Seafood Risk Assessment

New Zealand Silver Warehou Fishery

Prepared for the OpenSeas Programme

Assessment Summary

New Zealand Silver Warehou Fishery	Unit/s of Assessment:	
	Product Name/s:	***Silver warehou***
	Species:	*Seriolella punctata*
	Stock:	SWA3, SWA4
	Gear type:	Demersal trawl
	Year of Assessment:	2017

Fishery Overview

This summary is adapted from MPI (2017):

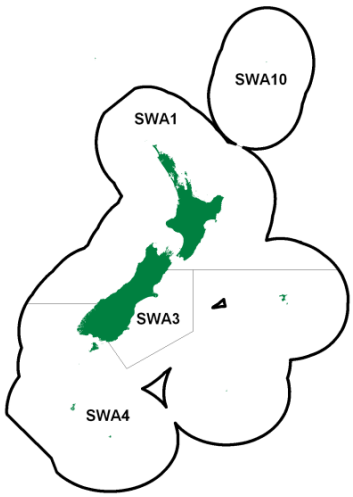

Figure 1: Management areas for the New Zealand silver warehou fishery.

Silver warehou are common around the South Island and on the Chatham Rise in depths of 200–800 m. The majority of the commercial catch is taken from the Chatham Rise, Canterbury Bight, southeast of Stewart Island and the west coast of the South Island.

Silver warehou entered the Quota Management System (QMS) on 1 October 1986. There are no current recreational fisheries for silver warehou.

This assessment covers the demersal trawl fishery in SWA 3 and SWA 4.

Scoring

Performance Indicator	SWA3	SWA4
COMPONENT 1		
1A: Stock Status	PRECAUTIONARY HIGH RISK	PRECAUTIONARY HIGH RISK
1B: Harvest Strategy	PRECAUTIONARY HIGH RISK	PRECAUTIONARY HIGH RISK
1C: Information and Assessment	PRECAUTIONARY HIGH RISK	PRECAUTIONARY HIGH RISK
OVERALL	HIGH RISK	HIGH RISK
COMPONENT 2		
2A: Non-target Species	MEDIUM RISK	PRECAUTIONARY HIGH RISK
2B: ETP Species	LOW RISK	LOW RISK
2C: Habitats	LOW RISK	LOW RISK
2D: Ecosystems	LOW RISK	LOW RISK
OVERALL	LOW RISK	MEDIUM RISK
COMPONENT 3		
3A: Governance and Policy	LOW RISK	LOW RISK
3B: Fishery-specific Management System	LOW RISK	LOW RISK
OVERALL	LOW RISK	LOW RISK

Summary of main issues

- The stock structure of silver warehou is not known.
- There are no stock assessments available for any silver warehou stocks. No estimates of biomass are available and the status of the stocks are unknown. The sustainability of current TACCs and recent catch levels for SWA3 and SWA4 is not known.

Outlook

SWA3, SWA4

Component	Outlook	Comments
Target species	Uncertain	McGregor (2016) outlines a range of work that could be undertaken to make CPUE data more reliable as an indicator of stock abundance, although it is not known when the work will occur.
Environmental impact of fishing	Stable	No major changes to existing C2 arrangements are expected.
Management system	Stable	No major changes to existing C3 arrangements are expected.

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Disclaimer

This assessment has been undertaken in a limited timeframe based on publicly available information. Although all reasonable efforts have been made to ensure the quality of the report, neither this company nor the assessment' s authors warrant that the information contained in this assessment is free from errors or omissions. To the maximum extent permitted by law, equity or statute, neither this company nor the authors accept any form of liability, it contractual, tortious or otherwise, for the contents of this report or for any consequences arising from misuse or any reliance placed on it.

Background

This report sets out the results of an assessment against a seafood risk assessment procedure, originally developed for Coles Supermarkets Australia by MRAG Asia Pacific. The aim of the procedure is to allow for the rapid screening of uncertified source fisheries to identify major sustainability problems, and to assist seafood buyers in procuring seafood from fisheries that are relatively well-managed and have lower relative risk to the aquatic environment. While it uses elements from the GSSI benchmarked MSC Fishery Standard version 2.0, the framework is not a duplicate of it nor a substitute for it. The methodology used to apply the framework differs substantially from an MSC Certification. Consequently, any claim made about the rating of the fishery based on this assessment should not make any reference to the MSC or any other third party scheme.

This report is a "live" document that will be reviewed and updated on an annual basis.

Methods

Risk Assessment

Detailed methodology for the risk assessment procedure is found in MRAG AP (2015). The following provides a brief summary of the method as it relates to the information provided in this report.

Assessments are undertaken according to a 'unit of assessment' (UoA). The UoA is a combination of three main components: (i) the target species and stock; (ii) the gear type used by the fishery; and (iii) the management system under which the UoA operates.

Each UoA is assessed against three components:

1. Target fish stocks;
2. Environmental impact of fishing; and
3. Management system.

Each component has a number of performance indicators (PIs). In turn, each PI has associated criteria, scoring issues (SIs) and scoring guideposts (SGs). For each UoA, each PI is assigned one of the following scores, according to how well the fishery performs against the SGs:

- Low risk;
- Medium risk;
- Precautionary high risk; or
- High risk

Scores at the PI level are determined by the aggregate of the SI scores. For example, if there are five SIs in a PI and three of them are scored low risk with two medium risk, the overall PI score is low risk. If three are medium risk and two are low risk, the overall PI score is medium risk. If there are an equal number of low risk and medium risk SI scores, the PI is scored medium risk. If any SI scores precautionary high risk, the PI scores precautionary high risk. If any SI scores high risk, the PI scores high risk.

For this assessment, each component has also been given an overall risk score based on the scores of the PIs. Overall risk scores are either low, medium or high. The overall component risk score is low where the majority of PI risk scores are low. The overall risk score is high where any one PI is scored high risk, or two or more PIs score precautionary high risk. The overall risk score is medium for all other combinations (e.g. equal number of medium/low risk PI scores; majority medium PI scores; one PHR score, others low/medium).

Outlook

For each UoA, an assessment of the future 'outlook' is provided against each component. Assessments are essentially a qualitative judgement of the assessor based on the likely future performance of the fishery against the relevant risk assessment criteria over the short to medium term (0-3 years). Assessments are based on the available information for the UoA and take into account any known management changes. Outlook scores are provided for information only and do not influence current or future risk scoring.

Table 1: Outlook scoring categories.

Outlook score	Guidance
Improving	The performance of the UoA is expected to improve against the relevant risk assessment criteria.
Stable	The performance of the UoA is expected to remain generally stable against the relevant risk assessment criteria.
Uncertain	The likely performance of the UoA against the relevant risk assessment criteria is uncertain.
Declining	The performance of the UoA is expected to decline against the relevant risk assessment criteria.

Information sources

Information to support scoring is obtained from publicly available sources, unless otherwise specified. Scores will be assigned on the basis of the objective evidence available to the assessor. A brief justification is provided to accompany the score for each PI.

Assessors will gather publicly available information as necessary to complete or update a PI. Information sources may include information gathered from the internet, fishery management agencies, scientific organisations or other sources.

Assessment Results

COMPONENT 1: Target fish stocks

1A: Stock Status

CRITERIA: (i)The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing.

(a) Stock Status **PRECAUTIONARY HIGH RISK**

The stock structure of silver warehou is unknown (MPI, 2017).

MPI (2017) reports that "there are no stock assessments available for any silver warehou stocks. Neither the trawl survey nor the CPUE time series are currently suitable for monitoring the stocks or useful for stock assessments. No estimates of biomass are available and the status of the stocks are unknown." Accordingly, we have scored this SI precautionary high risk.

PI SCORE	PRECAUTIONARY HIGH RISK

1B: Harvest Strategy

CRITERIA: (i) There is a robust and precautionary harvest strategy in place.

