



Fisheries New Zealand
Tini a Tangaroa

**Southern Scallop
Working Group**

Southern Scallop Fishery; Marlborough Sounds

An initial assessment of the risks to sustainability

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Executive summary

The Southern Scallop Fishery has been partially, or completely closed to scallop fishing since 2016. The fishery was closed following a continued period of decline in scallop biomass. Biomass surveys carried out in 2017 and 2018 indicated that scallop populations in some areas of the Marlborough Sounds were rebuilding (increasing in numbers). Accordingly, it is foreseeable that the Marlborough Sounds could support a fishery in the near-future. In the event that the Marlborough Sounds scallop fishery should be reopened, it is important that appropriate rules and regulations are in place to manage the fishery, and to promote sustainability.

With this in mind, the Minister of Fisheries requested that a multi-sector group (the Southern Scallop Working Group) be set up to develop an agreed opening regime for the Marlborough Sounds. The Southern Scallop Working Group (SSWG) was formed in 2018 in partnership with iwi, and brings together tangata whenua, scientists, commercial, recreational fishing and community interests, and Fisheries New Zealand.

The SSWG applied the Australia / New Zealand International Organisation for Standardisation *Risk Management – Principles and Guidelines* (ISO31000: 2017) to carry out an initial risk assessment of the Marlborough Sounds scallop fishery. The risks and mitigations were assessed over two workshops held at the beginning of 2019, and guided by the risk assessment template (ISO31000:2017). The objective guiding the risk assessment was the purpose of the Fisheries Act 1996; to provide for the utilisation of fisheries resources while ensuring sustainability.

The SSWG identified six key risks to the sustainability of the Marlborough Sounds fishery, in the event that it were to be reopened. This document outlines the process of identifying, characterising and weighting the risks, and how mitigation strategies were suggested and weighted. The SSWG has put together a Southern Scallop Strategy: Marlborough Sounds which details the outcomes of the risk assessment at a high level. It is anticipated that the initial risk assessment will be built on, and become more detailed as time progresses.

The purpose of this risk assessment and the strategy is to outline an approach towards a more sustainable fisheries management framework. This document is designed to complement the strategy, and to summarise the detailed risk analysis that sits behind what has been proposed in the strategy.

Abbreviations and definitions

CSEC	Challenger Scallop Enhancement Company; the mandated organisation which represents those who own commercial scallop quota in FMA 7.
Enhancement	Activities that help maintain or improve scallop productivity and biomass.
Hard limit	A biomass limit below which fisheries should be considered for closure.
Mitigation	An action that is taken to reduce adverse effects (i.e. the magnitude of the risk or the likelihood of it occurring etc.).
MLS	Minimum Legal Size is the minimum size that a fish can be legally kept at.
MoU	A Memorandum of Understanding between the Challenger Scallop Enhancement Company and Fisheries New Zealand that devolved management responsibilities from Government to CSEC.
NIWA	The National Institute of Water and Atmospheric research is a Crown Research Institute
QMS	Quota Management System guides the sustainable use of New Zealand fisheries
Refugia	Areas strategically closed to all scallop fishing to protect scallop spawning stock densities and associated habitats.
Residual Risk	The amount of risk that remains after the inherent risk (i.e. the risk that was being assessed) has been reduced by a mitigation strategy.
Restoration	The placement of scallop shell or other materials to encourage scallop spat settlement and re-establish a healthy scallop ecosystem.
Risk	Effect of uncertainty on objectives
SCA 7	The scallop fishery in fisheries management area (FMA) 7.
Soft limit	A biomass limit below which the requirement for a formal, time-constrained rebuilding plan is triggered.
SSWG	Southern Scallop Working Group; a multi-sector group formed in partnership with iwi, and brings together tangata whenua, scientists, commercial, recreational fishing and community interests, and Fisheries New Zealand.
Sustainability	Maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations and avoiding, remedying and mitigating any adverse effects of fishing on the aquatic environment.
Target exploitation rate	The desired harvest level, expressed as a proportion of the recruited biomass that is caught during a certain period, usually a fishing year.
Threshold biomass for reopening	The point at which the biomass is considered sufficient to support a fishery.
Utilisation	Conserving, using, enhancing, and developing fisheries resources to enable people to provide for their social, economic, and cultural well-being.

Introduction

Overview and history of SCA 7

The Southern Scallop Fishery (SCA 7) is important to all fishing sectors; customary, commercial and recreational. It comprises three distinct areas; Golden Bay, Tasman Bay and the Marlborough Sounds.

Commercial

The commercial SCA 7 fishery was the largest commercial scallop fishery in New Zealand and landings peaked in 1975. However commercial fishing activity declined in the early 2000s as scallop abundance declined. In the last commercial scallop fishing season in 2015-16, commercial fishers harvested 22 tonnes (meatweight), primarily from the Marlborough Sounds. At a port price of around \$15/kg green weight, the landed value of this catch was around \$350,000¹.

Commercial fishing history

Scallops have been commercially fished in SCA 7 since the 1950s, with 1959 marking the first record of commercial landings. Captures peaked in 1975 at 1244t and the fishery was overfished until its closure in 1980. The fishery was reopened in 1983 and only 48 licenses were issued, compared with the 200 licenses that were issued in 1975². During the 1980s, enhancement³ of scallops was trialed, and in 1986, the first enhanced scallops were harvested. During the late-1980s, enhancement operations increased in size and scale, and rotational harvesting⁴ was implemented at the sector level (**Figure 1**). Annually, a certain number of sectors in the Tasman and Golden Bay areas were fished, and following fishing, were enhanced.

