

# **Orkney Creel Fishery for Brown Crab, European Lobster and Velvet Crab**

## **Review of Fishery Improvement Project 2014**

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**DRAFT**

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## Executive Summary

- The Orkney creel fishery for brown crab, European lobster and velvet crab is a valuable component of the islands' economy. The importance of moving the fishery forward on a demonstrably sustainable basis is recognised, driven particularly by market demand for sustainably sourced products and the need to understand the potential interactions of the fishery with the emerging wave and tidal energy industry in Orkney waters.
- A Pre-Assessment of the fishery against the Marine Stewardship Council environmental standard for sustainable fishing in 2012 identified three essential components of a sustainable fishery management system were lacking, namely criteria for sustainable fishing (Biological Reference Points), rules for controlling fishing pressure in response to stock status (Harvest Control Rules), and data on fishing effort that could be used in monitoring and controlling fishery input.
- The Orkney Shellfish Research Project commenced in 2013, aiming to address these lacks, and also to identify how areas delivering value for the fishery might overlap with those earmarked for wave and tidal energy developments. Specifically, the aims of the project are to describe spatial patterns of creel fishing effort in relation to marine renewable energy licensing areas, and to undertake monitoring and research activities in support of sustainable fishery management. A Fishery Improvement Project (FIP) directed at moving the fishery towards meeting the MSC standard is a crucial component of the overall project.
- This document reports on progress in relation to the FIP over the first year of the project, following a review meeting held in February 2014.
- Objective 1 of the FIP relates to monitoring and providing the biological understanding to support the development of a Harvest Strategy and management system for sustainable fishing. Sampling of fishermen's catches onshore and offshore has been at a high level during 2013, with more than 80,000 crustaceans of the three main target species measured. Tagging of brown crabs is aimed at understanding the spatial structure of the stock, particularly in relation to movements of spawning females between inshore and offshore grounds. After a delayed start to the season owing to unusually low water temperatures, a total of more than 5,000 crabs was tagged. Engagement of fishermen with vessel monitoring systems (Succorfish) and logbook monitoring systems was a particularly challenging element of the project, but 20 fishermen agreed to carry Succorfish systems and an index fleet of six vessels providing daily logbook sheets was identified.
- Objective 2 of the FIP relates to assessment of the status of Orkney crustacean stocks in relation to sustainability criteria. Stock assessment of the main target species is due to take place in 2014, using data collected during 2013 and by OSF since 2010. This will allow candidate Biological Reference Points to be identified, providing the first basis for designing Harvest Control Rules for the fishery.
- Objective 3 of the FIP is to satisfy shellfish consumers of Orkney's commitment to sustainable fishing. A Fishermen's Code of Practice is in place, specifying best practice for fishing, handling and storage of shellfish. Stakeholder engagement and publicity for the project during 2013 has been extensive.
- The review group was satisfied with progress against all objectives during 2013. The MSC Benchmarking and Tracking Tool was applied to measure progress in relation to expected scores under Principles 1 to 3 of the MSC standard, finding that the fishery is on target for year 1 of the FIP. It was noted that the establishment of a legal framework for effective and enforceable management controls is key to future progress towards the MSC standard, determining the ability to define and implement Harvest Control Rules.

## 1. Background

Inshore fishing, notably creel fishing for crustaceans, has been a traditional activity in Orkney waters for centuries. Shellfish landings currently support more than 400 jobs in the county and typically contribute around £7 million in first sale value to the economy. Two recent developments have highlighted the need to take these fisheries forward on a demonstrably sustainable basis, safeguarding both the biological integrity of the target stocks and the economic activities they support. Firstly, increased market demand for shellfish coupled with retailers' requirements for sustainably sourced products means that meeting and demonstrating standards for sustainable exploitation is now essential for the future of a secure and competitive local industry. Secondly, marine renewable energy, notably extracting energy from waves and tides, is emerging as an important new user of sea space in Orkney waters and the Pentland Firth, with areas licensed for development potentially overlapping with traditional fishing grounds. It is important both for developers, in progressing consenting activities, and for fishermen, in protecting the source of their livelihoods, to understand the extent and nature of the overlap, and the potential for both impacts and synergies.

In response to these two drivers, the Orkney Shellfish Research Project was initiated, having the twin aims of (i) describing spatial patterns of creel fishing effort in relation to marine renewable energy licensing areas, and (ii) undertaking monitoring and research activities in support of sustainable fishery management. The Crown Estate are the principal supporters of this project, focusing particularly on the funding of a full time research coordinator and the use of Vessel Monitoring System (VMS) technology on board participating vessels to determine the key areas of Orkney and Pentland Firth waters delivering value to the fishery. This aspect of the project has also been supported by Marine Scotland, providing the VMS units for use on board vessels operating out of Orkney and Caithness. Sustainability objectives are being taken forward through a Fishery Improvement Project (FIP), working towards meeting the MSC environmental standard for sustainable fishing (MSC, 2010, 2013). Principal sponsors for this aspect of the project are WWF UK and Marks & Spencer plc. Financial support for the project is also provided by Orkney Islands Council.

The project was the initiative of Orkney Sustainable Fisheries Ltd (OSF), a company set up in 2006 by a board of local fishermen, merchants and processors with the common aim of driving forward initiatives relating to the sustainability of Orkney shellfisheries. In 2012, OSF commissioned the second of two MSC Pre-Assessments of the Orkney creel fishery for brown crab (*Cancer pagurus*), European lobster (*Homarus gammarus*) and velvet crab (*Necora puber*) (Bell & Gascoigne, 2012). The Units of Certification covered the creel fishery for these three species conducted by OSF member vessels. The Pre-Assessment concluded that the fishery appears to be managed on a sustainable base at present, but the lack of a formal Harvest Strategy<sup>1</sup> means that the MSC standard is not met. Three essential shortcomings were identified:

- the lack of Biological Reference Points<sup>2</sup> for the fishery that would define targets and limits for sustainable exploitation;
- an absence of Harvest Control Rules<sup>3</sup> that would allow fishing pressure to be reduced as limits were approached or exceeded;

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<sup>1</sup> Harvest Strategy is defined as the combination of monitoring, stock assessment, harvest control rules and management actions.

<sup>2</sup> Biological Reference Points cover limits for sustainable exploitation, beyond which stock sizes are considered too small, and targets, which represent ideal exploitation levels in terms of biological and fishery productivity.

<sup>3</sup> Harvest Control Rules are a set of pre-agree rules about management actions to be taken in response to assessment of stock status in relation to criteria for sustainable exploitation.

- the lack of data on fishing effort, that would be an essential component of any management system, (a) for monitoring and controlling input by the fishery, and (b) for use in defining limits for sustainable exploitation.

The Orkney Shellfish Research Project commenced in 2013, taken forward with a full-time research coordinator employed by OSF and with scientific support from Heriot-Watt University (at the International Centre for Island Technology (ICIT) in Stromness). An important action during the first year of the project was to set up a Fishery Improvement Project (FIP) under the guidance of WWF (see Work Plan at Appendix 3). The present document provides an evaluation of progress over the first year of the FIP, following a review meeting held in Edinburgh in February 2014 (see Appendices 1 and 2, pp.24 and 25). To assist this evaluation, the MSC Bench Marking and Tracking Tool (BMT) has been used to map progress against expected outcomes in relation to Performance Indicators for the MSC standard (see Section 3, p.13).

## **2. Progress with Year 1 of the Fishery Improvement Project**

A Fishery Improvement Project (FIP) involves an alliance of fisheries organisations, business, government, scientists and NGOs, taking a stepwise approach to promoting sustainable fishery management. The goal of a FIP is that the fishery be advanced towards meeting the MSC environmental standard for sustainable fishing<sup>4</sup>. As set out in the Work Plan (Appendix 3, p.27), the objectives of the FIP for the Orkney Creel Fishery are to provide data and biological understanding to support the development of a harvest strategy and management systems for sustainable fishing, to assess the Orkney crustacean stocks in relation to sustainability criteria, and to demonstrate Orkney's commitment to sustainable fishing to shellfish consumers.

The stakeholders engaged in the Orkney FIP (see Appendix 1, p.24) met in February 2014 with the objectives of reviewing the progress of the FIP in relation to MSC principles and criteria, updating research objectives and to discuss the existing and upcoming challenges for the FIP (see Appendix 2, p.25). This section of the report provides a brief assessment of progress against objectives over the first year of the FIP. Application of the MSC Benchmarking and Tracking Tool (BMT) later in this report (Section 3, p.13) uses a formalised framework to measure this progress against expectations in relation to the MSC principles and criteria. Section 3 sets out the assumptions involved in projecting expected future progress, highlighting a critical bottleneck for progress towards setting up an effective Harvest Strategy, namely the establishment of a legal framework under which enforceable management rules can be defined for implementing Harvest Control Rules.

As noted above, the Pre-Assessment identified three critical issues, namely lack of biological reference points, lack of a pre-agreed Harvest Control Rule to reduce exploitation rate in response to unfavourable stock status, and a lack of data on fishing effort. The FIP is addressing these shortcomings by: collecting VMS and logbook data on fishing effort and catch rates; developing a sound basis for stock assessment, generating candidate Biological Reference Points; and providing data and fishery metrics on which any Harvest Control Rules can be based. The sub-sections below set the FIP actions in the context of the main strengths and weaknesses for the fishery, before reviewing progress against each of the FIP objectives.

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<sup>4</sup> Note that this goal is distinct from actually embarking on the MSC certification process, which is not necessarily implied.