(a) Harvest Strategy **PRECAUTIONARY HIGH RISK**

The harvest strategy in the commercial silver warehou fisheries consists of:

- Catch controls through TACs and ITQs;
- Disincentives to over-catch through application of deemed values;
- Gear restrictions;
- Monitoring through logbooks and catch returns;
- Monitoring through VMS
- Periodic review of stock status and recommended TAC levels through the MPI Working Group process.

TACs and TACCs are set according to the NZ Harvest Strategy Standard which establishes default target (25% - 45% B_0, depending on the productivity of the stock), soft limit (20% B_0) and hard limit (10% B_0) reference points which guide Ministry advice to the Minister (MFish, 2008; MFish, 2011). Under the Standard, TACs are set at levels that aim to maintain biomass at levels consistent with the Target Reference Point (TRP), a breach of the soft limit triggers a requirement for a formal, time-constrained rebuilding plan and a breach of the hard limits leads to consideration for closure.

MPI (2017) report that "in most years from 2000–01 to 2008–09 catches in SWA 3 and SWA 4 were well above the TACCs as fishers landed catches well in excess of ACE holdings. The sustainability of current TACCs and recent catch levels for these Fishstocks is not known, and it is not known if they will allow the stocks to move towards a size that will support the maximum sustainable yield."

Accordingly, we have scored this SI precautionary high risk.

(b) Shark-finning

NA

CRITERIA: (ii) There are well defined and effective harvest control rules (HCRs) and tools in place.

(a) HCR Design and application **MEDIUM RISK**

The silver warehou UoAs are covered by the requirements of the *Fisheries Act 1996* to maintain stocks at levels capable of producing MSY or higher [e.g. sub-section 13(2A) states that "*if the Minister considers that the current level of the stock or the level of the stock that can produce the maximum sustainable yield is not able to be estimated reliably using best available information, the Minister must … (c) set a total allowable catch … (ii) that is not inconsistent with the objective of maintaining the stock at or above, or moving the stock towards or above, a level that can produce the maximum sustainable yield*"], and the NZ Harvest Strategy Standard (HSS) which requires QMS stocks to be maintained at or above a target equivalent to B_{MSY}, and above a soft limit equating to ½ B_{MSY} (MFish, 2008). The HSS requires that target and limit biological reference points be set for all QMS fishstocks but is flexible about the means by which this is achieved. The intention is to make best use of available information for each individual stock.

While a framework exists to identify, examine and respond to issues of declines in the silver warehou stock, and a suite of tools is available to implement reductions in exploitation if needed, there is no reliable index of abundance currently available. Accordingly, while generally understood HCRs and tools exist which could be expected to reduce exploitation as PRI is approached, there are no well-defined HCRs which are robust to the main uncertainties.

PI SCORE	PRECAUTIONARY HIGH RISK

1C: Information and Assessment

CRITERIA: (i) Relevant information is collected to support the harvest strategy.

(a) Range of information MEDIUM RISK

Stock structure is not well defined, although spawning location, growth rates and age structure has been studied to some extent (see summary in MPI, 2017). The fisheries biology has been studied to some extent (e.g. Horn and Sutton; in MPI, 2017) although McGregor (2016) notes that "although silver warehou have been harvested commercially at significant levels for more than 40 years, many aspects of their biology, important to stock assessment, remain unknown. Foremost is their size and age at maturity.". The fleet composition and catches are well monitored. Accordingly, some information is available to support the harvest strategy although there are weaknesses around a reliable index of abundance to support harvest control rules and TAC setting.

(b) Monitoring and comprehensiveness PRECAUTIONARY HIGH RISK

While commercial removals from the UoA are closely monitored through the QMS reporting arrangements, with validation from observers, there is no reliable index of abundance available at this stage.

CRITERIA: (ii) There is an adequate assessment of the stock status.

(a) Stock assessment PRECAUTIONARY HIGH RISK

There are no quantitative stock assessments for any of the silver warehou stocks and the available potential indices of abundance (commercial CPUE, independent trawl survey indices) are not considered reliable (MPI, 2017).

(b) Uncertainty and Peer review MEDIUM RISK

The main uncertainties are discussed by the MPI Fishery Working Group and identified in the Fisheries Plenary Report (MPI, 2017). The available information is considered by the Working Group, including independent scientists.

PI SCORE	PRECAUTIONARY HIGH RISK

COMPONENT 2: Environmental impact of fishing

2A: Other Species

CRITERIA: (i) The UoA aims to maintain other species above the point where recruitment would be impaired (PRI) and does not hinder recovery of other species if they are below the PRI.

(a) Main other species stock status

The intent of this scoring issue is to examine the impact of the UoA on 'main' other species taken while harvesting the target species. 'Main' is defined as any species which comprises >5% of the total catch (retained species + discards) by weight in the UoA, or >2% if it is a 'less resilient' species (MSC, 2014). The aim is to maintain other species above the point where recruitment would be impaired and ensure that, for species below PRI, there are effective measures in place to ensure the UoA does not hinder recovery and rebuilding.

Silver warehou is taken in targeted trawls, as well as trawls targeted at other species (e.g. hoki, barracouta, hake) (McGregor, 2016). There is limited information to determine a total catch composition for trawls involving silver warehou in SWA 3 and SWA 4, although the information available in McGregor (2016) suggest the main other species in the Chatham Islands region (SWA 4) are likely to be hoki, barracouta and hake, while in the southland region (SWA 4) the main other species are likely to be squid and hoki. In the east coast South Island (ECSI) (SWA 3) region the main other species are likely to be hoki and squid.

SWA3 MEDIUM RISK

SQU 1

MFish (2017) report that "*no estimates of current and reference biomass are available. There is also no proven method at this time to estimate yields from the squid fishery before a fishing season begins based on biomass estimates or CPUE data. Because squid live for about one year, spawn and then die, and because the fishery is so variable, it is not practical to predict future stock size in advance of the fishing season. As a consequence, it is not possible to estimate a long-term sustainable yield for squid, nor determine if recent catch levels or the current TACC will allow the stock to move towards a size that will support the MSY.*"

For this type of species, a fixed TAC (such as here) will mean that a highly variable proportion of the stock is removed each year, and a significant stock-recruit relationship is only likely if the stock is very strongly depleted over a number of years. On this basis, since recruitment is largely decoupled from biomass, it appears that the fishing mortality rate exerted by this fishery is not likely to pose a

significant problem, even though the biomass at any given moment is unknown. Overall, the New Zealand government concludes that it is 'unlikely' (>60%) the stock is below its 'hard limit' and no corrective management action is recommended[1].

On the basis of the highly variable nature of the stock, the likelihood that the stock is not below the hard limit and recent MPI advice that maintaining the stock at the 2014-15 TAC would "*ensure the long term sustainability of the stock*" (MPI, 2016b), there is probably a reasonable basis to conclude that the stock is at least likely to be above the point of recruitment impairment (PRI).

Work is currently underway as part of the Deepwater Group's Fishery Improvement Plan (FIP) for the New Zealand EEZ Arrow Squid Trawl Fishery to develop a quantitative assessment model for squid (DWG, 2016).

Hoki

Biomass of the eastern hoki stock in 2017 was estimated to be 60%B_0 and virtually certain (>99%) to be above the target reference point (MPI, 2017). Accordingly, the stock is highly likely to be above PRI.

SWA4 **PRECAUTIONARY HIGH RISK**

Squid

As above

Hoki

As above

Hake

The SWA 4 fishery overlaps with the HAK 1 and HAK 4 stocks. Biomass in the Sub-Antarctic Stock (HAK 1 South of Otago Peninsula) in 2014 was estimated to be at B60%. MPI (2017) concluded the stock was highly likely to be above the target reference point. The Chatham Rise Stock (HAK 4 plus HAK 1 north of Otago Peninsula) was estimated to be at B48%, and likely to be above the target reference point (MPI, 2017).

Barracouta

The SWA 4 fishery overlaps with the BAR 4 and BAR 5 stocks.