¹ At a retail price of around \$80/kg meat weight, the value of this catch was around \$1.76 million.

² The Southern Scallop Fishery was the first in New Zealand to require commercial fishers to hold a fishing license. This was introduced in 1977 in an effort to control and reduce fishing pressure.

³ Enhancement involved catching scallop spat on longlines at designated spat catching sites in FMA7, and placing this spat into the areas that had been commercially fished in a given year.

⁴ Under the rotational fishing strategy, several sectors were opened to fishing each year, and were reseeded following fishing. A modelling study by Breen & Kendrick (1997) suggested that rotational fishing was a highly stabilising fisheries management measure, even without enhancement.



Figure 1. The Fisheries Management Area (FMA) 7, divided into sectors for the purposes of the enhancement programme and rotational harvest strategy. Sectors J, K and L, were not part of the then rotational and enhancement strategy.

Since 1994, aspects of management have been undertaken by the Challenger Scallop Enhancement Company Limited (CSEC) under a formal Enhancement Programme pursuant to Section 310 of the Fisheries Act 1996⁵. The fishery at that time was primarily an enhanced fishery due to the transfer of scallop spat from collectors, to the scallop beds in Golden and Tasman Bays. As a result of the enhancement programme and rotational harvest strategy, two key rules and regulations were changed:

- The commercial Minimum Legal Size (MLS) limit was reduced from 100mm to 90mm⁶; and
- The recreational daily bag limit was increased to 50 scallops per person per day (from 20).

SCA 7 was brought into a modified form of the Quota Management System (QMS) in 1992, where the Total Allowable Commercial Catch (TACC) was set as a fixed tonnage. In 1996, because of the rotational fishing and stock enhancement management strategy being used to manage the stocks in SCA 7, the fishery was placed on the Third Schedule to the Fisheries Act 1996 (the Act), which allows a TAC to be set under s 14 of the Act.

From the mid to late 1990s the bulk of the commercial harvest was taken from Golden Bay. The Marlborough Sounds harvest was a relatively small proportion of the overall catch, but catch was still significant from this area. In 1994 the Challenger Scallop Enhancement Company (CSEC) was incorporated. CSEC was set up following changes to Fisheries New Zealand's (then the Ministry of Agriculture and Fisheries) cost-recovery framework, and restructures in the early 1990s. CSEC was developed to fit within this new structure and management responsibilities were transferred from government to CSEC at this time.

The Memorandum of Understanding (MoU) set out a regime whereby CSEC was responsible for the collection of biomass information meeting certain parameters and standards, supply this information to MPI, preparation of harvest plans based on that information, and carry out

⁵ A Memorandum of Understanding (MoU) between CSEC and Fisheries New Zealand also prescribes the information and data quality criteria under which the CSEC gathers and uses information in management recommendations for the Minister.

⁶ In 1995, the size limit was also reduced from 100mm to 90mm for the recreational sector as a result of the enhancement programme.

consultation with non-commercial stakeholders (among other responsibilities). The devolvement of management responsibilities from government to CSEC was supported by the MoU.

The fishery was highly productive during the 1990's. However, from the early to mid-2000, the scallop fisheries in Golden Bay and Tasman Bay declined dramatically. Rotational fishing ceased due to productivity issues. In 2011 and 2016, the CSEC⁷ ceased commercial fishing in Tasman Bay and Golden Bay, respectively. Commercial fishing activities however continued in the Marlborough Sounds, with catches peaking in 2009, following which the Marlborough Sounds biomass declined, until the fishery's closure in 2016. Commercial landings for SCA 7 are shown in **Figure 2**.

