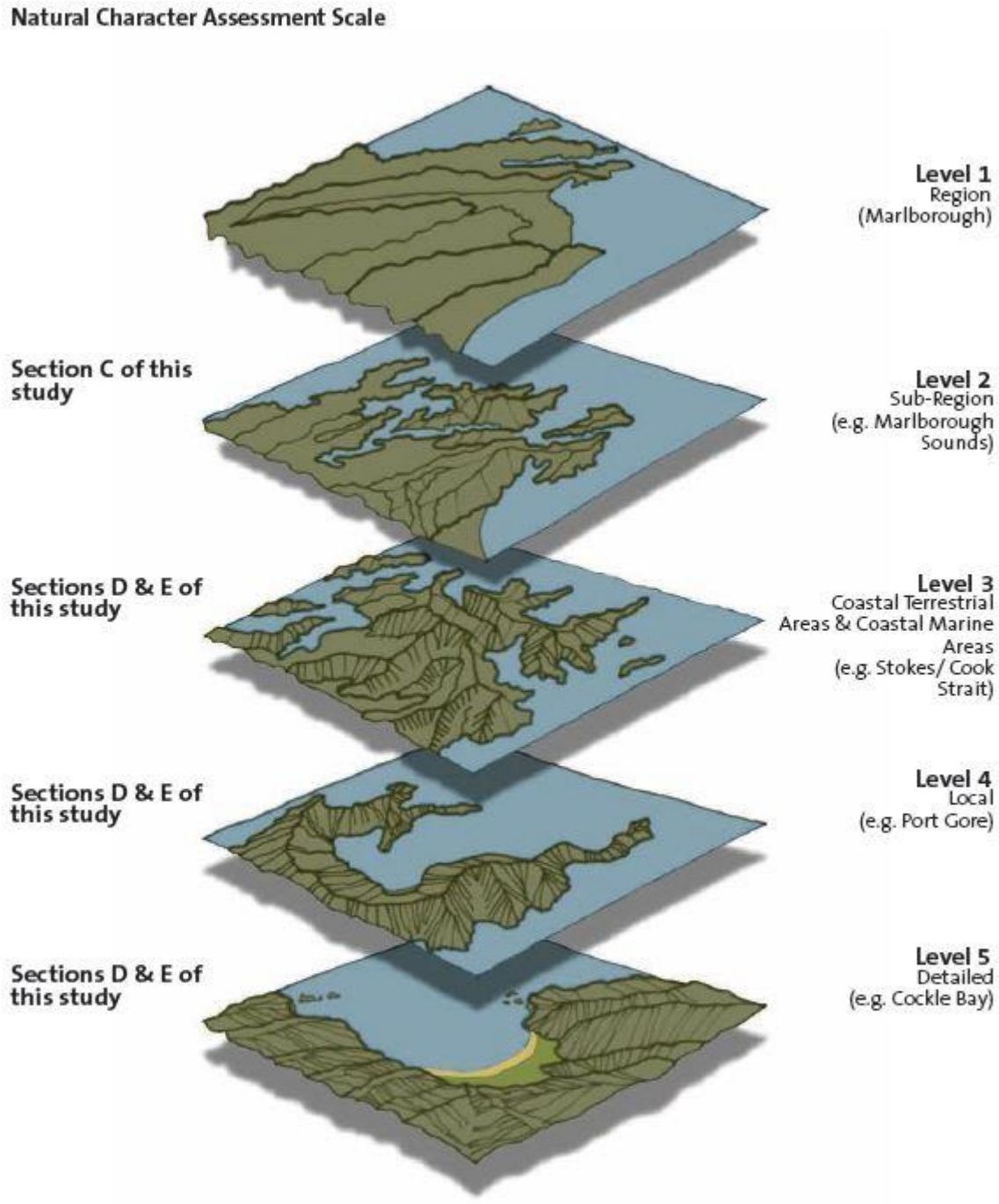
Seabirds recorded in the Marlborough Sounds are noted in the following table.[355]