BAR 4

MPI (2017) reports that in BAR 4 the fishery has been highly variable and no standardised analysis is possible. No stock status is given.

BAR 5

MPI (2017) conclude that biomass in 2015 is very unlikely (< 10%) to be below both the soft and hard limits.

CRITERIA: (ii) There is a strategy in place that is designed to maintain or to not hinder rebuilding of other species; and the UoA regularly reviews and implements

(a) Management strategy in place

The strategy to manage main other species across all SWA stocks includes:

- Control on catch and effort through TACs and ITQs on the target species;
- Gear restrictions;
- Monitoring through logbooks and catch returns;
- Monitoring through VMS and observers
- Periodic assessments of QMS species through the NZ Plenary process

SWA3 **MEDIUM RISK**

In the case of SWA 3, the measures in place have been sufficient to maintain hoki well above PRI. For squid, the evidence that the stock is above PRI is less straightforward given the biological characteristics of the species, although there appears to be limited evidence that the stock has undergone significant recruitment impairment. The stock specific assessment techniques and harvest control rules to be developed as part of the Deepwater Group's FIP (DWG, 2016) will likely improve certainty around stock status as well as the management system's capacity to demonstrate stocks are being maintained above PRI.

SWA4 **PRECAUTIONARY HIGH RISK**

In the case of SWA 4, the measures in place have been sufficient to maintain both hoki and hake well above PRI. Squid is as above. For BAR 4 there is no clear index of abundance and there is limited evidence that the current TAC will maintain the stock above PRI in the long term. Accordingly, we have scored this SI precautionary high risk. Scoring against this SI would change if there was (a) evidence that BAR 4 was above PRI or (b) the BAR 4 stock did not constitute a 'main' other species in the catch of SWA 4.

(b) Management strategy evaluation

SWA3 **MEDIUM RISK**

For hoki, ongoing stock assessments and stock projections provide a strong objective basis for confidence that the current strategy will work. For squid, there is less evidence but the existing measures, together with improvements expected under the DWG FIP, are considered likely to work based on plausible argument.

[1] http://fs.fish.govt.nz/Doc/24003/Stock%20Status%20Table%20Nov%202015%20symbols.pdf.ashx

SWA4 **PRECAUTIONARY HIGH RISK**

For hoki and hake, ongoing stock assessments and stock projections provide a strong objective basis for confidence that the current strategy will work. For squid, there is less evidence but the existing measures, together with improvements expected under the DWG FIP, are considered likely to work based on plausible argument. For BAR 5, periodic analyses of standardised CPUE provide some objective basis for confidence that the measures in place will work. For BAR 4, it is not known whether the current sustainability measures will maintain the stock above PRI.

(c) Shark-finning

NA

CRITERIA: (iii) Information on the nature and amount of other species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage other species.

(a) Information **MEDIUM RISK**

SWA3

While information to evaluate the total catch composition of trawls taking silver warehou is complicated because it is frequently taken as a bycatch in other targeted fisheries, sufficient information appears to be available to determine the impacts on likely main other species with respect to status and to detect increased risk to them. The main limitation appears to be a lack of detailed information on full catch composition including discards.

SWA4 **PRECAUTIONARY HIGH RISK**

Very good quantitative information is available for some species (hoki, hake) and is sufficient to detect the impact of the UoA with respect to status. For BAR 4, quantitative information is available, however the fishery has been highly variable and no standardised analysis is possible (MPI, 2017).

PI SCORE	MEDIUM RISK – SWA3
	PRECAUTIONARY HIGH RISK – SWA4

2B: Endangered Threatened and/or Protected (ETP) Species

CRITERIA: (i) The UoA meets national and international requirements for protection of ETP species.
The UoA does not hinder recovery of ETP species.

(a) Effects of the UoA on populations/stocks **LOW RISK**

There is limited information on ETP species interactions specific to silver warehou targeted trawls, although it is taken in the same depth range and at the same time as hoki, hake and barracouta targeted trawls so we have assumed ETP species interactions and risks will be similar to these fisheries. On that basis, the main potential ETP species interactions are likely to be with seabirds, marine mammals and protected corals.

Seabirds

Observer data shows the main interactions with hoki trawl fisheries are with sooty shearwater, Salvin's albatross, southern Buller's albatross, white-chinned petrels and New Zealand white-capped albatross (Abraham and Thompson, 2015). The main interactions in the hake trawl fisheries are with New Zealand white-capped albatross and Salvin's albatross, and the main interactions in barracouta targeted fisheries are with sooty shearwater, white-chinned petrels, Salvin's albatross and white-capped albatross.

Risks to sea birds associated with New Zealand's commercial fisheries have been assessed through a hierarchical series of risk assessments (e.g. Rowe, 2013, Richard and Abraham, 2013; Richard and Abraham, 2015, Richard and Abraham, in prep.; in MPI, 2016a). The most recent iteration derives for each taxon a risk ratio, which is an estimate of annual potential fatalities (APF) across trawl and longline fisheries relative to the Population Sustainability Threshold, PST (an analogue of the Potential Biological Removals, PBR, approach) (Richard & Abraham in prep, in MPI, 2016a). This index represents the amount of human-induced mortality a population can sustain without compromising its ability to achieve and maintain a population size above its maximum net productivity (MNPL) or to achieve rapid recovery from a depleted state. The management criterion used for developing the seabird risk assessment was that seabird populations should have a 95% probability of being above half the carrying capacity after 200 years, in the presence of ongoing commercial fishing related mortalities, and environmental and demographic stochasticity (Richard & Abraham, 2013).

In the most recent assessment, only one species of seabird, black petrel (1.15), had a median risk ratio higher than 1 (or upper 95% confidence limit higher than 2) taking into account fishing related mortality across all trawl and longline fisheries (Richard & Abraham in prep, in MPI, 2016a). For all other species, current rates of fishing related mortality were not expected to hinder the achievement of management targets (i.e. the risk ratio was <1). There have been no estimated captures of black petrel in hoki, hake or barracouta trawl fisheries between 2002-03 and 2014-15.

Of the other main species taken, only Salvin's albatross has a risk ratio with an upper 95% confidence interval higher than 1 (median risk ratio 0.78; 95% c.i. 0.51 – 1.09). Collectively, the hoki, hake and barracouta trawl sectors accounted for around 17% - 26% of the Salvin's albatross estimated mortalities in the period 2012-13 to 2014-15 (Abraham and Thompson, 2015). This is likely to be an overestimate of the contribution of silver warehou trawls given these species will also be taken without silver warehou. Accordingly, the available evidence indicates it is highly likely the trawls involving silver warehou will hinder recovery of seabird species.

Marine mammals

New Zealand sea lions

Estimated captures of New Zealand sea lions in hoki targeted trawls have been between 0 and 2 annually between 2002-03 and 2014-15 (Abraham and Thompson, 2015). There have been no observed captures in the hake and barracouta targeted trawl fisheries. This level of interaction is very low in comparison of other New Zealand fisheries and is highly unlikely to hinder recovery.

New Zealand fur seals

During the 2002-03 to 2014-15 period, estimated annual captures of New Zealand fur seals ranged between 168-755 for hoki targeted trawls, 8-53 for hake targeted trawls and 24-104 for barracouta targeted trawls (Abraham and Thompson, 2015).

New Zealand fur seals are the most common seals in New Zealand and are listed as 'least concern', with an increasing population trend. There are no national or international limits on incidental captures of fur seals. Based on this it appears highly likely that current rates of capture are not hindering recovery of either species.

Cetaceans

Captures of cetaceans are limited in hoki, hake and barracouta trawl fisheries (Abraham and Thompson, 2015).

Corals

Black corals (all species in the order Antipatharia), gorgonian corals (all species in the order Gorgonacea), stony corals (all species in the order Scleractinia), and hydrocorals (all species in the family Stylasteridae) are protected in New Zealand under the Wildlife Act.