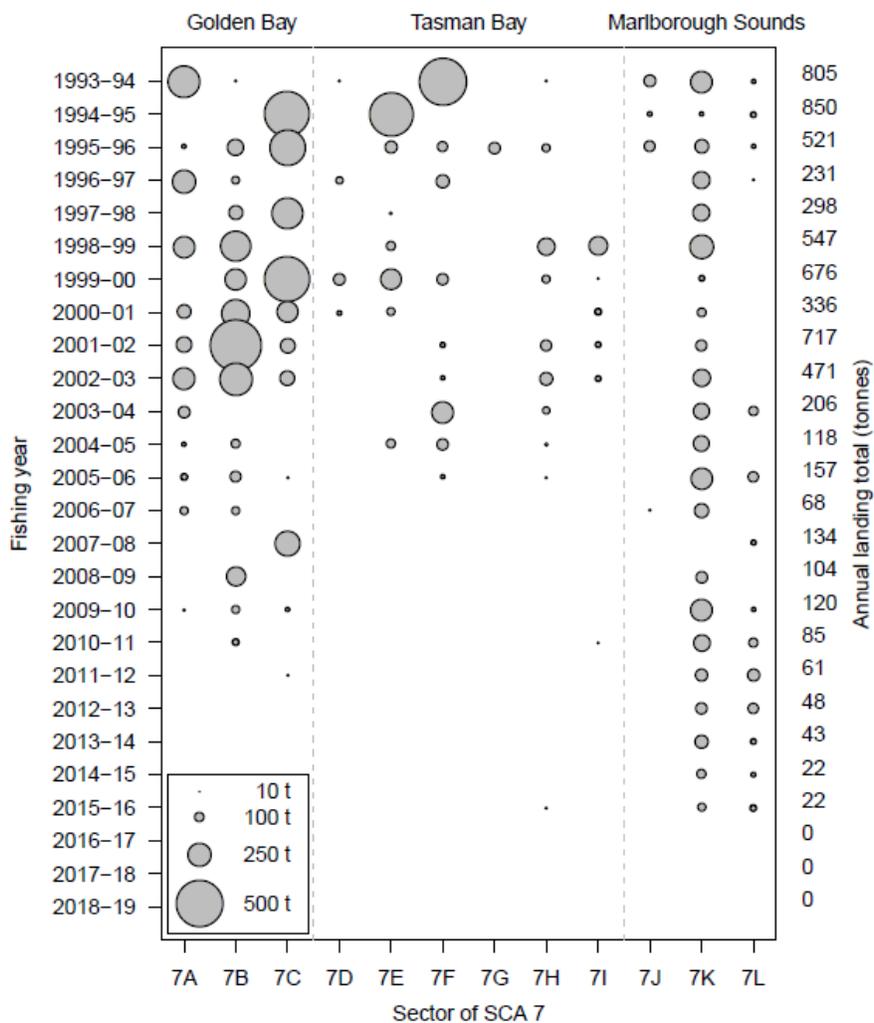


Figure 2. Bubble plot displaying annual commercial scallop landings (tonnes) from 1993. No values are given for the period prior to 1993 as Golden Bay and Tasman Bay scallop landings were reported together (as one area).

⁷ The Challenger Scallop Enhancement Company (CSEC) was established to provide fisheries management services to quota owners in the southern scallop fishery. Shares in CSEC are held exclusively by owners of southern scallop quota.

Customary

Scallops (tupa/tipa) are an important kaimoana species for tangata whenua. Scallops are identified by Te Waka a Māui me Ōna Toka iwi forum⁸ as a taonga (highly prized) species in the Te Waipounamu Iwi Fisheries Plan.

Few customary permits for the take of scallops have been issued over the last three years, to prevent further decline of scallop populations. Prior to this, there has been some uncertainty in the customary take of scallops in SCA 7 due to different customary reporting requirements. However, submissions from tangata whenua suggest that the customary take has historically been less than the allowance (as set under the TAC framework).

Recreational

Scallops are a highly sought after recreational fishing species. The results of a National Panel Survey of Recreational Fishers⁹ in 2011 estimated that the recreational take for scallops in SCA 7 during the 2011 / 12 fishing year was ~11t meat weight. This estimate is less than the 40 t recreational allowance. The results of the panel survey also showed that the most common methods used to target scallops by recreational fishers was evenly spread between hand gathering and dredges.

Amateur Charter Vessels (ACVs) are also included in the recreational sector. ACV fishing pressure (targeting scallops) is likely concentrated in the Marlborough Sounds area. However, we note that ACVs are not required to report their scallop catch.

Stock information & Regulatory framework

SCA 7 is listed on the Fisheries New Zealand Draft National Fisheries Plan for Inshore Shellfish¹⁰ as a Group 2 stock; which means that it is valuable to the inshore commercial sector and important to customary and recreational fishers. Biologically, Group 2 stocks are fast-growing and have a highly variable abundance which means that a more flexible management approach is required to enable access to these fisheries and increased benefits when abundance is high.

Relevant legislation

The principal legislation governing fisheries management in New Zealand is the Fisheries Act 1996 (the Act). The purpose of the Act is to provide for the utilisation of fisheries resources while ensuring sustainability. In the Act, ensuring sustainability is defined as:

⁸ The Te Waka a Māui me Ōna Toka Iwi forum represents the nine Iwi of the South Island, each holding mana moana and significant interests (both commercial and non-commercial) in South Island fisheries.

⁹ Recreational fishers are not required to report their catch in New Zealand. Fisheries New Zealand carries out a National Panel Survey of Recreational Fishers every 5-6 years to help better understand and manage recreational fishing and fishing activity in important shared fisheries. The most recent panel survey was carried out in 2018, however because SCA 7 was closed to recreational fishing at this time, the most recent panel survey with information on fishing effort in SCA 7 is that conducted in 2011. More information can be found here: <https://www.mpi.govt.nz/travel-and-recreation/fishing/national-survey-of-recreational-fishers/>

¹⁰ More information on the draft strategies can be found here: <https://www.mpi.govt.nz/growing-and-harvesting/fisheries/fisheries-management/inshore-fisheries/>

- a) maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations; and
- b) avoiding, remedying, or mitigating any adverse effects of fishing on the aquatic environment

Other relevant legislation that outlines specific rules and regulations for each fishing sector is the:

- Fisheries (Challenger Area Commercial Fishing) Regulations 1986;
- Fisheries (Amateur Fishing) Regulations 2013; and
- Fisheries (South Island Customary Fishing) Regulations 1999.

There is also other legislation that is relevant to fisheries management issues, including the Resource Management Act (1991) which is the principle legislation controlling non-fishing related effects on scallop fisheries and the coastal environment including impacts of structures and sedimentation and contaminants arising from land based activities.

Relevant policies

Fisheries New Zealand released the Harvest Strategy Standard (HSS) for New Zealand fisheries in 2008. The HSS is a policy statement of best practice in relation to the setting of fishery and stock targets and limits for fish stocks in New Zealand's QMS. The HSS has been used as a guide in this risk assessment, and will be used with the best available information and a comprehensive risk assessment for future management of this fishery.

The Marlborough District Council (MDC) Marlborough Environment Plan (MEP) guides how individuals, businesses and the wider community may use public resources such as freshwater and coastal space. As part of the MEP the MDC has identified a number of Ecologically Significant Marine Sites (ESMS) in the Marlborough Sounds. Consideration will be given to these ESMS during any assessment of the risks to the scallop ecosystem when considering appropriate fishing methods and area closures. The distribution of marine space for aquaculture and land-based impacts on the marine environment are also governed under the MEP, consideration will need to be given to avoiding adverse impacts on scallop beds.