Species	Scientific Name	Conservation status	Breeding in Marlborough Sounds?
NZ King Shag	*Leucocarbo carunculatus*	Nationally Endangered	Yes
Black-billed Gull	*Larus bulleri*	Nationally Endangered	No
Black-fronted Tern	*Chlidonias albostriatus*	Nationally Endangered	No
Gibson's Albatross	*Diomedea antipodensis gibsoni*	Nationally Vulnerable	No
Salvin's Mollymawk	*Thalossarche salvini*	Nationally Vulnerable	No
Pied Shag	*Phalacrocorax varius*	Nationally Vulnerable	Yes
Reef Heron	*Egretta sacra*	Nationally Vulnerable	Yes
Red-billed Gull	*Larus novaehollandiae scopulinus*	Nationally Vulnerable	Yes
Caspian Tern	*Hydroprogne caspia*	Nationally Vulnerable	No
Blue Penguin	*Eudyptula minor*	At Risk – Declining	Yes
White-capped Mollymawk	*Thalassarche cauta steadi*	At Risk – Declining	No
White-chinned Petrel	*Procellaria aequinoctialis*	At Risk – Declining	No
Sooty Shearwater	*Puffinus griseus*	At Risk – Declining	No
Flesh-footed Shearwater	*Puffinus cameipes*	At Risk – Declining	No
Hutton's Shearwater	*Puffinus huttoni*	At Risk – Declining	No
NZ Pied Oystercatcher	*Haemotopus finischi*	At Risk – Declining	No
White-fronted Tern	*Sterna striata*	At Risk – Declining	?
Fluttering shearwater	*Puffinus gavial*	Relict	Yes
Diving Petrel	*Pelecanoides urinatrix*	Relict	No
Fairy Prion	*Pachyptila turtur*	Relict	Yes
Cook's Petrel	*Pterodroma cookie*	Relict	No

[355] Source: Sagar, P. (2011) Assessment of potential environmental effects of the proposed king Salmon expansion on seabirds, with particular reference to the NZ King Shag, p.10

Species	Scientific Name	Conservation status	Breeding in Marlborough Sounds?
Campbell Molymawk	*Thalassarche impavidua*	Naturally Uncommon	No
Northern Royal Albatross	*Diomedea epomophora sanfordii*	Naturally Uncommon	No
Southern Royal Albatross	*Diomedea e. epomorpha*	Naturally Uncommon	No
Northern Buller's Mollymawk	*Thallassarche bulleri platei*	Naturally Uncommon	No
Southern Buller's Mollymawk	*Thallassarche b. bulleri*	Naturally Uncommon	No
Westland Petrel	*Procellaria westlandica*	Naturally Uncommon	No
Northern Giant Petrel	*Macronectes halii*	Naturally Uncommon	No
Snares Cape Petrel	*Daption capense australe*	Naturally Uncommon	No
Buller's Shearwater	*Puffinus bulleri*	Naturally Uncommon	No
Antarctic Prion	*Pachyptila desolata*	Naturally Uncommon	No
Black Shag	*Phalacrocorax carbo*	Naturally Uncommon	Yes?
Little Shag	*Phalacrocorax melanoleucos brevirostris*	Naturally Uncommon	Yes?

Appendix C Marlborough Natural Character Assessment Levels



Source: Marlborough Natural Character Study 2014

Appendix D Water Quality Modelling Scenarios in Tory Channel

The scenarios modelled in the Tory and Queen Charlotte Sound geographical area are outlined in the table below.[356]

