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Tini a Tangaroa

National Environmental Standard for Marine Aquaculture

Draft Section 32 Evaluation Report

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Executive Summary

Aquaculture contributes to the economic well-being of towns and communities throughout New Zealand, through farming, processing and support industries. Over the next 7 years, consents for up to 689 existing marine farms (60% of the total current marine farms) will expire, with consents for 602 of those farms (52%) expiring at the end of 2024. Under the existing planning framework replacement consenting for existing marine farms, realignment of existing farms and change of species on existing farms can be complex and uncertain, which is undermining confidence in the industry. Most of those consents were granted prior to the Resource Management Act 1991. Conditions on these consents often do not represent current best environmental practice and there was little or no consideration of tangata whenua values. In addition to the replacement consenting issues, biosecurity is a key risk to both the New Zealand coastal environment and the aquaculture industry, and measures to manage on-farm marine biosecurity are currently not consistent across the country.

To address these issues, the Minister for the Environment and the Minister of Fisheries propose to recommend to the Governor-General the making of a National Environmental Standard for Marine Aquaculture, under section 43 of the Resource Management Act 1991. The policy objective of the proposed NESMA is to:

> *Develop a more consistent and efficient regional planning framework for the management of existing marine aquaculture activities and on-farm biosecurity management, while supporting sustainable aquaculture within environmental limits.*

The proposed NESMA has been refined over several years, and through consultation, to ensure the provisions (rules and requirements) are efficient, effective and achieve the policy objective by:

- providing a more certain and efficient replacement consent, realignment and change of species application process for existing marine farms, while ensuring farms meet best environmental practice; and
- implementing consistent biosecurity management requirements on all marine farms.

The purpose of this report is to provide an evaluation of the proposed NESMA in accordance with section 32 of the Resource Management Act 1991. Section 32 requires an evaluation of a proposal (including a proposed national environmental standard) to determine whether:

- The objectives of the proposal are appropriate to achieve the purpose of the Act; and
- The provisions of the proposal are the most appropriate to achieve those objectives, based on an assessment of efficiency, effectiveness, benefits, costs and risks.

The key findings of this evaluation are as follows:

- **Policy objective:** the policy objective of the proposed NESMA is considered to be the most appropriate option to achieve the purpose of the RMA. The policy objective is focused on developing a consistent and efficient regional planning framework and supporting sustainable aquaculture within environmental limits. Consistent with the purpose of the RMA efficient and consistent processes will provide for the economic and social well-being of the community in general, while ensuring that marine farming continues to sustain the potential of the natural and physical resources of the coastal marine area to meet the needs of future generations, safeguarding the life-supporting capacity of water and ecosystems in the coastal marine area, and avoiding, remedying or mitigating the adverse effects of marine farming on the environment. A more consistent and efficient planning framework will set a consistent set of provisions for addressing the environmental effects of existing marine farms, and of changing species on marine farms, and will require comprehensive and consistent management of on-farm biosecurity in relation to those issues and practices that are within the jurisdiction of the RMA.
- **Other reasonably practicable options:** Two main alternatives to the policy objective were considered – doing nothing, or undertaking initiatives to build social licence for aquaculture. The proposed NESMA was considered the most appropriate option, as it would achieve national consistency in plan provisions and set out an efficient framework for processing considering applications for replacement consent, realignment and change of species on existing marine farms.

- **Effectiveness assessment:** the evaluation contained in this report found that the proposed NESMA provisions would be effective in providing a consistent and efficient regional planning framework that would continue to manage marine aquaculture within environmental limits. In particular:
    - For replacement consents for, realignment of, and change of species on existing marine farms, a restricted discretionary activity with nationally defined matters of discretion would provide a consistent framework for all existing marine farms. Matters of discretion can be used to ensure that marine farming continues to occur within environmental limits.
    - With respect to on-farm biosecurity management, the proposed NESMA will lead to a consistent requirement for the preparation of on-farm biosecurity management plans for all existing and new marine farms, for all species. Contents of plans will be required to meet the standards of an externally referenced technical document, which will allow some flexibility to address site specific circumstances, so some variation in approaches across marine farms is likely to remain, but within an overall consistent framework.
- **Efficiency assessment:** the evaluation found that the proposed NESMA provisions will be efficiency, based on an assessment of the benefits and costs anticipated from the implementation of the provisions. In economic terms, the benefits of the proposed NESMA will exceed the costs, and this has been confirmed in an independent CBA. In particular:
    - The evaluation contained in this report has concluded that there will be environmental costs and benefits as a result of the implementation of the proposed NESMA replacement consent provisions (with costs and benefits arising differently in different regions) but that none of the effects that give rise to these costs and benefits are significant. For realignment there is an overall environmental benefit to enabling consent applications to be made to relocate existing marine farms away from areas where they may be causing adverse effects, and there may be a productivity benefit as well.
    - Improved certainty has a number of impacts under the independent CBA. Having an NESMA gives the industry confidence that it has regulatory support, and underpins the licence to farm.
    - The proposed NESMA has the benefit that it would result in improved biosecurity along the aquaculture pathway, ensuring that at the farm level best practice is followed consistently across New Zealand.
    - The proposed NESMA also has the benefit of ensuring consistent rules across New Zealand, which will bring further certainty to environmental outcomes, industry, government and communities.
    - The proposed NESMA could have an overall economic cost over the course twenty years (at a discount rate of 6%) of between $2.7M and $27.7M, and benefits of between $13.1M and $48.5M (depending on whether per farm or per management area biosecurity management plans are required).
- **Risks of acting where there is uncertain or insufficient information:** Significant information is available on the effects of existing marine farms and marine biosecurity incursions and there is a high level of confidence that the proposed NESMA will result in benefits, particularly in relation to improved certainty of process and the continued management of marine aquaculture within environmental limits. However, there are inevitably some information gaps and uncertainties in this evaluation. In particular:
    - The benefits and costs of many of the environmental, social and cultural effects cannot be quantified and are subjective. Costs and benefits may therefore be greater or lower than anticipated in this analysis;
    - The economic costs and benefits identified are widely variable, depending on whether a per farm or per management area approach to on-farm biosecurity management plans is instituted;
    - There is a degree of uncertainty about which councils will introduce more stringent or more lenient provisions, as provided for by different parts of the proposed NESMA. This may have an effect on the overall costs and benefits of the proposal.

  These potential risks will be mitigated through a comprehensive implementation package and a proactive monitoring and evaluation programme to ensure the proposed NESMA is achieving its objective. The monitoring and evaluation programme will also provide a basis for continuous

improvement of the NESMA to recognise improvements in best practice for the management of marine aquaculture.

Overall, this evaluation has demonstrated that the proposed NESMA policy objective is the most appropriate to achieve the purpose of the RMA, and the proposed NESMA provisions will be effective and efficient to continue to manage marine aquaculture within environmental limits while increasing consistency and efficiency in the management of those activities under the RMA.

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1. Introduction

1.1 Overview

The Minister for the Environment and the Minister of Fisheries propose to recommend to the Governor-General the making of a National Environmental Standard for Marine Aquaculture (the proposed NESMA), under section 43 of the Resource Management Act 1991 (the RMA). The policy objective of the proposed NESMA is to:

> *Develop a more consistent and efficient regional planning framework for the management of existing marine aquaculture activities and on-farm biosecurity management, while supporting sustainable aquaculture within environmental limits.*

This report provides an evaluation of the proposed NESMA in accordance with section 32 of the RMA. Section 32 requires an evaluation of a proposal (noting that the term 'proposal' includes proposed national environmental standards) to determine:

- the extent to which the objectives of a proposal are the most appropriate way to achieve the purpose of the RMA;
- whether the provisions in the proposal are the most appropriate way to achieve the objectives – assessed by considering the effects, benefits and costs that are anticipated to arise from the implementation of a proposal and on the basis of these the effectiveness, efficiency and risks of the proposal.

This evaluation should be read alongside the summary of submissions and recommended amendments to the proposed NESMA (the section 46A report). A series of appendices are also provided to this report that provide a number of technical assessments and reports that have informed the development of the proposed NESMA.

The term 'proposed NESMA' used throughout this evaluation report refers to the proposed NESMA as if the amendments recommended in the section 46A report have been made.

1.2 National Environmental Standards

A national environmental standard (NES) is a regulation that applies nationally or within a specified part of New Zealand. They are binding on local authorities and local authorities must observe an NES (section 44A(7)) and enforce the observation of the NES to the extent to which their powers enable them to do so (section 44(8)). An NES may prescribe standards for matters referred to in sections 9, 11, 12, 13, 14 or 15 of the RMA (section 43(1)(a)) and, if it allows a resource consent to be granted for an activity, may state the activity classification and matters of control or discretion (section 43A(6)). Regulations may also include (section 43(2)(a)-(f)):

- qualitative or quantitative standards;
- standards for any discharge or the ambient environment;
- methods for classifying a natural or physical resource;
- methods, processes, or technology to implement standards;
- non-technical methods or requirements;
- exemption from standards;
- transitional provisions for standards, methods, or requirements.

Section 44 of the RMA sets out statutory prerequisites that must be adhered to prior to making an NES. This section requires the Minister for the Environment to:

- comply with section 46A(3) of the RMA;
- prepare an evaluation report for the NES in accordance with section 32 of the RMA;
- have particular regard to that report when deciding whether to recommend the making of a standard;
- publicly notify a report and recommendations made to the Minister on the submissions and the subject matter of the NES (section 46A(4)(c)).

The full text of the relevant sections of the RMA is included in **Appendix A**.

1.3 Proposed National Environmental Standard for Marine Aquaculture (the Proposed NESMA)

The proposed NESMA seeks to achieve the policy objective outlined above by setting nationally consistent rules and requirements for regional councils[1] to:

- providing a more certain and efficient replacement consent, realignment and change of species application process for existing marine farms, while ensuring farms meet best environmental practice; and
- implement consistent biosecurity management requirements on all marine farms.

Consents for most existing marine farms will be classified as restricted discretionary activities, with a consistent set of matters of discretion to be applied in decision making. The potential need for realignment of existing marine farms, particularly to reduce environmental effects or to remove them from within outstanding natural features, outstanding natural landscapes or areas of outstanding natural character is recognised, with a consistent set of matters to consider provided. In order to recognise the desire of marine farmers to innovate, a set of nationally consistent rules for replacement consents that also involve a change of species have been proposed.

The proposed NESMA recognises that regional coastal plans are required to give effect to the New Zealand Coastal Policy Statement 2010 (the NZCPS) and that second-generation coastal plans are being developed by regional councils. Policies 7 and 8 of the NZCPS are particularly relevant in terms of second-generation plans, with their requirement for strategic planning and the identification of areas that are appropriate or inappropriate for aquaculture. Provisions are included in the proposed NESMA to recognise those future planning processes, and to classify replacement consents for existing marine farms as discretionary activities in areas that in the future are identified in regional coastal plans as inappropriate for aquaculture.

The proposed NESMA seeks to implement consistent biosecurity management requirements by requiring that all marine farms (existing and new) prepare, implement and keep up to date biosecurity management plans to manage biosecurity risks from farm activities and protect all users of the marine environment from pests and diseases.

The NESMA generally takes precedence over rules in regional coastal plans. However, the NESMA allows councils to impose more lenient rules in some circumstances and more stringent rules in others. These circumstances are limited to when:

- plan rules developed through an RMA Schedule 1 process have a controlled activity status - these more lenient rules are allowed by the NESMA to be retained);
- as note previously, where plan rules identify an area as inappropriate for aquaculture and the plan has adopted a more stringent activity status than discretionary (such as non-complying) - these more stringent rules can be retained.

1.4 Development of NESMA

The proposed NESMA has been developed and refined over the past five years to ensure the provisions are efficient, effective and will achieve the policy objective. The Ministry for Primary Industries has led the work to assess the problem for existing marine aquaculture that is addressed by the proposed NESMA, working in collaboration with the Ministry for the Environment and the Department of Conservation. A summary of the development of the NESMA is provided in Table 1-1 below.

Table 1-1: Summary of development of NESMA

Stage	Focus of work
Evaluation of tools for national direction for marine aquaculture 2013-2015	As discussed in section 3 of this report, background analysis was undertaken over a two year period to analyse and decide the most appropriate tool for national direction for marine aquaculture. The work was led by the Ministry for Primary Industries, working in conjunction with the Ministry for the Environment and the Department of Conservation.

[1] In this report the term 'regional councils' refers to both regional councils and unitary authorities.

Stage	Focus of work
Development of subject matter of proposed NESMA 2015-2017	From 2015-2017 the Ministry for Primary Industries worked with an Aquaculture Reference Group formed of individuals from the aquaculture industry, regional councils and non-governmental organisations (all with significant experience and expertise in aquaculture) to analyse options to address the various issues raised with respect to marine aquaculture. This exercise confirmed the three subject areas for the NESMA – replacement consents for existing marine farms, change of species and biosecurity, with the latter being the only one intended to apply to both existing and new marine farms. In late 2016 a draft discussion document on the subject matter of the proposed NESMA (including indicative provisions) was developed and further consultation with the Aquaculture Reference Group, regional councils more generally, and iwi around the country occurred. A preliminary economic analysis was also prepared.
Consultation with the public and iwi authorities 14 June – 8 August 2017	Consultation with the public and iwi authorities occurred from 4 June 2017 to 8 August 2017. During consultation, the Ministry for Primary Industries held 18 public meetings and hui, and this feedback has been considered alongside the formal submissions. A total of 107 submissions were received on the proposal.
Proposal refinement August 2017 – October 2018	This stage involved analysis of submissions and further discussions with stakeholders, the Aquaculture Reference Group and technical experts to address the issues raised in submissions. An economic cost-benefit analysis was also undertaken.

1.5 Section 32 Evaluation and Report

Section 32(1) of the RMA states that an evaluation must:

(a) examine the extent to which the objectives of the proposal being evaluated are the most appropriate way to achieve the purpose of this Act; and

(b) examine whether the provisions in the proposal are the most appropriate way to achieve the objectives by –

(i) identifying other reasonably practicable options for achieving the objectives; and

(ii) assessing the efficiency and effectiveness of the provisions in achieving the objectives; and

(iii) summarising the reasons for deciding on the provisions; and

(c) contain a level of detail that corresponds to the scale and significance of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the proposal.

Section 32(2) of the RMA states that the assessment of efficiency and effectiveness in section 32(1)(b)(ii) must:

(a) identify and assess the benefits and costs of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the provisions, including the opportunities for –

(i) economic growth that are anticipated to be provided or reduced; and

(ii) employment that are anticipated to be provided or reduced; and

(b) if practicable, quantify the benefits and costs referred to in paragraph (a); and

(c) assess the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the provisions.

1.6 Report Structure

This evaluation report is structured as follows:

- Section 2 – outlines the marine aquaculture industry in New Zealand and current issues;
- Section 3 – provides an overview of the approach taken to the section 32 evaluation of the proposed NESMA and contains an assessment of the scale and significance of the proposal, which helps guide the level of detail contained in the evaluation that follows;
- Section 4 – evaluates the policy objective, as required by section 32(1)(a) of the RMA;
- Section 5 – outlines options that were considered to achieve the policy objective in terms of the various tools available,[2] and options that were considered for provisions within the proposed NESMA;
- Section 6 – contains an assessment of the efficiency and effectiveness of different options for provisions for the three areas of marine aquaculture addressed in the proposed NESMA (replacement consents for existing marine farms, realignment, and change of species);
- Section 7 – completes the evaluation of the policy objective;
- Section 8 – provides a conclusion to the evaluation.

A series of appendices are also attached to this evaluation report:

- Appendix A – Relevant sections of Resource Management Act 1991
- Appendix B – Non-NES scenario report
- Appendix C – Record of reports and briefings
- Appendix D - Biosecurity report
- Appendix E - Cumulative effects report
- Appendix F - Cost-benefit analysis
- Appendix G - Environmental effects resulting from replacement consenting provisions
- Appendix H - First level options that were not considered viable

The following reports should also be read alongside this evaluation report:

- Report and recommendations on the submissions and the subject matter of the proposed National Environmental Standard for Marine Aquaculture (Ministry for Primary Industries, 2018)
- Options to improve management of existing marine aquaculture and reduce marine aquaculture biosecurity risks (Ministry for Primary Industries, 2018)
- Analysis of proposed NES on marine aquaculture: Cost benefit analysis in support of the Section 32 analysis for the National Environmental Standard Marine Aquaculture (NZIER, 2018)

2. Marine Aquaculture in New Zealand and Problem Statement

2.1 Marine Aquaculture in New Zealand

In New Zealand, three main aquaculture species are farmed commercially – green-lipped mussels, Pacific oysters and salmon. There are also a number of other species farmed on a smaller scale. New Zealand research institutes and the aquaculture industry are experimenting with other species such as snapper, hāpuku and kingfish to assess whether they can be commercially farmed.

There are currently 1149 marine farms in New Zealand.[3] Aquaculture occurs in the majority of regions in New Zealand, however the key aquaculture regions are considered to be Northland, Auckland, Waikato, Bay of Plenty, Tasman, Marlborough, Canterbury and Southland.

[2] Tools such as national environmental standards, a New Zealand Coastal Policy Statement, Minister-directed plan changes, regulations under s360A-C of the RMA and non-statutory guidance.

[3] Authorised by 1782 consents – as a number of farms, particularly in Marlborough, have more than one consent that authorises the area covered by the farm.

Aquaculture contributes to the economic well-being of towns and communities through New Zealand, through farming, processing and support industries. In 2017, the industry employed around 3,000 people and generated around $612 million of revenue, including $426.7 million in export revenue.[4] Studies of the social impacts of aquaculture jobs have shown significant benefits to individuals and communities, with each additional job being highly valued in small towns.

Production plays an important function in sustaining regional economies by providing an employment base and flow of economic activity through to local economies. This is particularly important in areas such as Northland, Coromandel, Bay of Plenty, Marlborough, Tasman and Southland. Estimated full time employment in aquaculture by major aquaculture region is outlined in Table 2-1.

Table 2-1: Full time employment in aquaculture by region[5]

Region	FTEs
Northland	100
Auckland	400
Waikato/Coromandel/Bay of Plenty	475
Marlborough	700
Tasman and Nelson	850
Canterbury	350
Southland	100
Total	**2975**

Iwi participation in aquaculture is significant both in terms of Māori businesses and individual owners, operators and staff. Iwi own aquaculture assets throughout the main aquaculture regions, with iwi ownership being particularly significant in Northland, Auckland and Waikato in the mussel and oyster industries. Te Tau Ihu (the top of the South Island iwi) have interests in mussel and oyster farms in Tasman and Golden Bays, and throughout the Marlborough Sounds, and Ngāi Tahu holds interests throughout the South Island.

Aquaculture is an opportunity for local, regional and national economic growth in New Zealand. Ernst and Young economic analysis estimated that if the volume, value and productivity of aquaculture increased, the sector would be worth $1.45 billion by 2025,[6] and the industry aims to increase sales to $1 billion by 2025.

2.2 Effects of Marine Aquaculture

Marine aquaculture can have a number of effects on the environment and on the social, economic and cultural wellbeing of the community. Table 2-2 provides a summary of the potential effects of marine farming.

Table 2-2: Potential effects of marine farming

Effect	Description
Water column	• Phytoplankton depletion and changes in planktonic community composition • Dissolved nutrient and particulate release into the water column, including nutrient enrichment effects and potential depletion of dissolved oxygen from finfish farming • Effects from biofouling communities
Benthic (seabed)	• Localised organic enrichment of the seabed beneath the farm • Smothering of benthic organisms by biodeposits under marine farms, with more widespread deposition from finfish farming • Biofouling drop-off and debris altering the composition of the seabed

[4] Aquaculture New Zealand http://www.aquaculture.org.nz/industry/overview/

[5] Adapted from Ernst and Young (2014) *New Zealand Aquaculture: Potential financial and economic impacts of 2014 Supreme Court decision.* Report prepared for Aquaculture New Zealand

[6] Ernst & Young (2013) *New Zealand Aquaculture: Industry Growth Scenarios, 2013 update*

Effect	Description
	• Seabed shading by structures that could affect localised algal productivity under the farm
Marine mammal interactions	• Habitat exclusion or modification leading to less use or less productive use • Potential for entanglement • Underwater noise disturbance • Attraction to artificial lighting used for finfish farming
Wild fish	• Attraction of wild fish to aquaculture structures (creation of artificial habitat) • Alteration of existing fish habitats • Consumption of waste feed from finfish farming
Seabirds	• Entanglement (resulting in birds drowning) • Habitat exclusion • Providing roost sites closer to foraging areas • Aggregation of prey fish
Biosecurity	• Potential to facilitate establishment and spread of pests and diseases
Escapee and genetic effects	• Changes to the genetic distinctiveness, fitness, adaptability and diversity of local wild populations • Competition of finfish farming for space with wild fish • Transmission of pathogens from farmed fish stocks to wild fish populations
Additives	• Current shellfish aquaculture does not require the ongoing use of chemicals and antibiotics • Intertidal oyster farming racks constructed from treated timber have potential to leach trace contaminants • Accumulation of metals from use of antifoulants and additives in fish feed • Use of therapeutants to treat stock (potential effect only at the current time, as therapeutants are not currently used in finfish aquaculture in New Zealand
Hydrodynamic alteration of flows	• Farm structures altering and reducing current speeds, potentially affecting biological processes, such as phytoplankton production and depletion • Effects on stratification through vertical mixing and partial blocking of some water layers • Wave dampening may affect shoreline habitat and sediment transport
Landscape and natural character	• Mussel farm buoys visible as horizontal structures on the water surface • Inter-tidal oyster racks fully visible at low tide and partially visible at high tide • Finfish pens and barges visible as both horizontal and vertical structures on the water surface • Consequent effects on landscape and natural character, depending on the values of the surrounding area, and may lead to effects on people's perception of an area (i.e. its wildness and naturalness)
Noise	• Noise from shellfish farms generally associated with harvesting activities • Spat catching operations require more intensive management and can result in greater levels of noise • Continuous low-level noise from on-site generators for finfish farms, and intermittent noise from activities such as net lifting and cleaning
Seabed disturbance	• Initial short term disturbance association with construction of a marine farm
Recreation and public access	• Marine farms occupy public space in the coastal marine area and can therefore reduce recreational opportunities in a particular area

Effect	Description
	• Access generally available through and around a shellfish farm, but finfish farms are not 'permeable' in the same way, so access is only available around them • Creation of artificial habitat and effects on wild fish (for example through waste feed consumption) can result in improved fishing possibilities
Navigation and safety	• Shellfish farms occupy space in the coastal marine area and represent a potential hazard to other users
Amenity	• Visual effects as described in relation to landscape and natural character • Additional visual effects from night-time lighting of accommodation structures and sea pens for operational reasons • Noise effects as described above • Potential for generation of rubbish and debris • Wildlife attraction effects (seals establishing haul-out sites in close proximity, potentially increasing numbers of seabirds, can affect public use of nearby jetties and shoreline) • Level of effect depends on proximity to a particular site
Effects on tangata whenua values	• Effects on sites of significance to tangata whenua, such as waahi tapu • Effects on taonga species • Effects on mahinga kai • Effects on mauri of the coastal marine area • Effects on ability to exercise kaitiakitanga and other mana whenua responsibilities
Positive effects	• Effects on local market supply • Effects of marketing for the community through branding • Provision for employment in the local community • Provision of income into the local community • Establishment of subsequent and supporting industries (such as processing facilities, and structure and vessel suppliers)

2.3 Current Issues Facing Marine Aquaculture

Over the next 7 years, consents for up to 689 existing marine farms (60% of the total current marine farms) will expire, with consents for 602 of those farms (52%) expiring at the end of 2024.[7] Under the existing planning framework replacement consenting can be complex and uncertain, which is undermining confidence in the industry. The current issues under the existing planning framework are outlined in sections 2.3.1 – 2.3.4 below.

2.3.1 Rules between regions are inconsistent

Regional councils develop objectives, policies and rules for aquaculture through a planning process which provides for community participation. Through this process, the activity status and notification requirements for existing marine farms, including applications for replacement consents, can vary between regions. The different frameworks that currently exist are outlined in the report attached as **Appendix B**. This inconsistency can impose unnecessary and unjustified extra time and costs on applicants, regional councils and interested parties.

The NZCPS 2010 requires regional councils to undertake strategic planning for the coastal environment and recognise the importance of aquaculture, through regional policy statements and regional coastal plans. These directions will be implemented as councils prepare their second-generation regional coastal plans. There is an opportunity through the development of second generation regional coastal plans to better plan for areas that are appropriate for aquaculture, to identify areas where aquaculture is considered to be inappropriate, and to better address the cumulative adverse effects of multiple marine farms.

Over time, planning should reduce uncertainty about the process for marine farmers seeking replacement consents. Development of a proposed plan to public notification can be a lengthy process, as can the

[7] Figures calculated as at 2018 and assuming that existing consents would run to their expiry dates.

process under Schedule 1 of the RMA following public notification of a proposed plan. Of the eight major aquaculture regions, Auckland and Bay of Plenty have operative or near-operative second-generation plan provisions and Northland is at the stage of hearings for its second-generation plan. None of the other major aquaculture regions have notified second generation plan provisions for aquaculture activities.

Uncertainty in replacement consent processes is driven mainly by:

- Activity status and/or broadly defined matters of discretion or control;
- Extent of notification of consent applications;
- NZCPS 2010 policies in relation to protection of outstanding areas.

2.3.1.1 Activity status and notification

The activity status and notification requirements for replacement consents, set out in regional plans, contribute to regulatory uncertainty and consenting costs by increasing the information requirements on applicants and potentially through hearings and appeals that add to the time and cost of processing a consent application.

The RMA provides the following range of activity statuses for aquaculture activities, which could form the basis for rules in regional coastal plans:[8]

- Controlled activity – requires resource consent. The consent authority must grant a resource consent except if the marine farm is undertaken wholly or in part within a protected customary rights area, or it has a more than minor effect on a protected customary rights area, or if there is insufficient information. The consent authority can impose conditions on the resource consent, but conditions are restricted to the stated matters of control and cannot be made so stringent as to mean the consent cannot be exercised;
- Restricted discretionary activity – a resource consent is required for the activity and an application may be declined by the consent authority, but only in relation to the matters to which discretion is restricted. If the consent is granted, conditions may be imposed, but consideration is restricted to the matters to which discretion is restricted;
- Discretionary activity – a resource consent is required for the activity and may be declined, or granted by the consent authority with or without conditions. The matters to be considered for a discretionary activity are not restricted, but any conditions of consent must be within the jurisdiction of the consent authority under the RMA and be lawful;
- Non-complying activity – a resource consent is required for the activity and may be declined, or granted by the consent authority with or without conditions. The consent may only be granted if the consent authority is satisfied that the adverse effects on the environment will be minor or that the activity will not be contrary to the objectives and policies of the relevant regional coastal plan and/or proposed regional coastal plan;
- Prohibited activity – no application for a resource consent may be made for the activity, and the consent authority must not grant a consent for it.

A range of activity statuses for existing marine farms have been set by regional councils and unitary authorities through their regional coastal plans. Based on analysis carried out in 2017[9] (noting that no further plan changes to regional coastal plans have been notified since then):

- Potentially up to 37% of existing marine farms have controlled activity status;[10]
- A few existing marine farms in Marlborough have restricted discretionary activity status with confined matters of discretion;

[8] Noting that under s68A of the RMA regional coastal plans cannot contain rules that provide for aquaculture activities as a permitted activity.

[9] Proposed National Environmental Standard for Marine Aquaculture (MPI Discussion Paper No: 2017/23)

[10] In Northland, some areas of Waikato and some farms in Marlborough. The number is an estimate only because establishing how many existing marine farms in Marlborough are classified as controlled activities is complicated, primarily because of the construction of the rule framework that applies in the Marlborough Sounds Resource Plan and the 'patchwork' of consents that authorises many existing marine farms in Marlborough.

- All other existing marine farms have a discretionary or non-complying activity status, or restricted discretionary activity status with relatively wide matters of discretion.

This means that up to 63% of existing marine farms currently have an activity status that provides less certainty of process than desirable for stabilising current levels of production and providing investment confidence.

While public participation through public notification of resource consent applications can enhance the quality of decision-making for new farms or for significant changes to existing farms, the value of notification is more limited for most existing farms. The effects on the environment of existing marine farms that are making no or minor changes are relatively well known, and can be managed through appropriate consent conditions. Where concerns have been expressed about existing marine farms through public notification of replacement consents to date, these have often been about whether the particular location is an appropriate location for marine farming. This is a matter that is better considered at the time that regional coastal plans are developed, rather than in the course of an individual replacement consent application.

2.3.1.2 Uncertainty in relation to farms in or near outstanding areas

The NZCPS 2010 directs that adverse effects of activities on outstanding areas are to be avoided. Two elements contribute to uncertainty in replacement consenting processes in relation to outstanding areas:

- Identification of outstanding areas, which determines whether an existing marine farm is located in or near an outstanding area. Councils are at different stages with respect to identifying outstanding areas and values in the coastal environment;
- Determination of whether the existence of a marine farm in or near an outstanding area has an adverse effect on the outstanding values. This often involves assessment and expert reports, and is often a matter of judgement because of the relatively subjective nature of some assessments, particularly those for landscape.

A review of 50 replacement consent applications in Marlborough for farms near outstanding areas (or with minor overlaps) indicates that decision makers concluded that continued existence of the marine farms would have no more than a minor effect (or in some cases less than a minor effect) on landscape values and/or natural character. Discussions with regional councils anecdotally indicates that existing marine farms with the greatest likelihood of adverse effects on outstanding areas are those located within outstanding areas, as opposed to those just outside the boundaries of outstanding areas.

2.3.2 Ecological effects of aquaculture

A comprehensive literature review of the ecological effects of aquaculture in New Zealand was carried out by the Ministry for Primary Industries in collaboration with the Cawthron Institute and the National Institute of Water and Atmospheric Research (NIWA). The review was part of a wider programme to provide current and science-based information and advice on ecological effects of marine aquaculture, and best practice guidance to regional councils and unitary authorities in relation to the management of aquaculture. An overview document summarises the key potential ecological effects of marine aquaculture in New Zealand, comments on their likely significance, and suggests management and mitigation options.

In some regions, the benefit of this literature review and advice cannot be implemented without changes to regional coastal plans to insert appropriate matters of discretion or control on consents. In those regions where existing marine farms are discretionary or non-complying, regional councils and unitary authorities may take inconsistent approaches to managing these effects.

2.3.3 Barriers to on-farm innovation

In many regions, lack of specific rules can hinder changes to existing marine farms that improve environmental outcomes or increase value of production.

Regulatory processes to alter consent conditions to allow for changes in farmed species or make small-scale realignments of farms to more suitable locations are often complex. Unless regional coastal plans make specific provisions for these activities, or marine farm consents have flexibility in relation to species farmed, such changes require either a new consent or an amendment to the conditions of the existing consent. As noted above, the activity status for replacement consents varies between regions, with notification determined by the consent authority on a case-by-case basis, and some less stringent activity classifications dependent on the same species as listed on the current consent being farmed or the farm

being maintained in the same position. Section 127 of the RMA requires applications for changes to consent conditions (for example changing the species being farmed) to be treated as a discretionary activity. The complexity and uncertainty of outcome of these processes can deter innovation on existing marine farms.

2.3.4 Need for national approach to on-farm biosecurity

Biosecurity is a key risk to both the New Zealand coastal environment and the aquaculture industry. Effective biosecurity practices are critical to safeguarding New Zealand's coastal environment (including indigenous biodiversity), as well as the aquaculture industry's production, global reputation and market access.

Currently, around 80% of existing marine farms have some degree of biosecurity practice in place. These practices and methods are often inconsistent, and effectiveness can vary substantially between farms.

The industry has taken a voluntary and proactive approach to managing biosecurity risks through its *A+ Sustainable Aquaculture Programme* but there is currently no national requirement for consistent biosecurity management plans for marine farms.

For on-farm biosecurity measures to be effective, measures need to be consistent across the country, and be comprehensive in terms of coverage of all farms.

3. Approach to Evaluation

This section evaluates the policy objective that is addressed by the proposed NESMA:

> *Develop a more consistent and efficient regional planning framework for the management of existing marine aquaculture activities and on-farm biosecurity management, while supporting sustainable aquaculture within environmental limits.*

3.1 Approach to Evaluation

The evaluation contained in this report is divided into the following components:

- **Section 4** – An evaluation of the policy objective that is addressed by the NES-MA: section 32(1)(a) of the Act requires an evaluation of the extent to which the objectives of the proposal are the most appropriate way to achieve the purpose of the Act. National Environmental Standards do not contain objectives in the sense that the term is used in policy statements and regional or district plans. However, National Environmental Standards do result from a policy objective related to addressing a particular problem or issue. The policy objective for the NES-MA is outlined above. Section 4 of this report outlines the evaluation of that objective that was undertaken first as part of the background preparation work prior to consultation and second on an ongoing basis as submissions on the discussion document were considered;
- **Section 5** – An assessment of the options to achieve the policy objective: section 32(1)(b) of the Act requires an evaluation of whether the provisions in the proposal are the most appropriate way to achieve the policy objective of the NES-MA, in part by identifying other reasonably practicable options for achieving the objective. Two levels of option assessment are outlined in section 5 of this report:
    - An assessment of 'first level' options – to assess whether an NES is the most appropriate tool to achieve the policy objective
    - An assessment of 'second level' options – to assess the various options for provisions that could be included in the NES
- **Section 6** – An assessment of the efficiency and effectiveness of the proposed provisions: section 32(1)(b) requires an assessment of the efficiency and effectiveness of the provisions in achieving the policy objective. Section 32(2) outlines the matters that must be covered in that assessment, being:
    - The benefits and costs of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the provisions, including opportunities for economic growth and employment. If practicable, these benefits and costs are to be quantified. The Ministry for the Environment report *A Guide to section 32 of the Resource Management Act 1991* notes that quantification of costs and benefits means to place a numerical value on, not

necessarily to monetise,[11] and further notes that for ethical reasons or because of methodological limitations it may be difficult to quantify benefits and costs.

The approach to the evaluation of the NES-MA has adopted a hierarchy of monetising costs and benefits where possible, then to otherwise quantify if monetisation is not possible, and finally to provide qualitative descriptions of benefits and costs if quantification is not possible.

- The risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the provisions

Whether or not a provision is effective is assessed on the basis of the following criteria (developed from the overall policy objective for the NES-MA):

- Does it result in a consistent approach?
- Does it result in an efficient system of managing existing marine aquaculture and biosecurity for all marine farms?
- Will it ensure that existing marine aquaculture is undertaken within environmental limits?

The policy objective also seeks to support sustainable aquaculture. Sustainable aquaculture can be defined as aquaculture that enables people and communities to provide for their social, economic and cultural wellbeing and for their health and safety while:

- Sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations
- Safeguarding the life-supporting capacity of air, water, soil and ecosystems
- Avoiding, remedying or mitigating any adverse effects of activities on the environment

Ensuring that aquaculture is undertaken within environmental limits will address the bullet points above. Whether aquaculture under the NES enables people and communities to provide for their social, economic and cultural wellbeing and their health and safety has been assessed with reference to the social, economic and cultural effects and costs and benefits that may arise as the result of any given option, rather than adopting a more generalised overall criteria

Section 6 also includes a discussion of the reasons for adopting the proposed provisions, as required by section 32(1)(b)(iii) of the Act.

Section 7 of this report returns to the evaluation of the policy objective, as some matters assessed in relation to the feasibility of the policy objective cannot be assessed until the provisions that would give effect to that objective have been considered.

Section 8 of this report then provides an overall conclusion to the evaluation.

3.2 Scale and Significance of the Proposal

Section 32(1)(c) of the Act states that an evaluation report must *'contain a level of detail that corresponds to the scale and significance of the environmental, economic, social and cultural effects that are anticipated from the implementation of the proposal'*.

This section of the report therefore provides an initial indication of the scale and significance of the effects anticipated from the implementation of the proposal. This initial indication has guided the level of detail that is included in the sections of the report that follow.

In determining scale and significance, the Ministry for the Environment notes that:[12]

- Scale refers to the size or magnitude of the effects, including how many people or species or other natural resources are affected, by how much, and over how wide an area;
- Significance refers to the importance of the effects, whether this is at a national, regional or local level;

[11] Ministry for the Environment, *A Guide to section 32 of the Resource Management Act 1991*, p18.

[12] Ministry for the Environment, *A guide to section 32 of the Resource Management Act: Incorporating change as a result of the Resource Legislation Amendment Act 2017,* 2014.

and then defines a series of criteria for evaluating the scale and significance of effects from a proposal. Using these criteria, Table 3-1 below provides an assessment of the scale and significance of the proposal for the NES-MA. Scale and significance are ranked using a numeric scale of 1-5 as follows:

- 5 – Large scale/High significance
- 4 – Medium-large scale/Medium-large significance
- 3 – Medium scale/Medium significance
- 2 – Low-medium scale/Low-medium significance
- 1 – Low scale/Low significance

Table 3-1: Scale and significance of the effects anticipated from implementation of the proposed NESMA

Criteria	Sub-criteria	Comment	Ranking of scale/significance
Reasons for the change	• 10-year review • Giving effect to higher level RMA document • Ministerial direction/requirement for plan to not be inconsistent with NES • Responding to a Court decision/direction • Implementing non-statutory planning initiative (e.g. urban growth strategy) • Initiated locally because of plan effectiveness monitoring, community reaction to resource use etc • Assessed as having high significance under the Local Government Act	None of the identified sub-criteria are relevant, however: • Gives effect to Government direction to establish national direction for marine aquaculture • Responds to upcoming significant number of existing marine farms whose consents expire in 2024.	4 897 marine farms will be affected in terms of replacement consenting, realignment and change of species, and all existing marine farms will be affected in relation to biosecurity requirements, across a wide geographic area of New Zealand, which results in the scale of the initiative being medium-large
Degree of shift from the status quo and from the assumed 'non-NES' scenario	• Addressing an existing or new resource management issue • Proposing a new management regime/minor or major change in rule framework • Extent and scale of regulatory impact • Degree of 'Packaging' with other plan changes or other interventions • Discrete provisions, or broader suite of existing provisions	• Addresses an existing resource management issue • Reflects a moderate change in the existing rule framework • Affects regional planning framework in 11 of the 16 regional councils or unitary authorities in New Zealand, and affects 78% of existing marine farms with regard to replacement consenting, realignment and change of species, and all existing and new farms in relation to biosecurity	3 While the proposal affects 11 of the 16 regions in New Zealand, analysis in the attached report – the 'counterfactual' report – demonstrates that the change to the

Criteria	Sub-criteria	Comment	Ranking of scale/significance
	• Changing existing plan objectives, and to what degree	• Addresses four strands of resource management for existing marine farms – while strands are separable, they work best as an integrated whole • Provisions would integrate with existing regional coastal plan provisions in each region – where applications do not fall within the requirements of the NES-MA provisions they will be processed under existing regional coastal plans; and existing farms in the Tasman AMAs and Waikato's Wilsons Bay Zone will be exempt and retain their current planning framework	assumed rule framework is moderate
Who and how many will be affected?	• Degree of public interest and engagement in issue • Degree to which proposal will address identified community outcomes • How may will be affected? Single landowner / multiple landowners / occupiers / neighbourhoods / businesses / cities / future generations • Degree of impact on private property	• Levels of public engagement in aquaculture vary around the country, but can be significant in some regions. 107 submissions were received when the proposal for an NES-MA was publicly notified • Not applicable • All existing marine farmers will be affected to some extent. Future marine farmers will be affected in relation to biosecurity and eventual replacement of consents. Local communities in close proximity to areas of existing marine farms may be affected, depending on the degree of effect from the existing marine farms • No significant impact on private property	4 The proposal will affect all marine farmers to some extent, and in some regions there is high public interest in aquaculture
Degree of impact on, or interest from iwi / Māori	• Level of interest from iwi / Māori engagement with iwi on the issue • Likely degree of impact on iwi/hapū? • Impact on sites, areas or resources of significance to iwi/ Māori • Degree of consistency with iwi management plans	• 14 submissions were received from iwi when the proposal for the NES-MA was publicly notified. 11 hui were held with iwi to discuss the proposal prior to public notification, with 7 further hui held during the public and iwi consultation process. 5 hui were held following the submission period to discuss particular	1 Matter of discretion in relation to tangata whenua values means essentially

Criteria	Sub-criteria	Comment	Ranking of scale/significance
		matters relating to tangata whenua values following submissions on the proposal • A proposed matter of discretion in relation to tangata whenua values requires pre-application consultation and will likely improve management of the impact of marine farming on iwi/Māori. Iwi commercial interests in marine farming will benefit from provisions that provide a greater certainty of process and consistency of approach • Matter of discretion in relation to tangata whenua values allows effects on sites, areas or resources to be considered • Generally, iwi management plans identify that iwi ability to partake in coastal management practices has been eroded over time – which adversely impacts on their social, cultural and spiritual well-being. This is not only detrimental to their mana, but also takes away their ability to pass on their traditions to future generations. In many cases the iwi management plans did not contain specific reference to aquaculture or marine farming. It is recommended that where there isn't clear direction around aquaculture or marine farming, Fisheries New Zealand engages to understand how they aim to manage these sorts of activities within their rohe.	no change from the status quo for iwi/hapū.
When will effects occur?	• Temporarily (weeks or months) • For the next 1-5 years • Ongoing into the future	• Ongoing into the future if non-NESMA scenario planning framework remained in place indefinitely • For the next 1-5 years if regional coastal plans changed over time to more closely reflect proposed NESMA provisions	3 Effects of marine farming are ongoing, but effects of proposal may not be long

Criteria	Sub-criteria	Comment	Ranking of scale/significance
			term, depending on how regional coastal plans would have continued to evolve in the absence of the NESMA
Geographic scale of impacts	• Very localised or wide ranging (i.e. single site / whole zone / one or more regions / single or multiple natural resources	• Wide ranging effects, marine farming occurs in 11 of the 16 regions in New Zealand, and all expect one of these regions will be affected by the proposed for the NES-MA	5 Large scale as 11 regions affected by proposal
Type of effect	• Acute / chronic / temporary / cumulative / positive / negative / irreversible • Likelihood and consequence (e.g. low probability, high consequence) • Part(s) of environment affected (ecosystems, infrastructure, amenity) • Degree of impact on social, cultural or economic well-being • Degree of impact (positive/negative) on Part 2 matters	• Effects from existing marine farms can generally be described as chronic effects.[13] Effects can be cumulative, and can be positive or negative • High likelihood of effects occurring, but moderate consequence as degree of effects is not generally significantly adverse • Marine farms affect the natural and social (i.e. people's use and enjoyment of an area) environment in their immediate vicinity • See analysis contained in section 6 of this report in relation to the degree of impact on social, cultural and economic well-being • See analysis contained in section 6 of this report in relation to the degree of impact on Part 2 matters	3 Effects anticipated from the proposal are chronic but relatively limited, and proposed matters of discretion mean that residual effects will not be significant

As four of the sub-criteria for assessing scale and significance are assessed in Table 3-1 as being of medium-large or large scale and/or significance, the overall scale and significance of the proposal is considered to be medium-large. A relatively detailed level of analysis is therefore outlined in this evaluation report.

[13] In this context 'chronic' means long term and ongoing.

A significant level of analysis has been undertaken throughout the course of the development of the proposal for an NESMA and in response to submissions received on the discussion document. A record of the reports and briefings is contained in **Appendix C**. The level of analysis undertaken means that this report can only provide a summary of it.

4. Evaluation of Policy Objective

4.1 Introduction

The policy objective of the NESMA is to:

> *Develop a more consistent and efficient regional planning framework for the management of existing marine aquaculture activities and on-farm biosecurity management, while supporting sustainable aquaculture within environmental limits.*

Section 32(1) of the RMA requires an examination of the extent to which the objectives of the proposal being evaluated are the most appropriate way to achieve the purpose of the RMA.

The purpose of the RMA is outlined in section 5, as follows:

(1) The purpose of this Act is to promote the sustainable management of natural and physical resources.

(2) In this Act, **sustainable management** means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while –

(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and

(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

4.2 Key issues that give rise to the policy objective

Existing marine aquaculture activities and on farm biosecurity are managed through a number of different pieces of legislation, primarily the Resource Management Act 1991, but also the Biosecurity Act 1993, the Fisheries Act 1996 and the Marine and Coastal Area (Takutai Moana) Act 2011.

The current management of existing marine aquaculture activities gives rise to five key issues:

- regulatory uncertainty associated with replacement consenting for existing marine farms;
- variable rules relating to management of ecological effects of aquaculture and inconsistent application of best understanding of the impacts of marine aquaculture in New Zealand;
- barriers to on-farm innovation for existing marine farms;
- incomplete and inconsistent on-farm biosecurity management practices (which reduces the effectiveness of biosecurity risk management);
- inconsistent rules between regions.

Each regional council has different rules and requirements for replacement consenting for existing marine farms and on-farm biosecurity requirements (as demonstrated in the report attached as **Appendix B** – the 'non-NES scenario' report). In addition, councils are at different stages with respect to reviewing their regional coastal plans.

If the current regulatory framework is maintained, regional councils will continue to make decisions on replacement consent applications on the basis of the rules in their operative and proposed regional coastal plans, and will apply notification requirements as set out in their plans or the RMA. Innovation through changing species will, in most cases, require marine farms to apply for a consent variation which must be treated as a discretionary activity.

Councils will also continue to undertake 'second generation' planning as they review their regional coastal plans. They will incur the associated costs of running the planning and consultation processes. Outcomes of these review processes are unknown: some councils may adopt rules that reduce regulatory and process uncertainty and inefficiency for existing marine farms, but some may not. Plan review processes are lengthy and, in some cases, may not be completed before the consent expiry 'spike' in 2024 and 2025.

The current situation is likely to:

- be expensive and time consuming for industry, regional councils and other interested parties (due to regional differences in activity status and notification requirements);
- result in variable and incomplete approaches to on-farm biosecurity management and management of environmental effects;
- result in ongoing uncertainty about the potential impact of planning for outstanding areas on the process of replacement consenting for existing marine farms.

In addition, to date no council has notified a regional coastal plan that identifies areas that are inappropriate for existing aquaculture, meaning that issues of appropriateness are being considered and re-litigated on a farm-by-farm basis through the consenting processes.

It is this background that has given rise to the policy objective for the proposal for a national environmental standard for marine aquaculture.

4.3 Evaluation of the policy objective

The Ministry for the Environment's *Guide to section 32 of the Resource Management Act 1991* identifies three categories of criteria for determining whether an objective is the most appropriate way to achieve the purpose of the RMA: relevance, feasibility and acceptability.

Sections 4.3.1 and 4.3.2 outline the assessment of the policy objective against the Ministry for the Environment's recommended criteria in relation to the relevance and acceptability of the policy objective. Whether the policy objective is feasible or not is more a matter relating to the effectiveness of the provisions, and so has been assessed later in this report.

4.3.1 Relevance of the policy objective

Table 4-1: Assessment of relevance of the policy objective

Criteria	Assessment of relevance
Directed to addressing a resource management issue	• The policy objective of the NESMA is focused on developing a consistent and efficient regional planning framework and supporting sustainable aquaculture within environmental limits. It therefore concerns the resource management issue of managing activities within the capacity of the environment to sustain. • A more consistent and efficient planning framework will set a consistent set of provisions for addressing the environmental effects of existing marine farms, and of changing species on marine farms, and will require comprehensive and consistent management of on-farm biosecurity, in relation to those issues and practices that are within the jurisdiction of the RMA. The NESMA would still encourage strategic planning by regional councils to determine where aquaculture would be appropriate and inappropriate, and if that planning results in a different approach to that contained within the NESMA, the NES would enable coastal plans to set more lenient or stringent provisions
Focused on achieving the purpose of the RMA	• Efficient and consistent processes will provide for the economic and social well-being of the community in general through the provision of efficient and consistent processes, while ensuring that marine farming activities covered: ○ sustain the potential of the natural and physical resources of the coastal marine area to meet the needs of future generations; ○ safeguard the life-supporting capacity of water and ecosystems in the coastal marine area; and ○ avoid, remedy or mitigate their adverse effects on the environment.

Criteria	Assessment of relevance
Assists councils to carry out its statutory functions	• Marine farming can be a contentious activity in the coastal marine area. A consistent set of rules around the country would provide certainty of process for all parties (councils, marine farmers and all interested parties) and reduce some of the time and expense associated with obtaining consents • Regional councils have a statutory function to manage the effects of activities in the coastal marine area, including effects related to biosecurity risk. A consistent bottom-line approach to managing biosecurity on-farm would assist councils to discharge these functions
Within scope of higher level documents	• A national level initiative such as that contemplated by the policy objective is only required to achieve the purpose of the RMA, there are no other higher level documents that need to be complied with. However, the New Zealand Coastal Policy Statement 2010 (the NZCPS) is relevant to consideration of any national level initiative that affects the coastal marine area. In order to maintain an appropriate relationship, any national level initiative should be consistent with the NZCPS, and the proposed NESMA has been developed to ensure that.

4.3.2 Acceptability of the policy objective

Table 4-2: Assessment of acceptability of the NESMA policy objective

Criteria	Assessment of acceptability
Consistent with identified iwi/Māori and community outcomes	• For those iwi/Māori and community members involved in commercial aquaculture activities, a consistent and efficient regional planning framework would have benefits for social, cultural and economic wellbeing. • The policy objective seeks to ensure that aquaculture is managed within environmental limits in order to ensure that effects are managed in a manner consistent with iwi/Māori and community aspirations in each of the main aquaculture regions
Will not result in unjustifiably high costs on the community or parts of the community	• Can only be assessed following the analysis of costs and benefits contained in sections 5 and 6 of this report. Continued analysis of the policy objective is therefore contained in section 7 of this report.

4.3.3 Alternatives to policy objective

The main alternatives to the policy objective for marine aquaculture are:

- Doing nothing (i.e. allowing marine farming to continue being managed through a variety of approaches in regional coastal plans)
- Undertaking initiatives to build social license for aquaculture

These alternative options are not considered to be the most appropriate to achieve the purpose of the RMA for the following reasons:

- As outlined in sections 2 and 4 of this report, the current approach has several problems, in terms of best giving effect to the RMA in relation to managing environmental effects and providing for social and economic wellbeing
- Building social licence would address the social effects of aquaculture, but may not be effective at addressing environmental effects, and would not provide a consistent framework for activities, two of the key issues identified for the existing aquaculture industry.

5. Options to achieve the objectives

5.1 Assessment approach

As part of assessing whether the NESMA provisions are the most appropriate to achieve the policy objective, section 32(1)(b)(i) of the RMA requires other reasonably practicable options for achieving the objective to be identified. The Ministry for the Environment's *A guide to section 32 of the Resource Management Act 1991* (2014, updated April 2017) notes that:

> *To date, s32 case law has interpreted 'most appropriate' to mean "suitable, but not necessarily superior".*[14] *This means the most appropriate option does not need to be the most optimal or best option, but must demonstrate that it will meet the objectives in an efficient and effective way.*

The MfE guide goes on to note that while s32 does not require different options to be identified, several options will often need to be compared in order to determine which is the most appropriate.

A number of options have therefore been considered in determining the most appropriate way to achieve the policy objective of the proposed NESMA as outlined in section 4.1 of this report. The assessment of options has been carried out at two levels:

- An assessment of 'first level' options – essentially asking the question 'is an NES the most appropriate option to achieve the policy objective?
- An assessment of 'second level' options – what is the most appropriate approach for an NES?

The first level options are identified and analysed in section 5.2 of this report. The second level options are identified in section 5.3 of this report, and then analysed in more detail in section 6 of the report, consistent with the requirements under s32(1)(b)(ii) and s32(2) that the proposed provisions be subject to a series of assessments.

5.2 Assessment of first level options

This section identifies and assesses options to achieve the policy objective, in terms of the type of planning instrument that might be utilised. The assessment is divided into two parts (one that deals with replacement consents for existing marine farms, realignment and change of species on existing farms, and one that covers options for on-farm biosecurity management) as further options for on-farm biosecurity management were identified and investigated in response to submissions on the NESMA discussion document.

5.2.1 Replacement consents for existing marine farms, realignment and change of species on existing marine farms

The first level options that were considered to achieve the NESMA policy objective in relation to replacement consents for existing marine farms and for change of species on existing marine farms are:[15]

- Status quo – no central government intervention, or with the addition of:
    - Non-statutory national guidance
    - Use of the Aquaculture Planning Fund to assist regional councils with strategic planning
    - Industry standards
- National Environmental Standard for Marine Aquaculture
- New Zealand Coastal Policy Statement: Marine Aquaculture and National Environmental Standard for Marine Aquaculture
- Minister for the Environment directed plan changes (s25A)
- Aquaculture regulations (s360A)

To determine the most appropriate tool to achieve the policy objective, these options were assessed against 'first order' assessment criteria (to assess how well the option would address the policy objective)

[14] Rational Transport Soc Inc v New Zealand Transport Agency HC Wellington CIV-2011-485-2259, 15 December 2011.

[15] Options that were considered not to achieve the NESMA policy objective or the criteria are outlined briefly in Appendix H.

and 'second order' assessment criteria (to assess whether the option could be implemented effectively and efficiently). The criteria used were:

First order criteria

- *Delivers consistency*: Does the option address unnecessary variation between councils in relation to controls on aquaculture?
- *Increases certainty about consenting processes and requirements*: Does the option provide simpler and more certain replacement consenting provisions for existing farms, while maintaining the underlying purpose of the RMA?
- *Improves management of on-farm biosecurity risks*: Does the option enable consistent and effective on-farm biosecurity management plans/procedures?
- *Recognises recent and future strategic planning for aquaculture*: Does the option recognise and provide for recent and future strategic planning by councils that identifies areas that are appropriate or inappropriate for aquaculture?

Second order criteria

- *Ease of implementation*: Are there any significant barriers or complexities to implementation? Does the option deliver a solution that can be implemented in a timely and effective manner prior to 2024? Is it possible to monitor compliance with the option, and can it be enforced?
- *Efficiency*: To what extent are the benefits of the option expected to exceed costs?

The options are described in Table 5-1.

Table 5-1: Options for replacement consents for existing marine farms, realignment and change of species

Option	Comment
Status quo (or non-NESMA scenario)	The planning framework that is considered likely to apply in 2024 when a significant number of consents for existing marine farms expire and will need replacement. The non-NESMA scenario is discussed in detail in the report attached as **Appendix B**.
NESMA	An NES for marine aquaculture would set rules and requirements for replacement consents and on-farm biosecurity. Regional councils must update their coastal plans to give effect to the NES, but Schedule 1 processes are not required. The proposed NES would: • set restricted discretionary activity status and clearly specified matters of discretion for existing marine farms that are not in areas identified in regional coastal plans as inappropriate for aquaculture • preclude notification, except to affected tangata whenua and where special circumstances exist, as required under sections 95A and 95B of the RMA • clarify that consideration of effects on outstanding values is limited to marine farms that are within, or partially within, outstanding areas • require consideration of all relevant environmental effects of existing farms, based on current best understanding • provide simpler processes for existing farms to reduce adverse effects through realignment and add value through species changes • recognise strategic planning for aquaculture carried out by councils by providing greater flexibility where planning has occurred • require all marine farms (existing and new) to develop and implement on-farm biosecurity management plans that meet specific criteria
NZCPS and NESMA	A combined approach involving an NZCPS: Marine Aquaculture and an NESMA could be taken. This would provide a consistent set of rules and requirements as set out above for the NESMA alone option, as well as more detailed and specific aquaculture objectives and policies than those currently in the NZCPS 2010. The NES element would be implemented directly, as in

Option	Comment
	the NESMA alone option. The NZCPS element would be interpreted and implemented by regions through changes to coastal plans using Schedule 1 processes, and through decisions on consent applications made under the NESMA.
Minister for the Environment directed plan changes (s25A)	The Minister for the Environment can, under s25A of the RMA, direct regional councils to prepare a plan change. The Minister could direct relevant regional councils to prepare changes to their coastal plans to include new provisions for replacement consents for existing marine farms and on-farm biosecurity management, as set out in the NESMA alone option. Once prepared, the plan change would be subject to the normal Schedule 1 process under the RMA. A separate direction would have to be made to each regional council.
Aquaculture regulations (s360A)	The Minister of Aquaculture can, under s360A of the RMA, recommend regulations to amend provisions in an operative regional coastal plan that relate to management of aquaculture. Specific rules for replacement consents and management of on-farm biosecurity risks, as set out in the NES alone option, could be added to regional coastal plans by regulation. Regulations need to be customised to the individual regional coastal plans and can only be used to amend operative regional coastal plans. Before recommending regulations the Minister of Aquaculture must carry out a consultation process.
Non-statutory national guidance	Central government could prepare national guidance material for regional councils on the recommended approach to setting activity status, notification requirements and matters that should be considered for replacement consents, including realignment and species changes. Initial guidance has been developed in relation to biosecurity management plans through MPI's Biosecurity Handbook and the aquaculture industry's A+ programme, and further guidance could be provided.
Use Aquaculture Planning Fund to assist with upfront planning	Strategic planning for aquaculture could be encouraged, and funding provided, through MPI's Aquaculture Planning Fund. Work is already underway to identify projects that might be suitable to support. Strategic planning would need to be given effect through a plan change process using Schedule 1 of the RMA.
Industry standards	The A+ Sustainable Aquaculture Framework is a voluntary industry standard that promotes best practice, including biosecurity measures. It provides high level guidance for salmon, oyster and mussel farming. The standard could be used to promote further adoption of consistent biosecurity measures.

Table 5-2 outlines the analysis of the options described above against the first and second order criteria.

Table 5-2: First level option assessment

Options / Criteria	No action	Regulatory: NES	Regulatory: NES and NZCPS	Regulatory: Minister directed plan changes	Regulatory: Aquaculture regulations	Non-regulatory: Guidance	Non-regulatory: Planning Fund	Non-regulatory: Industry standard (A+)
Consistency	**0**	**++** One set of rules and requirements for replacement consents and biosecurity	**++** One set of rules and requirements for replacement consents and biosecurity, but variable interpretation of NZCPS at regional level	**+** Some variation due to differing council drafting, and outcome of Schedule 1 process	**+** One set of rules and requirements for replacement consents and biosecurity, for current plan	**+** Could achieve some greater consistency	**0** Would only increase consistency if used in a very directive manner and across all regions	**0** Does not alter regional rules
Increased regulatory certainty	**0**	**++** Increased certainty due to rules about activity status, notification, and matters to be considered (including outstanding areas)	**++** Increased certainty due to rules about activity status, notification, and matters to be considered (including outstanding areas)	**+** Could increase certainty, depending on final outcome of Schedule 1 process	**++** Increased certainty due to rules about activity status, notification, and matters to be considered (including outstanding areas) for current plan	**+** Depends on uptake by regions and outcome of Schedule 1 process	**+** Could be used to identify areas that are appropriate (or not) for aquaculture in key regions	**0** Does not alter regional rules
Biosecurity	**0**	**++** Comprehensive requirements for all marine farms	**++** Comprehensive requirements for all marine farms	**+** Comprehensive requirements for all marine farms, but consistency depends on outcome of Schedule 1 process	**+** Comprehensive requirements for all marine farms under current plans	**+** Depends on uptake by regions and outcome of Schedule 1 process	**0** Not applicable to biosecurity	**+** Increased adoption of voluntary biosecurity measures

Options		Regulatory				Non-regulatory		
Criteria	No action	NES	NES and NZCPS	Minister directed plan changes	Aquaculture regulations	Guidance	Planning Fund	Industry standard (A+)
Strategic planning	**0**	**++** Strategic planning by regional councils recognised	**++** Strategic planning by regional councils recognised	**0** Cannot recognise future planning because rule changes only apply to current plans	**0** Cannot recognise future planning because rule changes only apply to current plans	**0** Depends on uptake by regions	**++** Accelerates strategic planning	**0** Does not alter regional rules
Ease of implementation	**0**	**++** Councils must change coastal plans, but no further consultation required. Can be implemented well in advance of 2024	**+** NES can be implemented quickly but NZCPS-driven changes to regional plans require Schedule 1 processes and unlikely to be in place in advance of 2024	**- -** Requires customised interventions for each plan and ongoing intervention for new plans. Lengthy plan change processes using Schedule 1	**-** Requires customised interventions for each plan and ongoing intervention for new plans	**0** Can be developed quickly, but unlikely to achieve change in consenting practice in advance of 2024	**0** Not expected to result in significant changes to rules in advance of 2024	**0** Does not alter regional rules
Efficiency (Benefits over costs)	**0**	**++** Benefits expected to exceed costs	**-** Costs expected to exceed benefits	**-** Implementation costs high and outcomes not future proof	**-** Implementation costs high and outcomes not future proof	**0**	**0**	**0**

Options / Criteria		Regulatory				Non-regulatory		
	No action	NES	NES and NZCPS	Minister directed plan changes	Aquaculture regulations	Guidance	Planning Fund	Industry standard (A+)
Overall assessment		Best option – especially with complementary guidance and support from Aquaculture Planning Fund	NZCPS element adds cost and time without much increase in certainty	Complex implementation, and unlikely to achieve change in advance of 2024		Ineffective as standalone options, but useful complementary measures to regulatory options		

Key:

++ much better than doing nothing/the status quo
+ better than doing nothing/the status quo
0 about the same as doing nothing/the status quo
- worse than doing nothing/the status quo
- - much worse than doing nothing/the status quo

5.2.2 Marine farm biosecurity

The first level options that were considered to achieve the NESMA policy objective in relation to consistent national requirements for marine farm biosecurity are:

- Status quo – no central government intervention
- National Environmental Standard: Marine Aquaculture
- Tools under the Biosecurity Act 1993 – such as pathway management plans, pest management plans, controlled area notices
- National Environmental Standard: Marine Aquaculture and an appropriate tool under the Biosecurity Act 1993
- Updating the Fisheries Act 1996
- Encouraging voluntary initiatives such as Aquaculture New Zealand's A+ sustainable management framework

Each of the options identified above for marine farm biosecurity were assessed using the following criteria:

First order criteria

- *Delivers consistency*: Does the option address unnecessary variation between councils in relation to controls on aquaculture?
- *Improves management of on-farm biosecurity risks*: Does the option enable consistent and effective on-farm biosecurity management plans/procedures?

Second order criteria

- *Ease of implementation*: Are there any significant barriers or complexities to implementation? Does the option deliver a solution that can be implemented in a timely and effective manner prior to 2024? Is it possible to monitor compliance with the option, and can it be enforced?
- *Efficiency*: To what extent are the benefits of the option expected to exceed costs?

The options are briefly described in Table 5-3.