Sustainability issues

From 2002 - 2006, the biomass of scallops in Golden Bay and Tasman Bay declined dramatically. The Marlborough Sounds biomass began to decline in 2009, until it was closed to commercial and recreational scallop harvesting in 2016. While scallop biomass in Golden Bay and Tasman Bay remains negligible, the Marlborough Sounds has shown signs of recovery in some areas in the last two years (2017 and 2018).

The SSWG carried out an initial assessment of the sustainability risks to the Marlborough Sounds fishery, in the event that it should be reopened¹¹. The risk assessment acknowledges the role of fishing pressure, and a changed and changing environment in the potential decline of scallops. The National Institute of Water and Atmospheric Research (NIWA) is currently doing research in SCA 7 on what constitutes good scallop conditions, and what and where

¹¹ Risks to the Golden Bay and Tasman Bay (including the Croisilles) fisheries were not considered in this risk assessment, because scallop biomass remains negligible in these areas and they are not being considered for reopening at this time.

interventions (such as enhancement of scallops and restoration of shell reefs) are most likely to be successful. The outcomes of this research should prove highly useful when considering ongoing risk mitigations as part of this framework.

Risk assessment objectives

The overarching objective of the risk assessment was to assess whether the current fisheries management framework, rules and regulations were appropriate for managing a small fishery that has been closed to fishing for a number of years for sustainability reasons. Driving this objective setting exercise was the overall aim for the fishery, which is 'to provide for utilisation of the scallop resource while ensuring sustainability'.

Scope of the document

This document describes the approach that was taken to assess the risks to the sustainability of the Marlborough Sounds scallop fishery in the event that it should be reopened.

Methods

The Australia / New Zealand International Organisation for Standardisation *Risk Management – Principles and Guidelines* (ISO31000: 2017) were used for the risk assessment of the Southern Scallop Fishery: Marlborough Sounds. The risks and mitigations were assessed over two workshops held at the beginning of 2019 with the SSWG¹², and guided by the risk assessment template (ISO31000:2017).

According to the ISO, **a risk is the ‘effect of uncertainty on objectives’**. Sources of uncertainty were assessed against the risk they pose to the sustainability of scallop populations in the Marlborough Sounds. The Marlborough Sounds was given priority over the rest of Fisheries Management Area 7 (FMA7) because it is the only area showing signs of rebuilding scallop biomass. It was suggested that should a renewed management framework for the Marlborough Sounds be successful, this framework could be applied more broadly across SCA 7 (to Golden Bay and Tasman Bay) depending on patterns of stock recovery in those areas.

The risks were identified, ranked, and assessed as to whether the risks required a mitigation(s). In the case where multiple mitigation measures were proposed, these went through a prioritisation process. Following an assessment of the mitigation strategy, the residual risk¹³ was assessed.

Risk context

The high-level objectives of this risk assessment were based against the purpose of management which is outlined in the Fisheries Act 1996; ‘to provide for the utilisation of fisheries resources while ensuring sustainability’. **Ensuring sustainability** means—(a) maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations; and (b) avoiding, remedying, or mitigating any adverse effects of fishing on the aquatic environment. **Utilisation** means conserving, using, enhancing, and developing fisheries resources to enable people to provide for their social, economic, and cultural well-being.

Management must also be consistent with:

- New Zealand’s international obligations and the Provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act;
- Provisions of Marine Mammals Protection Act, Wildlife Act and Marine Reserves Act apply; and
- Law that is binding on government as well as stakeholders.

We also note that no provisions in any regional plan or coastal permit are enforceable to the extent that it provides for allocation of access to any fisheries resources in the coastal marine area etc. (Councils must consider any plans established under the Act);

¹² The SSWG has been formed in partnership with Iwi, and brings together tangata whenua, scientists, commercial, recreational fishing and community interests, and Fisheries New Zealand.

¹³ The residual risk is the amount of risk that remains after the inherent risk (i.e. the risk that was being assessed) has been reduced by a mitigation strategy.

The **undesirable outcome** that this risk assessment was assessed against was the scallop fishery not being utilised sustainably. The risk analysis process provides the opportunity to identify tools and services that are not necessary to achieve the desired management objectives and additional tools and services that may be required to manage the risk. The initial risk assessment analyses carried out by the SSWG in the SCA 7 fishery has focussed on assessing the risks to key sustainability objectives or measures.

Risks

The ISO31000:2017 Risk Management standard identifies ten key steps that are to be followed in carrying out a risk assessment. These are identified in **Appendix 1** along with a series of diagnostic questions that were applied to the risk assessment of the Southern Scallop Fishery: Marlborough Sounds. In the first instance, the risk context was developed by gathering information to answer the questions in **Appendix 1**. This information was used to inform the risk assessment, and established a comprehensive categorization of the fishery, its history, and intensity, among others. The information was gathered in the structure of **Appendix 1**, to provide an overview of the fishery, and establish risk context.

Risk assessment parameters and criteria

Each risk was characterised and weighted according to the criteria outlined in **Table 1**. Each risk score was given a confidence rating, which shows the confidence with which each risk characterisation was made. The framework used to assign these confidence values is given in **Table 2**. There was a variety of ‘averseness to risk’ within the SSWG when characterising the risk. When there was a difference of opinion, the group went with the majority and in general, most risks were characterised and weighted with all in agreement. Once the risks were characterised and assigned confidence values, the SSWG assessed whether a mitigation strategy was needed according to the criteria outlined in **Table 3**.