Scenario	Description
Operating farms	This scenario included all mussel farms that were in operation in 2010 (as revealed in an aerial survey) and the four salmon farms operating at that time – Ruakaka, Otanerau, Clay Point and Te Pangu). NZ King Salmon provided fish farm characteristics (monthly stock size distribution and feed inputs) and the period 24 May 2012 to 6 October 2013 was modelled based on this information.
Baseline$_{f2016}$	Currently allocated mussel and salmon farm space. In this scenario, all water-space that has already been allocated for mussel farming was assumed to be occupied. Similarly, all five currently operating salmon farms were included, with the full annual consented feed discharge at the Ngamahau site (4000T) included, and historical feed data from 1 May 2012 – 31 October 2013 used for the other four salmon farms.
Baseline + Tipi	As for the baseline scenario, but with a potential farm at Tipi Bay added (with an annual feed input of 2000 tonne)
Baseline + Motu	As for the baseline scenario, but with a potential farm at Motukina added (with an annual feed input of 5000 tonne)
Baseline + Weka	As for the baseline scenario, but with a potential farm at Te Weka added (with an annual feed input of 5000 tonne)
Baseline + Tipi + Motu	As for the baseline scenario, but with a potential farm at both Tipi Bay and Motukina added (with annual feed inputs of 2000 tonne and 5000 tonne respectively)
Baseline + Tipi + Oyster	As for the baseline scenario, but with a potential farm at both Tipi Bay and Tio Point (Oyster Bay) added (with feed inputs of 2000 and 3000 tonne respectively)
Baseline + Tipi + Motu + Weka	As for the baseline scenario, but with a potential farm at Tipi Bay, Motukina and Te Weka added (with feed inputs of 2000, 5000 and 5000 tonne respectively)
Baseline + Tipi + Oyster + Motu	As for the baseline scenario, but with a potential farm at Tipi Bay, Tio Point and Motukina added (with feed inputs of 2000, 3000 and 5000 tonne respectively)
Swapped farms 1	As for the Baseline + Tipi + Motu + Weka scenario, but without Ruakaka and Otanerau – to reflect the relocation nature of the proposal

[356] NIWA (2016) Additional salmon farms in Tory Channel: an assessment of effects on water-quality using a biophysical model (Oyster Bay, Tipi Bay and Motukina Point)
NIWA (2016) Additional salmon farms in Tory Channel: an assessment of effects on water-quality using a biophysical model

Scenario	Description
Swapped farms 2	As for the Baseline + Tipi + Oyster + Motu, but with a potential farm at Te Weka (5000 tonne annual feed input) and without Ruakaka and Otanerau – to reflect the relocation nature of the proposal and the possible addition of a farm at Tio Point

Appendix E Finfish and Shark Species in the Marlborough Sounds

Finfish and shark species listed by Bell (2001), Davey et al (2008), and Morrisey et al (2006), as occurring in the Marlborough Sounds, and locations relevant to the NZ King Salmon project where Bell (2001) and Davey et al (2008) recorded their occurrence are listed in the following table; ticks indicate those species listed by Morrisey et al (2006).[357]

Species	Common name	Family	Morrisey	Bell	Davey
Pelagic finfish					
Aldrichetta forsteri	**Yellow-eyed mullet	Mugilidae	✓		c
Arripis trutta	Kahawai	Arripidae	✓	a,b,c,d	a,b,c,d
Engraulis australis	Anchovy	Engraulididae	✓		*
Hyporhamphus ihi	Garfish/Piper	Hemiramphidae	✓		e
Pseudocaranx dentex	Trevally	Carangidae			c
Sardinops neopilchardus	**Pilchard	Clupeidae	✓		*
Seriola lalandi	Yellowtail kingfish	Carangidae	✓		c
Seriolella brama	Warehou	Centrolophidae			d
Thyristes atun	Barracouta	Gempylidae	✓	a,b,c,d	a,b,c,d
Trachurus novaezelandiae	Jack mackerel	Carangidae	✓		a
Zeus faber	John dory	Zeidae	✓		a
	**Herring				c
Reef/rocky bottom species					
Aplodactylus arctidens	Marblefish	Aplodactylidae			d
Caesioperca lepidoptera	Butterfly perch	Serranidae			c
Cheilodactylus spectabilis	Red moki	Cheilodactylidae			e
Conger spp.	Conger eel	Congridae			b
Table 1: *continued*					
Species	Common name	Family	Morrisey	Bell	Davey
Forsterygion spp.	Triplefin	Tripterygiidae	✓		
Grahamina spp.	Triplefin	Tripterygiidae	✓		
Helicolenus percoides†	Sea perch	Scorpaenidae		a,b,c,d	a,b,c,d
Hippocampus abdominalis	Seahorse	Syngnathidae	✓		
Latridopsis ciliaris	Blue moki	Latrididae		a,c,d	a,b,c,d
Latris lineate	Trumpeter	Latrididae			c,d
Notolabrus celidotus	Spotty	Labridae	✓		a,c,d
Notolabrus fucicola	Banded wrasse	Labridae			e