The nature and distribution of protected corals in New Zealand's EEZ, as well as fishery interactions with them, was examined by Baird et al (2013). While interactions with protected corals are possible in SWA fisheries, Baird et al (2013) reported that fewer reports of coral catch from observed fisheries in waters shallower than 800 m. Observations of protected coral catch in hoki, hake and barracouta fisheries were all comparatively minor in the context of overall catches. The hoki fisheries met the equivalent 80 scoring guideline in the most recent full MSC reassessment (Ackroyd et al, 2012).

CRITERIA: (ii) The UoA has in place precautionary management strategies designed to:

- meet national and international requirements; and
- ensure the UoA does not hinder recovery of ETP species.

Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species

(a) Management strategy in place **LOW RISK**

The strategic framework for managing protected species interactions in New Zealand fisheries currently includes:

- Legislation: the Fisheries Act, Wildlife Act, and Marine Mammals Protection Act
- The National Plan of Action—Seabirds (MPI 2013a)
- The National Plan of Action – Sharks (MPI 2013b)
- The Marine Conservation Services Programme

When impacts of fishing are such that they are causing an adverse effect on protected species, measures are to be taken pursuant to s 15 of the Fisheries Act to avoid, remedy or mitigate that effect. If a Population Management Plan has been approved by the Minister of Conservation under either the Wildlife Act 1953 or the Marine Mammals Protection Act 1978 the Minister responsible for fisheries must give effect to those plans when managing the effects of fishing.

The Department of Conservation and Ministry for Primary Industries also contract research, including:

- population monitoring protected species;
- research relating to fishing effects on protected species;
- research on measures to mitigate the adverse effects of commercial fishing on protected species.

Seabirds

Management measures to mitigate impacts of commercial fisheries on seabirds are included in the NPOA-Seabirds (MPI, 2013). The measures are given effect through the national fisheries planning process, and vary by vessel type. Table 2 summarises the measures across New Zealand's main commercial fishing gear/vessel types (MPI, 2013a)

Within cells in the table:

- R = regulated;
- SM = required via a self-managed regime (non-regulatory, but required by industry organisation and audited independently by Government);
- V = voluntary with at least some use known;
- Cells blacked out indicate that the measure is not relevant in a particular fishery;
- A year in ( ) indicates the year of implementation;
- Measures annotated with * are part of a vessel-specific seabird risk management plan; and
- Large vessels are those 28m and greater in length.

On trawl vessels, seabird scaring devices such as paired streamer (tori) lines, bird bafflers and warp deflector have been required on vessels >28 m in length since 2006. These measures are designed to achieve or maintain a favourable conservation status for albatrosses and petrels, as required by ACAP. Non-regulatory measures include vessel-specific Vessel Management Plans, which describe how fishery waste will be managed to reduce the risk of seabird captures. Offal management plans, vessel specific seabird risk management plans and codes of practice are also implemented via a self-management regime on trawl vessels >28m. The NPOA defines a vessel-specific seabird risk management plan as "*a plan which specifies seabird mitigation devices to be used, operational management requirements to minimise the attraction of seabirds to vessels, and incident response requirements and other techniques or processes in place to minimise risk to seabirds from fishing operations*."

Table 2: Mitigation measures in place for New Zealand's fisheries under the National Plan of Action for Seabirds.(MPI, 2013a)

Mitigation Measure	Surface longline		Bottom longline			Trawl		Set net	Notes
	Large-vessel	Small-vessel	Vessels >20m	Vessels 7-20m	Vessels <7m	Large-vessel	Small-vessel		
Net sonde cable prohibition						R (1992)	R (1992)		Net sonde cables are also referred to as third wires
Seabird scaring device	R (Streamer line)	R (Streamer line)	R (Streamer line)	R (Streamer line)		R (2006)	V		On trawlers this is a recognised device which is designed to prevent warp captures and collisions
Additional seabird scaring device			V (second streamer line, gas cannon)			SM (2008)*	V		
Night setting	R (or line weighting)	R (or line weighting)	R (or line weighting)	R (or line weighting)	R (or line weighting)				Longline fleets must use night setting if not line weighting, or vice-versa.
Line weighting	R (or night setting)	R (or night setting)	R (or night setting)	R (or night setting)	R (or night setting)				
Dyed bait	V	V							
Offal management	V	V	R	R	R	SM (2008)*			
Vessel-specific seabird risk management plans						SM (2008)	V		Some vessel-specific seabird risk management plans have been developed for vessels < 28m
Code of Practice	V	V	V			SM (Vessel-specific seabird risk management plans)			

For larger trawl vessels (>28m), the measures outlined in the NPOA-Seabirds together with observer coverage and periodic risk assessments form a strategy to ensure the UoAs do not hinder recovery of ETP species. For smaller trawl vessels (<28m), fewer measures to mitigate seabirds are required and observer coverage has historically been lower. Nevertheless, risk assessments are updated periodically and there is evidence that new measures have been progressively introduced over time where required. No captures of black petrel were observed in the middle depth trawl fisheries between 2002-03 and 2014-15 (Abraham and Thompson, 2015), other seabird species have median risk ratios <1. Accordingly, the existing strategy appears likely to ensure the trawl UoAs do not hinder recovery of seabird species.

Marine mammals

All vessels managed under the DWG are required to follow specific operating procedures to reduce the risk of marine mammal captures. Procedures described in the Operating Procedures: Marine Mammals, based on data analyses and expert opinion (DWG, 2014). The measures are largely operational including removing 'stickers' (fish stuck in net), shooting and hauling as fast as possible, steaming away from large (>5) congregations of sea lions and designating a crew member to be on watch during setting and hauling. These measures were sufficient to meet at least the SG80 scoring guideline against equivalent indicators in the most recent hoki MSC re-assessment (Ackroyd et al, 2012).

Corals

Cold water corals are fully protected under the Wildlife Act 2010, and Benthic Protection Areas provide areas off limits to bottom trawl fisheries. Interactions between fisheries and ETP species are monitored through the NZ Observer Programme and vessel reporting.

Overall, policy frameworks and their implementation through a series of measures explicitly designed to manage the impact of fisheries on ETP species comprise a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.

(b) Management strategy implementation — LOW RISK

For seabirds, periodic risk assessments (e.g. Richard and Abraham, in prep; in MPI, 2016a) provide an objective basis for confidence that the strategy will work, and modelling suggests progress has been made on reducing risk for key species (e.g. black petrel) since the introduction of the 2013 NPOA-Seabirds. To that end, there is at least some evidence that the strategy is being implemented successfully. Baird et al (2013) provides an objective basis for confidence that the strategy will work for protected corals. For marine mammals, the main interaction is with New Zealand fur seals whose population is growing.

CRITERIA: (iii) Relevant information is collected to support the management of UoA impacts on ETP species, including:

- information for the development of the management strategy;
- information to assess the effectiveness of the
- management strategy; and
- information to determine the outcome status of ETP species.

(a) Information — LOW RISK

Quantitative information is adequate to assess the UoA related mortality across all ETP species groups and to support strategies to minimise impact. Information includes interactions between the fishery and protected species from observer data and VMS tracks (in

relation to coral habitat and BPAs). The MPI protected species bycatch database contains good records and analysis of fisheries interactions by gear, vessel size, and ETP bird, mammal and reptile species across NZ commercial fisheries (MRAG Americas, 2016).