Table 1. Risk characterisation and weighting outline used in the risk assessment, with a description of what each weight and character means.

Risk Characterisation	Weighting	Description
Priority	High	The risk impacts directly on one of the primary objectives
	Medium	The risk impacts on a secondary objective but does not directly preclude achievement of the goal
	Low	The perceived risk is not clearly associated with a stated objective risk
Averseness to risk	High	Fisheries NZ (SSWG) is strongly averse to compromise of the corresponding objective
	Medium	Fisheries NZ (SSWG) is risk neutral with respect to the corresponding objective
	Low	Fisheries NZ (SSWG) is willing to accept a degree of compromise with respect to the corresponding objective
Severity	High	If the risk eventuates the impact is likely to be total failure of the associated objective
	Medium	If the risk eventuates the associated objective will be significantly compromised
	Low	If the risk eventuates the likely impact will be minor.

Likelihood	High	The risk has already been realized or it is probable that it will eventuate
	Medium	It is possible that the risk will eventuate
	Low	It is unlikely that the risk will eventuate
Immediacy	High	The risk has already eventuated or may eventuate within the management year
	Medium	The risk may eventuate within two to five years
	Low	The risk may not eventuate within the next five years

Table 2. Shows the description behind how each risk was assigned a confidence rating i.e. how confident the SSWG was in their assessment, characterization and weighting of each risk.

Confidence	Description
High	The risk categorisation is made with confidence. The risk fits neatly into the nominated category.
Medium	The risk characterisation is moderately certain and likely to fit into the nominated category.
Low	The risk characterisation is highly uncertain or is not with certainty to not fit neatly into a single category.

Table 3. Framework for determining whether a mitigation strategy was required, based on the weighting and characterisation of each risk from Table 1.

Mitigation Action	Weighting	Description
Not required	Priority low	Risks with Priority “Low” typically require no action.
	Priority ‘Medium’; and at least two out of Averseness, Severity and Likelihood ‘Low’	Risks with Priority “Medium” and at least two out of Averseness, Severity and Likelihood “Low” require no action.
	Severity low and risk averseness low	Risks with Severity “Low” and Risk Averseness “Low” require no action.
Not required / ongoing monitoring	Immediacy low	Risks with Immediacy “Low” typically require no action, or ongoing monitoring.
Ongoing monitoring	Immediacy medium	Risks with Immediacy “Medium” may require ongoing monitoring only.
	High uncertainty	Risks categorized with “High” uncertainty may require ongoing monitoring to reduce uncertainty before further action is considered.

In the event that more than one mitigation measure was proposed for each risk, the mitigation measures were analysed independently. Each mitigation measure was assessed and scored against the criteria in **Table 4**. The residual risk is the amount of risk that remains after the inherent risk (i.e. the risk that was being assessed) has been reduced by a mitigation strategy. The residual risk was assessed as high, medium or low as a judgement exercise using the following general guidelines:

- *“If the Effectiveness of a mitigation strategy is “Medium” or “High” it will typically reduce the Severity or Likelihood of the risk;*
- *If the Likelihood of a mitigation strategy is “Medium” or “Low”, it will increase the uncertainty of the Severity and Likelihood dimensions of the risk; and*
- *The Immediacy of the residual risk might be increased if the Effectiveness of the strategy is “Low” or “Medium”.”*

Table 4. Framework used to assess mitigation measures and strategies for the risk assessment of the Southern Scallop Fishery: Marlborough Sounds.

Mitigation Characterisation	Score	Description
Effectiveness	High	If successful the mitigation strategy will reduce the likelihood and/or impact of the risks, should it eventuate, to negligible levels.
	Medium	If successful the mitigation strategy will reduce the likelihood and/or impact of the risk, should it eventuate, to acceptable levels.
	Low	If successful the mitigation strategy will reduce the likelihood and/or impact of the risk, should it eventuate, but significant risk remains.
Likelihood	High	The mitigation strategy is a standard approach with a high degree of success.
	Medium	The mitigation strategy is a standard approach with a reasonable level of success, or a new approach with a high degree of certainty.
	Low	The mitigation approach is uncertain and subject to significant uncertainty.
Immediacy	High	If successful, the mitigation strategy will be fully effective within one year.
	Medium	If successful, the mitigation strategy will be fully effective within two to five years.
	Low	If successful, the mitigation strategy will be fully effective within five years.

Results

The detailed risk assessment tables are presented in **Appendix 2**, and summarise how each risk was scored, the confidence assigned to this score, the recommended mitigation strategy, mitigation strategy scores and an assessment of the residual risk. The results of each risk that was assessed are summarised in the following section.

The results of the initial risk assessment suggested that the **six key risks to the sustainability of the Marlborough Sounds fishery** are¹⁴:

- Threshold biomass for reopening¹⁵ is set too low (i.e. it's opened to fishing before scallop populations have recovered enough);
- The target exploitation rate¹⁶ is too high, resulting in too many scallops being harvested;
- Risk that fishing will exceed harvest allocations;
- Management measures are no longer fit for purpose;
- Impacts of fishing on the aquatic environment and scallops are too large; and
- Non-fishing impacts cause scallop abundance to decline.

1. Threshold biomass for reopening is set too low

There is a risk that the threshold biomass for reopening has been set too low, which means that the fishery is reopened too early to sustain harvest. The key measure proposed to mitigate this risk is to base the threshold biomass for reopening on a time period when scallop populations were considered to be healthy in the past. For the Marlborough Sounds, this time period was between 2001 and 2008.