## 2.1 Current strengths and weaknesses in relation to MSC Principles

<b>Principle 1 – stocks</b>		
<b>Strengths</b>	<b>Weaknesses</b>	<b>Relevant FIP Actions</b>
<ul style="list-style-type: none"> <li>• PSA analysis indicates low-medium risk in terms of life-history features</li> <li>• Monitoring data on landings composition</li> <li>• Some monitoring data on discards</li> <li>• Good understanding of total removals</li> <li>• Marine Scotland stock assessment</li> </ul>	<ul style="list-style-type: none"> <li>• No Biological Reference Points to judge stock status</li> <li>• No Harvest Strategy or Harvest Control Rules</li> <li>• Lack of CPUE, LPUE data</li> <li>• Lack of data on fishing effort</li> <li>• Uncertainties about stock assessment – biological parameters, non-equilibrium, stock structure</li> </ul>	<ul style="list-style-type: none"> <li>• Data on fishing effort and LPUE from index fleet</li> <li>• Data on CPUE and discards from observer trips</li> <li>• Data on spatial distribution of fishing effort from Succorfish VMS</li> <li>• Understanding of stock structure from crab tagging</li> <li>• Data on landings composition from biological sampling</li> <li>• Updated stock status from review and development of stock assessment</li> <li>• Updated stock status from review and development of biological parameters</li> <li>• Review and development of harvest strategy and available management controls</li> </ul>

<b>Principle 2 - ecology</b>		
<b>Strengths</b>	<b>Weaknesses</b>	<b>Relevant FIP Actions</b>
<ul style="list-style-type: none"> <li>• Good information on retained crustaceans</li> <li>• MLS, return of berried females and soft crabs, lobster v-notching</li> <li>• Some observer data on bycatch and discards</li> <li>• Bycatch and discard mortality not significant</li> <li>• No ETP species taken</li> <li>• Low risk to benthic habitats</li> <li>• OFS Codes of Practice</li> </ul>	<ul style="list-style-type: none"> <li>• No quantitative information on retained fish</li> <li>• Lack of quantitative information on bycatch</li> <li>• Possible interactions with large cetaceans and breeding seabirds</li> <li>• Lack of information on possible ecosystem effects</li> </ul>	<ul style="list-style-type: none"> <li>• Principle 1 actions, giving Retained Species information, management and outcomes</li> <li>• Data on bycatch from observer trips</li> <li>• Review and development of Codes of Practice</li> <li>• Impact assessment for bycatch species, habitats and ecosystems</li> <li>• Outreach and participation activities relevant to all three principles</li> </ul>

<b>Principle 3 – governance</b>		
<b>Strengths</b>	<b>Weaknesses</b>	<b>Relevant FIP Actions</b>
<ul style="list-style-type: none"> <li>• Consultation process for changes to national management measures</li> <li>• Fishermen’s cooperative handling 85% of landings</li> <li>• High level of local stakeholder involvement</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of defined standards for sustainable fishing under Principles 1 and 2</li> <li>• Lack of explicit short- and long-term fishery objectives</li> <li>• Lack of risk-based</li> </ul>	<ul style="list-style-type: none"> <li>• Principle 1 actions, providing data, metrics and criteria to support development of objectives and decision-making</li> <li>• Review and development of harvest strategy and available management controls</li> </ul>

<ul style="list-style-type: none"> <li>• Economic &amp; social incentives for sustainable fishing through OFS standards</li> <li>• Compliance monitoring and high level of compliance</li> <li>• OSF research, e.g. tagging</li> <li>• OFS month review of fishery performance</li> <li>• OFS Codes of Practice</li> </ul>	<p>management based on data and harvest strategy</p> <ul style="list-style-type: none"> <li>• Need for wider programme of research to support management, monitoring and assessment needs</li> <li>• Need for more formalised system of monitoring and review to support a harvest strategy</li> </ul>	<ul style="list-style-type: none"> <li>• Stock assessment providing fishery metrics and biological reference points</li> </ul>
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## 2.2 FIP Objective 1

*Objective 1* – to provide monitoring data and biological understanding to support the development and implementation of a harvest strategy and management systems for sustainable fishing.

### *Biological Sampling*

<b>Working Group</b>	OSF / The Crown Estate / Marine Scotland / M&S / WWF-UK
<b>Priority</b>	High
<b>Time frame</b>	Ongoing
<b>Main MSC Performance Indicators</b>	1.1.1, 1.1.2, 1.2.3, 1.2.4

Onshore and offshore sampling of fishermen’s catch has run throughout the first year of the project. Offshore sampling is weather dependent and takes place in line with the OSF Health and Safety method statement. The onshore biological sampling is ongoing on a daily basis focusing on fishermen participating in the project and on obtaining a wide geographical coverage of catch. In addition to this the larger offshore vivier crabber catch is sampled every week.

Species	Number sampled in 2012	Number sampled in 2013
Brown Crab	25,876	49,785
European Lobster	2,539	10,791
Velvet Crab	19,967	20,178

Biological sampling involves recording the carapace width (crabs) or length (lobster) of all individuals, their sex, berried status and, for lobsters, the presence of V-notches. Offshore sampling involves measurement and quantification of discards as well as catch retained for landing. Sampling levels are relatively high, for brown crab representing 31 t out of 225 t landed in 2013.

### *Crab tagging*

<b>Working Group</b>	OSF / M&S / WWF-UK
<b>Priority</b>	Medium-High
<b>Time frame</b>	Ongoing
<b>Main MSC Performance Indicators</b>	1.1.1, 1.2.3, 1.2.4

Tagging brown crab is an important part of the project as it is essential to understanding the movement of crabs, particularly spawning females, between the inshore and offshore grounds. Tagging involves attaching a sequence numbered cable tie around the top of the claw in soft crabs, followed by release as near as possible to the capture location. Fishermen recording recaptures provide information on the location to which the crabs have moved.

Tagging crabs is seasonal and the crabs are only in suitable condition once or maybe twice a year. Owing to low ambient sea water temperature in 2013, the crabs were 6-8 weeks later than normal in their moulting season, delaying the start of the tagging season until mid-September. A total of 1,753 crabs was tagged by the research coordinator, which is some way short of the target of 4,000, but participating fishermen have tagged an additional 3,602 crabs during 2013.

*Fishery-specific data*

<b>Working Group</b>	OSF / The Crown Estate / Marine Scotland / M&S / WWF-UK
<b>Priority</b>	High
<b>Time frame</b>	Ongoing
<b>Main MSC Performance Indicators</b>	1.1.1, 1.2.3, 1.2.4, 2.2.3

Participation by fishermen is a key element of this project. It has also been the most challenging to achieve. Orkney part of the project, 20 fishermen have agreed to supply information on their activities through the Succorfish SMS system

An index fleet of six vessels carrying the Succorfish system has been identified and has been providing logbook sheets on their daily catch, fishing effort and by-catch during 2013, and an additional two vessels without Succorfish units have also been providing logbooks. The logbooks were designed to be easy for the fishermen to fill in but at the same time provide good quality information on their fishing activities. The areas covered by the logbooks are Kirkwall, Stromness, Tingwall, Hoy (Longhope), Burray, and Northern Isles of Orkney. An analysis of logbook data is not yet available, but an example return is illustrated below:

Date	Total Pots Lifted	Soak Time	Species	Wt landed (Kg)	number of undersized per creel	By-Catch
01/07/2013	480	1 to 3 days	BC	1080	2	Ling
			EL	10	1 per rope	Cod
			VC	0		Congers
						Rockling
02/07/2013	230	1 to 5 days	BC	540	6	Dog fish (lesser)
			EL	10	1 per rope	Cod
			VC	0		Ling
						Rockling
04/07/2013	600	2 to 3 days	BC	1110	10	Dog fish (lesser)
			EL	10	1 per rope	Cod
			VC	0	0	Ling
						Rockling
						Dab
05/07/2013	520	1 to 2 days	BC	1040	10	Dog fish (lesser)
			EL	12	1 per rope	Cod
			VC			Ling
						Rockling
						Dab
06/07/2013	450	3 to 8 days	BC	280	4	Dog fish (lesser)
			EL	1	1 every 3rd rope	Cod
			VC	30	2	Ling
07/07/2013	80	2 days	BC	2	10	Congers
			EL	0	4 per rope	
			VC	30	5	

*Conclusion*

Progress against Objective 1 tasks is on target according to expectations for Year 1 of the project (see application of MSC Benchmarking and Tracking Tool, p.14). Biological sampling, both onshore and offshore, is in place to allow characterisation of catches, discards and bycatch. Ongoing tagging of brown crabs is providing information on stock structure, particularly in relation to movements of spawning females between inshore and offshore grounds. Fishermen’s logbooks and onboard Succorfish units are providing information on fishing effort and catch rates and their spatial distribution.



## 2.3 FIP Objective 2

*Objective 2* – to assess the status of Orkney crustacean stocks in relation to sustainability criteria.

<b>Working Group</b>	OSF / M&S / WWF-UK
<b>Priority</b>	High
<b>Time frame</b>	Ongoing
<b>Main MSC Performance Indicators</b>	1.1.1, 1.1.2, 1.2.1, 1.2.4

A full stock assessment based on data collected by OSF over four years is due to be undertaken during 2014. Yield and spawner per recruit analyses will be undertaken to identify candidate target reference points. Fishing mortality estimates will be based on analysis of length composition data for landings. The stock assessment will provide the first basis for designing Harvest Control Rules for the fishery, although the definition of an appropriate limit reference point is likely to require a longer time-series of catch rate data.

### *Conclusion*

No progress against Objective 2 tasks was expected during Year 1 of the project (see application of MSC Benchmarking and Tracking Tool, p.14). Fisheries monitoring activities undertaken for Objective 1 will provide the basis for OSF's first formal stock assessment during Year 2 of the project. This will allow candidate biological reference points to be identified against which stock status can be measured, and thus provide a basis for the design of future Harvest Control Rules

## 2.4 FIP Objective 3

*Objective 3* – to satisfy shellfish consumers of Orkney's commitment to sustainable fishing.

### *Code of Practice*

<b>Working Group</b>	OSF / Marine Scotland / M&S / WWF-UK
<b>Priority</b>	High
<b>Time frame</b>	Ongoing
<b>Main MSC Performance indicators</b>	2.1.2, 2.2.2, 3.1.4, 3.2.3

Fishermen have been asked to sign a Code of Practice (attached as Appendix 4, p.34), specifying best practice for fishing, handling and storage of shellfish.