PI SCORE	LOW RISK – SWA3, SWA4

2C: Habitats

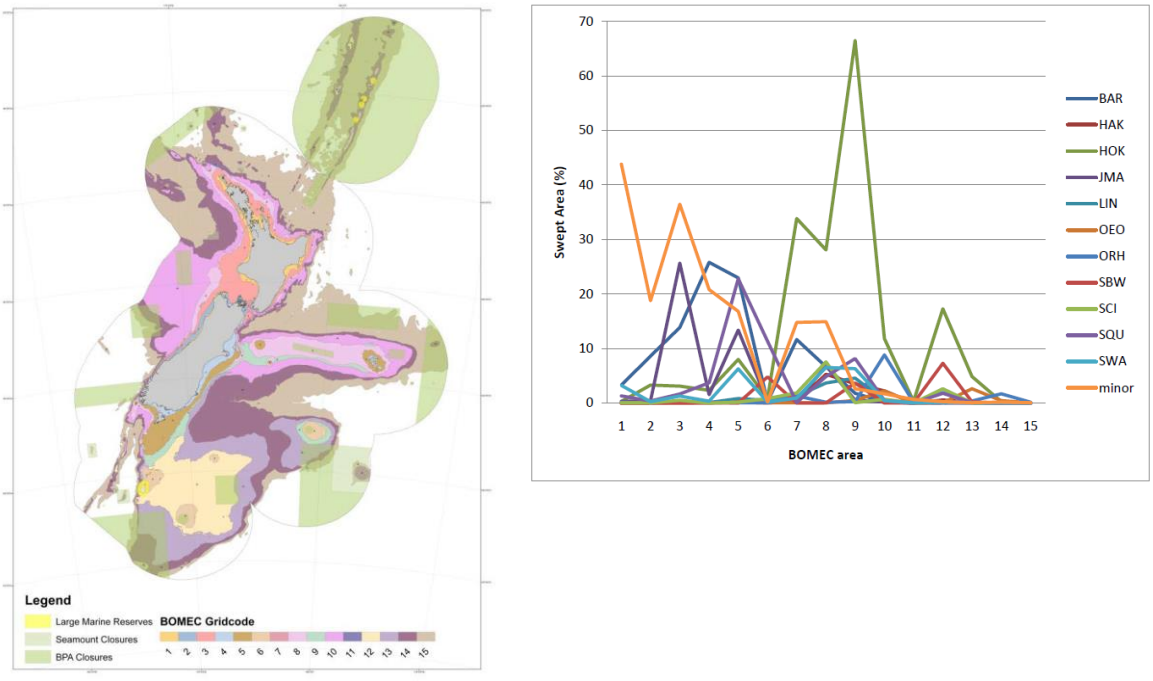
CRITERIA: (i) The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area(s) covered by the governance body(s) responsible for fisheries management

(a) Habitat status — LOW RISK

Examples of "serious or irreversible harm" to habitats include the loss (extinction) of habitat types, depletion of key habitat forming species or associated species to the extent that they meet criteria for high risk of extinction, and significant alteration of habitat cover/mosaic that causes major change in the structure or diversity of the associated species assemblages (MSC, 2014). Further, MSC specifies that if a habitat extends beyond the area fished then the full range of the habitat should be considered when evaluating the effects of the fishery. The 'full range' of a habitat shall include areas that may be spatially disconnected from the area affected by the fishery and may include both pristine areas and areas affected by other fisheries.

It is recognized that when demersal trawl gear touches the bottom, damage is done to the benthic environment and the communities that dwell there. Depending on the type of habitat, type of interaction, its duration and frequency, some areas may receive permanent damage while other areas will be able to recover in relatively short time periods. Damage to some habitats occurs with minimal trawling and will be long lasting due to the nature of the benthic organisms and the depth (e.g. biogenic habitat with vertical relief). Damage will, however, be restricted to areas trawled so that, the extent of any damage will be in proportion to the trawl footprint of the fishery (MRAG Americas, 2016).

Ackroyd and Pilling (2014) report that "currently, the best single tool currently available to evaluate benthic habitat types is the Benthic-Optimised Marine Environment Classification (BOMEC) for New Zealand waters." Black et al (2013) assessed the swept area coverage of silver warehou targeted fisheries against the BOMEC areas. Coverage across all BOMEC class was <10%, with the highest coverage around 7% in classes 8 and 9 (Figure 2). Given upwards of 90% of the area remained untrawled for the 20 year sample period, there is a reasonable basis to conclude it is highly unlikely that habitat structure and function would be reduced to the point of serious or irreversible harm. Accordingly, we have score this SI low risk. We note this is consistent with the scoring of other middle depth trawl fisheries which have undergone full MSC assessment.



(a) *(b)*

Figure 2: (a) New Zealand's EEZ and TS showing the 15 BOMEC classification zones and (b) percentage of BOMEC areas swept by trawls for each of the 11 major species for fishing years 1989/90 to 2009/10. (From Black et al, 2013)

CRITERIA: (ii) There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.

(a) Management strategy in place — LOW RISK

There are a number of key elements of the approach to managing fisheries impacts on habitat under a range of different legislative tools. These include:

- The closing of about one third of the New Zealand EEZ to bottom fishing though the designation of Benthic Protection areas (BPAs);
- The designation or Marine Protected Areas (MPAs);
- The designation of Marine Reserves;
- Monitoring vessel position;
- Research and analysis of footprints and impacts.

In the New Zealand Territorial Sea (TS) and EEZ there are substantial areas closed to bottom fishing, including marine reserves, marine protected areas (MPAs) and large Benthic Protected Areas (BPAs) and all contribute to protecting the environment generally and from the impact of trawling. These areas are largely based on the analysis of physical and some biological attributes and in total exclude bottom trawling from around 30% of the New Zealand EEZ to minimize benthic impact, safeguard habitats and protect representative marine benthic ecosystems and biodiversity in accordance with s 8(1) of the Fisheries Act 1996 which focuses on avoidance, mitigation or remedy of "*any adverse effects of fishing on the aquatic environment*." Marine reserves are closed to all fishing and BPAs are open only to trawling that does not contact the seabed (any trawling fewer than 100 meters directly above the seabed is prohibited, and trawling above this level has substantial verification requirements including Electronic Net Monitoring Systems). Penalties for violating bottom trawl bans in BPAs include fines of up to NZD 100,000 and criminal charges. To qualify as Marine Protected Areas (MPAs), sites must be under a level of protection that allows their habitats and ecosystems to remain at (or recover to) a healthy state.

The network of MPAs and BPAs, the representativeness of habitat they encompass, and the restrictions on bottom trawling they include within the BNS trawl fishery areas and the bioregion as a whole comprise at least a partial strategy that is expected to achieve the outcome stated in Criteria 2C(i).

(b) Management strategy implementation **LOW RISK**

An objective basis for confidence that the partial strategy will work/is working includes evidence that the restrictions on bottom fishing in MPAs and BPAs are effectively enforced. SWA fishing in the UoA areas and elsewhere within the NZ EEZ is fully monitored through VMS (and observer coverage) and there have reportedly been no violations since the implementation of closed areas to bottom trawling by vessels targeting deepwater species (MRAG Americas, 2016). In addition, relevant habitats including coral composition and density is well mapped, studied and regularly monitored such that the objectives of the Fisheries Act 1996 which focuses on avoidance, mitigation or remedy of "any adverse effects of fishing on the aquatic environment" can be achieved. In addition, there is some evidence to suggest that the SWA targeted trawl footprint is likely to cover a relatively small proportion of each BOMEC area (Black et al, 2013).

CRITERIA: (iii) Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat.

(a) Information quality **LOW RISK**

Ackroyd and Pilling (2014) note for the ling trawl fishery "*habitat mapping data, combined with the results of specimen collections from known trawl locations by fisheries observers, allow the nature, distribution and vulnerability of main habitat types to be known in the fishery, at a level of detail relevant to the scale and intensity of the fishery. Beyond areas of fishing activity, the degree of habitat knowledge at sub-regional scales is patchier. In turn, the footprint of the fishery is well established through VMS records and the TCEPR data, and has been used within risk assessments for key benthic species.*"

There is good information on the distribution of protected coral species that have been used to model observed and predicted coral distributions across fished and unfished areas (e.g. Baird et al., 2013). Particularly vulnerable habitat types such as seamounts and hydrothermal vents are well mapped and monitored.

