Fishery Improvement Plan
SSO4 Oreo Trawl Fishery

Version 3: December 2017

Version 2: July 2016

Version 1: August 2015

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Overview

Deepwater Group (DWG) and the Ministry for Primary Industries (MPI) are committed to the ongoing sustainable management of New Zealand's deepwater fisheries. To this end we have jointly embarked on a Fisheries Certification Programme (FCP) with the objective of achieving independent certification of New Zealand's key deep water fisheries. Our FCP is a four-staged work programme and a summary of this process to date can be seen on our website. As part of this programme, three key oreo fisheries are in formal Fishery Improvement Plans (FIP). These are: SSO4 (smooth oreo), SSO3A (smooth oreo) and BOE3A (black oreo)

DWG has developed this FIP using tools and templates provided by the MSC to establish a public, transparent, inclusive and stepwise approach towards MSC certification. The draft SSO4 FIP was provided to MSC Stakeholders for their consideration in June/July 2015.

The objective of this FIP is to ensure the performance of this fishery meets the MSC Fisheries Standard and subsequently achieves MSC certification. It also serves as a mechanism which enables external observers to track progress and to assess fisheries performance against the MSC Fisheries Standard.

The following sections provide further details on the SSO4 FCP including a Gap Analysis and a Remedial Action Plan.

SSO4 is currently progressing through Phase 2 (FIP) of Stage 2 (Remedial Action Plan) (see Figure 1 and Table 1). This involves implementing remedial management actions and monitoring their progress in accordance with a public, time-bound FIP. This FIP, and periodic updates, will be made available on our website along with all supporting documentation.

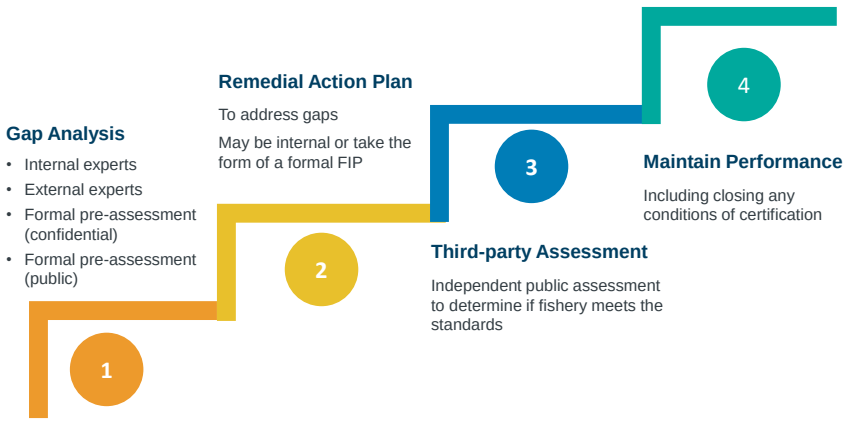

Figure 1. The stages of development guiding Deepwater Group's Fisheries Certification Programme.

Table 1. Timelines and milestones for the SSO4 Fisheries Certification Programme.