### *Stakeholder Engagement*

<b>Working Group</b>	OSF / The Crown Estate / Marine Scotland / M&S / WWF-UK
<b>Priority</b>	High
<b>Time frame</b>	Ongoing
<b>Main MSC Performance indicators</b>	2.1.2, 2.1.3, 3.1.1, 3.1.4, 3.2.1, 3.2.2, 3.2.3, 3.2.5

OSF has held various meetings to engage with stakeholders who have an interest Orkney's inshore waters. The stakeholders that were asked to attend meetings include local fishermen, newly appointed councillors for 2012, Scottish National Heritage, RSPB and Orkney Fisheries Association

The meetings introduced the work that OSF has carried out over the last four years and highlighted the reasons for the current project. The methods of data collection which will be used as part of the FIP and the data analysis were discussed. The meeting with the local fishermen invited all willing fishermen to

get involved with the sampling process through tagging soft shelled crab, completing logbooks or having a researcher on board for observer trips and sampling activities.

The FIP has been discussed at various Orkney Fishermen's Society board meetings and Orkney Fisheries Association meetings.

The project has received both national and local publicity over a wide range of media. The initial press release was published on 13<sup>th</sup> January 2013. This press release was approved by all parties involved in the project. Links to press release articles:

- <http://www.thecrownstate.co.uk/news-media/news/2013/pentland-firth-and-orkney-fishing-and-renewable-energy-industries-work-together/>
- <http://www.bbc.co.uk/news/uk-scotland-north-east-orkney-shetland-21270461>
- <http://renews.biz/33383/ce-study-to-guide-marine-developers/>
- [http://www.wwf.org.uk/what we do/press centre/?unewsid=6463](http://www.wwf.org.uk/what_we_do/press_centre/?unewsid=6463)
- <http://blogs.wwf.org.uk/blog/business-government/green-economy/how-orkney-brown-crabs-could-lead-us-all-to-clean-green-renewable-energy/>
- <http://producerexchange.marksandspencer.com/news/ms-support-ground-breaking-shellfish-research-project-orkney>
- <http://www.heraldscotland.com/comment/columnists/agenda-orkney-brown-crabs-could-lead-us-all-to-clean-green-marine-energy.21880893>

In addition to the published articles, news about the project has been presented on BBC Radio Scotland Breakfast on 31<sup>st</sup> February 2013.

A presentation about the project was given by Kate Walker at the RSPB Nature Festival in Orkney on 17<sup>th</sup> May 2013, engaging the public to learn about the project work and how fishing and marine renewable energy industries are working together.

WWF and Marks & Spencer have produced a short film (3-4 minutes) about the fishery sustainability work that has been done and about the finished product that they sell. This film included segments about the project work with Kate Walker and on board one of the vessels participating in the project. The link to the film is: <http://plana.marksandspencer.com/we-are-doing/natural-resources/forever-fish/orkney-brown-crab#video>

Project update meetings have recently taken place between OSF and Orkney Islands Council and with Marks & Spencer and WWF in August 2013.

### *Conclusions*

Progress against Objective 2 tasks is on target according to expectations for Year 1 of the project (see application of MSC Benchmarking and Tracking Tool, p.14). The Fishermen's Code of Practice is in place, and the level of stakeholder and public engagement with the project has been high.

## 2.5 Review workshop outcomes

Issues that will need to be addressed to meet criteria under each MSC principle were discussed by the review workshop participants. These issues are identified as ‘weaknesses’ in Section 2.1 (p.6), and the view of the workshop in relation to each of these is summarised in the tables below.

<b>Principle 1 - stocks</b>		
<b>Issue</b>	<b>Comments</b>	<b>Workshop outcome</b>
No Biological reference points to judge stock status	A stock assessment will be undertaken in 2014, providing candidate values for a target reference point for fishing mortality. A limit reference point for stock abundance will be more problematic, and the OSF research coordinator will explore possible short- and long-term approaches to this.	The group was satisfied with progress.
No Harvest Strategy or Harvest Control Rules	Fishery monitoring is now in place and is sharpening up. The 2014 stock assessment will provide some elements upon which any harvest control rule could be based. ‘Soft’ management is currently possible through pricing mechanisms, with the effect of limiting or changing the pattern of fishing effort. A fisheries management plan can also be developed through the Inshore Fishery Group working with Marine Scotland. Discussions are currently underway regarding approaches to management in an open fishery.	The group was satisfied with progress, but suggested that temperature measurements could be included in any Harvest Control Rule design.
Lack of CPUE, LPUE data	Fishermen’s log-books provide an insight into catch rates. Analysis of log-book data during the course of the project (including seasonal patterns), coupled with comparisons with data available for other crustacean fisheries (e.g. NW Ireland) will provide a perspective on catch rates within the fishery.	The group was satisfied with progress.
Lack of data on fishing effort	Effort data will be available through the fishermen’s log-books linked with Vessel Monitoring System data.	The group was satisfied with progress.
Uncertainties about stock assessment – biological parameters, non-equilibrium, stock structure	A review of potential stock assessment methods will be needed, including non-equilibrium methods that can account for between-year dynamics. OSF research will also focus on locally applicable biological parameter values to feed into stock assessments.	The group was satisfied with progress.

<b>Principle 2 - ecology</b>		
<b>Issue</b>	<b>Comments</b>	<b>Workshop outcome</b>
No quantitative information on retained fish and bycatch	Data on retained fish and bycatch are now being collected through log-books and observer trips.	The group was satisfied with progress.
Possible interactions with large cetaceans	Interactions with cetaceans and seabirds are not currently included in log-books, but fishermen will report informally. OSF will consider adding an	The group was satisfied with progress.

and breeding seabirds	appropriate reporting box to the log-books. The OSF Code of Practice for fishermen (see Appendix 4, p. 34) will be reviewed to ensure that it is fit for purpose (an annual review is undertaken currently). Participating fishermen are passively audited in relation to this Code of Practice (M&S will look into this. Informally, best practice is maintained through communication with OSF research coordinator, OSF audits and peer pressure.	
Lack of information on ecosystem effects	This aspect could be covered within the stock assessment, with support from Marine Scotland. It was suggested that the MSC report for the Shetland brown crab fishery could be used as an example.	The group was satisfied with progress.

<b>Principle 3 – governance</b>		
<b>Issue</b>	<b>Comments</b>	<b>Workshop outcome</b>
Lack of defined standards for sustainable fishing under Principles 1 and 2	Actions against Principles 1 and 2 will also address this lack.	The group was satisfied with progress.
Lack of explicit short- and long-term fishery objectives	The group questioned what it is that the fishery aims to achieve from socio-economic and biological points of view. Currently there is a community entitlement to fish in Orkney, the fishery not being owned by individuals. OSF will discuss the issue of fishery objectives with fishermen, and all partners to the project will consider the economic indicators that could be used to define and measure any objectives. A Dutch example was highlighted by MSC.	The group was satisfied with progress.
Lack of risk-based management based on data and harvest strategy	Actions against Principles 1 and 2 will also address this lack.	The group was satisfied with progress.
Need for wider programme of research to support management, monitoring and assessment needs	The Orkney Shellfish Research project by OSF is fulfilling this need.	The group was satisfied with progress.
Need for more formalised system of monitoring and review to support a harvest strategy	The Orkney Shellfish Research project by OSF is fulfilling this need.	The group was satisfied with progress.

### 3. Application of the MSC Benchmarking and Tracking Tool

The MSC Benchmarking and Tracking Tool (BMT) provides a consistent method of benchmarking the performance of a FIP against the MSC standard (MSC, 2014). The BMT gives overall and principle-specific summary scores, and provides a forward plan for performance to be tracked against expected progress in relation to MSC Performance Indicators (PIs). The BMT scores are scaled in the range 0 to 1, with 1 indicating unconditional passes against all PIs.

The BMT has been applied<sup>5</sup> separately to all three main target species of the Orkney creel fishery, using a tentative forward mapping of expected performance against PIs over five years. Actual scores for Year 1 are those from the 2012 Pre-Assessment (Bell & Gascoigne, 2012). Future progress has been projected under the following assumptions:

- Principle 1 scores are expected to move from the Risk-Based Framework used in the Pre-Assessment to being based on analytical stock assessments starting in 2014, with adoption of formal Biological Reference Points (PI 1.1.2) allowing a Harvest Strategy (PI 1.2.1) and Harvest Control Rules (PI 1.2.3) to be defined.
- Improvements in Information and Monitoring (PI 1.2.4) are expected to provide data on fishing effort and catch rates.
- Under Principle 3, it is projected that explicit objectives will be defined for the fishery (PIs 3.1.3 and 3.2.1) and that decision-making processes (PI 3.1.3) will be defined alongside the adoption of Harvest Control Rules.
- Effective management in relation to fishery objectives will be supported by the required legal framework (PI 3.1.1) for implementing a Harvest Strategy and Harvest Control Rules.
- Implementation of legally-supported Harvest Strategy and Harvest Control Rules will allow stock status (PI 1.1.1) to be established as being, or improved towards being, satisfactory in relation to Biological Reference Points, hence meriting an unconditional pass for all three main species, thus also allowing an unconditional pass under Principle 2 for retained species outcome (PI 2.1.1).
- Analysis of the wider ecosystem implications of fishery removals of the three main species during 2014-15 will allow an unconditional pass in relation to information on the ecosystem (PI 2.5.3).

The BMT tables below map this expected progress through: stock assessment based on new information gathering activities allowing estimation of candidate Biological Reference Points, upon which Harvest Strategy and Harvest Control Rules can be based; definition of explicit fishery objectives and establishment of legal frameworks; to implementation of objectives and instruments, allowing stock status to be both determined and, if appropriate, improved. Note that a key assumption here is that it will be possible to establish a legal framework under which effective and enforceable management controls can be defined for implementing Harvest Control Rules. Although improvements in information collecting will allow informal (i.e. lacking formal criteria) stock assessments to be performed, candidate Biological Reference Points to be estimated and a Harvest Strategy to be designed, without a such a legal framework it will be impossible to implement Harvest Control Rules and for the Principle 1 PIs to progress beyond conditional passes under the Risk-Based Framework.