Ongoing monitoring / research, enhancement and refugia were proposed to supplement this mitigation approach. Ongoing monitoring / research was ranked as the highest priority services to properly inform this mitigation strategy. Currently, scallop stocks in the Marlborough Sounds are monitored annually via a biomass survey conducted by NIWA. The SSWG agreed that ongoing monitoring would be adequate to determine the trajectory of the stock, and that research to better inform the setting of the soft limit is necessary. Refugia and enhancement were not the priority strategies for this risk, but are discussed as priority mitigations for other risks in this assessment.

¹⁴ The SSWG will be seeking input from Iwi and stakeholders on whether the risks have been captured correctly, or if there are others that should be considered.

¹⁵ The point at which the abundance of scallops is considered sufficient to support a fishery.

¹⁶ An exploitation rate is the proportion of scallops that is taken from a population.

2. The target exploitation rate is too high

The risk, as discussed, was that the agreed target harvest rate would result in the stock declining below the soft limit (50% target biomass). A number of mitigation options were proposed to minimise this risk, and in order of effectiveness (highest to lowest) included:

- a) Ongoing monitoring – with commercial and non-commercial monitored separately;
- b) Set a lower harvest level until stocks are rebuilt to above the soft limit; and
- c) Refugia.

Ongoing monitoring combined with setting an interim target exploitation rate¹⁷ (%) until the stocks are rebuilt, were identified as the priority mitigation options. Initially, it was proposed to set an interim exploitation rate (lower than the target exploitation rate) to allow the stock to rebuild further. Rules will be set to prevent scallop harvest exceeding the interim exploitation rate, and monitoring will be conducted by collecting scallop biomass information to see how the stock responds to fishing pressure. Adequate information on how many scallops are taken by each sector is also required, to identify whether catch limits are being adhered to.

3. Risk that fishing will exceed harvest allocations;

This risk was analysed in two parts; the risk that commercial fishing would exceed harvest allocations, and that recreational fishing would exceed harvest allocations. It is unlikely that commercial fishing will exceed harvest allocations due to the reporting requirements, management and penalties that are in effect. However, it is possible that the recreational sector will exceed harvest allocations because recreational fishing is not constrained by an overall catch limit. The key mitigation to this risk was to get better catch information from all sectors, particularly from the recreational sector. This would allow management actions to be taken if target catches are exceeded.

4. Management measures are no longer fit for purpose;

The risk that 'management measures are no longer fit for purpose' was not initially analysed as a risk per se. The risk analysis identified a number of scallop fishing rules and regulations that may need to be changed to minimise the impacts of fishing on scallop biomass and habitat. As a result, it became clear that there is a risk that the management measures are no longer fit for purpose, and that mitigating this risk would greatly assist towards reducing the impacts of fishing on scallops.

The current management measures (rules and regulations surrounding the fishery) were put in place when the fishery was much bigger, and when Golden Bay and Tasman Bay were fully enhanced, rotational fisheries. Now the fishery is much smaller, and has been closed for a number of years due to sustainability reasons. Therefore changes to the rules and regulations may be required to prevent the overharvest of scallops.

¹⁷ A target exploitation rate is the proportion of biomass that is taken from a population.

These changes could include reviewing the: daily bag limits, season length, size limits, how catch is reported, and fishing methods (i.e. dredging or diving) and gear requirements (such as dredge size and design). In addition, ensuring that management changes occur over the right timeframes will be important for the future of this fishery.

5. Impacts of fishing on the aquatic environment & scallop sustainability are too large

This risk was discussed as: 'the risk of fishing (scallop dredging) on the aquatic environment and habitats of particular significance for fisheries management / associated, dependent and protected species', in the context that the only scallop harvesting method used by the commercial sector is dredging, and that half of those recreational fishers targeting scallops use a dredge. Dredges are known to have a negative impact on certain scallop habitats, and that some scallop habitats are particularly vulnerable to the impacts of dredging.

The mitigation measures proposed for this risk were:

- a) Close some areas to dredging;
- b) Put in place harvest strategies that reflect the sensitivity of the benthic environment to bottom-impacting fishing methods (e.g. rotational harvesting);
- c) Refugia (areas completely closed to scallop fishing);
- d) Enhancement; and
- e) Habitat restoration; the placement of scallop shell to promote areas for spat settlement.

A combination of the first three mitigations was proposed as the most effective mitigation strategy in the short-term. The SSWG recommended that the remaining and historical scallop beds in the Marlborough Sounds be allocated into one of three categories:

1. Resilient to regular rotational harvesting;
2. Can sustain periodic rotational fishing that will allow for longer recovery times; and
3. Predisposed to dredging impacts and may not be appropriate to dredge.

The assignment of areas to a particular category would be based on the best available scientific information on the type of substrate and ecosystems that are present. Refugia would be assigned to areas that have highly productive scallop beds which support recruitment into the fishery, or to those which are in particularly sensitive habitats.

6. Non-fishing impacts cause scallop abundance to decline.

Fishing is not the only factor that can influence scallop abundance and population health. Wider environmental impacts that result in increased sedimentation and turbidity appear to have been important in driving the decline of the fishery. The other factors, such as disease and competition for marine space, which may be influencing the productivity of the fishery will be examined to determine how they can be minimised.

This is one of the biggest risks to the fishery, which falls largely outside of the scope of the Fisheries Act 1996. Options to identify pathways to mitigate this risk will be further investigated by the SSWG.

How will this risk assessment be used?