Fisheries Certification Stage	Deliverables and Outcomes	Action Lead	Timelines for Milestone	Progress
Gap Analysis 	**Phase 1 – MSC Confidential Pre-assessment:** In September 2009 a Conformity Assessment Body (CAB) undertook a high-level confidential pre-assessment of SSO4 against the MSC Fisheries Standard (v1.3).	DWG & MPI	Sep 2009	Completed 
	Phase 2 – Fishery Gap Analysis: Identification of non-conformities and information gaps.	DWG & MPI	Oct 2014-Sep 2017	Completed 
	Phase 3 – Fishery Evaluations: The progress and performance of the fishery were evaluated by DWG and MPI in 2014 and 2015, using the 'Fishsource' template. Provided the Sustainable Fisheries Partnership (SFP) with current information for evaluation and for SFP to post to their FishSource™ website. Posted relevant documents on the DWG website.	DWG & MPI	Nov 2014-May 2015	Completed 
Remedial Action Plan 	**Phase 1 – Fishery Improvement Analysis:** Investigated reasons why the CAB pre-assessment identified certain Performance Indicators as unlikely to meet the MSC Fisheries Standard. Identified remedial management actions. Consulted with MSC Stakeholders.	DWG & MPI	Apr 2015	Completed 
	Phase 2 – Fishery Improvement Plan: Implemented remedial management actions within an agreed and time-bound plan using the MSC's Monitoring and Benchmarking FIP Template. Posted on DWG's website for public viewing.	DWG & MPI	Apr 2015-Nov 2019	Remedial Actions In Progress 
Third Party Assessment 	**Phase 1 – MSC Assessment:** Formal assessment of the SSO4 fishery against the MSC Fisheries Standard.	CAB, DWG & MPI	Dec 2019	
	Phase 2 – MSC Certification: Achieved certification of the SSO4 fishery against the MSC Fisheries Standard.	DWG & MPI	Dec 2020	

Stage 1 - Gap Analysis

1

The three phases of the Gap Analysis have been completed:

- Phase 1 Confidential Pre-assessment against the MSC Standard
- Phase 2 Fishery Gap Analysis
- Phase 3 Fishery Evaluations.

Phase 3: Fishery Evaluations

In September 2009, Moody Marine Ltd (now Acoura Ltd) undertook a confidential pre-assessment of the SSO4 fishery against the MSC Fisheries Standard.

Subsequent reviews of this pre-assessment were undertaken (2014, 2015, 2016 & 2017) and the fishery was rated for each Performance Indicator (PI) with a detailed rationale provided. The pre-assessment and reviews identified areas of non-conformity to provide an indication of the work required for the fishery to meet the MSC SG60 and SG80 Certification Requirements.

The outcomes of the 2016 and 2017 reviews of the confidential pre-assessment are summarised in Table 2. The results for each PI are categorised as:

- Red = likely to score below 60
- Orange = likely to score between 60 & 79
- Green = likely to score above 80.

Table 2. Revised pre-assessment PI scores as of 2015, 2016 and 2017.