Table 5-3: Options for biosecurity management

Option	Comment
Status quo (or non-NESMA scenario)	The planning framework that is considered likely to apply in 2024 when a significant number of consents for existing marine farms expire and will need replacement. The non-NESMA scenario is discussed in detail in the report attached as **Appendix B**.
NESMA	As described in Table 5-1 above.
Tools under the Biosecurity Act 1993	Various tools for managing biosecurity risk exist under the Biosecurity Act 1993, including pathway management plans, pest management plans and controlled area notices. Each of the available tools is described in detail in the report attached as **Appendix D**. This option considered the implementation of any one or a combination of these tools to manage on-farm biosecurity risks. Of note, this option would not preclude councils including conditions relating to on-farm biosecurity on resource consents issued under the Resource Management Act 1991, and so could lead to inconsistent management of risks.
NESMA and an appropriate tool under the Biosecurity Act 1993	A combined approach using a national environmental standard and appropriate tools under the Biosecurity Act 1993 could be taken. The most likely tool to use under the Biosecurity Act 1993 would be national pathway management plans.

Option	Comment
Updating the Fisheries Act 1996	The Fisheries Act 1996, and in particular the fish farm register, could be used to require record keeping of stock and gear movements and to provide the ability to change and require conditions on registration. Both of these steps would enable improved biosecurity management, but would require amendment of the Fisheries Act 1996 to achieve. Of note, this option would not preclude councils including conditions relating to on-farm biosecurity on resource consents issued under the Resource Management Act 1991, and so could lead to inconsistent management of risks.
Encouraging voluntary initiatives	As described in Table 5-1 above.

5.2.3 Summary

Following the analysis outlined in sections 5.2.1 and 5.2.2 above, an NES was identified as the preferred regulatory option, complemented by guidance material and financial assistance to regional councils through the Aquaculture Planning Fund.

The proposed NES meets all of the assessment criteria and is the preferred option for its ability to:

- provide prescriptive national direction in a way that can provide consistency and increased certainty of process for replacement consenting, while ensuring aquaculture is managed in accordance with current understanding of best environmental practice;
- be implemented in a timely manner, enabling a consistent approach to replacement consenting to be established well before 2024 when the majority of current consents expire, and providing greater investor confidence in the existing aquaculture industry;
- drive councils to more deliberately consider NZCPS requirements for strategic planning and aquaculture; and
- ensure a consistent, comprehensive and effective management framework under the RMA for on-farm biosecurity risks for both new and existing marine farms.

The proposed NES would increase certainty about replacement consenting processes and requirements generally, but it would not include site specific determinations about which farms will get resource consents. This decision role is retained with regional councils. In addition, regional councils would continue to specify any consent conditions needed to address the matters of discretion.

5.3 Identification of second level options

On the basis that a national environmental standard has been identified as the preferred regulatory option, section 32(1)(b)(ii) of the RMA requires an assessment of the efficiency and effectiveness of the provisions of the NESMA in achieving the policy objective. As noted earlier, in order to assess those provisions it is also necessary to consider alternative options to them. Over the course of three years, a series of options for provisions have been assessed. Each of the options is briefly described in Table 5-4 below. Where an option was not considered to be viable a brief assessment of the reasons for that decision is also included.

Table 5-4: Options for provisions for NESMA

Option	Comment
Replacement consents for existing marine farms	
Activity status	Three options were considered for activity status:[16] • Controlled activity • Restricted discretionary activity • Discretionary activity

[16] Noting that under s68A of the RMA regional coastal plans cannot contain rules that permit aquaculture activities. Non-complying activity status was considered and discarded early in the process of developing the proposed NESMA, as it did not align with the policy objective.

Option	Comment
Notification provisions	Two options were considered with respect to whether consent applications under the NESMA would be publicly notified: • Precluding public and limited notification (with special circumstances still applying) • Retaining standard RMA notification decision tests and providing councils with the discretion to choose
Matters of control/discretion	Two broad options were considered for matters of control or discretion (depending on which of the activity status options was selected): • Restricting matters of control/discretion to focus on acknowledged issues with existing marine farms • Drafting matters of control/discretion to match existing examples in regional plans around the country It is acknowledged that with these two broad options there are numerous variations on the exact nature of the matters of control or discretion. Therefore considerable analysis was also undertaken in relation to which matters of control/discretion to include. Some of those options are outlined below, others can be found in the *section 46A report*.
Planning to give effect to Policies 7 and 8 of the NZCPS	Policies 7 and 8 of the NZCPS 2010 state that regional councils are to identify (in preparing regional policy statements and plans) areas of the coastal environment where particular activities and forms of subdivision, use and development are inappropriate, or may be inappropriate without consideration of effects through a resource consent process (Policy 7) and to include in regional policy statements and regional coastal plans provision for aquaculture activities in appropriate places in the coastal environment (Policy 8). One option for the NESMA would be to define the activity status for replacement consents for existing marine farms on the basis of the areas identified by regional councils as appropriate or inappropriate for aquaculture under Policies 7 and 8 of the NZCPS. A number of councils in the eight main aquaculture regions of New Zealand either do not have regional coastal plans in place that give effect to Policies 7 and 8 of the NZCPS, or are not yet through the process of developing these plans. There was doubt about whether all plans would be sufficiently progressed by 2024 to make this option viable. There were also doubts about the legal framework in terms of defining an activity status for marine farming on the basis of planning work that had not yet been completed, and which could not be clearly defined. As a result of these issues, this option was not considered further and was not part of the subject matter of the NESMA that was publicly notified.
Bay-wide management	A planning approach akin to catchment management for freshwater, the potential of bay-wide management to manage cumulative effects and co-ordinate the management of multiple marine farms in a confined geographic area is being investigated by some councils around New Zealand. The possibility of recognising bay-wide management initiatives through the NESMA was considered, but the complexity of the process and the lack of a consistent nation-wide demand for it meant that it was not part of the subject matter of the proposed NESMA that was publicly notified.
Full rule framework	The proposed NESMA as notified only identified regulations in relation to specified activities. Where an activity falls outside those regulations it defaults back to the relevant regional coastal planning framework. Consideration was given to including a full rule framework within the NESMA, however discussion with councils during consultation indicated a preference for rule frameworks in regional coastal plans to be maintained, in order to allow for regional specificity where circumstances were different to those covered by national direction.

Option	Comment
Wilsons Bay Marine Farming Zone and Tasman AMAs	The Wilsons Bay Marine Farming Zone in Waikato and the Tasman AMAs have specific plan provisions developed for them in their respective regional coastal plans. These provisions could be retained, or in order to ensure consistency with the rest of the main aquaculture regions these two areas could also be subject to the NESMA.
Identifying sites of importance	The discussion document for the NESMA noted that some areas around New Zealand hold particular importance for marine farming, including those where spat are collected from the wild for growing to maturity on marine farms. Sites that are currently important could be specifically recognised, for example through activity classification and/or matters that will be considered for replacement consent applications.
Outstanding and significant areas	Under Policies 13 and 15 of the NZCPS adverse effects on areas of outstanding natural character, outstanding natural features and outstanding natural landscapes are to be avoided. Provisions in the NESMA would need to recognise this requirement. Policy 11 of the NZCPS provides similar policy support to areas of indigenous biological diversity and as well as recommended matters of discretion in relation to significant seabed values such as reefs or biogenic habitats, and in relation to the management of marine mammal and seabird interactions with marine farms, consideration was also given as to whether significant ecological areas should have the same recognition through the NESMA as areas of outstanding natural character, outstanding natural features and outstanding natural landscapes. Further analysis of provisions in relation to these matters is discussed in section 6 of this report.
Resolving 'technical touches' on outstanding areas	A number of existing marine farms, particularly in Marlborough, overlap to a very limited extent with areas defined as areas of outstanding natural character, outstanding natural features and outstanding natural landscapes. The NESMA could resolve these overlaps by specifying that they were not considered to be issues, or it could leave that decision to councils as they process replacement consents.
Adaptive management and cumulative effects	Adaptive management and the management of cumulative effects of existing marine farms were the subject of detailed analysis in relation to the proposed NESMA, as outlined in the report attached as **Appendix E**.
Leniency and stringency	Section 43B of the RMA contains provisions that allow rules to be more stringent or lenient than a national environmental standard, provided that the standard expressly allows this. Consideration was therefore given, for each proposed NESMA regulation, as to whether leniency or stringency should be provided for.
Change of species	
Activity status	Three options were considered for activity status: • Controlled activity • Restricted discretionary activity • Discretionary activity
Notification provisions	Two options were considered with respect to whether consent applications under the NESMA would be publicly notified: • Precluding public and limited notification • Retaining standard RMA notification decision tests and providing councils with the discretion to choose
Matters of control/discretion	Two options were considered for matters of control or discretion (depending on which of the activity status options was selected): • Restricting matters of control/discretion to focus on acknowledged issues with existing marine farms

Option	Comment
	• Drafting matters of control/discretion to match existing examples in regional plans around the country Considerable analysis was also undertaken in relation to which matters of control/discretion to include. Some of those options are discussed above in relation to replacement consents for existing marine farms, others can be found in the *section 46A report*.
Including spat catching	Existing marine farms used for catching wild spat for eventual transfer to production farms for grow-out have a different mode of operation to production farms. Consideration was given as to whether to include these farms in the change of species provisions or exempt them on the basis of their different effects.
Change of species during term of consent	The option of providing for a change of species during the term of a consent, as either a controlled or restricted discretionary activity, was investigated. However, s127(3) of the RMA states that an application to change consent conditions is treated as if it is an application for resource consent for a discretionary activity. This option was therefore not included in the subject matter of the proposed NESMA when it was publicly notified.

Unlike replacement consents and change of species, the only other option considered in relation to realignment was not to include provisions to provide for realignment of existing marine farms. Likewise, the principal option for the biosecurity provisions was not to include them, although a variety of other options, as outlined in section 6.5 below were considered if provisions were not to be included in the NESMA.

Those options that were not discarded prior to public notification of the subject matter of the NESMA continued to be considered through the public consultation and submissions analysis process and are discussed further in section 6 below.

6. Assessment of Second Level Options

6.1 Introduction

Section 32(1)(b)(ii) of the RMA requires an assessment of the efficiency and effectiveness of the provisions of the NESMA in achieving the objectives of the proposal. Section 32(2) states that this assessment must:

(a) identify and assess the benefits and costs of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the provisions, including the opportunities for –

(i) economic growth that are anticipated to be provided or reduced; and

(ii) employment that are anticipated to be provided or reduced; and

(b) if practicable, quantify the benefits and costs referred to in paragraph (a); and

(c) assess the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the provisions.

In reaching a preliminary conclusion that a national environmental standard is the most appropriate way to achieve the policy objective (as discussed in section 4 of this evaluation report), the analysis concluded that maintaining the status quo was not appropriate, as it did not address the issues identified. As a result, through this section of the evaluation report the second level options are described and then evaluated and compared against each other in order to determine whether the provisions are the most appropriate way to achieve the policy objective. Adopting this approach, this section of the report provides an assessment of the provisions (rules) in the NES-MA in terms of both efficiency and effectiveness.

An assessment of efficiency under section 32 of the RMA considers whether the provisions will be likely to achieve the objectives at the lowest total cost, or achieves the highest net benefit. An assessment of efficiency also considers how costs or benefits are spread, and whether a particular group receives a disproportionate share. It needs to consider a broad range of costs and benefits, both tangible and intangible. The analysis that follows considers the benefits and costs of the

environmental, economic, social and cultural effects that could arise from each option. Where possible, those costs and benefits have been quantified, and in some cases monetised through a formal cost-benefit analysis (see report attached as **Appendix F**. The formal cost benefit analysis considers both the quantified and non-quantified costs and benefits, and has concluded that the benefits outweigh the costs. There are, however, limitations in the quantified analysis due to the information available on different aspects of the proposed NESMA. The robustness of the analysis is influenced by the potential bias in the information provided and the potential magnitude of unquantified costs and benefits, such as uncertainty around social and environmental outcomes. The figures in the cost-benefit analysis (and those included in the analysis in this report that follows) should therefore be regarded as an order of magnitude calculation rather than a definitive measure.

An assessment of effectiveness under section 32 of the RMA considers the ability of the provisions to achieve the stated objective. The assessment of the effectiveness of the provisions is therefore focused on whether they will achieve the three key 'limbs' of the policy objective:

- a **consistent** regional planning framework, that address unnecessary variation between councils in relation to controls on aquaculture;
- an **efficient** regional planning framework;
- sustainable aquaculture within **environmental limits**.

A number of the options identified in section 5 of this report are considered in more detail in sections 6.2 – 6.5 below. Some options failed one or more of the criteria used for assessment, generally the consistency, efficiency or environmental limits criteria. Options that failed any one of these criteria are not analysed in detail, but the reasons that they failed the criteria are outlined in **Appendix G**.

6.2 Replacement consents for existing marine farms

As outlined in section 5.3 a wide variety of options were considered for provisions for replacement consents for existing marine farms in the NESMA, within the following general areas:

- Activity status
- Approach to notification
- Matters of control/discretion
- Including Waikato and Tasman AMAs
- Identifying Wainui Bay and other sites of importance
- Including provisions with respect to other 'significant areas' (e.g. NZCPS Policy 11)
- Requiring all marine farms (i.e. including the 'technical touches') in outstanding areas to have the additional matter of discretion
- Including adaptive management and management of cumulative effects as MODs (i.e. relying on the consent process rather than plan provisions)
- Leniency and stringency

While the options within each of these general areas could be broken down and assessed separately, the three principal components of any framework of provisions (the activity status, notification requirements and matters that would be considered by a decision maker) tend to be interlinked and so are best considered together. The following four general options for provisions for replacement consents for existing marine farms have therefore been assessed to determine which is the most appropriate to achieve the policy objective:

- A controlled activity, with public and limited notification precluded unless required under sections 95A(9), 95B(2)-(4) or 95B(10) of the RMA, and highly constrained matters of control[17]

[17] Recognising that as a controlled activity must be granted consent, logically the matters that can be considered by a decision maker should be very restricted.

- A restricted discretionary activity, with public and limited notification precluded unless required under sections 95A(9), 95B(2)-(4) or 95B(10) of the RMA, and constrained matters of discretion[18]
- A restricted discretionary activity, with discretion concerning notification left to councils and common matters of discretion
- A discretionary activity

Each of these options are discussed in terms of their social, economic, cultural and environmental effects, the costs and benefits of those effects, and whether those costs and benefits can be quantified (and monetised) in the sections that follow. The effectiveness of the provisions, in terms of whether they would achieve a consistent and efficient planning framework, and whether existing marine farming would continue to be managed within environmental limits is then assessed. Last, the certainty and sufficiency of the information available for each option is considered, and the risk of acting or not acting if uncertain or insufficient information is available.

Considerable analysis was also undertaken in relation to providing for sites of importance to the aquaculture industry, such as spat catching farms at Wainui Bay in Tasman District, in the NESMA. Sixty four submissions were received in relation to this matter when the subject matter of the proposed NESMA was consulted on. Options for providing for sites of importance are therefore analysed within the body of this report, in section 6.2.5 below.

Two options for provisions for replacement consents for existing marine farms identified above failed to meet one of the key criteria of consistency, efficiency or managing within environmental limits are so have not been analysed in detail. Including the existing marine farms contained in the Wilsons Bay Zone in Waikato and the Aquaculture Management Areas in Tasman did not meet the criteria of efficiency. Plan provisions for both these areas were developed and negotiated over the course of a number of years, and the Tasman areas in particular were the subject of an exhaustive Court enquiry process. Replacing the provisions developed through this level of effort would ignore the investment of time and resources by marine farms, the two councils and the local community to reach an acceptable solution. In relation to the option of including other 'significant areas' in the provisions in the proposed NES, the s46A report contains a detailed analysis of the reasons that this is not recommended.

6.2.1 Option 1 – Controlled activity for replacement consents

Table 6-1 outlines the social, economic, cultural and environmental effects that could arise from Option 1, and the costs and benefits of those effects.

Table 6-1: Controlled activity – effects and costs and benefits

Assessment matter	Comment
Effects	• An application for a controlled activity cannot be declined, and the matters that can be considered should be constrained • Social and cultural effects may arise from over-riding local decision making by a rule that requires consent to be granted • In combination with consent having to be granted, further social and cultural effects may arise from precluding public or limited notification as the community and tangata whenua are excluded from the consent process and have no say in the conditions that may be imposed on the consent. The effect being considered here is one of loss of local decision making, as effects on social and cultural values may be able to be managed through matters of control (see below) • Economic effects (such as increased investment in farms and farm structures) may arise as a result of the certainty for a marine farmer that consent will be granted and that public or limited notification would generally be precluded • Environmental effects may arise as a result of effects not being able to be considered, or their consideration being constrained. An analysis of the potential environmental effects of existing marine farms is attached as

[18] Recognising that a number of current restricted discretionary activity rules in regional and district plans around the country currently contain wide matters of discretion such that they function essentially as discretionary activities

Assessment matter	Comment
	Appendix G. While this has been prepared in light of likely effects resulting from constrained matters of discretion for a restricted discretionary activity, those effects are likely to be greater under matters of control, which should be further constrained • Social effects in terms of matters such as noise, odour and public access through a marine farm could be controlled by matters of control, but wider matters such as effects on general amenity and recreational use are unlikely to be able to be adequately controlled. Adverse effects may therefore result • Cultural effects in terms of effects on tangata whenua values may result, as these types of effects are sufficiently wide-ranging that they are not amenable to management through matters of control that are sufficiently constrained to be meaningful in a controlled activity context.
Costs and benefits	• For local communities and tangata whenua, the requirement to grant consent for a controlled activity represents a cost in terms of loss of local decision making if a national instrument requires that activities be classified as controlled • There will be further costs in terms of local decision making if local communities and tangata whenua are precluded from participating through providing their perspective on any consent conditions that may be imposed • For marine farmers a controlled activity with public and limited notification precluded represents a benefit in terms of the certainty conveyed by knowing that consent will be granted • For marine farmers there is a potential benefit in knowing the matters that will be considered for a consent application. The size of that benefit varies depending on the matters of control, and the way in which each council implements them • Environmental, social and cultural costs may arise if existing marine farms that are having adverse effects on the environment are enabled by a controlled activity rule to continue operating, and matters of control mean that some or all of those effects cannot be adequately addressed.
Quantified costs and benefits	• Costs in terms of a loss of local decision making cannot be quantified • Economic benefits of increased certainty likely to exceed the $4.5 - $8M calculated for the proposed NESMA option, as controlled activity status provides certainty that consent will be granted • Environmental, social and cultural costs would depend on the matters of control imposed on the rule, and would also depend on the particular farm being considered. Quantification of these costs has therefore not been attempted

Table 6-2 assesses the effectiveness of Option 1 against the key criteria of consistency, efficiency (of process, not economic efficiency) and ensuring sustainable aquaculture within environmental limits.

Table 6-2: Controlled activity – effectiveness

Criteria	Comment

Consistency	• A controlled activity would provide both a consistent process and a consistent outcome for all existing marine farms as follows:
	  ○ Replacement consents for all existing marine farms would have to be granted
	  ○ Consistent matters of control would be assessed by each council and while there is the possibility of variation in the way that matters are assessed, matters of control should typically be sufficiently restricted that consistency of assessment is considered to be more likely to occur than not

Criteria	Comment
	○ In general, public or limited notification would not occur. Circumstances provided for by sections 95A(9), 95B(2)-(4) or 95B(10) of the RMA may result in some variation in approach, but this is unlikely to occur for the majority of consent applications
Efficiency	• A controlled activity with public and limited notification generally precluded, and restricted matters of control would provide an efficient process in relation to time to process consents, due to the relative lack of matters that can be considered • Increased efficiency in application preparation is likely to result for those marine farmers who have interests in more than one region, as opposed to the current situation of different approaches being taken in different regions
Environmental limits	• It is not clear that marine farming would operate within environmental limits under this option – marine farms that are currently having adverse effects would be able to continue operating and it would not be good practice plan drafting to have matters of control sufficiently wide that all effects could be addressed

Table 6-3 assesses whether sufficient information is available in relation to Option 1, and the risks of acting or not acting if insufficient information is available.

Table 6-3: Controlled activity – available information and risk of acting or not acting

Criteria	Comment
Available information	• The level of social and cultural decision making cost is not known, but may vary from region to region depending on the current planning framework. For example, Northland has had a controlled activity rule for existing marine farms for some years now and the approach is widely accepted by the community • The level of economic benefit to industry is not certain • The likely level of environmental effects is not known, and would vary from region to region
Risk of acting	• The risk of acting in light of insufficient information is that local communities, tangata whenua and the natural and physical environment would be significantly affected by the ongoing operation of existing marine farms • This represents a definite risk, as many of the existing marine farms were not originally considered under the RMA

6.2.2 Option 2 – Proposed NESMA approach for replacement consents

Table 6-4 outlines the social, economic, cultural and environmental effects that could arise from Option 2, and the costs and benefits of those effects.

Table 6-4: Proposed NESMA restricted discretionary activity – effects and costs and benefits

Assessment matter	Comment
Effects	• Social and cultural effects in terms of provision for local decision making from providing ability to decline consent • Social and cultural effects may arise from precluding public and limited notification as the community and tangata whenua only have the opportunity to be involved in the process if the circumstances provided for by sections 95A(9), 95B(2)-(4) or 95B(10) of the RMA exist. These effects are mitigated to an extent by matters of discretion that provide for issues known to be of concern to local communities, and by a matter of discretion and process for consultation with tangata whenua about their values. Effects are also not as great as for Option 1, as a restricted discretionary activity provides an opportunity for consent to be declined

Assessment matter	Comment
	• Economic effects (such as increased investment in farms and farm structures) may arise as a result of the certainty conveyed by having a defined set of matters of discretion and precluding public and limited notification except in restricted circumstances • Environmental effects may arise as a result of effects not being able to be considered, or their consideration being constrained. An analysis of the potential environmental effects of existing marine farms is attached as **Appendix G**, in relation to the matters of discretion considered as part of the development of the proposed NESMA.

Costs and benefits	• A consent application for a restricted discretionary activity can be declined, but the matters that can be considered are restricted and must be defined
	• In terms solely of the activity classification, for local communities and tangata whenua a restricted discretionary activity classification is therefore neutral, as there is no guarantee that an existing marine farm will retain consent
	• There may be costs to local communities in terms of lost participation opportunity, although these costs are mitigated to an extent by matters of discretion that provide for issues known to be of concern to local communities, and by a matter of discretion and process for consultation with tangata whenua about their values
	• There are benefits to tangata whenua arising from the formal provision for pre-application consultation contained in the proposed NESMA
	• There may be costs to tangata whenua who do not have statutory acknowledgements in the coastal marine area, in terms of a lost participation opportunity in terms of formal participation
	• There may be costs to marine farmers as a result of the requirement to consult with tangata whenua, but these costs are not anticipated to be significant, as consultation often occurs under the status quo for replacement consent applications
	• For marine farmers there is a potential benefit in knowing the matters that will be considered for a consent application. The size of that benefit varies depending on the matters of discretion, and the way in which each council implements them
	• Environmental costs and benefits arise in different regions, depending on the differences between the proposed NESMA approach and the current planning framework. In summary, and bearing in mind that none of the identified effects were assessed as significant, there is the potential for:
	  ○ Costs in terms of landscape in Auckland and Southland
	  ○ Costs in terms of natural character in Auckland and Southland
	  ○ Costs in terms of benthic effects from shellfish farming in Auckland, Waikato, Bay of Plenty and Southland
	  ○ Costs in terms of habitat exclusion effects on marine mammals in Auckland, Bay of Plenty and Southland
	  ○ Costs in terms of phytoplankton depletion effects in Auckland, Canterbury and Southland
	  ○ Benefits in terms of management of noise from existing marine farming in Auckland and Bay of Plenty
	  ○ Benefits for management of effects on recreational fishing
	  ○ Benefits for management of effects on public access in Auckland and Northland, but costs in Canterbury and Southland
	  ○ Benefits in relation to access through marine farms in Northland, Auckland and Bay of Plenty
	  ○ Benefits in terms of managing public exclusion in Northland and Auckland

Assessment matter	Comment
	○ Benefits in Northland and Auckland in relation to managing rubbish and debris, but costs overall in relation to amenity in Canterbury and Southland All other effects are neutral as a result of the proposed NESMA
Quantified costs and benefits	• Costs in terms of lost participation opportunity are intangible and cannot be quantified • Increased certainty for marine farmers as a result of activity status has been quantified at between $4.5M and $8M between now and 2025 (NZIER, 2018) • Increased certainty for marine farmers as a result of precluding public and limited notification has been quantified at between $10.5M and $21M • Environmental costs and benefits could, with further analysis, be quantified in terms of area or number of farms or number of members of the community affected, but the effects cannot be monetised on the basis of information available valuing these types of effects in the New Zealand context

Table 6-5 assesses the effectiveness of Option 2 against the key criteria of consistency, efficiency (of process, not economic efficiency) and ensuring sustainable aquaculture within environmental limits.

Table 6-5: Proposed NESMA restricted discretionary activity – effectiveness

Criteria	Comment
Consistency	• A restricted discretionary activity, with nationally defined matters of discretion, would provide a consistent framework for considering replacement consents for all existing marine farms • In general, public or limited notification would not occur. Circumstances provided for by sections 95A(9), 95B(2)-(4) or 95B(10) of the RMA may result in some variation in approach, but this is unlikely to occur for the majority of consent applications • There may be some variation in the way each council interprets and applies a particular matter of discretion
Efficiency	• A restricted discretionary activity with constrained matters of discretion is not as efficient in terms of time for consent processing as a controlled activity, however the standardisation of the matters to be considered is likely to lead to some efficiency gains • Increased efficiency in application preparation is likely to result for those marine farmers who have interests in more than one region, as opposed to the current situation of different approaches being taken in different regions
Environmental limits	• Proposed matters of discretion, in conjunction with the ability to decline consents, mean that marine farming under the NES-MA approach would be highly likely to be undertaken within environmental limits

Sufficient information exists in relation to the effects and costs and benefits of Option 2, such that the risk of acting or not acting does not need to be considered.

6.2.3 Option 3 – Typical RMA restricted discretionary activity for replacement consents

The difference between Option 3 and Option 2 is that in Option 3 public or limited notification would not be precluded and that matters of discretion typically written for existing marine farms in regional coastal plans around the country would be adopted.

Table 6-6 outlines the social, economic, cultural and environmental effects that could arise from Option 3, and the costs and benefits of those effects.

Table 6-6: Restricted discretionary activity – effects and costs and benefits

Assessment matter	Comment
Effects	• Social and cultural effects in terms of provision for local decision making from providing ability to decline consent • Social and cultural effects from providing opportunity for participating in consent process (at the discretion of the processing council) • Economic effects (such as increased investment in farms and farm structures) may arise as a result of the certainty conveyed by having a defined set of matters of discretion • Environmental effects may arise as a result of effects not being able to be considered, or their consideration being constrained, depending on the matters of discretion defined
Costs and benefits	• A consent application for a restricted discretionary activity can be declined, but the matters that can be considered are restricted and must be defined • In terms solely of the activity classification, for local communities and tangata whenua a restricted discretionary activity classification is therefore neutral, as there is no guarantee that an existing marine farm will retain consent • As Option 3 does not preclude public or limited notification, for local communities and tangata whenua a restricted discretionary activity classification is neutral, as the decision remains with the council (as it currently does) about the extent to involve other parties • For marine farmers there is a potential benefit in knowing the matters that will be considered for a consent application. The size of that benefit varies depending on the matters of discretion, and the way in which each council implements them. Review of existing matters of discretion in a number of regional coastal plans suggests that they tend to be relatively wide, which means any benefit is likely to be small • Retaining council discretion to make decisions about public or limited notification increases the potential for costs to marine farmers of hearing processes. • Review of existing matters of discretion in a number of regional coastal plans suggests that they tend to be relatively wide, which means that environmental costs and benefits are unlikely to occur as a result of this option compared with the current approach
Quantified costs and benefits	• The costs and benefits listed above have not been quantified. •

Table 6-7 assesses the effectiveness of Option 3 against the key criteria of consistency, efficiency (of process, not economic efficiency) and ensuring sustainable aquaculture within environmental limits.

Table 6-7: Restricted discretionary activity - effectiveness

Criteria	Comment
Consistency	• A restricted discretionary activity, with nationally defined matters of discretion, would provide a consistent framework for considering replacement consents for all existing marine farms • There may be significant variation in the way each council interprets and applies a particular matter of discretion, if the matters of discretion are written widely • Retaining council discretion with regard to public and limited notification is likely to perpetuate the current inconsistent approaches across the country

Criteria	Comment
Efficiency	• Providing wide matters of discretion is unlikely to result in an efficient planning framework as it increases the likelihood that further information will be sought and that a wide range of matters will be considered • Depending on whether a council chooses to publicly or limited notify a consent application, timeframes for consent processing will vary between short and long
Environmental limits	• Proposed matters of discretion, in conjunction with the ability to decline consents, mean that marine farming under Option 3 would be undertaken within environmental limits

Sufficient information exists in relation to the effects and costs and benefits of Option 3, such that the risk of acting or not acting does not need to be considered.

6.2.4 Option 4 – discretionary activity for replacement consents

Table 6-8 outlines the social, economic, cultural and environmental effects that could arise from Option 4, and the costs and benefits of those effects.

Table 6-8: Discretionary activity – effects, costs and benefits

Assessment matter	Comment
Effects	• Social and cultural effects in terms of provision for local decision making from providing ability to decline consent • Social and cultural effects from providing opportunity for participating in consent process (at the discretion of the processing council) • Economic effects may arise through the ongoing lack of certainty for marine farmers, with concern that replacement consents will not be obtained resulting in a constraint on investment • While existing marine farms are generally considered not to have significant adverse effects on the environment, some effects may occur but can be managed through consent conditions or, if necessary, declining consent
Costs and benefits	• A consent application for a discretionary activity can be declined, and the processing council can consider any effect it considers relevant • In terms solely of the activity classification, for local communities and tangata whenua a discretionary activity classification is therefore neutral, as there is no guarantee that an existing marine farm will retain consent • As Option 4 does not preclude public or limited notification, for local communities and tangata whenua a discretionary activity classification is neutral, as the decision remains with the council (as it currently does) about the extent to involve other parties • There is a potential lost opportunity cost for the marine farming industry in general if investment in marine farms and farm structures is delayed or does not proceed because of uncertainty about whether replacement consents will be gained.[19] With approximately 62% of marine farms needing to apply for replacement consents by 1 January 2025 further significant investment in some areas of the industry could be delayed by 5 years or more • Retaining council discretion to make decisions about public or limited notification increases the potential for costs to marine farmers of hearing processes. • As a discretionary activity classification allows a processing council to consider any effect and manage it through either consent conditions or declining consent, environmental costs and benefits are unlikely to occur as a result of this option compared with the current approach

[19] See for example *Overview of the impacts of re-consenting uncertainty and delay on aquaculture investment in New Zealand* (NZIER, 2015).

Assessment matter	Comment
Quantified costs and benefits	• The costs and benefits listed above have not been quantified. •

Table 6-9 assesses the effectiveness of Option 4 against the key criteria of consistency, efficiency (of process, not economic efficiency) and ensuring sustainable aquaculture within environmental limits.

Table 6-9: Discretionary activity - effectiveness

Criteria	Comment
Consistency	• A discretionary activity means that each council has complete discretion as to how a replacement consent for an existing marine farm is considered, and the types of conditions that would be imposed. The significant variation in the approach that councils take to existing marine farms is therefore likely to continue • Retaining council discretion with regard to public and limited notification is likely to perpetuate the current inconsistent approaches across the country
Efficiency	• Continuing a widely variable approach to processing replacement consents for existing marine farms continues the inefficiency of the current system identified as an issue when a decision was made to develop national direction for marine aquaculture • Depending on whether a council chooses to publicly or limited notify a consent application, timeframes for consent processing will vary between short and long
Environmental limits	• Proposed matters of discretion, in conjunction with the ability to decline consents, mean that marine farming under Option 4 would be undertaken within environmental limits

Sufficient information exists in relation to the effects and costs and benefits of Option 4, such that the risk of acting or not acting does not need to be considered.

6.2.5 Summary

On the basis of the assessment outlined in sections 6.2.1 to 6.2.4 above, the provisions proposed for the NESMA in relation to replacement consents for existing marine farms (Option 2 above), which include exempting the Wainui Bay spat catching farms from the replacement consenting provisions of the NESMA, are considered to be the most appropriate to give effect to the policy objective.

6.3 Realignment

Within the approach proposed for the NESMA for replacement consents for existing marine farms, realignment of relatively small areas of existing farms is to be provided for. This is principally to allow the resolution of issues such as marine farms being located over valued seafloor habitat or small areas of the farm being located within areas defined as outstanding.

The only other option considered with respect to realignment was to not provide for it. This section assesses both the proposed approach and the 'do-nothing' option.

6.3.1 Realignment - Do nothing

Table 6-10 outlines the social, economic, cultural and environmental effects that could arise from the 'do nothing' option, and the costs and benefits of those effects.

Table 6-10: Do nothing – effects and costs and benefits

Assessment matter	Comment
Effects	• Social effects if existing farm is positioned in a location that restricts or prevents public access through the area • Social effects if existing farm is poorly located in terms of effects on amenity and landscape, particularly if the farm is located within an outstanding area • Cultural effects if existing farm is positioned in a location that has adverse effects on sites or areas of value to tangata whenua, or restricts access for mahinga kai • Economic effects for marine farmers if farm is positioned in a location that does not provide optimal growing conditions • Economic effects for marine farmers if farm is difficult to obtain replacement consent for due to the other effects of its current location • Environmental effects if farm is located over rare or significant seabed habitat
Costs and benefits	• Restriction of access and effects on amenity and landscape values are social costs • Restriction of access for mahinga kai, and effects on sites and areas of value to tangata whenua are cultural costs • Location of farms over rare or significant seabed habitat may cause a degradation or loss of that habitat, which is an environmental cost • Economic costs in terms of lost production opportunity if a farm is positioned in a location that does not provide optimal growing conditions • Economic costs for consent process if obtaining replacement consent in current location is difficult or contentious, with more significant costs if consent cannot be obtained • Economic benefits in terms of avoided cost of having to realign
Quantified costs and benefits	• None of the costs and benefits identified above have been able to be quantified

Table 6-11 assesses the effectiveness of the 'do nothing' option against the key criteria of consistency, efficiency (of process, not economic efficiency) and ensuring sustainable aquaculture within environmental limits.

Table 6-11: Do nothing – effectiveness

Criteria	Comment
Consistency	• Two councils, Auckland and Northland, currently provide rules specifically covering realignment of existing marine farms. In Waikato, the current rule framework would mean that realignment would be a prohibited activity, although small-scale extensions are covered by a consenting framework. In the rest of the country realignment is currently either a discretionary or restricted discretionary activity. • The 'do nothing' option would result in this inconsistent approach continuing
Efficiency	• The efficiency of the current process will depend on the particular council (with the exception of Waikato, where realignment is prohibited), but is likely to be variable across the country
Environmental limits	• Some existing marine farms may be having environmental effects as a result of the location of a portion of the farm • Experience from replacement consent processes in Marlborough suggests that 25% of farms have had some amount of rocky substrate found underneath them that has necessitated either a rearrangement of the lines or the exclusion of areas from the farm footprint[20]

[20] 28 June 2018 expert workshop on reefs and biogenic habitat, convened by MPI and involving scientists from DOC, NIWA, Cawthron and Davidson Environmental.

Table 6-12 assesses whether sufficient information is available in relation to the 'do nothing' option, and the risks of acting or not acting if insufficient information is available.

Table 6-12: Do nothing – available information and risk of acting or not acting

Criteria	Comment
Available information	• The exact number of farms located in areas that result in adverse social, cultural or environmental effects is unknown and will be difficult to establish until the replacement consenting peak is reached in 2024/25 • Not knowing the number of farms with potential issues means that information on the economic costs to marine farms is also not available
Risk of acting	• The risk of not acting, and therefore maintaining the current variable approach throughout the country is largely a risk that inconsistent approaches will continue to be taken and a less efficient regulatory framework will result • Marine farms located in or over areas that result in social, cultural and/or environmental effects will be assessed when a replacement consent is required, so there is limited risk that any issues will not be addressed

6.3.2 Realignment - NESMA approach

Table 6-13 outlines the social, economic, cultural and environmental effects that could arise from the NESMA option, and the costs and benefits of those effects.

Table 6-13: NESMA – effects and costs and benefits

Assessment matter	Comment
Effects	• Social, cultural and environmental effects may be able to be reduced through realigning existing marine farms, although the reduction is constrained by the area of farm that can be realigned under the proposed NESMA (a maximum of 3.33ha of a 10ha farm, with 10ha being the maximum size of farm covered by the provisions) • As a result of the planning framework assumed to be the baseline (see **Appendix B**) the proposed NESMA would represent a change in only three regions, Auckland (where matters of discretion would be more constrained than they are in the current Auckland Unitary Plan), Bay of Plenty and Southland, where the activity classification would change from discretionary to restricted discretionary • There is therefore the potential for effects as outlined in the analysis of the potential environmental effects for replacement marine farms (see **Appendix G**), in the three identified regions only in relation to realignment. The analysis contained in **Appendix G** identifies the potential for some effects in these regions, although none of the effects are considered to be significant
Costs and benefits	• A consent application including realignment of no more than 1/3 of a maximum 10ha existing marine farm would be classified as a restricted discretionary activity, with the matters of discretion identified for replacement consents, but with extra matters to address specific issues associated with realignment. Public or limited notification of consent applications would not be precluded • In terms of activity classification and notification provisions the proposed NES-MA approach is neutral for local communities and tangata whenua, as there is no guarantee that an existing marine farms will retain consent and the level of public involvement is left to the council (as in the current situation) • For marine farmers there is a potential benefit (certainty) in knowing the matters that will be considered for a consent application. This is particularly the case for marine farmers operating in multiple regions in the country. The size of that benefit varies depending on the matters of discretion, and the way in which each council implements them

Assessment matter	Comment
	• There is an overall environmental benefit to enabling consent applications to be made to relocate existing marine farms away from areas where they may be causing adverse effects, and there may be a productivity benefit as well • That benefit is somewhat reduced in Auckland, Bay of Plenty and Southland where the provisions proposed for the NES-MA would be somewhat more restrictive than those that would apply if consent applications were made under the non-NES-MA scenario. Many of the matters outlined as potential costs for replacement consenting in section 6.2.2 of this report are however the reasons that realignment would be considered, so the overall cost may be in the range of zero to minor depending on the particular circumstances
Quantified costs and benefits	• As noted above, the three regions where costs and benefits may arise as a result of the NESMA provisions are Auckland, Bay of Plenty and Southland. There are a total of 124 farms in these regions as at March 2018 that could take advantage of the realignment provisions. Assuming that a maximum of 25% of these farms may need to realign (based on Marlborough experience), the costs and benefits identified above may apply to 31 marine farms • The quantum of effects resulting has not been quantified to date

Table 6-14 assesses the effectiveness of the NESMA option against the key criteria of consistency, efficiency (of process, not economic efficiency) and ensuring sustainable aquaculture within environmental limits.

Table 6-14: NESMA – effectiveness

Criteria	Comment
Consistency	• A restricted discretionary activity, with nationally defined matters of discretion, would provide a consistent framework for considering proposals to realign existing marine farms • Variation will continue with respect to approaches to public or limited notification, however, if the reason for proposing realignment is to reduce adverse social, cultural and/or environmental effects, the occurrence of public or limited notification may be infrequent • There may be some variation in the way each council interprets and applies a particular matter of discretion
Efficiency	• A restricted discretionary activity with standardised matters of discretion is likely to lead to some efficiency gains • Increased efficiency in application preparation is likely to result for those marine farmers who have interests in more than one region, as opposed to the current situation of different approaches being taken in different regions
Environmental limits	• Providing for realignment recognises that some existing marine farms may be having environmental effects

Table 6-15 assesses whether sufficient information is available in relation to the NSE-MA option, and the risks of acting or not acting if insufficient information is available.

Table 6-15: NESMA – available information and risk of acting or not acting

Criteria	Comment
Available information	• The exact number of existing marine farms partially located in areas where social, cultural or environmental effects may result is not known, although may be in the region of 25% of existing farms based on Marlborough experience • The exact effects of those marine farms on those values is also not known

Criteria	Comment
Risk of acting	• The risk of acting is that matters of discretion may be defined that do not adequately address the effects of realigning existing marine farms. This risk is, however, considered relatively low, as the general effects of marine farming in New Zealand are well understood, and provisions have been developed to ensure that these effects continue to be addressed as required • The risk of not acting is a continuation of a variable and potentially inefficient process for marine farmers. There is no risk that environmental effects will continue past the expiry date of the current consents, as they will be addressed during the replacement consent process and realignment could be suggested or required at that stage

6.3.3 Summary

On the basis of the assessment outlined in sections 6.3.1 and 6.3.2 above, the provisions proposed for the NESMA are considered to be the most appropriate to give effect to the policy objective.

6.4 Change of species

Within the approach proposed for the NESMA specific provisions are included relating to change of species on existing marine farms. Other options considered included not specifically providing for change of species, providing for it but not differentiating between the types of species change that marine farmers might propose, and including spat catching farms in the farms that the provisions apply to.

This section assesses the approach included in the NESMA and the three options.

6.4.1 Change of species – Option 1 (do nothing)

Under Option 1 the non-NESMA scenario planning framework would continue. Those councils that already consent multiple species (notably Marlborough and Southland) would continue to provide that flexibility to marine farmers, although for species other than those listed on a consent either a consent variation or a replacement consent with a wider range of species would have to be sought. Other councils would continue their current approach of consenting the principal aquaculture species and requiring either a variation or a replacement consent to be obtained to farm different species.

Table 6-16 outlines the social, economic, cultural and environmental effects that could arise from Option 1, and the costs and benefits of those effects.

Table 6-16: Option 1 – effects and costs and benefits

Assessment matter	Comment
Effects	• Potential social and cultural effects as a result of new species being farmed, particularly if they result in changed operations or structures on an existing marine farm, but effects managed through the standard consent process • Economic effects through lost opportunity to innovate quickly on marine farms • Potential environmental effects as a result of new species being farmed, but effects managed through the standard consent process
Costs and benefits	• Neutral from the perspective of social, cultural and environmental costs and benefits, as effects managed through the standard consent process • Lost opportunity cost to marine farmers through lost opportunity to innovate quickly on marine farms or cost of changing existing resource consents to enable the farming of new species
Quantified costs and benefits	• Costs and benefits identified above have not been quantified

Table 6-17 assesses the effectiveness of Option 1 against the key criteria of consistency, efficiency (of process, not economic efficiency) and ensuring sustainable aquaculture within environmental limits.

Table 6-17: Do nothing – effectiveness

Criteria	Comment
Consistency	• Will continue current level of inconsistency in council approaches to consents for new species
Efficiency	• Does not result in an efficient process to allow marine farmers to innovate on farm, because of the process that needs to be followed to gain a consent variation or replacement consent
Environmental limits	• Farming of new species managed to environmental limits through consent conditions

A general desire has been expressed by the marine farming industry for some time to be able to innovate quickly and easily on farm, in order to respond to emerging markets and opportunities. It is considered that there is sufficient information available to understand the current restrictions on innovation as a result of the consenting framework.

6.4.2 Change of species - NESMA approach (Option 2)

Table 6-18 outlines the social, economic, cultural and environmental effects that could arise from the NESMA option, and the costs and benefits of those effects.

Table 6-18: NESMA – effects and costs and benefits

Assessment matter	Comment
Effects	• The effects of the NES-MA approach are the same as those identified in Table 6-4, as change of species would occur at the same time as obtaining replacement consent under the NES-MA, with the exception of: ○ a reduction in social and cultural effects of loss of participation in consent processes for change of species under Categories 3 and 4, where public or limited notification is not precluded ○ additional management of the potential environmental effects of new species through additional matters of discretion to address genetic effects of escapees, cultural effects of translocation of taonga species and hydrodynamic effects
Costs and benefits	• The costs and benefits of the NES-MA approach are the same as those identified in Table 6-4, as change of species would occur at the same time as obtaining replacement consent under the NES-MA, with the exception of: ○ a potential benefit to marine farmers through providing a consistent set of matters that would be considered for changing species, and reducing those matters for change of species under Categories 1 and 2
Quantified costs and benefits	• The costs and benefits of the change of species provisions on their own (as opposed to as part of a replacement consent process) have not been quantified. Work by NZIER indicates a neutral to small positive benefit

Table 6-19 assesses the effectiveness of the NESMA option against the key criteria of consistency, efficiency (of process, not economic efficiency) and ensuring sustainable aquaculture within environmental limits.

Table 6-19: NESMA – effectiveness

Criteria	Comment
Consistency	• A restricted discretionary activity, with nationally defined matters of discretion, would provide a consistent framework for considering change of species as part of replacement consents for the majority of existing marine farms (as spat catching farms are excluded from the change of species provisions)

Criteria	Comment
	• For Categories 1 and 2, public or limited notification is unlikely to occur. For the more significant change of species however (Categories 3 and 4) discretion is left to councils as to whether to publicly or limited notify applications, which may result in variation throughout the country • There may be some variation in the way each council interprets and applies a particular matter of discretion
Efficiency	• Providing for change of species at the time of replacement consenting is not particularly efficient as it ties the change of species to the normal resource consent cycle. The RMA however does not provide another mechanism for initiating a change of species mid-consent, as a variation to a consent is treated as a discretionary activity under the RMA
Environmental limits	• Providing for change of species subject to matters of discretion will ensure marine farming continues to occur within environmental limits

A general desire has been expressed by the marine farming industry for some time to be able to innovate quickly and easily on farm, in order to respond to emerging markets and opportunities. It is considered that there is sufficient information available to understand the current restrictions on innovation as a result of the consenting framework, and the likely effects as a result of the NES-MA approach.

6.4.3 Change of species - Option 3 (not differentiating types of species change)

Option 3 is essentially the NES-MA provisions in relation to replacement consenting, as it would remove any differentiation between types of species change, but would provide for species change within the replacement consenting provisions *[presumably by removing the requirement that the species to be farmed are only those authorised by the current coastal permit]*. The analysis contained in section 6.2.2 is therefore directly applicable to this option.

The difference between Option 2 for change of species and the NES-MA approach is that Option 3 would result in a less efficient process, and have fewer benefits, for Category 1 and 2 change of species.

6.4.4 Change of species – Option 4 (including spat catching)

The NESMA currently proposes that the change of species provisions do not apply to marine farms consented solely for the purpose of spat catching, or to the addition of spat catching to an existing farm.

Table 6-20 outlines the social, economic, cultural and environmental effects that could arise from Option 4, and the costs and benefits of those effects.

Table 6-20: Option 3 – effects and costs and benefits

Assessment matter	Comment
Effects	• The effects of the NES-MA approach are the same as those identified in Table 6-4, as change of species would occur at the same time as obtaining replacement consent under the NES-MA, with the exception of: ○ a potential increase in social and cultural effects if marine farms that currently solely operate to catch spat could be changed to become full production farms, resulting in increased presence and activity throughout any given year ○ additional environmental effects as a result of increased farming activity on a farm previously operated solely for spat catching These effects could arise as a result of the specified matters of discretion being designed for full production farms, and therefore recognising a potentially greater level of effects than currently occur from spat catching farms.
Costs and benefits	• The costs and benefits of the NES-MA approach are the same as those identified in Table 6-4, as change of species would occur at the same time as obtaining replacement consent under the NES-MA, with the exception of:

Assessment matter	Comment
	○ a potential benefit to marine farmers currently operating spat catching farms in providing a defined path, with restricted matters of discretion to convert to full production use. Indications from work undertaken by NZIER (ref spat report) however are that spat supply is the largest constraint on the growth of the industry, and it is considered unlikely therefore that existing spat catching farms would convert to full production farms
Quantified costs and benefits	• The costs and benefits of including spat catching farms within the change of species provisions have not been quantified

The effectiveness of Option 4 is the same as that assessed for the NES-MA approach, with the exception that the inclusion of spat catching farms would mean that the approach was consistent across all existing marine farms in New Zealand. It is considered that there is sufficient information available to understand the current restrictions on innovation as a result of the consenting framework, and the likely effects as a result of the NES-MA approach including spat catching farms.

6.4.5 Summary

The change of species provisions in the NES-MA offer some, limited, benefits to marine farmers over the non-NESMA scenario. While marine farmers have expressed a desire to easily innovate on farm, the ways in which this can be provided for are constrained under the RMA, particularly in relation to the consideration of variations to consent conditions as discretionary activities during the term of consent. The benefits are therefore constrained by the relative inefficiency of the change of species provisions having to apply at the time of obtaining replacement consent, however there is nothing that can be done under the current statutory framework to reduce that inefficiency and improve the benefits of the provisions.

6.5 Biosecurity

Within the approach proposed for the NES-MA, all marine farms (both existing and new) will be required by 2025 to either have an on-farm biosecurity management plan or will have had consent conditions imposed to require a plan to be prepared. This is achieved through:

- the imposition of consent conditions on all new marine farm consents;
- the imposition of consent conditions on existing marine farms where replacement consents are sought prior to 1 January 2025;
- councils reviewing those consents for existing marine farms that do not already have a condition requiring an on-farm biosecurity management plan and imposing a condition (with the plan having to be prepared and submitted within 6 months of the review being completed).

All plans will be required to meet the same basic standards in terms of completeness and the quality of the plan through reference to a technical document (to be developed by the time the NES-MA is gazetted) which will provide information on the expectations for on-farm biosecurity management plans. Of particular note, the technical document will contain directive provisions about the movement of aquaculture stock and gear between defined regions.

Other options considered during the development of the NES-MA included:

- Including a more detailed matter of discretion in the replacement consenting regulations
- Including biosecurity standards in the NESMA
- Use of s43A(1)(d) of the RMA
- Not including a requirement for on-farm biosecurity management plans and relying on voluntary approach under Aquaculture New Zealand's A+ Sustainability Framework

This section assesses the approach included in the NES-MA and the four options. The report *Proposed National Environmental Standards for Marine Aquaculture – Addressing Marine Farm Biosecurity* prepared by Stantec New Zealand in May 2018 (attached as **Appendix D**) provided an analysis of the submissions received on the necessity for the biosecurity provisions proposed for the NESMA and evaluated a series of tools other than a national environmental standard. The report concluded that none of the tools under the Biosecurity Act 1993 would achieve complete

management of marine farm biosecurity, and that nor would the tools available under the RMA or Aquaculture New Zealand's A+ programme. The report concluded that it was most likely that a combined approach, using a variety of different tools would be necessary to effectively manage marine farm biosecurity in New Zealand. This conclusion has been considered throughout the analysis of options for the NESMA that follows.

6.5.1 Biosecurity – Option 1 (Matter of discretion)

A matter of discretion could be included in regulations for replacement consents for existing marine farms, realignment and change of species to specify the outcomes that biosecurity management practices proposed on a marine farm would have to achieve. These outcomes could be set on the basis of currently available best practice information.

Table 6-21 outlines the social, economic, cultural and environmental effects that could arise from Option 1, and the costs and benefits of those effects.

Table 6-21: Option 1 – effects and costs and benefits

Assessment matter	Comment
Effects	• Potential improvements in on-farm biosecurity management practices on existing marine farms, mandated through consent conditions, leading to a reduction in environmental risk • Social and cultural effects in terms of provision for local decision making from providing ability to decline consent, although the inclusion of a more detailed matter of discretion may function more to define the types of consent conditions that can be imposed rather than providing for a consent application to be declined • Social and cultural effects may arise from precluding public and limited notification for most replacement consents and some change of species as the community and tangata whenua only have the opportunity to be involved in the process if the circumstances provided for by sections 95A(9), 95B(2)-(4) or 95B(10) of the RMA exist, and tangata whenua only if they hold statutory acknowledgements within the coastal marine area. These effects would be mitigated to an extent by a matter of discretion requiring specific outcomes in terms of biosecurity management to be achieved • Economic effects resulting from requirement for marine farmers to prepare on-farm biosecurity management plans
Costs and benefits	• Social, cultural and environmental benefits arise from improved on-farm biosecurity management and a potential reduction in disease or pest incursions. Benefits are relatively small scale though, as on-farm biosecurity management is only one component of the wider biosecurity risk posed by human activities in the coastal marine area • Minor social and cultural costs through precluding public and limited notification for most replacement consents and some change of species, as costs are not significantly additional to those identified for replacement consenting • Costs for marine farmers to comply with biosecurity consent conditions, with costs potentially varying around the country depending on the conditions imposed
Quantified costs and benefits	• Social, cultural and environmental benefits are intangible and not able to be quantified • Costs for marine farmers to comply with consent conditions are not able to be quantified, because specific consent conditions imposed by councils are not known

Table 6-22 assesses the effectiveness of Option 1 against the key criteria of consistency, efficiency (of process, not economic efficiency) and ensuring sustainable aquaculture within environmental limits.

Table 6-22: Option 1 – effectiveness

Criteria	Comment
Consistency	• The NES-MA replacement consent, realignment and change of species provisions only apply to existing marine farms. Including a more detailed matter of discretion in relation to biosecurity would therefore result in an inconsistent approach between existing marine farms and new marine farms • The level of inconsistency between existing marine farms and new marine farms in any given region may not be great, as it is anticipated that new marine farms would be subject to biosecurity management conditions, which may well end up being similar to those imposed on existing marine farms under the NES-MA • Depending on the level of detail specified in the matter of discretion, there may be variations in approach to the setting of consent conditions around the country and consequent variation in the approach to managing on-farm biosecurity
Efficiency	• Providing just a matter of discretion, with no additional requirements is unlikely to be efficient, as each council puts the time and effort into determining what is required for its region and applying it
Environmental limits	• A matter of discretion cannot be detailed enough to describe practices to be implemented to manage biosecurity risks on farm, it can only set the general parameters which those practices must comply with. Councils are, however, required to act within the provisions of the RMA and environmental limits should therefore be complied with in the management of biosecurity risks through a matter of discretion

Table 6-23 assesses whether sufficient information is available in relation to Option 1, and the risks of acting or not acting if insufficient information is available.

Table 6-23: Option 1 – available information and risk of acting or not acting

Criteria	Comment
Available information	• The exact form of a matter of discretion is not available • As a result, the effectiveness of the approach is unknown, although it is likely that existing marine farming would continue to be managed within environmental limits
Risk of acting	• The risk of acting in light of the lack of information available is that an ineffective approach will be developed and no improvement in on-farm biosecurity management will occur

6.5.2 Biosecurity – Option 2 (Biosecurity standards)

Under section 43(1) of the RMA, national environmental standards can prescribe standards for the matters referred to in section 12 of the RMA, including the occupation of any part of the common marine and coastal area under section 12(2) of the RMA. The NES-MA could therefore set the standards required for the management of on-farm biosecurity.

Table 6-24 outlines the social, economic, cultural and environmental effects that could arise from Option 2, and the costs and benefits of those effects.

Table 6-24: Option 2 – effects and costs and benefits

Assessment matter	Comment
Effects	• Social and cultural effects unlikely to occur as definition of practices is seeking to avoid these effects • Positive environmental effects likely to occur through the prescription of specific on-farm biosecurity management practices that are mandatory to comply with

Assessment matter	Comment
Costs and benefits	• Neutral in terms of social and cultural costs or benefits • Environmental benefit from comprehensive management of on-farm biosecurity risks. Benefits are relatively small scale though, as on-farm biosecurity management is only one component of the wider biosecurity risk posed by human activities in the coastal marine area • Cost to marine farmers to comply with specified standards • Cost to government to develop standards and ensure ongoing compliance
Quantified costs and benefits	• Costs and benefits outlined above are currently unable to be quantified, as specific standards have not been defined

Table 6-25 assesses the effectiveness of Option 2 against the key criteria of consistency, efficiency (of process, not economic efficiency) and ensuring sustainable aquaculture within environmental limits.

Table 6-25: Option 2 – effectiveness

Criteria	Comment
Consistency	• Would result in a nationally consistent approach for existing and new marine farms
Efficiency	• Involves a significant workload and period of time for developing biosecurity standards for inclusion in the NES-MA • Does not recognise the need for flexibility to recognise specific circumstances in specific locations
Environmental limits	• Likely to result in existing and new marine farming being managed within environmental limits with respect to on-farm biosecurity

Table 6-26 assesses whether sufficient information is available in relation to Option 2, and the risks of acting or not acting if insufficient information is available.

Table 6-26: Option 2 – available information and risk of acting or not acting

Criteria	Comment
Available information	• Detail of specific standards is not available, so information on effects, costs and benefits is only available in the most general sense
Risk of acting	• The risk of acting is that it may not prove possible to develop specific biosecurity standards for inclusion in the NES-MA, and as a result there would be no significant improvement in the management of on-farm biosecurity

6.5.3 Biosecurity – Option 3 (s43A(1)(d) RMA)

Under section 43A(1)(d) of the RMA, a national environmental standard can require a person to obtain a certificate from a specified person stating that an activity complies with a term or condition imposed by the national environmental standard. If a standard or term was included in the regulations for replacement consents, realignment and change of species for existing farms that an on-farm biosecurity management plan was required, and a provision was included in the NES-MA that all new marine farms were to have an on-farm biosecurity management plan, Option 3 would set up a system whereby the Ministry for Primary Industries served as the certifier that the plan produced by each existing or new marine farmer was sufficient to meet the requirements under the NES-MA for a plan to be produced. Using this approach it is anticipated that something more than simply preparing a plan would have to occur, and that in certifying the plan the Ministry for Primary Industries would have to be satisfied that it was of sufficient quality to manage the biosecurity risks that arise from on-farm management practices.

Table 6-27 outlines the social, economic, cultural and environmental effects that could arise from Option 3, and the costs and benefits of those effects.

Table 6-27: Option 3 – effects and costs and benefits

Assessment matter	Comment
Effects	• Social and cultural effects unlikely to occur, as MPI unlikely to certify inadequate on-farm biosecurity management plans • Positive environmental effects likely to occur through anticipated MPI requirements for on-farm biosecurity management plans sufficient to manage the risks posed by on-farm practices • Economic effects on marine farmers anticipated as a result of needing to upgrade on-farm biosecurity management practices
Costs and benefits	• Neutral in terms of social and cultural costs or benefits, and potentially positive as a result of improved on-farm biosecurity management • Environmental benefit from comprehensive management of on-farm biosecurity risks. Benefits are relatively small scale though, as on-farm biosecurity management is only one component of the wider biosecurity risk posed by human activities in the coastal marine area • Cost to marine farmers to prepare a biosecurity management plan that MPI is willing to certify as meeting standards • Cost to government to certify plans
Quantified costs and benefits	• Costs and benefits outlined above are currently unable to be quantified

Table 6-28 assesses the effectiveness of Option 3 against the key criteria of consistency, efficiency (of process, not economic efficiency) and ensuring sustainable aquaculture within environmental limits.

Table 6-28: Option 3 – effectiveness

Criteria	Comment
Consistency	• Likely to result in a nationally consistent approach to on-farm biosecurity management, due to MPI's role in certifying plans

Criteria	Comment
Efficiency	• Currently undefined requirements for a biosecurity management plan to be certified by MPI and the certification process that would be adopted, in conjunction with unknown timeframes for the certification process make assessing the efficiency of this option impossible
Environmental limits	• Likely to result in existing and new marine farming being managed within environmental limits with respect to on-farm biosecurity

Table 6-29 assesses whether sufficient information is available in relation to Option 3, and the risks of acting or not acting if insufficient information is available.

Table 6-29: Option 3 – available information and risk of acting or not acting

Criteria	Comment
Available information	• Detail of specific requirements in order to certify a biosecurity management plan as sufficient is not available, so information on effects, costs and benefits is only available in the most general sense
Risk of acting	• The risk of acting is that it may not prove possible to implement this option, and as a result there would be no significant improvement in the management of on-farm biosecurity

6.5.4 Biosecurity – Option 4 (A+)

Aquaculture New Zealand's A+ Sustainable Aquaculture Framework includes environmental objectives and indicators and operational procedures in relation to biosecurity. The operational procedures represent a baseline for meeting acceptable standards for biosecurity management

under A+. The performance of marine farms that have joined the programme is monitored and assessed against these objectives and standards, and is publicly reported.

As well as the existing sustainable management frameworks, Aquaculture New Zealand is in the process of developing more detailed species agreements to manage biosecurity risks in relation to mussel, oyster and salmon farming. Option 4 would involve no biosecurity provisions being included within the NES-MA and management of biosecurity instead being left to the A+ programme.

Table 6-30 outlines the social, economic, cultural and environmental effects that could arise from Option 4, and the costs and benefits of those effects.

Table 6-30: Option 4 – effects and costs and benefits

Assessment matter	Comment
Effects	• Social and cultural effects may occur, although are unlikely, if there is a mismatch between the standards specified by the A+ programme and what is required to effectively manage disease and pest incursions • Positive environmental effects considered likely, although they may be less than for other options if there is a mismatch between the standards specified by the A+ programme and what is required to effectively manage disease and pest incursions, and if not all species or marine farmers are covered by the programme • Economic effects on those marine farmers who are part of A+ anticipated as a result of needing to upgrade on-farm biosecurity management practices and provide for auditing of a proportion of plans every year through their industry levy to fund auditing
Costs and benefits	• Potential social and cultural costs if A+ programme is less able to manage the risk of disease or pest incursion compared to other options assessed vs potential benefits if it does result in appropriate management of risks • Potential social and cultural costs if a disease or pest incursion occurs on a farm or species not covered by the A+ programme
	• Potential environmental benefits through the management of biosecurity risks from on-farm practices on the majority of existing marine farms, although the benefits are relatively small scale, as on-farm biosecurity management is only one component of the wider biosecurity risk posed by human activities in the coastal marine area, and not all marine farms are currently covered by the A+ programme • Cost to marine farmers who are part of the A+ programme to implement biosecurity management practices sufficient to meet the requirements of the programme • Cost to marine farming industry generally to maintain auditing and reporting system
Quantified costs and benefits	• Social, cultural and environmental benefits are unable to be quantified

Table 6-31 assesses the effectiveness of Option 4 against the key criteria of consistency, efficiency (of process, not economic efficiency) and ensuring sustainable aquaculture within environmental limits.

Table 6-31: Option 2 – effectiveness

Criteria	Comment
Consistency	• Likely to result in a consistent approach for the 90% of marine farmers who are members of A+, but will not result in complete consistency • Consistency is also contingent on continued compliance with the programme and continued membership of the programme (the latter is voluntary)

Criteria	Comment
Efficiency	• Likely to be relatively efficient as Aquaculture New Zealand sets in place processes to implement the A+ programme, but not entirely efficient due to the voluntary membership of A+, the lack of complete coverage of existing marine farmers, and the current application to only the three major species being farmed
Environmental limits	• Level of match between A+ practices and recommended practice at a government level is unknown until species specific plans are agreed and signed up to • For those farmers and species that are not covered by A+ there is the potential for adverse effects to occur through on-farm biosecurity management practices not being implemented

Table 6-32 assesses whether sufficient information is available in relation to Option 4, and the risks of acting or not acting if insufficient information is available.