The BMT tables are given separately for the three main species, but are identical for brown crab and European lobster and differ only for velvet crab in the higher Pre-Assessment score under PI 1.1.1 based on lower susceptibility to exploitation scored under the Risk-Based Framework. According to these tables, the progress against expectations is on target for Year 2, based on improved information and monitoring activities (PI 1.2.3).

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<sup>5</sup> The BMT is provided as an Excel spreadsheet at <http://www.msc.org/documents/developing-world/benchmarking-and-tracking-tool/benchmarking-and-tracking-tool-excel-spreadsheet>

### 3.1 Brown Crab

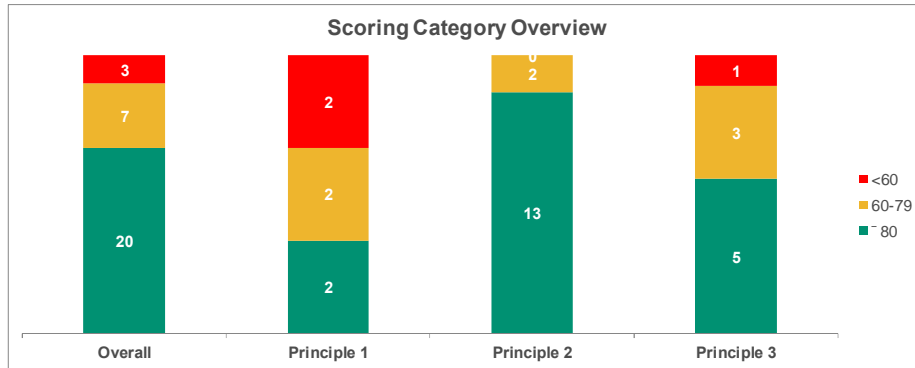
## BMT Dashboard

		Unit of Assessment		
Fishery Name	Orkney Creel Fishery	Species	Area	Gear type
Provider	Orkney Sustainable Fisheries Ltd	Brown Crab	Orkney	Creel
Pre-assessment by:	MacAlister Elliott and Partners Ltd			
Action plan developed by:	Orkney Sustainable Fisheries Ltd			
BMT undertaken by:	Dr Michael Bell, Heriot-Watt University			
Date of BMT	04/07/2014			

#### BMT Summary Table

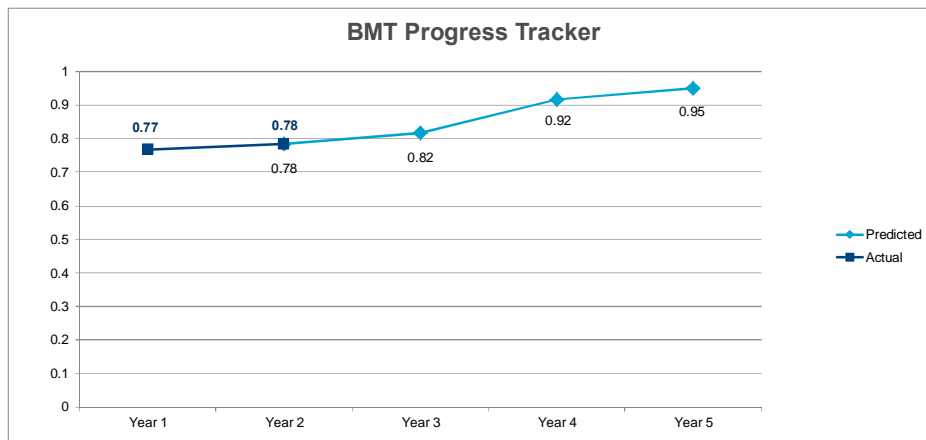
Last update: Actual Year 2

Scoring Level	Overall Number of PIs	Principle 1 Number of PIs	Principle 2 Number of PIs	Principle 3 Number of PIs
≥ 80	20	2	13	5
60-79	7	2	2	3
<60	3	2	0	1
<b>BMT Index</b>	<b>0.78</b>	<b>0.50</b>	<b>0.93</b>	<b>0.72</b>



#### BMT Index Summary Table

		BMT Index				
		Year 1	Year 2	Year 3	Year 4	Year 5
Principle 1	Actual	0.42	0.50			
	Predicted		0.50	0.58	0.75	0.83
Principle 2	Actual	0.93	0.93			
	Predicted		0.93	0.97	0.97	1.00
Principle 3	Actual	0.72	0.72			
	Predicted		0.72	0.72	0.94	0.94
Overall	Actual	0.77	0.78			
	Predicted		0.78	0.82	0.92	0.95



### 3.1 Brown Crab (continued)

## BMT Report Sheet

Principle	Component	PI	Performance Indicator	Expected Scoring Category: Actual Year 2	Actual Scoring Category: Actual Year 2	Status
1	Outcome	1.1.1	Stock status	60-79	60-79	On Target
		1.1.2	Reference points	~ 80	~ 80	On Target
		1.1.3	Stock rebuilding	---	---	
	Management	1.2.1	Harvest Strategy	<60	<60	On Target
		1.2.2	Harvest control rules and tools	<60	<60	On Target
		1.2.3	Information and monitoring	60-79	60-79	On Target
		1.2.4	Assessment of stock status	~ 80	~ 80	On Target
2	Retained species	2.1.1	Outcome	60-79	60-79	On Target
		2.1.2	Management	~ 80	~ 80	On Target
		2.1.3	Information	~ 80	~ 80	On Target
	Bycatch species	2.2.1	Outcome	~ 80	~ 80	On Target
		2.2.2	Management	~ 80	~ 80	On Target
		2.2.3	Information	~ 80	~ 80	On Target
	ETP species	2.3.1	Outcome	~ 80	~ 80	On Target
		2.3.2	Management	~ 80	~ 80	On Target
		2.3.3	Information	~ 80	~ 80	On Target
	Habitats	2.4.1	Outcome	~ 80	~ 80	On Target
		2.4.2	Management	~ 80	~ 80	On Target
		2.4.3	Information	~ 80	~ 80	On Target
	Ecosystem	2.5.1	Outcome	~ 80	~ 80	On Target
		2.5.2	Management	~ 80	~ 80	On Target
		2.5.3	Information	60-79	60-79	On Target
3	Governance and Policy	3.1.1	Legal and customary framework	<60	<60	On Target
		3.1.2	Consultation, roles and responsibilities	~ 80	~ 80	On Target
		3.1.3	Long term objectives	60-79	60-79	On Target
		3.1.4	Incentives for sustainable fishing	~ 80	~ 80	On Target
	Fishery specific management system	3.2.1	Fishery specific objectives	60-79	60-79	On Target
		3.2.2	Decision making processes	60-79	60-79	On Target
		3.2.3	Compliance and enforcement	~ 80	~ 80	On Target
		3.2.4	Research plan	~ 80	~ 80	On Target
		3.2.5	Management performance evaluation	~ 80	~ 80	On Target
	Total number of PIs less than 60				3	3
Total number of PIs 60-79				7	7	
Total number of PIs equal to or greater than 80				20	20	
<b>Overall BMT Index</b>				<b>0.78</b>	<b>0.78</b>	

3.1 Brown Crab (continued)

Principle	Component	PI	Performance Indicator	Actual Year 1	Expected Year 2	Expected Year 3	Expected Year 4	Expected Year 5	Actual Year 2	Status	Actual Year 3	Status	Actual Year 4	Status	Actual Year 5	Status		
1	Outcome	1.1.1	Stock status	60-79	60-79	60-79	60-79	80	60-79	On Target								
		1.1.2	Reference points	-80	-80	-80	-80	-80	-80	-80	On Target							
		1.1.3	Stock rebuilding															
	Management	1.2.1	1.2.1	Harvest control rules and tool	<60	<60	<60	60-79	60-79	<60	On Target							
			1.2.2	Harvest control rules and tool	<60	<60	<60	60-79	60-79	<60	On Target							
		1.2.3	1.2.3	Information and monitoring	<60	60-79	-80	-80	-80	60-79	On Target							
			1.2.4	Assessment of stock status	-80	-80	-80	-80	-80	-80	-80	On Target						
	2	Retained species	2.1.1	Outcome	60-79	60-79	60-79	60-79	80	60-79	On Target							
			2.1.2	Management	-80	-80	-80	-80	-80	-80	-80	On Target						
			2.1.3	Information	-80	-80	-80	-80	-80	-80	-80	On Target						
		Bycatch species	2.2.1	Outcome	-80	-80	-80	-80	-80	-80	-80	On Target						
			2.2.2	Management	-80	-80	-80	-80	-80	-80	-80	On Target						
2.2.3			Information	-80	-80	-80	-80	-80	-80	-80	On Target							
ETP species		2.3.1	Outcome	-80	-80	-80	-80	-80	-80	-80	On Target							
		2.3.2	Management	-80	-80	-80	-80	-80	-80	-80	On Target							
		2.3.3	Information	-80	-80	-80	-80	-80	-80	-80	On Target							
Habitats		2.4.1	Outcome	-80	-80	-80	-80	-80	-80	-80	On Target							
		2.4.2	Management	-80	-80	-80	-80	-80	-80	-80	On Target							
		2.4.3	Information	-80	-80	-80	-80	-80	-80	-80	On Target							
Ecosystem	2.5.1	Outcome	-80	-80	-80	-80	-80	-80	-80	On Target								
	2.5.2	Management	-80	-80	-80	-80	-80	-80	-80	On Target								
	2.5.3	Information	60-79	60-79	80	-80	-80	60-79	60-79	On Target								
3	Governance and Policy	3.1.1	Legal and customary framework	<60	<60	<60	60-79	60-79	<60	On Target								
		3.1.2	Consultation, roles and responsibility	-80	-80	-80	-80	-80	-80	-80	On Target							
		3.1.3	Long term objective	60-79	60-79	60-79	-80	-80	60-79	60-79	On Target							
		3.1.4	Incentives for sustainable fishin	-80	-80	-80	-80	-80	-80	-80	-80	On Target						
		3.2.1	Fishery specific objectives	60-79	60-79	60-79	60-79	80	60-79	60-79	60-79	On Target						
Fishery specific management system	3.2.2	Decision making processes	60-79	60-79	60-79	80	80	60-79	60-79	On Target								
	3.2.3	Compliance and enforcement	-80	-80	-80	-80	-80	-80	-80	-80	On Target							
	3.2.4	Research plan	-80	-80	-80	-80	-80	-80	-80	-80	On Target							
		3.2.5	Management performance evaluatic	80	80	80	80	80	80	On Target								
			Total number of PIs less than 60	4	3	3	0	0	3									
			Total number of PIs 60-79	6	7	5	5	3	7									
			Total number of PIs equal to or greater than 80	20	20	22	25	27	20									
			<b>Overall BMT Index</b>	<b>0.77</b>	<b>0.78</b>	<b>0.82</b>	<b>0.92</b>	<b>0.95</b>	<b>0.78</b>									