MSC Component	MSC PI	MSC Performance Indicator (PI) Description	Outcomes 2015 & 2016	Outcome 2017
Outcome	1.1.1	**Stock Status:** Stock at a level which maintains high productivity	60-79	60-79
	1.1.2	**Stock Rebuilding:** Where stock depleted, there is evidence of rebuilding	<60	<60
Management	1.2.1	**Harvest Strategy:** Precautionary and robust harvest strategy in place	60-79	≥80
	1.2.2	**Harvest Control Rules & Tools:** Well defined harvest control rules in place	60-79	60-79
	1.2.3	**Information & Monitoring:** Relevant Information collected to support harvest strategy	60-79	≥80
	1.2.4	**Assessment of Stock Status:** Assessment of stock status is adequate	≥80	≥80
	P1 ALL	Sustainability of Exploited Stock	Fail	Fail
Primary Species	2.1.1	**Primary Species Outcome:** Does not cause serious or irreversible harm to primary species	≥80	≥80
	2.1.2	**Primary Species Management:** Strategy in place for managing primary species	≥80	≥80
	2.1.3	**Primary Species Information:** Relevant information to help manage primary species	≥80	≥80
Secondary species	2.2.1	**Secondary Species Outcome:** Does not cause serious or irreversible harm to secondary species	60-79	60-79
	2.2.2	**Secondary Species Management:** Strategy in place for managing secondary species	≥80	≥80
	2.2.3	**Secondary Species Information:** Relevant information to help manage secondary species	≥80	≥80
ETP species	2.3.1	**ETP Species Outcome:** Meets national and international requirements for ETP protection	60-79	60-79
	2.3.2	**ETP Species Management:** Precautionary management strategies in place	≥80	≥80
	2.3.3	**ETP Species Information:** Relevant information to support management of impacts	≥80	60-79
Habitats	2.4.1	**Habitats Outcome:** Does not cause serious or irreversible harm to habitat structure	≥80	≥80
	2.4.2	**Habitats Management:** The strategy is adequate to determine risk to habitat types	≥80	≥80
	2.4.3	**Habitats Information:** Information adequate to determine risk to habitats	≥80	≥80
Ecosystem	2.5.1	**Ecosystem Outcome:** Does not cause serious or irreversible harm to ecosystem	≥80	≥80
	2.5.2	**Ecosystem Management:** Measures are in place to mitigate risk to ecosystem	≥80	≥80
	2.5.3	**Ecosystem Information:** Adequate knowledge of impacts of fishery on the ecosystem	≥80	≥80
	P2 ALL	Maintenance of Ecosystem	Pass	Pass
Governance and Policy	3.1.1	**Legal/Customary Framework:** Management system exists with legal/customary framework	≥80	≥80
	3.1.2	**Consultation, Roles & Responsibilities:** Management system has clear processes	≥80	≥80
	3.1.3	**Long Term Objectives:** Management policy contains clear long-term objectives	≥80	≥80
Fishery specific management system	3.2.1	**Fishery Specific Objectives:** Fishery has clear and specific outcome objectives	≥80	≥80
	3.2.2	**Decision Making Processes:** Management system includes effective decision making	≥80	≥80
	3.2.3	**Compliance & Enforcement:** Monitoring, control and surveillance mechanisms in place	≥80	≥80
	3.2.4	**Management Performance Evaluation:** Performance evaluation processes in place	≥80	75
	P3 ALL	Effective Management System	Pass	Pass
		Total number of PIs equal to or greater than 80	21	21
		Total number of PIs 60-79	6	6
		Total number of PIs less than 60	1	1
		Overall BMT Index	0.86	0.86

Remedial Action Plan

2

There are two phases to the Remedial Action Plan:

- Phase 1 Fishery Improvement Analysis
- Phase 2 Fishery Improvement Plan.

Phase 1 Fishery Improvement Analysis

The performance of SSO4 has been considered against the MSC Fisheries Standard to identify non-conformities and information gaps against the MSC Performance Indicators (SG80 and SG60) (Appendix 1).

Phase 2 Fishery Improvement Plan

This involves developing and implementing remedial management actions and monitoring progress according to a public, time-bound FIP.

Table 3 provides the management actions developed to remedy the identified gaps in Phase 1 of the Remedial Action Plan.

Table 4 gives timelines for each of the remedial management actions.

2017 Progress Update

Refer to Table 5 for an update on progress made to December 2017 towards completing the remedial management actions.

Table 3. Remaining remedial management actions and links to MSC Performance Indicators, December 2017.

	ACTIONS	ACTION LEAD & PARTNERS	Links to MSC Performance Indicators						
			P1 Target stocks					P2 Ecosystem Components	
			1.1.1	1.1.2	1.2.1	1.2.2	1.2.3	2.3.1	2.3.3
1. Stock assessment									
1.2	Validate ageing information and estimation method.	DWG & MPI							
1.4	Acceptance of stock assessment methods.								
1.5	Conduct MSE and review HS and HCR.	DWG & MPI							
1.6	Implement HS and HCR.	DWG & MPI							
2. Habitats and ecosystems									
2.3	Quantitatively determine ETP coral distributions within the fishery, the bioregion, and the EEZ.	DWG & MPI							

Notes: DWG (Deepwater Grup Ltd.) MPI (Ministry for Primary Industries for New Zealand)

Table 4. Timelines for each of the remedial management actions, December 2017.