Table 6-32: Option 2 – available information and risk of acting or not acting

Criteria	Comment
Available information	• While the A+ programme's objectives and operational procedures are known, the more specific plans for the three major species are still under development • The number of farmers covered by the A+ programme and the species covered are known
Risk of acting	• The risk of acting is that the effectiveness of the more specific species plans under A+ are not currently known, and that not all farms and not all species are part of the programme. Relying on the A+ programme to manage on-farm biosecurity therefor runs the risk of incomplete coverage and a remaining risk of a pest or disease incursion on one of the farms or as a result of the one of the species that is not covered by the programme

6.5.5 Proposed NES-MA approach

Table 6-33 outlines the social, economic, cultural and environmental effects that could arise from the NES-MA option, and the costs and benefits of those effects.

Table 6-33: NES-MA – effects and costs and benefits

Assessment matter	Comment
Effects	• Social and cultural effects unlikely to occur as requirement for on-farm biosecurity management plans of a specified standards is seeking to avoid these effects • Positive environmental effects likely to occur through the implementation of specific on-farm biosecurity management practices that are mandatory to comply with
Costs and benefits	• Neutral in terms of social and cultural costs or benefits • Environmental benefit from comprehensive management of on-farm biosecurity risks. Benefits are relatively small scale though, as on-farm biosecurity management is only one component of the wider biosecurity risk posed by human activities in the coastal marine area • Cost to marine farmers to develop and implement plans • Cost to councils to review consents that do not expire before 2025 • Ongoing cost to councils to monitor and audit on-farm biosecurity management plans • Cost to government to developed externally referenced technical document

Assessment matter	Comment

Quantified costs and benefits	• Noting that these are only broadly indicative costs for the purpose of considering the impact of the NES-MA:
	  ○ Costs to marine farmers to prepare plans have been estimated at between $200,000 if area management plans are prepared, to $1.6M if individual plans for each farm are required
	  ○ Costs to councils to review consents that do not expire before 2025 have been estimated at $350,000
	  ○ Ongoing costs to councils to monitor and audit on-farm biosecurity management plans have been estimated at between $800,000 and $2M, with a cost to the industry of between $230,000 and $2M for each round of auditing and certification that practices are sufficient to meet the objectives of plans
	• Broadly indicative benefits have been estimated in the range of $16M - $60M depending on whether a per farm or per area approach is taken to biosecurity management plans, and noting that these benefits are offset by the substantial potential costs in terms of the risk of pest or disease incursions represented by the fact that on-farm biosecurity management plans can only address a relatively small area of the overall biosecurity risk to the coastal marine area

Table 6-34 assesses the effectiveness of the NES-MA option against the key criteria of consistency, efficiency (of process, not economic efficiency) and ensuring sustainable aquaculture within environmental limits.

Table 6-34: NES-MA – effectiveness

Criteria	Comment
Consistency	• Will lead to a consistent requirement for the preparation of on-farm biosecurity management plans for all existing and new marine farms, for all species
	• Contents of the plans will be required to meet the standards of an externally referenced technical document that is to be developed. This is likely to allow some flexibility to address site specific circumstances, so there is likely to remain some variation in approaches across marine farms
Efficiency	• The process will set clear expectations for all involved about what is required for the management of on-farm biosecurity risks • The process will impose a burden on some councils in terms of reviewing consents that do not expire before 2025 and the ongoing role in monitoring and compliance auditing of the implementation of plans. While a number of councils have not identified this as a particular issue, Marlborough District Council, with smaller council staff numbers and the highest number of marine farms may struggle to implement the process without sacrificing work on other areas of biosecurity management
Environmental limits	• Likely to result in existing and new marine farming being managed within environmental limits with respect to on-farm biosecurity

Table 6-35 assesses whether sufficient information is available in relation to the NSE-MA option, and the risks of acting or not acting if insufficient information is available.

Table 6-35: NES-MA – available information and risk of acting or not acting

Criteria	Comment
Available information	• In general, sufficient information is considered to be available on the costs and benefits of the NESMA approach, with the possible exception of the likely contents of the externally referenced technical document

Criteria	Comment
Risk of acting	• The risk of acting is that it may prove more costly in economic terms than currently anticipated to implement on-farm biosecurity management practices as the externally referenced technical document becomes clearer. • Benefits, costs, efficiency and effectiveness of the various options for managing on-farm biosecurity risks are relatively finely balanced currently and if the costs of the NESMA approach increase significantly and its effectiveness decreases, it may no longer be the best option to implement

6.5.6 Summary

Of the five options identified for addressing on-farm biosecurity management, three – including standards in the NESMA, relying on the Aquaculture New Zealand A+ programme and the approach currently proposed in the NESMA – are all still considered to be viable. Effects, benefits, costs, efficiency and effectiveness are relatively finely balanced between these three options and it is possible that the proposed approach in the NESMA may cease to be the most appropriate as further work is undertaken to develop it. This is particularly in light of the fact that the NESMA can only achieve a relatively limited amount of improvement in biosecurity management on its own and relies for improved effectiveness on the management of other marine pathways, such as shipping and boating, under the Biosecurity Act.

7. Re-evaluation of policy objective

If these other management initiatives do not proceed or are not successful, the effectiveness of the proposed NESMA in managing biosecurity risks is likely to be relatively low and the costs are likely to significantly outweigh the benefits. The question would then be raised about whether the approach is the most appropriate way to give effect to the identified policy objective. As discussed in section 4 of this evaluation report, the criteria that have been used for assessing whether the policy objective is the most appropriate way to achieve the purpose of the RMA are relevance, feasibility and acceptability. Consistent with the guidance provided in *A guide to section 32 of the Resource Management Act 1991* following evaluation of the provisions, the policy objective is re-evaluated in Table 7-1 below to ensure it is still relevant and appropriate.

Table 7-1: Evaluation of policy objective

Criteria	Sub-criteria	Comment
Relevance	• Directed to addressing a resource management issue • Focused on achieving the purpose of the RMA • Assists councils to carry out statutory functions • Within the scope of higher order documents	The analysis outlined in section 4 of this report has not changed as a result of consideration of the provisions.
Feasibility	• Acceptable level of uncertainty and risk	For each of the options assessed in section 6 of this report the sufficiency of the available information has been evaluated, and the risk of acting or not acting assessed. For each of the options recommended for the proposed NESMA there is considered to be sufficient information and the risks of acting are therefore considered to be low.
	• Realistically able to be achieved within council's powers, skills and resources	For replacement consents for existing marine farms, realignment and change of species, the analysis of the provisions contained in section 6 of this report has shown that they are able to be achieved within councils' powers, skills and resources.

Criteria	Sub-criteria	Comment
		The analysis for the on-farm biosecurity management provisions in section 6 of this report, and the cost-benefit analysis undertaken by NZIER, note that there will be significant resourcing requirements for some councils to deliver this part of the proposal, and that the necessary skills to assess on-farm biosecurity management plans are not particularly common in New Zealand. Central government will need to consider how to assist councils to implement this part of the proposed NESMA in order to ensure that it is feasible.
Acceptability	• Consistent with identified iwi/Māori and community outcomes Will not result in unjustifiably high costs on the community or parts of the community	The analysis contained in section 4 of this report is still applicable with regard to consistency with identified outcomes. In addition, the analysis contained in section 6 of this report has considered the possible social and cultural effects of the provisions. Provision for formal pre-application consultation with tangata whenua and the matter of discretion that relates to effects on tangata whenua sites of significance should ensure that decisions are consistent with identified iwi/Māori outcomes. In terms of community outcomes, the proposed NESMA represents some reduction in community input into existing marine farms. However, matters of discretion have been developed to address typical community concerns, and there is still an important role for the community to play in the plan development process, particularly in relation to identifying areas that may be appropriate or inappropriate for aquaculture. Based on the analysis contained in section 6, it is not considered that the proposed NESMA will result in unjustifiably high costs on the community.

8. Conclusion

Aquaculture contributes to the economic well-being of towns and communities throughout New Zealand, through farming, processing and support industries. Over the next 7 years, consents for up to 689 existing marine farms (60% of the total current marine farms) will expire, with consents for 602 of those farms (52%) expiring at the end of 2024. Under the existing planning framework replacement consenting can be complex and uncertain, which is undermining confidence in the industry. Most of those consents were granted prior to the Resource Management Act 1991. Conditions on these consents often do not represent current best environmental practice and there was little or no consideration of tangata whenua values. In addition, in some regions the benefits of a recent Government project to provide current and science-based information and advice on the ecological effects of marine aquaculture, and best practice guidance to councils in relation to the management of aquaculture cannot be implemented without changes to regional coastal plans. A lack of specific rules can also hinder changes to existing marine farms that improve environmental outcomes or increase the value of production.

In addition to the replacement consenting issues, biosecurity is a key risk to both the New Zealand coastal environment and the aquaculture industry. Effective biosecurity practices are critical to safeguarding New Zealand's coastal environment, as well as the aquaculture industry's production, global reputation and market access. For on-farm biosecurity measures to be effective, measures need to be consistent across the country, and be comprehensive in terms of coverage of all farms.

The proposed NESMA is intended to address these issues. The policy objective of the NESMA is to:

> *Develop a more consistent and efficient regional planning framework for the management of existing marine aquaculture activities and on-farm biosecurity management, while supporting sustainable aquaculture within environmental limits.*

This report has evaluated the proposed NESMA policy objective and provisions in accordance with the requirements in section 32 of the RMA. The key findings of this evaluation are as follows:

- **Policy objective:** the policy objective of the proposed NESMA is considered to be the most appropriate option to achieve the purpose of the RMA. The policy objective is focused on developing a consistent and efficient regional planning framework and supporting sustainable aquaculture within environmental limits. Consistent with the purpose of the RMA efficient and consistent processes will provide for the economic and social well-being of the community in general, while ensuring that marine farming continues to sustain the potential of the natural and physical resources of the coastal marine area to meet the needs of future generations, safeguarding the life-supporting capacity of water and ecosystems in the coastal marine area, and avoiding, remedying or mitigating the adverse effects of marine farming on the environment. A more consistent and efficient planning framework will set a consistent set of provisions for addressing the environmental effects of existing marine farms, and of changing species on marine farms, and will require comprehensive and consistent management of on-farm biosecurity in relation to those issues and practices that are within the jurisdiction of the RMA.
- **Other reasonably practicable options:** Two main alternatives to the policy objective were considered – doing nothing, or undertaking initiatives to build social licence for aquaculture. The proposed NESMA was considered the most appropriate option, as it would achieve national consistency in plan provisions and set out an efficient framework for processing and considering applications for replacement consent, realignment and change of species on existing marine farms.
- **Effectiveness assessment:** the evaluation contained in this report found that the proposed NESMA provisions would be effective in providing a consistent and efficient regional planning framework that would continue to manage marine aquaculture within environmental limits. In particular:
    - For replacement consents for, realignment of, and change of species on existing marine farms, a restricted discretionary activity with nationally defined matters of discretion would provide a consistent framework for all existing marine farms. Matters of discretion can be used to ensure that marine farming continues to occur within environmental limits.
    - With respect to on-farm biosecurity management, the proposed NESMA will lead to a consistent requirement for the preparation of on-farm biosecurity management plans for all existing and new marine farms, for all species. Contents of plans will be required to meet the standards of an externally referenced technical document, which will allow some flexibility to address site specific circumstances, so some variation in approaches across marine farms is likely to remain, but within an overall consistent framework.
- **Efficiency assessment:** the evaluation found that the proposed NESMA provisions will be efficiency, based on an assessment of the benefits and costs anticipated from the implementation of the provisions. In economic terms, the benefits of the proposed NESMA will exceed the costs, and this has been confirmed in an independent CBA. In particular:
    - The evaluation contained in this report has concluded that there will be environmental costs and benefits as a result of the implementation of the proposed NESMA replacement consent provisions (with costs and benefits arising differently in different regions) but that none of the effects that give rise to these costs and benefits are significant. For realignment there is an overall environmental benefit to enabling consent applications to be made to relocate existing marine farms away from areas where they may be causing adverse effects, and there may be a productivity benefit as well.
    - Improved certainty has a number of impacts under the independent CBA. Having an NESMA gives the industry confidence that it has regulatory support, and underpins the licence to farm.

- The proposed NESMA has the benefit that it would result in improved biosecurity along the aquaculture pathway, ensuring that at the farm level best practice is followed consistently across New Zealand.
- The proposed NESMA also has the benefit of ensuring consistent rules across New Zealand, which will bring further certainty to environmental outcomes, industry, government and communities.
- The proposed NESMA could have an overall economic cost over the course twenty years (at a discount rate of 6%) of between $2.7M and $27.7M, and benefits of between $13.1M and $48.5M (depending on whether per farm or per management area biosecurity management plans are required).

- **Risks of acting where there is uncertain or insufficient information:** Significant information is available on the effects of existing marine farms and marine biosecurity incursions and there is a high level of confidence that the proposed NESMA will result in benefits, particularly in relation to improved certainty of process and the continued management of marine aquaculture within environmental limits. However, there are inevitably some information gaps and uncertainties in this evaluation. In particular:
  - The benefits and costs of many of the environmental, social and cultural effects cannot be quantified and are subjective. Costs and benefits may therefore be greater or lower than anticipated in this analysis;
  - The economic costs and benefits identified are widely variable, depending on whether a per farm or per management area approach to on-farm biosecurity management plans is instituted;
  - There is a degree of uncertainty about which councils will introduce more stringent or more lenient provisions, as provided for by different parts of the proposed NESMA. This may have an effect on the overall costs and benefits of the proposal.

  These potential risks will be mitigated through a comprehensive implementation package and a proactive monitoring and evaluation programme to ensure the proposed NESMA is achieving its objective. The monitoring and evaluation programme will also provide a basis for continuous improvement of the NESMA to recognise improvements in best practice for the management of marine aquaculture.

Overall, this evaluation has demonstrated that the proposed NESMA policy objective is the most appropriate to achieve the purpose of the RMA, and the proposed NESMA provisions will be effective and efficient to continue to manage marine aquaculture within environmental limits while increasing consistency and efficiency in the management of those activities under the RMA.

Appendix A – Relevant sections of Resource Management Act 1991

43 Regulations prescribing national environmental standards

(1) The Governor-General may, by Order in Council, make regulations, to be known as national environmental standards, that prescribe any or all of the following technical standards, methods, or requirements:

(a) standards for the matters referred to in section 9, section 11, section 12, section 13, section 14, or section 15, including, but not limited to –

(i) contaminants:

(ii) water quality, level or flow:

(iii) air quality:

(iv) soil quality in relation to the discharge of contaminants

(b) standards for noise:

(c) standards, methods, or requirements for monitoring.

(2) The regulations may include:

(a) qualitative or quantitative standards:

(b) standards for any discharge or the ambient environment:

(c) methods for classifying a natural or physical resource:

(d) methods, processes, or technology to implement standards:

(da) non-technical methods or requirements:

(e) exemptions from standards:

(f) transitional provisions for standards, methods, or requirements.

(3) Section 360(2) applies to all regulations made under this section.

(4) Regulations made under this section may apply –

(a) generally; or

(b) to any specified district or region of any local authority; or

(c) to any specified part of New Zealand

43A Contents of national environmental standards

(1) National environmental standards may –

(a) prohibit an activity:

(b) allow an activity:

(c) restrict the making of a rule or the granting of a resource consent to matters specified in a national environmental standard:

(d) require a person to obtain a certificate from a specified person stating that an activity complies with a term or condition imposed by a national environmental standard:

(e) specify, in relation to a rule made before the commencement of a national environmental standard, –

(i) the extent to which any matter to which the standard applies continues to have effect; or

(ii) the time period during which any matter to which the standard applies continues to have effect:

(f) require local authorities to review, under s128(1), all or any of the permits or consents to which paragraph (ba) of that subsection applies as soon as practicable or within the time specified in a national environmental standard.

(2) A national environmental standard that prohibits an activity –

(a) may do one or both of the following:

(i) state that a resource consent may be granted for the activity, but only on the terms or conditions specified in the standard, including the duration of a consent; and

(ii) require compliance with the rules in a plan or proposed plan as a term or condition; or

(b) may state that the activity is a prohibited activity.

(3) If an activity has significant adverse effects on the environment, a national environmental standard must not, under subsections (1)(b) and (4), –

(a) allow the activity, unless it states that a resource consent is required for the activity; or

(b) state that the activity is a permitted activity.

(4) A national environmental standard that allows an activity –

(a) may state that a resource consent is not required for the activity; or

(b) may do one or both of the following:

(i) state that the activity is a permitted activity, but only on the terms or conditions specified in the standard; and

(ii) require compliance with the rules in a plan or proposed plan as a term or condition.

(5) If a national environmental standard allows an activity and states that a resource consent is not required for the activity, or states than an activity is a permitted activity, the following provisions apply to plans and proposed plans:

(a) a plan or proposed plan may state that the activity is a permitted activity on the terms or conditions specified in the plan; and

(b) the terms or conditions specified in the plan may deal only with effects of the activity that are difference from those dealt with in the terms or conditions specified in the standard; and

(c) if a plan's terms or conditions deal with effects of the activity that are the same as those dealt with in the terms or conditions specified in the standard, the terms or conditions in the standard prevail.

(6) A national environmental standard that allows a resource consent to be granted for an activity–

(a) may state that the activity is –

(i) a controlled activity; or

(ii) a restricted discretionary activity; or

(iii) a discretionary activity; or

(iv) a non-complying activity; and

(b) may state the matters over which –

(i) control is reserved; or

(ii) discretion is restricted.

(7) A national environmental standard may specify the activities for which the consent authority –

(a) must give public notification of an application for a resource consent:

(b) is precluded from giving public notification of an application for a resource consent:

(c) is precluded from giving limited notification of an application for a resource consent.

(8) A national environmental standard may empower local authorities to charge for monitoring any specified permitted activities in the standard.

44 Restriction on power to make national environmental standards

(1) Before recommending the making of a national environmental standard to the Governor-General, the Minister must –

(a) comply with section 46A(3); and

(b) prepare an evaluation report for the standard in accordance with section 32; and

(c) have particular regard to that report when deciding whether to recommend the making of the standard; and

(d) publicly notify the report and recommendation made under section 46A(4)(c) or 51(2), as the case requires.

(3) The Minister need not follow the steps in section 46A if the Minister is recommending the making of an amendment –

(a) that has no more than a minor effect; or

(b) that corrects errors or makes similar technical alterations.

44A Local authority recognition of national environmental standards

(1) Subsections (3) to (5) apply if a local authority's plan or proposed plan contains a rule that duplicates a provision in a national environmental standard.

(2) Subsections (3) to (5) apply if a local authority's plan or proposed plan contains a rule that conflicts with a provision in a national environmental standard. A rule conflicts with a provision if –

(a) both of the following apply:

(i) the rule is more stringent than the provision in that it prohibits or restricts an activity that the provision permits or authorises; and

(ii) the standard does not expressly say that a rule may be more stringent than it; or

(b) the rule in the plan is more lenient than a provision in the standard and the standard does not expressly specify that a rule may be more lenient than the provision in the standard.

(3) If the duplication or conflict is dealt with in the national environmental standard in one of the ways described in section 43A(1)(e), the local authority must amend the plan or proposed plan to remove the duplication or conflict –

(a) without using the process in Schedule 1; and

(b) in accordance with the specification in the national environmental standard.

(4) If the duplication or conflict arises as described in section 43A(5)(c), the local authority must amend the plan or proposed plan to remove the duplication or conflict –
(a) without using the process in Schedule 1; and
(b) as soon as practicable after the date on which the standard comes into force.
(5) In every other case of duplication or conflict, the local authority must amend the plan or proposed plan to remove the duplication or conflict –
(a) without using the process in Schedule 1; and
(b) as soon as practicable after the date on which the standard comes into force.
(6) A local authority may amend a plan or proposed plan to include a reference to a national environmental standard –
(a) without using the process in Schedule 1; and
(b) after the date on which the standard comes into force.
(7) Every local authority and consent authority must observe national environmental standards.
(8) Every local authority and consent authority must enforce the observance of national environmental standards to the extent to which their powers enable them to do so.

46A Single process for preparing national directions
(1) This section and sections 47 to 51 set out the requirements for preparing a national direction.
*(2) In this section and sections 47 to 51, **national direction** means both or either of the following documents:*
(a) a national environmental standard:
(b) a national policy statement.
(3) If the Minister proposes to issue a national direction, the Minister must either –
(a) follow the requirements set out in sections 47 to 51; or
(b) establish and follow a process that includes the steps described in subsection (4).
(4) The steps required in the process established under subsection 3(b) must include the following:
(a) the public and iwi authorities must be given notice of –
(i) the proposed national direction; and
(ii) why the Minister considers that the proposed national direction is consistent with the purpose of the Act; and
(b) those notified must be given adequate time and opportunity to make a submission on the subject matter of the proposed national direction; and
(c) a report and recommendations must be made to the Minister on the submissions and the subject matters of the national direction; and
(d) the matters listed in section 51(1) must be considered as if the references in that provision to a board of inquiry were references to the person who prepares the report and recommendations.
(5) In preparing a national direction, the Minister may, at any time, consult on a draft national direction.
(6) When choosing between subsection 3(a) and (b), the Minister may consider –
(a) the advantages and disadvantages of preparing the proposed national direction quickly:
(b) the extent to which the proposed national direction differs from –
(i) other national environmental standards:
(ii) other national policy statements:
(iii) regional policy statements:
(iv) plans:
(c) the extent and timing of public debate and consultation that took place before the proposed national direction was prepared:
(d) any other relevant matter.
(7) If the Minister decides, after consulting as required by subsection (3), to recommend that regulations on the same subject matter as that consulted on be made under any of sections 360 to 360H, the consultation under subsection (3) satisfies the requirement to consult the public and iwi authorities in relation to those regulations.
(8) A national policy statement prepared in accordance with this section is a disallowable instrument, but not a legislative instrument, for the purposes of the Legislation Act 2012 and must be presented to the House of Representatives under section 41 of that Act.

Appendix B – Non-NES scenario report

Proposed National Environmental Standard for Marine Aquaculture

Counterfactual for CBA and s32 analysis

This report has been prepared for the benefit of Ministry for Primary Industries and NZIER. No liability is accepted by this company or any employee or sub-consultant of this company with respect to its use by any other person.

Rev. No.	Date	Description	Prepared By	Checked By	Reviewed By	Approved By
0	10/4/18	First draft	FL		RP	
1	11/5/18	Updated following discussion with officials	FL			
2	22/10/18	Updated for final review by officials	FL			

1 Introduction

1.1 Background

In mid-2017 the Ministry for Primary Industries notified a proposal for a National Environmental Standard for Marine Aquaculture (the NESMA). Before a National Environmental Standard can be made, s44(1)(b) of the RMA requires that the Minister must prepare an evaluation report for the standard in accordance with s32 of the RMA. The Ministry for Primary Industries is currently analysing the submissions received on the proposal and commencing the write-up of the s32 evaluation report. As part of that evaluation report, a formal cost-benefit analysis is going to be undertaken. In order for the costs and benefits of any proposal to be evaluated, an understanding is needed of what would happen in the absence of the proposal – referred to as the counterfactual.

1.2 Purpose of this report

The purpose of this report is to set out a potential counterfactual for each of the regions where existing marine farms are located, for discussion and confirmation with government officials. The counterfactual, along with an outline of the likely environmental, social, cultural and economic costs of the proposal when compared to the counterfactual in each region will then form the basis of the cost-benefit analysis to be completed by NZIER.

Each of the relevant regional coastal plans has a slightly different approach to the management of existing marine farms. As a result, the costs and benefits of the NESMA will differ across the regions. In order to gain as clear an understanding as possible of the likely costs and benefits, this report sets out the framework for each region. Seven of the eight major aquaculture regions (Northland, Auckland, Waikato, Bay of Plenty, Marlborough, Canterbury and Southland) are covered in detail. Tasman has been omitted as the majority of the existing marine farms are exempted from the proposed NESMA. Three marine farms also exist outside the eight major aquaculture regions (in Hawkes Bay, Wellington and West Coast) and the provisions of those plans are also outlined briefly.

2 Northland

The Regional Coastal Plan for Northland is the operative regional coastal plan. However, the Northland Regional Plan (a combined plan) was notified in 2017 and is currently at the stage of further submissions. As this plan is likely to be more relevant over the life time of the CBA, it has been used to describe the current planning framework and develop the counterfactual.

2.1 Replacement consents for existing marine farms

2018 planning framework for replacement consents for existing marine farms

Activity status:	**Matters of control/discretion:**	**Notification**
Controlled activity (shellfish) <u>provided not in</u>: • Significant Ecological Area • Outstanding Natural Feature • Area of Outstanding Natural Character • Site or Area of Significance to Tangata Whenua and no change to the activities authorised.	• Effects on marine mammals, birds and benthic habitat • Effects on food (plankton) availability in the water • The risk of introducing or spreading marine pests • Lighting • Noise • Integrity of the structure • Navigation safety • The need to upgrade, replace or remove any derelict or disused structures • The mechanism to recover the full cost of the repair or removal of abandoned or derelict farms and reinstatement of the environment	Public and limited notification are precluded
Restricted discretionary activity (shellfish) <u>in</u>: • Significant Ecological Area • Outstanding Natural Feature • Area of Outstanding Natural Character • Site or Area of Significance to Tangata Whenua and no change to the activities authorised. *Note that this rule does not come into effect until 1 January 2020*	• Effects on outstanding natural character, outstanding natural features and significant marine ecology • Effects on marine mammals, birds and benthic habitat • Effects on food (plankton) availability in the water • The risk of introducing or spreading marine pests • Lighting • Noise • Integrity of the structure • Navigation and safety • The need to upgrade, replace or remove any derelict or disused structures • Effects on Sites and Areas of Significance to Tangata Whenua • The mechanism to recover the full cost of the repair or removal of abandoned or derelict farms and reinstatement of the environment	Public and limited notification are precluded

Activity status:	Matters of control/discretion:	Notification
Discretionary activity (finfish): • provided there is no change to the activities authorised	Full discretion	Standard notification provisions

Counterfactual to compare against proposed NESMA provisions for replacement consent for existing marine farms

The planning framework will remain the same as the 2018 planning framework over the 20 year period of the CBA:

- the Proposed Regional Plan framework largely reflects the currently operative Regional Coastal Plan framework
- the operative Regional Coastal Plan became operative in 2004. Review commenced in December 2014 and decisions are anticipated in 2019. Even with the question of appeals not taken into account this is a period of 15 years. The Proposed Regional Plan framework is therefore likely to remain in place for the majority of the period of the CBA
- there are submissions that request that reconsenting existing marine farms within the Aquaculture Exclusion Area be fully discretionary, but it is assumed that this change to the plan provisions will not be made
- there is no reference to Outstanding Natural Landscapes in the current rules, and submissions have requested their inclusion. There are no ONLs that apply to the coastal marine area, so it is assumed that including reference to them in the rules will not happen.

2.2 Realignment

2018 planning framework for realignment

Activity status:	Matters of discretion:	Notification
Restricted discretionary activity provided that: 1. no part of the existing authorised area has been realigned in the last five years 2. there is no increase in the authorised area 3. a minimum of 2/3 of the existing authorised area remains 4. the new area is no more than 1/3 of the existing authorised area 5. the new area is contiguous to the existing authorised area 6. the aquaculture activity in the new area is the same as that approved for the existing authorised area	1. Effects on outstanding natural character, outstanding natural features and significant marine ecology 2. Effects on Sites and Areas of Significance to Tangata Whenua 3. Effects on marine mammals, birds and benthic habitat 4. Effects on food (plankton) availability in the water 5. The risk of introducing or spreading marine pests 6. Lighting 7. Noise 8. Integrity of the structure 9. Navigation and safety 10. The need to upgrade, replace or remove any derelict or disused structures 11. The mechanism to recover the full cost of the repair or removal of abandoned or derelict farms and reinstatement of the environment	Standard notification tests under the RMA

Counterfactual to compare against proposed NESMA provisions for realignment of existing marine farms

The planning framework will remain much the same as the 2018 planning framework over the 20 year period of the CBA:

- providing for consent applications to be made for realignment is a new approach in the Proposed Regional Plan, to provide some flexibility and ability for growth in the Northland industry (see s32 report for Proposed Regional Plan)

- the operative Regional Coastal Plan became operative in 2004. Review commenced in December 2014 and decisions are anticipated in 2019. Even with the question of appeals not taken into account this is a period of 15 years. The Proposed Regional Plan framework is therefore likely to remain in place for the majority of the period of the CBA
- there may be some changes through the submission process, but these are likely to bring the Proposed Regional Plan more in line with the Proposed NESMA:
    - the Proposed NESMA excludes existing marine farms in outstanding natural features, outstanding natural landscapes, areas of outstanding natural character, and/or significant ecological areas, and any farms proposing to realign into those areas, from the restricted discretionary activity rule. Three submissions on the Northland Plan request that the rule not apply within *inter alia* significant ecological areas, outstanding natural features and areas of outstanding natural character, and Northland Regional Council may therefore take the opportunity to align the plan more closely with the proposed NESMA
    - the Proposed NESMA includes a matter of discretion for realignment applications for effects on historic heritage. Heritage NZ has submitted to the Northland Plan requesting that additional matters of discretion be added to Rule C.1.3.3 relating to historic heritage. Northland Regional Council may therefore take the opportunity to align the plan more closely with the proposed NESMA

2.3 Change of species

2018 planning framework for change of species

The Proposed Northland Plan does not contain any rules for change of species on existing marine farms and neither does the Operative Northland Regional Coastal Plan. Replacement consents for existing marine farms where a species change is sought will therefore be considered as a discretionary activity under s87B(1)(a) of the RMA. Consent variations to change species can also be sought during the term of an existing consent, and would be considered as discretionary activities under s127(3) of the RMA.

Counterfactual to compare against proposed NESMA provisions for change of species

One submitter has requested the addition of a rule to address changing species, requesting a controlled activity status. In Stantec's opinion it is reasonably unlikely that Northland Regional Council will introduce a new rule on the strength of one submission, but this could be checked with the Council.

The counterfactual for change of species is therefore the current approach – a fully discretionary activity with standard notification tests under the RMA.

3 Auckland

The Auckland Unitary Plan is Operative in part. None of the provisions summarised below are subject to appeal, but the Minister of Conservation has not yet approved the coastal sections of the plan. However, because the plan development process is now so advanced, the Auckland Unitary Plan is the most relevant document to consider for the purposes of establishing the counterfactual

3.1 Replacement consents for existing marine farms

2018 planning framework for replacement consents for existing marine farms

Activity status:	**Matters of control/discretion:**	**Notification**

Restricted discretionary	• Effects on Mana Whenua values and ecological values and water quality
	  ○ Assessment criteria (effects on ecological values and water quality):
	  - Whether measures to avoid adverse effects and avoid, remedy or mitigate other adverse effects on ecological values and water quality have been implemented
	• Effects on navigation and safety from the established aquaculture activities
	  ○ Assessment criteria:
	  - Whether measures to avoid adverse effects and to avoid, remedy or mitigate adverse effects on navigation and safety have been implemented
	• Consent duration is a minimum of 20 years and a maximum of 35 years and monitoring
	  ○ Assessment criteria:
	  - Whether the term of consent is appropriate to provide for the operational needs of the aquaculture activities and to manage its environmental effects
	  - Whether any monitoring is required to demonstrate the extent and type of environmental effects of the aquaculture activities, and the degree to which the effects are remedied or mitigated during and after the activity
	• Where the activity is within an overlay, effects on the characteristics and qualities of the overlay
	  ○ Assessment criteria:
	  - The relevant assessment criteria are those included for structures/activities in the relevant overlay
	• The existing level of economic investment in lawfully established aquaculture activities
	  ○ Assessment criteria:
	  - Whether information demonstrating the value of existing infrastructure supporting the ongoing use of the aquaculture activity has been provided
		Standard RMA notification tests

Counterfactual to compare against proposed NESMA provisions for replacement consent for existing marine farms

The planning framework will remain the same as the 2018 planning framework over the 20 year period of the CBA:

- The previous Regional Coastal Plan for Auckland became operative in October 2004 (although the aquaculture provisions did not, and are still being managed under the transitional plan provisions that existed in 1991). The Auckland Unitary Plan coastal section is not yet operative in 2018, some 13 years later. The Auckland Unitary Plan was publicly notified in late 2013, nine years after the Regional Coastal Plan became operative. Allowing time for remaining appeals to be resolved, the Minister of Conservation to

approve the coastal sections of the Unitary Plan, a ten year plan life and a five year review process it is likely that the Unitary Plan will be the operative plan over the majority of the 20 year period of the CBA.

3.2 Realignment

2018 planning framework for realignment

Activity status:	Matters of control/discretion:	Notification
Restricted discretionary, provided that realignment is limited to moving 1/3 of the farm area, while 2/3 of the farm area stays within the same space as originally consented	• The effects from construction or works methods o Assessment criteria: - Whether measures to ensure construction works avoid adverse effects and avoid, remedy or mitigate other adverse effects, particularly on water quality have been implemented • The effects of the location, extent, design and materials of the marine farm o Assessment criteria: - Whether the realignment is located and designed to avoid adverse effects and avoid, remedy or mitigate other adverse effects on the environment - Whether the form, intensity and scale of works, structures and buildings are sensitive to the marine environment and surrounding adjoining spaces - Whether the materials used are compatible with the surrounding coastal environment and, where practicable, consistent with the existing materials at the site • The effects on coastal processes, Mana Whenua values and ecological values and water quality o Assessment criteria (effects on coastal processes, ecological values and water quality): - Whether measures to avoid adverse effects and avoid, remedy or mitigate other adverse effects on coastal processes, ecological values and water quality have been implemented • The effects on public access, navigation and safety o Assessment criteria: - Whether measures to ensure adverse effects on existing public access arrangements are minimized to the extent and duration of work and via the provision of alternative access routes where practicable have been implemented - Whether measures have been provided to avoid, remedy or mitigate adverse effects on navigation and safety • The effects on existing uses and activities o Assessment criteria: - Whether measures to avoid adverse effects on existing activities, on amenity of adjacent residential and open space zoned land, taking into account both activities in the coastal marine area and on adjacent land, have been implemented • Consent duration and monitoring o Assessment criteria: - Whether the term of consent is appropriate to provide for the operational needs of the realignment and to manage its environmental effects - Whether the consent duration need to be limited to allow an adaptive management approach	Standard RMA notification tests

Activity status:	Matters of control/discretion:	Notification
	- Whether any monitoring is required to demonstrate the extent and type of environmental effects of the activity, and the degree to which the effects are remedied or mitigated during and after the activity • Where the activity is within an overlay, effects on the characteristics and qualities of the overlay o Assessment criteria: - The relevant assessment criteria are those included for structures/activities in the relevant overlay • The existing level of economic investment in lawfully established aquaculture activities o Assessment criteria: - Whether information demonstrating the value of existing infrastructure supporting the ongoing use of the aquaculture activity has been provided **Note also one further set of assessment criteria that are not tied to a matter of discretion:** • Whether any realignment of established aquaculture activities has: o Demonstrated it is an efficient use of the coastal marine area o Does not have adverse effects on other uses and values o Resulted in greater or more efficient use of the established aquaculture activities, and o That any adverse effects have been avoided, remedied or mitigated	

Counterfactual to compare against proposed NESMA provisions for realignment

The planning framework will remain the same as the 2018 planning framework over the 20 year period of the CBA:
The previous Regional Coastal Plan for Auckland became operative in October 2004. The Auckland Unitary Plan coastal section is not yet operative in 2018, some 13 years later. The Auckland Unitary Plan was publicly notified in late 2013, nine years after the Regional Coastal Plan became operative. Allowing time for remaining appeals to be resolved, the Minister of Conservation to approve the coastal sections of the Unitary Plan, a ten year plan life and a five year review process it is likely that the Unitary Plan will be the operative plan over the majority of the 20 year period of the CBA.

3.3 Change of species

2018 planning framework for change of species

The Auckland Unitary Plan does not contain any rules that make specific reference to change of species. Equally however, the rules relating to re-consenting an 'established aquaculture activity' do not contain conditions restricting the rule to the same species as a currently being farmed. 'Established aquaculture activity' is not defined in the Auckland Unitary Plan. 'Aquaculture activities' are defined in the RMA, but do not restrict them to particular species. At face value therefore, the rule as outlined above for re-consenting an established aquaculture activity would also apply to a change of species, if done at the same time as a replacement consent application, although this is not the way that Auckland Council interprets the rule, considering change of species instead as a discretionary activity.

Counterfactual to compare against proposed NESMA provisions for change of species

The counterfactual for change of species is therefore the current approach – a discretionary activity with standard notification tests under the RMA.

4 Waikato

The Waikato Regional Coastal Plan is the operative plan. The Marine Farming Variation to that plan was adopted by the Council in December 2005, although one rule (Rule 16.5.3 relating to current marine farm structures) remains under appeal.

Waikato Regional Council has recently launched Healthy Environments/He Taiao Mauriora, a project to review both the Waikato Regional Coastal Plan and the Waikato Regional Plan. The review project has a timeline through until at least 2023.[1]

4.1 Replacement consents for existing marine farms

Existing marine farms in Waikato can be divided into two groups – the marine farms in Wilsons Bay Zone Areas A and B, and marine farms outside these two areas.

The proposed NESMA exempts the marine farms in the Wilsons Bay Zone because the specific planning framework for the zone was developed only relatively recently. The Wilsons Bay Zone therefore does not need to be considered further in terms of the counterfactual.

2018 planning framework for replacement consents for existing marine farms outside Wilsons Bay Zone Areas A and B

Activity status:	**Matters of control/discretion:**	**Notification**
Discretionary (under the RMA) Discretionary (once Rule 16.5.3 becomes operative	Fully discretionary activity	Standard RMA notification tests

Counterfactual to compare against proposed NESMA provisions for replacement consents for existing marine farms outside Wilsons Bay Zone Areas A and B

Because the review of the Regional Coastal Plan is in its very early stages, determining the counterfactual for Waikato is not simple. Five options were considered possible, but following discussion with officials from the Ministry for Primary Industries, Ministry for the Environment and Department of Conservation, it was thought most likely that an approach similar to that outlined in the proposed NESMA is adopted. While in the counterfactual the NESMA does not exist, the fact that nationally consistent provisions were proposed may influence Waikato Regional Council in its preparation of new marine farming provisions. Wilson's Bay will keep its current planning regime.

4.2 Realignment

2018 planning framework for realignment

Realignment of existing marine farms is a prohibited activity in Waikato under Rule 16.5.6, which prohibits marine farms that are not covered by Rule 16.5.3 (which in turn only allows applications for consents for current marine farms where they are located on the site originally authorised by the marine farming licence or resource consent.

Counterfactual to compare against proposed NESMA provisions for realignment
As for replacement consents for existing marine farms, determining the counterfactual for Waikato is not simple. Provisions that were inserted into the Waikato Regional Coastal Plan as part of the aquaculture reform in 2011 allowed for minor extensions of existing marine farms, and have been utilised by marine farmers without apparent significant adverse effects on the environment. The purpose of the realignment provisions in the

[1] Waikato Regional Council staff have informally advised that notification of the coastal plan provisions is anticipated in late 2019/early 2020.

proposed NESMA is generally to obtain better environmental outcomes by facilitating realignment away from areas of important benthic habitat, or to outside defined outstanding areas.

As both the Auckland and Northland coastal plans contain specific provisions for realignment, it has been signaled as desirable from a national perspective through the proposed NESMA, it is likely that specific provisions for realignment will be included in the new coastal plan provisions.

Two options were considered possible in terms of what the provisions would look like for realignment in a new regional coastal plan, but following discussion with officials from the Ministry for Primary Industries, Ministry for the Environment and Department of Conservation, it was thought most likely that a restricted discretionary activity rule would be developed for realignment with matters of discretion similar to those contained in the proposed NESMA. Based on Auckland and Northland's rules, it is most likely that standard RMA notification tests will apply, with the potential for public notification.

4.3 Change of species

2018 planning framework for change of species
The discretionary activity rule for current marine farms in Waikato is restricted to the 'same activity' as covered by the existing marine farm lease or licence or the current coastal permit. While the rule is not operative, Rule 16.1.2 classifies any activity not covered by a rule in the plan as a non-complying activity. A current marine farm seeking to change the species being farmed at the time of seeking a replacement consent, would therefore be a non-complying activity. Any relevant matter can be considered in processing the consent application and there is the potential for public notification.

Counterfactual to compare against proposed NESMA provisions for change of species
The Waikato Regional Coastal Plan contains Rule 16.5.2, which allows for the erection, placement, use and occupation of the coastal marine area by structures for shellfish research purposes. The possibility of new and novel species, or species not currently being farmed in the region, is therefore anticipated by the current planning framework.

Two options were considered possible in terms of what the provisions would look like for change of species in a new regional coastal plan, but following discussion with officials from the Ministry for Primary Industries, Ministry for the Environment and Department of Conservation, it was thought most likely that a discretionary activity classification would be applied, both to match the way a consent change would be processed and because species other than mussels or oysters would be relatively novel to Waikato.

5 Bay of Plenty

Decisions on the Proposed Bay of Plenty Regional Coastal Environment Plan were released on 1 September 2015. While two of the rules relating to marine farms (Rules AQ1 and AQ2) are under appeal, the rest of the rules have legal effect, and have therefore been considered as the current planning framework for developing the counterfactual.

5.1 Replacement consents for existing marine farms

2018 planning framework for replacement consents for existing marine farms

Activity status:	Matters of control/discretion:	Notification

Controlled, provided that it is not located in an:
• Indigenous Biological Diversity Area A
• Area of Outstanding Natural Character
(note that this rule applies to three of the farms in the Bay of Plenty)
	• Measures to avoid, remedy or mitigate the adverse effects of the aquaculture activities on:
	  ○ Ecology
	  ○ Natural character
	  ○ Cultural values
	  ○ Recreation
	• Use of underwater lighting
	• Antifoulant management on structures – for example the use of antifoulants, cleaning methods and associated discharges
	• Navigation and safety requirements
	• Duration of the activity
	• Requirements to remove all structures, organisms and other items from the area if the operation is closed
	• Use of feed additives in the coastal marine area
	• Monitoring and reporting requirements
	• Management of biosecurity risks
		Standard RMA notification tests

Restricted discretionary in an:
• Indigenous Biological Diversity Area A
• Area of Outstanding Natural Character
(note that this rule applies to the three farms in the Ohiwa Harbour)
	• Measures to avoid, remedy or mitigate the adverse effects of the aquaculture activities on:
	  ○ Ecology
	  ○ Natural character
	  ○ Cultural values
	  ○ Recreation
	• Area of the common marine and coastal area occupied by the aquaculture activity
	• Use of underwater lighting
	• Antifoulant management on structures – for example the use of antifoulants, cleaning methods and associated discharges
	• Navigation and safety requirements
	• Duration of the activity
	• Requirements to remove all structures, organisms and other items from the area if the operation is closed
	• Use of feed additives in the coastal marine area
	• Monitoring and reporting requirements
	• Management of biosecurity risks
		Standard RMA notification tests

Counterfactual to compare against proposed NESMA provisions for replacement consents for existing farms
The planning framework will remain the same as the 2018 planning framework over the 20 year period of the CBA:

- The previous Regional Coastal Environment Plan became operative in 2003. Decisions were released on the Proposed Regional Coastal Environment Plan in 2015. Assuming that the Proposed RCEP becomes operative in 2018, a period of 15 years will have passed. When compared to the 20 year period of the CBA it is reasonable to assume that the planning framework as outlined in the Proposed RCEP will be operative for the majority of the period of the CBA

5.2 Realignment

2018 planning framework for realignment
There is no specific rule covering realignment of existing marine farms in the Proposed Regional Coastal Environment Plan. The controlled activity rule covering replacement consents for existing marine farms (Rule AQ2A) relates only to lawfully established commercial aquaculture activities. Reference to 'lawfully established' is likely to confine activities under Rule AQ2A to the area that is specified on the consent, and realignment will therefore not be covered by this rule or Rule AQ3 (which again relates to lawfully established commercial aquaculture activities). Realignment of existing marine farms is therefore covered either under Rule AQ4 (which is titled 'new commercial aquaculture', although the summary of rules contained in Section 5 of the Plan describes the rule as relating to aquaculture not covered by any other rule) or is a discretionary activity under s87B(1)(a) of the RMA.

Counterfactual to compare against proposed NESMA provisions for realignment
There are currently six existing marine farms in the Bay of Plenty – the experimental geoduck farm in Tauranga Harbour, three farms in Ohiwa Harbour and two farms on the open coast. The three Ohiwa Harbour farms are located in an area of outstanding natural character under the Regional Policy Statement and are surrounded by an Indigenous Biological Diversity Area A under the Proposed Regional Coastal Environment Plan. While it is possible that environmental gains might be realised from the realignment of a portion of the farms officials consider it is more likely that no further change will be made to the new plan provisions.

5.3 Change of species

2018 planning framework for realignment
There is no specific rule covering change of species in the Proposed Regional Coastal Environment Plan. The controlled activity rule covering replacement consents for existing marine farms (Rule AQ2A) relates only to lawfully established commercial aquaculture activities. Reference to 'lawfully established' is likely to confine activities under Rule AQ2A to the species that are specified on the consent, and change of species will therefore not be covered by this rule or Rule AQ3 (which again relates to lawfully established commercial aquaculture activities). Change of species is therefore covered either under Rule AQ4 (which is titled 'new commercial aquaculture', although the summary of rules contained in Section 5 of the Plan describes the rule as relating to aquaculture not covered by any other rule) or is a discretionary activity under s87B(1)(a) of the RMA.

Counterfactual to compare against proposed NESMA provisions for realignment
Rules AQ1 and AQ1A of the Proposed Regional Coastal Environment Plan provide for small-scale aquaculture research activities as a controlled activity (for indigenous species) and a restricted discretionary activity (for non-indigenous species), but leave the commercialisation of any successful trial as a discretionary activity. As the rule framework was only finalised in 2016 it is unlikely that Bay of Plenty Regional Council would change its approach significantly over the potentially 15 year life of the plan. It is therefore likely that change of species will be a discretionary activity over the time period of the CBA.

6 Marlborough

The operative regional coastal plans in Marlborough are the Marlborough Sounds Resource Management Plan and the Wairau-Awatere Resource Management Plan. There is only one marine farm in the area covered by the Wairau-Awatere Resource Management Plan (the large Clifford Bay farm) and so that plan will not be considered further in developing the counterfactual for the proposed NESMA.

Marlborough District Council is well into the process of reviewing both of the existing Resource Management Plans and the Regional Policy Statement, and combining all of them into the Marlborough Environment Plan. The aquaculture provisions have not yet been notified, but are the subject of an ongoing working group process that the Ministry for Primary Industries is taking part in. Some general assumptions can be made about what the aquaculture provisions are likely to look like, and these assumptions have been used to develop the counterfactuals outlined below.

6.1 Replacement consents for existing marine farms

2018 planning framework for replacement consents for existing marine farms

Activity status:	**Matters of control/discretion:**	**Notification**
Controlled, provided that the original application for the farm was made prior to 1 August 1996 and that: • Structures and anchoring systems are those authorised by the original coastal permit, lease or licence • Area occupied, purpose and species are only those authorised by the original coastal permit, lease or licence • Lighting is compliant with consent conditions	• The duration of the consent (subject to a term that requires that it not exceed 20 years) • Information and monitoring requirements • The provision of warning devices and signs • The layout and positioning of the marine farm structures to ensure public access (including recreational and forestry access) through the area and the preservation of navigational safety both within the marine farm and within the vicinity of the marine farm • The extent and nature of disturbance to the foreshore and seabed • Administrative charges payable • The adverse effects of any marine farming related structures on navigation or on visual amenities • The adverse ecological effects of the activity • Adverse effects of marine farming activities and structures previously addressed by way of conditions in earlier Coastal Permits, Marine Farm Licences and Leases pertaining to any particular marine farm site and in the case of marine farms listed in Appendix D as controlled activities (the three Fairy Bay farms and two farms as Kauauroa Bay): • The adverse visual effects of support structures on the natural character of the coastal environment • The adverse effects from the use of surface structures to the extent that in whole or in part the use of such surface structures may be able to be reduced by other technology involving, where appropriate, subsurface farming techniques or buoy or surface support mechanisms utilising methods which mitigate adverse visual effects	Standard RMA notification tests
'Limited' discretionary, provided that the original application for the farm was made prior to 1 August 1996 but where: • The number and length of long-lines and anchoring systems are not those authorised, provided that any	• A consideration of the adverse effects expected to directly result from the proposed non-compliance • Any of the matters of control listed above that are relevant to the non-compliance that results in consent being required as a limited discretionary activity	Applications may be considered without public notification and without the need to obtain written approval of affected persons

Activity status:	Matters of control/discretion:	Notification
alteration to line length does not result in subsurface lines extending to within 3 m of the surface of the sea • The lighting system is not in accordance with the conditions of the original coastal permit, lease or licence, or specified alternative standards		
Discretionary, where: • the marine farm is not occupying the area authorised by the original consent, lease or licence for the specified purpose and with the same species • the number and length of long-lines are not those authorised and subsurface lines extend to within 3m of the surface of the sea provided that: • no part of any farm shall be located closer than 50m to mean low water mark • no part of any farm shall be located further than 200m from mean low water mark Note that three farms listed in Appendix D2 of the Plan that are located in CMZ1 are also discretionary activities – two in Pig Bay that have been refused but are currently under appeal, and one other in Port Gore where the current consent expires in 2019		Standard RMA notification tests

Activity status:	Matters of control/discretion:	Notification
The three CMZ3 finfish farms are also discretionary activities, provided they comply with 11 standards specified in the Plan		
Non-complying, where the marine farm is located: • inside a line drawn 50m from mean low water mark at right angles to a line normal to the nearest part of the mean high water mark; or • beyond a line drawn 200m from mean low water, at right angles to a line normal to the nearest part of mean high water mark or where the marine farm is one of the three located in CMZ3 and does not comply with the specified standards (all of the current farms comply with the specified standards)		Standard RMA notification tests

Counterfactual to compare against proposed NESMA provisions for replacement consents for existing farms
Marlborough District Council is currently reviewing the aquaculture provisions of the Marlborough Sounds Resource Management Plan, in order to notify a variation to the Proposed Marlborough Environment Plan. Notification of that variation is anticipated in 2019. As rules relating to aquaculture in the Proposed Marlborough Environment Plan will have legal effect from the date the variation is notified (under s87B(3) of the RMA), it is those provisions that should form the counterfactual.

As no draft provisions are available to date, some broad assumptions, based on the Ministry for Primary Industries' involvement in the Marlborough Aquaculture Review Working Group process have to be made to develop the counterfactual, as follows:

- The notified aquaculture provisions create a series of Aquaculture Management Zones – in most cases these will be a ribbon approximately 100m to 300m from mean high water springs
- Replacement consenting (i.e. same farm, same location – equivalent to the replacement consenting provisions of the proposed NESMA) of marine farms located wholly within an Aquaculture Management Zone would have a controlled activity status. The notification approach is not clear at present – but based on current practice while Marlborough District Council may choose to preclude public notification (because the approach has been developed collaboratively with the community), it is very unlikely to preclude limited notification
- Replacement consenting of marine farms located outside of Aquaculture Management Zones (either in part or wholly) would have a non-complying or prohibited activity status, with standard RMA notification tests (and is most likely to be publicly notified) – although realignment provisions (see section 6.2 below) would encourage realignment of most of these farms into an Aquaculture Management Zone

6.2 Realignment

2018 planning framework for realignment

The controlled activity rule for marine farming in the Marlborough Sounds Resource Management Plan requires that the marine farm occupies only the area authorised in the coastal permit, lease or licence issued prior to 1 August 1996, and so will not apply to any proposals to realign an existing marine farm. If any realignment remains within the 'coastal ribbon' (i.e. between 50m and 200m from mean high water springs) it would be classified as a discretionary activity, with standard RMA notification tests. If any realignment is proposed outside the coastal ribbon, or would result in a farm that is currently within the coastal ribbon being realigned to be wholly or partially outside the coastal ribbon, it would be classified as a non-complying activity, with standard RMA notification tests.

There is no restriction within the Marlborough Sounds Resource Management Plan on the proportion of an existing marine farm that can be realigned.

Counterfactual to compare against proposed NESMA provisions for realignment
As with replacement consents for existing marine farms, the aquaculture provisions of the Proposed Marlborough Environment Plan will be the relevant plan provisions for the period of time over which the CBA would be considered. The aquaculture provisions may provide for realignment in a more lenient way than the Marlborough Sounds Resource Management Plan currently does, to facilitate any rearrangement of existing marine farms that will result in environmental, social and possibly production benefits. The following broad assumptions have therefore been made about the Marlborough Environment Plan aquaculture provisions relating to realignment:

- As noted in section 6.1 above, the aquaculture provisions will create a series of Aquaculture Management Zones
- Realignment of an existing marine farm into an Aquaculture Management Zone would have a controlled activity status – there would be no restriction on the proportion of an existing marine farm that could be realigned, so long as it was realigning completely into an Aquaculture Management Zone. The approach to notification is still unclear, but is likely to be as outlined in section 6.1 above
- Realignment of an existing marine farm that is located outside an Aquaculture Management Zone would have a non-complying or prohibited activity status, with standard RMA notification tests applying to a non-complying activity (which would be very likely to be publicly notified)

6.3 Change of species

2018 planning framework for change of species
Marlborough District Council has previously issued coastal permits for the farming of a reasonably wide variety of species, so for a number of marine farmers in Marlborough no change to the existing consent would be required. Change of species at the time of seeking a replacement consent would therefore fall into one of the activity classifications outlined in section 6.1 above, depending on what the base classification for the existing farm was.

If a marine farmer is seeking to change species beyond those specified in the current consent, the controlled activity rule is not available to them as it requires that the species to be farmed are only those authorised by the prior to 1 August 1996 coastal permit, lease or licence. The consent application would therefore be considered as either a discretionary activity or a non-complying activity, depending on whether it is located inside or outside the coastal ribbon.

Counterfactual to compare against proposed NESMA provisions for change of species
As Marlborough District Council has a past practice of issuing multiple species consents it is most likely that any further change of species beyond those specified would remain at least a discretionary activity. If a non-complying activity is retained in the aquaculture provisions for the Marlborough Environment Plan, marine farmers seeking to change species are most likely to take the perceived easier route of applying for a change to their current consent conditions, which would also be classified as a discretionary activity.

7 Canterbury

Until the late 1990s there was relatively little interest in aquaculture in Canterbury. As a result, the Regional Coastal Environment Plan (which is the currently operative plan) contains no separate specific policies or rules for aquaculture. While the Regional Coastal Environment Plan is due for review (it became operative in November 2005) there is no easily available information on the progress of any review.

7.1 Replacement consents for existing marine farms

2018 planning framework for replacement consents for existing marine farms

Marine farms are classified under a series of rules in the Regional Coastal Environment Plan, as follows, and provided that the marine farm structures originally authorised have been completely constructed:

- Occupation of the coastal marine area (discretionary under Rule 8.23 or 8.24, depending on the size of the marine farm)
- Deposition of material (discretionary under Rule 8.13)
- Discharge of material (discretionary under Rule 7.2)

If all of the structures have not been completed (as was the case, for example, with the large Pegasus Bay offshore farm when applications were made for replacement consents), then consent would also be required for the erection or placement of structures (either as a discretionary activity, or as a non-complying activity if the farm is located in either an area identified in Schedule 5.13 or an Area of Significant Natural Value).

Consent applications under each of these rules are subject to the standard RMA notification tests.

Counterfactual to compare against proposed NESMA provisions for replacement consents for existing farms
Two options were considered possible in terms of what the provisions would look like for replacement consents for existing marine farms in Canterbury over the period of time to which the CBA will apply. Following discussion with officials from the Ministry for Primary Industries, Ministry for the Environment and Department of Conservation, it was thought most likely that the current approach in the Regional Coastal Environment Plan would be maintained, and replacement consents would be a discretionary activity. Environment Canterbury has processed (or is processing) replacement consents for five existing marine farms since 2014, with four of the farms being non-notified (the fifth requested public notification). For the purposes of the counterfactual it could be assumed that replacement consents will not be publicly notified

7.2 Realignment

2018 planning framework for replacement consents for existing marine farms
The absence of marine farming specific rules in the Canterbury Regional Coastal Environment Plan makes it complex to determine the exact rules that would apply to realignment. It is most likely that consent would be required as a discretionary activity for the activities outlined in section 7.1 above for the new area that a marine farm is to be realigned into. It is also likely that rules relating to the erection or placement of structures will apply – meaning that realignment of the farms at Port Levy would be a non-complying activity,[2] and that realignment of any of the other farms around Banks Peninsula would be discretionary.

Counterfactual to compare against proposed NESMA provisions for realignment
As with the counterfactual for replacement consents for existing marine farms, the counterfactual for realignment is affected by the unknown results of any review of the Canterbury Regional Coastal Environment Plan. Two options were considered possible, but following discussion with officials from the Ministry for Primary Industries, Ministry for the Environment and Department of Conservation, it was thought most likely that a rule for realignment would be included, on the basis that realignment is specifically provided for in the Northland and Auckland plans and is being actively considered in the development of the aquaculture provisions for the proposed Marlborough Environment Plan, and that the public consultation on the proposed NESMA (even if the NESMA did not go ahead) would have demonstrated the value of specifically providing for realignment. In addition, realignment provides the flexibility to address effects of a marine farm at a consented location that

[2] Port Levy is listed in Schedule 5.13 of the RCEP, where the erection or placement of a structure is a non-complying activity, unless it is *inter alia* a marine farm structure that was authorised prior to 16 May 2001. The two existing marine farms at Port Levy were both established after 2001. Menzies Bay, Pigeon Bay and Akaroa Harbour are also all listed in Schedule 5.13 of the RCEP, but the marine farms in those bays were established prior to 2001 and so will be discretionary activities.

may not become obvious until a farm is operational. An approach similar to that outlined in the proposed NESMA could reasonably be anticipated to form the basis for any new rules developed in Canterbury.

7.3 Change of species

2018 planning framework for change of species
Recent replacement consents issued for existing marine farms in Canterbury have included conditions restricting the species that can be farmed to those identified on the consent. Because of the lack of aquaculture specific rules in the Regional Coastal Environment Plan, any replacement consent seeking a change of species will be processed in accordance with the activity classification identified in section 7.1 above (and therefore be a discretionary activity, with standard RMA notification tests). If a structure change is required as part of any proposal to change species, Rule 8.2 of the Regional Coastal Environment Plan classifies the alteration of structures as a discretionary activity.[3]

Counterfactual to compare against proposed NESMA provisions for change of species
As with the counterfactual for replacement consents for existing marine farms, the counterfactual for realignment is affected by the unknown results of any review of the Canterbury Regional Coastal Environment Plan. However, the aquaculture industry has identified a desire for more flexibility to enable innovation. If the proposed NESMA does not go ahead, it is possible that the public consultation that has occurred to date will encourage Environment Canterbury to include specific aquaculture rules in any review of the Regional Coastal Environment Plan, and provide a more enabling approach to change of species. An approach similar to that outlined in the proposed NESMA could reasonably be anticipated to form the basis for any new rules developed in Canterbury.

[3] The alteration of a marine farm structure to enable the farming of a different species cannot comply with the conditions of permitted rule 8.1 of the Regional Coastal Environment Plan.

8 Southland

The Regional Coastal Plan for Southland is the operative regional coastal plan for development of the counterfactual. The Regional Coastal Plan became fully operative in March 2013, with the marine farming provisions the last part of the plan to become operative. The Environment Southland website notes that in April 2017 the Council approved the start of a project to set the strategic direction for how the coast is managed, which is the first step before commencing a detailed review of the plan. Discussions with Environment Southland staff indicate that new Regional Coastal Plan provisions may be notified in mid-2022.

8.1 Replacement consents for existing marine farms

2018 planning framework for replacement consents for existing marine farms
Marine farming, other than in identified prohibited areas, is a discretionary activity under Rule 15.1.7, with standard RMA notification tests.

Counterfactual to compare against proposed NESMA provisions for replacement consents for existing farms
With the early stage of the Regional Coastal Plan review, the operative plan could be the relevant plan framework for the next 5-10 years. All of the consents for existing marine farms in Southland expire in 2024 and it is most likely that they will be assessed as discretionary activities. If all of the consents are granted 20 year terms then the current plan framework is the counterfactual over the life of the CBA.

8.2 Realignment

2018 planning framework for realignment
Marine farming, other than in identified prohibited areas, is a discretionary activity under Rule 15.1.7, with standard RMA notification tests. Realignment of existing farms will therefore also be a discretionary activity.

Counterfactual to compare against proposed NESMA provisions for realignment
With the early stage of the Regional Coastal Plan review, the operative plan could be the relevant plan framework for the next 5-10 years, and realignment would therefore be a discretionary activity. As all of the consents for the existing marine farms in Southland expire in 2024, any marine farmers who see benefit in realigning their farms, or who need to for environmental, social or cultural reasons may take the opportunity of needing a replacement consent to reposition their marine farm. If replacement consents are granted for 20 year terms, then the current plan framework is the counterfactual over the life of the CBA.

8.3 Change of species

2018 planning framework for change of species
Rule 15.1.1 of the Regional Coastal Plan for Southland classifies the growth of new or additional species on an existing marine farm as a discretionary activity, with standard RMA notification tests.

Counterfactual to compare against proposed NESMA provisions for change of species
Environment Southland consents for marine farming typically list a number of species, even if not all of them are currently farmed, and so there is an existing level of flexibility for marine farmers in Southland. Many of the species swaps contemplated by Categories 1 and 2 of the proposed NESMA may therefore already be consented in Southland.

The explanation to Rule 15.1.1 notes that *'The potential adverse effects of marine farming activities using different species need to be scrutinised as much as the initial establishment of a like activity'*. With the early stage of the Regional Coastal Plan review, the operative plan could be the relevant plan framework for the next 5-10 years, and change of species to one not listed on a consent would therefore be a discretionary activity. Any new regional coastal plan is likely to replace the exising rule with a similar approach, consistent with the current explanation to Rule 15.1.1

9 Other regions

There are three existing marine farms in other regions – the large offshore farm in Hawkes Bay, an experimental research farm in Wellington, and a small farm in Jacksons Bay on the West Coast.