The results of this risk assessment have been summarised at a high-level in the draft Southern Scallop Strategy: Marlborough Sounds. The strategy was drafted based on the risk assessment, and the SSWG had input into each iteration of the strategy, to progress it to the stage where it is ready for wider input. The SSWG is seeking views, more broadly, on the strategy and will incorporate feedback into the final version.

The purpose of this risk assessment, the strategy and this engagement process is to put in place a management framework, and rules and regulations, which, if the fishery were to reopen, would allow for its sustainable utilisation. There are some significant concerns from iwi, community groups and stakeholders about reopening the Marlborough Sounds to scallop fishing.

Any proposal to reopen the Marlborough Sounds component of the fishery will be informed by the results of biomass surveys and iwi and stakeholders would have the opportunity to have their say on whether they feel the fishery could support being reopened or not.

For more information, visit our webpage: <https://www.fisheries.govt.nz/protection-and-response/sustainable-fisheries/the-southern-scallop-fishery-sca-7>



Appendix 1. Risk assessment steps and diagnostic questions used in the risk assessment of the Southern Scallop Fishery: Marlborough Sounds.

Risk assessment steps	Diagnostic questions
Specify the scope	<p>What are the species or stocks or sub-stocks covered by the management regime?</p> <p>What are the defining characteristics of the habitats affected by utilization of this resource?</p> <p>What aquatic life is affected by utilization of this resource?</p> <p>What stakeholder groups (e.g. commercial, recreational, customary) have an interest in the species, stocks habitats or aquatic life identified?</p> <p>What fishery policy / law relate to the species, stocks, habitats or aquatic life or stakeholder groups identified above?</p>
Establish Objectives	<p>What specific objectives or standards arise from the fisheries policy with respect to the species, stocks, habitats, aquatic life stakeholder groups pertinent to the SSF?</p> <p>Are there any inconsistencies between the identified objectives?</p> <p>What priority does the fishery policy framework give to each of the objectives?</p>
Describe the existing management framework	<p>Are these stocks in the QMS?</p> <p>What input (e.g. method) / output (e.g. TAC) controls apply?</p> <p>What economic incentives / controls apply (i.e. deemed values etc.)?</p> <p>What research is being conducted into the species, stocks, aquatic life or habitats associated with the SSF?</p> <p>What monitoring regime is in place?</p> <p>What level of enforcement is applied?</p> <p>What administrative services are provided?</p> <p>What stakeholder organizations exist and what role do stakeholders play?</p>
Summarise current performance measures	<p>What is the current level of target fishing activity on the stock?</p> <p>Are the stocks caught as a bycatch?</p> <p>What are the historical catch levels (recreational, customary, commercial)?</p> <p>What is the level of compliance with existing management measures?</p> <p>What is the current health of the stocks (biomass vs MSY) as measured against any identified standards?</p> <p>Are there any specific vulnerabilities (e.g. life cycle vulnerability, links between bycatch and fishing methods, etc.) threatening the species, stocks, aquatic life or habitats??</p>
Identify risks and opportunities	<p>Are the objectives identified satisfied currently?</p> <p>Are the performance standards being met?</p> <p>Is sufficient information available to adequately assess performance against objectives?</p> <p>Are all elements of the existing framework contributing to the objectives – how?</p> <p>Is there opportunity to relax existing constraints?</p> <p>Is there opportunity to increase stakeholder participation in management?</p>
Analyse each risk (high, medium, low)	<p>What is the priority of the risks relative to the objectives?</p> <p>How risk adverse is manager to failure of the objective at risk?</p> <p>How severe is the consequence of the risk if it eventuates?</p> <p>What is the likelihood of each identified risk occurring?</p> <p>On what timescale is the risk likely to eventuate (high = immediately)?</p> <p>How certain is each risk characterization?</p>
Categorisation of Risks	<p>Which risks should be mitigated assuming a cost effective mitigation strategy can be identified?</p> <p>Which risks should be monitored on an ongoing basis?</p> <p>Which risks require no further action?</p>

Appendix One

Develop mitigation strategies	What options are available to mitigate the risk? What is the probability of success of each mitigation option considered? What are the services required to implement each mitigation option?
Evaluate risks and opportunities (High, Medium, Low)	How effective is the mitigation strategy likely to be, such that the benefits of avoiding the adverse consequence are likely to exceed the costs of action? How likely is the mitigation strategy likely to succeed in addressing risks? How quickly will the mitigation strategy be in effect (high = immediately)?
Address risks and opportunities	What specific actions are required to action risk mitigation options? What services are required to support the management arrangements for the fishery?

Appendix Two: Risk Assessment

Appendix Two provides summary sheets of the risk assessment, how risks were categorized, scored, assigned confidence values and options that were put forward for mitigations, and how these were scored.

Risk 1: Threshold biomass for reopening (soft limit) is set too low

Description of Risk	
Description of risk factor/s	Risk is that the soft limit (50% target biomass (average biomass of stable years) is too low) (50% target biomass applies to existing or recoverable beds only)
Associated policy / legal objectives	As per Fisheries Act 1996
Likely impact of risk	Risk to sustainability

Risk Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Priority	High	High
Averseness to risk	High	High
Severity	High	High
Likelihood	Medium	High
Immediacy	Medium	High

Recommended Mitigation Strategy (options)	
Description of mitigation strategy	Ongoing monitoring / research (and adjustment if concern is indicated). Enhancement. Refugia.
Summary of services required	Annual stock assessment. Detailed and accurate time series of the scallop biomass across SCA 7, but at a fine-scale (currently underway by NIWA).