SSO4		Progress (see key below)											
		2015		2016		2017		2018		2019		2020	
		H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
MSC Principle 1: Stock Status													
1.1	Review survey methodology and undertake biomass survey.												
1.2	Validate ageing information and estimation method.												
1.3	Develop and update stock assessment methodology.												
1.4	Acceptance of stock assessment methods.												
1.5	Conduct MSE and review HS and HCR.												
1.6	Implement HS and HCR.												
1.7	Review the need for, and implement if necessary, a rebuilding plan.												
MSC Principle 2: Ecosystem Management													
2.1	Analyse fish bycatch to identify main/secondary bycatch species.												
2.2	Document the management strategy for bycatch species.												
2.3	Quantitatively determine ETP coral distributions within the fishery, the bioregion, and the EEZ.												
2.4	Assess the nature and extent of impact by the fishery on ETP corals.												
2.5	Document the management strategy for impacts on ETP corals.												

In-progress | Completed | Planned completion date

Table 5. Update on remedial management actions, December 2017.

MSC Principle 1: Stock Status		Progress Update 2017
1.1	Review survey methodology and undertake biomass survey.	**Completed:** A biomass survey was undertaken in October-November 2016 using a revised survey strategy (Doonan & Ladroit, 2017). The biomass estimates, considered by the Deep Water Fisheries Assessment Working Group (DWFAWG) in August 2017, were of a similar magnitude to those of the 2012 acoustic survey. The next survey is scheduled in November 2020.
1.2	Validate ageing information and estimation method.	**Partially completed:** Radiocarbon validation partially supported otolith age estimates. Additional population age frequencies, determined using otoliths from the 1991 trawl survey, 2008-09 observer sampling and 2016 acoustic biomass survey, will be used to improve the estimation of year-class strengths in the 2018 stock assessment. Preliminary ageing results were considered by DWFAWG in August 2017.
1.3	Develop and update stock assessment methodology.	**Completed:** The 2014 stock assessment was ranked as 'High Quality' (MPI, 2017). [http://fs.fish.govt.nz/Doc/24340/53_OEO_4_2017.pdf.ashx]. Stock assessment methodology for SSO4 continues to be refined with a focus on determining a reliable estimate of natural mortality (*M*), which is influential in the model outputs.
1.4	Acceptance of stock assessment methods.	Provisional results of a revised stock assessment were considered by DWFAWG in December 2017. MSE, HS and HCR work will take place in 2018 once this stock assessment has been finalised.
1.5	Conduct MSE and review HS and HCR.	
1.6	Implement HS and HCR.	
1.7	Review the need for, and implement if necessary, a rebuilding plan.	**Actioned:** The SSO4 stock was assessed in 2015 to be at 27% B_0, well below the management target of 40% B_0. In response, the TACC for OEO4 (i.e. for all oreo species in FMA 4), was reduced on 1 October 2015 from 7,000 t to 3,000 t, thereby reducing the annual SSO4 catch from approximately 6,000 t to a limit of 2,000 t, to allow the stock to rebuild towards the management target. A revised stock assessment in December 2017 provided a provisional spawning stock biomass estimate of 39% B_0. This assessment will be finalised in 2018 and forward biomass projections will indicate whether rebuilding is likely to continue to occur at the current catch rate.
MSC Principle 2: Ecosystem Management		**Progress Update 2016**
2.1	Analyse fish bycatch to identify 'main' Primary and/or Secondary species.	**Completed:** An updated review of observer-based estimates of total bycatch in all oreo fisheries revealed that oreo accounted for 96.4% of the catch in 2013-14, the most recent year for which data are available, and that no single bycatch species contributed more than 0.9% of the total catch (Anderson, 2017 http://fs.fish.govt.nz/Page.aspx?pk=113&dk=24284). For deep water sharks, which are considered 'low resilience' species, the bycatch of 4 species and a generic 'shark' component combined, amounted to 1.0% of the total catch. There are therefore no 'main' Primary or Secondary species.
2.2	Document the management strategy for main/minor bycatch species.	**Completed:** Available information from MPI observer coverage, comprehensive logbook reporting of retained and discarded non-QMS catch, and trawl surveys, support the strategy of monitoring non-QMS species and moving them into the QMS if necessary for sustainability or utilisation reasons. Annual analyses of these data are sufficient to detect changes in risk to the bycatch species. Shark protection measures include prohibition of shark finning, release of sharks to maximise survival, improved species identification and monitoring of abundance in catches to determine possible negative effects of fishing.
2.3	Quantitatively determine ETP coral distributions within the fishery, the bioregion and the EEZ.	**Partially completed:** A coral distribution prediction model was developed in 2015 (see: http://deepwatergroup.org/wp-content/uploads/2014/08/NIWA-2015-Assessment-of-orange-roughy-and-oreo-trawl-footprint-in-relation-to-protected-coral-species-distribution.pdf). This will be updated during 2018.