9.1 Hawkes Bay

Replacement consents for existing marine farms
The erection, reconstruction, placement, alteration or extension of a structure required for an aquaculture activity in an Aquaculture Management Area, and the occupation of space within an Aquaculture Management Area by an aquaculture activity are both controlled activities under the Hawkes Bay Regional Coastal Environment Plan, which became operative in 2014. Applications will generally be processed without public notification, but written approvals of affected parties will be requested.

As the Regional Coastal Environment Plan has only been operative for 3 years, it is likely that the current rule framework will apply for at least the next ten years, half of the time period for the CBA. As Hawkes Bay has taken a deliberate approach of defining Aquaculture Management Areas and facilitating consents within those areas, it is most likely that the controlled activity approach to existing farms would continue.

Realignment
The exact conditions of the coastal permits for the existing offshore farm are not known, but it is likely that the consented area takes up the majority of the defined AMA that overlays it. Any proposal to realign the farm would therefore be a discretionary activity.

Under the proposed NESMA the realignment provisions do not apply to existing marine farms that are larger than 10ha in size. There is therefore no need to establish a counterfactual for the Hawkes Bay marine farm in terms of the realignment provisions, as it will not be affected by them.

Change of species
The occupation of space in an Aquaculture Management Area by an aquaculture activity is a controlled activity provided that only the species authorised by the current consent are being farmed. Change of species in Hawkes Bay will therefore require consent as a discretionary activity.

In common with a number of the other regions discussed in this report, there are two possibilities for the counterfactual for change of species – that the planning framework remains the same as it is currently throughout the time period of the CBA, or that change of species is a discretionary activity for approximately 10 years, and then provisions similar to those outlined in the proposed NESMA for the remaining 10 years.

9.2 Wellington

Replacement consents for existing marine farms
The first renewal of an existing resource consent for the occupation of space by a structure in the coastal marine area after the date the Proposed Natural Resources Plan for Wellington was notified is a controlled activity under Rule R183. Matters of control are limited, and public notification is precluded. Subsequent renewals appear to be discretionary activities under Rule R184.

The Proposed Natural Resources Plan is currently undergoing hearings, with the hearing on the coast provisions not scheduled to commence until the end of May 2018. It is likely to be some time until the coast provisions are operative (following decisions and appeals), and with a 10 year life for the plan, the current provisions are most likely to remain in place for the majority of the time period for the CBA.

Realignment
Rule R150 of the Proposed Natural Resources Plan permits minor alterations to structures in the coastal marine area, which on face value would include a change to their position through realignment. However, s68A of the RMA states that no rule may be included in a regional coastal plan that authorises any aquaculture activity as a permitted activity. There is no 'catch-all' rule in the coast rules for activities that are not covered by other rules in the plan, and realignment of the existing marine farm therefore becomes a discretionary activity under s87B(1)(a) of the RMA.

As outlined above in relation to replacement consents for existing marine farms, the Proposed Natural Resources Plan framework is most likely to remain in place for the majority of the time period for the CBA, and should be considered as the counterfactual.

Change of species
There are no aquaculture specific rules in the Proposed Natural Resources Plan. The species being farmed is most likely to be tied to the coastal permit for occupation of the coastal marine area. Any species change at the time of seeking a replacement consent will therefore mean that the existing resource consent is not being replaced, and the application would be classified as a discretionary activity under Rule R184.

As outlined above in relation to replacement consents for existing marine farms, the Proposed Natural Resources Plan framework is most likely to remain in place for the majority of the time period for the CBA, and should be considered as the counterfactual.

9.3 West Coast

Replacement consents
The occupation of the coastal marine area by the existing marine farm at Jacksons Bay is a discretionary activity under the Proposed West Coast Regional Coastal Plan, with standard RMA notification tests.

Work on the Proposed Regional Coastal Plan has been on hold since late 2016 while the Proposed Regional Policy Statement has been progressed, however West Coast Regional Council is anticipating that hearings will occur in 2019. The Proposed Regional Coastal Plan framework is therefore likely to remain in place for the majority of the time period for the CBA, and should be considered as the counterfactual.

Realignment
While Rule 10 of the Proposed Regional Coastal Plan permits the alteration of structures by amending their orientation by up to 10%, realignment anticipated by the proposed NESMA would be greater than this. Realignment would therefore be a discretionary activity under Rule 13, with standard RMA notification tests.

As outlined above in relation to replacement consents for existing marine farms, the Proposed Regional Coastal Plan framework is most likely to remain in place for the majority of the time period for the CBA, and should be considered as the counterfactual.

Change of species
The exact conditions of the coastal permits for the existing Jacksons Bay farm are not known, but it is likely that the species that can be farmed are specified. Change of species at the time of replacement consenting is not specifically identified by rules in the Proposed Regional Coastal Plan and so would be included within the consideration of a replacement consent, as a discretionary activity.

As outlined above in relation to replacement consents for existing marine farms, the Proposed Regional Coastal Plan framework is most likely to remain in place for the majority of the time period for the CBA, and should be considered as the counterfactual.

10 Summary

In summary:

- For replacement consents for existing marine farms, three approaches would be used by councils in the absence of the NESMA:
  - a full discretionary activity with standard RMA notification tests (2 councils – 62 farms, or 5%)
  - a restricted discretionary activity, most likely with standard RMA notification tests (2 councils – 150 farms, or 13%)
  - a tiered approach of a controlled activity for most farms, with a restricted discretionary activity for those in identified significant areas or a non-complying/prohibited activity (3 councils – 689 farms, or 60%), with public and limited notification precluded where a controlled/restricted discretionary tier is adopted in one region (99 farms, approx. 9%), although in general with relatively wide matters of control or discretion

- For realignment, two main approaches would be used by councils in the absence of the NESMA:
  - a full discretionary activity with standard RMA notification tests (2 councils – 62 farms, or 5%)
  - a restricted discretionary activity, most likely with standard RMA notification tests (4 councils – 267 farms, or 23%), with 99 of these farms (9%) subject to more confined matters of discretion
  - one council (Marlborough) would adopt a controlled activity for those farms realigning in accordance with the bay by plan for marine farms in the region. This is likely to cover the majority of farms in the region (584 farms, 51%), based on the collaborative approach that has been adopted to the project

- For change of species:
  - the majority of councils (5 of the 7 addressed in this report) would retain a discretionary activity with standard RMA notification tests in the absence of the NESMA (1068 farms, 93%)
  - two councils would have restricted discretionary activity rules, likely with standard RMA notification tests (81 farms, or 7%)

Appendix C – Record of reports and briefings

Date	Report/briefing
April 2013	Ministerial briefing on proposal for central government intervention in regional coastal plans to establish nationally consistent planning framework
August 2013	Ministerial briefing on use of template planning proposed to be included in the RMA amendment bill
2013-2014	Work on inclusion of marine aquaculture into priorities for national direction
May 2014	Aquaculture Planning Workshop to consider opportunities for national consistency
October 2014	*Aquaculture: Options for National Direction* (Andrew. Stewart Limited)
March 2015	Ministerial briefing (to Business Growth Agenda Ministers) with an action plan to address challenges facing aquaculture growth, including agreeing to prioritise national direction for aquaculture
August 2015	First Aquaculture Reference Group meeting: • Background and problem definition for national direction
October 2015	Second Aquaculture Reference Group meeting: • Issues and options for national direction
March 2016	Third Aquaculture Reference Group meeting: • Options for National Direction (MWH NZ Ltd) • Reconsenting costs by region (Aquaculture Direct)
July 2016	Fourth Reference Group meeting: • Draft replacement consenting proposal
August 2016	Fifth Reference Group meeting: • Revised draft replacement consenting proposal • *National Direction for Aquaculture – Innovation and Research Activities* (MWH NZ Ltd) • *National Direction for Aquaculture Biosecurity under the Resource Management Act 1991* (MWH NZ Ltd) • *Broad concepts underpinning baywide management* (MWH NZ Ltd)
September 2016	Sixth Reference Group meeting: • *Context for National Direction: Aquaculture Biosecurity* (MWH NZ Ltd) • *Revised Broad concepts underpinning baywide management* (MWH NZ Ltd) • *Broad concepts underpinning replacement consenting* (MWH NZ Ltd) • *Broad concepts underpinning innovation and research – experimental farms* (MWH NZ Ltd)
December 2016	Seventh Reference Group meeting: • Revised draft replacement consenting proposal • Draft biosecurity proposal
March 2017	Eighth Reference Group meeting: • Revised draft replacement consenting proposal • Revised draft biosecurity proposal • Draft change of species proposal
June 2017	Public notification of proposal for a national environmental standard: • *Proposed National Environmental Standard for Marine Aquaculture* – discussion document

Date	Report/briefing
	• Regulatory Impact Statement • Preliminary economic analysis (NZIER) • *Grouping aquaculture species by their ecological effects* (Cawthron Institute)
November 2017	Ninth Reference Group Meeting
November 2017	*Proposed National Environmental Standards for Marine Aquaculture – Addressing Marine Farm Biosecurity* (Stantec NZ)
December 2017	Tenth Reference Group Meeting
March 2018	Eleventh Reference Group Meeting: • *National Environmental Standards for Marine Aquaculture – Cumulative Effects* (Stantec NZ) • Tangata whenua matter of discretion analysis (MPI)
October 2018	Regulatory Impact Assessment Report and recommendations on the submissions and the subject matter of the proposed National Environmental Standard for Marine Aquaculture (MPI) National Environmental Standard for Marine Aquaculture Section 32 Evaluation Report (Stantec NZ) Analysis of proposed NES on marine aquaculture – Cost benefit analysis in support of the Section 32 analysis for the National Environmental Standard Marine Aquaculture (NZIER) Proposed National Environmental Standard for Marine Aquaculture – Non-NES Scenario for CBA and s32 analysis (Stantec NZ) Summary of effects of proposed NESMA (Stantec NZ)

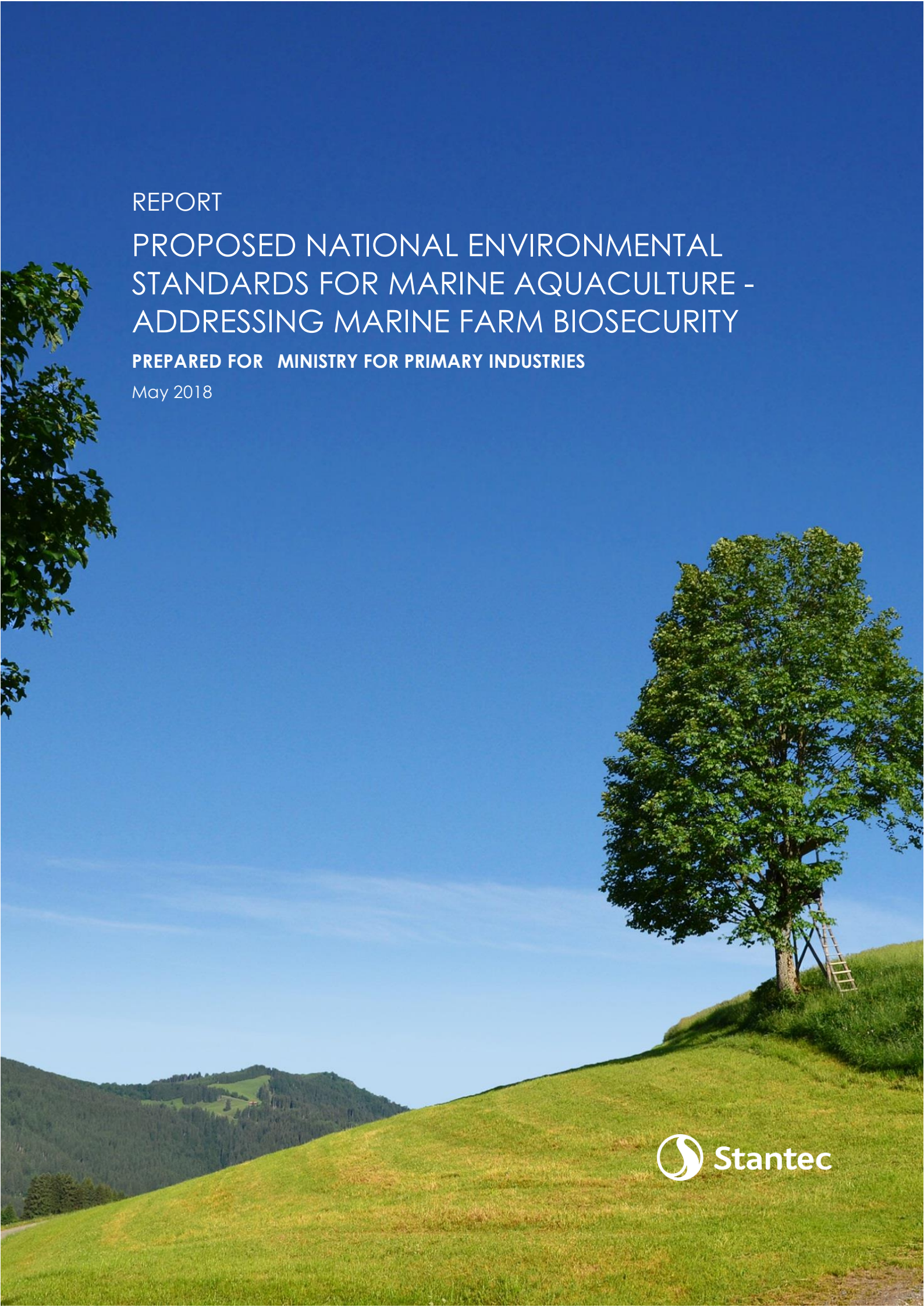
Appendix D – Biosecurity Report

REPORT

PROPOSED NATIONAL ENVIRONMENTAL STANDARDS FOR MARINE AQUACULTURE - ADDRESSING MARINE FARM BIOSECURITY

PREPARED FOR MINISTRY FOR PRIMARY INDUSTRIES

May 2018



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REVISION SCHEDULE

Rev No.	Date	Description	Signature or Typed Name (documentation on file)			
			Prepared by	Checked by	Reviewed by	Approved by
0	2 Nov 2017	Initial draft	FL			
1	3 Nov 2017	Check and review	FL	JD	JD	AC
2	14 Nov 2017	Update to expand recommendations and conclusion	FL			
3	9 Feb 2018	Update following Ref Group feedback	FL	AC	AC	AC
4	1 May 2018	Final	FL	JD	JD	AC

Executive Summary

This report provides analysis of the submissions received on the necessity for the biosecurity provisions contained in the Proposed National Environmental Standard for Marine Aquaculture (the proposed NESMA) i.e. whether the NESMA should contain standards requiring marine farm biosecurity management plans. A variety of tools other than national environmental standards are available to implement marine farm biosecurity management, and the report evaluates the potential of each of these tools to meet the following goals that the Ministry for Primary Industries (MPI) has for marine farm biosecurity national direction:

- That the tool is compulsory to prepare
- That it is enforceable, in order to achieve 100% implementation
- That it is comprehensive – i.e. that it covers all matters in the MPI Biosecurity Technical Paper and that it covers all aquaculture species
- That both the role of marine farms and marine farming as vectors, and the effects of activities on marine farms and marine farming can be addressed
- That industry will implement the tool, and monitor whether the objectives specified in that tool have been achieved, and that such monitoring will be verified through an independent auditing process
- That councils will enforce the NESMA, with support from MPI

Potential tools for managing marine farm biosecurity are available under both the Biosecurity Act 1993 and the Resource Management Act 1991. The tools available under Parts 5 and 5A of the Biosecurity Act 1993 are:

- National policy direction
- National and regional pest management plans
- National and regional pathway management plans
- Small-scale management plans
- Government/industry agreements

The tools available under the Resource Management Act 1991 are:

- National policy statements (including the New Zealand Coastal Policy Statement)
- National environmental standards
- Regional policy statements
- Regional coastal plans

Note that compliance with each of the tools is compulsory under the Biosecurity Act 1993 and the Resource Management Act 1991, but preparation is not necessarily compulsory.

None of the tools under the Biosecurity Act 1993 achieve all of the goals identified. In particular, of all of the tools, only national policy direction is compulsory to prepare, and it is relatively poorly suited to addressing the majority of the other goals identified for marine farm biosecurity.

A variety of different tools that may be relevant or useful for implementing marine farm biosecurity management exist under the Resource Management Act 1991, but none of them achieve all of the goals identified. In particular, the jurisdiction of regional councils and unitary authorities under the Resource Management Act 1991 is restricted to their functions under section 30, and to the purpose of the Act under section 5. While activities such as biofouling removal, which have a direct environmental effect, can be controlled under the Resource Management Act 1991, a number of the other components of a comprehensive biosecurity management approach, particularly animal husbandry matters, are either not within the jurisdiction of councils or are only loosely related (and attempts to manage them through regional plans or resource consents may result in successful legal challenge).

The development of the A+ Sustainable Aquaculture programme is to be commended, but it too does not achieve all of the goals identified.

It is most likely therefore that a combined approach, using a variety of different tools wil be necessary to effectively manage marine farm biosecurity in New Zealand.

Ministry for Primary Industries

Proposed National Environmental Standards for Marine Aquaculture - Addressing Marine Farm Biosecurity

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APPENDICES

Appendix A Reference Group Feedback

1. Introduction

This report provides analysis of the submissions received on the necessity for the biosecurity provisions contained in the Proposed National Environmental Standard for Marine Aquaculture (the proposed NESMA) i.e. whether the NESMA should contain standards requiring marine farm biosecurity management plans. A number of submissions were also received on the wording of specific provisions contained in the proposed NESMA, but these submissions cannot be addressed until a decision has been made about whether to continue with the inclusion of marine farm biosecurity provisions in the proposed NESMA.

The purpose of this report is:

- To set out in detail the objectives for marine farm biosecurity that led to the inclusion of the provisions in the proposed NESMA;
- To outline what MPI considers is current best practice for marine farm biosecurity, in order to understand what it is that a marine farm biosecurity plan should address;
- To analyse the tools available under the Biosecurity Act 1993 and the Resource Management Act 1991 (the RMA) to manage marine farm biosecurity, in order to compare the tools against the objectives and best practice to determine which tool is the 'best fit' both to address issues and to achieve MPI's objectives
- To evaluate suggestions made by various submitters about how marine farm biosecurity should be addressed
- To make recommendations about how marine farm biosecurity should be addressed through the proposed NESMA.

2. Proposed NESMA provisions for marine farm biosecurity

The provisions relating to marine farm biosecurity contained in the proposed NESMA were developed following discussions internally at the Ministry for Primary Industries (MPI) - particularly with marine biosecurity officials - discussions amongst officials from MPI, DOC and MfE, and discussions at Aquaculture Reference Group meetings. The history of the development of the provisions is laid out in the following trail of documents:

- **Background and Problem Definition** (MPI) – paper presented to the First Aquaculture Reference Group meeting. The paper noted that improving biosecurity is a top priority for central government, and briefly summarised the work that was being done on reviewing New Zealand's biosecurity system, and the work by AQNZ and MPI specifically on options for enhancing on-farm marine farm biosecurity. The paper suggested that national direction could look to create nationally consistent plan provisions and resource consent requirements which improve biosecurity management and response (where this was within the jurisdiction of the RMA)
- **Issues and Options** (MPI) – paper presented to the Second Aquaculture Reference Group meeting. Provided some further information on the matters outlined in the Background and Problem Definition paper, and presented four options:
    - Require a biosecurity plan as a condition of resource consent
    - Develop minimum standards for biosecurity management under the RMA
    - Non-statutory guidance on biosecurity plans and resource consent conditions
    - Councils continue to manage biosecurity on a regional basis without national direction
- **Preliminary Report National Direction for Aquaculture Biosecurity – A Think Piece** (MWH, Sept 2016) – a preliminary paper prepared for agency officials on the potential benefits of developing national direction in respect of aquaculture biosecurity.
    - Key benefits were seen as being:
        - Driving a mandatory requirement for all marine farms to provide biosecurity plans, and to provide consent authorities with a consistent national framework for assessing the adequacy of those plans;

        - Providing firm and consistent guidance for implementing, monitoring and enforcing biosecurity plans at farm level
    - The following challenges were identified:
        - Maintaining flexibility and relevance across species, farms types and farm scales, without undue restrictions or unreasonable costs associated with preparing, implementing and monitoring biosecurity plans
        - The potential costs on farms to prepare, implement and monitor biosecurity management plans, where those costs may not be fully supported across the industry until or unless a biosecurity incursion occurs
        - Effective monitoring and enforcement

    Options identified for national direction included a national environmental standard and a national policy statement

- **National Direction for Aquaculture Biosecurity under the Resource Management Act 1991** (MPI/MWH) – paper presented to the Fifth Aquaculture Reference Group meeting, to support discussion in respect of the potential development of national direction specific to marine farm biosecurity. Based on the preliminary report (above) it provided background for the Reference Group on potential approaches to national environmental standards and/or policy, to help seek feedback about which should be pursued
- **Context for National Direction: Aquaculture Biosecurity** (MPI/MWH) – paper presented to the Sixth Aquaculture Reference Group meeting, as an update from the previous paper, to broadly discuss the regulatory framework applicable to the potential development of national direction under the RMA specific to marine farm biosecurity. The paper provided some more detail on the tools available under the Biosecurity Act 1993
- **Draft Biosecurity Proposal** (MPI/MWH) – draft proposal presented to the Seventh Aquaculture Reference Group meeting, for input and discussion, with an updated version presented to the Eighth Aquaculture Reference Group meeting

The indicative provisions contained in the discussion document for the proposed National Environmental Standard for Marine Aquaculture propose that:

- Resource consent can only be granted for a marine farm (new or existing) where a biosecurity management plan has been lodged as part of the application and assessed as meeting criteria to be outlined in an externally referenced document
- If a replacement resource consent for an existing farm does not expire until after 31 January 2025, and the existing resource consents do not require the preparation and implementation of a biosecurity management plan, consent authorities are required to review the consent conditions to ensure that they require a biosecurity management plan (consistent with the requirements to be outlined in an externally referenced document) to be prepared and implemented.

3. Summary of submissions

Fifty-five submissions were received that commented on whether marine farm biosecurity should be included in the proposed NESMA. Forty-six submissions were in support, six in opposition and three that provided general comment but did not specifically support or oppose, as shown in Table 3-1.

Table 3-1: Submitters by support/opposition and submitter type

	Requirement for BioMPs under NESMA – support	Requirement for BioMPs under NESMA – oppose	Requirement for BioMPs under NESMA – general comment
Total	**46**	**6**	**10**
Aquaculture industry	11	1	4
Interested individual	9	1	1
Iwi organisation	9		1
NGO or community group	5	2	
Other	7	1	1

	Requirement for BioMPs under NESMA – support	Requirement for BioMPs under NESMA – oppose	Requirement for BioMPs under NESMA – general comment
Regional council or unitary authority	5	1	3

3.1 Submissions in support

While 46 submitters supported requiring biosecurity management plans under the NESMA, only 18 of these submitters did not caveat their support in some way. The comments made by submitters in support included:

- At least nine submitters commented that biosecurity provisions need to be put in place for other non-aquaculture coastal users, both to recognise that aquaculture is not the only biosecurity risk in the coastal marine area, and to make sure that biosecurity measures are effective as a result of being comprehensive
- That it is critical that the framework is both cost effective and efficient
- Concerns that marine farmers would adequately give effect to their biosecurity management plans in all aspects of their operations (including those that may not be documented) and ensure that all their contractors also abide by the biosecurity management plan requirements
- That while biosecurity management plans should be required, an exception should be provided to this requirement where there is an 'agreed alternative method of providing for marine biosecurity', for example through an operative regional pest management plan, a pathway management plan, an industry wide management plan, product stewardship requirements or any 'other instrument'
- A national biosecurity strategy for marine farms and the movement of organisms should be developed as soon as possible
- At least three submitters noted that a comprehensive and integrated approach is required to fully manage biosecurity risks both to marine farms and from marine farms on the surrounding environment, and that having both biosecurity management plans and a complete 'Domestic Marine Pathway Management Plan' is the only way to achieve this

Most submitters who supported requiring biosecurity management plans under the NESMA also supported the need for a nationally consistent approach to marine farm biosecurity. Submitters raised the need for national strategy, that any tool should support and strengthen the more comprehensive mechanisms provided under the Biosecurity Act 1993, and the need for flexibility to add matters unique to specific locations to any plan.

3.2 Submissions in opposition

Six submitters opposed requiring biosecurity management plans under an NESMA. Submitters were concerned that:

- the cost and time demands of preparing biosecurity management plans would be too great on marine farmers
- provisions already exist for marine farm biosecurity and that these could be strengthened under existing regimes, rather than being included in an NESMA
- no good arguments are advanced that changes to the resource consent process will enhance biosecurity, and that the proposal ignores the fact that large-scale aggregation of single species under farmed management creates ecological instability and heightened vulnerability to disease and pest organisms. A simpler strategy would be to limit the size and spread of locations for marine farming, to avoid overcrowding in any given area

Marlborough District Council (MDC), Local Government New Zealand (LGNZ) and Kenepuru and Central Sounds Residents Association (KCSRA) each provided detailed submissions in opposition to the proposed NESMA provisions for marine farm biosecurity.

MDC and LGNZ submitted that biosecurity management plans should not be required under the NESMA because:

- The focus on biosecurity matters within the proposed NESMA is very narrow in scope and, by concentrating on marine farms, does not acknowledge all aspects of the area in question (including

protection of the natural marine environment, the sustainable use of resources and all associated aspects of concern to the community)

- Mechanisms available under the Biosecurity Act 1993 (such as regional pest management plans and regional pathway management plans) are more appropriate to manage biosecurity threats at a regional level, as they allow for a broader view of threats, their impacts and appropriate programmes to address those threats
- Threats to aquaculture appear to place the emphasis on plans being developed associated with risks to the farming operation itself (for example, organisms that can affect stock health). The primary role of MDC is the protection of the natural marine environment and sustainable use of natural resources, and placing the assessment and auditing responsibility on councils of stock-protection focussed biosecurity management plans does not seem logical. Industry would be best placed to manage this
- Assessing and subsequent auditing of biosecurity management plans, which is essential to their success, would be a very large undertaking and a new level of service for MDC. The associated costs would not be able to be fully recovered, and the s128 RMA review of consents proposed by the NESMA would create a further cost to MDC
- Due to environmental differences within bays, 'global' biosecurity management plans may not always be possible, and the forecast reduction in council workload in terms of assessment and auditing may therefore not eventuate
- Incomplete buy-in to the requirements of biosecurity management plans will continue under the proposed NESMA, as no auditing system can ensure 100% compliance and would have to be implemented remotely, relying heavily on consent holder self-reporting of implementation.

KCSRA supported the need for a nationally consistent approach to marine farm biosecurity, but submitted that the proposed NESMA was deficient because:

- Biosecurity management has to be implemented at a national level for marine aquaculture, rather than being left up to each regional or district council to interpret requirements, approve plans, implement a biosecurity inspection, auditing and surveillance scheme, and to carry out regular overall reviews of the suitability of any regime
- The measures proposed in the NESMA fall well short of this
- The proposed NESMA lacks clear guidance around independent and accountable auditing and monitoring requirements
- The NESMA is proposing to transfer the implementation and ongoing operational oversight and monitoring responsibility to local government, which is least able (in part for competency and resourcing reasons) to carry it out and has even more opaque governance issues than MPI.

3.3 General feedback on the requirement for biosecurity management plans under the NESMA

Ten submitters provided general comments on the requirement for biosecurity management plans under the NESMA. Seven of these submitters had also expressed either support or opposition to the proposal. Of particular note:

- Environment Southland (ES) was concerned that biosecurity management plans will not achieve a nationally consistent approach to biosecurity management, as they are devolved instruments that are likely to be developed, implemented and managed in a variety of ways around the country. ES considered that there will be unnecessary variation in key elements of the plans, such as equipment and vessel cleaning and the health and movement of stock, that would create duplication of effort for industry, increase costs for regional councils and give rise to a range of inconsistent biosecurity practices on marine farms that would expose the industry to higher risk. ES therefore submitted that minimum standards to mitigate biosecurity risks should be included within the NESMA and supported by a national marine pathway management plan, in order to ensure clear and consistent rules that can be easily and efficiently enforced
- Tasman District Council noted that where a marine biosecurity incursion occurs, immediate response may be required, and that the Biosecurity Act 1993 has more direct powers of surveillance and enforcement which provide for entry, immediate directions to be given for an activity to cease, requirements to manage effects such as removing pests or risk goods such as vessels and lines, and the ability to act on default if the owner does not comply within the time limits specified

- The Paua Industry Council and the New Zealand Rock Lobster Industry Council submitted that some biosecurity measures for aquaculture are best implemented nationally, others regionally or locally, and other at the level of individual marine farms. It is not clear how the 'dual response' noted in the discussion document is intended to operate at national, regional, local and on-farm level, and it is not clear how the Resource Management Act 1991 and the Biosecurity Act 1993 are intended to interact in practice to achieve the required level of risk management

3.4 Other submissions

Eighteen submitters raised concerns about council capability and capacity to implement the biosecurity management plan proposal, including seven regional or unitary authorities[1]. Concerns related to time and cost, but also to the specialist expertise needed to assess and audit biosecurity management plans.

Ten submitters suggested that pathway management plans should either be a component of the approach or should be used instead of the biosecurity management plans proposed under the NESMA. Submitters noted the advantages of adopting a tool that would encompass all users of the marine environment and that would be able to address inter-regional vector movements. A number of these submitters suggested that the most comprehensive approach would be to have both on-farm biosecurity management plans, and regional or national pathway management plans.

Twelve submitters included comment on Aquaculture New Zealand's A+ Sustainable Aquaculture Framework and its approach to managing on-farm biosecurity. Submitters suggested that membership of the programme should be compulsory or that biosecurity management should be supported through Aquaculture New Zealand or similar national organisations that can assist in plan preparation and auditing. Aquaculture New Zealand provided a detailed suggestion for addressing marine farm biosecurity:

- A template biosecurity management plan and a detailed guidance document (including auditing guidance) should be drawn up for each species sector, utilising industry expertise, MPI input and external advice, be peer reviewed by independent external experts with experience in applied aquaculture biosecurity, and then approved by consent authorities
- Once agreed, the requirements of both documents should be incorporated into the A+ programme
- Consent authorities should make A+ membership a consent requirement
- The guidance document would contain sufficient detail that council officers could assess the adequacy of the biosecurity management plans directly
- Inclusion in A+, with membership a consent requirement, would result in both internal self-reporting and external independent auditing
- Marine farming enterprises should re-assess their own risks regularly (i.e. assessing biosecurity management plans against changing biosecurity risks), which could form part of self-reporting
- Included in the guidance material would be a requirement for a thorough review of the biosecurity management plan against a risk profile every 5 years, with justification for either changes or no changes detailed in that year's report against consent conditions provided to the council. The consent authority could then assess the suitability of that review against the guidance documents and seek external advice if necessary

4. Management of marine farm biosecurity

4.1 Significance of the risk

Biosecurity is a set of preventive measures designed to reduce the risk of transmission of pests and infectious diseases. Biosecurity risk is defined as the likelihood of the occurrence of an adverse event and the magnitude of consequences to economic, environment, human health and/or socio-cultural values.

Maintaining good on-farm biosecurity practices can minimise the potential impact of pests and pathogens to farms, sectors, the wider industry and New Zealand's aquatic environment.

Pests and diseases associated with marine aquaculture can have unintended environmental consequences. For example, disease exacerbation and large stock escapes have been recorded from the

[1] Of the 8 major aquaculture regions, only Environment Canterbury and Northland Regional Council did not submit. All of the other major aquaculture regions raised concern about capacity and capability in their submissions, as did West Coast Regional Council.

salmon industry; the spread of *Bonamia ostreae* has the potential to have major ramifications to all of New Zealand's flat oyster populations; and anthropogenic structures, such as those found on aquaculture establishments, serve as hubs for the settlement and transfer of non-indigenous biofouling species.

It is important to note however that marine aquaculture is only one source of biosecurity risk in the marine environment. Other sectors that pose risks include maritime transport (including merchant ships, barges, cruise ships, ferries and water taxis), mining and exploration, commercial fishing, recreation and sport (including customary and recreational fishing) and marine research and education activities (including the use of vessels and scientific equipment in field surveys, and the deliberate movement of equipment or live organisms for experimentation).As well as posing risks to marine biosecurity overall, these activities also pose biosecurity risks to marine aquaculture itself.

4.2 The integrated approach

Management of pathogens, pests, and livestock stress (e.g. biosecurity and animal welfare practices) are essential on-going requirements of all intensive farming systems to ensure long-term sustainability and profitability. Many biosecurity practices have an animal welfare component (e.g. they prevent the spread of disease). Similarly, many good husbandry practices are important for onsite biosecurity (e.g., stressed animals are more likely to succumb to disease, increasing the likelihood of proliferation and spread).

To reduce the risk of introducing pathogens and pests onto a site, there is a need to manage the potential entry points. Given that there are multiple potential pathways and entry points onto a site, application of an individual biosecurity measure in isolation is unlikely to sufficiently manage these risks. On-site biosecurity is reliant on the implementation of a concerted approach via a biosecurity plan.

Given the connectedness of the marine environment and positioning of aquaculture farms in relative proximity (i.e. within the same hydrodynamic zone), any biosecurity measures applied on one farm are likely to only be as effective as those on the surrounding farms and facilities. These facilities include the presence of land-based aquaculture operations and seafood processing plants.

The biosecurity practices of land-based facilities can have far reaching consequences for the aquaculture industry and the marine environment, as they often serve as hubs for the production and dispersal of new stock for farms (e.g., salmon, oysters and mussels) or fisheries (e.g. paua). Effluent treatment is particularly important to mitigate the risks from land-based sites.

4.3 On-farm biosecurity management project

From 2014 to 2017 MPI and Aquaculture New Zealand collaborated on a project to enhance on-farm biosecurity protection for New Zealand's commercial and non-commercial aquaculture (called the On-farm Biosecurity Management Project). The project was divided into three phases:

- Understanding practices, priorities and perceptions (*Managing Biosecurity Risk for Business Benefit: Aquaculture Biosecurity Practices Research*, MPI Technical Paper No: 2016/14)
- Risk profiling and option identification (*Options to Strengthen On-farm Biosecurity Management for Commercial and Non-commercial Aquaculture*, MPI Technical Paper No: 2016/47). Each chapter of the Technical Document identifies a factor, or related factors, that influence on-farm biosecurity and provides options to prevent, reduce or manage the associated pest and disease risks. These risks may be covered by one or several management options, however it is important to note that on-farm biosecurity is a series of measures implemented together rather than one or two measures applied in isolation; and
- Developing tools to manage biological risk (*Aquaculture Biosecurity Handbook: Assisting New Zealand's commercial and non-commercial aquaculture to minimise on-farm biosecurity risk*, MPI July 2016)

The project considered the management of pathways, pathogens/pests and stress levels of stock as ongoing requirements for addressing biosecurity.

The On-farm Biosecurity Management Project provides a good indication of MPI's overall objectives for marine farm biosecurity. Those objectives help inform what marine farm biosecurity national direction could be aimed at managing, and are as follows:

- To provide effective controls points to manage the risk of pest and pathogen transfer onto, within and from the facility[2]
- To manage the risk of pest and pathogen transfer onto, within and from the facility
- To manage the risk of pest and pathogen transfer into areas of higher health status (i.e. disease or pest free areas)
- To ensure the facility biosecurity plan continues to address biosecurity risks effectively and efficiently
- To manage the risk of transferring pests and pathogens onto, within and from the facility via equipment, structures, vehicles and vessels etc
- To ensure contingency plans are developed and understood to minimise the impact of emergency incidents that relate directly or indirectly to facility biosecurity
- To manage the risk of pathogen transfer between different growing cycles of production stock (i.e. to break the disease cycle)
- To manage the risk of feed transferring pests and pathogens onto, within and from the facility
- To manage the risk of feeding exacerbating the impacts of pests and pathogens within the facility
- To prevent disease outbreaks and optimise production by managing stock health and welfare
- To manage the risk of harmful algae transfer onto, within and from marine facilities
- To manage the risk of pest and pathogen transfer onto, within and from the facility via harvesting
- To manage the risks associated with jellyfish
- To manage the risk of pest and pathogen transfer onto, within and from the facility from the production of new species or via introduction of stock and gamete production
- To manage the risk of staff and visitors transferring pests and pathogens onto, within and off the facility
- To manage pest and pathogen establishment and impacts on the facility
- To record all information necessary to support good biosecurity practice in accordance with the facility biosecurity management plan
- To manage the risk of dead or moribund animals transferring pathogens onto, within and from the facility
- To manage the risk of stock transferring pests and pathogens onto, within and off the facility
- To manage the risk of waste materials transferring pests and pathogens onto, within and from the facility
- To manage the risk of wildlife, scavengers and vermin transferring pests and disease onto, within or from the facility
- To manage the risk of pest and pathogen transfer between different production populations (e.g. year classes)

MPI Technical Paper 2016/47 sets out a series of options for managing biosecurity risks on marine farms and land-based facilities to achieve these objectives, grouped by subject matter. Each of the sections in MPI Technical Paper 2016/47 can be broadly categorised as either an activity that poses a biosecurity risk, or a management tool or technique to reduce biosecurity risks. As noted above, an integrated approach is needed to effectively manage biosecurity risks, i.e. across both biosecurity and animal welfare practices. Table 4-1 and Table 4-2 provide an outline of the matters identified in MPI Technical Paper 2016/47 in order to provide a basis for assessing the national direction tools available under the Biosecurity Act 1993 and the RMA.

[2] In the context of this report, 'facility' refers to a marine farm.

Table 4-1: MPI Technical Paper 2016/47 source of biosecurity risk for national direction

Biosecurity matters	Comment	Potential significance of biosecurity risk
Identification of biosecurity hazards (to the industry)	Identifies pathogens, pests and pathways for New Zealand aquaculture	Illustrative of the difficulty of identifying the 'next' pest or pathogen impacting industry and highlights the benefits of the preventive approach
Biofouling (shellfish)	Implications for: • Costs of biofouling control • Production effects from non-indigenous biofouling organisms • Facilitating spread of pathogens harboured by biofouling organisms • Establishment and transfer of biofouling species through aquaculture activities • Restriction of water exchange • Increased disease risk • Deformation of cages and structures	
Biofouling (finfish)	Implications for: • Costs of biofouling control • Production effects from non-indigenous biofouling organisms • Facilitating spread of pathogens harboured by biofouling organisms • Establishment and transfer of biofouling species through aquaculture activities • Physical damage of stock • Mechanical interference of stock • Competition between fouling species and stock • Increased disease risk • Deformation and maintenance of infrastructure	
Feeds and feeding	Diet and feeding can affect susceptibility to infectious and non-infectious diseases Can introduce pests and pathogens onsite Poor storage can lead to bacterial or fungal growth	Animal based feed that has not been adequately treated provides a pathway for disease entry.
Harvest (finfish)	Harvesting of farmed fish may spread disease Risks associated with fish transport and movement of contaminated equipment and personnel Harvest and processing sites as hubs for widespread infection	

Biosecurity matters	Comment	Potential significance of biosecurity risk
Harvest (shellfish)	Harvesting of shellfish may spread disease (through dead or moribund shellfish) Risks associated with stock transport and movement of contaminated equipment and personnel Removal of biofouling during harvesting can contribute to subsequent fouling problems in the environment	
New species	Import of new organisms is controlled by the Hazardous Substances and New Organisms Act 1996	
Removal and disposal of dead and moribund stock	Dead and moribund stock are a source of disease, but can also attract predators and represent a source of waste in the environment if not addressed	
Stock containment	Escaped stock perceived as a threat to other farmed and wild populations, and as a source of re-infection of open ocean sites following fallowing	
Stock origin	Hatcheries often act as hubs for infection Wildcaught broodstock can be sources of infections A particular challenge in terms of management for the shellfish industry where spat is regularly sourced from areas away from the final growing region and the industry is heavily dependent on moving spat for its viability	Big Glory Bay an example where broodstock are in the same zone as smolt and on-growing salmon highlights the importance of separation to break disease cycles
Stock transfer	Movement of stock is recognised as an important risk factor in the spread of pests and disease See comment above in relation to stock origin	
Waste management	Effective waste management is critical to good water quality, which is critical to aquaculture production – and also has consequences for pest and disease management	Practices that return viable fouling organisms removed from the structures into the environment may contribute to subsequent fouling problems.
Water treatment	Relevant to land-based facilities only Facilities that do not treat their effluent have wider ramifications to open water facilities within the same hydrodynamic zone and thus wider Facilities that do not treat their inflow have potential to spread pests and disease to multiple receiving environments with the movement of stock	Wider implications for both pest and disease spread both from untreated water and stock entering environment. Effluent from live holding and processing facilities also pose a risk.

Biosecurity matters	Comment	Potential significance of biosecurity risk
Wildlife management	Wildlife exposure can result in, stress, disease, equipment damage and stock escape	
Harmful algal blooms (marine)	Effects on stock (and food safety) from harmful algal blooms Movement of harmful algal bloom (HAB) exposed shellfish as a source of HAB spread	HABs may have potential for environmental effects if spread
Jellyfish	Stock losses and effects on stock health	Aquaculture and other marine structures may provide favourable habitat for the benthic stages of jellyfish. Some jellyfish blooms can have wider environmental effects

The last two risks identified in Table 4-1 may be affected to an extent by marine aquaculture but also arise entirely independently of aquaculture activities.

Table 4-2: MPI Technical Paper 2016/47 management tools or techniques for national direction

Biosecurity tool/technique	Comment	Potential significance
Biosecurity (general) Integrated approach to biosecurity	Provides a general summary of the desirable overall approach to management of biosecurity	Integrated approach to biosecurity underpins all national direction tools, that is, these management processes should be based on a number of integrated measures rather than isolated measures
Area based management	Targeted at disease establishment and spread, and managing risks posed by pathogens and parasites present in the environment. Outlines options in respect of: • Synchronisation of biosecurity practices • Movements within an area-based management scheme • Movements between area-based management schemes • Placement of broodstock sites	Level of residual risk is based on uptake of area based management and communication. Area based biosecurity is only as good as the 'weakest link' in the chain. Needs buy in from all members within the management area, including land-based facilities and processing facilities. Also needs to consider the types of farms within the area, for example whether broodstock, smolt and on-growing farms are all based within the area.
Auditing	Compliance and verification	Voluntary biosecurity measures tend not to be taken up by all farms. Whether biosecurity plans are voluntary or mandatory, third party auditing should be mandatory
Cleaning and disinfection	Pathogen risk reduction and disease control Risk minimisation within and between sites	Movements of staff, equipment and infrastructure between sites should be avoided unless certified cleaned and disinfected.

Biosecurity tool/technique	Comment	Potential significance
Contingency plans	Recommended as part of standard on-farm biosecurity plans	Not being prepared for incursion (pest or disease) puts neighbouring sites/areas at risk
Facility design and structures	Aim is to create the best (least stressful) stock rearing conditions possible Choice of facility materials influence cleaning and disinfection practices Positioning may limit parasite spread and exacerbation	
Fallowing	Aim is to reduce the probability of transferring infection to the next production generation and/or the neighbouring populations Fallowing has environmental advantages as well, but those are not the focus of the biosecurity paper Obtaining enough water space to allow for fallowing of finfish sites has been and continues to be a significant challenge for the industry	On-site prevention, and area based prevention (synchronised fallowing) assists with between area prevention of disease.
Good husbandry	Aimed to prevent the exacerbation, establishment and spread of clinical disease (infectious) and occurrence of non-infectious disease	Biosecurity and good husbandry go hand in hand
HACCP (Hazard Analysis Critical Control Point) procedures	Science based risk management approach traditionally used to enhance food safety	A preventive tool to assess hazards and establish control systems rather than relying on reactive measures.
On-site management of staff and visitors	Potential for pathogen transfer through staff or visiting personnel (although direct evidence is scarce)	Cleaning and disinfection of staff and equipment associated with staff
Preventive practices (surveillance and vaccinations)	Routine monitoring and recording of stock, facility structures and equipment, active sampling and site visits by independent qualified personnel Passive surveillance should be a standard practice for both biosecurity and animal welfare	Early detection of pests and diseases is facilitated by an active health surveillance programme which enables the mounting of rapid response
Reactive measures	Use of veterinary medicines to address disease outbreaks Reduction of pathogens in environment	In finfish culture, treatment can reduce the risk of a wider disease outbreak by reducing the level of pathogenic organisms in the environment.

Biosecurity tool/technique	Comment	Potential significance
Record keeping	Underpins biosecurity planning. Should be mandatory and auditable by independent party	Allows for recognition of conditions that exacerbate pest or disease outbreaks. Allows trace-back in the event of pest or disease outbreak.
Site location	A successful site is based on its ability to provide conditions appropriate for the growth and welfare (including biosecurity) of the species to be farmed	Site proximity affects transfer between sites – ideally should be subject to management through area based management and synchronised practices
Year class separation	Method used to prevent or reduce horizontal disease transmission, in combination with fallowing See comment in fallowing concerning the challenge of obtaining sufficient space to allow year class separation to occur.	Used to prevent or break disease cycle

5. Goals for marine farm biosecurity national direction

The goals for any tool developed need to be considered in order to choose an appropriate tool. To date the following goals have been suggested for marine farm biosecurity national direction:

- That the tool is compulsory to prepare
- That it is enforceable, in order to achieve 100% implementation
- That it is comprehensive – i.e. that it covers all matters in the MPI Biosecurity Technical Paper and that it covers all aquaculture species
- That both the role of marine farms and marine farming as vectors, and the effects of activities on marine farms and marine farming can be addressed
- That industry will implement the tool, and monitor whether the objectives specified in that tool have been achieved, and that such monitoring will be verified through an independent auditing process
- That the tool is capable of addressing both currently known diseases, pests and unwanted organisms, and the 'next threat'

These goals have been used for the analysis contained in this report, but are likely to be subject to further refinement.

6. Tools available to manage marine farm biosecurity

6.1 Biosecurity Act 1993

The Biosecurity Act 1993 provides a series of tools for the internal management of biosecurity in New Zealand, contained in Parts 5 and 5A.[3] The purpose of these tools is to:

[3] There are a number of other tools, such as import health standards, craft risk management standards and border controls provided for under the Biosecurity Act 1993 to manage the import of pests and diseases to New Zealand.

- Part 5: provide for the eradication or effective management of harmful organisms that are present in New Zealand by providing for –

  (a) the development of effective and efficient instruments and measures that prevent, reduce, or eliminate the adverse effects of harmful organisms on economic wellbeing, the environment, human health, enjoyment of the natural environment, and the relationship between Māori, their culture, and their traditions and their ancestral lands, waters, sites, wāhi tapu, and taonga; and

  (b) the appropriate distribution of costs associated with the instruments and measures.

- Part 5A: provide a framework that enables government and industry to work together in partnership to achieve the best possible outcomes from readiness or response activities by –

  (a) making joint decisions on activities; and

  (b) jointly funding the costs of the activities in shares that take into account the public benefits and industry benefits that the activities deliver.

Tools available under Parts 5 and 5A of the BSA are:

- Part 5:
  - National policy direction
  - National and regional pest management plans
  - National and regional pathway management plans
  - Small-scale management plans
- Part 5A:
  - Government/industry agreements

Other tools are also provided through the BSA (including for example, controlled area notices and unwanted organism declarations) but these relate more to specific responses to specific harmful organisms and so are not considered further in this report.

6.1.1 National policy direction

Sections 56-58 of the Biosecurity Act 1993 set out the provisions relating to national direction. A national policy direction must be made by the Minister responsible for the Biosecurity Act (currently the Minister for Primary Industries), and its purpose is to ensure that activities under Part 5 of the Biosecurity Act provide the best use of available resources for New Zealand's best interests, and align with one another (where necessary) to contribute to the achievement of the purpose of the Biosecurity Act.

Section 54(5) of the Biosecurity Act notes that the national policy direction may include directions on:

(a) the process for making plans or small-scale management programmes;

(b) the content of plans or small-scale management programmes;

(c) any other matter that the responsible Minister considers necessary.

National Policy Direction for Pest Management 2015

The National Policy Direction for Pest Management 2015 was approved by the Governor-General on 17 August 2015. It clarifies the requirements for Biosecurity Act 1993 Part 5 regulatory instruments and ensures consistent application of these requirements nationally and between regions (as appropriate). It provides directions on:

- *setting objectives in pest management plans, pathway management plans and small-scale management programmes*
- *programmes that must be included in pest management plans or pathway management plans (e.g. exclusion programmes, sustained control programmes)*
- *analysing benefits and costs of pest management plans and pathway management plans*
- *proposed allocation of costs for pest and pathway management plans*
- *good neighbour rules in regional pest management plans*

- *timing of inconsistency determinations in relation to whether a pest management plan or pathway management plan is inconsistent with the national policy direction*

The National Policy Direction for Pest Management 2015 therefore contains information as provided for by sections 54(5)(a) and (b) of the Biosecurity Act. At the time that it was prepared, no 'other matters' were considered to be necessary to include.

Section 54(5)(c) of the Biosecurity Act gives the Minister power to include directions in the national policy direction on 'any other matter'. In relation to marine farm biosecurity, the Minister could include directions requiring the preparation, implementation and monitoring of national or regional pest or pathway management plans that are concerned solely with marine farm biosecurity. In relation to this, Section 6.1.3 of this report should be considered in terms of the ability of national or regional pest or pathway management plans to address all matters of concern for marine farm biosecurity as outlined in Table 4-1.

Table 6-1 assesses the national policy direction against the goals for marine farm biosecurity national direction contained in Section 0.

Table 6-1: Assessment of national policy direction

Goal	Assessment
Compulsory to prepare	Yes
Enforceable	Essentially – national and regional pest and pathway management plans must not be inconsistent with the national policy direction, and the Minister and regional councils cannot approve a pest or pathway management plan if it is inconsistent
Comprehensive	Partially – restricted to the matters that can be addressed by pest or pathway management plans
Addresses marine farms as vectors and as affected enterprises	Partially – will not address management of the 'next threat', if that cannot be managed by a pathway management plan (see discussion in section 6.1.3 of this report)
Industry implementation and monitoring	Not the purpose of the tool, but may be achieved in compliance with other tools
Independent auditing	Not the purpose of the tool, but may be achieved in compliance with other tools
Council enforcement	Not the purpose of the tool, but may be achieved in compliance with other tools

6.1.2 National and regional pest management plans

Sections 59 – 78 of the Biosecurity Act 1993 set out the provisions relating to national and regional pest management plans. Both national and regional pest management plans require, as a first step, that a proposal be made to prepare a plan – by:

- the Minister in the case of a national pest management plan or
- a council in the case of a regional pest management plan (or, in both cases by a person who submits a proposal to the Minister or a council).

It is therefore not mandatory under the Biosecurity Act 1993 to prepare national or regional pest management plans.

A pest management plan must specify the following matters:

- the pest or pests to be eradicated or managed
- the plan's objectives
- the principal measures to be taken to achieve the objectives
- the means by which the achievement of the plan's objectives will be monitored or measured
- the sources of funding for the implementation of the plan
- the limitations, if any, on how the funds collected from those sources may be used to implement the plan

- the powers in Part 6 [of the Biosecurity Act 1993) to be used to implement the plan
- the rules, if any
- the rules, if any, that are good neighbour rules (for regional pest management plans)
- the management agency
- the actions that local authorities may take to implement the plan, including contributing towards the costs of implementation
- the parts of the EEZ to which the plan applies, if it applies to parts, or the fact that it applies to the whole EEZ, if it does (for national pest management plans)
- the portions of road, if any, adjoining land covered by the plan and, as authorised by section 6, also covered by the plan
- the plan's commencement date and termination date
- any matters required by the national policy direction.

Sections 64(5) and 73(5) specify a wide range of matters for which a pest management plan may include rules, including for example requiring the occupier of a place to take specific actions to eradicate or manage a pest, and requiring the occupier of a place to carry out specific procedures to assist in preventing the spread of a pest.

Appeal rights to the Environment Court exist for regional pest management plans.

All eight of the major aquaculture regions have either a regional pest management strategy (the previous requirement under the Biosecurity Act 1993) or a regional pest management plan, however the majority of the regional pest management plans don't specifically identify marine pests.[4] The exceptions are Northland and Southland, which have full sections in their current pest management strategies on marine pests.

Regional Pest Management Strategy for Southland

Environment Southland has designated nine marine organisms as pests in its Regional Pest Management Strategy. Eight of the marine pests (Asian clam, Caulerpa seaweed, Chinese mitten crab, European shore crab, Mediterranean fan worm, Northern Pacific seastar, and two sea squirts (Styela clava and Didemnum vexillum) have been classified as exclusion pests, as they are not known to occur in Southland. Undaria is classified as a containment pest, as it is already present in the region.

Rules in the pest management strategy for exclusion and containment marine pests typically require that:

- *No person shall possess, sell, offer for sale, propagate, transport or release the organism into or within the Southland region*
- *The person in charge of any vehicle used to transport persons or equipment is responsible for ensuring no live individuals of the organism are present on or within the vehicle prior to arrival in the Southland region*
- *Every person who sees the organism or suspects that it is present in Southland must report it immediately to Environment Southland*

A breach of the rules, without reasonable excuse, is an offence under section 154(r) of the Biosecurity Act 1993.

Where pest management plans exist that specifically identify marine pests they can be used to control the spread or introduction of marine pests from one part of the country to another. Provisions under sections 64(5) and 73(5) of the Biosecurity Act 1993 would allow rules to be set requiring specific procedures to be undertaken, and providing the enforcement provisions of the Biosecurity Act 1993 to ensure compliance. These rules could be included in a national pest management plan to ensure consistency across all eight major aquaculture regions. Pest management plans do however have to be targeted towards a particular pest organism or class of organisms. They are therefore not as adept at responding to the 'next threat' as some other tools.

[4] This is likely to be as a result of the requirements of sections 71 and 74 of the Biosecurity Act 1993, which require the council to be satisfied on a number of matters before including a particular pest in a pest management strategy – including the costs and benefits of the proposal.

Table 6-2 assesses national and regional pest management plans against the goals for marine farm biosecurity national direction contained in Section 0.

Table 6-2: Assessment of national and regional pest management plans

Goal	Assessment
Compulsory to prepare	No
Enforceable	Yes
Comprehensive	Partially – deal most effectively with known pests, so potentially not effective at addressing 'next threat' and don't address disease risk
Addresses marine farms as vectors and as affected enterprises	Yes
Industry implementation and monitoring	Industry are one of a number of groups responsible
Independent auditing	Not the purpose of the tool
Council enforcement	Yes (for regional pest management plans)

6.1.3 National and regional pathway management plans

Sections 79 – 98 of the Biosecurity Act 1993 set out the provisions relating to national and regional pathway management plans. Both national and regional pathway management plans require, as a first step, that a proposal be made to prepare a plan – by the Minister in the case of a national pathway management plan or a council in the case of a regional pathway management plan (or, in both cases by a person who submits a proposal to the Minister or a council). It is therefore not mandatory under the Biosecurity Act 1993 to prepare national or regional pathway management plans.

A pathway management plan must specify identical matters to a pest management plan (see Section 6.1.2 of this report), except that the plan is focused on pathways instead of specific pests. 'Pathway' is defined in the Biosecurity Act 1993 as meaning:

'…movement that –

(a) is of goods or craft out of, into, or through –

(i) a particular place in New Zealand; or

(ii) a particular kind of place in New Zealand; and

(b) has the potential to spread harmful organisms'

'Goods' are defined as *'all kinds of moveable personal property'*.

As with national and regional pest management plans, sections 84(5) and 94(5) of the Biosecurity Act 1993 specify a wide range of matters for which a pathway management plan may include rules, including for example requiring the occupier of a place to take specific actions to eradicate or manage a pest, and requiring the occupier of a place to carry out specific procedures to assist in preventing the spread of a pest.

Appeal rights to the Environment Court exist for regional pathway management plans.

In 2013 the Ministry for Primary Industries commissioned NIWA and the Cawthron Institute to undertake a review of practical measures for reducing the spread of potentially harmful marine organisms via human transport pathways within New Zealand, and policy options for promoting the implementation of risk reduction measures. The work identified five 'modes of infection' or pathways relevant to aquaculture: bilge, hull fouling, gear, livestock and bait and structures, and contained preliminary recommendations that the tools outlined in Table 6-3 be considered for each pathway. Tools were recommended across all the sector pathways considered in the work, and so may be broader than if only aquaculture had been considered.

Table 6-3: Aquaculture pathways and preliminary recommendations for management tools[5]

Pathway	Management tool
Bilge and retained water[6]	National pathway management plan Code or practice Deed of agreement between domestic maritime transport sector and MPI Regional coastal plans and resource consents[7] Preliminary recommendations: • promote good management practices for the discharge and/or treatment of bilge through Codes of Practice • consider prohibition on the discharge of bilge in specified high value areas in national or regional pathway management plans (with exceptions to allow for discharges to maintain the safe operation of the vessel)
Hull fouling	*Passive discharges of reproductive or other viable organic material (from simple presence on hulls)* • Movement restrictions through resource consents for the movement of heavily fouled vessels[8] • Control of vessel movement under the Biosecurity Act 1993 • Rules in regional coastal plans requiring heavily fouled vessels to have remedial treatment[9] or implementation of an approved biofouling management plan or report intentions to visit specified high value areas • Pathway management plan requiring heavily fouled vessels to have remedial treatment or implementation of an approved biofouling management plan or report intentions to visit specified high value areas • Clean hull codes of practice Preliminary recommendations: • Implement requirements for biofouling management plans, intentions reporting and movement restrictions – report does not provide a recommendation as to whether this should be through regional coastal plans, resource consents or pathway management plans *Intentional removal through hull cleaning* Preliminary recommendations: • Pathway management plans • In water cleaning requires consent under Resource Management (Marine Pollution) Regulations 1998 – either obtain consent, or adjust the Marine Pollution regulations

[5] Source: *Managing the Domestic Spread of Harmful Marine Organisms, Part B: Statutory Framework and Analysis of options*, Cawthron Institute, Report No. 2442, 22 November 2013

[6] Bilge and retained water refers to any seawater that accumulates within the hull of a vessel; including in the engine room of larger vessels and in the bilge sumps of smaller vessels; seawater contained in or on the vessel; and uncontained water on the deck area of a vessel, including in gear storage areas.

[7] Note that the Cawthron report suggests that under section 15 of the RMA, discharge of bilge would appear to require a resource consent or authorisation in a regional coastal plan. However, the Resource Management (Marine Pollution) Regulations 1998 cover discharges made as part of normal operations of ships and prevent regional rules being included or resource consents being granted for these discharges.

[8] In order to implement this option, either regional councils would have to include rules in regional coastal plans controlling the movement of vessels in the coastal marine area (the jurisdiction for which is provided by section 30(d)(vii)) or central government would have to allow the activity (either as a permitted activity or by specifying that resource consent is required) in a national environmental standard.

[9] In order to implement this option, regional councils would have to include rules in regional coastal plans controlling the movement of vessels in the coastal marine area (the jurisdiction for which is provided by section 30(d)(vii)).

Pathway	Management tool
Gear (needs an integrated approach with livestock and structures pathways)	Codes of practice Pathway management plan Preliminary recommendations: • Codes of practice, supported by regulatory restrictions on movement of heavily fouled gear
Livestock (needs an integrated approach with gear and structures pathways)	• Pathway management plan to regulate the movement of livestock, although generic restrictions considered to be highly disruptive and costly to the seafood sector • Certification of biosecurity practices for wild spat collection, although further information is needed on nature of operations, existing practices to reduce biosecurity risk and potential for additional measures • Requiring record-keeping of transfers of livestock under the Fisheries Act 1996 • Codes of practice for stock transfer Preliminary recommendations: • Improved record-keeping • Industry codes of practice • Biosecurity certification (potentially)
Structures (needs an integrated approach with gear and livestock pathways)	• Resource consent conditions requiring new structures to be constructed from new or sterilised materials • Guidance and codes of practice • Resource consent conditions to restrict the movement of structures (could be imposed on occupation consents potentially), probably requiring a risk assessment to be undertaken • Pathway management plan to restrict movement of structures • Voluntary measures (e.g. awareness campaigns) Preliminary recommendations: • Conditions on resource consents • Codes of practice and public awareness campaigns

While not all of the pathways are therefore currently recommended for pathway management plans, they have all been identified as suitable for pathway management.

Two marine pathway management plans have been prepared to date – the Fiordland Marine Regional Pathway Management Plan, and the 'Marine' chapter of the Northland Regional Pest and Marine Pathway Management Plan 2017-2027.

Fiordland Marine Regional Pathway Management Plan

The purpose of the Fiordland Marine Regional Pathway Management Plan is to minimise the risk of marine pests being transported into the area within one nautical mile of the landward boundary of the Fiordland Marine Area, by addressing the threat of them being transported into the area by vessels.

The key known organisms to be excluded are Undaria, two sea squirts (Styela clava and Didemnum vexillum), Mediterranean fanworm, Asian paddle crab, shallow water tunicate, and droplet tunicate.

Principle measures outlined in the plan are:

(a) implementing clean hull, clean gear and residual seawater standards, and bilge water procedures;

(b) requiring the owner or person in charge of a vessel entering or operating within the area within one nautical mile of the landward boundary of the Fiordland Marine Area to hold a Fiordland Clean Vessel Pass to assist with vessel operator knowledge and identifying higher-risk vessels;

(c) implementing a communication plan to ensure that owners or persons in charge of vessels entering the area within one nautical mile of the landward boundary of the Fiordland Marine Area understand the rules and the reasons for them;

(d) monthly hull inspections at Bluff to assist with vessel operator knowledge and identifying high-risk vessels; and

(e) a compliance and enforcement programme to ensure that non-compliant vessels are identified and corrective action is taken.

The Fiordland Marine Regional Pathway Management Plan contains three rules:

- *Rule 1: requiring the owner or person in charge of a vessel to hold a current Fiordland Clean Vessel Pass (passes are only valid for a period of one year);*
- *Rule 2: requiring the owner or person in charge of a vessel to comply with defined clean hull, clean gear and residual seawater standards;*
- *Rule 3: requiring the owner or person in charge of a vessel to keep records of the actions taken to comply with Rule 2, and provide those records on request.*

Failure to comply with any of these rules creates an offence under section 154N(19) of the Biosecurity Act 1993.

The Fiordland Marine Regional Pathway Management Plan cost $420,000 to develop, and has an annual budget of approximately $140,000 to implement.

Northland Regional Pest and Marine Pathway Management Plan 2017-2027

The Northland Regional Pest and Marine Pathway Management Plan notes that biofouling on the hulls of moored, anchored or berthed vessels is widely regarded as an important contributor to the spread and establishment of marine pests. Both recreational and commercial vessels have the potential to transport marine pests as hull biofouling. With Northland being highly connected to other regions of New Zealand through the movement of both commercial and recreational vessels, it is likely that new species will continue to be introduced unless effective management systems are put in place. Vessel hull biofouling has been implicated in incursions of the marine pests Sabella spallanzanii (Mediterranean fanworm) and Styela clava (a sea squirt) in Northland.