Mitigation Strategy Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Effectiveness	High	High
Likelihood	High	High
Immediacy	Medium	High

Residual Risk Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Effectiveness	Low	High
Likelihood	Low	High
Immediacy	Low	High

Risk 2: The target exploitation rate would result in the stock declining below the soft limit.

Description of Risk	
Description of risk factor/s	Risk is that the harvest would result in the stock declining below the soft limit
Associated policy / legal objectives	Fisheries Act 1996.
Likely impact of risk	Risk to sustainability

Risk Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Priority	High	High
Averseness to risk	High	High
Severity	Medium	Medium
Likelihood	Medium	Medium
Immediacy	Medium	Medium

Recommended Mitigation Strategy (options)	
Description of mitigation strategy	Ongoing monitoring. (should separate commercial and non-commercial monitoring) Set lower harvest level until stocks are rebuilt to above soft limit Refugia
Summary of services required	Existing commercial fishery monitoring. Existing recreational surveys. Customary monitoring. Annual stock surveys.

Mitigation Strategy Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Effectiveness	C High, R Low, Cust Medium	High
Likelihood	C High, R Low, Cust Medium	High
Immediacy	C High, R Low, Cust Medium	High

Residual Risk Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Effectiveness	C Low, R High, Cust Medium	High
Likelihood	C High, R Low, Cust Medium	High
Immediacy	C High, R Low, Cust Medium	High

Risk 3: Recreational harvest will exceed harvest allocations.

Description of Risk	
Description of risk factor/s	Risk that recreational fishing will exceed harvest allocations.
Associated policy / legal objectives	As per Fisheries Act 1996. Percentage share of harvest total at target exploitation rate.
Likely impact of risk	Sustainability

Risk Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Priority	High	High
Averseness to risk	High	High
Severity	Medium	High
Likelihood	Medium	Medium
Immediacy	High	Medium

Recommended Mitigation Strategy (options)	
Description of mitigation strategy	Enhanced monitoring, potentially in-season (with immediate action if concern is indicated). Legal shell size change, bag limit change, season change, licensing / registration, methods (size, number of dredges). Charter vessel monitoring / control.
Summary of services required	Improved recreational surveys. Recreational reporting (voluntary)? Regulatory change?

Mitigation Strategy Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Effectiveness	tbc	tbc
Likelihood	tbc	tbc
Immediacy	tbc	tbc

Residual Risk Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Effectiveness	tbc	tbc
Likelihood	tbc	tbc
Immediacy	tbc	tbc

Risk 4: Impacts of fishing on the aquatic environment and scallops are too large.

Description of Risk	
Description of risk factor/s	Risk of fishing (scallop dredging) on the aquatic environment - habitats of particular significance for fisheries management / associated and dependent species (protected species)
Associated policy / legal objectives	As per Fisheries Act 1996, Resource Management Act 1991 overlap
Likely impact of risk	Risk to sustainability

Risk Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Priority	High	High
Averseness to risk	High	High
Severity	Medium	Medium
Likelihood	Medium	High
Immediacy	High	High

Recommended Mitigation Strategy (options)	
Description of mitigation strategy	Sensitive scallop habitat - rotationally fished, no dredging in certain environments. Recreational dredge design. Refugia. Enhancement (scallops / substrates (shell) replacement).
Summary of services required	Regulatory closures (recreational), enforcement costs. Habitat restoration. Research / trial programmes.

Mitigation Strategy Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Effectiveness	tbc	tbc
Likelihood	tbc	tbc
Immediacy	tbc	tbc

Residual Risk Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Effectiveness	tbc	tbc
Likelihood	tbc	tbc
Immediacy	tbc	tbc

Risk 5: Non-fishing impacts cause scallop abundance to decline.

Description of Risk	
Description of risk factor/s	Risk of non-scallop fishing activities to scallop sustainability (other fishing, aquaculture and land based activities, biosecurity) – focus on Marlborough Sounds
Associated policy / legal objectives	As per Fisheries Act 1996, Resource Management Act 1991 overlap
Likely impact of risk	Risk to sustainability

Risk Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Priority	High	High
Averseness to risk	High	High
Severity	High	High
Likelihood	High	Medium
Immediacy	High	High

Recommended Mitigation Strategy (options)	
Description of mitigation strategy	Formalise SSWG management as a Fisheries Plan (to hold RMA processes accountable) under the Fisheries Act Strengthen SSWG / Fisheries NZ / iwi advocacy for plan
Summary of services required	

Mitigation Strategy Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Effectiveness	Low	High
Likelihood	Low	Medium
Immediacy	Medium	Medium

Residual Risk Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Effectiveness	High	High
Likelihood	High	Medium
Immediacy	High	High

Risk 6: Commercial fishing will exceed harvest allocations.

Description of Risk	
Description of risk factor/s	Risk that commercial fishing will exceed harvest allocations.
Associated policy / legal objectives	As per Fish Act 1996. Percentage share of target harvest level
Likely impact of risk	Risk to sustainability

Risk Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Priority	High	High
Averseness to risk	High	High
Severity	Medium	High
Likelihood	Low	High
Immediacy	Low	Medium

Recommended Mitigation Strategy	
Description of mitigation strategy	Ongoing monitoring incl. Memorandum of Understanding reporting and new electronic reporting.
Summary of services required	Existing commercial fishery monitoring.

Mitigation Strategy Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Effectiveness	High	High
Likelihood	High	High
Immediacy	High	High

Residual Risk Scoring		
	Score (H/M/L)	Confidence (H/M/L)
Effectiveness	Low	High
Likelihood	Low	High
Immediacy	Low	High