[357] Taylor, P & Dempster, T. (2016) Effects of salmon farming on the pelagic habitat and fish fauna of the Marlborough Sounds and management options for avoiding, remedying and mitigation adverse effect, p. 7-8

Species	Common name	Family	Morrisey	Bell	Davey
Odax pullus	Butterfish	Odacidae			a,b,c,d
Parika scaber	Leather jacket	Monacanthidae	✓		d
Pseudolabrus miles	Scarlet wrasse	Labridae		‡a,b,c,d	a,c,d
Lotella rhacinus	Rock cod	Moridae			e
Ruanoho spp.	Triplefin	Tripterygiidae	✓		
Scorpaena papillosus†	Dwarf scorpionfish	Scorpaenidae			a
Scorpis lineolatus	Sweep	Kyphosidae			e
Stigmatopora spp.	Pipefishes	Syngnathidae	✓		
Lissocampus spp.	Pipefishes	Syngnathidae	✓		
Benthic/Demersal species					
Chelidonichthys kumu	(Red) Gurnard	Triglidae		a,b,c	b,c
Nemadactylus macropterus	Tarakihi	Cheilodactylidae		a,b,c,d	a,b,c,d
Pagrus auratus	Snapper	Sparidae	✓	a,c	a,b,c
Parapercis colias	Blue cod	Pinguipedidae		a,b,c,d	a,b,c,d
Pelotretis/Peltorhamphus spp.	Sole	Pleuronectidae			e
Polyprion oxygeneios	Hapuku	Percichthyidae			b,c,d
Pseudophycis bachus	Red cod	Moridae		a,c	a,c
Rhombosolea spp.	Flounder	Pleuronectidae			c
Unspecified	Stargazer	Leptoscpidae			b,c
Sharks					
Alopias vulpinus	Thresher shark	Aulopiidae			e
Galeorhinus galeus	Sand shark	Triakidae			
Mustelus lenticulatus	Rig	Triakidae			b,d
Notorynchus cepedianus	Seven-gill shark	Hexanchidae			e
Squalus acanthias	Spiny dogfish	Squalidae		a,c	a,b,c
Other Elasmobranchs					
Unspecified	Stingray	Dasyatidae			e
Myliobatis tenuicaudatus	Eagle ray	Myliobatidae			e
Unspecified	Skate	Rajidae			c

* Not included in lists by Davey et al (2008), but unlikely targets for fishers.
**Pilchard, herring, yellow-eyed mullet, and sprat sometimes misidentified for each other; herring was included in lists by Davey et al (2008).
†There may be some confusion in separating these two species.
‡Only "wrasse" specified by Bell (2001); some could be the banded wrasse, *Notolabrus fucicola*.
a —Waitata and Richmond; b — Port Gore; c — Ruakaka and Otanerau; d —Tory Channel; e — elsewhere in Marlborough Sounds.
Morrisey is Morrisey et al (2006); Bell is Bell (2001); Davey is Davey et al (2008).