The objective of the Northland Marine Pathway Plan is to prevent the introduction of new marine pests into Northland and the slow the spread of established marine pests within the region.

It does this by managing vessel movement.

Principle measures outlined in the plan are:

(a) a requirement to act – whereby the person in charge of a vessel is required to ensure there are no pest species or unwanted organisms present on the hull, and that fouling meets the requirements of the Marine Pathway Plan

(b) a Council survey and enforcement work programme

(c) Council funding of surveillance and education activities, and provision of tools and best practice guidelines to manage hull fouling

(d) an advocacy and education programme.

The Northland Marine Pathway Management Plan contains two rules:

- *Rule 10.1.1: requiring that the owner or person in charge of a craft entering Northland must ensure that the fouling on the hull and niche areas of the craft does not exceed 'light fouling';*
- *Rule 10.1.2: requiring that the owner or person in charge of a craft moving from one designated 'place' and entering a separate designated 'place' must ensure that the fouling on the hull and niche areas of the craft does not exceed 'light fouling' (although travelling for the purpose of a haul out within 24 hours of arrival is exempted from this rule)*

Northland Regional Council has designated harbours and popular anchorages around the region as 'places' for the purpose of giving effect to Rule 10.1.2.

Failure to comply with either of these rules creates an offence under section 154N(19) of the Biosecurity Act 1993.

The Northland Marine Pathway Management Plan is therefore much more widely applicable than the Fiordland Plan, but is not as comprehensive in terms of the matters it addresses, nor as clearly and simply enforceable as the Fiordland approach.

As the Northland Marine Pathway Management Plan forms part of the overall Northland Regional Pathway Management Plan it is not possible to determine the cost or preparing it., The Marine Pathway Management Plan has an annual budget of $500,000 to implement.

It is important to note however, that there are some biosecurity risks posed by marine farms that cannot be managed by pathway management, such as stock containment and interactions with wild stock, marine mammals and birds.

Table 6-4 assesses national and regional pathway management plans against the goals for marine farm biosecurity national direction contained in Section 0.

Table 6-4: Assessment of national and regional pathway management plans

Goal	Assessment
Compulsory to prepare	No
Enforceable	Yes
Comprehensive	No – restricted to 'pathways'
Addresses marine farms as vectors and as affected enterprises	Partially – will address marine farms as vectors in relation to movement of goods or craft, and can therefore address management of the 'next threat' as specific pest species do not have to be identified. Also addresses effects on marine farms that are not the initiator of craft or goods movement. Doesn't address biosecurity risks not associated with movement of goods or craft (see section 4.2).
Industry implementation and monitoring	Implementation – industry and Government/council Monitoring – Government/council
Independent auditing	Not the purpose of the tool
Council enforcement	Yes (for regional pathway management plans)

6.1.4 Small-scale management plans

Section 100V of the Biosecurity Act 1993 allows regional councils to declare small-scale management programmes, which consist of small-scale measures to eradicate or control an unwanted organism. Programmes are targeted to specific unwanted organisms (for example, several small-scale management programmes exist around the country for the Mediterranean fanworm *Sabella spallanzanii*) and are short-term measures. They are therefore not suitable for the long term management of marine farm biosecurity that the national direction programme is attempting to address.

6.1.5 Controlled area notices

Section 131 of the Biosecurity Act 1993 provides for the imposition of Controlled Area Notices (CANs). While CANs are most commonly used to impose movement controls to reduce the effect of a disease or pest outbreak, section 131(1)(c) does enable movement controls to be instituted to *protect any area from the incursion of pests or unwanted organisms*. On balance it is considered unlikely that CANs would be used in a long term way to protect areas from biosecurity risks, and so they are not considered further in this report.

6.1.6 Government-industry agreements

Sections 100X to 100ZH of the Biosecurity Act 1993 provide for Government/industry agreements, and set out a framework that enables government and industry to work together to achieve the best possible

outcomes from readiness or response activities by making joint decisions on activities, and jointly funding the costs of activities.

Under section 100Z of the Biosecurity Act 1993, Government/industry agreements may include provisions on one or more of the following matters:

(a) the unwanted organisms against which the parties wish to undertake readiness or response activities;

(b) readiness or response activities that the parties have agreed to undertake;

(c) joint decision-making on the readiness or response activities that the parties wish to undertake;

(d) the sharing of the costs of the readiness or response activities;

(e) variation of compensation provisions under section 162A of the Biosecurity Act 1993;

(f) how the parties will engage on issues relating to parts of the biosecurity system other than readiness or response activities;

(g) any other matter that the parties agree on.

Readiness and response activities are both defined (in section 100Y) as relating to unwanted organisms. Deed signatories negotiate and agree the priority pests and diseases of most concern to them, and agree actions to minimise the risk and impact of an incursion, or prepare for and manage a response in the event that an incursion occurs. Operational agreements entered into to date have therefore focused on specific pests, rather than biosecurity management in general.

Seventeen industry organisations have signed the GIA Deed with the Government to date, primarily horticultural organisations (such as Kiwifruit Vine Health and New Zealand Apples and Pears), although two meat sector organisations and the Dairy Companies Association of NZ are also signatories. Three operational agreements have been signed to date – one for fruit fly (May 2016), one for four common biosecurity threats to the kiwifruit and kiwiberry sectors (March 2017)[10], and one for brown marmorated stink bug (July 2017).

Brown Marmorated Stink Bug (BMSB) Operational Agreement Summary

The Operational Agreement covers specific biosecurity readiness and response activities for the Brown Marmorated Stink Bug. The outcomes sought are that the signatories work together to achieve the following:

- *Maintaining and enhancing on-going public, importer, and tourist awareness campaigns;*
- *Successfully and rapidly detecting BMSB post border, eradicating any population(s) before BMSB can establish, and reducing the spread and establishment potential or any populations detected;*
- *Continuing to develop and improve readiness and response plans including targeted research and development activities that will measurably improve the ability to respond to a BMSB incursion;*
- *Planning to reduce the impact of a BMSB incursion on production, processing and sales;*
- *Developing transition plans and funding arrangements for long-term management of BMSB;*
- *Enhancing the integrity and effectiveness of New Zealand's wider biosecurity system, and enhancing the social license for BMSB response activities.*

In 2015, Aquaculture New Zealand notified its levy-payers that feedback was required on whether AQNZ should sign the GIA Deed on behalf of the aquaculture sector. In April 2016 AQNZ prepared a GIA analysis document to help inform its members. The analysis identified potential risk pathways, and a number of pathogens and pests of particular concern, and also noted a number of strategic biosecurity interests that a GIA may help to pursue:

- Better marine pathway management and tools
- Improved strategic national biosecurity planning and management of the aquatic resource
- Wider marine surveillance for pests and pathogens
- Generic and agreed response systems, actions and triggers

[10] *Ceratocystis fimbriata*, Verticillium wilt, Psa-nonNZ strains and Invasive Phytophthoras.

- Improvements in responsiveness and preventive/reactive actions, with advantages for overseas markets
- Research on external potential risks and whether they do represent a risk to New Zealand or otherwise.

No further information is available online about potential progress with AQNZ signature on the GIA Deed, although it is anticipated that progress has been made since 2015 and this will continue to be investigated.

Table 6-5 assesses Government/industry agreements against the goals for marine farm biosecurity national direction contained in Section 0.

Table 6-5: Assessment of Government/industry agreements

Goal	Assessment
Compulsory to prepare	No
Enforceable	?
Comprehensive	No – relates only to identified unwanted organisms
Addresses marine farms as vectors and as affected enterprises	Yes
Industry implementation and monitoring	Yes
Independent auditing	No
Council enforcement	Not relevant to this tool

6.1.7 Summary

A variety of different tools for marine farm biosecurity management exist under the Biosecurity Act 1993, but none of them achieve all of the goals identified in Section 4.2 of this report. Of particular note, of all of the tools, only national policy direction is compulsory to prepare, and it is relatively poorly suited to addressing the majority of the other goals identified for marine farm biosecurity.

6.2 Resource Management Act 1991

The RMA identifies a series of tools for giving effect to the sustainable management purpose of the Act. Under section 5 of the RMA sustainable management is defined as:

'…managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while –

(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and

(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.'

Tools available under the Resource Management Act 1991 to manage marine farm biosecurity include national policy statements (including the New Zealand Coastal Policy Statement 2010), national environmental standards, regional policy statements and regional plans, and resource consents. In relation to marine farm biosecurity these tools are developed and implemented by the Minister for the Environment, the Minister of Conservation, regional councils or the five unitary authorities with responsibility for the coastal marine area in Auckland, Tasman, Nelson, Marlborough and Gisborne. Functions, powers and duties are outlined under section 24 (Minister for the Environment), section 28 (Minister of Conservation), and section 30 (regional councils and unitary authorities). Biosecurity is not mentioned as a specific function of any of these parties, and does not otherwise appear in the Resource Management Act 1991 (which is unsurprising based on the enactment two years later of the Biosecurity Act 1993).

6.2.1 National Policy Statements

The purpose of a national policy statement (section 45 RMA) is to state objectives and policies for matters of national significance that are relevant to achieving the purpose of the Act. A national policy statement can state matters that local authorities are required to achieve or provide for in policy statements or plans.

The purpose of a New Zealand coastal policy statement (section 56 RMA) is to state objectives and policies in order to achieve the purpose of the Act in relation to the coastal environment of New Zealand. Section 57 of the Resource Management Act 1991 states that there shall at all times be at least one New Zealand Coastal Policy Statement. A New Zealand coastal policy statement can state objectives and policies about activities involving the subdivision, use, or development of areas of the coastal environment, which would include marine farming and marine farms.

New Zealand Coastal Policy Statement 2010 – Policy 12

Policy 12 of the NZCPS 2010 relates to 'harmful aquatic organisms' and states as follows:

1. *Provide in regional policy statements and in plans, as far as practicable, for the control of activities in or near the coastal marine area that could have adverse effects on the coastal environment by causing harmful aquatic organisms to be released or otherwise spread, and include conditions in resource consents, where relevant, to assist with managing the risk of such effects occurring.*
2. *Recognise that activities relevant to (1) include:*
    a. *the introduction of structures likely to be contaminated with harmful aquatic organisms;*
    b. *the discharge or disposal of organic material from dredging, or from vessels and structures, whether during maintenance, cleaning or otherwise; and whether in the coastal marine area or on land;*
    c. *the provision and ongoing maintenance of moorings, marine berths, jetties and wharves; and*
    d. *the establishment and relocation of equipment and stock required for or associated with aquaculture.*

While guidance is available on the DOC website for a number of policies in the NZCPS 2010, no guidance is currently available for Policy 12.

Of the eight major aquaculture regions, four (Northland, Auckland, Bay of Plenty and Marlborough) have reviewed or are in the process of reviewing their regional coastal plans since the New Zealand Coastal Policy Statement 2010 (NZCPS2010) was gazetted. Implementation of Policy 12 in regional plans is discussed under section 6.2.4 below.

Table 6-6 assesses national policy statements against the goals for marine farm biosecurity national direction contained in Section 0.

Table 6-6: Assessment of national policy statements

Goal	Assessment
Compulsory to prepare	Yes – NZCPS
Enforceable	Potentially – Minister of Conservation is responsible for approving regional coastal plans, and could refuse to approve a plan that did not appropriately give effect to NZCPS policies
Comprehensive	No – can only address the sustainable management of natural and physical resources, and while a marine farm and its stock may be considered natural and physical resources, sustainable management is typically focused on effects of activities
Addresses marine farms as vectors and as affected enterprises	Yes
Industry implementation and monitoring	Not the purpose of the tool, but may be achieved in compliance with other tools
Independent auditing	Not the purpose of the tool, but may be achieved in compliance with other tools
Council enforcement	Not the purpose of the tool, but may be achieved in compliance with other tools

6.2.2 National environmental standards

Section 43 of the Resource Management Act 1991 provides that the Governor-General may, by Order in Council, make regulations (known as national environmental standards) that prescribe *inter alia* standards for the matters listed in sections 12 (use of the coastal marine area) and 15 (discharges of contaminants) of the Act. Section 43A of the Resource Management Act 1991 sets out the contents of national environmental standards, and states that:

(1) National environmental standards may –

(a) prohibit an activity

(b) allow an activity

(c) restrict the making of a rule or the granting of a resource consent to matters specified in a national environmental standard

(d) require a person to obtain a certificate from a specified person stating that an activity complies with a term or condition imposed by a national environmental standard

…

(f) require local authorities to review, under section 128(1), all or any of the permits or consents to which paragraph (ba) of that subsection applies as soon as practicable or within the time specified in a national environmental standard.

The Proposed National Environmental Standard for Marine Aquaculture included an indicative standard that would require that a regional council could only grant a coastal permit for a marine farm where a biosecurity management plan had been lodged and assessed by the regional council as meeting the requirements of an externally referenced document (still to be developed), and utilised section 43A(1)(f) to propose that local authorities be required to review any consents for marine farms that had not needed replacement consents prior to 31 January 2025, and impose a condition requiring the preparation of a biosecurity management plan. Submissions in relation to this proposal are outlined in section 3 of this report.

Table 6-7 assesses national environmental standards against the goals for marine farm biosecurity national direction contained in Section 0.

Table 6-7: Assessment of national environmental standards

Goal	Assessment
Compulsory to prepare	No
Enforceable	Yes
Comprehensive	No – restricted to the jurisdiction of regional councils/unitary authorities under the RMA, which does not extend to animal husbandry matters
Addresses marine farms as vectors and as affected enterprises	Potentially – depending on the wideness of the subject matter of the standard
Industry implementation and monitoring	Yes – can be specified
Independent auditing	Potentially – depending on how a council chooses to implement the standards
Council enforcement	Yes

6.2.3 Regional policy statements

Section 59 of the Resource Management Act 1991 sets out that the purpose of a regional policy statement is:

'…to achieve the purpose of the Act by providing an overview of the resource management issues of the region and policies and methods to achieve integrated management of the natural and physical resources of the whole region.'

Regional policy statements are mandatory under section 60 of the Resource Management Act 1991, but must be prepared in accordance with the functions of a regional council under section 30, and the provisions of Part 2 of the Resource Management Act 1991. A regional policy statement must also be prepared in accordance with a New Zealand coastal policy statement.

Of the eight major aquaculture regions, only Tasman District has not released a second generation regional policy statement since the NZCPS2010 was gazetted. Regional policy statements tend to identify regional pest management strategies or plans as the primary mechanism for addressing biosecurity matters, but some include provisions relating to biosecurity, principally in relation to biodiversity policies. Many high level policies relating to the management of adverse effects on ecosystems and the environment will also encompass biosecurity effects.

The Waikato Regional Policy Statement 2016

Policy 11.1.2 Adverse effects on indigenous biodiversity

Regional and district plans shall recognise that adverse effects on indigenous biodiversity within terrestrial, freshwater and coastal environments are cumulative and may include:

…

j) changes resulting in an increased threat from animal and plant pests;

…

Table 6-8 assesses national environmental standards against the goals for marine farm biosecurity national direction contained in Section 0.

Table 6-8: Assessment of regional policy statements

Goal	Assessment
Compulsory to prepare	Yes
Enforceable	No – contains no rules
Comprehensive	No – restricted to the jurisdiction of regional councils/unitary authorities under the RMA, which does not extend to animal husbandry matters
Addresses marine farms as vectors and as affected enterprises	Potentially – if considered a regionally significant issue
Industry implementation and monitoring	Not relevant to this tool
Independent auditing	Not relevant to this tool
Council enforcement	Not relevant to this tool

6.2.4 Regional coastal plans

Section 63 of the Resource Management Act 1991 states that the purpose of the preparation, implementation and administration of regional plans is to assist a regional council to carry out any of its functions in order to achieve the purpose of the Act. Section 64 requires that there shall at all times be, for all the coastal marine area of a region, one or more regional coastal plans. As with regional policy statements, a regional council must prepare a regional plan in accordance with its functions under section 30 of the Resource Management Act 1991, and in accordance with a New Zealand coastal policy statement. A regional council is also required (section 66) to have regard to any management plans and strategies (which would include pest management strategies and plans) prepared under other Acts to the extent that their content has a bearing on resource management issues of the region. Regional plans must state (section 67) the objectives for the region, the policies to implement the objectives and the rules (if any) to implement the policies.

As noted in section 6.2.1 of this report, only four of the major aquaculture regions have reviewed their regional coastal plans since the NZCPS 2010 was gazetted. Prior to 2010, the NZCPS did not contain a policy equivalent to the current Policy 12, and regional coastal plans did not necessarily specifically address activities in relation to marine biosecurity.

Proposed Regional Plan for Northland September 2017

The Proposed Regional Plan for Northland contains a policy and rule framework that gives effect to Policy 12 of the NZCPS 2010.

Policy D.5.25 Marine pests

Protect Northland from the adverse effects from marine pests by:

1) recognising that the introduction or spreading of marine pests could have significant and irreversible adverse effects on Northland's marine environment, and

2) recognising that the main risk of introducing and spreading of marine pests is from the movement of vessels, structures, equipment, marine livestock and materials, and

3) decision makers applying the precautionary principle when there is scientific uncertainty as to the extent of effects from the introduction or spread of marine pests, and

4) putting conditions in resource consents requiring that best practicable option measures are implemented so that there is a very low risk of introducing or spreading marine pests as a result of the consented activity.

Rules in the Proposed Regional Plan for Northland control in-water vessel hull and niche area cleaning, passive biofouling discharges, and introduction of marine pests. Aquaculture requires consent as a controlled, restricted discretionary or discretionary activity (depending on the type of aquaculture and its location), and a matter of discretion on each of the restricted discretionary activity rules is 'risk of introducing or spreading marine pests'.

Table 6-9 assesses regional coastal plans against the goals for marine farm biosecurity national direction contained in Section 0.

Table 6-9: Assessment of regional coastal plans

Goal	Assessment
Compulsory to prepare	Yes
Enforceable	Yes
Comprehensive	No - restricted to the jurisdiction of regional councils/unitary authorities under the RMA, which does not extend to animal husbandry matters
Addresses marine farms as vectors and as affected enterprises	Potentially – depends on which activities are controlled with respect to management of biosecurity risks
Industry implementation and monitoring	Yes
Independent auditing	Potentially – can be specified by regional councils
Council enforcement	Yes

6.2.5 Summary

A variety of different tools that may be relevant or useful for implementing marine farm biosecurity management exist under the Resource Management Act 1991, but none of them achieve all of the goals identified in Section 4.2 of this report. In particular, the jurisdiction of regional councils and unitary authorities under the Resource Management Act 1991 is restricted to their functions under section 30, and to the purpose of the Act under section 5. While activities such as biofouling removal, which have a direct environmental effect, can be controlled under the Resource Management Act 1991, a number of the other components of a comprehensive biosecurity management approach, particularly animal husbandry matters, are either not within the jurisdiction of councils or are only loosely related (and attempts to manage them through regional plans or resource consents may result in successful legal challenge).

6.3 Aquaculture New Zealand A+ programme

Aquaculture New Zealand has recently developed the A+ New Zealand Sustainable Aquaculture programme (the A+ programme), to provide New Zealand marine farmers with practical tools to

demonstrate transparency around their environmental performance. The programme focuses on the following key areas:

- Healthy ecology
- Clean clear water quality
- Responsible waste management
- Efficient use of resources
- Guarantee of food safety
- Valuing iwi participation
- Enhancing communities

Figure 6-1**Error! Reference source not found.** shows the principles underpinning the sustainable aquaculture framework.

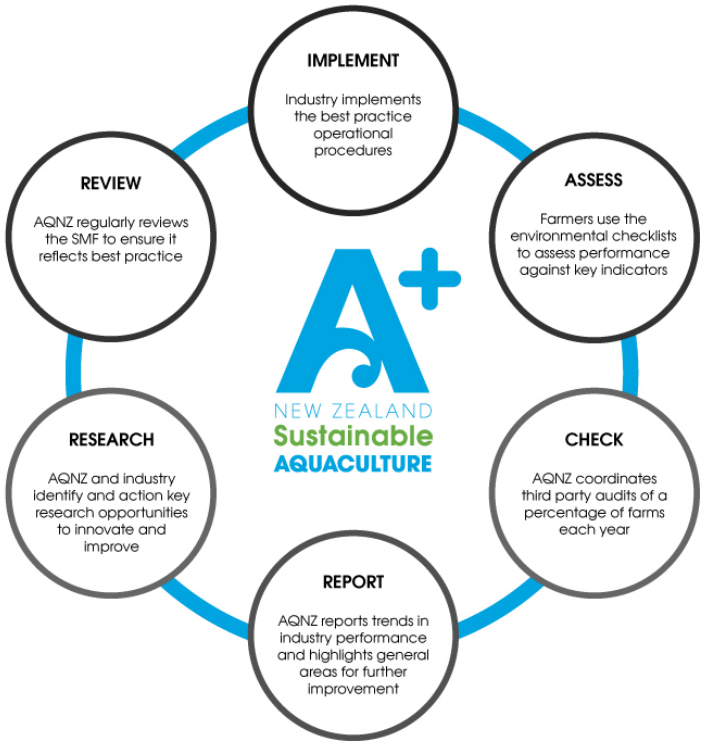

Figure 6-1: The A+ Sustainable Aquaculture Framework

The programme promotes best practice, and includes objectives and standards to provide consistent up-to-date best practice guidance to the industry. The performance of marine farms that have joined the programme is monitored and assessed against these objectives and standards, and is publicly reported. While the programme appears to be well supported by the industry, it is currently voluntary, and only covers the three main aquaculture species.

As part of the A+ programme, sustainable management framework documents have been developed for each of the three major aquaculture species. Each document identifies the key environmental principles, objectives and targets for the species industry, identifying potential environmental effects and highlighting management practices that can address those effects. Rather than being overly prescriptive, each sustainable management framework provides a series of suggestions to focus thinking, and allow improvement and innovation in practices over time. In relation to biosecurity, the key parts of the sustainable management frameworks are:

- Section 3: Environmental objectives and indicators
- Appendix 2: Operational Procedures – which represent a baseline for meeting acceptable standards

A+ New Zealand Sustainable Aquaculture Programme – Pacific Oyster Sustainable Management Framework

Objective

Farming activities do not cause an unacceptable biosecurity risk

Target

Minimise the spread of pests and diseases with inter-regional transfers of equipment or stock, or movement of vessels

Identify new marine pests, and isolate and contain any outbreaks of disease

Report any suspected new or notifiable pest or disease, or unusual mortality, to the Ministry for Primary Industries

Indicators

Recommended best practice biosecurity measures are implemented and reported to AQNZ

Evidence of staff training in biosecurity management

Number of early notifications of any concerns to the Ministry for Primary Industries

Operational Procedures

- *Stock transfer:*

  Environmental aspect and overview: Once the spat have grown to sufficient size, they can be transported from the spat catching area to the farm, with little mortality…Stock movements between regions may result in the inadvertent transfer of associated organisms. These include biofouling organisms and those inhabiting muddy sediments. It is important to mitigate the risk of notifiable unwanted organisms (or other marine pests potentially harmful to aquaculture) being transferred into areas they do not currently inhabit. To achieve this, operators must ensure spat has been appropriately washed and inspected.

  Management practices:
  - *Care should be taken to ensure oysters are appropriately protected from excessive heat and sunlight while they are out of water*
  - *Transfers should always be done with care regarding contaminants e.g. very careful washing and shorting prior to shifting*
  - *Rejects at the destination should be returned to land disposal*
  - *Report any suspected new or notifiable pest or disease, or unusual mortality to the MPI Exotic Pest and Disease hotline*
  - *Records should be kept of all stock transfers, including transfer date, amount and location, and any treatments applied to reduce biosecurity risk*

- *Transfer of oysters between hatchery and marine farms:*

  Environmental aspect and overview: [introduction to hatchery concept] All hatchery operations are required to comply with appropriate biosecurity procedures which should include removal and/or destruction of fouling organisms on incoming stock, and surveillance for pests and diseases. Compliance with the Freshwater Fish Farm Licence and hatchery biosecurity procedures greatly reduces the risk of unwanted organisms being transferred from zone to zone and pests becoming established at a hatchery.

  Management practices:
  - *Adhere to Freshwater Fish Farm Licence conditions and hatchery biosecurity procedures*
  - *Report any suspected new or notifiable pest or disease, or unusual mortality to the MPI Exotic Pest and Disease hotline*
  - *Records should be kept of all stock transfers, including transfer date, amount and location, and the nature of any treatment undertaken to mitigate biosecurity risk*

- *On-farm biosecurity management*

  Environmental aspect and overview: The spread of unwanted organisms could impact marine farms, as well as adjacent natural ecosystems and associated values. Many of the measures contained in this SMF aim to minimise the spread of unwanted organisms to and among regions. It is also important that oyster farm operators know how to minimise the occurrence of unwanted organisms on their farms, and respond in a timely manner to the discovery on their farms of any suspect marine pest or

disease. The latter can be achieved through 'passive' surveillance and timely response to biosecurity events. Passive surveillance involves operators watching out for any suspected new or notifiable pest (e.g. Styela) or disease, or unusual stock mortality, as part of their day to day activities. Operators will report any such occurrences to MPI, who will provide guidance on follow up actions. Additional biosecurity protocols may be developed within the industry in relation to specific pests or diseases.

Management practices:

- *Become familiar with, and display on all vessels, the MPI 'New Zealand's Marine Pest Identification Guide'*
- *Upon the discovery of any suspected new or notifiable pest (e.g. Styela) or disease, or unusual mortality, operators will:*
    - *Note exact location and take a photo/sample where possible*
    - *Keep samples shaded, cool and wet by containing (in a plastic bag or other container) with a small amount of seawater*
    - *Keep records of any mortalities*
    - *Phone the MPI Exotic Pest and Disease Hotline, and follow any resulting recommendations*
- *From time to time the industry may develop protocols related to specific pests or diseases. For example it is important to avoid the transfer of OsHV-1 to areas where it does not currently exist. Operators will comply with requirements relating to these as advised in writing by Aquaculture New Zealand*

- *Biosecurity – common pests and controls*

  Environmental aspect and overview: Although disease in Pacific oyster farming is relatively rare, a number of parasites or predators or fouling organisms may affect oysters [six are then identified]

  Management practices:
  - *The design and operation of structures and equipment should minimise opportunities for fouling*
  - *The farm should be kept in good order and repair*
  - *The farm should ideally have a Biosecurity Management Plan which appropriately minimises pest species*

- *Structures and debris – transfer or equipment among regions*

  Environmental aspect and overview: From time to time, used equipment such as bins, bags and footwear may be transferred among growing regions. Pest organisms can be transferred at the same time e.g. biofouling organisms and those inhabiting muddy sediments. It is important to mitigate the risk of notifiable unwanted organisms (or other marine pests potentially harmful to aquaculture) being transferred into areas they do not currently inhabit.

  Management practices:
  - *Where feasible, do not transfer equipment such as bins, bags and footwear between regions*
  - *Where equipment is transferred, operators should treat it prior to transfer using any feasible methods, such as outlined in the MPI guidance document Clean Boats – Living Seas (A Boatie's Guide to Marine Biosecurity). A simple method is air drying at least one month before transfer*
  - *Records should be kept of all equipment transfers, including transfer data, amount/type and location, and the nature of any sterilisation treatment undertaken*

- *Vessel operation – maintenance and operational practices for biosecurity purposes*

  Environmental aspect and overview: Appropriate maintenance and operational practices are necessary to minimise the risk of transferring pests between regions with vessel movements. Transfer of biofouling, sediment or water associated with vessels or boat trailers could all be important, depending on circumstances. For vessels that remain in-water and move among oyster growing harbours, biofouling may be especially important; vessels are particularly prone to fouling in niche areas (e.g. bottom of keel, trim tabs, pipe intakes/outlets, rudders, hard-stand support strips).

  Management practices:
  - *Carry out regular antifouling of vessels that remain in the water, at appropriate locations/facilities, and maintain relevant records (e.g. paint type, expected service life). Guidance on appropriate antifouling and record keeping for biosecurity purposes can be found at [Australian website reference]*
  - *For vessels travelling between regions, undertake the following as necessary and appropriate:*
    - *Ensure that the external hull is free of conspicuous fouling or notifiable pests, especially in niche areas*

- *Ensure sediments and biofouling debris (e.g. on decks, equipment, boat trailers if relevant) are washed off before departure to other regions. Clean trailered boats and their trailers with freshwater where possible*

- *Harvest – biofouling removal*

  Environmental aspect and overview: An important element in maintaining the life of farm structures is the regular removal of fouling organisms during harvesting, including oysters, from the posts and rails. This may be done as the crop is harvested, but in any event before the farm is re-stocked. These fouling organisms can harbour pests and diseases. This on site cleaning process ensures that encrusting biota and sediment are released within the permitted area and helps prevent the transfer of species among different farming areas.

  Management practices:
  - *Minimise organic material discarded into the environment by adopting best farming practices, including regular maintenance of farm structures and cleaning of equipment to minimise the build-up of biofouling. For example, clean racks and rails during harvesting or before the farm is re-stocked*
  - *Report any suspected new or notifiable pest (e.g. Styela) to the MPI Exotic Pest and Disease Hotline*
  - *Inform AQNZ if you identify any new or innovative methods to reduce quantity of organic materials discarded into the marine environment*

The operational procedures can be contrasted with the management options outlined in the MPI Technical Report in order to assess the effectiveness of requiring compliance with the A+ Sustainable Aquaculture Framework in achieving the goals for marine farm biosecurity outlined in Section 0. Table 6-10 provides an example of this comparison, for biofouling management.

Table 6-10: Biofouling management – A+ and MPI Technical Paper

A+	MPI Technical Paper
Stock transfer: *Environmental aspect and overview: Once the spat have grown to sufficient size, they can be transported from the spat catching area to the farm, with little mortality…Stock movements between regions may result in the inadvertent transfer of associated organisms. These include biofouling organisms and those inhabiting muddy sediments. It is important to mitigate the risk of notifiable unwanted organisms (or other marine pests potentially harmful to aquaculture) being transferred into areas they do not currently inhabit. To achieve this, operators must ensure spat has been appropriately washed and inspected.*	*5.7 Biofouling Management (Shellfish)* *In addition, movements of aquaculture stock and equipment represent significant pathways for the translocation of biofouling and associated "hitchhiker" organisms. For example, shellfish stock movements have been implicated in invasive species transfer, including slipper limpets, Atlantic oyster drills, the ascidians and macroalgae*
Vessel operation – maintenance and operational practices for biosecurity purposes *Environmental aspect and overview: Appropriate maintenance and operational practices are necessary to minimise the risk of transferring pests between regions with vessel movements. Transfer of biofouling, sediment or water associated with vessels or boat trailers could all be important, depending on circumstances. For vessels that remain in-water and move among oyster growing harbours, biofouling may be especially important; vessels are particularly prone to fouling in niche areas (e.g. bottom of keel, trim tabs, pipe intakes/outlets, rudders, hard-stand support strips).*	*5.7 Biofouling Management (Shellfish)* *A range of vessel types are used by the New Zealand aquaculture industry including mussel harversters and seeding vessels, tug boats, finfish transporters, barges, small launches, water taxis and dinghies. The amount of biofouling present on the submerged vessel surfaces is dependent on their operating profile, the antifouling measures employed and the vessel maintenance schedule.*
Harvest – biofouling removal *Environmental aspect and overview: An important element in maintaining the life of farm structures is*	*5.7 Biofouling Management (Shellfish)* *The production infrastructure for aquaculture and, in the case of shellfish production the organisms*

A+	MPI Technical Paper
the regular removal of fouling organisms during harvesting, including oysters, from the posts and rails. This may be done as the crop is harvested, but in any event before the farm is re-stocked. These fouling organisms can harbour pests and diseases. This on site cleaning process ensures that encrusting biota and sediment are released within the permitted area and helps prevent the transfer of species among different farming areas.	*themselves, provide a habitat for the settlement of biofouling organisms.* *Substantial economic costs to industry, conservatively estimated at between 5 and 10% of production costs, are associated with biofouling control. This illustrates the need for effective preventive technologies and mitigation methods. Several incursions of non-indigenous biofouling organisms into New Zealand have also affected production and costs to the aquaculture industry or have the potential to do so.* *These organisms may also harbour pathogens whose spread may be facilitated by activities within the aquaculture industry.*
<u>Stock transfer management practices:</u> - *Care should be taken to ensure oysters are appropriately protected from excessive heat and sunlight while they are out of water* - *Transfers should always be done with care regarding contaminants e.g. very careful washing and shorting prior to shifting* - *Rejects at the destination should be returned to land disposal* - *Report any suspected new or notifiable pest or disease, or unusual mortality to the MPI Exotic Pest and Disease hotline* - *Records should be kept of all stock transfers, including transfer date, amount and location, and any treatments applied to reduce biosecurity risk*	*<u>General biosecurity</u>* - *Seed should be carefully inspected to prevent the introduction of small predators or unwanted species with the seed and document organisms removed (date and identification)* - *Biosecurity attestation of hatcheries, land-based facilities and wild spat should be put in place due to the potential to spread pest organisms quickly to multiple locations*
<u>Vessel operation management practices:</u> - *Carry out regular antifouling of vessels that remain in the water, at appropriate locations/facilities, and maintain relevant records (e.g. paint type, expected service life). Guidance on appropriate antifouling and record keeping for biosecurity purposes can be found at [Australian website reference]* - *For vessels travelling between regions, undertake the following as necessary and appropriate:* o *Ensure that the external hull is free of conspicuous fouling or notifiable pests, especially in niche areas* o *Ensure sediments and biofouling debris (e.g. on decks, equipment, boat trailers if relevant) are washed off before departure to other regions. Clean trailered boats and their trailers with freshwater where possible*	*<u>Vessel biofouling</u>* *See pages 111-113 of MPI Technical paper for options for managing vessel biofouling*
<u>Harvest (biofouling removal) management practices:</u> - *Minimise organic material discarded into the environment by adopting best farming practices, including regular maintenance of*	*<u>General biosecurity</u>* - *Facilities should be aware of the locally important, invasive, rare and endangered species and record organisms observed at the*

A+	MPI Technical Paper
farm structures and cleaning of equipment to minimise the build-up of biofouling. For example, clean racks and rails during harvesting or before the farm is re-stocked - *Report any suspected new or notifiable pest (e.g. Styela) to the MPI Exotic Pest and Disease Hotline* - *Inform AQNZ if you identify any new or innovative methods to reduce quantity of organic materials discarded into the marine environment*	*facility location (e.g. date, identification, abundance)* - *Notable occurrences of biofouling organisms should be documented and recorded (e.g. date, identification, photographs)* - *Facility staff should be trained to monitor for and identify marine pests when they are inspecting and cleaning live-stock, equipment, structures and vessels* - *Facility structures and equipment should undergo regular maintenance and cleaning to manage the occurrence of biofouling* - *Coastlines adjacent to facilities should be monitored for occurrence of new and established non-indigenous species. MPI should be contacted in all instances where an unfamiliar species is encountered* - *Biofouling should not build-up to a level that impairs water flow* - *Any materials and equipment that is no longer required should be removed from the marine environment* - *The amount of organic material discarded into the environment should be minimised* - *Materials and equipment should be cleaned on shore and fouling materials disposed of in an appropriate land based facility* - *Removal of biofouling organisms should be achieved via methods, such as:* o *dessication in air* o *freshwater immersion (e.g. for marine biofouling)* o *brine immersion* o *combined treatment (e.g. freshwater treatment followed by dessication in air)* o *high pressure blasting (freshwater, salt water, hot water)* o *separation of liquids and solids from biofouling waste* o *chemical treatment (e.g. chlorine, hydrogen peroxide)* o *heat treatment* o *manual control (e.g. gear should be cleaned frequently when fouling is slight rather than waiting until the fouling is difficult to control); or* o *onshore cleaning (e.g. fouling material should be disposed of in an approved manner, such as landfill or other public disposal facility)*

The MPI Technical Paper was prepared to assist the commercial and non-commercial aquaculture industry to strengthen their on-farm biosecurity practices, by providing technical information, biosecurity objectives and best practice options to enable farmers to make informed decisions regarding their on-farm biosecurity management. The Executive Summary of the MPI Technical Paper identifies that:

'Biosecurity measures adopted by farmers should be practical and fit for purpose. The options identified within this document represent a starting point for the implementation of general on-farm biosecurity procedures for each farm based on their own site-specific conditions.'

As can be seen from Table 6-10 there is a significant difference in the level of detail provided by the MPI Technical Paper and the operational procedures contained in the sustainable management frameworks under the A+ programme.

As part of the MPI project, a user friendly handbook was also created to cover biosecurity practices more generally. The approach in the handbook can also be contrasted with the A+ programme, as outlined in Table 6-11.

Table 6-11: Stock transfer – A+ and AQNZ/MPI Aquaculture Biosecurity Handbook

A+	AQNZ/MPI Aquaculture Biosecurity Handbook
Stock transfer: *Environmental aspect and overview: Once the spat have grown to sufficient size, they can be transported from the spat catching area to the farm, with little mortality…Stock movements between regions may result in the inadvertent transfer of associated organisms. These include biofouling organisms and those inhabiting muddy sediments. It is important to mitigate the risk of notifiable unwanted organisms (or other marine pests potentially harmful to aquaculture) being transferred into areas they do not currently inhabit. To achieve this, operators must ensure spat has been appropriately washed and inspected.*	*Stock movements and containment* *Objective: Minimise the pest and disease risk associated with stock movements onto, within and off your farm*
Stock transfer management practices: - *Care should be taken to ensure oysters are appropriately protected from excessive heat and sunlight while they are out of water* - *Transfers should always be done with care regarding contaminants e.g. very careful washing and shorting prior to shifting* - *Rejects at the destination should be returned to land disposal* - *Report any suspected new or notifiable pest or disease, or unusual mortality to the MPI Exotic Pest and Disease hotline* - *Records should be kept of all stock transfers, including transfer date, amount and location, and any treatments applied to reduce biosecurity risk*	*Recommended practices:* - *Only stock of known health status should be introduced onto your farm. Health status should be equal or better than stock already present* - *Only move stock off your farm to locations of equal or lesser health status than the current location* - *If stock of unknown health status is to be introduced (e.g. wild broodstock, seed stock), this stock should be isolated in separate production unit or dedicated quarantine facilities (e.g. land-based farms)* - *Where it is considered by your biosecurity adviser that unacceptable risk exists, broodstock should be indefinitely quarantined with the aim of producing progeny that would replace that broodstock (e.g. high-health or specific pathogen-free progeny), or euthanise broodstock and dispose in a biosecure manner* - *Within-farm stock movements to areas of equal or higher health status should occur following a documented consideration of pest and disease risks* - *Precautions should be undertaken to prevent the within farm spread of pests, disease until such situations are resolved* - *Monitor and treat (as required) new stock* - *Keep accurate records of all stock movements onto, within and off your farm* - *Prevent stock escapes*

While less acute than the difference between the MPI Technical Paper and A+, it is clear that the Aquaculture Biosecurity Handbook is also providing a greater level of detail than the A+ operational procedures.

Table 6-12 assesses the A+ New Zealand Sustainable Aquaculture Programme against the goals for marine farm biosecurity national direction contained in Section 0.

Table 6-12: Assessment of A+ New Zealand Sustainable Aquaculture Programme

Goal	Assessment
Compulsory to prepare	No
Enforceable	No
Comprehensive	Partially – covers greenshell mussels, Pacific oysters and King Salmon (which account for the majority of New Zealand aquaculture production) but does not cover other species Operational procedures are currently not as detailed as guidance material available from MPI, and it is not clear how this would influence the effectiveness of the A+ operational procedures
Addresses marine farms as vectors and as affected enterprises	Partially – addresses marine farms as vectors
Industry implementation and monitoring	Yes
Independent auditing	Yes
Council enforcement	No

7. Submitter suggestions

7.1 Pathway management plans

Ten submitters referred to pathway management plans in their submissions, with most suggesting that:

- Pathway management plans would be a more effective tool than the NESMA
- A national pathway management plan for aquaculture should be prepared
- That other pathways apart from aquaculture should be considered for pathway management plans in order to manage marine biosecurity
- A combination of pathway management plans and on-farm biosecurity management plans should be used to management marine farm biosecurity risks.

Pathway management plans are discussed in section 6.1.3. As a tool on their own, the analysis contained in Table 6-4 suggests that they will not be sufficient to achieve the goals for marine farm biosecurity outlined in section 0, and consideration of other sectors that need to be covered by pathway management plans is not within the scope of this project. The option of a combined approach is discussed further in section 8.

7.2 Use of A+ programme

Twelve submitters referred to the A+ programme in their submissions, with a number recommending that compliance with A+ should be required. Aquaculture New Zealand provided a detailed suggestion for addressing marine farm biosecurity, which can be summarised as follows:

- A template biosecurity management plan and a detailed guidance document (including auditing guidance) should be drawn up for each species sector, utilising industry expertise, MPI input and external advice, be peer reviewed by independent external experts with experience in applied aquaculture biosecurity, and then approved by consent authorities
- Once agreed, the requirements of both documents should be incorporated into the A+ programme
- Consent authorities should make A+ membership a consent requirement
- The guidance document would contain sufficient detail that council officers could assess the adequacy of the biosecurity management plans directly

- Inclusion in A+, with membership a consent requirement, would result in both internal self-reporting and external independent auditing
- Marine farming enterprises should re-assess their own risks regularly (i.e. assessing biosecurity management plans against changing biosecurity risks), which could form part of self-reporting
- Included in the guidance material would be a requirement for a thorough review of the biosecurity management plan against a risk profile every 5 years, with justification for either changes or no changes detailed in that year's report against consent conditions provided to the council. The consent authority could then assess the suitability of that review against the guidance documents and seek external advice if necessary

As noted in Table 6-12 entry into the A+ programme is currently voluntary, and it only covers the three principal aquaculture species. Until this approach alters, including the requirements of a template biosecurity management plan and detailed guidance on preparing it within the A+ framework will only capture those marine farmers who are part of the programme. Requiring membership of a third party organisation or programme is also not something that can be achieved through consent conditions. While the A+ programme is a laudatory initiative and a significant improvement on previous practice, it is not currently sufficient to meet the goals for marine farm biosecurity outlined in section 0 of this report.

7.3 Specifying biosecurity standards in the NESMA

Environment Southland submitted that minimum standards to mitigate biosecurity risks in the marine farm environment should be included within the National Environmental Standard for Marine Aquaculture (supported by a national marine pathway management plan), to ensure that all marine farms have clear and consistent rules to follow that can be easily and efficiently enforced by regional councils.

Minimum standards could be included in the National Environmental Standard for Marine Aquaculture for those matters over which the Resource Management Act 1991 has jurisdiction. Further discussions are needed to consider the workability of this option.

7.4 Processor-supplier agreements

Particularly in the shellfish industry, a number of marine farmers have supplier agreements with the larger processing companies (such as Sanford Limited). The ability of these agreements to specify that biosecurity measures are to be adopted by suppliers could also be investigated as a way of improving marine aquaculture biosecurity.

8. Suitability of tools to address biosecurity concerns

Table 4-1 provided an indication of biosecurity management matters that need to be addressed for marine farms. On the basis of the information provided in Table 4-1, and the analysis contained in sections 6 and 7 of this report, Table 8-1 identifies the potential tools available under the Biosecurity Act 1993 and the Resource Management Act 1991 that may be suitable for biosecurity management for each identified matter.

Table 8-1: Potential tools to address biosecurity matters

Biosecurity matters	Potential tool
Biosecurity (general)	
Integrated approach to biosecurity	Whichever tools are selected, an integrated approach should be taken
Identification of biosecurity hazards (to the industry)	
Area based management	• Pathway management (for movements between or into areas)
Auditing	• On-farm management (resource consent condition auditing)

Biosecurity matters	Potential tool
Biofouling (shellfish)	• Some effects relevant to stock health and production levels, so not amenable for BSA or RMA tool • Pest management • Pathway management • On-farm management (resource consents)
Biofouling (finfish)	• Some effects relevant to stock health and production levels, so not amenable for BSA or RMA tool • Pest management • Pathway management • On-farm management (resource consents)
Cleaning and disinfection	• Pest management • Pathway management (for goods and materials moving on and off site)
Contingency plans	• Pathway management
Facility design and structures	• Resource consents
Fallowing	• Pest management • On-farm management (resource consents)
Feeds and feeding	• Pest management • Pathway management • On-farm management (resource consents)
Good husbandry	• Pest management
HACCP (Hazard Analysis Critical Control Point) procedures	• Pest management • Pathway management • On-farm management (resource consents) – potentially
Harmful algal blooms (marine)	
Harvest (finfish)	• Pest management • Pathway management • On-farm management (resource consents) – when harvesting done on site
Harvest (shellfish)	• Pest management • Pathway management • On-farm management (resource consents) – of disposal of biofouling
Jellyfish	
New species	
On-site management of staff and visitors	• Pest management • Pathway management • On-farm management (resource consents)
Preventive practices (surveillance and vaccinations)	• Generally relevant to all tools
Reactive measures	• Pest management

Biosecurity matters	Potential tool
	• Pathway management – if moving stock
Record keeping	• Relevant to all tools
Removal and disposal of dead and moribund stock	• Pest management • Pathway management – in relation to harvesting and moving stock off site • On-farm management
Site location	• Resource consents
Stock containment	• Pest management • On-farm management (resource consents)
Stock origin	• Pest management • Pathway management • On-farm management (resource consents)
Stock transfer	• Pest management • Pathway management • On-farm management (resource consents)
Waste management	• Pest management • On-farm management (resource consents)
Water treatment	
Wildlife management	• Pest management • On-farm management (resource consents)
Year class separation	• Pest management

Table 8-2 on the following page provides a summary of the analysis contained in this report of each of the tools against the goals for marine farm biosecurity set out above. Aquaculture New Zealand's A+ New Zealand Sustainable Aquaculture Framework has also been analysed against the goals outlined above.

The available tools were also the subject of discussion at the Aquaculture Reference Group meeting on 5 December 2018. Feedback from small group sessions on the available tools is contained in Appendix A.

Table 8-2: Summary of tools available for marine farm biosecurity management

	Compulsory	Enforceable	Comprehensive	Addresses marine farms as vectors and as receivers	Industry implementation and monitoring, independent auditing	Council enforcement
Biosecurity Act 1993						
National policy direction	Yes	Essentially – national and regional pest and pathway management plans must not be inconsistent with the national policy direction, and the Minister and regional councils cannot approve a pest or pathway management plan if it is inconsistent	Partially – restricted to the matters that can be addressed by pest or pathway management plans	Partially – will not address management of the 'next threat', if that cannot be managed by a pathway management plan (see discussion in section 6.1.3 of this report)	Not the purpose of the tool, but may be achieved in compliance with other tools	Not the purpose of the tool, but may be achieved in compliance with other tools
National and regional pest management plans	No	Yes	Partially – deal most effectively with known pests, so potentially not effective at addressing 'next threat' and don't address disease risk	Industry are one of a number of groups responsible	Not the purpose of the tool	Yes (regional pest management plans)
National and regional pathway management plans	No	Yes	No – restricted to 'pathways'	Partially – will address marine farms as vectors in relation to movement of goods or craft, and can therefore address management of the 'next threat' as specific pest species do not have to be identified. Also addresses effects on marine farms that are not the initiator of craft or goods movement. Doesn't address biosecurity risks not associated with movement of goods or craft (see section 4.2).	Implementation – industry and Government/council Monitoring – Government/council	Yes (regional pathway management plans)
Government/industry agreements	No		No – relates only to identified unwanted organisms	Yes	Industry implementation and monitoring Does not appear to be subject to auditing	Not relevant to this tool
Resource Management Act 1991						
National policy statement	Yes (NZCPS)	Potentially – Minister of Conservation is responsible for approving regional coastal plans, and could refuse to approve a plan that did not appropriately give effect to NZCPS policies	No – can only address the sustainable management of natural and physical resources, and while a marine farm and its stock may be considered natural and physical resources, sustainable management is typically focused on effects of activities	Yes	Not the purpose of the tool, but may be achieved in compliance with other tools	Not the purpose of the tool, but may be achieved in compliance with other tools
National environmental standard	No	Yes	No – restricted to the jurisdiction of regional councils/unitary authorities under the RMA, which does not extend to animal husbandry matters	Potentially – depending on the wideness of the subject matter of the standard	Industry implementation and monitoring can be specified Potential for independent auditing	Yes
Regional policy statements	Yes	No – contains no rules	No – restricted to the jurisdiction of regional councils/unitary authorities under the RMA, which does not extend to animal husbandry matters	Potentially – if considered a regionally significant issue	Not relevant to this tool	Not relevant to this tool
Regional coastal plan	Yes	Yes	No – restricted to the jurisdiction of regional councils/unitary authorities under the RMA, which does not extend to animal husbandry matters	Potentially – depends on which activities are controlled with respect to management of biosecurity risks	Industry implementation and monitoring Potential for independent auditing	Yes
A+ New Zealand Sustainable Aquaculture programme						
A+ programme	No	No	Partially – covers greenshell mussels, Pacific oysters and King Salmon (which account for the majority of New Zealand aquaculture production) but does not cover other species Operational procedures are currently not as detailed as guidance material available from MPI, and it is not clear how this would influence the effectiveness of the A+ operational procedures	Partially – addresses marine farms as vectors	Yes	No

9. Conclusion and recommendations

What is obvious from Table 8-2 and the analysis contained in sections 6 and 7 of this report is that one tool is not going to be sufficient to meet goals for marine farm biosecurity. A combined approach is therefore recommended:

- A national pathway management plan for aquaculture, to address the major pathways associated with marine farming
- A requirement through the National Environmental Standard for Marine Aquaculture for an on-farm biosecurity management plan to be prepared, but restricted to those matters that can be controlled under the Resource Management Act 1991, and not addressing those matters covered by the national pathway management plan

In making these recommendations it is acknowledged that marine aquaculture is only one source of biosecurity risk in the coastal marine area, and that questions of equity will also need to be considered in any decision to proceed.

Table 9-1 provides the potential contents of each instrument as an initial indication of how biosecurity matters for marine farms might be addressed, based on the biosecurity risks outlined in MPI Technical Paper 2016/47.

Table 9-1: National pathway management plan and NESMA biosecurity management plan

Instrument	Biosecurity matters to be addressed
National pathway management plan	• Vessels and vessel movement – including management of bilge and retained water (potentially), biofouling and shipboard gear • Movement of marine farming gear – on and off site and between sites • Stock movement • Movement of marine farming structures • Movement of personnel (potentially) – to and from farms, and from farm to farm • Feed Each of these would (where relevant) incorporate consideration of: - Auditing - Cleaning and disinfection - Contingency plans - Preventive practices - Record keeping
National Environmental Standard for Marine Aquaculture	• Management of on-farm biofouling • Fallowing (if necessary) • Feeds and feeding (in terms of biosecurity risks posed by feed) • Harvesting (when done on site) – control of discharges for finfish harvesting, and removal of biofouling for shellfish harvest • Removal and disposal of dead and moribund stock • Stock containment • Stock origin (potentially) • Waste management • Wildlife management Each of these would (where relevant) incorporate consideration of: - Auditing - Contingency plans - Preventive practices - Record keeping

Area based management and integrated management are also key considerations in relation to managing biosecurity risks, and there are a number of other measures identified in MPI Technical Paper 2016/47 that are key to managing biosecurity risks, but do not lend themselves to management through either a pathway management plan or resource consents under the NESMA. Further discussion will be needed to establish how to address these matters in order to provide a comprehensive solution to management of biosecurity risks from marine farming.

Appendices

Appendix A Reference Group Feedback

Group 1

Tools	Biosecurity matter
Biosecurity Act 1993	
National policy direction	• New species • Stock origin
National pest management plan	• Biofouling (finfish) • Biofouling (shellfish)
Regional pest management plans	• Contingency plans
National pathway management plan	• Stock origin • Stock transfer • Waste management • Preventive practices (surveillance and vaccination) • Reactive measures • New species • HACCP
Regional pathway management plan	• Stock transfer • Stock origin
Small scale management plans	• Biofouling (shellfish) • Biofouling (finfish) • Cleaning and disinfection • Fallowing • Feeds and feeding • Good husbandry • HACCP • Harvest (finfish) • Harvest (shellfish) • Waste management • Facility design and structures • Removal of dead and moribund stock • Jellyfish • Preventive practices (surveillance and vaccination) • Staff and visitors • Stock containment • Wildlife management • Year class separation • Stock transfer • Area based management
Controlled area notice	• Reactive measures • Stock containment
Government-industry agreements	• Contingency plans • Reactive measures
Resource Management Act 1991	
National policy statement	•
NES – BioMP	•
NES – standards	•
Regional Coastal Plan – resource consents	• Site location • Area based management

Tools	Biosecurity matter
Regional Coastal Plan – permitted activities	•
A+ programme	
A+ programme	• Biofouling (shellfish) • Biofouling (finfish) • Harmful algal blooms • Contingency plans • Good husbandry • Cleaning and disinfection • Removal and disposal of dead and moribund stock • Preventive practices (surveillance and vaccination) • Feeds and feeding • Harvest (shellfish) • Harvest (finfish) • Fallowing • HACCP • Year class separation • Waste management • Wildlife management • Harmful algal blooms • Staff and visitors • Site location • Stock containment • Facility design and structures

Group 2

Tools	Biosecurity matter
Biosecurity Act 1993	
National policy direction	• Year class separation • Good husbandry • Feeds and feeding • Site location • Integrated approach • Record keeping • Auditing • Contingency plans • Stock containment • Preventive practices (surveillance and vaccination)
National pest management plan	• Contingency plans • Fallowing • Cleaning and disinfection
Regional pest management plans	• Year class separation • Jellyfish • Biofouling (shellfish) • Biofouling (finfish) • Fallowing
National pathway management plan	• Stock origin • Stock transfer • Harmful algal blooms • Biofouling (shellfish) • Biofouling (finfish)
Regional pathway management plan	• Stock origin • Stock transfer • Harvest (finfish) • Harvest (shellfish) • Harmful algal blooms

Tools	Biosecurity matter
Small scale management plans	• Staff and visitors • Area based management • HACCP • Good husbandry • Harmful algal blooms
Controlled area notice	• Preventive practices (surveillance and vaccination) • Stock containment • Cleaning and disinfection
Government-industry agreements	• Reactive measures • Contingency plans • Cleaning and disinfection • Preventive practices (surveillance and vaccination) • Removal and disposal of dead and moribund stock • Stock containment • New species
Resource Management Act 1991	
National policy statement	•
NES – BioMP	•
NES – standards	•
Regional Coastal Plan	• Area based management • Site location
Regional Coastal Plan – resource consents	• Facility design and structures • Stock transfer • Waste management • Wildlife management • Removal and disposal of dead and moribund stock • Site location • New species • Feeds and feeding • Harvest (shellfish)
A+ programme	
A+ programme	• Wildlife management • Removal and disposal of dead and moribund stock • HACCP • Good husbandry • Facility design and structures

Group 3

Tools	Biosecurity matter
Biosecurity Act tools	• Harvest (shellfish) • Harvest (finfish) • Removal and disposal of dead and moribund stock • Stock transfer • Harmful algal blooms • Area based management • Reactive measures • Stock origin
Resource Management Act tools	• Contingency plans • Biofouling (shellfish) • Biofouling (finfish) • Feeds and feeding • Waste management • Wildlife management • Stock containment

Tools	Biosecurity matter
	• Year class separation • Site location • Preventive practices (surveillance and vaccination) • New species • Facility design and structures • Fallowing

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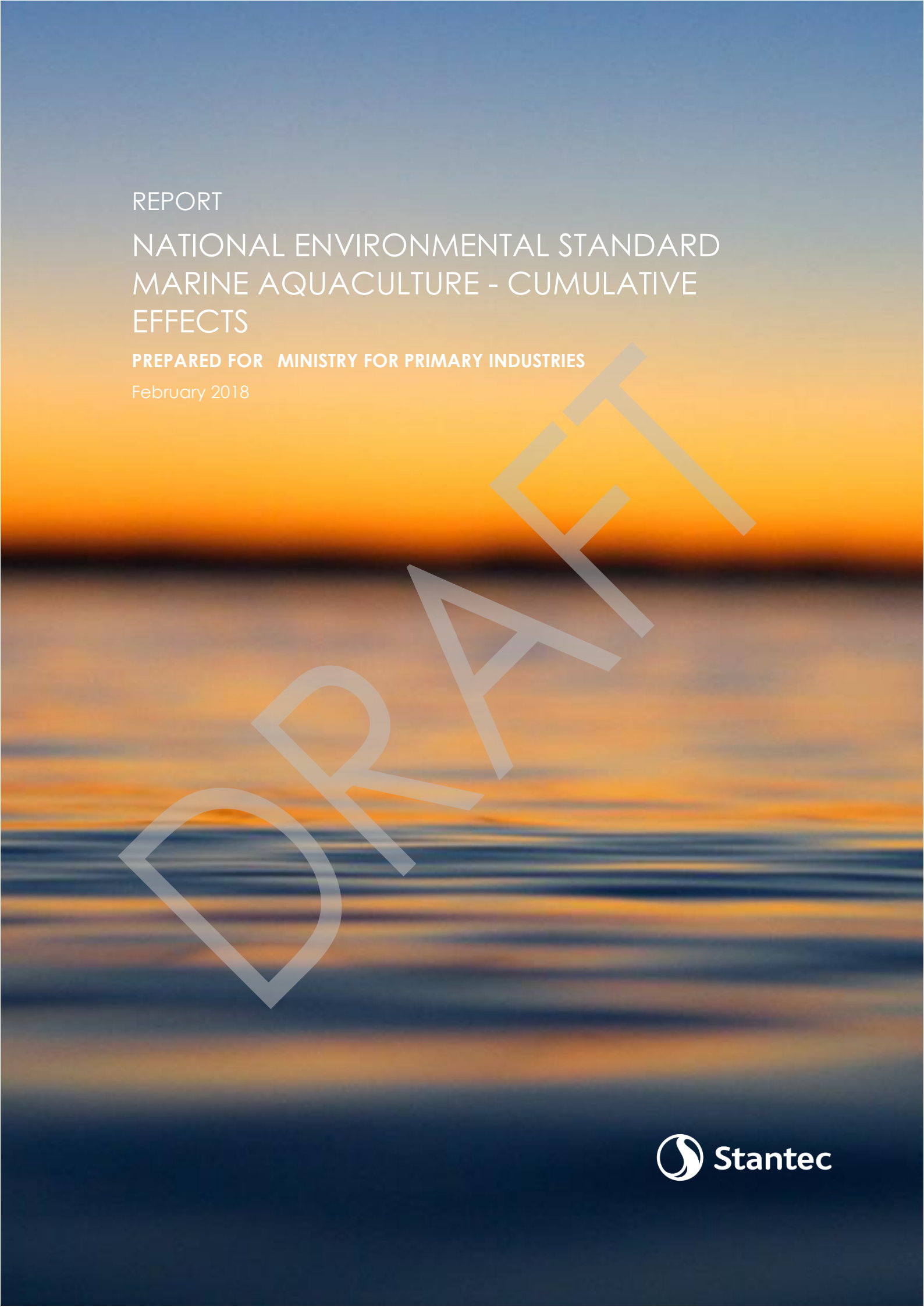
Appendix E – Cumulative Effects Report



REPORT

NATIONAL ENVIRONMENTAL STANDARD MARINE AQUACULTURE - CUMULATIVE EFFECTS

PREPARED FOR MINISTRY FOR PRIMARY INDUSTRIES

February 2018

Stantec

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REVISION SCHEDULE

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1	1/2/18	Updated draft following MPI review	FL			
2	7/2/18	Addition of first draft on future planning	FL	JD	JD	
3	20/2/18	Updated draft following officials discussion	FL			AC

Ministry for Primary Industries

National Environmental Standard Marine Aquaculture - Cumulative Effects

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APPENDICES

Appendix A Title

1. Introduction

This report provides analysis of submissions received on the proposed National Environmental Standard for Marine Aquaculture (the NESMA) in relation to three matters:

- cumulative effects
- adaptive management
- future planning, including spatial allocation and identification of areas that are inappropriate for aquaculture

A broad summary of the submissions on each topic is provided first, followed by the analysis. While adaptive management and future planning are both tools for addressing cumulative effects, they are also used to manage other issues, and have therefore been analysed separately.

The purpose of this report is to initially provide a focus for discussion with officials in relation to any changes that should be made to the provisions of the NESMA, and then, having developed a series of recommendations, to provide the basis for discussion with the Government's Aquaculture Reference Group, at its meeting in March 2018.

2. Submissions on cumulative effects

The NESMA discussion document did not raise any questions in relation to cumulative effects, but eighteen submissions were received that raised the matter. In very broad summary, submitters who supported the inclusion of cumulative effects as a matter in the NESMA made the following points:

1. Original consents were granted before cumulative effects were well understood, and so the industry has never undertaken a holistic analysis of the overall effects of marine farming over an extended area. In Marlborough there has been scant regard for managing marine farming as part of wider environmental management. It would be preferable for areas to be managed in a holistic way, as a zone rather than on a farm by farm basis, which would allow for adaptive management and management of cumulative effects
2. Issues have arisen since the Resource Management Act 1991 (the RMA) was enacted that require revised planning provisions, including: cumulative effects of land use activities, including urban development, forestry and farming on the water quality of coastal waters and cumulative effects of activities on natural character, landscape and recreational values from activities and structures in the coastal marine area, including jetties, moorings, reclamations and marine aquaculture
3. An NES will severely restrict Marlborough District Council (MDC) from properly assessing aggregations of existing marine farms in terms of avoiding, remedying and mitigating any adverse effects of the activity[1]
4. The management of cumulative effects of multiple farms where there is no zoning should be spelled out in the NES, and management of cumulative effects should have a time/trend component
5. A baywide approach is the marine equivalent of the freshwater catchment or subcatchment management approach
6. What is a sustainable level of aquaculture?
7. Cumulative effects needs support
8. Ecosystem level analysis should be undertaken to understand effects
9. Provisions of s165ZF of the RMA should be used as a tool instead
10. Criticism of deferring consideration of cumulative effects to the plan-making stage - granting of consents for long terms before second generation plans have legal effect will render consideration of cumulative effects obsolete for up to 35 years
11. Pushing cumulative effects consideration to the plan-making stage creates an issue in advance of third generation plans taking effect for farms that might be considered to be in appropriate places currently. This is because farms will undoubtedly apply to renew their consents under the NES RD provisions in advance of any third generation plans taking effect if there is a risk they might lose space to help accommodate a reduction for cumulative effects. The NES should prohibit re-consenting if it has the effect of frustrating the consideration and addressing of cumulative effects through the plan review process

[1] In order to ensure a comprehensive analysis, this submission has been extrapolated to apply to all councils, rather than just Marlborough District Council.