2.4	Assess the nature and extent of impact by the fishery on ETP corals.	**Completed:** The oreo fisheries cumulative trawl footprint within the EEZ and bioregion is updated annually. A pilot, level 2 (semi-quantitative) risk assessment of the impact of oreo fishing on ETP coral habitats was undertaken in 2014 (Clark et al., 2014). The Department of Conservation Threat Classification System ranks 2 coral species as 'Nationally Vulnerable' and 5 coral species as 'Declining', but none as 'Threatened' or 'Nationally Endangered' (Freeman et al., 2013).
2.5	Document the management strategy for impacts on ETP corals.	**Completed:** Cold water corals are fully protected under the Wildlife Act 1953, and Seamount Closures and Benthic Protection Areas provide coral habitats that are protected from bottom trawling. Interactions between fisheries and ETP corals are monitored through MPI's Observer Programme and satellite-based Vessel Monitoring System and through reports from vessels using 'Non-fish bycatch' reporting forms. Policy frameworks, implemented 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 corals.

Third-party Assessment

MSC Assessment

DWG's objective is to manage the SSO4 fishery towards achieving SG80 against all Performance Indicators. Stage 3 of the FCP requires the submission of this fishery for full MSC Assessment against the MSC Fisheries Standard by an accredited MSC Conformity Assessment Body.

MSC Certification

DWG will consider submitting the fishery for MSC assessment when there is evidence of sustained stock rebuild towards the target biomass level.

Appendix 1

SSO4 Fishery Improvement Analysis (Actions are referenced to Tables 3 and 4)

PI 1.1.1 – The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
MSC SG80 Certification Requirements	a) It is highly likely that the stock is above the point where recruitment would be impaired b) The stock is at or fluctuating around its target reference point.	
Gap Analysis Findings	The Gap Analysis found that: • The stock is estimated to be below the current management target of 40% B_0 • An updated stock assessment for SSO4 was finalised in July 2014. The assessment estimated SSO4 stock status to be 27% B_0. The assessment indicated that, at the prevailing catch at that time, biomass was likey to continue to decline toward the Soft Limit (20% B_0 – the effective LRP).	
Responses	• Develop and implement a Management Strategy Evaluation to better determine the management targets • Implement a rebuilding plan for SSO4 • Demonstrate through an accepted stock assessment that the stock status is highly likely to be above the point at which recruitment would be impaired.	**Actions 1.4 - 1.7**
PI 1.1.2 – Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe		
MSC SG80 Certification Requirements	a) A rebuilding timeframe is specified for the depleted stock that is the shorter of 20 years or 2 times its generation time. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years. b) There is evidence that the rebuilding strategies are rebuilding stocks or it is highly likely, based on simulation modelling or previous performance, that they will be able to rebuild the stock within the specified timeframe.	
Gap Analysis Findings	The Gap Analysis found that: • The the biomass in 2014 was below the management target and in need rebuilding • The 2014 stock assessment estimated biomass was likey to continue to decline under the catch at that time.	
Responses	• Develop and implement a rebuilding plan for the SSO4 fishery • Test the robustness of the rebuilding plan using the Management Strategy Evaluation based on the stock assessment model.	**Action 1.5 – 1.7**
PI 1.2.1 – There is a robust and precautionary harvest strategy in place		
MSC SG80 Certification Requirements	a) The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points b) The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.	