### 3.2 European Lobster

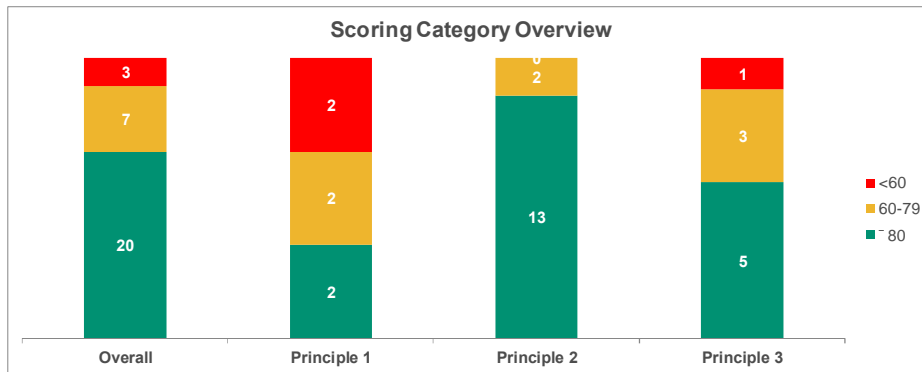
## BMT Dashboard

		Unit of Assessment		
Fishery Name	Orkney Creel Fishery	Species	Area	Gear type
Provider	Orkney Sustainable Fisheries Ltd	European lobster	Orkney	Creel
Pre-assessment by:	MacAlister Elliott and Partners Ltd			
Action plan developed by:	Orkney Sustainable Fisheries Ltd			
BMT undertaken by:	Dr Michael Bell, Heriot-Watt University			
Date of BMT	04/07/2014			

#### BMT Summary Table

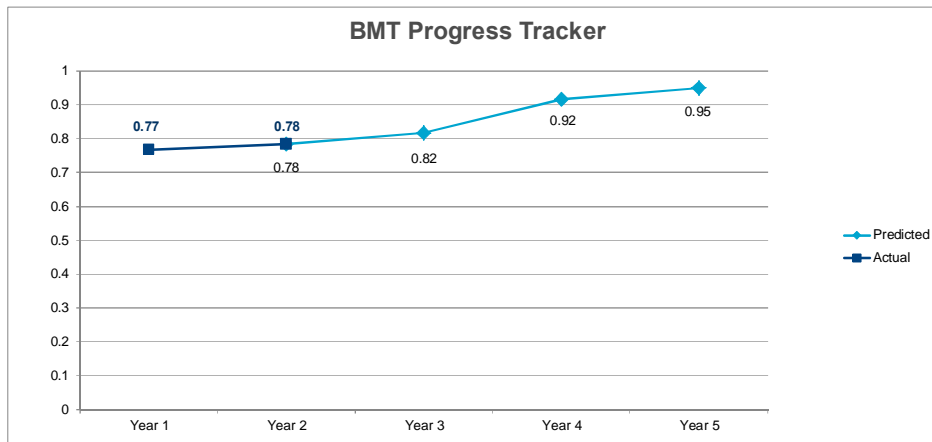
Last update: Actual Year 2

Scoring Level	Overall	Principle 1	Principle 2	Principle 3
	Number of PIs	Number of PIs	Number of PIs	Number of PIs
≥ 80	20	2	13	5
60-79	7	2	2	3
<60	3	2	0	1
<b>BMT Index</b>	<b>0.78</b>	<b>0.50</b>	<b>0.93</b>	<b>0.72</b>



#### BMT Index Summary Table

		BMT Index				
		Year 1	Year 2	Year 3	Year 4	Year 5
Principle 1	Actual	0.42	0.50			
	Predicted	0.50	0.58	0.75	0.83	
Principle 2	Actual	0.93	0.93			
	Predicted	0.93	0.97	0.97	1.00	
Principle 3	Actual	0.72	0.72			
	Predicted	0.72	0.72	0.94	0.94	
Overall	Actual	0.77	0.78			
	Predicted	0.78	0.82	0.92	0.95	



### 3.2 European Lobster (continued)

## BMT Report Sheet

Principle	Component	PI	Performance Indicator	Expected Scoring Category: Actual Year 2	Actual Scoring Category: Actual Year 2	Status
1	Outcome	1.1.1	Stock status	60-79	60-79	On Target
		1.1.2	Reference points	~ 80	~ 80	On Target
		1.1.3	Stock rebuilding	---	---	
	Management	1.2.1	Harvest Strategy	<60	<60	On Target
		1.2.2	Harvest control rules and tools	<60	<60	On Target
		1.2.3	Information and monitoring	60-79	60-79	On Target
		1.2.4	Assessment of stock status	~ 80	~ 80	On Target
2	Retained species	2.1.1	Outcome	60-79	60-79	On Target
		2.1.2	Management	~ 80	~ 80	On Target
		2.1.3	Information	~ 80	~ 80	On Target
	Bycatch species	2.2.1	Outcome	~ 80	~ 80	On Target
		2.2.2	Management	~ 80	~ 80	On Target
		2.2.3	Information	~ 80	~ 80	On Target
	ETP species	2.3.1	Outcome	~ 80	~ 80	On Target
		2.3.2	Management	~ 80	~ 80	On Target
		2.3.3	Information	~ 80	~ 80	On Target
	Habitats	2.4.1	Outcome	~ 80	~ 80	On Target
		2.4.2	Management	~ 80	~ 80	On Target
		2.4.3	Information	~ 80	~ 80	On Target
	Ecosystem	2.5.1	Outcome	~ 80	~ 80	On Target
		2.5.2	Management	~ 80	~ 80	On Target
		2.5.3	Information	60-79	60-79	On Target
3	Governance and Policy	3.1.1	Legal and customary framework	<60	<60	On Target
		3.1.2	Consultation, roles and responsibilities	~ 80	~ 80	On Target
		3.1.3	Long term objectives	60-79	60-79	On Target
		3.1.4	Incentives for sustainable fishing	~ 80	~ 80	On Target
	Fishery specific management system	3.2.1	Fishery specific objectives	60-79	60-79	On Target
		3.2.2	Decision making processes	60-79	60-79	On Target
		3.2.3	Compliance and enforcement	~ 80	~ 80	On Target
		3.2.4	Research plan	~ 80	~ 80	On Target
		3.2.5	Management performance evaluation	~ 80	~ 80	On Target
	Total number of PIs less than 60				3	3
Total number of PIs 60-79				7	7	
Total number of PIs equal to or greater than 80				20	20	
<b>Overall BMT Index</b>				<b>0.78</b>	<b>0.78</b>	

### 3.2 European Lobster (continued)

Principle	Component	PI	Performance Indicator	Actual Year 1	Expected Year 2	Expected Year 3	Expected Year 4	Expected Year 5	Actual Year 2	Status	Actual Year 3	Status	Actual Year 4	Status	Actual Year 5	Status	
1	Outcome	1.1.1	Stock status	60-79	60-79	60-79	60-79	80	60-79	On Target							
		1.1.2	Reference points	-80	-80	-80	-80	-80	-80	-80	On Target						
		1.1.3	Stock rebuilding														
		1.2.1	Harvest Strategy	<60	<60	<60	60-79	60-79	<60	<60	On Target						
	Management	1.2.2	Harvest control rules and tool	<60	<60	<60	60-79	60-79	<60	<60	On Target						
		1.2.3	Information and monitoring	<60	60-79	-80	-80	-80	60-79	60-79	On Target						
		1.2.4	Assessment of stock status	-80	-80	-80	-80	-80	-80	-80	On Target						
		2.1.1	Outcome	60-79	60-79	60-79	60-79	80	60-79	60-79	On Target						
	2	Retained species	2.1.2	Management	-80	-80	-80	-80	-80	-80	On Target						
			2.1.3	Information	-80	-80	-80	-80	-80	-80	-80	On Target					
		Bycatch species	2.2.1	Outcome	80	80	80	80	80	80	80	On Target					
			2.2.2	Management	-80	-80	-80	-80	-80	-80	-80	On Target					
ETP species		2.2.3	Information	-80	-80	-80	-80	-80	-80	-80	On Target						
		2.3.1	Outcome	-80	-80	-80	-80	-80	-80	-80	On Target						
		2.3.2	Management	-80	-80	-80	-80	-80	-80	-80	On Target						
		2.3.3	Information	-80	-80	-80	-80	-80	-80	-80	On Target						
		2.4.1	Outcome	-80	-80	-80	-80	-80	-80	-80	On Target						
		2.4.2	Management	80	80	80	80	80	80	80	On Target						
Habitats	2.4.3	Information	-80	-80	-80	-80	-80	-80	-80	On Target							
	2.5.1	Outcome	-80	-80	-80	-80	-80	-80	-80	On Target							
	2.5.2	Management	-80	-80	-80	-80	-80	-80	-80	On Target							
	2.5.3	Information	60-79	60-79	80	80	80	80	60-79	On Target							
3	Governance and Policy	3.1.1	Legal and customary framework	<60	<60	<60	60-79	60-79	<60	On Target							
		3.1.2	Consultation, roles and responsibility	-80	-80	-80	-80	-80	-80	-80	On Target						
	3.1.3	Long term objectives	60-79	60-79	60-79	80	80	60-79	60-79	60-79	On Target						
	3.1.4	Incentives for sustainable fishin	-80	-80	-80	-80	-80	-80	-80	-80	On Target						
	Fishery specific management system	3.2.1	Fishery specific objectives	60-79	60-79	60-79	80	80	60-79	60-79	On Target						
3.2.2		Decision making processes	60-79	60-79	60-79	80	80	60-79	60-79	On Target							
3.2.3		Compliance and enforcement	-80	-80	-80	-80	-80	-80	-80	-80	On Target						
Total number of PIs less than 60	3.2.4	Research plan	-80	-80	-80	-80	-80	-80	-80	On Target							
	3.2.5	Management performance evaluatic	80	80	80	80	80	80	80	On Target							
	Total number of PIs equal to or greater than 80			4	3	3	0	0	3								
	Total number of PIs 60-79			6	7	5	5	3	5								
	Total number of PIs equal to or greater than 80			20	20	22	25	27	20								
	<b>Overall BMT Index</b>			<b>0.77</b>	<b>0.78</b>	<b>0.82</b>	<b>0.92</b>	<b>0.95</b>	<b>0.78</b>								