12. Members of the public are more motivated to be involved on a site by site basis, rather than in the planning process
13. Query about what national standards have been established to assess cumulative effects of existing marine farms
14. Include a matter of discretion: c) Any cumulative effects arising from a farm's location and operation

Submissions were also made that tied cumulative effects to adaptive management and spatial allocation; those submissions are considered in later sections of this report.

Submitters who were concerned about cumulative effects being included in the NESMA made the following (summarised) points:

1. Attempting to address any potential cumulative effects at the consenting stage is likely to be inequitable, inefficient and ineffective. The first marine farm to come up for renewal in an area would bear the cost of proving lack of cumulative effects. In the event that there were known effects, it would be unreasonable to remove that farm purely because it was the first to come up for renewal. It may well be that farms that come up for renewal first were some of the first to be established in a bay
2. Alternatively, if it is determined that a portion of every farm needs to be removed to address cumulative effects, then it would take 20 years to remove the relevant portion from all farms as they go through the consenting process. This underlines why the consenting process is an inefficient way to respond to problems of this nature
3. Aquaculture New Zealand suggests a 'water quality management plan' to address cumulative effects on water quality
4. MDC agrees that the management of phytoplankton depletion and cumulative effects is best dealt with at the planning stage. This is the most equitable and effective method for applying management given that the adverse effect is not attributable to one farm, but is a combined effect from many farms

3. Cumulative effects concepts

3.1 Definition of cumulative effect

The term 'cumulative effect' appears in section 3 of the RMA, where it forms part of the meaning of 'effect', which includes 'any cumulative effect which arises over time or in combination with other effects'. Philip Milne's 2008 think-piece on cumulative effects (*When is enough, enough? Dealing with cumulative effects under the Resource Management Act*) notes that the term 'cumulative effect' is not further defined, but can be considered to encompass two concepts:

- effects arising over time (e.g. nitrate contamination of groundwater); and
- effects arising in combination with other effects (e.g. interference between groundwater uses or synergistic air pollution effects)

Following a review of the leading case law at the time (*Dye v Auckland Regional Council* and *Queenstown Lakes District Council v Hawthorn Estates Ltd*), Milne concludes that the scope and meaning of cumulative effects is not settled. He goes on to note that:

- cumulative effects can and must be considered when determining a resource consent application (although there is considerable discussion later in the paper about the role of guidance and direction provided in plans in relating to managing cumulative effects);
- cumulative effects include the effects that would result if the activity for which consent is sought is approved, in combination with the effects of other existing activities and/or effects which are likely to arise over time;
- cumulative effects require consideration on a case-by-case basis and there are circumstances where such cumulative effects warrant the declining of consent (e.g. *Browning v Marlborough District Council* or *Jennings v Tasman District Council*);
- so called precedent effects are not cumulative effects but are a relevant consideration (*Dye*); and
- cumulative effects include the additive effects of other possible but not yet occurring permitted activities and the effects of granted but not yet implemented consents.

Milne also considers that any consideration of cumulative effects should arguably include the additive effects of a proposed activity in conjunction with reasonably foreseeable environmental change. One other point that becomes obvious in reading the Milne think piece is that, depending on the type of effect, the area that will be affected will differ, and that, there may be more than one type of effect that is cumulative for some activities.

Apart from the Milne think-piece, surprisingly little has been written about the assessment of cumulative effects in a New Zealand context. The only other places in which the term appears in the RMA are in sections 150C, 165ZF and 165ZFA in relation to the management of aquaculture activities. Policy 7 of the New Zealand Coastal Policy Statement 2010 (the NZCPS 2010) requires regional councils to:

> 2. *Identify in regional policy statements, and plans, coastal processes, resources or values that are under threat or at significant risk from adverse cumulative effects. Include provisions in plans to manage these effects. Where practicable, in plans, set thresholds (including zones, standards or targets), or specify acceptable limits to change, to assist in determining when activities causing adverse cumulative effects are to be avoided.*

The Board of Inquiry's report to the Minister of Conservation for the NZCPS noted that submissions were concerned that the focus of councils in managing coastal development was 'on the process rather than the environmental outcomes required, with little attempt to adopt a forward looking and spatial approach to avoid potential cumulative effects'. This lack of spatial planning was noted by the Board as including recognition of the needs of aquaculture.

The Policy 7 guidance note[2] list examples of cumulative effects in the coastal environment as including a proliferation of structures, sprawling and sporadic coastal development, and nutrient and sediment inputs into coastal waters. The guidance note further notes that: *'There are often practical difficulties in addressing cumulative effects in isolation through individual resource consent processes. These effects are better addressed through a strategic planning approach, including the identification of environmental limits and integrated management of the impact of different and/or numerous similar activities'*. Tools to manage cumulative effects identified in the Policy 7 guidance note includes zones, water quality standards, water quality targets, and limits (specified limits to change that identify an envelope within which use can occur). No specific examples of projects addressing cumulative effects are identified in the guidance note.

3.2 Cumulative effects of marine farming

The following cumulative effects of marine farming have been identified in literature, case law and submissions:

- nutrient depletion (MPI literature review) and possible effects higher up the food chain as a result (Clifford Bay Marine Farms Environment Court decision)
- changes in abundances and composition of organisms in the wider ecosystem (e.g. changes in fish or benthic invertebrate populations) through alteration of a larger proportion of the benthos where there are high densities of marine farms (e.g. in the 'coastal ribbon' in Marlborough) (MPI literature review, discussed briefly in the Davidson Environment Court decision)
- changes to habitats and/or migration routes of marine mammals or seabirds (MPI literature review, Admiralty Bay Consortium Environment Court decision re King Shags, Clifford Bay Marine Farms Environment Court decision re Hector's dolphins) and entanglement and effects on prey for marine mammals (Clifford Bay Marine Farms Environment Court decision re Hector's dolphins)
- effects on nearshore currents and waves where numerous farms are situated along the coast, which could then affect processes such as larval transport and nutrient exchange along the shoreline (MPI literature review)
- increased risk of invasion and establishment of marine pests with increasing numbers of marine farms (MPI literature review)
- eutrophication (MPI literature review, NZKS Board of Inquiry and Supreme Court decisions, KPF Environment Court decision)
- oligotrophication – a reduction in nutrient enrichment and levels of primary production (MPI literature review)
- overall cumulative effects on the coastal environment of significant numbers of marine farms (Browning Environment Court decision)
- effects on landscape and natural character of multiple marine farms within a bay or confined area (see for example Kuku Mara Partnership Environment Court decision, NZKS Board of Inquiry decision, Davidson Environment Court decision)

[2] http://www.doc.govt.nz/Documents/conservation/marine-and-coastal/coastal-management/guidance/policy-7.pdf

- potentially, effects on tangata whenua values (KPF Environment Court decision)

A particular difficulty with the literature and case law on cumulative effects is that the discussion provided almost universally addresses the effects of a new marine farm. The majority of the Environment Court decisions that have discussed cumulative effects have also only looked at the cumulative effects of the proposed marine farm and remained silent on whether there are effects as a result of the existing marine farms within any area.

An exception is the Environment Court decision for RJ Davidson Family Trust, in relation to king shags. Here the Environment Court made a distinction between the cumulative effects of the application on king shag habitat, the effects that had already accumulated through the reduction in previously available habitat from the existing marine farms, and the effects that might occur in the future (what the Court termed 'accumulative effects') from activities other than the marine farm. While this might offer a framework for considering cumulative effects in both the past and the future, on appeal the High Court stated that '*…importing new terminology in a statutory definition invites confusion, creates uncertainty and in light of the statutory wording of 104(1)(a), is unnecessary*'.[3] This leaves us with the *Dye* judgement that cumulative effects are those that will either occur now as the result of a proposed activity or that will occur in the future), and by inference that any future cumulative effects that are not certain should instead be assessed as potential effects under s104(1)(a) of the RMA.

In considering cumulative effects of existing marine farms, it is also important to note a statement from the High Court at paragraph [160] of the *Davidson* decision that: '*The definition of "effect" does not include "accumulated effects"*'. This presents a difficulty for those submitters on the NESMA who have expressed concern about the 'cumulative effects' of the existing level of development of marine farms, indicating that those 'cumulative effects' should be addressed. According to the High Court decision in *Davidson* they are not cumulative effects, and only the effects of the (usually) single consent application that is being considered can be assessed.

An example may assist:

> *A bay contains nine mussel farms, all of which have consents that expire at different dates. Kozma Marine Farming Ltd (KMFL) holds one of those consents and operates a mussel farm. The consent is due to expire on 30 June 2018 and an application has therefore been made to replace the consent and continue to operate the farm. As the farms have been in place for between 10 and 20 years, there has been a gradual build-up of shell debris under each of the farms, and what was previously a muddy seafloor in the bay as a whole now consists of a combination of muddy areas and patches of shell reef type habitat. At the time that the application to replace the existing consent held by KMFL was made, this changed seabed represents the environment of the bay. As KMFL is proposing to continue farming, the benthic habitat underneath its mussel farm will continue to gradually change as shell drop (for example) continues. The effect of that ongoing change at the KMFL site, in combination with the existing seabed environment at the time the consent application is made, is the cumulative effect of the KMFL farm on the benthic environment, and it is only that effect that can be referred to as cumulative according to case law.*

The argument may seem pointless and relatively complex, but is nonetheless important for two reasons. Because *Dye* is a Court of Appeal judgement, and there is an appeal of the High Court decision on *Davidson* but not in relation to what it stated about cumulative effects, the Environment Court has been rigorous in ensuring that its judgements have accorded with *Dye*. Being clear therefore about what is considered to be a cumulative effect and respecting the position that has already been reached on the matter is important. Second, as far as possible the NESMA should avoid creating a situation that does not assist councils to address cumulative effects and that then contributes to the regular stream of Environment Court cases on marine farming, nor should it raise the hopes of submitters that the matter at least some of them appear to be principally concerned with (the effects that have occurred to date) can be addressed by the NESMA.

3.3 The 'unit' for considering cumulative effects

As noted in section 3.2 there are a variety of effects from marine farming that may potentially be cumulative. Some of the effects – reductions in significant habitat for indigenous species, eutrophication, oligotrophication and effects on landscape and natural character – have been accepted and traversed in consent application and plan provision decisions – while others are currently more theoretical.

[3] *R J Davidson Family Trust v Marlborough District Council [2017] NZHC 52* [paragraph 161].

Even taking only the four effects that have been considered to date, it is clear that the effects have been considered over varying geographic scales. The most common unit for consideration of most cumulative effects is the relevant bay. Effects on significant habitat for indigenous fauna (dusky dolphins, Hector's dolphins and king shags) have been considered, for example, within the bay in which a particular proposal is located, and landscape and natural character effects are generally initially considered within a particular enclosed geographic area, generally a bay. Marlborough District Council's current approach to the development of aquaculture provisions for the Marlborough Environment Plan could also very broadly be described as using a bay size scale to assess effects.

Both landscape and natural character, and significant habitat for king shags have been considered at a wide scale than the bay however, particularly in Marlborough where:

- effects of marine farming on available feeding habitat for king shags has been considered in the context of all of the marine farming in the area identified as important for king shags
- effects of salmon farming on landscape were considered using the Waitata Reach and the 'gateway' to Pelorus Sound as the unit for measurement
- effects of mussel farming on landscape in relation to Forsyth Island were considered in the context of the whole island (both east and west coasts, which would not be able to be seen from one, sea level or ground based viewpoint)

The classification of the whole of Banks Peninsula as an outstanding natural landscape has also led to marine farms within bays being considered in the context of the overall landscape.

Water quality effects (eutrophication) from supplementary fed aquaculture are generally considered at two scales – the effects on particular bays or enclosed waters within a general area (not necessarily the bay where the farm is located) and the overall effect at a much wider scale (Pelorus Sound as a whole, Tory Channel/Queen Charlotte Sound as a combined whole, and the Firth of Thames for example).

A further complication is that each marine farm does not have an identical set of cumulative effects, and for some farms, more than one of the effects listed in section 3.2 may need to be considered. The effects that have accumulated in the environment to date will also potentially be at different scales.

3.4 Second generation regional coastal plans and NZCPS2010 Policy 7

Policy 7(2) of the NZCPS 2010 is as follows:

> *(2) Identify in regional policy statements, and plans, coastal processes, resources or values that are under threat or at significant risk from adverse cumulative effects. Include provisions in plans to manage these effects. Where practicable, in plans, set thresholds (including zones, standards or targets), or specify acceptable limits to change, to assist in determining when activities causing adverse cumulative effects are to be avoided.*

Since the NZCPS was gazetted in 2010, four 'second-generation' regional coastal plans have been notified: Northland, Auckland, Bay of Plenty and Marlborough.[4] Various approaches have been taken to addressing Policy 7 of the NZCPS:

- in Northland 'significant' areas have been identified (outstanding natural character, outstanding natural landscapes and features as well as significant marine biodiversity areas) where effects are generally to be avoided. While cumulative effects are not noted as a specific issue in relation to the identification of these areas, their identification is consistent with Policy 7. Cumulative effects of multiple stormwater discharges are identified as an issue, but no thresholds or limits are specified. Policy D.5.2 (relating to aquaculture) does identify 'ecological carrying capacity' as a matter to be considered, which implicitly provides the context that overall limits in the system will be considered;[5]

[4] While provisions to manage marine farming have not been notified yet as part of the proposed Marlborough Environment Plan, other provisions relating to the management of the coastal marine area are relevant to a consideration of cumulative effects.

[5] Note that there is a complication with the drafting of the Northland plan in relation to existing marine farms, which are classified as a controlled activity. The directive in Policy D.5.2 is for aquaculture activities to avoid adverse effects on existing aquaculture (either because there is no or limited space, or the area is at its production or ecological carrying capacity). If existing marine farms are causing adverse effects on ecological carrying capacity to such an extent that they should not be there, the consent authority will be unable to fully give effect to Policy D.5.2 with a controlled activity classification.

- in Auckland, 'significant' areas have been identified in much the same way as they are in Northland. Policy B8.5.2(3) requires applications for use and development to be assessed in terms of the cumulative effects on the ecological and amenity values of the Hauraki Gulf overall (i.e. a very wide unit for assessment), but this is the only reference to management of cumulative effects, but this is the only relevant reference to management of cumulative effects in the Auckland wide policies. Policy B8.3(10) relates to providing for aquaculture activities 'within appropriate limits in the coastal environment', although those limits do not appear to be defined ('soft' limits, such as managing effects on areas of high recreational use in the Hauraki Gulf, are identified). Policies specific to aquaculture provide for the continued operation of established aquaculture activities where adverse effects on ecological values, water quality and navigation and safety are avoided, remedied or mitigated, adverse effects on characteristics and qualities that contribute to the identified values of overlay areas are avoided, and there is existing substantial level of economic investment in lawfully established aquaculture activities. No particular issue is identified with cumulative effects in relation to any of these matters;
- in Bay of Plenty, Issue 3 identifies areas that are particularly vulnerable to cumulative effects and Issue 11 identifies harbours and estuaries as facing challenges from cumulative effects of land based activities and land use on water quality. Objective 1 seeks to achieve integrated management of the coastal environment by planning for and managing cumulative effects. Policies again include 'soft' limits in terms of activities not causing cumulative adverse effects, without defining any limits to those effects. Policy RA 7 provides a more concrete example of how to address cumulative effects:

    > *(b) Avoid cumulative impacts of such infrastructure* [land-based infrastructure that will support recreational activities and access to the coastal marine area] *on the coastal environment, by ensuring such infrastructure is located in the vicinity of official access ways and preferably where the coast is already modified or future development is planned (consented, zoned or designated);*

  Method 6 provides a good example of the type of framework for managing cumulative effects that the NZCPS2010 anticipates:

  > *Support further research to model sub-catchments in the Tauranga Harbour, and other catchments where urban or industrial areas discharge stormwater to the coastal environment, to determine assimilative capacity for stormwater. This will include the assimilative capacity for sediment-contaminated stormwater from land disturbance activities, and residually accumulative contaminants (e.g. heavy metals) and incorporate mātauranga Māori where practicable to do so. The results of the modelling will be used to manage cumulative effects and loading of contaminants from stormwater discharges.*

- in Marlborough, Policy 13.2.2(f) of the proposed Marlborough Environment Plan (pMEP) indicates that decision makers are to consider whether an activity, individually or cumulatively results in sprawling or sporadic patterns of development that would compromise identified values and matters. The values are identified in Policy 13.2.1 and again represent 'soft' limits (i.e. they are subjective values that are to be preserved, rather than numerical limits). While not a means of implementing Policy 7 of the NZCPS 2010, Policy 15.1.3 of the pMEP provides an example of an approach to cumulative effects:

  > *Policy 15.1.3 – To investigate the capacity of fresh waterbodies to receive contaminants from all sources, having regard to the management purposes established by Policy 15.1.1 in order to establish cumulative contaminant limits by 2024.*

Policies or methods setting out a detailed approach to managing cumulative effects in the coastal marine area are therefore currently relatively uncommon. This may be because regions are not experiencing or perhaps identifying issues with cumulative effects, particularly from aquaculture, although it is difficult to tell from a review of existing planning documents.

3.5 Management and monitoring of cumulative effects of aquaculture

Four examples of approaches to managing cumulative effects of aquaculture are available – the Coromandel Marine Farming Zone and Wilson's Bay Zone in Waikato, the Tasman AMAs, and the New Zealand King Salmon Board of Inquiry sites in Marlborough – although all of these relate to managing cumulative effects of new aquaculture activities only.

The main features of each approach are outlined in the table below.

Table 3-1: Approaches to management and monitoring of cumulative effects

Area	Details
Coromandel Marine Farming Zone (Waikato) – cumulative effects of concern = water quality	• Zone introduced through legislation in 2011, and with guidance from a Ministerial Advisory Panel • Underpinned by modelling of nitrogen discharges and assessment of effects on water quality of the Firth of Thames • Policy framework specific to the CMFZ requires staged development of the zone • Policy sets a nitrogen discharge limit of 800 tonnes per year, and a maximum feed discharge (related to quantity of nitrogen discharged) of 13,600 tonnes per year • Marine farming within the zone is a discretionary activity and Rule 16.5.8 states that resource consents for marine farming in the zone will include conditions requiring staged development • Development of the zone divided into three stages – 50% of nitrogen and feed authorised by consent, then 75% and 100% • Baseline survey to be completed before consent can be exercised – details of monitoring required contained in an appendix to the plan • After the first stage, development of subsequent stages is dependent on permission from the regional council, which in turn depends on: o Monitoring of a minimum of two production cycles at full development of that stage being complete o Monitoring data having been analysed in comparison to predetermined thresholds o No significant adverse effects occurring, including cumulative effects o Compliance against consent conditions being assessed
Wilson Bay Marine Farming Zone (Waikato) – cumulative effects of concern = benthic values and nutrient depletion	• Zone created in 1999 by Waikato Regional Council, with sufficient scientific investigations to classify shellfish farming within the zone as a controlled activity (subject to staged development occurring) • Method 17.5.3 outlines the development approach to manage cumulative effects: o First stage of 200ha in Area A and 260ha in Area B o Once an area is fully developed, and no significant adverse environmental effects have been demonstrated, a further equivalent area can be developed o Marine farmers are required to undertake monitoring to identify trigger points which could result in the restriction of further development • Trigger points identified in Environment Waikato Technical Report 2005/28 *Trigger Points for Wilson's Bay Marine Farming Zone* • Baseline survey to be completed before consent can be exercised – details of the monitoring required are contained in an appendix to the plan
Tasman AMAs – cumulative effects of concern = overall effects on species and ecology of Tasman and Golden Bays	• AMAs included in the Tasman Resource Management Plan following a series of Environment Court hearings and High Court action • Approach to managing adverse effects (including cumulative effects) is outlined in policy and consists of: o Concentrating aquaculture development in the AMAs and prohibiting it elsewhere o Providing for aquaculture only in certain sub-zones of the AMAs (the balance of the AMAs are reserved for seasonal and rotational spat catching) o Authorising a first stage of development, with requirements to monitor and report on environmental effects from farming at the full intensity of development allowed for the first stage o Allowing successive stages of development only when the Council is satisfied the risk of adverse effects is managed appropriately o Monitoring of species, habitats and ecological processes within Tasman Bay and Golden Bay so that individual and cumulative ecological effects are better understood

Area	Details
	○ Requiring ecological management plans to cover the whole of a subzone to which an application for consent relates ○ Establishing an Ecological Advisory Group to advise the Council on appropriate staging and development of aquaculture • Consent for first stage of development in any subzone (50ha at full intensity) is a controlled activity. For areas larger than this, consent is a restricted discretionary activity, but the first stage of the overall consent remains restricted to 50ha, and there must be an ecological management plan that has been prepared for the whole subzone • Progression to subsequent stages is assessed by the Council after monitoring reports from three years or two growing cycles of the first stage at full intensity of development have been reviewed by the Ecological Advisory Group • Requirements for ecological management plans are outlined in schedules to the plan, which also require that the management of the proposed marine farm be integrated with any existing ecological management plans for adjacent subzones in the same AMA. Additional matters are specified for aquaculture involving species that need feed added • Further schedules to the plan set out protocols for the operation of Ecological Advisory Groups for mussel farming, and for the farming of other species
New Zealand King Salmon sites (Marlborough)	• Provisions included in the Marlborough Sounds Resource Management Plan following a Board of Inquiry process and various Court decisions • Plan provisions set maximum initial and final feed discharges at each site, based on modelling work • Assessment criteria then provide for effects and standards to be set in consent conditions[6] • Conditions on consents: ○ Set environmental quality standards for seabed deposition, copper and zinc levels and the water column ○ Set feed levels that should ensure compliance with the environmental quality standards ○ Provide feedback loops between the environmental quality standards and the levels of feed that can be discharged to govern the increase or decrease of feed discharges ○ Provide detailed requirements for marine environmental monitoring, adaptive management and reporting

Common to all of the approaches to monitoring and managing cumulative effects are detailed frameworks in the plan provisions, and the setting of limits through the plans, either on areas that can be affected by the first stage of activities or on levels of discharge that can occur. These limits have generally been derived on the basis of scientific work undertaken during the development of plan provisions.

3.6 How does the proposed NESMA currently deal with cumulative effects?

The phrase cumulative effects does not currently appear in the NESMA. However:

1. cumulative effects on reefs and biogenic habitats affected by shellfish farms can be managed under matter of discretion 12f) and from supplementary fed aquaculture under matter of discretion 13b). For example, in a particular bay, a Council may now be concerned about the overall effect of shellfish farming on the total reef and biogenic habitat in the bay. When an existing farm seeks a replacement consent, the effect of that farm in relation to the total proportion of habitat in the bay can be considered, and the Council could impose conditions to reduce the effects, or decline part or all of the consent
2. cumulative effects on benthic values from supplementary fed aquaculture can be considered and managed under matter of discretion 13b). In the situation, for example, where benthic footprints of a supplementary fed farm overlap with those of an adjacent shellfish farm, the cumulative effects will be able to be considered

[6] Note that in this case, consents were applied for as part of the same process, and so the Board of Inquiry recommended consent conditions as well as plan provisions to address potential cumulative effects.

3. cumulative effects of supplementary fed aquaculture on water quality can be considered and managed (and this would include the continuation of existing adaptive management strategies and monitoring) under matter of discretion 13a)
4. cumulative effects on marine mammals and seabirds in terms of the overall risk of entanglement can be considered and managed under matter of discretion 12g)
5. cumulative effects of biosecurity risks can be considered and managed under matter of discretion 12h)
6. cumulative effects of noise can be considered and managed under matter of discretion 12j)
7. cumulative effects of multiple supplementary fed marine farms utilising underwater lighting can be considered and managed under matter of discretion 13e)
8. cumulative effects on recreational access and navigational safety can be considered and managed in relation to the layout and positioning (including density) of marine farms under matter of discretion 12c)

For all of these matters, the question of equity in a bay or area where not all the consents expire at the same time is relevant, but the NES itself does not restrict the consideration of cumulative effects for the matters listed above.

The main matter identified by submitters that is not covered, other than in 'outstanding' areas, is effects on landscape and natural character – but this has been the subject of discussion between officials in another workstream and no changes are proposed to the NES provisions.

Cumulative effects from nutrient depletion are not addressed by the existing matters of discretion. Unlike the other effects discussed above, there is a natural component to nutrient depletion that is difficult to characterise without undertaking complex food web modelling, with its inherent problems of being a representation of the environment rather than necessarily accurate. Like water quality, effects of nutrient depletion are most likely to be able to be managed on an area scale, potentially at a bay scale, and/or alternatively at a wider scale. While the relatively small number of supplementary fed aquaculture marine farms means that water quality effects can be managed, and cumulative effects taken into account through a consent process, the much larger number of shellfish farms makes it much less viable, as well as significantly inequitable, to consider nutrient depletion on a consent-by-consent basis.

4. Matters raised in submissions

The general tenor of submissions relating to cumulative effects was to request their inclusion in the NES and criticising the approach of relying on regional coastal plans to set the framework for managing cumulative effects. Those submitters who did not support the inclusion of cumulative effects within the NES pointed out the inequity and inefficiency of dealing with issue on a consent-by-consent basis.

4.1 Can cumulative effects be addressed in a consent?

As noted in the background analysis outlined in section 3 of this report, consideration of cumulative effects to date has been almost exclusively based on considering the effects of a new activity in addition to those of existing activities. In these circumstances the effects of each new activity as it is applied for can be considered at the consent application stage. Ideally environmental thresholds or limits will have been set through regional plans to guide consideration of cumulative effects so that there is an understanding of when enough is enough (to borrow Milne's phrasing).

The situation is more complicated for existing activities, such as the existing marine farms covered by the NES, where for example, the effects that have occurred as a result of multiple farms in a bay over the past 10-20 years form part of the environment against which a replacement consent for a single farm is considered, but cannot be considered in themselves to be an effect.

Those effects of existing marine farms identified in section 3.2 of this report that may continue to be cumulative include – benthic effects from shell drop and sediment accumulation under shellfish farms[7], water quality effects from supplementary fed aquaculture in combination with other anthropogenic inputs and natural receiving environment variability, ongoing biosecurity risks, and effects of ongoing environmental change on tangata whenua values. While not specifically mentioned in the proposed NES, matters of discretion relating to each of these matters are included, which will allow them to be addressed. It will remain critical though that thresholds or limits are clearly defined in regional plans in order

[7] Benthic effects from supplementary fed aquaculture are not included as a cumulative effect, as natural remediation can keep them in check provided that the level of discharge is controlled through consent conditions, and this is a matter that can be addressed on a consent by consent basis.

to manage cumulative effects and understand when the capacity of the environment to accept a certain type of change is being reached.

Effects of existing marine farms such as those on landscape and natural character, effects on habitat for marine mammals and seabirds, and effects on nearshore currents and waves will only be able to be considered as the cumulative effect of a single marine farm being added to existing farms through resource consent processes, unless consents in a defined area have common expiry dates.

Of those effects identified in section 3.2 of this report, effects from existing marine farms that will now form part of the environment for any replacement consent could include the changed seabed that has developed over time, and the overall results of multiple human uses of the coastal marine area on its overall character and amenity.

4.2 Common expiry dates

Section 4.1 has highlighted the difficulty of dealing with cumulative effects on a consent by consent basis, particularly where consents expire at different times and existing marine farms therefore form part of the 'environment' rather than being able to be considered, and where thresholds for acceptable change have not been set in plans.

Dealing with the issue of multiple expiry dates first, where consents expire at the same time, it may be more possible to address cumulative effects of a number of farms. The challenge then is that there are relatively few areas in the major aquaculture regions where significant numbers of consents for marine farms expire at the same time. The table below provides two examples to illustrate the problem of multiple expiry dates – the Kaipara Harbour in Northland and Forsyth Bay in Marlborough. Other bays or harbours in both regions also have a range of different expiry dates.

Table 4-1: Examples of existing marine farm expiry dates

Northland (Kaipara Harbour)		Marlborough (Forsyth Bay)	
Expiry year	**Number of consents**	**Expiry year**	**Number of consents**
2024	11	2018	2
2027	1 (Auckland region)	2020	3
2034	2	2021	3
2035	1	2024	20
2036	1	2025	1
2039	2	2027	1
2041	1	2028	1
2049	1	2030	1
		2031	1
		2033	1
		2034	1

While less acute, similar problems exist in Auckland and Waikato with respect to their shared responsibility for the Firth of Thames and on a much smaller scale in Canterbury with respect to the marine farms located in Akaroa Harbour.

Even if all of the consents expired in an area at the same time, the issue of the need for thresholds of acceptable change would remain, as discussed in section 4.3 below.

4.3 Role of 'environmental limits' in managing adverse effects

Four submitters either raised questions about, or referred to, the role of environmental limits in managing adverse effects:

- suggesting that they should be included as part of the NES
- querying what national work had been done to establish environmental limits for aquaculture
- suggesting that baywide management, akin to catchment management under the NPSFM, should be included in the NES along with a framework for regional assessment under Policy 7 of the NZCPS 2010.

In terms of the national work that has been done, *Our marine environment 2016* (MfE and Statistics NZ) states that:

Increased sedimentation from changes in land use can have substantial impacts on nursery habitats and shellfish species but we have not been able to assess the extent to which this is changing our coastal environment on a national scale. We cannot yet quantify the impact of excess nutrients on marine ecosystems and species. Heavy metal concentrations in estuaries and harbours are mostly at levels unlikely to cause harm to seabed species in the 10 of 16 regions around the country for which we have data.

To date therefore, with insufficient data to comprehensively assess state, no development of national standards has been undertaken.

As noted earlier, a critical component of managing cumulative effects is the establishment of thresholds or limits that determine when the level of effect has become too great. For those regions that have established cumulative effect management regimes for new aquaculture, limits were established in each case, either in relation to the area of the coastal marine area that could be developed, or the levels of feed that could be discharged. From review of existing coastal plans (both first and second generation plans), with the exception of identification of significant areas (within which adverse effects are to be avoided) there has been no development of thresholds or limits to manage cumulative effects for any type of activity in the coastal marine area.

As well as a limit or threshold being defined the 'unit' over which cumulative effects will be measured also needs to be defined. As discussed earlier in this report, that unit will vary depending on the effect and depending on the region.

5. Options for managing cumulative effects

Sections 3 and 4 of this report have outlined some of the complexity involved in addressing cumulative effects. Options for managing cumulative effects of existing marine farms will be discussed with the Aquaculture Reference Group on 8 March 2018.

6. Adaptive management

6.1 Submissions on adaptive management

Six submissions were received that made reference to adaptive management:

- Tasman District Council (24) noted that there may be some benefit in providing for adaptive management outside of Tasman and Waikato;[8]
- Marlborough District Council (90) expressed concern that it would not be able to impose conditions to require adaptive management for existing marine farms, and that two existing farms with consent conditions requiring adaptive management would be able to be replaced without these conditions;
- The New Zealand Marine Sciences Society (87) considered that it would be preferable for aquaculture to be managed on a zone basis rather than farm-by-farm, and that this would allow for adaptive management approaches to be instituted;
- Kenepuru and Central Sounds Residents Association (38) requested that the NES facilitate Marlborough District Council undertaking a bay-by-bay to the management of marine farms, so that a reduction in farming intensity could be effected, if required, through an adaptive management approach;
- Friends of Nelson Haven and Tasman Bay (44) referred to adaptive management in their submission but did not make any specific requests in relation to its inclusion within the NESMA;
- Helen Campbell (43) asked how adaptive management techniques included in conditions have played out, and posed a series of questions about the types of adaptive management approaches that were currently being imposed on consents.

6.2 Role of adaptive management

Adaptive management is generally used in two ways for marine farming – as a tool for managing cumulative effects and in relation to some site specific effects.

[8] The areas in Tasman and Waikato where adaptive management applies are both currently exempted from the NESMA.

A general outline of the adaptive management approaches enshrined in the Tasman and Waikato regional coastal plans and the approach imposed by consent condition on the New Zealand King Salmon EPA sites is contained in section 3.5 of this report. Each of these approaches was developed for new marine farms rather than existing farms. The Tasman and New Zealand King Salmon approaches have not yet been fully implemented – the final decision on the Tasman AMAs was only made in 2015 and the New Zealand King Salmon sites were only established in 2016, so neither has reached a complete first stage of development to date.

In Waikato, the Wilson's Bay Marine Farming Zone (the Wilson's Bay zone) is further along with implementing its adaptive management approach. As noted earlier in this report, the Wilson's Bay zone is divided into two areas for the purpose of implementing the adaptive management approach contained in the regional coastal plan – Area A and Area B. As at July 2017 Area A was 92% developed. The seabed monitoring had been carried out as required, and variations to the consents have recently been processed to allow seabed monitoring to cease, because the effects were as anticipated when the zone was first developed. The Area B consents are only approximately 50% developed, and so the adaptive management approach has not yet been completed for these farms. Of note, for both Area A and Area B water quality monitoring (both water column monitoring and synoptic surveys) is continuing, but difficulties are being experienced with separating any water quality effects from marine farming from natural variation, and therefore in establishing whether the trigger levels for water quality effects that were set in 2006 are appropriate and meaningful to implement. Technical work is continuing in relation to water quality to try to address this.

Two further marine farm consents have adaptive management conditions, both in Marlborough – Clifford Bay Marine Farms Ltd in Clifford Bay, and Wakatu Incorporation for a site to the west of D'Urville Island. The Clifford Bay Marine Farms Ltd conditions were developed in part as a response to potential cumulative effects on Hector's dolphins of the farm in combination with other actual and potential activities in the vicinity, while the Wakatu Incorporation conditions appear to be addressing a more site specific issue. The main features of each approach are outlined in the table below.

Table 6-1: Adaptive management – Clifford Bay and D'Urville Island

Site	Adaptive management approach

Clifford Bay	• Initial monitoring prior to site establishment:
	  ○ Surveys of beach profiles, current speed and direction, tuatua, seabed sediments and benthic biota, pelagic and benthic fish, *Macrocystis pyrifera*, chlorophyll a and water column characteristics over a period of one year
	  ○ Survey of Hector's dolphin breeding, nursing, feeding or sheltering in relation to the site over a period of three years
	• Reporting of the results of the initial monitoring and identification of any changes proposed by the consent holder to avoid, remedy or mitigate effects potential effects on Hector's dolphin habitat
	• Development of an initial 150 hectares (of 424.57 hectares in total) in three separate blocks
	• Ongoing monitoring of each of the matters listed above:
	  ○ For one year after completion of a stage for all matters except Hector's dolphin
	  ○ For periods of between one and a half to two and a half years for Hector's dolphin (depending on the stage of the farm being developed)
	• Reporting of the ongoing monitoring
	• A feedback loop to control development of the farm is then included via an RMA section 128 review condition, with the purpose of that review being *inter alia* to determine the appropriate scale, location, orientation and layout of subsequent stages, including whether or not it is appropriate for any subsequent stage to proceed

D'Urville Island	• Four stages of development defined (8ha, increasing to 350ha, increasing to 370ha and a final full development of 450ha) • Progression dependent upon monitoring 'proving that no adverse effects have arisen from the preceding stage' • Environmental Monitoring Programme to be provided to the Council prior to the commencement of Stage 1 • Up-current water column monitoring specified as follows (for at least 18 months):

Site	Adaptive management approach
	○ Fortnightly zooplankton sampling ○ Phytoplankton sampling (random) ○ Synoptic survey (to quantify the effect the farm has on phytoplankton, zooplankton, nutrient and dissolved oxygen) on two occasions during stage 1 of the farm development • Seabird and marine mammal monitoring required on a monthly basis over 12 months during stage 1 of the farm development • If monitoring shows adverse effects, consent holder is to take immediate steps to avoid, remedy or mitigate the identified significant adverse effects, 'such steps may including reducing the intensity of development and/or removal of lines from some areas'

The primary difference between the two approaches is the more explicit consent conditions attached to the D'Urville Island site relating to reduction in intensity of development if significant adverse effects occur, where the Clifford Bay consent would have to be reviewed by Marlborough District Council in order to effect any change in the consent conditions and 'wind back' development if a stage causes unacceptable adverse effects. The D'Urville Island approach is the more comprehensive adaptive management approach in that regard.

The only council currently investigating adaptive management for existing farms is the Marlborough District Council through its Marlborough Aquaculture Working Group. No results from that process are currently available.

In summary therefore, adaptive management is not yet a proven management tool for marine farming in New Zealand. It is also being used for different purposes in different areas of the country, including for site-specific effects management, management of cumulative effects, and as a mechanism to stage development (but then not be used further once full development has been attained).

In *Crest Energy Kaipara Limited v Northland Regional Council* the Environment Court identified the following features as being necessary for adaptive management:

- Stages of development are set out;
- The existing environment is established by robust baseline monitoring;
- There are clear and strong monitoring, reporting and checking mechanisms so that steps can be taken before significant adverse effects eventuate;
- These mechanisms must be supported by enforceable resource consent conditions which require certain criteria to be met before the next stage can proceed; and
- There is a real ability to remove all or some of the development that has occurred at that time if the monitoring results warrant it.

The Supreme Court in *Sustain Our Sounds Incorporated v The New Zealand King Salmon Company Ltd* further refined these features by making reference to the need for thresholds to trigger remedial action before the effects become overly damaging and to the fact that for an approach to be effective it is necessary that effects that may arise can be remedied before they become irreversible.

The challenges for adaptive management for existing marine farms therefore lies in:

- Being clear about the purpose for which adaptive management is to be used;
- Establishing what the baseline environmental conditions are in an environment where significant development has already occurred;
- Establishing appropriate trigger thresholds (particularly in a planning environment where councils are not currently generally establishing thresholds or limits for the management of effects in the coastal marine area – see section 3.4 of this report);
- Establishing effective measures to reduce effects, and 'winding back' existing marine farms if thresholds that have been established are found to be exceeded (particularly in terms of managing cumulative exceedances of thresholds where consents do not have common expiry dates).

The Department of Conservation has also noted that adaptive management is resource hungry and expensive – it needs reliable, continually validated modelling, comprehensive monitoring, reporting, expert analysis of cause and effect, and detailed enforceable trigger and response conditions.[9]

As with the discussion of cumulative effects, if the point of an adaptive management regime is to address cumulative effects, or the effects of multiple activities, the trigger thresholds need to be set through plans, rather than on a consent-by-consent basis.

6.3 How does the proposed NESMA currently deal with adaptive management?

Adaptive management is not specifically provided for in the NESMA currently. For the management of effects on benthic values and water quality from supplementary fed aquaculture, matter of discretion 13a) would allow adaptive management conditions to be set for existing farms that are seeking replacement consents. The approach currently contained in consent conditions for New Zealand King Salmon sites (both the EPA sites and two further sites that have adaptive management conditions imposed – Te Pangu and Clay Point) could therefore be retained through any replacement consent process or new conditions imposed if they are seen as necessary.

The existing adaptive management regimes in place in Tasman and Wilson's Bay are protected by the exemption of these areas from the NES.

As outlined above, adaptive management has been adopted for a variety of other purposes in existing consents, including management of effects on the habitat of marine mammals and effects at an ecosystem level as a result of nutrient addition or depletion. The matters of discretion contained in the indicative regulations are not currently broad enough to allow adaptive management conditions to be set in relation to these matters.

Marlborough District Council's submission makes the point that while a matter of discretion provides for monitoring and reporting, the other matters of discretion mean that the scope of that monitoring and reporting is restricted. Inclusion of a matter of discretion for adaptive management that is too coarsely worded (for example, requirements for adaptive management) will presumably run into the same problem (i.e. that adaptive management conditions only in relation to those matters specified in other matters of discretion would be able to be developed) and not allow current conditions to be retained. Until the matters identified in section 6.2 of this report that are fundamental to the establishment of an adaptive management regime are resolved in relation to existing marine farms, inclusion of a matter of discretion relating to adaptive management runs the risk of being confusing and ineffective, and is not recommended.

As demonstrated by the Marlborough example, there is a possibility that councils will, over the life of the NESMA develop adaptive management regimes to apply to existing consents. This situation could be provided for by including a matter of discretion that identifies that where a council has an adaptive management approach codified by plan provisions, council is provided with the discretion to include conditions on any replacement consent for an existing marine farm requiring that marine farm to operate in accordance with the established adaptive management regime (provided that the scope issue identified above can be resolved).

7. Future planning

7.1 Submissions on future planning

Twenty-five submissions were received on future planning and identification of inappropriate areas, three in support, three requesting that the activity status for marine farms in inappropriate areas be more stringent than discretionary, and twenty-two providing feedback on how the NES proposed to address future planning for inappropriate areas.[10] Submissions can be broadly summarised as: providing ideas for recognising future planning processes; making amendments to the provisions; and opposition to the approach.

[9] Email from Rod Witte, 18 December 2017.

[10] Note that three submitters fall into more than one category to describe the submission – twenty-five submissions were received but twenty-eight submission points were made overall.

In terms of ideas for recognising future planning processes, the following suggestions were made by submitters:

1. Get the councils to recognise that the farms were there a long time before people, but are given relatively little consideration now that further development on land nearby is occurring
2. Councils should follow the NES (i.e. the NES should dictate what councils do in the future) or in the opposite the regional coastal plans should be the main planning instrument
3. The NES should provide good scientific data in order to ensure adverse effects are avoided
4. NES needs to recognise spatial planning approaches (such as that being undertaken by MDC) – note the concern from MDC that consent holders will apply to replace consents prior to a plan being notified
5. NES needs to recognise future strategic planning processes under Policy 7 of the NZCPS
6. NES should encourage industry to adopt environmentally positive planning initiatives, such as relocation of farms to environmentally better areas – without the necessity of a Schedule 1 process
7. Councils should be provided with capable staff, resources and legal frameworks to evaluate aquaculture activities more broadly and thoroughly
8. Allow modification of base set of rules through future planning processes – either by allowing leniency or stringency (for example where sites of particular significance or have other significant values are identified), with greater certainty over which competing values might override NES provided through an NPS
9. Prepare an NZCPS-Aquaculture
10. Identify that future planning documents may identify inappropriate species as well as inappropriate areas
11. NES should include criteria for identifying areas unsuitable for marine farms
12. Provide a fair but limited time for existing farms in areas identified as inappropriate to 'adjust'
13. Areas deemed appropriate for aquaculture should be regularly reviewed because of lack of scientific data on effects

Amendments suggested to the NES indicative provisions included:

1. Councils should be able to be more stringent than the NES in relation to inappropriate areas (at least in part for consistency with Policy 7(b) of the NZCPS), so they can for example prohibit marine farms in inappropriate areas
2. NES should clarify that a regional council determines an area as inappropriate when the regional coastal plan has legal effect or where it is identified in a proposed plan
3. Clarify that where a marine farm in an outstanding areas has been determined as inappropriate, Regulation 2 does not apply to it
4. Add to Regulation 5 areas 'likely to become inappropriate for existing aquaculture during the term of the consent because of deterioration of water quality caused by activities allowed in a relevant regional or district plan'
5. Where an area is identified as inappropriate, plan provisions (as opposed to NES) should apply, along with full notification
6. Clarify that full notification applies to those activities classified more stringently than restricted discretionary in the NES

Those submitters in opposition were concerned that:

1. The approach doesn't allow councils to identify areas where marine farms are inappropriate
2. The NES will perpetuate inappropriate development in locations that are not appropriate for marine farm development but where historically farms have been developed (because they were not fully tested under the RMA)
3. There is a gap for dealing with areas identified as inappropriate before the gazettal of the NES
4. If a community has identified an area as inappropriate the decision-maker should be able to take this into account at reconsenting

5. Restricted discretionary activity classification should only apply where councils have done the work required under Policy 7 and identified that a farm is in an appropriate location or the NZCPS/Policy 7 included as a matter of discretion
6. Non-notification is not appropriate in areas that have been deemed as unsuitable for aquaculture
7. Concern that councils must only make plan changes that are consistent with the NES, which therefore sets up a situation where all existing farms will have to be restricted discretionary
8. All marine farming should be non-complying, particularly when they are in inappropriate areas, where prohibited activity status would be appropriate

7.2 Role of future planning

Policies 7 and 8 of the NZCPS2010 are of particular relevance to future planning and identification of inappropriate areas:

Policy 7 Strategic planning

(1) In preparing regional policy statements, and plans:
- *(a) consider where, how and when to provide for future residential, rural residential, settlement, urban development and other activities in the coastal environment at a regional and district level, and:*
- *(b) identify areas of the coastal environment where particular activities and forms of subdivision, use and development:*
  - *(i) are inappropriate; and*
  - *(ii) may be inappropriate without the consideration of effects through a resource consent application, notice of requirement for designation or Schedule 1 of the Act process;*

  and provide protection from inappropriate subdivision, use, and development in these areas through objectives, policies and rules.

(2) Identify in regional policy statements, and plans, coastal processes, resources or values that are under threat or at significant risk from adverse cumulative effects. Include provisions in plans to manage these effects. Where practicable, in plans, set thresholds (including zones, standards or targets), or specify acceptable limits to change, to assist in determining when activities causing adverse cumulative effects are to be avoided.

Policy 8 Aquaculture

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:
- *(i) the need for high water quality for aquaculture activities; and*
- *(ii) 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 that purpose.

While Policy 7 does not reference aquaculture specifically, if effects of aquaculture are an issue in a particular region, it is conceivable that planning under Policy 7(1)(b) could identify areas of the coastal environment where aquaculture would be inappropriate.

Consideration to date of aquaculture under Policies 7 and 8 has not been particularly explicit, possibly because of Council concern that addressing the needs of aquaculture results in the spending of ratepayer funds on activities that make a private gain from use of public space. Two exceptions are the Sea Change process run in the Hauraki Gulf in recent years, and the Marlborough Aquaculture Review Working Group process currently working on Marlborough Environment Plan provisions for aquaculture.

Future planning is both a tool for managing cumulative effects of marine farming and a way of addressing areas where activities such as aquaculture may not be appropriate on both a singular and cumulative basis.

7.3 How does the proposed NESMA currently deal with future planning?

Two of the existing indicative regulations address future planning – Regulation 2 and Regulation 5. Regulation 2 covers existing marine farms in outstanding natural features, outstanding natural landscapes and/or areas of outstanding natural character, identified in proposed or operative regional policy statements or regional coastal plans. Over time, as policy statements and plans are reviewed, Regulation 2 will continue to apply and can therefore cover any future identification or review of outstanding areas.

Regulation 5 applies to those areas specifically identified under Policy 7(1)(b)(i) of the NZCPS2010 as inappropriate for existing aquaculture. As currently drafted, it provides an opportunity for councils to phase out marine farms that are considered to be in inappropriate areas.

7.4 Responses to submissions

Of the submissions summarised above, the following matters have been analysed further:

1. Allowing more stringent activity classifications than discretionary in inappropriate areas;
2. Clarifying the relationship between Regulations 2 and 5;
3. Clarifying when Regulation 5 is intended to have effect;
4. Ensuring the future spatial allocation processes and/or other strategic planning initiatives under Policy 7 of the NZCPS2010 are recognised by the NES.

More stringent activity classifications in 'inappropriate' areas

If, through the community process of developing a new regional policy statement or regional coastal plan, the community in a region have determined that marine farms are inappropriate in a particular area and identified that in the policy framework, and consider that as a result the activity classification should be non-complying or prohibited, then the NES should respect this process.

Including a provision that allows councils to include rules in their regional coastal plans that are more stringent than indicative Regulation 5 would provide this opportunity.

Clarifying the relationship between Regulation 2 and Regulation 5

An existing marine farm could be located within an outstanding natural area (for example) where the relevant council has determined that the area is inappropriate for aquaculture (or other activities as well). As currently drafted, marine farms would fall under both indicative Regulation 2 and indicative Regulation 5. While it is likely that a council would adopt the most stringent activity classification, it would be useful to clarify this in the final NES.

Clarifying when indicative Regulation 5 is intended to have effect

In order to be consistent with indicative Regulation 2, which also addresses future planning, proposed regional policy statements or regional coastal plans should be included in indicative Regulation 5.

Future spatial allocation or strategic planning initiatives

Marlborough District Council has embarked on a process to assess the current spatial arrangement of marine farms in the Marlborough Sounds (utilising the Marlborough Aquaculture Review Working Group). The process may confirm that some farms are in appropriate locations, but may also result in recommendations that some farms move if possible. As currently drafted, the NES could inadvertently frustrate this process. By providing for existing farms in their current locations to replace their consents as restricted discretionary activities with no public notification an incentive is provided if any alternative spatial allocation adopts a more stringent activity classification, different conditions, or is likely to be notified. However, provided that the NESMA is gazetted before the Marlborough Environment Plan provisions are publicly notified, a combination of the three approaches outlined above (particularly the allowance for councils to be more stringent in their activity classification for indicative Regulation 5) should ensure that the NESMA does not cut across the spatial allocation process being run in Marlborough. If the NESMA is not gazetted before the Marlborough Environment Plan provisions are publicly notified, an alternative would be to amend Regulation 5 by replacing the reference to gazettal of the NESMA with a date such as 1 January 2017. This date would recognise those recent coastal planning processes that have been undertaken consistent with the requirements of Policy 7 of the NZCPS, but not inadvertently provide for those that predated the NZCPS 2010.

Looking further forward, ensuring that the NES is agile enough to recognise future spatial allocation processes, or other strategic planning initiatives, would be consistent with Policies 7 and 8 of the NZCPS2010. In terms of the likelihood of future processes occurring, the Sea Change process resulted in a spatial allocation plan for the Hauraki Gulf that could affect aquaculture in both the Auckland and Waikato regions (although is principally focused on new aquaculture), but which has not yet been implemented through plan changes or reviews. Environment Southland has previously expressed interest in better managing the allocation of space within Big Glory Bay. Of the major aquaculture regions not exempted from the NES therefore, only Northland and Canterbury are so far not indicating plans for spatial allocation or future strategic planning. Ensuring the NES does not frustrate these processes is therefore important, based on the number of the major aquaculture regions actively interested in them.

Amendments could potentially be made to the indicative NES provisions to address this matter as follows:

- include a matter of discretion relating to the consistency of any application for a replacement consent with a proposed or operative spatial allocation or strategic planning initiative
- include in the NES provision for shorter term consents (under s123A(2)(c) of the RMA) for replacement consents for existing marine farms in regions where spatial allocation or strategic planning initiatives are under way.

Appendices

Appendix A Title

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Appendix F – Cost-benefit analysis

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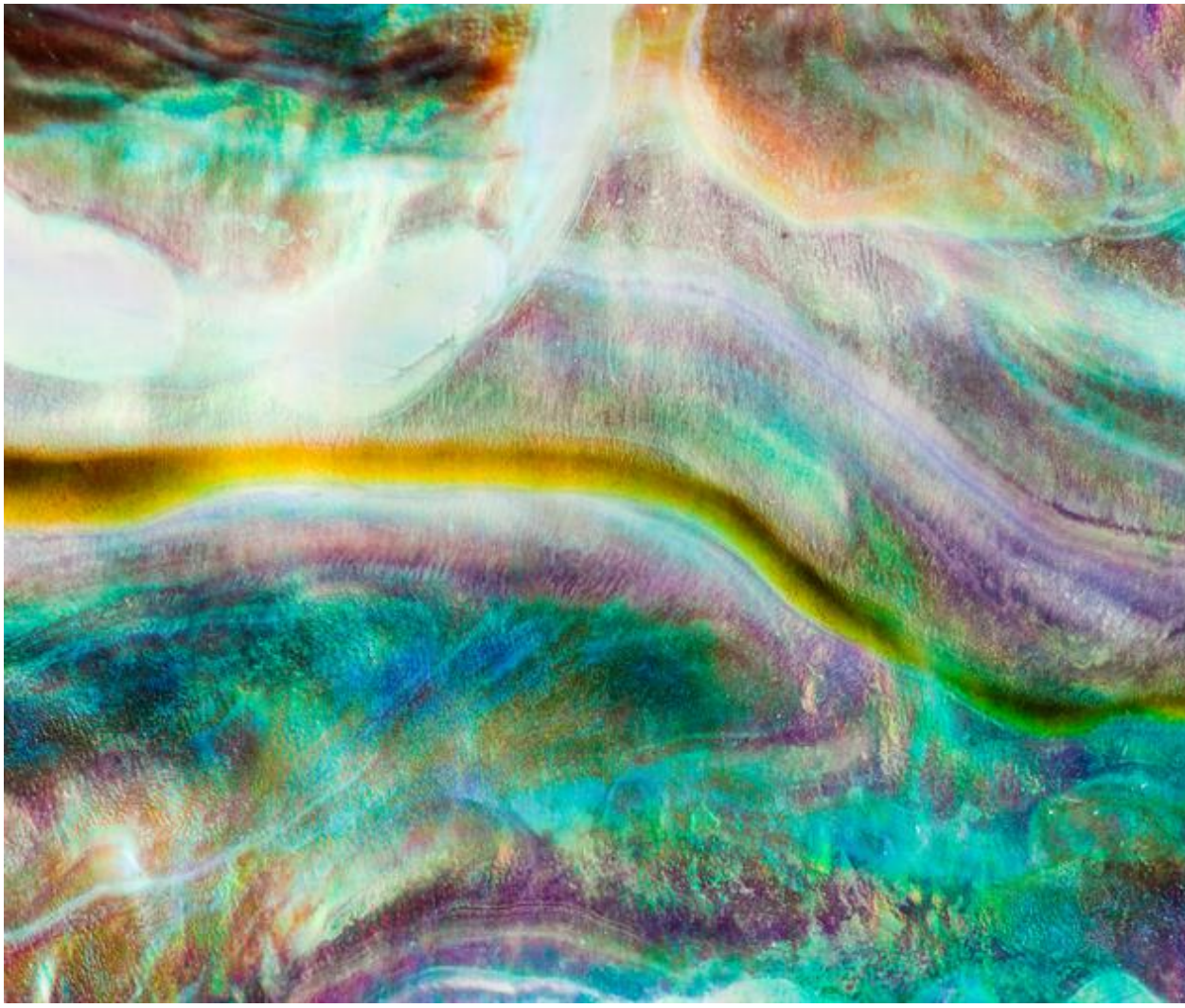

Analysis of proposed NES on marine aquaculture

Cost benefit analysis in support of the Section 32 analysis for the National Environmental Standard Marine Aquaculture

NZIER report to Fisheries New Zealand

October 2018

About NZIER

NZIER is a specialist consulting firm that uses applied economic research and analysis to provide a wide range of strategic advice to clients in the public and private sectors, throughout New Zealand and Australia, and further afield.

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Key points

Objective

This report provides an estimate of the costs and benefits of the National Environmental Standard for Marine Aquaculture (NES MA).

Main findings

The NES MA provides a key foundation for the development of aquaculture in New Zealand and has potentially, multiple benefits:

- **Increased certainty**. Improved certainty has a number of impacts. Having an NES MA gives the industry confidence that it has regulatory support. It also underpins the licence to farm.[1] The focus of improved certainty in the NES MA is on:
  - The activity status potentially provides a more certain and consistent processing pathway (a restricted discretionary activity), with fewer matters that a council is allowed to consider in making its decision
  - Providing for processing generally without public or limited notification of consents in recognition that council planning processes are the place for the community to make decisions
- **Improved biosecurity along the aquaculture pathway**. Ensuring that at the farm level best practice is followed consistently across New Zealand[2]
- **Consistent rules across New Zealand**. From region to region rules will be consistent bring further certainty to environmental outcomes, industry, government and communities.

The analysis considers that the impact will occur over a number of years, and that the benefits will not be captured immediately.

The **cost** is that environmental and social concerns will be capped at the individual consent stage but not at the planning stage as a result of improving industry certainty. The current view is that environmental costs are not considered large, although it is acknowledged that the data gaps are significant (see Table 6).

The social costs (noise, amenity values, visual effects) and benefits (jobs and their impact on the community) are unquantified.

Figure 1 summarises the estimated impacts of the NES MA. The analysis sets out two options for the central scenario (a per farm approach and a management area biosecurity approach) since the costs associated with different biosecurity options are significantly different.

An important assumption made is that biosecurity costs and benefits are equal. This is assumed because even if best practice was achieved the risks associated with incursions and spread along other biosecurity pathways remains extremely high.

[1] Although the licence to farm is conditional on maintaining the confidence of the public and stakeholders over time.

[2] While recognising that until other biosecurity pathways are brought up to a best practice standard the threat of incursions or increased spread remain high.

Under our central scenario, the benefits outweigh the costs in all scenarios driven by certainty and biosecurity benefits. The costs depend on which biosecurity approach is adopted. Those costs fall mainly on industry and councils. There are unquantified social and environmental costs.

Figure 1 Summary of benefits and costs

Per farm and management area biosecurity measures, PV 6%

Quantitative impacts					
	Per farm		**Per management area**		**Comment**
	Low	High	Low	High	
Costs	27,689,613	27,689,613	2,706,985	2,706,985	compares cost imposition
Benefits	38,012,208	48,517,218	13,116,061	23,621,071	low & high benefit estimate
Benefit cost ratio	1.37	1.75	4.85	8.73	
Qualitative impacts					
Costs	Concern over limiting environmental outcomes				
	No quantification of environmental outcomes				
	Reduce input by local communities at the consent stage				
Benefits	Consistent rules across NZ				
	Improved biosecurity				
	Consistent rules,better informed councils and further monitoring				

Source: NZIER

Caveats

Most of the assumptions are derived from interviews and New Zealand specific literature. These are characterised by major differences in views over the industry directions and large gaps in the science.

This brings uncertainty about the likely impacts and some of the assumptions. A key difficulty is establishing the 'baseline' science since the data is scarce. Despite this the environmental costs are relatively small.

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1. Introduction

1.1. The proposed National Environmental Standard

Fisheries New Zealand along with the Ministry for the Environment (MfE) and the Department of Conservation (DOC) are proposing a National Environmental Standard for Marine Aquaculture (NES MA).

Fisheries New Zealand consulted on the proposal in mid-2017. Before the NES MA can be enacted the Resource Management Act (RMA) requires that the Minister for the Environment prepare an evaluation for the standard in accordance with Section 32 of the RMA. As part of the Section 32 evaluation report a cost benefit analysis is also required.[3]

The purpose of this report is to provide a cost benefit analysis (CBA) for the NES MA that further assists the understanding of applying consistent rules nationally for marine aquaculture management.

The NES MA proposal aims to achieve a more efficient and certain consent process for existing marine farms. The environmental effects of existing farms will continue to be managed as part of this process with council plans recognised as the best mechanism for the community to agree the locations where aquaculture is and isn't appropriate. In addition, the NES MA:

- Addresses variations and regional inconsistencies in processing replacement permit applications for existing marine farms (many farms are due for replacement consenting prior to 2025)
- Reduces New Zealand's exposure to biosecurity risks (the globalisation of supply chains requires more awareness and consistency across New Zealand to avoid potential incursions)
- Reduces uncertainty and enables better use of space within existing marine farms (allowing for improved efficiency and effectiveness as scale increases, better matching of resources to tasks, and technology improvement)
- Balances environmental and social concerns in a way that improves national well-being.

We have drawn on industry interviews, further examination of the status quo (Stantec), domestic studies, case studies, information and discussion with Fisheries New Zealand, DOC and MfE, councils, environmental groups, perceptions of those involved in aquaculture, and other sources.

The analysis is intended to give policymakers an indication of the likely costs and benefits to assist in a decision on whether or not to progress the NES MA.

[3] The section 32 analysis is being conducted by Stantec.

1.2. Background for analysis

The analysis has been requested by Fisheries New Zealand as part of the evaluation of the effectiveness and efficiency of the NES MA and to inform the policy process. This report is intended to be informative for such a process and is a helpful input to the Section 32 evaluation.

Of significance are the changing supply and demand conditions. These include:

- Very strong growth in demand for aquaculture products, particularly the market for green-lipped mussels and finfish. To the point where one of the main industry constraints is lack of production
- Supply constraints associated with:
  - Climate change and the associated acidification of the environment (El Niño and La Niña dominate aquaculture production)
  - New technology that potentially could improve finfish production
  - The need to utilise new space, possibly in less sheltered areas (from the open sea)
  - Nascent development of hatchery based green-lipped mussel spat production (showing great promise but still uncertain)
  - Large information gaps associated with wild capture and retention of shellfish e.g.` understanding where spat sources are is largely still unknown
- Industry views of the status quo "without" the NES MA
- Work done on the opportunities and constraints of spat production.

The following analysis is intended to increase clarity around whether adopting the proposed standard for marine aquaculture would result in benefits for New Zealand that are greater than the costs incurred by adopting them.

However, not all the costs and benefits are quantified. In particular, we do not attempt to quantify relevant social and environmental costs and benefits. While the significance of these costs and benefits are described in a qualitative manner, it has not been possible to place a monetary value on them.

2. The current situation

This section provides a very brief and high-level outline of the current aquaculture industry.

Its purpose is to help identify the issues that may need to be addressed and identify the opportunities that the new national direction might assist.

2.1. The aquaculture industry

Globally, the output of "capture fisheries" involved in harvesting wild fish stocks has been relatively stable over the past 30 years, hovering around 90 million tonnes per year. This is the result of wild fisheries becoming fully utilised and quota limits coming into effect.

Aquaculture is the main growth area for seafood production, now accounting for around 40% of worldwide seafood production by weight. In 2011 global aquaculture production surpassed global beef production for the first time, and aquaculture is expected to exceed wild fish harvest in the next few years.

A similar pattern is observable in New Zealand, where marine aquaculture farming accounts for approximately 23% of total seafood production in greenweight tonnes and wild fish harvest has stabilised at a little over 400,000 greenweight tonnes. Marlborough is the engine room of aquaculture, producing over 60% of New Zealand's annual marine farming output.

Table 1 Estimated tonnage of mussels, Salmon, and Pacific oysters

Approximate tonnes per annum

Tonnage	Green-lipped mussels	Pacific oysters	Salmon
Northland	300	730	
Auckland	3,000	710	
Coromandel	25,000	500	
Tasman/Marlborough	65,000	30	9,000
Canterbury	2,000		500
Southland	3,000		4,500
Approximate totals[1]	**100,000**	**2,000**	**14,000**
Note (1) Numbers are rounded and don't add up exactly given year to year variability due to weather, spat collection and other industry factors.			

Source: Aquaculture New Zealand and NZ Salmon Farmers Association

Demand for New Zealand aquaculture products - finfish, green-lipped mussels, and Pacific oysters - is high and there are opportunities for seafood expansion in aquaculture. The focus and challenges are on the supply side and how New Zealand can maintain the best use of its aquaculture resources while also improving social, economic and environmental outcomes.