(b) Information and monitoring adequacy **LOW RISK**

Information on trawl footprint within the UoA are available to allow the nature of the impacts of the fishery on broad habitat types to be identified (e.g. Black et al, 2013; Black and Tilney, 2017). While the physical impacts of the gear on habitat types have not been fully quantified, there is on-going collection of relevant data from observer, vessel monitoring and research programs providing robust information on trawl footprint and the impact of trawling on slope and UTF habitats for the fisheries. Through the implementation of MPI's benthic impacts/habitats strategy, habitat distributions are monitored on a regular basis with specific studies designed to measure the impacts of fishing and identify new areas potentially in need of protecting based on a fixed set of criteria.

PI SCORE	LOW RISK – SWA3, SWA4

2D: Ecosystems

CRITERIA: (i) The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function.

(i)(a) Ecosystem Status **LOW RISK**

Serious or irreversible harm in the ecosystem context should be interpreted in relation to the capacity of the ecosystem to deliver ecosystem services (MSC, 2014). Examples include trophic cascades, severely truncated size composition of the ecological community, gross changes in species diversity of the ecological community, or changes in genetic diversity of species caused by selective fishing.

Although knowledge of the ecosystem impacts of fishing remains incomplete, the weight of evidence suggests that the SWA fishery is highly unlikely to result in serious or irreversible harm to key elements of the ecosystem. A number of middle depth and deepwater

species (e.g. hoki, orange roughy, ling) taken in similar areas to SWA have undergone full MSC assessment and received 80 scores or above against the equivalent indicator. Many of these species are likely to occupy similar trophic positions as SWA, and are harvested in substantially larger quantities (e.g. hoki). Moreover, general research on potential trophic effects from fisheries in areas where SWA is harvested do not point to serious or irreversible changes in the ecosystem. For example, the mean trophic index (MTI) of the Chatham Rise demersal fish community showed no long-term change between 1992 and 2014[2]. In this area, changes in MTI are driven by biomass of hoki rather than species such as SWA. Monitoring of mesopelagic biomass on the Chatham Rise has suggested no significant change between 2001 and 2010 (O'Driscoll et al., 2011). Given SWA are fished at lower levels of intensity and catch, over a smaller area than other fisheries which have received 80 scores in full MSC assessments (e.g. hoki, ORH), it is reasonable to conclude that SWA fisheries are also highly unlikely to result in serious or irreversible harm to the key elements underlying ecosystem structure.

CRITERIA: (ii) There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.

(a) Management Strategy in place **LOW RISK**

The New Zealand Fisheries Act 1996 s 8 provides for "the utilisation of fisheries resources while ensuring sustainability." Ecosystem-based management is achieved through a multi-layered approach that considers fishery management (e.g., QMS), vulnerable species needs (e.g., National Plan of Action (NPOA) sharks), ETP management (a host of protected species and related initiatives such as NPOA seabirds, the protection of marine mammals), and habitat considerations (e.g. BPAs).

Legislated protection of areas of seabottom to fishing activities, coupled with good quality monitoring of all fisheries removals that might impact on trophic structure and function and management of fishery removals (e.g. through TACCs) represent a partial strategy to restrain impacts from causing serious and irreversible harm to the ecosystem.

(b) Management Strategy implementation **LOW RISK**

Strategic and operational measures that are in place are considered likely to work, based on information about the fishery and ecosystem components involved (e.g. target and retained species, some ETP species, habitat). For example, target species stocks have been actively managed, fish species brought under the QMS structure, and seabird bycatch mitigation measures introduced, to address sustainability concerns specifically, while BPAs have been put in place to protect benthic ecosystems. Detailed monitoring of many aspects of the fishery (e.g. catches of target, retained species, and bycatch (including coral bycatch) allows for review of performance and identification of ongoing and new issues. Independent monitoring indicating an absence of change in MTI in key fishing areas (e.g. Chatham Rise[3]) provides some evidence that the partial strategy is being implemented successfully.

CRITERIA: (iii) There is adequate knowledge of the impacts of the UoA on the ecosystem.

(a) Information quality **LOW RISK**

The main impacts of the fishery on the ecosystem elements can be inferred from the stock assessments, QMS catch trends, and observer data that cover the target species, related species, and most levels of the ecosystem. The lack of significant levels of retained and discarded by-catch, limited ETP interactions and potentially limited benthic impacts (based on the trawl foot-prints) indicate a limited ecosystem impact. The information is sufficient to broadly understand the key elements of the ecosystem and to detect increased risk to them. Monitoring of MTI in key fishing areas through research trawl surveys provides information on changes in fish community structure.

(b) Investigations of UoA impacts **LOW RISK**

The main impacts of the fishery on the ecosystem elements such as structure and function can be inferred from the stock assessments, QMS catch trends, observer data, and surveys that cover the target species, related species, as well as specific research related to trawl impacts on habitat structure and function. Some of these impacts have been investigated in detail (e.g. Black et al, 2013; Baird et al, 2013; Pinkerton, 2015), and there is ongoing research and data collection aimed at continuing to inform management with the aim of fulfilling the ecosystem objectives stated in the Fisheries Act.

PI SCORE	LOW RISK – SWA3, SWA4

COMPONENT 3: Effective management

3A: Governance and Policy

CRITERIA: (i) The management system exists within an appropriate and effective legal and/or customary framework which ensures that it:

- Is capable of delivering sustainability in the UoA(s)
- Observes the legal rights

[2] http://www.stats.govt.nz/browse_for_stats/environment/environmental-reporting-series/environmental-indicators/Home/Marine/marine-trophic-index-chatham-rise.aspx (methodology in Pinkerton et al, 2015)

[3] http://www.stats.govt.nz/browse_for_stats/environment/environmental-reporting-series/environmental-indicators/Home/Marine/marine-trophic-index-chatham-rise.aspx

- Created explicitly or established by custom of people dependent on fishing for food or livelihood; and
- Incorporates an appropriate dispute resolution framework.

(a) Compatibility of laws or standards with effective management **LOW RISK**

At the national level, the 1996 Fisheries Act and subsequent amendments provide a binding legal framework for delivering the objectives of Components 1 and 2. The law identifies and sets requirements for cooperation among the parties involved in fishing activities.

(b) Respect for Rights **LOW RISK**

Ackroyd et al (2017) report that "*MPI is responsible for the administration of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992, which implements the 1992 Fisheries Deed of Settlement under which historical Treaty of Waitangi claims relating to commercial fisheries have been fully and finally settled. The Ministry is also responsible for the Maori Fisheries Act 2004, which provides that the Crown allocates 20% of quota for any new quota management stocks brought into the QMS to the Treaty of Waitangi Fisheries commission. For non-commercial fisheries, the Kaimoana Customary Fishing Regulations 1998 and the Fisheries (South Island Customary Fishing) Regulations 1998 strengthen some of the rights of Tangata Whenua to manage their fisheries.*

These regulations let iwi and hapü manage their non-commercial fishing in a way that best fits their local practices, without having a major effect on the fishing rights of others.

The management system therefore has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2."

CRITERIA: (ii) The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties.

(a) Roles and Responsibilities **LOW RISK**

The Minister responsible for the Fisheries Act, the Ministry of Primary Industries (responsible for effective fishery management), the Department of Conservation (responsible for conservation issues such as ETP species and MPAs) are the main government entities involved in the management process. Each has clearly and explicitly defined roles. Stakeholders and independent experts are involved in the fisheries working group process which provides advice to MPI and the Minister.

(b) Consultation Process **LOW RISK**

The Fishery Act requires consultations among stakeholders with an 'interest' in the decision to be made, and the Stakeholder Consultation Process Standard provides guidelines for implementing the consultations. The consultation regularly seeks and accepts information, explains the use and results, and provides opportunity and encouragement for engagement. The Minister of Fisheries is required to consult with those classes of persons having an interest (including, but not limited to, Maori, environmental, commercial and recreational interests) in the stock or the effects of fishing on the aquatic environment in the area concerned.

In practice, MPI has a number of forums that provide for interested party participation in the assessment and management of the fishery. All stakeholders are actively encouraged to participate in the meetings or to provide submissions. These forums include specific working groups on management and research issues. Commercial, customary, and environmental fishery interests participate in each of these processes. In addition, interested groups representing environmental and wildlife interests, along with local community interests, are given opportunities to participate in these discussions or provide submissions.