### 3.3 Velvet Crab

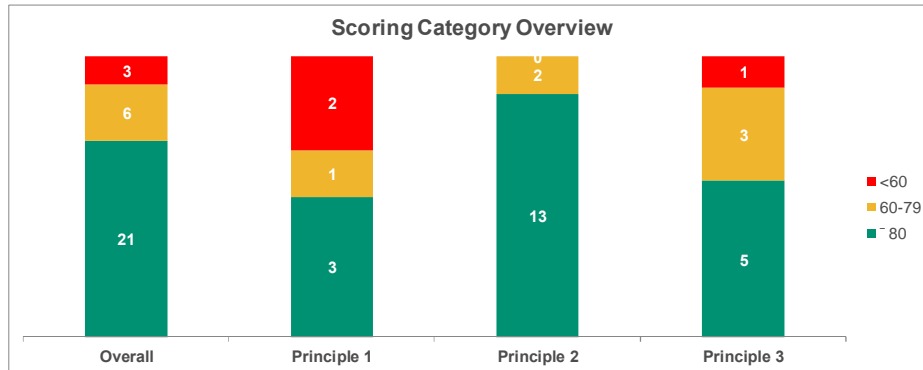
## BMT Dashboard

		Unit of Assessment		
Fishery Name	Orkney Creel Fishery	Species	Area	Gear type
Provider	Orkney Sustainable Fisheries Ltd	Velvet crab	Orkney	Creel
Pre-assessment by:	MacAlister Elliott and Partners Ltd			
Action plan developed by:	Orkney Sustainable Fisheries Ltd			
BMT undertaken by:	Dr Michael Bell, Heriot-Watt University			
Date of BMT	04/07/2014			

#### BMT Summary Table

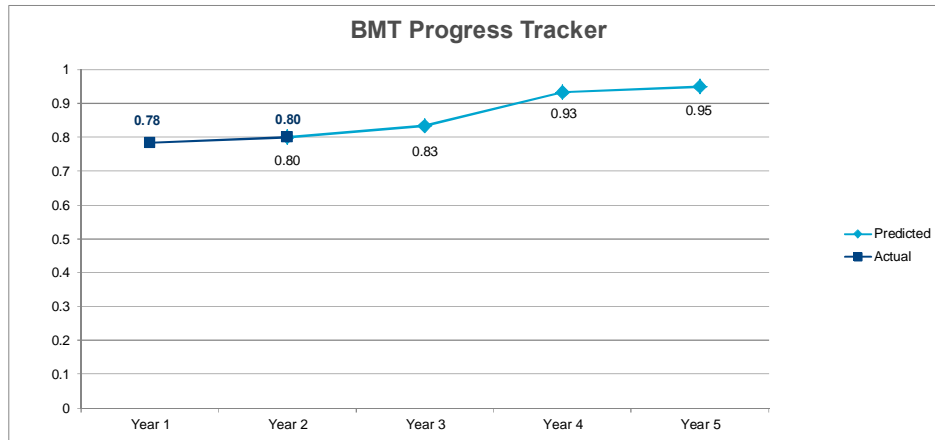
Last update: Actual Year 2

Scoring Level	Overall Number of PIs	Principle 1 Number of PIs	Principle 2 Number of PIs	Principle 3 Number of PIs
≥ 80	21	3	13	5
60-79	6	1	2	3
<60	3	2	0	1
<b>BMT Index</b>	<b>0.80</b>	<b>0.58</b>	<b>0.93</b>	<b>0.72</b>



#### BMT Index Summary Table

		BMT Index				
		Year 1	Year 2	Year 3	Year 4	Year 5
Principle 1	Actual	0.50	0.58			
	Predicted		0.58	0.67	0.83	0.83
Principle 2	Actual	0.93	0.93			
	Predicted		0.93	0.97	0.97	1.00
Principle 3	Actual	0.72	0.72			
	Predicted		0.72	0.72	0.94	0.94
Overall	Actual	0.78	0.80			
	Predicted		0.80	0.83	0.93	0.95



### 3.3 Velvet Crab (continued)

## BMT Report Sheet

Principle	Component	PI	Performance Indicator	Expected Scoring Category: Actual Year 2	Actual Scoring Category: Actual Year 2	Status
1	Outcome	1.1.1	Stock status	~ 80	~ 80	On Target
		1.1.2	Reference points	~ 80	~ 80	On Target
		1.1.3	Stock rebuilding	---	---	
	Management	1.2.1	Harvest Strategy	<60	<60	On Target
		1.2.2	Harvest control rules and tools	<60	<60	On Target
		1.2.3	Information and monitoring	60-79	60-79	On Target
1.2.4		Assessment of stock status	~ 80	~ 80	On Target	
2	Retained species	2.1.1	Outcome	60-79	60-79	On Target
		2.1.2	Management	~ 80	~ 80	On Target
		2.1.3	Information	~ 80	~ 80	On Target
	Bycatch species	2.2.1	Outcome	~ 80	~ 80	On Target
		2.2.2	Management	~ 80	~ 80	On Target
		2.2.3	Information	~ 80	~ 80	On Target
	ETP species	2.3.1	Outcome	~ 80	~ 80	On Target
		2.3.2	Management	~ 80	~ 80	On Target
		2.3.3	Information	~ 80	~ 80	On Target
	Habitats	2.4.1	Outcome	~ 80	~ 80	On Target
		2.4.2	Management	~ 80	~ 80	On Target
		2.4.3	Information	~ 80	~ 80	On Target
	Ecosystem	2.5.1	Outcome	~ 80	~ 80	On Target
		2.5.2	Management	~ 80	~ 80	On Target
		2.5.3	Information	60-79	60-79	On Target
3	Governance and Policy	3.1.1	Legal and customary framework	<60	<60	On Target
		3.1.2	Consultation, roles and responsibilities	~ 80	~ 80	On Target
		3.1.3	Long term objectives	60-79	60-79	On Target
		3.1.4	Incentives for sustainable fishing	~ 80	~ 80	On Target
	Fishery specific management system	3.2.1	Fishery specific objectives	60-79	60-79	On Target
		3.2.2	Decision making processes	60-79	60-79	On Target
		3.2.3	Compliance and enforcement	~ 80	~ 80	On Target
		3.2.4	Research plan	~ 80	~ 80	On Target
		3.2.5	Management performance evaluation	~ 80	~ 80	On Target
	Total number of PIs less than 60				3	3
Total number of PIs 60-79				6	6	
Total number of PIs equal to or greater than 80				21	21	
<b>Overall BMT Index</b>				<b>0.80</b>	<b>0.80</b>	

### 3.3 Velvet Crab (continued)

Principle	Component	PI	Performance Indicator	Actual Year 1	Expected Year 2	Expected Year 3	Expected Year 4	Expected Year 5	Actual Year 2	Status	Actual Year 3	Status	Actual Year 4	Status	Actual Year 5	Status	
1	Outcome	1.1.1	Stock status	-80	-80	-80	-80	-80	-80	On Target							
		1.1.2	Reference points	-80	-80	-80	-80	-80	-80	On Target							
		1.1.3	Stock rebuilding	-80	-80	-80	-80	-80	-80	On Target							
	Management	1.2.1	Harvest Strategy	<60	<60	<60	60-79	60-79	<60	<60	On Target						
		1.2.2	Harvest control rules and tool	<60	<60	<60	60-79	60-79	<60	<60	On Target						
		1.2.3	Information and monitoring	<60	60-79	-80	-80	-80	60-79	60-79	On Target						
		1.2.4	Assessment of stock status	-80	-80	-80	-80	-80	-80	-80	On Target						
	2	Retained species	2.1.1	Outcome	60-79	60-79	60-79	60-79	60-79	60-79	On Target						
			2.1.2	Management	-80	-80	-80	-80	-80	-80	-80	On Target					
		Bycatch species	2.2.1	Information	-80	-80	-80	-80	-80	-80	-80	On Target					
2.2.2			Management	-80	-80	-80	-80	-80	-80	-80	On Target						
ETP species		2.2.3	Information	-80	-80	-80	-80	-80	-80	-80	On Target						
		2.3.1	Outcome	-80	-80	-80	-80	-80	-80	-80	On Target						
		2.3.2	Management	-80	-80	-80	-80	-80	-80	-80	On Target						
		2.3.3	Information	-80	-80	-80	-80	-80	-80	-80	On Target						
		2.4.1	Outcome	-80	-80	-80	-80	-80	-80	-80	On Target						
		2.4.2	Management	-80	-80	-80	-80	-80	-80	-80	On Target						
Ecosystem	2.4.3	Information	-80	-80	-80	-80	-80	-80	-80	On Target							
	2.5.1	Outcome	-80	-80	-80	-80	-80	-80	-80	On Target							
	2.5.2	Management	-80	-80	-80	-80	-80	-80	-80	On Target							
	2.5.3	Information	60-79	60-79	-80	-80	-80	60-79	60-79	On Target							
	3.1.1	Legal and customary framework	<60	<60	<60	60-79	60-79	<60	<60	On Target							
3	Governance and Policy	3.1.2	Consultation, roles and responsibility	-80	-80	-80	-80	-80	-80	On Target							
		3.1.3	Long term objectives	60-79	60-79	60-79	60-79	60-79	60-79	On Target							
	Fishery specific management system	3.1.4	Incentives for sustainable fishin	-80	-80	-80	-80	-80	-80	-80	On Target						
		3.2.1	Fishery specific objectives	60-79	60-79	60-79	60-79	60-79	60-79	60-79	On Target						
		3.2.2	Decision making processes	60-79	60-79	60-79	60-79	60-79	60-79	60-79	On Target						
Total number of PIs less than 60	3.2.3	Compliance and enforcement	-80	-80	-80	-80	-80	-80	-80	On Target							
	3.2.4	Research plan	-80	-80	-80	-80	-80	-80	-80	On Target							
Total number of PIs equal to or greater than 80				4	3	3	3	3	0	3	0	3	0	3	0	3	
Total number of PIs 60-79				5	6	4	4	4	3	6	4	4	3	6	4	3	
Total number of PIs equal to or greater than 80				21	21	23	26	27	21	21	23	26	27	21	21	21	
<b>Overall BMT Index</b>				<b>0.78</b>	<b>0.80</b>	<b>0.83</b>	<b>0.93</b>	<b>0.95</b>	<b>0.80</b>	<b>0.95</b>	<b>0.83</b>	<b>0.93</b>	<b>0.95</b>	<b>0.80</b>	<b>0.80</b>	<b>0.80</b>	