Appendix F Derivation of Feed Limits

Three feed levels were set through the BoI work, based on work done by Cawthron for the application:

- Maximum Conceivable Feed Level (MCFL) – upper limit for a site that could conceivably be achieved without 'excessively impacting' the seabed, on the basis of DEPOMOD modelling. MCFL = ES5 according to the model, although sometimes (e.g. Richmond/Kopāua and Ngamahau) this was adjusted upwards if it was felt that the model result was conservative
- Predicted Sustainable Feed Level (PSFL) – the best estimate of the amount of feed a site could assimilate without seabed effects becoming unacceptable, on the basis of verified DEPOMOD modelling. DEPOMOD had been verified up to 4000T by using the Clay Point and Te Pangu sites, and so reasonable confidence could be expressed in the results. The PSFL was therefore one of:
- Recommended Initial Feed Level (RIFL) – 75% of the PSFL as a 'conservative' place to start feed discharges

A further general constraint was imposed on the benthic sustainability of those levels, by aiming to keep the footprint affected by deposition at greater than ES3 to 20ha or less

Cawthron introduced an additional factor by not always using the modelled feed level as the MCFL, but adjusting it upwards if they felt the modelled result was too conservative.

For Waitata:

- The initial modelled feed level was 6000T, which gave a footprint of 28ha. This became the MCFL
- The PSFL was adjusted down to 4000T, recognised that this was all that DEPOMOD could be verified against, which gave a footprint of 24ha
- The RIFL was 75% of the PSFL, which is 3000T (footprint 21ha)

For Richmond/Kopaua

- The initial modelled feed level was 2000T, but as Cawthron considered this 'conservative' based on experience with Clay Point and Te Pangu, the MCFL was set at 4000T, which gave a footprint of 12 ha
- The PSFL was 2000T
- The RIFL was 75% of the PSFL, which is 1500T

Using the same logic for all of the sites except the Waitata mid-channel site, and contrasting the 2011 and 2016 approaches:

Site	Half MCFL (2016 approach)	RIFL (75% of PSFL) (2011 approach)	PSFL (ES5 or 4000T if ES5>4000T) (2011 approach)	MCFL (ES5) (2011 and 2016 approach to max feed levels)	Footprint (at 1kg/m^2/yr) (2016)
BHN	2250	3000	4000	4500	15
BHS	2500	3000	4000	5000	20
RBS	2500	3000	4000	5000	22
HSB	1000	1125	1500	1500	8
Tio	1000	1200	1600	1600	4.5

Note that NIWA has followed the same approach as Cawthron and modelled a feed discharge that will be compliant with ES5, this is the MCFL in the table above.

For all these sites, the approach in the plan change therefore remains more conservative than it would have been under the Board of Inquiry approach. In the case of the 2016 sites, there are no instances where the initially modelled value (the MCFL in the table above) has been increased as it was for some of the sites in 2011.

For the Waitata mid-channel site, the MCFL is 12,000T according to the NIWA report. However, discussions internally at the Ministry for Primary Industries, have led to a decision to reduce the MCFL to 7000T. Undertaking the same contrast as for the other sites above:

Site	Half MCFL (2016 approach)	RIFL (75% of PSFL) (2011 approach)	PSFL (ES5 or 4000T if ES5>4000T) (2011 approach)	MCFL (ES5) (adjusted figure)	Footprint (at 1kg/m^2/yr) (2016)
WMC	3500	3000	4000	7000	28

In this case, the 2016 approach is less conservative. However, discussions with a group of scientists convened to give general advice on the feed levels on 26 October 2016 did not convey any significant concerns with increasing the Waitata mid-channel site initial feed level to keep it in line with the overall approach adopted to the 2016 sites. Advice from Nigel Keeley (the author of the original 2011 report) was also that the half MCFL approach was probably suitably conservative. Note also that this advice was received on the basis of a discussion on the modelled MCFL of 12000T, which resulted in an initial feed level of 6000T, significantly in excess of the initial feed discharge now proposed.

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