Gap Analysis Findings	The Gap Analysis found that: • The lack of analyses to demonstrate that the harvest strategy (HS) is "responsive to the state of the stock" or to demonstrate that the HS elements successfully "work together towards achieving management objectives reflected in the target and limit reference points." • The lack of analyses to demonstrate the efficacy of the HS in achieving its objectives	
Responses	• Undertake a Management Strategy Evaluation to develop and test a Management Procedure and harvest control rule to establish that these are responsive to the state of the stock and the stock management processes.	**Actions 1.5 - 1.6**
PI 1.2.2 – There are well defined and effective harvest control rules in place		
MSC SG80 Certification Requirements	(a) Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached (b) The selection of the harvest control rules takes into account the main uncertainties (c) Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.	
Gap Analysis Findings	The Gap Analysis found that: • A generally understood harvest control rule is in place that is consistent with the harvest strategy and which acts to reduce the exploitation rate as limit reference points are approached. • The harvest control rule, as it implemented for New Zealand fish stocks and for oreos in particular, is consistent with the aims of the Harvest Strategy Standard, although it is not fully specified at present. The harvest control rule applied to oreos is less well-specified than that for the MSC Certified orange roughy fisheries. • There is a lack of documentation of the main uncertainties for the SSO4 fishery and the selection of the harvest control rule to address those uncertainties. • There is a lack of evidence indicating that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rule.	
Responses	• Undertake a Management Strategy Evaluation to establish and test Management Procedures and harvest control rule that meet the requirements of PI 1.2.2.	**Actions 1.5 - 1.6**
PI 1.2.3 – Information and Monitoring		
MSC SG80 Certification Requirements	(a) Sufficient relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy (b) Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule (c) There is good information on all other fishery removals from the stock.	
Gap Analysis Findings	The Gap Analysis found that: • The fishery lacks information related to stock structure, including validating ageing information and age estimation methodology.	

Responses	• Formalise stock structure information for SSO4 (including information on natural mortality, growth and ageing) • Validate age estimation method for smooth oreo.	**Action 1.2**

PI 2.3.1 – The UoA meets national and international requirements for protection of ETP species. The UoA does not hinder recovery of ETP species.		
MSC SG80 Certification Requirements	(a) The effects of the UoA on the populations/stocks are known and are highly likely to be within limits of national and international requirements for protection of ETP species (b) Direct effects are highly likely to not hinder recovery of ETP species (c) Indirect effects have been considered and are thought to be highly unlikely to create unacceptable impacts.	
Gap Analysis Findings	The Gap Analysis found that: • There was a lack of robust distributional information of several cold water coral species (that overlap with the fishery) outside fished areas • There was a lack of information describing the level of impacts of fisheries on protected corals, species identification, quantities taken and distribution • There was a lack of any rationale to quantitatively determine if any impacts are such that they pose a risk of serious or irreversible harm to ETP coral species.	
Responses	• Document national (and relevant international) requirements for the protection of corals, demonstrating that direct effects (considering also indirect effects) are highly unlikely to create unacceptable impacts (impacts that hinder recovery or rebuilding) to ETP coral species • Undertake a desktop analysis of the nature and extent of information used in modelling coral density distributions, including (where possible) the distribution of corals within fished areas, outside fished areas, and within protected areas (BPAs and Seamount Closures) • Undertake a desktop analysis of the distribution of coral genera/species in the New Zealand EEZ and within the SSO4 fishery, coral taken within the SSO4 fishery and determine (where possible) which genera/species are affected most by the SSO4 fishery • Undertake a semi-quantitative analysis to demonstrate the nature and extent of the interactions with corals in areas that are fished (taking into account recovery and closed areas). Determine if effects of the fishery are: highly likely to be within limits of national (and international) requirements for protection of ETP coral species; highly unlikely to create unacceptable impacts to ETP coral species; and, consider indirect effects.	**Actions 2.3**