CRITERIA: (iii) The management policy has clear long-term objectives to guide decision making that are consistent with the outcomes expressed by Components 1 and 2, and incorporates the precautionary approach.

(a) Objectives **LOW RISK**

Long-term objectives to guide decision making are set out in the Fisheries Act, in Fisheries 2030 and other supporting documents (e.g. the Harvest Strategy Standard). These documents provide clear long-term objectives to guide decision-making, consistent with Components 1 and 2. The Fisheries Act (s10) also requires the application of a precautionary approach to decision making: "*All persons exercising or performing functions, duties, or powers under this Act, in relation to the utilisation of fisheries resources or ensuring sustainability, shall take into account the following information principles:*

a) Decisions should be based on the best available information;
b) Decision makers should consider any uncertainty in the information available in any case;
c) Decision makers should be cautious when information is uncertain, unreliable, or inadequate; and
d) *The absence of, or any uncertainty in, any information should not be used as a reason for postponing or failing to take any measure to achieve the purpose of this Act."*

Accordingly, clear long-term objectives to guide decision-making, consistent with Components 1 and 2 and the precautionary approach, and are explicit within and required by management policy.

PI SCORE	**LOW RISK – SWA3, SWA4**

3B: Fishery Specific Management System

CRITERIA: (i) The fishery specific management system has clear, specific objectives designed to achieve the outcomes expressed by Components 1 and 2.

(a) Objectives **LOW RISK**

The management system has explicit short- and long-term objectives which are set out in long-term plans e.g., Fisheries 2030, National Fisheries Plan and Annual Operational Plans. Objectives are subject to an annual review report and are explicit within the fishery's management system.

CRITERIA: (ii) The fishery specific management system includes effective decision making processes that result in measures and strategies to achieve the objectives and has an appropriate approach to actual disputes in the fishery.

(a) Decision making **LOW RISK**

Domestically, sections 10, 11, and 12 of the Fisheries Act establish the requirements for the decision-making process, and Section 10 further requires the use of best available information for all decisions. This results in measures and strategies to achieve the fishery-specific objectives. The Fisheries Act requirement for best available information leads to scientific evaluation in advance of decisions. The Fisheries Act further requires consultation with such persons or organisations as the Minister considers are representative of those classes of persons having an interest in the stock or the effects of fishing on the aquatic environment in the area concerned including Maori, environmental, commercial, and recreational interests.

The MPI ensures that the Minister is provided with analysed alternatives for consideration before making any decisions (information is both from within and outside the Ministry [stakeholders, science]). The feedback process is formalised, involving planning, consultation, project development, and scientific enquiry. The Initial Position Paper/Final Advice Paper process highlights the extent of consultation, engagement and transparency of the decision making process. Thus, decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.

(b) Use of the Precautionary approach **LOW RISK**

The precautionary approach must be followed by MPI. Section 10 of the Fisheries Act Information principles states: "*All persons exercising or performing functions, duties, or powers under this Act, in relation to the utilisation of fisheries resources or ensuring sustainability, shall take into account the following information principles:*

a) Decisions should be based on the best available information:
b) Decision makers should consider any uncertainty in the information available in any case:
c) Decision makers should be cautious when information is uncertain, unreliable, or inadequate:
d) *The absence of, or any uncertainty in, any information should not be used as a reason for postponing or failing to take any measure to achieve the purpose of this Act*."

(c) Accountability and Transparency **LOW RISK**

Information on the fishery's performance is produced through the MPI Fisheries Assessment Plenary process and is available on the MPI website. Scientific and other research reports commissioned by MPI are also available on the Ministry website. Information on proposed management changes are published through Initial Position Paper which allow for stakeholders to comment. MPI's Final Advice Paper to the Minister is also publicly available together with a summary of submissions and alternative policy options. Feedback on any actions or lack of action is provided to stakeholders through a variety of forums, as well as directly through published decision letters of the Minister (e.g. Guy, 2016).

Disclosure of information can be requested from the Ministry, under the Official Information Act. Information is released except when it is decreed by the Minister to be commercially sensitive or breaches confidentiality between the parties.

CRITERIA: (iii) Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.

(a) MCS Implementation **LOW RISK**

MPI operates a comprehensive monitoring control and surveillance system including:

- fishing permit requirements;
- fishing permit and fishing vessel registers;
- vessel and gear marking requirements;
- fishing gear and method restrictions;
- vessel inspections;
- control of landings (e.g. requirement to land only to licensed fish receivers);
- auditing of licensed fish receivers;
- monitored unloads of fish;
- information management and intelligence analysis;
- analysis of catch and effort reporting and comparison with landing and trade data to confirm accuracy;
- boarding and inspection by fishery officers at sea; and
- aerial and surface surveillance.

In addition, MPI has a fishery outreach programme of informed and assisted compliance, in which enforcement agents work with the industry in a proactive way to ensure understanding of regulations and to prevent infractions (Ackroyd and McLoughlin, 2017). In combination with at-sea and air surveillance supported by the New Zealand joint forces, vessel activity can be monitored and verified to ensure compliance with regulations and with industry-agreed codes of practice.

There is evidence that the MPI MCS system has demonstrated an ability to enforce relevant management measures. For example, Heron (2016) reports that MPI undertakes about 300 fishing related prosecutions per year with (ordinarily) over 80% or more resulting in convictions.

(b) Sanctions and Compliance **LOW RISK**

For offences against the Fisheries Act 1996 or any of the Fisheries Regulations, the offender has to satisfy a reverse onus and establish that the offence was outside their control, that they took reasonable precautions and exercised due diligence to avoid the contravention, and, where applicable, they returned fish that was unlawfully taken and complied with all recording and reporting requirements. A wide range of sanctions from fines ($250 to 500,000) and imprisonment, forfeiture of catch and potential forfeiture of vessel, to prohibition from participating in fishing in the future constitute an effective deterrent to offenses and lead to industry compliance.

To meet the low risk SG against this SI, sanctions to deal with non-compliance must exist and some evidence must exist that fishers comply with the management system under assessment including, where required, providing information of importance to the effective management of the fishery. In the first instance, it is clear that sanctions to deal with non-compliance exist for a range of offences, and these sanctions are regularly applied by MPI (for example, Heron [2016] notes that MPI undertakes about 300 fishing related prosecutions per year with [ordinarily] over 80% or more resulting in convictions). Evidence also exists from compliance monitoring of deepwater fisheries that fishers comply with the management system. In the 2013/4 management year, MPI (2015) reports 70 compliance inspections were completed covering 24 vessels. Very high rates of compliance were evident across both fishing authorisation and gear requirements, as well as catch and effort reporting (Table 3).

Table 3: Summary of 2013/14 performance against pre-fishing preparation and fishing documentation regulatory requirements (from MPI, 2015)

Inspection detail	# of inspections	# of breaches	Compliance rate
Certificate of registry	43	1*	95%
Fishing gear	25	0	100%
Fishing permit	52	0	100%
SLED	16	0	100%

Inspection detail	# of inspections	# of breaches	Compliance rate
Effort returns	27	0	100%
Landing documents	11	0	100%
Landing return book	23	1	94%

In addition, MPI (2016b) reports that towards the end of the 2013 calendar year, MPI introduced 'interim observer trip reports'. Under these reports, observers rate the performance of vessels against 15 questions with a rating of A, B, C or N/A. It is considered that ratings of A and B are acceptable performance. Overall, 160 interim trip reports relating to observed trips on deepwater vessels were completed in the 2014/15 year. The majority of factors were rated A (81%) or B (7%), however over the year, six C ratings were given by observers (less than 1%). Observer coverage in the squid trawl fisheries has been >85% in recent years.

Accordingly, evidence is available for deepwater fisheries that sanctions to deal with non-compliance exist, and are applied if necessary, and that fishers comply with the management system, including providing information of importance to the effective management of the fishery.