## 4. Conclusions

The review group recognised that satisfactory progress with the FIP for the Orkney creel fishery has been made during year 1 of the project. Engagement with fishermen remains challenging, and it is crucial that levels of participation in logbook and Succorfish monitoring systems be maintained or increased, to provide data of high quality on fishing effort and its distribution across the Orkney grounds, as well as on catch rates, discarding and bycatch quantities. Data from these monitoring programmes will provide the underpinning for defining Harvest Control Rules and associated criteria, and for measuring fishery performance in relation to these. Stock assessment during year 2 of the FIP is expected to inform the development of Biological Reference Points and other elements upon which any Harvest Control Rules would be built.

The MSC Benchmarking and Tracking Tool provides a very useful framework for assessing progress of the fishery in relation to Performance Indicators for the MSC standard. This indicates that fishery performance against these PIs is on target for year 1 of the FIP. It is apparent that the establishment of an effective and enforceable legal framework for fishery management will be key to future progress in relation to expected fishery performance, determining the extent to which it will be possible to define and implement Harvest Control Rules.

## 5. References

- Bell, M.C. & Gascoigne, J., 2012. *MSC Pre-Assessment: Orkney lobster, brown crab and velvet crab fishery*. Report to Orkney Sustainable Fisheries Ltd, MacAllister Elliott and Partners Ltd.
- MSC, 2010. *MSC Fishery Standard: Principles and Criteria for Sustainable Fishing*. Version 1.1. Marine Stewardship Council. [http://www.msc.org/documents/scheme-documents/msc-standards/MS\\_C\\_environmental\\_standard\\_for\\_sustainable\\_fishing.pdf](http://www.msc.org/documents/scheme-documents/msc-standards/MS_C_environmental_standard_for_sustainable_fishing.pdf)
- MSC, 2013. *Guidance to the MSC Certification Requirements*. Version 1.3. Marine Stewardship Council. [http://www.msc.org/documents/scheme-documents/msc-scheme-guidance-documents/guidance-to-the-msc-certification-requirements-v1.3/at\\_download/file](http://www.msc.org/documents/scheme-documents/msc-scheme-guidance-documents/guidance-to-the-msc-certification-requirements-v1.3/at_download/file)
- MSC, 2014. *Benchmarking and Tracking Tool (BMT): Guidance for benchmarking fisheries improving towards MSC certification*. Marine Stewardship Council. <http://www.msc.org/documents/developing-world/benchmarking-and-tracking-tool/benchmarking-and-tracking-tool-guidance-document>

## Appendix 1: List of Participants at the Review Meeting

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## Appendix 2: Meeting Agenda

### Fishery Improvement Project (FIP) for the Orkney brown crab Annual Review Workshop 2014

#### Background:

Orkney Fishermen's Society (OFS), M&S and WWF have been working together on the Fishery Improvement Project (FIP) for the Orkney creel fishery, aiming at supporting the brown crab fishery to improve its demonstrable sustainability as measured by the standards of Marine Stewardship Council (MSC) certification. Forming part of a wider Orkney Shellfish Research Project, this FIP commenced in early 2013 and its progress so far will be reviewed at the first annual review workshop held on 20 Feb 2014 in Edinburgh

#### Objectives

1. To review the progress of the FIP (using the MSC principles and criteria) and the update Shellfish Research objectives
2. To bring together key relevant stakeholders to discuss and address existing and upcoming challenges of the FIP

#### Workshop Detail

**Date:** 20 February 2014

**Time:** 10:00 am – 3:00pm

**Venue:** Manchester Room, Hilton Edinburgh Hotel (near Edinburgh Airport)

Tea, coffee and lunch will be provided in the workshop.

#### Agenda

Item No.	Topic/ Discussion Item
1	Opening and Introduction
2	Final sign-off of the Action Plan document
3	Progress Review based on the Action Plan Matrix and the next steps of the FIP Implementation
3A	Principle 1: Stock
	<ul style="list-style-type: none"><li>• Update and review the progress of the activities relating to Principle 1 of the Action Plan</li><li>• Actions for the next 6-12months</li><li>• Discussion on the stock assessment (methodologies, process, etc.) for the Orkney crab (and possibly other retained species)</li></ul>
3B	Principle 2: Ecology
	<ul style="list-style-type: none"><li>• Update and review the progress of the activities relating to Principle 2 of the Action Plan</li><li>• Actions for the next 6-12months</li><li>• Discussion on additional input or support, where requires.</li></ul>

Item No.	Topic/ Discussion Item
3C	Principle 3: Governance
	<ul style="list-style-type: none"> <li>• Update and review the progress of the activities relating to Principle 3 of the Action Plan</li> <li>• Discussion on the issues of management boundary/open assesses.</li> <li>• Actions for the next 6-12months</li> <li>• Discussion on additional input or support, where requires.</li> </ul>
4	Monitoring and Evaluation (M&E) of the FIP <ul style="list-style-type: none"> <li>• Discussion of possible tools for M&amp;E such as MSC FIP Benchmarking and Tracking Tool (BMT), WWF FIP Monitoring Log, etc.</li> </ul>
5	Communications of the FIP <ul style="list-style-type: none"> <li>• Report on the communications of the FIP after Aug 2013</li> </ul>
6	A.O.B <ul style="list-style-type: none"> <li>• Project Inshore in Scotland</li> <li>• Next mid-term review meeting date</li> </ul>

**Resource:**

MSC BMT: <http://www.msc.org/about-us/credibility/all-fisheries/tools-for-fisheries-improving-towards-msc-certification/benchmarking-and-tracking-tool>

WWF FIP: <https://sites.google.com/site/fisheryimprovementprojects/home>

## Appendix 3: Orkney Creel Fishery FIP Work Plan

### Work Plan

The following work plan has been developed to meet the sustainable fisheries management objectives that were set out in the Orkney Sustainable Fisheries research proposal (2012). These objectives are:

1. to provide monitoring data and biological understanding to support the development and implementation of a harvest strategy and management systems for sustainable fishing;
2. to assess the status of Orkney crustacean stocks in relation to sustainability criteria; and
3. to satisfy shellfish consumers of Orkney's commitment to sustainable fishing.

**Objective 1**—to provide monitoring data and biological understanding to support the development and implementation of a harvest strategy and management systems for sustainable fishing.

Biological and fishery specific data will be collected on an ongoing basis throughout the project, aimed both at improving our understanding of biological and fishery patterns and at providing an information base for the definition and application of management systems.

#### *Biological data*

Descriptive biological data will be collected onshore and onboard participating fishing vessels by the research coordinator. Data collection will be ongoing throughout the duration of the project.

Onshore sampling will be carried out weekly, at the main landing points around Orkney. The size and sex of each individual along with the weight of the sample and total weight landed for a given catch will be recorded. Sampling will cover the main commercially fished species, namely brown crab, European lobster and velvet crab. Sampling strategies will take account of the different fishing grounds from which catches are taken, ensuring that fishery-wide coverage is achieved.

Offshore sampling will be carried out onboard participating local vessels monthly. All individuals, undersized and legal commercial catch brought up in creels will be recorded. The size and sex of the individuals from each string of creels will be recorded along with any by-catch species. All undersized catch and by-catch will be returned unharmed to the sea. GPS co-ordinates for each string of creels hauled will also be recorded.

<b>Working Group</b>	OSF / The Crown Estate / Marine Scotland / M&S / WWF-UK
<b>Priority</b>	High
<b>Time frame</b>	Ongoing
<b>Main MSC Performance Indicators</b>	1.1.1, 1.1.2, 1.2.3, 1.2.4

#### *Crab Tagging*

Tagging of brown crab will be carried out throughout the year. The aim of the tagging scheme is to provide information on spatial stock structure, particularly with regards to inshore and offshore stock components in relation to spawning migrations by females. At least 4,000 crab will be tagged per year, by the research coordinator and participating local fishermen. Tagging will be carried out on all the major fishing grounds. Only recently moulted crabs will be used for tagging. These are more likely to retain their tag and are not landed by fishermen so will reduce the impact to their catch. Tags will be colour-coded by area of release, the GPS location of release will be recorded along with sex and size of each individual. The tagging scheme will be publicised throughout Orkney and surrounding areas to

ensure that tag recoveries are returned to the research coordinator, fishermen will be asked to provide tag serial number and GPS location of the crabs recapture.

<b>Working Group</b>	OSF / M&S / WWF-UK
<b>Priority</b>	Medium-High
<b>Time frame</b>	Ongoing
<b>Main MSC Performance Indicators</b>	1.1.1, 1.2.3, 1.2.4

#### *Fishery Specific Data*

The participation of local fishermen allows fishery-specific data to be collected using a logbook system. The logbook has been designed to be as simple as possible for ease of use by the fishermen, whilst at the same time providing for collection of good quality data on all the relevant catch and effort statistics. Logbooks will be collected every two weeks and analyzed.