Marine farming in New Zealand started in the 1960s with small scale production of mussels, and later expanded to include production of Pacific oysters and salmon. Growth was strong in the 1980s and early 1990s, but then slowed with the imposition of moratoria and the emergence of local opposition to new farms because of perceptions and concerns over visual intrusion and other impacts.

Further investment by the industry is also hindered by uncertainty over security of many marine farm consents which are due for replacement consents by 2025 and possible changes to the planning status of marine farming.

We have set out the details of the status quo. Replacement consenting is focused on Marlborough which faces approximately 50% of the total cost of re-consenting expected under the status quo.

Some reconsenting has already occurred and consultancies involved in putting together reconsenting proposals are extremely busy according to those interviewed.

Table 2: Aquaculture in New Zealand

Region	Northland	Auckland	Waikato	Bay of Plenty	Hawke's Bay	Wellington	Tasman	Marlborough	Canterbury	West Coast	Southland
Existing aquaculture areas											
Consented inshore and offshore trials	782 ha	370 ha	1,524 ha	3810.67 ha	2806 ha	3.4 ha	6,128 ha	4,418 ha	2844.79 ha	45.6 ha	288 ha
Species currently farmed	Oysters, mussels	Oysters, Mussels	Oysters, Mussels	Oysters, Mussels	Mussels	Various species	Mussels, Scallop spats	Oysters, Mussels, Salmon	Mussels, Salmon, Paua, Seaweed	Mussels	Mussels, Salmon
Existing marine farm consents/farms											
No. of consents/farms	154 / 99	86 / 69	310 /271	6 / 6	1 / 1	1/1	71 / 55	1082 / 584	20 / 12	1 / 1	50 / 50
Average size of inshore consent /Size range	4.98 ha / 0.2 ha – 86.2 ha	4.43 ha / 0.7 ha – 76 ha	4.59 ha / 0.05 ha – 54 ha	2.13 ha / 0.03 ha – 4.6 ha	-	3.4 ha	86 ha / 0.99 ha – 534 ha	4.9 ha / 0.06 ha – 769 ha	8.3 ha / 0.9 ha – 25.9 ha	45.6	6.48 ha
Re-consenting activity status	Controlled activity for most re-consenting, otherwise discretionary	Restricted discretionary, subject to conditions	Controlled and discretionary for re-consenting for existing farms, other activities discretionary	Controlled or restricted discretionary around re-consenting for existing farms, other activities discretionary	Controlled	Controlled	The activity status ranges between controlled and discretionary	The activity status ranges between controlled and discretionary	Discretionary	Discretionary	Discretionary
Notes (1) Numbers rounded.											

Source: NZIER, MWH (2016) MPI Marine Farming Database (Updated in March 2018)

2.2. How aquaculture is regulated

Marine aquaculture is treated differently from land-based farming activities because it uses defined areas of public space in coastal locations. The dominant regulatory mechanism used to govern its activities is the RMA. Other regulatory tools used include:

- The Fisheries Act 1996. Applications for new marine farms (or realignments) must pass an Undue Adverse Effects test to ensure that the proposal does not have an undue adverse impact on fishing (customary, commercial and recreational)
- Biosecurity Act 1993. It manages the risks associated with the introduction of harmful organisms and pests. Aquaculture biosecurity is concerned with preventing the introduction and spread of aquatic diseases and pests. This requires monitoring by regional councils through consent conditions
- Marine and Coastal Area (Takutai Moana) Act 2011. It creates a special status for marine and coastal areas meaning that no one owns the coastal marine areas. It also provides for processes to recognise protected customary and customary marine title rights and gives holders of those rights approval functions for proposed activities in the relevant areas
- Treaty of Waitangi settlements. Māori are entitled to 20% of commercial aquaculture assets under the Māori commercial aquaculture settlement process.[4] Historical Treaty settlements also include Statutory Acknowledgements as referred to in schedule 11 of the RMA. These are acknowledgements of mana associated with cultural, spiritual, historical and traditional associations with an area. Councils must have regard to Statutory Acknowledgements when forming an opinion on whether tangata whenua are adversely affected by a consent application.

The RMA makes regional councils responsible for managing the effects of aquaculture activities in their coastal marine area. Aquaculture farms require a resource consent (coastal permit) to operate. When this permit expires they must apply for a further consent. The consenting or re-consenting process for aquaculture farms requires consideration of:

- Sections of the RMA that are relevant to aquaculture. Sections 5-8 are the most relevant since they include matters of national importance, preservation of coastal natural character and protection of outstanding natural landscapes and features (sections 6(a) and 6(b)). Part 7A is on occupation of the coastal marine area and focused specifically on aquaculture
- The New Zealand Coastal Policy Statement (NZCPS) 2010. The aim of the NZCPS is to direct coastal management through policies and objectives that achieve the purpose of the RMA. Policy 8, for example, recognises the importance of aquaculture. Policies 13 and 15 provide protection for areas of outstanding natural character, features, or landscapes

[4] Under the Māori Commercial Aquaculture Claims Settlement Act 2004.

- Regional policy statements and regional coastal plans in the relevant aquaculture regions. Regional coastal plans set out the specific actions and processes required prior to aquaculture activity occurring. These include:
  - Identification of areas both appropriate and inappropriate for aquaculture with such identification undertaken through a strategic planning process involving public notification and submissions
  - The activity status, under which consent applications will be assessed
  - Reviewing plans within a specific time (ten years).

The RMA regulates aquaculture activities that can impact on the social, economic, environmental and cultural values of a community. Potentially, these activities could be allowed if their adverse effects are avoided, remedied or mitigated.

The RMA also has obligations to Māori. Decisions are required to recognise and provide for their cultural traditions associated with their ancestral lands, water, sites, wāhi tapu (places sacred to Māori), and taonga, have particular regard to kaitiakitanga (stewardship) and take into account the principles of the Treaty of Waitangi.

2.3. Mechanics of the consenting process

Once an aquaculture farmer makes an application for a coastal permit to a regional council the process is dependent on the activity status in each region. These are not uniform and vary depending on the history of rule-making in the region and specific regional characteristics.

In many cases the proposal requires consultation with stakeholders and interested parties including neighbours, interest groups, and iwi groups.

If successful, the permit can be granted for between 20 and 35 years. No rights are granted in perpetuity, but it does give the permit holder a right to occupy the space and undertake specified farming activities. At the expiry date the permit holder can apply for a further consent. There is no guarantee that a replacement consent will be granted, although council decision-makers must have regard to the value of the investment which is stranded.[5]

Permit holders can apply for a further consent well before the expiry date (evergreen consenting). It is no guarantee that they will obtain a consent, but it does – if successful – confer a new consent with new conditions for another 20 to 35 years.

2.4. Identified issues

This section summarises our analysis of the problem definition associated with the regulation of aquaculture under the RMA. It draws directly on the analysis of the status quo in the previous sections.

[5] Stranded assets are assets that have suffered from unanticipated or premature write-downs, devaluations or conversion to liabilities.

2.4.1. Significant numbers of consents expire before 2025

A significant number of consents (63%) are due to expire by 2025. This is a major concern to all industry and regulatory participants.

The high percentage due to expire in 2024 is largely the result of licences approved under the previous Marine Farming Act (1971) being deemed a resource consent under the RMA through the 2004 amendments.

Therefore, there is concern because of the structure and processes of the RMA, particularly the time and cost involved in consenting for aquaculture activity even while councils are also engaged in reviewing their regional coastal plans.

It should also be noted that the Wilson Bay Marine Farming Zone in the Waikato and the Tasman AMAs are proposed to be exempted from the replacement consent and change of species provisions of the NES MA due to the significant strategic planning processes that were undertaken to develop provisions specific to those zones in their respective regional coastal plans.

2.4.2. Regulatory variations and regional inconsistencies

As part of their regulatory mandate, regional councils are required to develop objectives, policies and rules for aquaculture through a planning process which involves community participation and consultation.

The approach to this process is independently controlled by individual regional councils. The activity status and notification requirements for existing marine farms, including applications for replacement consents are likely to vary between regions. Differing processes could potentially impose unnecessary and unjustified extra time and costs on applicants, regional councils and interested parties.

The NZCPS (2010) also has an important role. Parts of the NZCPS (Policy 8) are designed to assist aquaculture's development. Policy 7 requires regional councils to undertake strategic planning for the coastal environment and with Policy 6 and 8 recognise the importance of aquaculture through regional policy statements and regional coastal plans.

For efficiency reasons these regulatory directions will be implemented when councils prepare their second-generation regional coastal plans. Through this planning process there is more opportunity to:

- Better plan for areas that are appropriate for aquaculture
- Identify areas where aquaculture is inappropriate
- Better address the cumulative adverse effects of various activities (including multiple marine farms).

This is best practice since it reduces uncertainty for marine farmers, interested parties and councils. The issue is the transition to second-generation plans, since for at least five of the eight aquaculture provisions of second-generation plans are only at an early stage or are yet to commerce of what can be a contentious and lengthy process.

The development of the proposed NES MA has an impact on the development of second-generation plans. What tends to happen is the gap between the proposed NES MA provisions and council plans narrows significantly. This has certainly been the case in other NES processes. While on the surface it might seem that the benefits of a NES are not as great as when the idea of a NES MA was first mooted, the impact may be greater than the numbers show given the NES MA is a dynamic process.

2.4.3. Dealing with uncertainty: activity status and notification

The activity status and notification requirements for replacement consents do not only vary between regions but also cause uncertainty. Uncertainty occurs where new consents increase:

- Requirements and conditions on applicants
- Costs and time taken through hearings and appeals.

Under the proposed NES MA most consent applications for existing marine farms will be processed through a potentially more certain and consistent pathway (restricted discretionary), with fewer and more focused matters that a council is allowed to consider (i.e. the matters of discretion) in making a decision on the application, in recognition that most effects of existing activities are known and able to be managed.

Given that potentially 63% of aquaculture farms are in areas where the activity status provides them with less production certainty, it looms as a major concern and risk for the industry.

Community participation in the RMA is encouraged. In many cases their input improves the quality of the outcome for the region particularly where new farms are proposed or there are significant changes to existing farms. However, the environmental impacts of those farms making little or no changes are well known.

Regulators believe that it is more efficient and improves certainty if communities comment on appropriateness of marine farming at the strategic plan making stage rather than well down the process track at the consenting stage. That strategic approach is also consistent with the intent of the NZCPS (2010). Some environmental groups and community groups dispute this and believe that public input at the consenting stage is necessary.

The proposed NES generally provides for consent processing without public or limited notification in recognition that the council planning processes are the place for the community to make decisions about where aquaculture is appropriate.

The design of this process has been developed to give industry more certainty in the reconsenting process without necessarily improving certainty of outcome.

2.4.4. Dealing with uncertainty: in or near outstanding natural character areas

Uncertainty has also arisen for farms in or near outstanding natural character areas. The NZCPS 2010 directs that adverse effects of activities on outstanding natural landscapes, features or outstanding natural character must be avoided. Underpinning

this is the Supreme Court's ruling in EDS v The New Zealand King Salmon Company Limited, which increased focus on the identification of outstanding areas, and the implications for consent applications in these areas.

This also creates uncertainty for the reconsenting process. Although just because a marine farm is in an outstanding area does not mean that it is an inappropriate use in that area e.g. many marine farms in the Auckland area have plan provisions that acknowledge their presence in outstanding areas. The key issue is whether the marine farm has an adverse effect on the values and characteristics which make the area outstanding. If they do have an adverse effect, then consent applications must be declined.

The NES MA assists industry (and also councils) by clarifying which farms require assessments in outstanding areas. It gives increased certainty for farms adjacent to outstanding areas by not requiring them to undertake this assessment. The NES MA can resolve these problems by specifying that they were not considered to be issues, or it could leave that decision to councils as they process replacement consents.

A major area of uncertainty is associated with spat farms. These supply significant amounts of spat to the industry and are located where spat is plentiful and thus are not able to be re-sited.[6]

2.4.5. No national approach to on-farm biosecurity management

Marine farms (like any land-based farms) are potential vectors for and are potentially impacted by incursions of harmful pests and diseases. A co-ordinated New Zealand wide approach is required to enable effective responses to biosecurity incursions.

MPI (2016) report that:

> *there is a large variation in biosecurity practices within the [aquaculture] industry and the high level of industry concern regarding pests and diseases is not always reflected in their biosecurity practices.*

The effect of an incursion not only potentially severely impacts on the industry, it impacts on the natural environment, market access, and our global reputation. Therefore, ensuring that marine farmers adopt and maintain effective biosecurity practices and make on-going improvements are critical to safeguarding indigenous biodiversity and wider environmental quality.

Guidance on biosecurity practices for salmon, oysters and mussels has been developed by the industry through the A+ Sustainable Aquaculture Programme (A+ Programme). Further guidance is provided through Fisheries New Zealand's Aquaculture Biosecurity Handbook (Biosecurity Handbook), which includes a biosecurity management plan template for marine farms. These documents provide useful guidance although:

- Measures remain voluntary
- They are species-limited and provide high level guidance.

[6] Spat farms are unique places. Only a very small number of sites on the coast have the combination of currents, coastal features, and other factors that allow for spat catching.

We understand that 80% of marine farms have some sort of biosecurity practice in place. These practices and methods are often inconsistent between farms, and their effectiveness varies.

Consistent and comprehensive biosecurity measures and practices on-farms are extremely important for the industry, the wider community, and nationally. Uptake of effective and efficient biosecurity practices that safeguards the industry and the environment is required to improve industry-wide resilience to pest and disease incursions.

Therefore, there is a commitment generally to consistent biosecurity measures across the industry. However, improving biosecurity within in the industry only covers one pest and disease pathway. More effective biosecurity measures will need to be developed for other pathways – such as recreational fishers and yachts – before introduction and spread risks are reduced.

The focus of the NES MA is to change practice within the aquaculture industry in a cost-effective way.

2.4.6. Change in species

Innovation, particularly dynamic innovation, is vital for any economy since it is the engine that drives an economy forward. Specifically, it is the incremental gains as business refines and improves the delivery of goods and services it produces which are of interested.

Technology has the potential to advance marine aquaculture by changing species (in the same way as new apple varieties have transformed the apple industry). Therefore, having mechanisms for farmers to do this within the NES are critical since what and how stock is farmed today may not be the same as in ten years' time.

The proposed NES MA provides an approach for applications for replacement consents for existing farms to include changes in species (and associated changes in structures) on existing marine farms. It should be noted that areas such as Marlborough and Southland will continue to provide flexibility to marine farms where consents list multiple species.

As a restricted discretionary activity, there may be a potentially more certain and consistent processing pathway. The matters of discretion would be similar to those that would apply to applications for replacement consents for existing marine farms and include additional matters to account for the effects of changing species on a marine farm.

This approach does provide some increased certainty and efficiency of process for marine farmers, while ensuring that environmental and social effects are still taken into account as necessary. However, marine farmers will have to weigh up the costs and risks associated with the consent process before trialling new species. This will be a relatively high hurdle given the uncertainty associated with farming the new species.

2.4.7. Realignment

The NES MA provides for realignment of relatively small areas of existing farms, to allow the resolution of issues such as marine farms being located over valued seafloor habitat or small areas of the farm being located within areas defined as outstanding.

These are envisaged to be small scale realignments (up to 3 hectares) of existing marine farms, particularly where realignment would reduce adverse effects on the environment.

2.4.8. Summary of the problem

Table 3 summarises the problem as we understand in the status quo.

Table 3 Problem definition

Issues	Evidence from the analysis of the status quo
Address variations and regional inconsistencies to processing replacement permit applications for existing farms	Aquaculture activities provide the regulatory system with significant challenges since the activity takes place in public spaces and it has environmental effects. In each regional council area, the different activity status and notification processes can vary imposing unjustified and unnecessary costs. Further, NZCPS 2010 requires councils to undertake strategic planning recognising the importance of aquaculture. These directions will be implemented through second-generation plans. Second-generation plans in 5 out of the 8 major aquaculture areas are only at an early stage (if started at all). These plans may not be ready in time for the large number of aquaculture consents due to expire prior to 2025. This creates uncertainties for all parties.
Uncertainty associated with varying activity statuses and non-notification	Variation in activity statuses in different regions reduce certainty for consent holders. It increases uncertainty since large numbers of sites require reconsenting prior to 2025. Further, while public consultation on new or significantly altered farms should be encouraged, extensive public consultation on consents that only marginally change may not be efficient.
Uncertainty associated with farms located near outstanding areas	The NZCPS 2010 requires that adverse effects in outstanding areas should be avoided (i.e. not allowed). This and Supreme Court rulings have increased the focus on outstanding areas. Of particular interest are spat farms located in outstanding natural areas (draft or notified) and landscapes since they currently cannot be moved. The industry's reliance on these sites and its impact are significant.
A national approach to on-farm biosecurity management required	A consistent and comprehensive biosecurity approach is needed to reduce the risk of incursions. While 80% of farms have some form of biosecurity on-farm management they are often inconsistent, voluntary, and practice differs from farm to farm. Further biosecurity measures are required so ensure that the industry does its part in reducing the spread of disease and pests, although other pathways require attention (e.g. recreational boats).
Species change	Innovation at the margin is key for industry progression. Change in species is part of that progression. The NES MA provides for change in species through the reconsenting process. Farmers will need to weigh up the risks and costs of applying for species change provisions.

Source: NZIER

3. Costs and benefits of adopting the NES MA

3.1. It is all about improving efficiency

We have used a cost benefit framework to examine the value of the NES MA.

CBA is a long-established technique intended to identify the economic efficiency of a proposed project or policy change. Efficiency is broadly about maximising outputs obtained from available inputs, but there are different variants used in economics:

- **Technical efficiency** (scale) refers to the most cost-effective way of providing a given service, for instance, reducing or eliminating inconsistent regulatory costs that do not improve desired outcomes improves technical efficiency per unit of regulated activity
- **Allocative efficiency** (matching) refers to the ease with which resources can move across the economy to their most productive uses. For instance, rules in aquaculture that impede desirable investment or allow investment where it should not occur may hinder allocative efficiency
- **Dynamic efficiency** (innovation) refers to altering processes or changes to new activities over time (sometimes very gradual change).

If the introduction of the NES MA can reduce the community-wide costs of regulation, it will improve technical efficiency.

To the extent that it shifts resources from one less productive activity to a more productive activity, it also improves the allocative efficiency of resource used by focusing aquaculture entities on other profitable activities that might otherwise not occur.

If it also allows new, more efficient ways to implement regulations or change industry behaviour, it also improves dynamic efficiency.

3.2. Approach to valuation

We have focused on costs and benefits associated with the proposed NES. In this way, stakeholders receive a “big picture” view of the likely costs and benefits.

To assess whether the draft NES standards are likely to be worthwhile, it is necessary to assess the magnitude of the effects their introduction would have, and value these in dollar terms as far as possible.

The costs and benefits are informed by the interviews, including cross checking responses, and by the expert opinion of the authors. They infer some representative or typical values to use in the analysis. As much of the information obtained is commercially sensitive and offered in confidence by the respondents, the figures that appear here are in most cases “blended” from different respondents and are not attributable to individual sources.

The national aggregate cost benefit analysis is constructed by estimating the costs and benefits associated with the projected number of consents/farms, and plan costs over the next 20 years. The 20-year timeframe has been used since it is close to the timeframe of a consent length and council planning horizons.

A net present value is calculated from the central estimates.[7] The discount rate used is 6% real, in line with current Treasury guidelines. The discount rate is also varied to see if it makes any significant difference to the CBA. The figures in this report should be regarded as giving an order of magnitude of the net costs and benefits rather than being definitive. All costs and values are real resource costs, excluding all taxes, subsidies and other intra-community transfer payments. A sensitivity analysis is then developed to illustrate various options that could be considered.

The nature of the costs and benefits means that they are both market and non-market. We can identify and give approximate values to the market-based costs and benefits. We are less confident about valuing specific non-market costs and benefits, although we can describe them.

Our aim is to:

- Provide a framework for thinking about market and non-market values
- Bring together relevant information that sets out the significance of market and non-market values
- Examine the possible size of the market and non-market values.

We have set out the approach we take to valuation of costs and benefits in Appendix A.

Figure 2 is based on our approach outlined in Appendix A. It details the types of activity and the measures applied. It shows areas where we have data and where data is missing e.g. scientists have made it very clear that their current conclusions on environmental impacts are based on the scant data available (see for example, MPI, 2013).

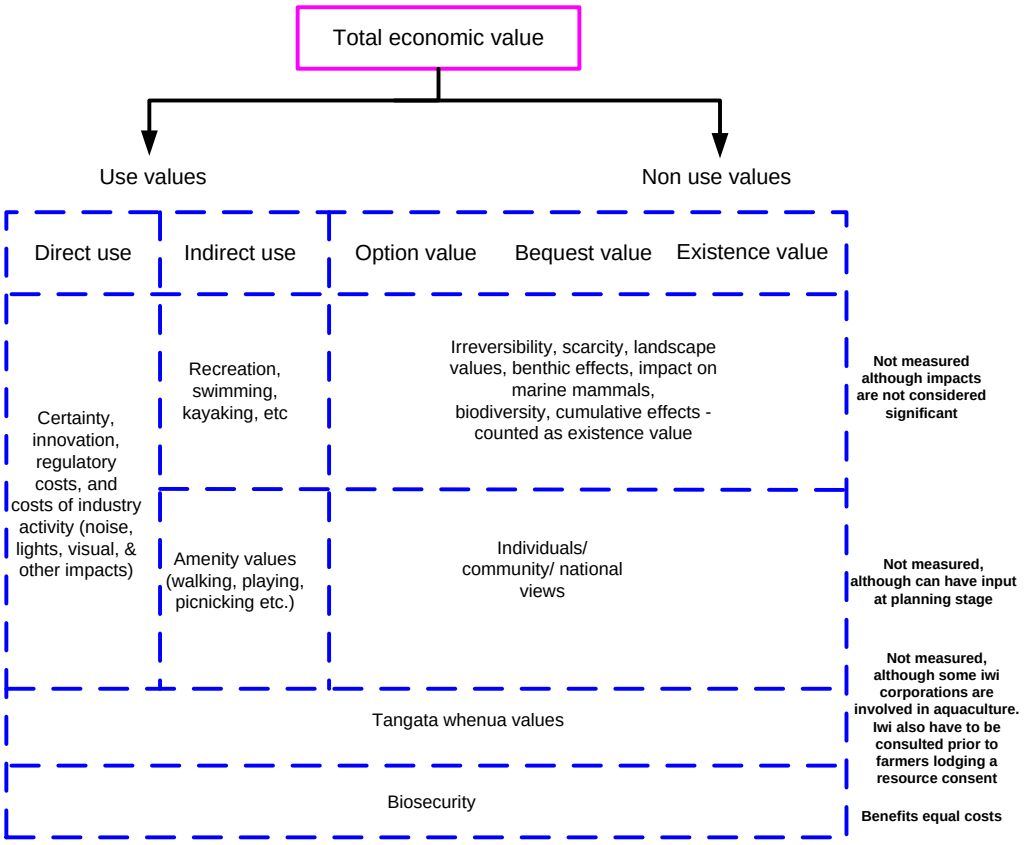
A CBA proceeds by comparing effects and outcomes associated with the introduction of the NES MA against what would have occurred under a counterfactual, i.e. without the proposed change. This counterfactual can be described as a projection of the status quo into the future as supply and demand conditions change.

This is not straightforward, so this report relies on credible assumptions about both the counterfactual and the expected costs and benefits. In all cases the figures in this report should be regarded as giving an order of magnitude of the net costs and benefits.

[7] It should be realised that in a discounted analysis that the costs and benefits that count most come in the initial years of the proposed NES.

Figure 2 Approach to evaluation

Adaption of the TEV model set out in Appendix A



Source: Adapted NZIER (2017)

3.3. Constructing the counterfactual

Setting up the counterfactual is difficult because there is:

- Limited baseline data from which to measure any change over 20 years
- Uncertainty about what aquaculture entities, councils and NGOs are likely to do in the absence of a NES MA
- Uncertainty about the impact of initiatives that would emerge without a NES MA.

Another complicating factor is that the process of the proposed NES is known to be underway. Experience from other NES/NPS processes suggests that it sets in place a dynamic since there is anticipation by stakeholders and interested parties that "something will happen". Therefore, expectations have been raised that changes behaviour by all. This also has an impact on actions and reactions of stakeholders and interested parties which may improve outcomes further. The setting in motion of the NES MA may have impacts well beyond its scope even if it does not pass into regulation.

There are then potentially a number of credible counterfactuals. The one we assume here is open to question and should be treated as "one possible future track". We treat the counterfactual here as a tentative "peg in the ground".

We assume that, if no NES was in place that unevenly and over time councils would gradually introduce elements of good practice but it would happen inconsistently and haphazardly. This would be a disjointed process with no consistency between councils. Further we expect that:

- Some councils will continue with evolving their current systems as second-generation plans eventually are introduced
- If parts of the draft NES MA were implemented, they are likely to be:
  - More expensive to implement
  - Stand-alone rules and configured differently
- Riskier (i.e. some councils could impose conditions that unnecessarily restrict aquaculture activity) and could cost more (i.e. impose unduly high costs on industry).

3.4. Further investigation of the counterfactual

As part of the development of the counterfactual Stantec have produced planning frameworks for the main eight regions that commercially grow aquaculture products. This is motivated by the varying activity status requirements in each of the major growing regions (see Table 4). [8]

Table 4 Description of regional plans and issues

Region	Likely operative plan over the period	Issues	Comment
Northland	Northland Regional Plan[1]	Significant number of marine farms requiring reconsenting. Biosecurity costs will be significant particularly for small business	Large Pacific oyster spat and growing region[2]
Auckland	Auckland Unitary Plan	Biosecurity costs Potentially ONL[3] issue in Mahurangi, Waiheke Island, and Great Barrier Island, although acknowledged in plan	Large Pacific oyster spat and growing region. Some mussels grown
Waikato	Updated Waikato Regional Coastal Plan	Biosecurity costs could be significant ONL issues around Aotea Habour and the Coromandel	Large mussel growing area with some spat rearing sites (e.g. Aotea)
Bay of Plenty	Regional Coastal Environmental Plan[4]	None	Three oyster farms
Marlborough	Marlborough Environment Plan[5]	Significant degree of interaction between stakeholders occurring. Biosecurity costs could be significant	60% of national mussel production in the Tasman/Marlborough area [6]
Tasman	Tasman Resource Management Plan	ONL issues at Wainui Bay spat farm	See Marlborough
Canterbury	Updated Regional Coastal Environment Plan	Aquaculture activity has potential Biosecurity costs could be significant	Limited regulatory oversight
Southland	Regional Coastal Plan 2013[7]	Aquaculture activity likely to increase over time. Biosecurity costs could be significant	Limited regulatory oversight
Notes (1) Refers to the finally operative version of the current Proposed Northland Regional Plan. (2) Also, a large spat catching area at 90 Mile Beach for green lipped mussels. This is managed under the Fisheries Act. (3) ONL – Outstanding Natural Landscapes (4) Refers to the finally operative version of the current Proposed Bay of Plenty Regional Coastal Environment Plan. (5) This will be superseded by the Marlborough Environmental Plan. (6) Also, in Tasman a pacific oyster hatchery produces 50% of industry needs. It is supervised under the Fisheries Act. (7) The current regional coastal plan is likely to be reviewed over the period of the CBA, but all existing consents are likely to be replaced under the current Regional Coastal Plan.			

Source: Stantec and NZIER

[8] Northland, Auckland, Waikato, Bay of Plenty, Marlborough, Canterbury, and Southland. Tasman is dealt with separately and the NES does not apply.

3.5. Identifying the specific costs/impacts

The costs are focused on three main species:

- Green-lipped mussels: filter feeders farmed using sub tidal long-lines
- Pacific oysters: filter feeders grown mainly on intertidal racks or baskets
- Chinook salmon: a feed added species farmed in cages or net pens.

Other species are being experimented with; but these three species are the main marine stock farmed in New Zealand.

3.5.1. Environmental impacts

All aquaculture has impacts on the environment. The extent of those impacts on the environment and how significant the costs are depends on how well they are managed. Councils make best endeavours to set out conditions to avoid, mitigate or remedy these costs. The NES MA attempts to address these issues, however aquaculture will continue to have environmental impacts, although these impacts and the costs associated with them will reduce.

Species impact

Aquaculture farming has a number of environmental impacts. To describe the impacts and further understand the potential issues we have relied on scientific information set out in MPI (2013). This information has in turn relied on the Literature Review of Ecological Effects of Aquaculture put together by the two main aquaculture science providers.

The following table briefly summarises the main environmental issues. For more detail on these impacts please refer to MPI (2013).

Table 5 Species environmental impacts

Given current scientific knowledge

	Shell fish			Fin fish	
	Mussel farming	**Oyster farming**	**Impact**	**Salmon farming**	**Impact**
Wider ecological effects	Effects on fish, seabirds, and mammals Pest and disease introduction and spread Genetic interactions with wild populations Ecological carrying capacity Biofouling and creation of novel habitat	Effects on fish, seabirds, mammals Pest and disease introduction and spread	Not considered significant (except for the dusky dolphin habitat exclusion in Admiralty Bay and habitat exclusion of King shag in Beatrix Bay and the outer Pelorus)	Fish disease and genetic transfer Biosecurity and transfer of fouling pests Seabirds, wild fish and marine mammals Genetic interactions with wild fish populations Ecological carrying capacity	Considered moderate
Localised benthic effects	Benthic habitat alteration Shell litter and debris Biodeposition Sediment enrichment and textural changes	Creation of novel habitat Trace contaminants Shading Shell litter and debris Sediment enrichment and textural changes	Minor ecological consequences beyond the farm	Uneaten feed, fish faeces, and other seabed effects lead to seabed enrichment and textural changes	Seabed enrichment and degradation on site. Rapid improvement as you move away from the farm
Water column effects	Flushing occurs Effects of farm structures Sediment water exchanges (nutrients and extraction of phytoplankton)	Flushing occurs Effects of farm structures Sediment water exchanges (nutrients and extraction of phytoplankton)	No significant water column issues	Flushing by waves and currents Effects of farm structures Nutrients impact on phytoplankton. Algal blooms	Elevated nutrient concentration evident in farms, rapidly decrease with increasing distance from farm. Nutrients may concentrate in particular localised embayments depending on hydrodynamics and other complex factors

Source: MPI (2013) and comments by stakeholders

Cumulative effects

The cumulative effects associated with aquaculture are not well understood. Many activities undertaken by people can potentially impact on the marine environment. Unfortunately, these impacts can have complex interactions over different temporal and spatial scales.

The cumulative effects in the marine environment can be due to:

- The impacts of land-based farming
- The impacts from industry and urbanisation
- Forestry
- Climate change
- Aquaculture.

MPI (2013) p 67 suggest that there are:

> *…potential cumulative effects of aquaculture, including additive spatial effects of multiple farms on other components of the ecosystem (such as the incremental increases in habitat loss or habitat creation for marine mammals, seabirds or wild fish populations); and subtle effects to wider ecosystem processes*

Further MPI (2013) comments that cumulative effects can range from bay-wide to regional scale impacts and can extend beyond the marine farming activities. Although, if the farming activities were to cease:

- The water column is likely recover in the short term
- The benthic structure and function recovery will take between one and ten years.

Crucially, there appear to be no impacts that are irreversible over the medium term, given the current state of knowledge.

The counter argument to this is that the knowledge gaps are large and therefore we need to be cautious about further development, particularly in areas where there is a large amount of aquaculture activity.

Below we set out the potential impacts, knowledge gaps and impacts.

Table 6 Cumulative effects associated with aquaculture

Issues	Current scientific knowledge
Potential impacts	Nutrient release from aquaculture will exceed the environmental carrying capacity (fin fish) at a local scale. A broad range of effects possible but difficult to judge because of a changing environment and interaction of factors.
Knowledge gaps	Long term environmental monitoring data is lacking to understand baseline conditions. Integrated data examining aquaculture/state of environment monitoring. Determination of carrying capacity remains problematic.
Effects of shellfish	Extraction of plankton could potentially lead to wide-scale changes in plankton abundance. Although current informed science opinion suggests that mussel farms have not lead to such a change. The impact could also be positive since shellfish filter water.
Effects of finfish	Nutrient additions vary given farm location. Effects are subtle and could lead to eutrophication and bay-wide organic accumulation and low oxygen levels in extreme cases.

Source: Adapted MPI (2013)

We have not included any monetary costs associated with environmental degradation. While we understand that there are some costs, the current scientific knowledge suggests that the impacts are limited. However, we need to acknowledge that data, particularly long-term data, is scarce.

3.5.2. Tangata whenua

Tangata whenua span both market and non-market interests. The market interests are partly folded into the industry viewpoint while the non-market approaches are set out in Appendix B.

Tangata whenua have significant aquaculture investments and are likely to continue as major players in the industry and may even increase their role and influence. The driving force is different from other businesses since they want to provide durable jobs in the region for their people. In this respect, aquaculture has a major role to play.

The market activities are driven by non-market and market values and those running iwi business are constantly reminded of this by other members of the iwi. The land and sea are also viewed as a core taonga. The RMA recognises this and underpins this in legislation.

To ensure that RMA requirements are fulfilled the NES requires applicants to consult with tangata whenua before lodging a resource consent application. This has been done to ensure that Māori values are respected.

Whether the NES incurs costs for Māori is a matter of debate and we have not tried to value those costs. What is clear however is that the consultation requirements do mitigate those costs.

3.5.3. Regional council costs

Regional councils face a range of costs associated with the NES ranging from plan changes to biosecurity costs.

Plan amendments/changes

The planning process is central to each regional council. Councils have their own knowledge and experience of their local aquaculture industry and bring this to bear when considering a strategic regional approach to aquaculture. They also make planning decisions based on their plan developed through community input.

Changing a plan under a Schedule 1 process can typically cost between $250,000 and $1,000,000. However, we expect that the NES requirements will result in plan amendments only. The plan amendments might coincide with Schedule 1 processes, but they would have occurred without the NES.

Councils believe that plan amendments/alterations will cost between $30,000 and $50,000. Minor alterations require staff time to overlaying the NES on council plans. This is estimated at around 3 to 4 weeks work for one planner (or $20,000) to shepherd the work through council processes.

In this way we expect that the NES will be integrated into existing regional coastal plans review processes. The following table sets out our assumptions.

Table 7 Plan changes/amendments

	Costs	No. of councils	
Plan amendments/ alterations	$30,000 to $50,000	5/6	$250,000
Slight alterations	$20,000	4	$80,000
		Total	**$330,000**
Note: These costs are spread over a number of years depending on plan change timing.			

Source: NZIER interviews

System costs

In some regional councils, systems will have to be changed to reflect the increased reporting and monitoring costs. Other councils, particularly bigger councils, already have the systems in place to handle the extra reporting requirements.

We have assumed a one-off cost of $100,000 (over 2020 and 2021) for smaller councils to upgrade their systems.

Training costs

Training will be required so that councils can become more familiar with the NES. Estimates from pervious NES costings suggest that the eight councils would spend at least two/three-person days to become familiar with the NES. We have allocated approximately $40,000 for the eight councils involved.

Implementation costs

Closely related to systems and training costs are implementation costs. The bigger councils are in a better position to absorb these costs relative to the smaller councils. In consultation with smaller councils we have allocated $60,000 over three years for the non-recoverable extra staff time required to set up NES processes.

Biosecurity costs

The impact of biosecurity costs on councils is heavily influenced by the management system put in place. An area biosecurity management plan will be much less resource intensive relative to a per farm system (both on councils and industry).

One major issue that has not been canvassed is the potential for a shortage of skilled staff and consultants to do the extra work. We expect that skill shortages will be a problem for both the industry and councils particularly if biosecurity management plans are required for each farm.

Non-recoverable per farm biosecurity costs

Some councils will need to employ extra staff and consultants to cover the increased work load associated with processing, assessing and on-going monitoring of biosecurity plans and their development. The on-going monitoring process requires visits to farms and a significant increase in the work load for a number of councils. Although some councils will be able to cope with the increased work load. Nationally we have allowed for an extra 4 staff and a further budget nationally of $150,000 per annum.

To assist with the extra workload with this process consultants will also have to be employed to cope with the per farm on-going biosecurity monitoring requirements (nationally $120,000 per annum). A number of councils voiced concerns about their ability to employ specialist staff and specialist consultants and retain those staff given that all councils with significant aquaculture activity will require these skills.

As an example, Northland Regional Council currently use a helicopter to go around at low tide to examine the mostly oyster farms with an annually inspection. Photos are taken, and the inspection is charged back to the marine farmer. This approach has been used as compliance.

Under new rules staff will have to visit each farm and conduct benthic monitoring (including the use of divers). This level of compliance will increase the workload dramatically in terms of time taken, resource used, and increasing processing. Northland Regional Council does not believe that it will have increase its staff numbers, but other councils will (notably Marlborough and Southland). The hiring of new staff is difficult to charge back to marine farmers along with the consultants that support this activity.

We have also allowed for costs associated with assessing the plans of those who do not have to go through the reconsenting process by 2025. This work will be done in 2024 since councils will be busy with the implementation of the NES and reconsenting work. This work cannot be (currently)[9] charged back to marine farmers and will be

[9] This situation may change with farms being directly charged.

approximately $610,000 nationally (an average of $1,400 per farm multiplied by 436 farms).[10]

Table 8 Per farm biosecurity costs

Cost	Number of FTEs	Per staff member	Total
Unrecoverable staff costs	4	$150,000	$600,000 per annum
Unrecoverable consultants fees	Unknown		$120,000 per annum
Consent reviews			$610,000 one-off cost in 2025
Monitoring costs			Charged back to marine farmers
Note: (1) While these costs are expected to be borne by Councils, overtime industry may be charged for these services. (2) Staff costs and unrecoverable consultants fees are gradually brought in over time.			

Source: NZIER

Biosecurity management area costs

The development of biosecurity management area plans will have a significant impact on cost (see benefits for a full explanation). This is driven by the large reduction in the number of plans required relative to the number of per farm plans (likely to be under 50 for the whole country). If biosecurity management areas can be effectively organised, then it is likely that councils will be able to absorb a lot of the costs.

For example, Southland has approximately 50 individual farms. If a biosecurity management area is established, then the maximum number of zones is two: Big Glory Bay and Bluff Harbour. Currently, Bluff Harbour farms are not operational.

In scenario 3 we have tested the impact on the benefit cost ratio by doubling the costs for the biosecurity management area (see section 5.3).

As with other costs these are gradually brought in over time.

3.5.4. Company/entity costs

Most of the compliance costs are associated with biosecurity costs and the need to change behaviour to stop incursions and the possible spread of diseases and pests.

Note that many of the costs over the next five to ten years will occur with or without the NES (e.g. such as the cost of reconsenting).

Biosecurity costs

The industry has made significant strides to further improve industry biosecurity measures. The Aquaculture NZ A+ scheme has been put into place to provide practical

[10] Some of these farms will already have best practice plans in place while other plans will require further work. Work includes checking the conditions of the plan, advising the marine farmer of the review, advising MfE, possibly hearing, appeals, imposing biosecurity conditions, receiving biosecurity plans, and approving those plans.

tools to improve industry-wide biosecurity management (for further information see Stantec 2018 p26).

The industry has provided the following information on the uptake of the A+ scheme within the industry.

Table 9 Industry biosecurity programme statistics

Species	Percent registered in A+ (estimated)	Percent of those that completed checklists	Percent that completed checklist and follow best practice	Percent of completed checklists that have best practice
	Industry biosecurity approaches		Percentage of column three	
Mussels	80%	90%	95%	75%
Salmon	93%	100%	97%	97%
Oysters	60%	88%	30%	20%
Note (1) Columns 4 and 5 are percentages of column 3. Not all industry participants who have been proactive on biosecurity matters have joined the A+ scheme. Hence the comparison between column's 2 and 3.				

Source: Aquaculture New Zealand

Further Stantec (2018a) paper illustrates to the commercial and non-commercial aquaculture industry the types of biosecurity measures required.

The conclusion of the MPI technical paper suggests:

> *…there is a significant difference in the level of detail provided by the MPI Technical Paper and the operational procedures contained in the sustainable management frameworks under the A+ programme.* Stantec (2018a) p33.

These differences are set out in the analysis comparing and contrasting the MPI technical paper and A+ programme.

The comparison suggests that further clarification and detail will be required by Fisheries New Zealand for a biosecurity plan to become operational. The extent of the work required has not been gauged and the costs of further upgrading existing biosecurity plans is unknown. NZIER suggests that the industry is at least 70% compliant (on average) with good biosecurity practice. We think is a conservative given that:

- The salmon industry is likely to face little change. Many of the salmon farms are contained in one region so stock and equipment are not moved
- Mussels are making great strides to improve their biosecurity approaches. This is helped by the increasing size of operations and the small number of processors
- The oyster industry has many small players and it is likely that compliance will be more difficult. It is helped by one or two firms controlling 50% of the industry.

Below we set out the implications for the industry for a per farm approach and a per management area approach.

Per farm biosecurity costs

There are significant costs associated with complying with per farm biosecurity plans. The individual plan costs are set out in Table 10.

Table 10 Estimated per farm biosecurity plan costs

Average cost	No. of farms	Completed	Total cost
$5,000	1,094	70%	$1.6 million[1]
Note (1) Spread over three years and discounted by 6%. (2) These costs are gradually introduced over time.			

Source: NZIER, interviews

There is also a certification/auditing cost where councils check the details of the plan and monitor every three years. Table 11 estimates the certification costs. We expect certification to take a day on average and cost approximately $2,000.

Table 11 Certification/auditing costs

Average cost	No. of farms	Total cost
$2,000	1,094	$2.2 million[1]
Note (1) Certification occurs once every three years so the cost is approximately $726,000 each year. (2) These costs are gradually introduced over time.		

Source: NZIER, interviews

We also expect yearly monitoring to occur that is more intensive than currently undertaken. This will include site visits and perhaps use of a diver.

While it is difficult to estimate interviewees expect costs to increase by at least $1,200 per farm per annum.

Table 12 Monitoring costs

Average cost	No. of farms	Total cost
$1,200	1,094	$1.3 million[1]
Note (1) Monitoring costs are per annum costs. (2) These costs are gradually introduced over time.		

Source: NZIER, interviews

Management area costs

The much larger size of the management areas means that the costs are significantly reduced for biosecurity plans for each farmer. The individual plan costs are set out in

Table 13. The cost of these plans is larger than individual farm plans and they will be more complicated e.g. protocols will need to be developed for different businesses bringing stock and equipment in from different areas.

Table 13 Estimated per farm biosecurity plan costs

Average cost	No. of plans	Completed	Total cost
$20,000	23	70%	$138,000[1]
Note (1) Spread over three years and discounted by 6%. (2) These costs are gradually introduced over time.			

Source: NZIER, interviews

There is also a certification cost where councils check the details of the plan and monitor each year. Table 14 estimates the certification costs. We expect certification to take a day on average and cost approximately $10,000 e.g. councils may randomly sample farms to check biosecurity status.

Table 14 Certification costs

Average cost	No. of management areas	Total cost
$10,000	23	$230,000[1]
Note (1) Certification occurs once every three years so the cost is approximately $77,000 each year. (2) These costs are gradually introduced over time.		

Source: NZIER, interviews

We also expect yearly monitoring occur that is more intensive than currently undertaken. This will include site visits and perhaps use of a diver.

While it is difficult to estimate interviewees expect costs to increase by 20% on the status quo to at least $138,000 in total.

Table 15 Monitoring costs

Costs in the status quo	No. of management areas	Total cost increase
$644,000	20%	$138,000[1]
Note (1) Monitoring costs are per annum costs. (2) These costs are gradually introduced over time.		

Source: NZIER, interviews

Change in behaviour

One of the biggest issues is that some farmers will have to change behaviour. The Stantec (2018a) pp30-33 technical paper outlines the types of changes required.

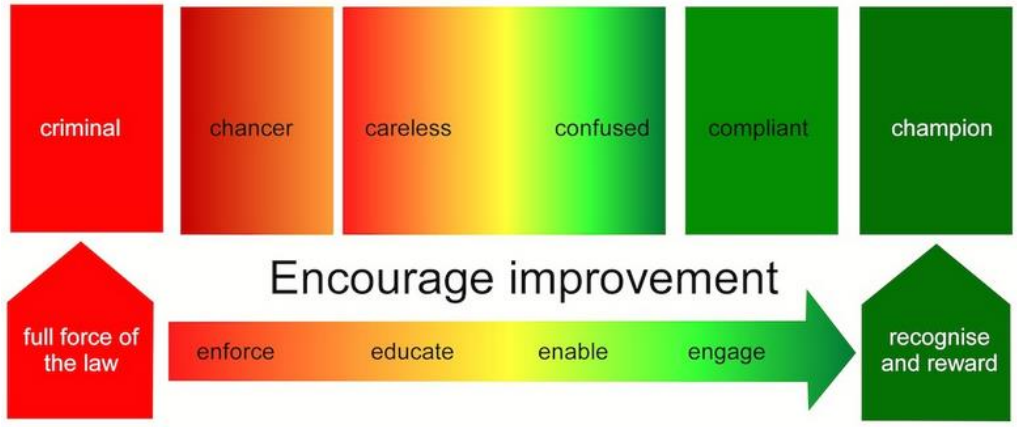
Possibly changing behaviour is the most crucial part of the implementation of the biosecurity provisions of the NES. The costs are unknown but for those operators following best practice the costs are unlikely to be large.

The following diagram adapted from work by Braithwaite[11] shows the likely approach by regulators given that all farms/management areas will need to adhere to the new rules for them to be effective in the aquaculture pathway. The diagram classifies various participants and applies the appropriate remedies.

It also signals potential costs for central and regional government that will have to absorbed within baseline resourcing costs.

Figure 3 Approach to biosecurity monitoring

Used by the South Australian Environmental Agency



Source: http://johnbraithwaite.com/responsive-regulation/

3.5.5. Government costs

Government will also incur costs associated with:

- Implementing the NES. These costs are expected to be incurred over the first three years of the NES and in year eight. In year three and year eight a review is programmed to occur
- Initial monitoring of NES processes. This is likely to be absorb into the day-to-day running of government.

Table 16 Government costs

	Year 1	Year 2	Year 3	Year 8
Government implementation costs	$100,000	$50,000	$100,000	$150,000

Source: NZIER

3.5.6. NGOs

NGOs are less confident that the NES MA will give the safeguards and protections for the environment. By giving industry increased certainty over the reconsenting process,

[11] http://johnbraithwaite.com/responsive-regulation/

environmental issues are determined by a set bottom line. Environmental groups take issue with those set bottom lines.[12] By giving industry more certainty, NGOs claim the risks to the environment have increased.

Non-notification is also an area of concern. Councils base their decisions on the applicant's consent application. These are biased since they want the consent. Some NGOs believe that there is not enough scrutiny of the consents and the full range of information is not provided.[13] Of note are farms close to or in outstanding natural character areas/landscapes.[14]

Cumulative effects of aquaculture farming are also a point of concern. Cumulative effects are effects which occur over time or are effects combined with other effects over time.[15] NGOs point to a lack of long term data in this area.

3.5.7. Communities and the general public

The NES will reduce the ability of individuals and communities to object/question individual consents. National rules by their very nature over rule local approaches (one of the rationales for intervention is to prevent hold-ups).

The restricted ability of communities to challenge consents is somewhat mitigated by planning processes adopted by councils such as the Marlborough District Council. While the outcomes of the process being conducted in Marlborough are still unclear the community and industry are sitting down and discussing the issues they have.

Issues such as noise and lighting have not been quantified.

3.6. Benefits of the NES

The benefits of the NES accrue to business, regional government, and central government.

An important benefit is certainty. Certainty occurs in a number of ways:

- Certainty of having an NES which demonstrates that government is attempting to support the industry over its compliance cost issues
- Certainty that the industry has a future i.e. its licence to farm is being supported
- Certainty around the rules and regulations that govern reconsenting (i.e. restricted discretionary approach to activity status and non-notification or limited notification requirements for consents.

There is a dynamic tension between providing certainty and impinging upon social and environmental outcomes.

[12] This is argument that could be levelled at a number of NESs. The Forestry NES is a case in point.

[13] Councils argue that the planning process is the best place for this type of input (see Section 3.5.3).

[14] The counter argument has been made in previous sections.

[15] Although the case law around the definition is not settled. For further information on Cumulative Effects see Ministry for Primary Industries (2018).

3.6.1. Environmental benefits

Environmental benefits are expected under the NES MA. Regional councils will be able to consider the key effects of aquaculture based on a comprehensive New Zealand-based literature review of effects, informing the conditions of specific consents.

This is likely to lead to improved environmental outcomes over time, particularly as some marine farms operate under deemed coastal permits. For these farms, the replacement consent application will be the first time they have undertaken an assessment of environmental effects under the RMA.

Further, the proposed realignment of existing marine farms and consistent biosecurity management provisions will also be key environmental benefits.

3.6.2. Aquaculture industry benefits

Activity status benefits

The NES provides for most consent applications for existing marine farms to be processed through a potentially more certain and consistent processing pathway (a restricted discretionary activity). The practical impact of using this activity status pathway is that it allows councils to focus on fewer and more focused matters (i.e. matters of discretion) in making a decision on any particular marine farming application. This process recognises that most effects of existing activities are known and are able to be managed.

By narrowing down the areas of discretion we expect savings to be made for consenting process with less:

- Processing costs
- Administrative and other additional costs
- Notification and hearing costs
- Environmental court costs.

The expected savings from a more streamlined and certain process are between $4.5 million and $8.0 million, nationally. We have spread this savings over the period until 2025.

These benefits are gradually introduced over time.

Non-notification status

The NES default provides for processing with public or limited notification in recognition that council planning processes are the place for the community to make decisions about where aquaculture activity is appropriate.

Limiting the notification process is considered by industry as an important concession that assists with certainty of business continuation. A number of farmers remarked that their businesses had outside investors who watched these issues closely.

Significantly, aquaculture is becoming big business and the sums of money invested in operations are increasing. Therefore, improvements in business certainty gave investors more confidence. This is underlined by work done by NZIER (2015).

Based on NZIER (2015) improved certainty is likely to have an important impact on production impacts. In uncertain times the price that an investor is willing to pay for an asset (such as a marine farm) falls. The size of the decline can range from 10% to 40%, indicating that regulatory uncertainty has a very large impact on the value of an investment.

Specifically, regulatory uncertainty can lead to:

- An increase in the risk premium an investor requires
- Delays in the timeframe of when an investment is able to be executed.

We have illustrated an improvement in certainty to be conservatively between 0.5% and 1% of turnover (or between $10.5 and $22 million by 2025) based on NZIER (2015). Note that this is an illustration of the certainty benefit which is very conservative.

3.6.3. Outstanding natural character/area

The NES requires that consents in areas identified in council plans or regional policy statements as "outstanding" will still have to follow the process without public notification.

Being in an area identified as outstanding is not the main issue. More important is whether a marine farm located in an area labeled outstanding has an adverse effect on the values and characteristics that make it outstanding. This means for many farms there will be little change in the way they operate.

For some specific farms (i.e. Wainui Bay and Aotea Harbour spat farms) the impact is less clear, so uncertainty remains, and the proposed NES MA may be neutral on the impact of spat farm consenting.

Farmers interviewed found it difficult to put a value on certainty of knowing where areas labelled outstanding were, but thought it was a benefit. We have not quantified it in the report.

Given the significance of spat farms to the industry and very limited ability of these farms to be moved we have explored increased certainty in Section 5.2.

3.6.4. Realignment of marine farms

The NES provides for small scale realignments of existing marine farms (limited to farms with less than 10 hectares). This is particularly relevant if the realignment can mitigate or reduce adverse effects on the environment.

Industry see this as a benefit but are unable to distinguish it from other certainty benefits.

3.6.5. Change in species

The NES provisions also deal with farms changing species. It does this through a potentially more certain and consistent pathway (a restricted discretionary activity). Using a restricted discretionary pathway has fewer more focused matters that a council is allowed to consider in making a decision on an application. This means the

pathway will be more certain and consistent relative to without the NES to change species.

While this is welcomed by the industry, experimenting with species involves much greater risk relative to land-based activities.[16] Weighing up the risks (particularly the possible large costs involved) of experimenting/introducing new species relative to the potential benefits may mean that changing species may have little impact on the industry. They may instead "stick to their knitting" focusing on innovation associated with demand and supply aspects of currently farmed species.

Improving certainty associated with species change may not be the primary consideration for new species innovation. The NES MA may only make a minor difference relative to the status quo.

3.6.6. Biosecurity improvements

The NES requires all marine farms (existing and new) to prepare, implement and keep up-to-date biosecurity management plans by no later than January 2025.

To value the impact of biosecurity provisions is not straightforward. The main reason for this is that the aquaculture biosecurity pathway is not the only pathway that pests and diseases can arrive in a specific area of New Zealand. Other pathways, particularly recreational craft, can also spread pests and diseases and will not be subject to the same scrutiny as the aquaculture industry.[17] The conclusion is that the impact of a best practice biosecurity programme in aquaculture may not stop the spread of pests and diseases.

The importance of a more comprehensive aquaculture biosecurity approach should not be underestimated. The aim of the NES is to change industry behaviour and ensure that the industry plays its part in New Zealand's biosecurity approach. Nobody is saying we do not need a more comprehensive biosecurity approach in aquaculture.

We have adopted the approach which recognises these issues: the cost of biosecurity (the administrative and compliance costs required) **equals** the benefits of biosecurity (recognising that other biosecurity pathways can reduce the benefits to the industry).[18]

This means the focus should be on reducing the costs while maintaining a level of biosecurity deemed appropriate by government.

Two options are considered:

1. Per farm biosecurity approach. Each farm is responsible for its biosecurity plan development, operational processes when moving stock and equipment, council monitoring (charged to the farmer), and three-yearly certification surveys (charged to the farmer)

[16] An apple orchard can plant new varieties without a huge cost to the business. Therefore, the risks are small to the business.

[17] This does not mean that they will be in the future. There are initiatives underway particularly in Northland that are aimed at partially addressing these issues. The National Pathway Management Plan may also become operational by the end of the forecast period.

[18] This is based on the assumption that the on-farm and management area schemes are equally effective. We acknowledge that this needs to be tested and that it is difficult to predict the outcomes from such different approaches. By assuming that biosecurity outcomes for New Zealand are not significantly different in each approach, the most cost effective approach is to adopt management area plans. Further, it may be that per farm biosecurity approaches are more effective, however it might be very difficult to justify the extra cost for incremental gains in protection.

2. Per management area biosecurity approach. Distinct management areas are set up and each farm contributes to a management plan which includes stock and equipment protocols and individual responsibilities (and potentially sanctions) within a management area plan.

Per farm biosecurity approach

The benefits (which are the costs) associated with the per farm biosecurity approach are set out in Table 17. These benefits are described in the cost section.

Table 17 Per farm biosecurity approach

First year, costs = benefits

	Item	Description	Comment
Council costs			
Monitoring costs	$600,000 per annum [3]	4 additional staff	Unable to be charged on to farmers[2]
Monitoring costs	$120,000 per annum [3]	Administration and employment of consultants	Unable to be charged on to farmers
Reviewing existing consents	$350,000	One-off in 2024	Unable to be charged on to farmers
Industry costs			
Plan development	$1.6 million ($555,000 per annum)	Spread over 3 years only	Estimated that the industry is 70% complete
Certification of plans	$2.2 million ($726,000 per annum) [3]	Spread over 3 years and continuous	
Monitoring	$1.3 million [3]	Per annum charge	
Non-quantifiable issues			
Capability skill shortage	Councils and industry are unsure that New Zealand has the capability (e.g. due to a skill shortage) to ensure that best practice biosecurity plans meet standards in the right timeframes		
Total Benefit	**$2.8 million[1]**	**Per annum benefit**	
Note: (1) The per annum benefit after year 4. We have not included the review of existing farms since it is a one-off cost in 2024. (2) Over time costs may be passed on to farmers. (3) These costs/benefits are gradually introduced over time.			

Source: NZIER

Per management area biosecurity approach

An alternative to the per farm management approach is to consider a management area approach. In the disease space the concept of an independent management unit is used. These are areas where the likelihood of the spread of disease between the management units is not very high e.g. the Pelorus Sound, Queen Charlotte Sound, and Port Underwood could be considered separate management areas.

Each biosecurity management plan would need to be tailored to address the specific biosecurity risks of each farm, however it is anticipated that 'area-based' biosecurity management plans could be prepared for multiple sites where there are commonalities between farms (e.g. an 'area-based' biosecurity management plan could be prepared for all marine farms within a suitable management area).

The exact nature and approach of area-based biosecurity management plans will be worked out through the development of the externally referenced document to the proposed NES MA, which will be finalised prior to the NES MA being gazetted.

The management plans would include:

- Chapters common for all farms
- Unique chapters for some farms
- Protocols for stock and equipment movement into and out of the management area (given specific/unique pathways to particular farms).

The cost of these plans will be higher; and the plans would be more complex relative to a single plan. Key issues would be the pathways for equipment and stock movement.

If there is an incursion it makes more sense to manage it at the bigger geographic scale e.g. if you had an incursion into Pelorus Sound, to protect Pelorus Sound, you would want everybody to contribute to a control or eradication programme within the management area.

Because the number of management areas (23) is much smaller than the number of farms (1,089) the costs are much smaller. This is despite the plans being more complex with an average cost of $20,000 relative to the per farm cost of $5,000.

There are substantial cost savings for councils and industry with the risks of a biosecurity incursion being the same. Table 18 illustrates this impact.

Table 18 Per management area biosecurity approach

First year, costs = benefits

	Item	Description	Comment
Council costs			
Monitoring costs	Slight increase in costs	Change from the status quo is likely to have a neutral impact on costs	Absorbed into base lines
Reviewing existing consents	Slight increase in costs	One-off in 2024. These farms a likely to be part of a new management area plan	Absorbed into base lines
Industry costs			
Plan development	$138,000 ($46,000 per annum)	Spread over 3 years only	Estimated that the industry is already 70% complete
Certification of plans	$230,000 ($77,000 per annum) [2]	Spread over 3 years and continuous	

Monitoring	$138,000 per year[2]	Per annum charge	A 20% increase on status quo costs.
Total Benefit	**$207,000[1]**	**Per annum benefit**	
Note: (1) The per annum benefit after year 4. (2) These costs/benefits are gradually introduced over time.			

Source: NZIER

3.6.7. Benefits to government

An important unquantified benefit is the improvement and consistent application of biosecurity rules in aquaculture across New Zealand.

3.7. Summary of costs and benefits

Below we have set out the across-region costs and benefits.

Table 19 National costs and benefits with the NES MA

"With" the NES MA PV 6%

Impact	Costs	Benefits
Environment		
Overall environmental management	Set bottom line environmental outcomes (not valued)	Better informed councils and consistent rules benefit environmental outcomes
Tangata whenua		
	Potential cost: consistent national rules (not valued)	Business certainty gains (not valued)
		Iwi consultation is mandatory (not valued)
Councils		
	Plan change/amendment costs ($294,000)	Fills gaps in one biosecurity pathway (not valued)
	Costs of employing more staff (per farm biosecurity scenario) ($5,493,900)	
	Further administration costs and employment of consultants ($1,091,000)	
	Training ($35,000)	
	Systems costs ($86,000)	
	Review of consents (per farm biosecurity scenario) ($430,000)	
	Implementation costs ($54,000)	
	Potential staff capability shortage (not valued)	
Companies/entities		
	Biosecurity plans (per farm $1,455,000; per management area $123,000)	Reduction in advocacy (not valued)
	Increased monitoring (per farm $11,876,000; per management area $1,188,000)	Increased certainty (reduced costs) between $2,469,000 and $4,335,000
	Increased certification (per farm $6,600,000; per management area $697,000)	Increased certainty business investment (between $8,639,000 and $17,278,000)
	Change in behaviour (not valued)	
Government		
Biosecurity (costs equal benefits)	Implementation costs ($317,000)	Biosecurity benefit (per farm $26,903,000; Per management area $2,007,000)
Efficiency/environmental outcomes		Balance efficiency & environmental outcomes

Impact	Costs	Benefits
NGOs		
	Setting environmental limits impacts on outcomes	
	Reduced advocacy opportunities	
General public		
	Reduced advocacy opportunities	
Total costs/benefits		
Total costs (biosecurity management per farm)	$27,690,000	
Total costs (biosecurity management areas)	$2,706,000	
Total benefits (biosecurity management per farm)		Between $38,012,000 and $48,517,000
Total benefits (biosecurity management area)		Between $13,116,000 and $23,621,000

Source: NZIER

4. Central scenario results

The section above has indicated the basis on which the CBA has been developed. The results are summarised in the following tables for the NES. Based on the central "typical" assumptions, the quantified analysis returns a net benefit. Further all of the scenarios set out have positive benefit cost ratios.

The outcome is robust against changes in the discount rate (in either direction). However, the robustness of the analysis is influenced by:

- The potential bias in the information provided[19]
- The potential magnitude of unquantified costs and benefits, such as environmental costs.

The figures in these tables are based on Table 19.

4.1. Central scenarios with per farm biosecurity measures

The first scenario sets out a situation with low benefits and per farm biosecurity measures in place. The benefits and costs are much higher (relative to the management area biosecurity measures) because we have deliberately set the costs equalling the benefits. This inflates not only the costs (because of the high cost of managing biosecurity on a per farm basis) but also the benefits.

The most significant issue is the relative low benefit cost ratio albeit still being positive.

Figure 4 Central scenario: low benefits

Per farm biosecurity measures, PVs between 4% and 8%

Quantitative impacts				
	4%	**6%**	**8%**	**Comment**
Costs	33,405,085	27,689,613	23,260,052	big cost imposition
Benefits	44,458,244	38,012,208	32,921,811	low benefit estimate
Net benefit/cost ratio	1.33	1.37	1.42	
Qualitative impacts				
Costs	Concern over limiting environmental outcomes			
	No quantification of environmental outcomes			
	Reduce input by local communities at the consent stage			
Benefits	Consistent rules across NZ			
	Improved biosecurity			
	Consistent rules,better informed councils and further monitoring			

Source: NZIER

[19] To try and avoid bias we asked a standard set of questions of each interviewee, used our professional judgement, and our experience from many other evaluations of National Policy Statements and National Environmental Standards. We also tried to – as far as possible – crosscheck answers from a different source.

The second scenario is similar to the first but with a higher benefit for industry (from certainty). This has the impact of lifting the benefit cost ratios, although they are still at a relatively low level.