Nevertheless, we note there has been considerable debate in recent years about the adequacy of the MPI compliance system, and in particular its response to alleged dumping of QMS species (e.g. Simmons et al, 2016; Heron, 2016). Email correspondence quoted by Heron (2016) suggests there has been a view internally amongst MPI that discarding has been a more general problem in some sectors.

(c) Systematic non-compliance **LOW RISK**

The results of compliance inspections in Table 3 together with observer reports (MPI, 2016b) appear to indicate no systematic non-compliance.

CRITERIA: (iv) There is a system for monitoring and evaluating the performance of the fishery specific management system against its objectives.
There is effective and timely review of the fishery specific management system.

(a) Evaluation coverage **LOW RISK**

The development and implementation of the Fisheries Plan framework – National Deepwater Plan, fishery specific chapters, Annual Operational Plan and Annual Review Report – ensures there is a structured process to ensure the performance of the fishery specific management system against its objectives. There is full stakeholder engagement on the development of all components of the Fisheries Plan framework and all documents are publicly available. The Ministry implements a comprehensive peer-review process for all science research that is used to inform fisheries management decisions.

(b) Internal and/or external review **LOW RISK**

The fishery management system has internal and external review through the Fisheries 2030, Statements of Intention, the National Deepwater Plan, the Annual Operational Plan and Annual Review Report.

PI SCORE	LOW RISK

References

Abraham E. R., Thompson F. N. (2015). Protected species bycatch in New Zealand fisheries (https://psc.dragonfly.co.nz/2016v1/). (data retrieved June 2017)

Ackroyd, J. and McLoughlin, K. (2017). MSC Sustainable Fisheries Certification. New Zealand Albacore Tuna Troll Public Certification Report. 177pp.

Ackroyd, J. and Pilling, G. (2014). New Zealand Ling Trawl and Longline Fishery. Public Certification Report. v5. 240pp.

Ackroyd, J., Pierre, J. and Punt, A. (2012). NZ Hoki Fisheries: 2nd Reassessment Public Certification Report V5. 297pp.

Baird, S.J., Tracey, D., Mormede, S. and Clark, M. (2013). The distribution of protected corals in New Zealand waters. NIWA client report for DOC, No: WLG2012-43. 95p.

Bentley, N.; Langley, A.D.; Middleton, D.A.J.; Lallemand, P. (2013) Fisheries of New Zealand, 1989/90-2011/12. Retrieved from http://fonz.tridentsystems.co.nz

Black, J; Wood, R; Berthelsen, T; Tilney, R (2013) Monitoring New Zealand's trawl footprint for deepwater fisheries: 1989–1990 to 2009–2010. New Zealand Aquatic Environment and Biodiversity Report No. 110. 57 p.

Black, J., O'Brien, G., Tilney, R. (2015). Orange Roughy and Oreodory Trawl Footprints Analysis of Slope Habitat and Summary Analysis of UTF Habitat (Part 1), GNS Science Consultancy Report 2015/58. 22 p.

Black, J; Tilney, R (2017) Monitoring New Zealand's trawl footprint for deepwater fisheries: 1989–90 to 2011–2012 and 2012–13. New Zealand Aquatic Environment and Biodiversity Report No. 176.

Deepwater Group (DWG) (2014). Marine Mammals Operational Procedures 01 October 2014.

Deepwater Group (DWG) (2016). Fishery Improvement Plan New Zealand EEZ Arrow Squid Trawl Fishery (SQU1T) Version 2: July 2016.

Guy, N. (2016). Sustainability measures and other management controls for 1 October 2016.

Heron, M. (2016). Independent Review of MPI/MFish Prosecution Decisions Operations Achilles, Hippocamp and Overdue. 35pp.

McGregor, V. (2016). Fishery characterisation and standardised CPUE analyses for silver warehou (*Seriolella punctata*) in SWA 1, 3, and 4, 1997–98 to 2010–11. New Zealand Fisheries Assessment Report 2016/07

MFish (2008). Harvest Strategy Standard for New Zealand Fisheries. 25pp.

MFish. (2011) Operational Guidelines for New Zealand's Harvest Strategy Standard. Revision 1. 78pp.

MPI (2013a) National Plan of Action – 2013 to reduce the incidental catch of seabirds in New Zealand Fisheries. 59pp.

MPI (2013b) National Plan of Action for the Conservation and Management of Sharks - 2013. 32pp.

MPI (2015). Annual Review Report for Deepwater Fisheries for 2013/14 (Technical Paper No. 2015/07). Retrieved from http://www.mpi.govt.nz/document-vault/7248

MPI (2016a) Aquatic Environment and Biodiversity Annual Review 2016. Compiled by the Fisheries Management Science Team, Ministry for Primary Industries, Wellington, New Zealand. 790 pp.

MPI (2016b). Annual Review Report for Deepwater Fisheries for 2014/15 MPI Technical Paper No: 2016/09. 102pp.

MPI (2017). Fisheries Assessment Plenary May 2017: Stock Assessments and Stock Status.

MRAG Americas (2016). Full Assessment New Zealand Orange Roughy Fisheries. Final Report and Determination May 2016. Volume 1: Report; Scoring; Peer Review.

O'Driscoll, R.L.; Hurst, R.J.; Dunn, M.R.; Gauthier, S.; Ballara, S.L. (2011). Trends in relative mesopelagic biomass using time series of acoustic backscatter data from trawl surveys. New Zealand Aquatic Environment and Biodiversity Report No. 76.

Pierre, J. (2015). Antarctic Butterfish (Bluenose) (*Hyperoglyphe antarctica*) Seafood Watch Report. 91pp.

Pierre, J., Thompson, F. and Cleal, J. (2014). Seabird interactions with the deepwater bottom-longline fleet, 33 pages. MIT2013-03 – Characterisation of smaller vessel deepwater bottom-longline operations in relation to risk factors for seabird capture.

Pinkerton, M, Anderson, O, Bury, S, Brown, J, Nodder, S, and Forman, J (2015). *Marine trophic index: Based on research trawl surveys of the Chatham Rise, 1992–2014*. Prepared for the Ministry for the Environment. Wellington: NIWA.

Richard Y., and Abraham, E.R. (2013). Risk of commercial fisheries to New Zealand seabird populations. New Zealand Aquatic Environment and Biodiversity Report No. 109. 58p.

Richard, Y.; Abraham, E.R. (2015). Assessment of the risk of commercial fisheries to New Zealand seabirds, 2006–07 to 2012–13. New Zealand Aquatic Environment and Biodiversity Report 162. 85 p.

Rowe (2013). Level 1 risk assessment for incidental seabird mortality associated with fisheries in New Zealand's Exclusive Economic Zone. DOC Marine Conservation Services Series 10. Department of Conservation, Wellington. 58 p.

Simmons, G., Bremner, G., Whittaker, H., Clarke, P., Teh, L., Zylich, K., Zeller, D., Pauly, D., Stringer, C., Torkington, B. and Haworth, N. (2016) Reconstruction of marine fisheries catches for New Zealand (1950-2010). Uni. of British Columbia. Institute for the Oceans and Fisheries. Working Paper #2015 – 87. 63pp. (http://www.seaaroundus.org/doc/PageContent/OtherWPContent/Simmons+et+al+2016+-+NZ+Catch+Reconstruction+-+May+11.pdf)

Stevens, D.W.; Hurst, R.J.; Bagley, N.W. 2011. Feeding habits of New Zealand fishes: a literature review and summary of research trawl database records 1960 to 2000. New Zealand Aquatic Environment and Biodiversity Report No. 85. 218 p.

Williams, A; Schlacher TA; Rowden AA; Althaus F; Clark MR; Bowden DA; Stewart R; Bax NJ; Consalvey M; Kloser RJ (2010). Seamount megabenthic assemblages fail to recover from trawling impacts. Marine Ecology 31 (Suppl. 1): 183–199.