Fishermen are asked to provide information on:

- the number of strings the vessel is hauling on a single fishing trip
- how many creels are on each string
- soak time
- sea state
- the state of the tide

<b>Working Group</b>	OSF / The Crown Estate / Marine Scotland / M&S / WWF-UK
<b>Priority</b>	High
<b>Time frame</b>	Ongoing
<b>Main MSC Performance Indicators</b>	1.1.1, 1.2.3, 1.2.4, 2.2.3

**Objective 2** – to assess the status of Orkney crustacean stocks in relation to sustainability criteria.

The assessment of the Orkney crustacean stocks is seen as ongoing part of the project. The data collected in the first year of the project will provide a baseline of knowledge and understanding on the fishery.

The biological data collected during onshore and offshore sampling will allow basic stock assessment methods such as Length Cohort Analysis to be applied to the fishery in Year 1 of the project. Continued data collection will allow stock assessment methods to be refined and make the models more representative of Orkney in future years. Biological sampling data will be linked to logbook records which will give a spatially explicit overview of the fishery.

Crab tagging data will enhance knowledge on the distribution of the stock on Orkney waters and will allow local and more extensive migrations to be understood more clearly. The data will be mapped on a GIS system.

The data from Year 1 will provide the basis of the Orkney fishery management strategy and harvest reference points. The management strategy will be reviewed and adapted to suit the fishery needs which will be highlighted by the stock assessments. Development of potential sustainability criteria, candidates for reference points that could be applied in any harvest control rules, will take place in parallel with the stock assessments.

<b>Working Group</b>	OSF / M&S / WWF-UK
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<b>Priority</b>	High
<b>Time frame</b>	Ongoing
<b>Main MSC Performance Indicators</b>	1.1.1, 1.1.2, 1.2.1, 1.2.4

**Objective 3** – to satisfy shellfish consumers of Orkney’s commitment to sustainable fishing.

Orkney Sustainable Fisheries will develop a Code of Practice for fishermen, which will include measures to reduce impacts to the environment, by-catch and retained species.

There will be regular fishermen’s meetings where the fishermen will be asked for feedback on the project and the data collection work. These meetings will also involve sharing results and findings with the fishermen, helping them to understand the assessment work. In addition there will be meetings with local processors and shellfish merchants to discuss the work carried out in the project.

There will be regular press releases in local and national press throughout the duration of the project providing a brief update on the progress of the project.

*Code of Practice*

Fishermen will be asked to agree and sign to a Code of Practice as part of the FIP. Participating fishermen will be expected to conform to guidelines on best fishing practices, handling and storage of shellfish. Best fishing practices may include:

- V-notching lobsters
- discarding soft crab
- discarding berried crab

Handling and storage guidelines for shellfish may include:

- handling shellfish in a way that minimises harm
- discarding shellfish in a way that maximises survivability
- storing crab in a way that maximises survivability

<b>Working Group</b>	OSF / Marine Scotland / M&S / WWF-UK
<b>Priority</b>	High
<b>Time frame</b>	Ongoing
<b>Main MSC Performance indicators</b>	2.1.2, 2.2.2, 3.1.4, 3.2.3

*Stakeholder Engagement*

The pre-assessment carried out by MacAlister Elliott and Partners Ltd was completed in March 2012. Stakeholders consulted during the pre-assessment were:

- Stewart Crichton, Orkney Fishermen’s Society Ltd
- William Harris, Marine Scotland Compliance
- Fiona Matheson, Orkney Fisheries Association
- Dawson Shearer, O-Fish-Shell Ltd
- Kate Thompson, Scottish National Heritage
- Kate Walker, Orkney Sustainable Fisheries Ltd

In addition to these consultations, Orkney Sustainable Fisheries (OSF) has engaged with public by presenting information and results of crab tagging trials at the Orkney International Science Festival on 12 September 2012. Wider public engagement has subsequently been achieved through articles in local papers and industry publications.

OSF has held various meetings to engage with stakeholders who have an interest in Orkney's inshore waters. The stakeholders that were asked to attend meetings are:

- local fishermen
- newly appointed councillors for 2012
- Scottish National Heritage
- RSPB
- Orkney Fisheries Association

The meetings introduced the work that OSF has carried out over the last four years and highlighted the reasons for the current project. The methods of data collection which will be used as part of the FIP and the data analysis were discussed. At these meetings copies of the OSF Summary Report 2011 were made available.

The meeting with the local fishermen invited all willing fishermen to get involved with the sampling process. There are three different ways in which they can be involved in sampling:

- tagging soft shelled crab
- completing a logbook
- having a researcher on board for observer trips and sampling activities

In addition to the meetings that OSF has held, the FIP has been raised at various Orkney Fishermen's Society board meetings and Orkney Fisheries Association meetings.

<b>Working Group</b>	OSF / The Crown Estate / Marine Scotland / M&S / WWF-UK
<b>Priority</b>	High
<b>Time frame</b>	Ongoing
<b>Main MSC Performance indicators</b>	2.1.2, 2.1.3, 3.1.1, 3.1.4, 3.2.1, 3.2.2, 3.2.3, 3.2.5

### Reports

Bi-monthly data reports will be produced providing a summary of the data collection and analysis. In addition to this an annual report will be produced which will be released to both M&S and WWF-UK in September of each year of the project. This report will document the progress of the project and will have updates from annual stock assessments that have been carried out for the fishery. It will also highlight reference points for the fishery which will be used in the management strategy and any changes to be made to the management strategy.

## Meetings

Over the course of the project, project update meetings will take place in January and July. The meetings will discuss the progress of the project to date and will focus on a management strategy being developed throughout the project.

## Timeline

Task	2013												2014												2015												2016													
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D		
Installation of VMS	■	■	■	■	■	■	■	■	■	■	■																																							
VMS Data Reports	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Index Fleet Selection	■	■	■	■	■	■	■	■	■	■	■																																							
Logbook Data collection	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Biological sampling of landings	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Collection of processor records	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Observer trips	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
GIS data management	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Crab tagging																																																		
Stakeholder meetings		■																																																
Fishery liaison meetings		■																																																
Develop and review codes of practice																																																		
Review harvest strategy																																																		
Review biological parameters for assessment																																																		
Review impacts on bycatch species, habitat and ecosystems																																																		
Undertake stock assessment																																																		
Review and Develop future work plan																																																		

The milestones associated with the timeline include:

- Develop and review harvest strategy August (2014, 2015, 2016)
- Stock Assessment, May (2014,2015,2016)
- Review harvest strategy, August (2014,2015,2016)
- Annual reports, September (2013,2014,2015,2016)







## Appendix 4: Fishermen's Code of Practice

### OFS Code of Practice for Crab Suppliers

The OFS scheme in contrast with other national or international standards is tailored directly at local suppliers of brown crab and specifically covers:

- Hygiene practices on vessels
- Good selection of suitable crabs for processing
- Good handling and storage of catch
- Good handling of undersized and out of condition crabs being returned to sea
- Completion of catch data showing area fished, number of pots hauled, crabs kept and crabs returned
- Environmental practices

Fishermen suppliers are asked to "sign up" to the Code of Practice and are audited annually by OFS staff. This brings the activity on fishing boats into the OFS Quality System and gives customers increased assurances regarding both catch quality, food safety and the commitment of the Orkney inshore fisheries to future friendly practices.

#### Hygiene practices on vessels

- All boxes, bongos or baskets used to store crabs on board will be kept clean and in a good condition.
- Broken or cracked boxes or baskets will be discarded and replaced as these can harbour bacteria.
- Fishing vessels will not load fuel, use chemicals or detergent cleaners (bilge wash, deck scrubbers etc) when there is live shellfish on deck.

#### Crab selection

- All crabs should be over 153 mm, hard shelled, heavy and in good condition.
- Pre or post moult crabs should not be landed.
- Berried female crabs should not be landed.
- Crabs exhibiting "black spot" or other visibly diseased crab should not be landed
- Cripple or one-clawed crabs should not be landed

#### Handling and storage

- Crabs should not be thrown or dropped. Storage boxes or bongos must be handled with care.
- Crabs should be stored in a cool, moist dark environment eg covered with wet sack, blanket or carpet. In their natural environment they are not used to rapid changes in temperature or light and their gills can easily dry out if exposed to sunlight or wind.

(The brown meat (hepatopancreas) is a large digestive gland. It is a fragile organ that produces and contains powerful digestive enzymes called proteases. Trauma caused by rough handling can damage the organ leading to the release of these enzymes. Proteases are indiscriminate destroyers of protein and will readily digest the insides of a crab causing a loss of quality and a reduction in shelf life whether live or cooked).

Good handling and storage can prevent crabs being stressed and mean they are less likely to fight. Bad handling and storage on the other hand can increase stress hormone levels leading to depletion of energy reserves, increased use of oxygen and increased excretion of waste products. Cases of severe stress have been known to lead to re-absorption of the ovaries and thereby tainting of the crab- meat when cooked. All of these can affect the eating quality of cooked crabmeat and a reduction in shelf-life.

#### Completion of catch data

Orkney Sustainable Fisheries Ltd carries out a stock assessment and stock monitoring programme in Orkneys inshore fisheries employing a full-time shellfish research graduate. The OFS supports this work.

The success of this project depends on individual fishermen supplying anonymous daily data regarding where they fish, how many creels they haul, what they catch and what they return in terms of undersized shellfish. This information will be analysed on a regular basis by Marine Scotland and will demonstrate that Orkney's inshore fisheries are being exploited in a sustainable manner.

The OFS Code of Practice requires compliance with the aims of this project.

#### Environmental practices

- Bilges not to be pumped in harbour or confined waterways
- All waste to be returned to shore and disposed of in responsible manner (plastics, bait boxes/bands, human food waste etc)
- Use only of approved anti-foulant paints
- Care taken not to disturb nesting sea-bird colonies
- Care taken not to endanger other marine life.

SC

Revised

24.7.13