Figure 5 Central scenario: high benefits

Per farm biosecurity measures, PVs between 4% and 8%

Quantitative impacts				
	4%	6%	8%	Comment
Costs	33,405,085	27,689,613	23,260,052	big cost imposition
Benefits	55,686,801	48,517,218	42,772,069	high benefit estimate
Net benefit/cost ratio	1.67	1.75	1.84	
Qualitative impacts				
Costs	Concern over limiting environmental outcomes			
	No quantification of environmental outcomes			
	Reduce input by local communities at the consent stage			
Benefits	Consistent rules across NZ			
	Improved biosecurity			
	Consistent rules,better informed councils and further monitoring			

Source: NZIER

4.2. Central scenarios with management area biosecurity measures

The third central scenario sets out the low benefits with the management area biosecurity measures. The management area biosecurity costs are much lower (relative to the per farm biosecurity measures). Since biosecurity costs equal benefits, the costs and benefits are much lower.

Significantly, the benefit cost ratios are much higher relative to per farm scenarios.

Figure 6 Central scenario: low benefits

Management area biosecurity measures, PVs between 4% and 8%

Quantitative impacts				
	4%	6%	8%	Comment
Costs	3,169,131	2,706,985	2,344,728	low cost imposition
Benefits	14,312,967	13,116,061	12,089,045	low benefit impositon
Net benefit/cost ratio	4.52	4.85	5.16	
Qualitative impacts				
Costs	Concern over limiting environmental outcomes			
	No quantification of environmental outcomes			
	Reduce input by local communities at the consent stage			
Benefits	Consistent rules across NZ			
	Improved biosecurity			
	Consistent rules,better informed councils and further monitoring			

Source: NZIER

The fourth central scenario sets out the high benefits estimates with the management area biosecurity measures. These results are similar to the third scenario but with slightly higher benefit cost ratios.

Figure 7 Central scenario: high benefits

Management area biosecurity measures, PVs between 4% and 8%

Quantitative impacts				
	4%	**6%**	**8%**	**Comment**
Costs	3,169,131	2,706,985	2,344,728	low cost imposition
Benefits	25,541,524	23,621,071	21,939,302	high benefit scenario
Net benefit/cost ratio	8.06	8.73	9.36	
Qualitative impacts				
Costs	Concern over limiting environmental outcomes			
	No quantification of environmental outcomes			
	Reduce input by local communities at the consent stage			
Benefits	Consistent rules across NZ			
	Improved biosecurity			
	Consistent rules,better informed councils and further monitoring			

Source: NZIER

5. Scenario analysis

We have looked at three different scenarios. These are:

- Marlborough region reverting to NES rules if its more lenient approach is successfully challenged
- More certainty for the industry associated with spat farmers
- Doubling of biosecurity management area costs.

All the scenarios remain positive but have differing impacts on the shape of the costs and benefits.

5.1. Scenario 1: Marlborough region reverting to NES rules

Currently Marlborough region has embarked upon its own approach to aquaculture management. The main impact is that their approach is more lenient than NES provisions e.g. they are advocating a controlled activity status rather than a restricted discretionary activity status.

This is a Schedule 1 planning process which is open to for public consultation and public challenge. If a challenge is successful, the Marlborough region would revert to NES provisions, improving the benefits of the NES nationally.[20]

The following scenario sets out the impact of that change. In the per farm biosecurity low and high benefit scenarios, it improves the benefit cost ratio slightly (see Figure 8).

Figure 8 Scenario 1: Marlborough reverting to NES rules

Per farm biosecurity management, low and high benefits, PV 6%

Quantitative impacts			
	Low	**High**	**Comment**
Costs	27,697,471	27,697,471	big cost imposition
Benefits	39,881,063	51,881,503	benefit range compared
Benefit cost ratio	1.44	1.87	
Qualitative impacts			
Costs	Concern over limiting environmental outcomes		
	No quantification of environmental outcomes		
	Reduce input by local communities at the consent stage		
Benefits	Consistent rules across NZ		
	Improved biosecurity		
	Consistent rules,better informed councils and further monitoring		

Source: NZIER

[20] Under the planned approach by Marlborough the NES has no impact, since rules would be more lenient.

In the per management area biosecurity low and high benefit scenarios, the benefit cost ratios are significantly higher too (see Figure 9).

Figure 9 Scenario 1: Marlborough reverting to NES rules

Biosecurity management area, low and high benefits, PV 6%

Quantitative impacts			
	Low	**High**	**Comment**
Costs	2,706,985	2,706,985	low cost imposition
Benefits	14,628,709	26,629,149	benefit range compared
Benefit cost ratio	5.40	9.84	
Qualitative impacts			
Costs	Concern over limiting environmental outcomes		
	No quantification of environmental outcomes		
	Reduce input by local communities at the consent stage		
Benefits	Consistent rules across NZ		
	Improved biosecurity		
	Consistent rules,better informed councils and further monitoring		

Source: NZIER

Marlborough region reverting to the NES provision improves the benefit cost ratios across the board. This is expected given the large size of aquaculture activity in the region and the reduction in leniency associated with a successful challenge to Marlborough's preferred approach.

5.2. Scenario 2 increased certainty for spat farms

The industry has identified access to spat (for green-lipped mussels) as one of its most pressing issues. Any reduction in spat production will have a significant impact on the industry both on-farm and off-farm (see NZIER 2018).

Two spat farms (Wainui Bay and Aotea Harbour) may be in areas identified through future planning processes as "Outstanding". Currently it is uncertain whether spat farms will be reconsented because of their location.

The scientific information on spat migration is sparse so the location of these farms is a critical factor – they cannot be moved without significant spat capture loss.

Therefore, any provisions within the NES to improve the ability of spat farms to obtain further consents will have an impact on certainty.

The following scenario sets out the impact of that change. In the per farm biosecurity low and high benefit scenarios, the benefit cost ratio improves slightly (see Figure 10).

Figure 10 Scenario 2: Increased certainty for spat catching sites

Per farm biosecurity management, low and high benefits, PV 6%

Quantitative impacts			
	Low	**High**	**Comment**
Costs	27,697,471	27,697,471	big cost imposition
Benefits	42,331,764	57,156,329	benefit range compared
Benefit cost ratio	1.53	2.06	
Qualitative impacts			
Costs	Concern over limiting environmental outcomes		
	No quantification of environmental outcomes		
	Reduce input by local communities at the consent stage		
Benefits	Consistent rules across NZ		
	Improved biosecurity		
	Consistent rules,better informed councils and further monitoring		

Source: NZIER

In the per management area biosecurity low and high benefit scenarios, the benefit cost ratios are significantly higher (see Figure 11).

Figure 11 Scenario 2: Increased certainty for spat catching sites

Biosecurity management area, low and high benefits, PV 6%

Quantitative impacts			
	Low	**High**	**Comment**
Costs	2,706,985	2,706,985	reduced cost imposition
Benefits	17,435,617	32,260,182	benefit range compared
Benefit cost ratio	6.44	11.92	
Qualitative impacts			
Costs	Concern over limiting environmental outcomes		
	No quantification of environmental outcomes		
	Reduce input by local communities at the consent stage		
Benefits	Consistent rules across NZ		
	Improved biosecurity		
	Consistent rules,better informed councils and further monitoring		

Source: NZIER

5.3. Scenario 3 Doubling the management area costs

The management area costs are much lower than the per farm biosecurity approach costs. This is to be expected since the management areas are significant, and the approach reduces the costs for both business and councils. It also greatly reduces the demand for further expertise since the plan development, certification, and monitoring requirements are less onerous.

Therefore, it is prudent to further explore the management area costs to further understand the impact. In this scenario we have doubled the cost impact.

By doubling the cost impact, the cost benefit ratios for both the low and high benefit scenarios remain at levels well above the per farm biosecurity central scenario (see Figure 12).

Figure 12 Scenario 3: Doubling the management area costs

Biosecurity management area, low and high benefits, PV 6%

Quantitative impacts			
	Low	**High**	**Comment**
Costs	5,413,969	5,413,969	Costs doubled
Benefits	13,116,061	23,621,071	Benefits held constant from central scenario
Net benefit/loss	2.42	4.36	
Qualitative impacts			
Costs	Concern over limiting environmental outcomes		
	No quantification of environmental outcomes		
	Reduce input by local communities at the consent stage		
Benefits	Consistent rules across NZ		
	Improved biosecurity		
	Consistent rules,better informed councils and further monitoring		

Source: NZIER

6. Conclusions

We have considered both the quantified and non-quantified costs and benefits, and the results suggest that benefits outweigh the costs.

The principal parts of the analysis are:

- Detailing the substantial difference in costs between a per farm biosecurity approach and a management area approach. Also, we include the impact of staffing levels and the difficulty of obtaining the expertise needed
- The improved certainty to the industry through a potentially more certain and consistent reconsenting pathway
- Improved industry certainty of process and costs through a replacement consenting pathway that has a potentially more certain process
- The trade-off between improving industry certainty and capping social and environmental outcomes.

We must stress that there are limitations in the quantified analysis due to the information available on different aspects. The robustness of the analysis is influenced by the potential bias in the information provided and the potential magnitude of unquantified costs and benefits, such as uncertainty around social and environmental outcomes.

The figures in this report should be regarded as an order of magnitude calculation rather than a definitive measure.

7. References

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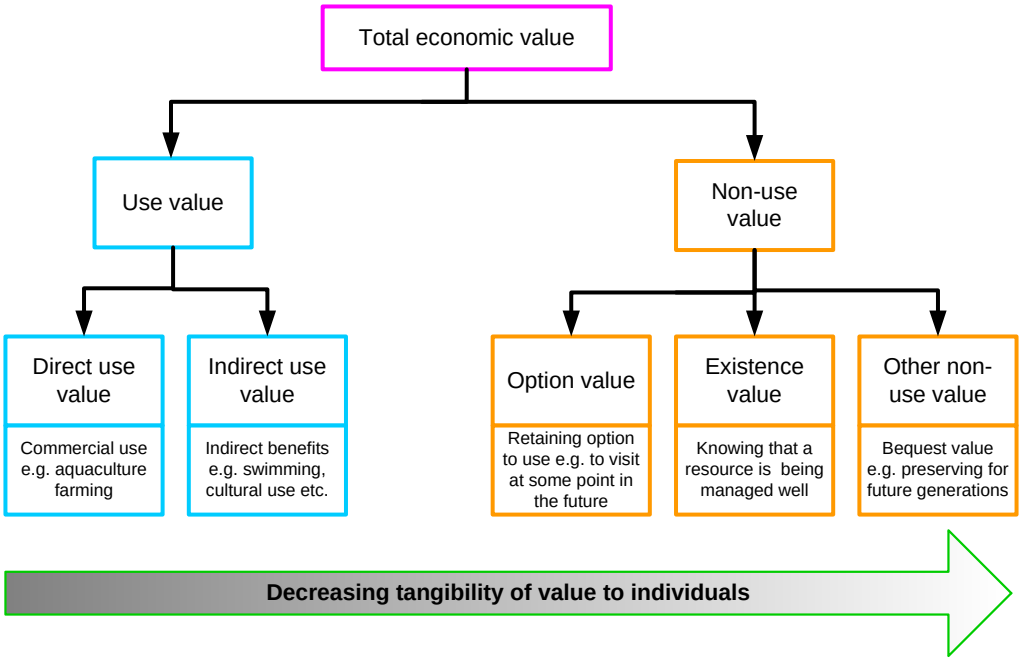
Appendix A Approach to costs and benefits

A.1 Total Economic Value

Total Economic Value (TEV)[21] is a standard framework for categorising and exploring the different sources of value. It provides a way to capture all the ways that people value resources. The framework is set out below.

Figure 13 Total economic value framework



Source: Serageldin, 1999

One way that people derive value from resources is by using them. Use values are relatively easily defined into direct uses – mainly commercial uses (e.g. commercial aquaculture farming) that are reflected in the economy – and indirect use values (such as recreation, environmental, cultural use, and swimming).

Direct uses take public spaces via consent for private purposes to the exclusion of others in ways that often contribute to a market return. Indirect uses employ resources in ways which do not deplete what is left for others, and often at a level of use at which it is not practical to charge because of high transaction costs in so doing.

Indirect uses often use resources with the public good characteristics of non-rival and non-excludable consumption and take place without explicit market prices. We have also – as a society – made provision for Māori to exercise customary rights in certain

[21] TEV is not the only classification framework that could be used. An alternative classification system would be to use ecosystem services (for example).

areas as part of obligations under the Treaty of Waitangi. Although, cultural importance is not just confined to indirect use values. Māori have interests across the spectrum of use and non-use values.

Aquaculture farming does impact on a broad range of activities both market and non-market. There will be landscape, natural character benthic, exclusion of marine mammals, and phytoplankton depletion. The impact may be felt on shore as well with jobs in processing.

Non-use values will also be affected. A non-use value is something that people derive from a well-managed aquaculture industry without actually using it, either directly or indirectly (e.g. having best practice biosecurity provisions). A non-use value can be an option value (preserving the ability to use it later, such as an Outstanding Natural Landscape/Area or as a commercial activity when commodity prices improve), the existence value (preserving and improving what we have) and other non-use values (preserving something for future generations).

As we move from commercial, direct use to non-use values, particularly for things like preserving recreational activities and visual effects, we move from more tangible values to less tangible. More tangible values tend to be easier to quantify and are often observed in markets.

Under the RMA, the benefits from use and non-use values are all equally important and as far as possible the assessment considers not only the more easily obtainable costs but the more intangible benefits. Many of the non-use values are not priced in markets; however, this does not mean they are not valuable. In fact, the RMA expressly points to:

> *managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being* (RMA Section 5(2)).

Using TEV valuation methods can provide estimates of use and non-use estimates that are consistent with cost benefit analysis.

A.2 Estimates of the type of benefits

To show where we have good data and where the gaps in the data are we need to operationalise the TEV framework. There are several steps to this process that require considerable care.

The benefits are based on improved certainty, biosecurity, and consistency of rules.

The approach to constructing the benefits is based on:

- What needs to be valued? Examining information from local and international sources that might assist in identifying what needs to be valued, i.e.:
  - NZIER (2015) that examines the importance of certainty in the aquaculture context
  - The Green Book (UK) sets out practical advice for setting out the costs and benefits, given resources available. Specifically, advice on the

importance of irreversibility and the importance of a structured approach

- Locating information from New Zealand sources that could assist in understanding the magnitude of the values (or the costs of restoring infrastructure to pre-dam breach levels). This includes:
  - Use values such as those of commercial activities
  - Indirect values such as recreation values and water related values
  - Non-use values that mainly involve existence and bequest values.
- Further understanding Māori values and how they connect with the TEV approach.

A.3 What needs to be valued?

A.3.1 Interview process

Interviews were conducted with councils, industry, central government, scientists, and environmental groups and other interested parties.

We used a standard questionnaire to test the assumptions and further understand views of the NES. Where possible we also received indicative costing information and attempted to cross check that information from different sources.

A.3.2 Use of NZIER (2015)

The NZIER was commissioned by the industry to examine the impact of regulation on certainty within the industry. It demonstrated that the impact can be quite dramatic with significant reductions in investment in certain circumstances.

The links between regulatory certainty, investment and production drive industry well-being.

A.3.3 Green book provides practical advice

In the United Kingdom, HM Treasury sets out its approach to techniques and issues associated with policies, programmes, and projects in the Green Book.[22] The relevant issue for the NES include: costs and benefits that have not been valued should also be appraised.

While it may not be practical to value all costs and benefits given complexity and budgets, valuation should not be ignored. All costs and benefits should be described and if possible quantified.

The Green Book describes a number of techniques that can be used to estimate hard to value issues (e.g. willingness to pay surveys). Such valuations tend to be site or case specific (e.g. the value of a fishing day will vary with local demand and supply characteristics), so applying these values elsewhere can only be justified in closely analogous situations. In smaller projects (such as this NES evaluation), it may prove too

[22] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf

complicated and costly to provide specific values. In these cases, comparisons and benchmarking to ensure good design is required.

We have not considered developing site-specific research to determine values in this project.[23] The values used come from existing studies. We have used non-market values estimated at individual sites (or in some cases costs) to identify order of magnitude values that can be used more generally. This is our only option and is known as the benefit transfer approach.

[23] Time and resources do not allow us to attempt this approach.

Appendix B Māori values[24]

The importance of land and water to Māori means that understanding how value is perceived by Māori is integral to any aquaculture NES value. It is also a statutory requirement in the RMA, the Conservation Act and the Local Government Act.

Further, in each area, the value to tangata whenua of the local environs is increasingly being recognised in Treaty Settlements via Statutory Acknowledgements.

The starting point is understanding how Māori view value (typically in an integrated holistic way) and to identify the values.

The value of land and water to tangata whenua show how important they are as a core taonga.[25] In relation to TEV, Covec (2013) point to a number of areas of significance:

- **Reciprocity is required**. Anything taken (food or other resources) is balanced by giving back. This concept is based upon elements of the Māori values of Kaitiakitanga, Mahinga, kai, Mauri, and Whānaungatanga. Mana will be lost with failure to look after the local environment. A deterioration in water quality may mean the inability to produce traditional food or other resources iconic to a local environment
- **Mātauranga (knowledge) and whakapapa (the sharing of it with future generations)**. Management and use of resources, and the relationship with the land or water body, provides resources for the group but also builds knowledge and provides educational experiences that can be passed on to future generations. Thus, losses in land or water from a dam breach can mean losses in knowledge precluding increases in the opportunities for use of a resource that yields opportunities for education
- **Whānau and hapū** are identified with the environment and resources that they relate to in their surrounding land and water. A loss of those resources reflects on their identity as a group.

The additional values Māori have result in greater preferences for (and valuations of) existence and preserving current use of land and water for passing on of knowledge and/or maintain cultural identity.

No separate values for Māori have been identified. Covec (2013) comment:

> *Some of these [values] may be included already in proportion to Māori's contribution to the total population in the original studies that were based on public surveys, but we do not have separate values for Māori, e.g. for existence value.*
>
> *To fully understand Māori values and their contributions to Māori value … further research with Tangata Whenua is required.*

[24] This section follows the approach, is shaped by, and is only slightly rewritten to reflect work done by Covec in 2013.

[25] Other authors have focused on the importance of consultation and process as a way of assessing the value of specific sites. See for example: https://www.nzta.govt.nz/assets/resources/research/reports/601/601-understanding-the-value-of-transport-investment-in-historic-and-cultural-heritage.pdf

Appendix G – Environmental effects resulting from replacement consenting provisions

Replacement consenting for existing marine farms

Effect	Cost/benefit
Landscape	Potential cost in Auckland and Southland
Natural character	Potential cost in Auckland and Southland
Benthic effects (shellfish)	Potential cost in Auckland, Waikato, Bay of Plenty and Southland
Marine mammals (habitat exclusion)	Potential cost in Auckland, Bay of Plenty and Southland
Phytoplankton depletion	Potential cost in Auckland, Canterbury and Southland
Noise	Potential benefit in Auckland and Bay of Plenty
Recreation	Potential benefit for recreational fishing Potential benefit in Auckland and Northland for public access Potential cost in Canterbury and Southland for public access
Access through the marine farm	Potential benefit in Northland, Auckland and Bay of Plenty
Access through the marine farm	Potential benefit in Northland, Auckland and Bay of Plenty
Public exclusion	Potential benefit in Northland and Auckland
Amenity	Potential benefit in Northland and Auckland re rubbish and debris Potential cost in Canterbury and Southland

All other effects are neutral as a result of the proposed NES.

Effect	Description	Counterfactual	Effect as a result of the NES
Environmental			
Landscape	• Landscape values are predominantly affected by above water structures (buoys, oyster racks, above water sections of sea pens, barges) • Above water structures may have an effect on landscape values, although the degree of that effect is dependent on the existing landscape character and the viewing distance • Landscape effects would typically be assessed for replacement consents on the basis of the farm not being in place (i.e. the farm that is due for a replacement consent does not form part of the existing baseline) • In Auckland and Southland, almost all and all respectively of the consents for the existing marine farms expire at the same time, and are mostly deemed permits. Effects on landscape would therefore be considered in the context of mass numbers of farms being removed from the landscape and then replaced (if all consents were granted). Auckland developed a generally understood approach to the effects of marine farms on outstanding landscapes as part of the development of the AUP. Without a detailed analysis of the available information on landscape values in areas other than outstanding landscapes in Auckland, and in Big	Northland = • controlled activity for shellfish outside of outstanding areas, no matter of control in relation to landscape • restricted discretionary activity for shellfish in outstanding areas, with a matter of discretion relating to effects on those areas	Northland = • retains controlled activity rule, no effect • for existing marine farms when the NES is gazetted, there are none in outstanding areas, no effect • for future farms, that will eventually come within NES, initial consent will have considered landscape, no effect
		Auckland = • restricted discretionary outside of overlays, with a general matter of discretion in relation to effects on landscape values • restricted discretion within overlays, with a matter of discretion relating to effects on the characteristics and qualities of the overlay	Auckland = • outside of overlays landscape will not be able to be considered. The majority of the farms are deemed permits and landscape may therefore not have been assessed fully previously, potential cost of NES • within overlays, provisions are equivalent, no effect
		Waikato = • restricted discretionary, with no matter of discretion in relation to landscape	Waikato = • provisions are equivalent, no effect
		Bay of Plenty = • controlled provided not in area of outstanding natural character, no matter of control in relation to landscape • restricted discretionary in areas of outstanding natural character, no matter of discretion in relation to landscape	Bay of Plenty = • retains controlled activity rule, no effect • within overlays, NES provides a matter of discretion, but as the overlay is defined for outstanding natural character it will not apply in terms of landscape, no effect

Effect	Description	Counterfactual	Effect as a result of the NES
	Glory Bay and Bluff Harbour it is difficult to determine whether the marine farms will have adverse effects on landscape. A number of existing marine farms have been in place since the 1980s and like-for-like replacement will not increase effects on landscape (although declining the consents could decrease effects) • In Waikato, all the consents for existing marine farms outside of the Wilson's Bay zone expire in 2025, so effects on landscape would be considered in the context of mass numbers of farms being removed from the landscape and then replaced (if all consents were granted). Without a detailed analysis of the available information on landscape values in each harbour or bay where marine farms are located it is difficult to determine whether the marine farms will have adverse effects on landscape. Existing marine farms have been in place in many cases for years and like-for-like replacement will not increase effects on landscape (although declining the consents could decrease effects) • In Northland, Marlborough and Canterbury existing farms have varying expiry dates. Effects on landscape will therefore need to be assessed in the context of only some farms in any given area being removed from the landscape (and	Marlborough = • controlled if in aquaculture management zone (likely to be majority of farms), matters of control unknown, but consent will not be able to be declined • non-complying or prohibited if outside an aquaculture management zone, so full discretion available to consider effects on landscape	Marlborough = • retains controlled activity rule, no effect • areas outside aquaculture management zones likely to be considered 'inappropriate' for aquaculture, NES will allow more stringent activity status to be retained, no effect
		Tasman = • existing marine farms are controlled or restricted discretionary, depending on the level of development of the AMA sub-zone proposed (in practice all consents have been applied for as restricted discretionary activities), matters of discretion do not include reference to landscape	Tasman = • exempt from NES, no effect
		Canterbury = • discretionary for all farms, so full discretion to consider landscape effects available	Canterbury = • for existing farms outside outstanding areas (1 farm), landscape will not be able to be considered. However, farm is post RMA and landscape will have been considered when consent granted, no effect • for existing farms inside outstanding areas (11 farms) matter of discretion is more focused than full discretion, but still allows all important effects to be considered, no effect
		Southland =	Southland = • for existing farms outside outstanding areas (43) landscape will not be able

Effect	Description	Counterfactual	Effect as a result of the NES
	then replaced if consents are granted). In this context it is unlikely that significant adverse effects on landscape values will occur • There are 132 marine farms in outstanding areas around the country	• discretionary for all farms, so full discretion to consider landscape effects available	to be considered. Farms are all pre-RMA, potential cost of NES • for existing farms inside outstanding areas (7) matter of discretion is more focused than full discretion, but still allows all important effects to be considered, no effect
Natural character	• Natural character is partially an environmental matter, as it is contributed to by abiotic and biotic values, but also partially a social matter, as experiential characteristics contribute to a definition of natural character. For the purpose of this analysis, it is going to be considered as an environmental effect • Natural character applies to both above water level and sub-surface (confirmed for example by the Rena case and the analysis that was done for the salmon relocation proposal) • Marine farms may have effects on natural character, although the extent of those effects can be influenced by the existing natural character of the site and area • The analysis outlined above for landscape effects in the major aquaculture regions also applies to natural character, i.e. in some regions on replacement consenting natural character would be considered almost on a 'blank slate' basis, but a complete understanding of effects is not available to the	Northland = • controlled activity for shellfish outside of outstanding areas, no matter of control in relation to natural character • restricted discretionary activity for shellfish in outstanding areas, with a matter of control relating to effects on those areas	Northland = • retains controlled activity rule, no effect • for existing marine farms when the NES is gazetted, there are none in outstanding areas, no effect • for future farms, that will eventually come within NES, initial consent will have considered natural character, no effect
		Auckland = • restricted discretionary outside of overlays, with a general matter of discretion in relation to effects on natural character • restricted discretion within overlays, with a matter of discretion relating to effects on the characteristics and qualities of the overlay	Auckland = • outside of overlays natural character will not be able to be considered. The majority of the farms are deemed permits and natural character may therefore not have been assessed fully previously, potential cost of NES • within overlays, provisions are equivalent, no effect
		Waikato = • restricted discretionary, with no matter of discretion in relation to natural character	Waikato = • provisions are equivalent, no effect
		Bay of Plenty = • controlled provided not in area of outstanding natural character, matter	Bay of Plenty = • retains controlled activity rule, no effect (although note that additional

Effect	Description	Counterfactual	Effect as a result of the NES
	NESMA team without much more detailed analysis than has been done to date, in other regions (including Marlborough and Northland which account for a significant proportion of the existing marine farms) the variation in expiry dates means that effects on natural character will be considered often in the context of other marine farms remaining in place • There are 132 farms in outstanding areas around the country, although not all of these will be in areas of outstanding natural character	of control in relation to measures to avoid, remedy or mitigate adverse effects on natural character • restricted discretionary in areas of outstanding natural character, matter of control in relation to measures to avoid, remedy or mitigate adverse effects on natural character	matters will be considered in consenting than if NES did not allow more lenient activity status) • restricted discretionary within areas of outstanding natural character, with a matter of discretion that is wider than the matter in the counterfactual
		Marlborough = • controlled if in aquaculture management zone (likely to be majority of farms), matters of control unknown, but consent will not be able to be declined • non-complying or prohibited if outside an aquaculture management zone, so full discretion available to consider effects on natural character	Marlborough = • retains controlled activity rule, no effect • areas outside aquaculture management zones likely to be considered 'inappropriate' for aquaculture, NES will allow more stringent activity status to be retained, no effect
		Tasman = • existing marine farms are controlled or restricted discretionary, depending on the level of development of the AMA sub-zone proposed (in practice all consents have been applied for as restricted discretionary activities), matters of discretion include natural character	Tasman = • exempt from NES, no effect
		Canterbury = • discretionary for all farms, so full discretion to consider natural character effects available	Canterbury = • for existing farms outside outstanding areas (1 farm), natural character will not be able to be considered. However, farm is post RMA and natural character will have been

Effect	Description	Counterfactual	Effect as a result of the NES
			considered when consent granted, no effect • for existing farms around Banks Peninsula, which has been classified as an ONL, natural character will not be able to be considered. However, as there is generally some overlap between what is considered for natural character and what is considered for landscape, the matter of discretion included in the NESMA should provide for the effect to be considered, no effect(?)
		Southland = • discretionary for all farms, so full discretion to consider natural character effects available	Southland = • for existing farms outside outstanding areas (43) natural character will not be able to be considered. Farms are all pre-RMA, potential cost of NES • for existing farms inside outstanding areas (7), depending on whether it is an ONFL or an ONC matter of discretion is more focused than full discretion, and may still allow all important effects to be considered, no effect or potential cost (depending on whether the areas are identified as ONC, see highlight above for Canterbury)
Benthic effects	*Shellfish* • Mussel and oyster farms can have benthic effects as a result of shell drop off, although the majority of these effects are confined to the farm site out to a distance of approximately 50 metres from a sub-	Northland = • controlled activity for shellfish outside of significant ecological areas, matter of control in relation to effects on benthic habitat • restricted discretionary activity for shellfish in significant ecological	Northland = • retains controlled activity, no effect • for future farms, that will eventually come within NES, initial consent will have considered effects on benthic habitat, no effect

Effect	Description	Counterfactual	Effect as a result of the NES
	tidal farm and 20 metres from an intertidal farm • Mussel and oyster farms can cause moderate enrichment of the seabed, although measurements from Marlborough suggest that it is no greater than an enrichment stage of 3, which is well within acceptable guidelines for that region • Benthic effects are generally well understood for these types of marine farms • The significance of effects depends on the original seabed underneath the marine farm – over a relatively bare sand or mud bed shell drop can result in an environmental benefit by providing habitat for aquatic species, over reefs or biogenic habitat adverse effects can be significant	areas, with matters of control relating to effects on benthic habitat and effects on significant marine ecology	
		Auckland = • restricted discretionary outside of overlays, matter of discretion in relation to ecological values, which would cover benthic effects • restricted discretion within overlays, with a matter of discretion in relation to ecological values, which would cover benthic effects	Auckland = • consideration of benthic effects overall will not occur, as matter of discretion relates only to reefs and biogenic habitat • consideration of effects on reefs and biogenic habitats is provided for, although is constrained to a distance of 20m from an inter-tidal farm and 20 metres from the consented area of a sub-tidal farm. Effects beyond this are likely to be minor on the basis of available evidence, but represent a potential cost of NES
		Waikato = • restricted discretionary, with no matter of discretion in relation to general benthic effects, and a matter of discretion re significant adverse effects on reefs and biogenic habitats within 20m (intertidal) and 50m (sub-tidal) of the farm	Waikato = • consideration of effects on reefs and biogenic habitats is provided for, although is constrained to a distance of 20m from an inter-tidal farm and 20 metres from the consented area of a sub-tidal farm. Effects beyond this are likely to be minor on the basis of available evidence, but represent a potential cost of NES
		Bay of Plenty = • controlled provided not in area of outstanding natural character, matter of control in relation to measures to avoid, remedy or mitigate adverse effects on ecology (which would include benthic ecology)	Bay of Plenty = • retains controlled activity, no effect • for farms that are restricted discretionary, consideration of benthic effects overall will not occur, as matter of discretion relates only to reefs and biogenic habitat.

Effect	Description	Counterfactual	Effect as a result of the NES
		• restricted discretionary in areas of outstanding natural character, matter of control in relation to measures to avoid, remedy or mitigate adverse effects on ecology (which would include benthic ecology)	Consideration of effects on reefs and biogenic habitats is provided for, although is constrained to a distance of 20m from an inter-tidal farm and 20 metres from the consented area of a sub-tidal farm. Effects beyond this are likely to be minor on the basis of available evidence, but represent a potential cost of NES
		Marlborough = • controlled if in aquaculture management zone (likely to be majority of farms), matters of control unknown, but consent will not be able to be declined • non-complying or prohibited if outside an aquaculture management zone, so full discretion available to consider effects on benthic habitat and ecology	Marlborough = • retains controlled activity rule, no effect • areas outside aquaculture management zones likely to be considered 'inappropriate' for aquaculture, NES will allow more stringent activity status to be retained, no effect
		Tasman = • existing marine farms are controlled or restricted discretionary, depending on the level of development of the AMA sub-zone proposed (in practice all consents have been applied for as restricted discretionary activities), matters of discretion include ecological effects	Tasman = • exempt from NES, no effect
		Canterbury = • discretionary for all farms, so full discretion to consider benthic effects available	Canterbury = • most marine farms in Canterbury were first granted post-RMA, overall benthic effects are therefore likely to have been assessed under the

Effect	Description	Counterfactual	Effect as a result of the NES
			original consent and any significant seafloor features identified, no effect
		Southland = • discretionary for all farms, so full discretion to consider benthic effects available	Southland = • for farms that are restricted discretionary, consideration of benthic effects overall will not occur, as matter of discretion relates only to reefs and biogenic habitat, potential cost of NES. Consideration of effects on reefs and biogenic habitats is provided for, although is constrained to a distance of 20m from an inter-tidal farm and 20 metres from the consented area of a sub-tidal farm. Effects beyond this are likely to be minor on the basis of available evidence, but represent a potential cost of NES
	Supplementary fed aquaculture • Salmon farms have benthic effects as a result of feed discharges and fish waste. Areas of greatest effect occur under the net pens, but can spread beyond the farm boundaries • Significant ecological effects (on reefs and biogenic habitats) could occur under farms • Significant ecological features (e.g. reefs) in the near vicinity to fed aquaculture could be affected • Benthic effects from fed aquaculture are well understood and can be modelled and monitored, but ongoing management is needed to ensure	Northland = • discretionary for all finfish farms, so full discretion to consider benthic effects available	Northland = • no finfish farms currently exist in Northland, the NESMA would only apply to replacement consents, and matter of discretion will allow any condition to be set to manage effects, no effect
		Auckland = • restricted discretionary outside of overlays, matter of discretion in relation to ecological values, which would cover benthic effects • restricted discretion within overlays, with a matter of discretion in relation to ecological values, which would cover benthic effects	Auckland = • matter of discretion in relation to reefs and/or biogenic habitats encompasses some of the benthic effects covered by the AUP reference to ‘ ecological values’, no effect • matter of discretion in relation to benthic effects overall is somewhat constrained compared to AUP, but it

Effect	Description	Counterfactual	Effect as a result of the NES
	they do not exceed adverse effects limits as specified by their coastal permits • Proposed NESMA include the following relevant matters of discretion: ○ Management of effects on water quality and benthic values ○ Significant adverse effects on reefs and/or biogenic habitat		will allow any condition to be set to manage effects, no effect
		Waikato = • restricted discretionary, with matters of discretion similar to those in proposed NESMA	Waikato = • provisions would be equivalent, no effect
		Bay of Plenty = • no supplementary fed aquaculture currently occurs in the Bay of Plenty. If such a farm was proposed, it would first have to obtain consent as a discretionary activity. Once that consent reached expiry, replacement consent would be able to be sought under the framework as outlined for shellfish benthic effects above, noting that benthic effects would have been thoroughly assessed when consent was first received	Bay of Plenty = • retains controlled activity outside outstanding areas, no effect • for farms that are restricted discretionary, consideration of benthic effects overall will be equivalent to current consideration under the coastal plan, and matter of discretion in relation to reefs and biogenic habitats is more wide-ranging than coastal plan
		Marlborough = • if the MSRMP approach to existing low flow sites is retained, may be controlled if in aquaculture management zone, matters of control unknown, but consent will not be able to be declined • existing CMZ3 (full discretionary) zone may be retained for EPA high flow sites • non-complying or prohibited if outside an aquaculture management zone, so full discretion available to consider effects on benthic habitat and ecology	Marlborough = • retains controlled activity rule, no effect • in CMZ3 zones, significant adverse effects on reefs and biogenic habitats can be considered, no effect. Matter of discretion in relation to benthic effects overall is somewhat constrained, but it will allow any condition to be set to manage effects, no effect • areas outside aquaculture management zones likely to be considered 'inappropriate' for aquaculture, NES will allow more

Effect	Description	Counterfactual	Effect as a result of the NES
			stringent activity status to be retained, no effect
		Tasman = • no supplementary fed aquaculture currently occurs in Tasman, although provisions is made for it in some AMA sub-zones, as a discretionary activity	Tasman = • exempt from NES, no effect
		Canterbury = • discretionary for all farms, so full discretion to consider benthic effects available	Canterbury = • discretionary for all farms, so full discretion to consider benthic effects available
		Southland = • discretionary for all farms, so full discretion to consider benthic effects available	Southland = • matter of discretion included in relation to significant adverse effects on reefs and biogenic habitats, no effect • matter of discretion in relation to benthic effects overall is somewhat constrained, but it will allow any condition to be set to manage effects, no effect
Water quality	• Mussel and oyster farms do not typically cause significant water quality issues (note that phytoplankton depletion is addressed separately later in this table) • Supplementary fed aquaculture can cause water quality effects, although benthic effects are typically the more limiting factor • Proposed NESMA include the following relevant matters of	Northland = • discretionary for all finfish farms, so full discretion to consider water quality effects available	Northland = • matter of discretion in relation to water quality is somewhat constrained (in that it refers to management of effects), but it will allow any condition to be set to manage effects, no effect
		Auckland = • restricted discretionary outside of overlays, matter of discretion in relation to effects on water quality	Auckland = • matter of discretion in relation to water quality is somewhat constrained (in that it refers to

Effect	Description	Counterfactual	Effect as a result of the NES
	discretion for supplementary fed aquaculture: ○ Management of effects on water quality	• restricted discretion within overlays, with a matter of discretion in relation to effects on water quality	management of effects), but it will allow any condition to be set to manage effects, no effect
		Waikato = • restricted discretionary, with matters of discretion similar to those in proposed NESMA	Waikato = • provisions would be equivalent, no effect
		Bay of Plenty = • no supplementary fed aquaculture currently occurs in the Bay of Plenty. If such a farm was proposed, it would first have to obtain consent as a discretionary activity. Once that consent reached expiry, replacement consent would be able to be sought under the framework as outlined previously, noting that there is no matter of control or discretion in relation to water quality	Bay of Plenty = • retains controlled activity outside outstanding areas, no effect • for farms that are restricted discretionary, consideration of management of effects on water quality is provided for, no effect
		Marlborough = • if the MSRMP approach to existing low flow sites is retained, may be controlled if in aquaculture management zone, matters of control unknown, but consent will not be able to be declined • existing CMZ3 (full discretionary) zone may be retained for EPA high flow sites • non-complying or prohibited if outside an aquaculture management zone, so full discretion available to consider effects on water quality	Marlborough = • retains controlled activity rule, no effect • in CMZ3 zones, matter of discretion in relation to water quality is somewhat constrained (in that it refers to management of effects), but it will allow any condition to be set to manage effects, no effect • areas outside aquaculture management zones likely to be considered 'inappropriate' for aquaculture, NES will allow more stringent activity status to be retained, no effect

Effect	Description	Counterfactual	Effect as a result of the NES
		Tasman = • no supplementary fed aquaculture currently occurs in Tasman, although provisions is made for it in some AMA sub-zones, as a discretionary activity	Tasman = • exempt from NES, no effect
		Canterbury = • discretionary for all farms, so full discretion to consider water quality effects available	Canterbury = • matter of discretion in relation to water quality is somewhat constrained (in that it refers to management of effects), but it will allow any condition to be set to manage effects, no effect
		Southland = • discretionary for all farms, so full discretion to consider water quality effects available	Southland = • somewhat constrained (in that it refers to management of effects), but it will allow any condition to be set to manage effects, no effect
Biosecurity	• Biosecurity issues need ongoing management	All of the major aquaculture regions, with the exception of Auckland, either have full discretion or include a matter of control/discretion in relation to biosecurity	The matter of discretion in the proposed NESMA is not constrained, no effect
Wild fish	• Mussels and oysters do not have effects on wild fish populations – note that demersal habitat effects are addressed under benthic effects • Waste feed from fed aquaculture can attract wild fish and provide a supplementary diet, but should be self-regulating, as waste feed is wasted profit for the farmer	All of the major aquaculture regions either have full discretion or include a matter of control or discretion in relation to 'ecology' or 'ecological values' that would apply to wild fish	There is no matter of discretion in relation to wild fish. However, effect is not significant and is not necessarily adverse, so not considered a cost of the NES

Effect	Description	Counterfactual	Effect as a result of the NES
	• Use of underwater lighting can attract wild fish to a marine farm		
Hydrodynamics	• Existing farms have already caused these effects and they have become part of the existing environment • No major effects as a result of altered hydrodynamics have been reported in any region in New Zealand • As for landscape and natural character, in areas where all the consents for marine farms expire at the same time, any effects on hydrodynamics could be removed	The regions where controlled or restricted discretionary activity rules are in place do not list effects on hydrodynamics as a matter for control or discretion. Only Southland and Canterbury (and Northland with respect to finfish farming) have full discretionary activities that would allow hydrodynamics to be considered, if relevant	Not seen as a significant potential effect, no effect as a result of the NES
Marine mammals and seabirds	• Risk of entanglement appears relatively low and can be managed through management plans • Indications in recent consent replacements have been that habitat exclusion is not an issue for existing farms but is for new space • Like landscape and natural character, in areas where all the consents for marine farms expire at the same time (Auckland, Waikato and Southland) habitat gains might be possible on the expiry of consents, if none of the existing consents were replaced	Northland = • controlled activity for shellfish outside of significant ecological areas, matter of control in relation to effects on marine mammals and birds • restricted discretionary activity for shellfish in outstanding areas, with a matter of control relating to effects on marine mammals and birds, and effects on significant marine ecology • discretionary for finfish, so full discretion available to consider effects on marine mammals and seabirds	Northland = • retains controlled activity, no effect • for existing marine farms when the NES is gazetted, there are none in outstanding areas, no effect • for future farms, that will eventually come within NES, initial consent will have considered effects on marine mammals, no effect • for finfish farms when the NES is gazetted, there are none, any future farms will have considered effects on marine mammals on first consent, no effect
		Auckland = • restricted discretionary outside of overlays, matter of discretion in relation to ecological values, which	Auckland = • both within and outside overlays, matter of discretion is constrained to management practices to minimise mammal and bird interactions with

Effect	Description	Counterfactual	Effect as a result of the NES
		would cover effects on marine mammals and birds • restricted discretion within overlays, with a matter of discretion in relation to ecological values, which would cover effects on marine mammals and birds	farms, no effect in terms of entanglement risk, but potential cost as habitat exclusion not able to be considered and almost all Auckland marine farms expire at the same time
		Waikato = • restricted discretionary, with matter of discretion in relation to entanglement risks	Waikato = • provisions are equivalent, no effect
		Bay of Plenty = • controlled provided not in area of outstanding natural character, matter of control in relation to measures to avoid, remedy or mitigate adverse effects on ecology (which would include marine mammals and birds) • restricted discretionary in areas of outstanding natural character, matter of control in relation to measures to avoid, remedy or mitigate adverse effects on ecology (which would include marine mammals and birds)	Bay of Plenty = • retains controlled activity, no effect • for farms that are restricted discretionary, consideration of entanglement risks, but not habitat exclusion, will occur. Inability to consider habitat exclusion represents a potential cost of NES
		Marlborough = • controlled if in aquaculture management zone (likely to be majority of farms), matters of control unknown, but consent will not be able to be declined • non-complying or prohibited if outside an aquaculture management zone, so full discretion available to	Marlborough = • retains controlled activity rule, no effect • areas outside aquaculture management zones likely to be considered 'inappropriate' for aquaculture, NES will allow more stringent activity status to be retained, no effect

Effect	Description	Counterfactual	Effect as a result of the NES
		consider effects on marine mammals and birds	
		Tasman = • existing marine farms are controlled or restricted discretionary, depending on the level of development of the AMA sub-zone proposed (in practice all consents have been applied for as restricted discretionary activities), matters of discretion include ecological effects	Tasman = • exempt from NES, no effect
		Canterbury = • discretionary for all farms, so full discretion to consider effects on marine mammals and birds available	Canterbury = • most marine farms in Canterbury were first granted post-RMA. A number of the existing marine farms around Banks Peninsula had effects on Hector's Dolphins assessed as part of original consent application, and a significant number have been replaced in recent years, effects unlikely
		Southland = • discretionary for all farms, so full discretion to consider benthic effects available	Southland = • consideration of entanglement risks, but not habitat exclusion, will occur. Inability to consider habitat exclusion represents a potential cost of NES
Wind disruption	• Only likely for fed aquaculture as a result of above water cages and barges • Effect not significant and does not need to be controlled	None of the rules in the major aquaculture regions that are controlled or restricted discretionary include consideration of wind disruption. Full discretion is available to consider effects in Canterbury, Southland and Northland (for finfish only)	While the NES will not allow consideration of wind disruption effects, the potential for effects is considered negligible, no effect of NES

Effect	Description	Counterfactual	Effect as a result of the NES
Additives	• An ongoing activity that needs to be managed	• Bay of Plenty is the only region that has a controlled or restricted discretionary rule that would apply, and a matter of control/discretion applies in relation to use of feed additives • Note that under the counterfactual Waikato would also adopt a restricted discretionary activity, but it would include a matter of discretion in relation to the use of additives	Proposed NESMA include a matter of discretion that covers the most common additives, no effect
Disturbance of the seabed	• Disturbance of the seabed only occurs as the farm is constructed. Farms are existing, so no further disturbance of the seabed is necessary	None of the rules in the major aquaculture regions that are controlled or restricted discretionary include consideration of disturbance of the seabed. Full discretion is available to consider effects in Canterbury, Southland and Northland (for finfish only)	While the NES will not allow consideration of effects from disturbance of the seabed, the potential for effects is considered minor, no effect of NES
Phytoplankton depletion	• Effect is wider than can be considered on a case by case basis • Needs to be dealt with at the planning stage, through specific provisions for aquaculture and/or through policies on baywide management	Northland is the only region that specifically lists phytoplankton depletion as a matter of control, but other councils either include a matter of control/discretion in relation to ecology that could presumably be applied to phytoplankton depletion, or the rules are fully discretionary and all effects can be considered	• Northland, Bay of Plenty and Marlborough will all retain controlled activities and the Tasman AMAs are exempt from the NES, no effect • Potential cost of the NES in Auckland, Canterbury and Southland
Cultural			
Sensitive sites Historic heritage sites Mahinga kai Mauri and wairua	• Discussion document noted that cultural effects needed to be further defined through the public consultation process	• In Northland, shellfish farms in Sites or Areas of Significance to Tangata Whenua are restricted discretionary, with a matter of discretion. Finfish farms are fully discretionary	The proposed NES includes a matter of discretion in relation to tangata whenua values, no effect

Effect	Description	Counterfactual	Effect as a result of the NES
		• In Auckland, rules include a matter of discretion in relation to effects on Mana Whenua • In Bay of Plenty there is a matter of control or discretion in relation to measures to avoid, remedy or mitigate effects on cultural values • In Waikato the counterfactual assumes NES-like provisions would be adopted • In Marlborough matters of control are not defined in the counterfactual • In Canterbury and Southland marine farming is a discretionary activity	
Involvement in decision making		• Northland is the only region that currently precludes public or limited notification of consent applications for replacement consents for shellfish farms. Finfish farms are discretionary activities, with standard notification tests	• Issue of iwi who are not covered by statutory requirements to be notified, potential cost of the NES (although this may be resolved if the current approach to the tangata whenua matter of discretion is agreed, with its pre-consultation requirement)
Social			
Noise	• Above water noise could be controlled by noise standards • Underwater noise has generally been assessed as not significant	• Noise is not a matter of control or discretion in either Auckland (although Auckland does include a matter around operating hours) or Bay of Plenty • Noise is listed as a matter of control/discretion in Northland (and would be in Waikato under the counterfactual) and Canterbury and Southland have full discretionary activities	• Management of noise listed as a matter of discretion in the indicative provisions, no effect in most regions, may be a benefit of the NES in Auckland and Bay of Plenty

Effect	Description	Counterfactual	Effect as a result of the NES
		• Marlborough is unknown	
Vessel movements (no, but not typically something controlled through consents anyway)	• That there would be no change in the number of vessels and husbandry required to service the farm • That vessels would take the same route to access and service the farm	• Vessel movement not listed as a matter of control or discretion in any of the existing rules • No information to suggest this is a significant effect	NES will not allow the matter to be considered, but effects are likely to be minor, no effect
Recreation	• Recreational fishing is often enhanced. These opportunities will continue • Maybe adverse effects on public access, although the assumption is that this was assessed when the farm was first considered and if necessary would be dealt with at the plan making stage	• Bay of Plenty lists a matter of control/discretion in relation to measures to avoid, remedy or mitigate the adverse effects of the marine farm on recreation • Auckland and Northland do not list recreation as a matter of control/discretion, although Auckland includes a matter of discretion about effects on existing uses and activities • Waikato would have an NES-like matter of discretion, in relation to the positioning of the farm in relation to recreational access • Marlborough is unknown, although the current controlled activity rule includes a matter of control similar to the indicative provisions • Canterbury and Southland have full discretion to consider effects on recreation	• Benefit of the NES in retaining potential positive effects on recreational fishing • Matter of discretion in the proposed NESMA may be somewhat more constrained than some in the counterfactual, but effect is not considered to be significant, and will represent a benefit in Auckland and Northland (the latter for restricted discretionary activities only) • Some potential cost in constraining consideration of effects in Canterbury and Southland
Access through the marine farm	• With the exception of realignment, existing farms are required to remain in the same location and use the same structures. Existing public access will therefore not be further affected, although the assumption is that this was assessed when the	• None of the aquaculture regions that have controlled or restricted discretionary activity rules list access through a marine farm as a matter of control/discretion	• Benefit of the proposed NESMA in allowing consideration of access in Northland, Auckland and Bay of Plenty

Effect	Description	Counterfactual	Effect as a result of the NES
	farm was first considered and if necessary would be dealt with at the plan making stage	• Marlborough is unknown, although the current controlled activity rule includes a matter of control similar to the indicative provisions • Canterbury and Southland have full discretion to consider effects on access through the farm	• No effect in Waikato or Marlborough as indicative provisions likely to be equivalent to counterfactual • Some potential cost in constraining consideration of effects in Canterbury and Southland, but matter of discretion in proposed NESMA specifically references access, so effect considered to be minor
Public exclusion	• May be adverse effects as a result of public exclusion, although the assumption is that this was assessed when the farm was first considered and if necessary would be dealt with at the plan making stage	• None of the aquaculture regions that have controlled or restricted discretionary activity rules list public exclusion as a matter of control/discretion, although Bay of Plenty does have a matter of discretion in relation to the area of the common marine and coastal area to be occupied, which would act as a proxy for public exclusion • Marlborough is unknown, although the current controlled activity rule includes a matter of control similar to the indicative provisions re access • Canterbury and Southland have full discretion to consider effects of public exclusion	• Proposed NESMA includes a matter of discretion in relation to the layout and position of the farm in relation to ensuring reasonable public access in the vicinity of the farm, which represents a potential benefit in Northland and Auckland • No effect in Waikato or Marlborough as indicative provisions likely to be equivalent to counterfactual • Some potential cost in constraining consideration of effects in Canterbury and Southland, but matter of discretion in the proposed NESMA specifically references public access, so effect considered to be minor
Increased boat ramps and facilities	• For existing marine farms, facilities will not increase	N/A	No effect
Local market supply	• Positive effect	•	• Benefit of the NES
Marketing for the community through branding	• Positive effect	•	• Benefit of the NES

Effect	Description	Counterfactual	Effect as a result of the NES
Navigation and safety	• Existing sites pose a navigational risk, although their long-term establishment in those locations should lower the risk. Consent conditions will be required to ensure they continue to be marked and lit as required by the Maritime Transport Act	• All regions are either full discretionary activities or have a matter of control/discretion relating to navigation and safety requirements	• Indicative provision include a matter of discretion in relation to the layout, positioning, lighting and marking of marine farm structures in relation to navigational safety. While more defined than matters of control/discretion in some regions, it will allow effects to be addressed, no effect
Amenity (litter, wildlife nuisance, visual amenity)	• That the structures and activity associated with the farm does not change • Litter under marine farms includes rope, growing lines, the ties for securing them to backbones, and whole mussel floats	• None of the aquaculture regions that have controlled or restricted discretionary activity rules list amenity as a matter of control/discretion, although Bay of Plenty does have a matter of discretion in relation to requirements to remove all structures and items from the area if the operation is close • Marlborough is unknown, although the current controlled activity rule includes a matter of control similar to the indicative provisions re management of rubbish and debris • Canterbury and Southland have full discretion to consider effects on amenity	• Indicative provisions includes a matter of discretion in relation to management of rubbish and debris • Benefit of the NES in allowing consideration of management of rubbish and debris in Northland and Auckland • No effect in Waikato or Marlborough as indicative provisions likely to be equivalent to counterfactual • Some potential cost in constraining consideration of effects in Canterbury and Southland
Economic			
Jobs	• Industries have been established to support aquaculture • The company employs people to service the farm • Number of people employed will not change, unless the farm increases production through innovation		• Benefit of the NES

Effect	Description	Counterfactual	Effect as a result of the NES
	• Positive effect		
Income into the local community	• That the farm is serviced locally • That there are supporting industries and services that provide support to the farm • That a range of other businesses are associated with the farm • That the supporting businesses rely on the continuation of the farm		• Benefit of the NES
Establishment of subsequent and supporting industries	• That a range of other businesses are associated with the farm • That the supporting businesses rely on the continuation of the farm • Positive effect		• Benefit of the NES
Investment in the farm	• That there is significant investment in the farm structures, growth and development		• Benefit of the NES
Exclusion of trawling, dredging and commercial fishing	• Effects have already been assessed, either through the processing of the marine farm lease/licence by MFish, or by the UAE done by MFish/MPI as part of the resource consent process	N/A	N/A
Consenting costs	NZIER to assess		
Plan submission costs	NZIER to assess		
NES implementation costs	NZIER to assess		

Change of species

For the majority of the major aquaculture regions, change of species would be a full discretionary activity in the absence of the proposed NESMA, although an assumption has been made that Canterbury might adopt specific change of species rules if encouraged by the public consultation undertaken on the proposed NES.

In Marlborough it is common for multiple species to be listed on resource consents for marine farms, as part of replacement consent processes.

The Tasman AMAs, and the Wilsons Bay Zone in Waikato are exempted from the change of species provisions.

In Southland, it is also common for multiple species to be listed on resource consents for marine farms. However, replacement consents for existing farms in Southland are assessed as full discretionary activities. Consideration of the effects of the change of species provisions in the NES in Southland is therefore contained in the discussion below.

Non-NES scenario	Effects of NES
Full discretionary activity in Northland, Auckland, Waikato, Bay of Plenty, Marlborough and Southland All effects over which the councils have jurisdiction can be considered	**Category 1 (change to species being farmed only)** • Any effects would relate to differences between the particular species of shellfish • Species within the overall class 'shellfish' are considered to be sufficiently similar that there would be no significant change in effects (for example, phytoplankton depletion, generation of faeces and psuedofaeces) • Biosecurity effects (which may differ, as different species have different susceptibilities to pests and diseases), and genetic effects if farmed species escape and affect local populations, are all relevant, but are covered by the proposed matters of discretion under the proposed NESMA Overall conclusion: proposed NESMA will be neutral in terms of environmental, social and environmental effects
	Category 2 (change to species being farmed, including by changing in water structures) • Any effects would relate to differences between the particular species of shellfish • Species within the overall class 'shellfish' are considered to be sufficiently similar that there would be no significant change in effects (for example, phytoplankton depletion, generation of faeces and psuedofaeces) • Biosecurity effects (which may differ, as different species have different susceptibilities to pests and diseases), and genetic effects if farmed species escape and affect local populations, , are all relevant, but are covered by the proposed matters of discretion under the proposed NESMA • Changing in water structures may result in hydrodynamic effects, for example if water flow through the farm is altered. This is considered unlikely, but is possible, and is covered by a proposed matter of discretion under the proposed NESMA Overall conclusion: proposed NESMA will be neutral in terms of environmental, social and environmental effects
	Category 3 (change to species being farmed, including in water structures, anchors and surface structures) • Matters of discretion are identical to the replacement consent matters • Costs and benefits identified for the replacement consent provisions will apply to Category 3 species change as well • Costs will also arise in Northland and Marlborough as species change is currently discretionary and will become restricted discretionary. As per the

Non-NES scenario	Effects of NES
	replacement consent analysis, costs may arise in these two regions in relation to: ○ Landscape ○ Natural character ○ Benthic effects ○ Marine mammals (in relation to habitat exclusion) ○ Phytoplankton depletion ○ Recreation ○ Amenity • Potential for costs in Marlborough will be somewhat reduced due to practice of consenting multiple species Overall conclusion: proposed NESMA will result in costs and benefits, as outlined for replacement consenting, and additional costs likely in Northland and Marlborough
	Category 4 (change to species being farmed, fed aquaculture) • Currently, Category 4 will only apply in Marlborough, Canterbury and Southland • In all other regions, a fed aquaculture farm will have had to first obtain consent for new space, and if consent is granted, effects on those matters constrained by the matters of consent for replacement consenting will have been addressed in making a decision to grant the consent • In Marlborough, Canterbury and Southland, matters of discretion are identical to the replacement consent matters for fed aquaculture • Costs and benefits identified for the replacement consent provisions will apply to Category 4 species change as well, but costs will arise in Southland and Marlborough as species change is currently discretionary and will become restricted discretionary. As per the replacement consent analysis, costs may arise in relation to: ○ Landscape ○ Natural character ○ Marine mammals (in relation to habitat exclusion) ○ Recreation ○ Amenity • Existing fed aquaculture marine farms tend to only have salmon authorised by the consent, as opposed to the multiple species that are often on shellfish farms. However, net pens may not change, so effects on landscape, natural character, recreation and amenity may be minor or negligible, and other effects are addressed by matters of discretion. • Addition of structures to fed aquaculture marine farms (for example to enable polyculture) could have costs in the terms of the matters outlined above Overall conclusion: proposed NESMA will result in costs in Southland and Marlborough, with greater costs likely from polyculture than from just a change in fish species

Realignment

The proposed NESMA with respect to realignment will apply as follows in each of the major aquaculture regions:

- In Northland and Auckland the provisions are largely equivalent to the proposed NESMA provisions, although matters of discretion are somewhat more constrained than the current Auckland approach
- In Waikato and Canterbury an assumption has been made in the non-NESMA scenario that provisions equivalent to the proposed NESMA would be adopted for realignment
- In Bay of Plenty realignment is a full discretionary activity under the current coastal planning framework. The proposed NESMA would change this to restricted discretionary for all six farms, with three of them getting an additional matter of discretion to cover their location within an outstanding natural feature
- In Marlborough it is assumed that under the new MEP provisions, realignment within the aquaculture management zones would be a controlled activity. Realignment outside these zones would be non-complying. Under the proposed NESMA Marlborough would retain its controlled activity status, and the realignment provisions do not apply to areas where aquaculture is identified as a non-complying activity
- In Southland realignment is a full discretionary activity under the current coastal planning framework. Under the proposed NESMA it would become a restricted discretionary activity
- The Tasman AMAs are exempted from the NESMA

Effects of the proposed NESMA realignment provisions therefore need to be considered in relation to the more constrained framework that would exist in Auckland, and the change from a discretionary to a restricted discretionary activity in Bay of Plenty and Southland.

Benefits and costs of the proposed NESMA in these three regions will be as per the replacement consenting effects analysis, with the exception of effects on marine mammals and seabirds from realignment, where the proposed NESMA will be neutral as a result of the additional matter of discretion that addresses the effects of realignment on these species.

Appendix H - First level options that were not considered viable

The following six options were also identified but were not considered viable.

1. *NZCPS for Marine Aquaculture (Standalone)*
   Description: An NZCPS with specific objectives and policies for marine aquaculture has potential to provide a more nationally consistent policy approach to how aquaculture activities are addressed by councils in regional policy statements and coastal plans. An NZCPS for aquaculture would be developed, under the RMA, by the Minister of Conservation and requires either a Ministerial consultation process or a Board of Inquiry, followed by Schedule 1 processes to amend regional policies and plans.
   Assessment: This option is not considered viable because an NZCPS can only set policy and would depend on councils making plan changes to set activity status and rules for replacement consents and biosecurity. Implementation through changes to regional coastal plans are unlikely to be completed prior to 2024 due to extended timeframes associated with Schedule 1 processes which must be followed by each region. In addition a standalone NZCPS: Marine Aquaculture would only partially achieve more certain and efficient replacement consent processes for existing marine farms and partially improve on-farm biosecurity management, since local interpretation and implementation could still lead to different approaches across regional councils. It could reinforce the need to undertake strategic planning for aquaculture, but this is already directed under Policies 7 and 8 of the NZCPS 2010.

2. *Amend NZCPS 2010*
   Description: The NZCPS 2010 could be amended to more explicitly recognise existing aquaculture, and give greater direction about how existing farms in outstanding areas should be treated. Amending the NZCPS 2010 would require either a Ministerial consultation process or a Board of Inquiry process, followed by regional council processes to amend regional coastal plans.
   Assessment: This option is not considered viable because, like the previous option, an amended NZCPS 2010 can only set policy and would depend on councils making plan changes to set activity status and rules for replacement consents and biosecurity. Implementation through changes to regional coastal plans is unlikely to be able to be completed within the timeframes required and would continue to result in some variability due to regional council interpretation of the amended NZCPS 2010

3. *Minister of Conservation amendment of plans prior to approval*
   Description: Clause 19 of Schedule 1 of the RMA allows the Minister of Conservation to amend regional coastal plans prior to approval.
   Assessment: This option is not considered viable because, while it could achieve a high level of certainty through prescriptive amendments, it can only be used at the end of a plan review process. Until plan reviews are initiated there would be ongoing uncertainty about replacement consenting for existing marine farms and incomplete management of biosecurity risks. To date Clause 19 has not been used to make substantive changes to plans. It is very unlikely that rules for all relevant regional plans could be in place before 2024.

4. *National planning standards*
   Description: The Resource Legislation Amendment Act 2017 provided for national planning standards. Planning standards are designed to set nationally consistent parameters (structure, format or content) for regional policy statements and plans to support implementation of national environmental standards, national policy statements, New Zealand coastal policy statements or regulations made under the RMA. National planning standards may specify objectives, policies and rules to be included in plans. The first set of national planning standards, dealing with the structure and form of policy statements and plans, are to be gazetted in April 2019. Planning standards need to be translated into plans before they have effect.

Assessment: This option is not considered viable because any national planning standards for aquaculture would not be able to be prepared until the first set of standards is completed. It is very unlikely that rules for all relevant regional plans, complying with any aquaculture national planning standard, could be in place before 2024.

5. *Legislative reform*
Description: The government could propose amendments to the RMA and Fisheries Act, or develop new aquaculture-specific legislation to provide stability for existing aquaculture activities.
Assessment: While legislative reform could provide a high level of consistency and certainty through prescriptive statutory provisions, it might not allow for regional planning (particularly the strategic planning for the coastal environment envisaged by Policy 7 of the NZCPS 2010) and would separate consideration of aquaculture from other activities and uses of the coastal environment.

6. *Enhanced central government participation in regional processes*
Description: Central government could increase its involvement in regional processes through submissions to regional councils on second generation regional coastal plans and on consent applications in an attempt to have greater influence over the outcome.
Assessment: This option is not considered viable because it relies on regional councils first developing, then notifying proposed regional coastal plans. Furthermore, any submissions from central government would still be subject to council decisions and therefore may not achieve an increase in certainty about consenting processes or requirements for biosecurity. Any changes to regional plans would be protracted and have variable outcomes in terms of reducing uncertainty in replacement consenting or increasing consistency in biosecurity management, as the RMA Schedule 1 processes must be followed.