MSC SUSTAINABLE FISHERIES CERTIFICATION

Shetland and Scottish Mainland Rope Grown mussel Enhanced fishery

Public Certification Report

June 2017

Prepared For: **The Scottish Shellfish Marketing Group & Seafood Shetland**
Prepared By: Acoura Marine Ltd
Authors: Rod Cappell & Bert Keus

Contents

Glossary

ASSG	Association of Scottish Shellfish Growers
CFP	Common Fisheries Policy
ETP	Endangered, Threatened and Protected
FAM	MSC's Fisheries Assessment Methodology
HCR	Harvest Control Rule
MGSA	Ministerial Group for Sustainable Aquaculture
NAFC	North Atlantic Fisheries College
P1	MSC Principle 1
P2	MSC Principle 2
P3	MSC Principle 3
PI	MSC Performance Indicator
PSA	Productivity Susceptibility Analysis
SAMS	Scottish Association of Marine Sciences
SICA	Scale Intensity Consequence Analysis
SNH	ScottishNatural Heritage
SOTEAG	Sullom Voe Oil Terminal Environmental Action Group
SCOS	Special Committee on Seals
SPP	Scottish Planning Policy
SS	Seafood Shetland
SSMG	Scottish Shellfish Marketing Group
SSMEI AG	Scottish Sustainable Marine Environment Initiative Advisory Group
RBF	Risk Based Framework

1 Executive Summary

» This report provides details of the MSC re-assessment process for the Shetland and Scottish Mainland Rope Grown mussel Enhanced fishery fishery for The Scottish Shellfish Marketing Group & Seafood Shetland. The assessment process began 18th August 2016 and was concluded (to be determined at a later date).

» A comprehensive programme of stakeholder consultations was carried out as part of this assessment, complemented by a full and thorough review of relevant literature and data sources.

» A rigorous assessment of the wide ranging MSC Principles and Criteria was undertaken by the assessment team and a detailed and fully referenced scoring rationale is provided in the assessment tree provided in **Appendix 1.1** of this report.

» The **Target Eligibility Date** for this assessment is 2nd May 2017 (the date of expiry of the current certificate).

The assessment team for this fishery re-assessment comprised of Rod Cappell, who acted as team leader and primary Principle P3 specialist and Bert Keus who was primarily responsible for evaluation of Principle 2. Paul MacIntyre was the traceability expert advisor.

Client strengths

» The UoC only includes spat that is collected at the farm sites, with no translocation (therefore P1 is not scored)

» As an enhanced catch and grow fishery, the production does not result in by-catch and has minimal ETP and benthic impact.

» There is a robust planning system in Scotland that is devolved to local authorities. Regional marine plans are being developed and the management system ensures that there is appropriate consultation on licensing and policy development.

Client weaknesses

» No PIs under this re-assessment scored less than 80 and the weaknesses identified at the first assessment in 2012 have been addressed.

Determination

» On completion of the assessment and scoring process, the assessment team concluded that the fishery should be re-certified.

Rationale

» There are a number of areas which reflect positively on the fishery:

» Fishery-specific management has been improved with the client group developing a management plan, contributing to a Scottish aquaculture research plan, and engaging with a Ministerial Shellfish working group.

Conditions & Recommendations

» All conditions set at first assessment were closed by year 4 surveillance.

» No new conditions are set for this fishery.

For interested readers, the report also provides background to the target species and fishery covered by the assessment, the wider impacts of the fishery and the management regime, supported by full details of the assessment team, a full list of references used and details of the stakeholder consultation process.
Acoura Marine Ltd. confirm that this fishery is within scope.

2 Authorship and Peer Reviewers

2.1 Assessment Team

All team members listed below have completed all requisite training and signed all relevant forms for assessment team membership on this fishery.

Assessment team leader: Rod Cappell
Team leader and primarily responsible for assessment under Principle 3
Rod Cappell is Director with Poseidon based in Northern Ireland and has 20 years of experience in the maritime sector. Rod holds degrees in marine biology, marine resource development and a post-graduate qualification in environmental economics. Recent work includes exploring the economic impact of the CFP reform's discard ban. Rod has also worked on a range of European fisheries projects including a review of effort management regimes and contributed to Regulatory Impact Assessments of EC policy, including CFP reform and most recently cessation measures.

Rod's MSC experience has included a variety of UK and European fisheries at pre-assessment and main assessment level. His completed main assessments include Greenland lumpfish fishery, Dutch flatfish fisheries, hand-raked cockles and various mussel fisheries, including the original Shetland and Scottish mainland mussel assessment. He has completed assessments of scandinavian Nephrops fisheries, shrimp, lumpfish and halibut fisheries in Greenland and whitefish fisheries in the Barents Sea.

Expert team member: Bert Keus
Primarily responsible for assessment under Principle 2
Bert Keus is an independent consultant based in Leiden, the Netherlands. He holds degrees in biology and law, and has previously held the position of Head of the Environmental Division of the Dutch Fisheries Board, and research fellow with the fisheries division of the Agricultural Economics Research Institute of Holland (LEI-DLO).
Over the years 2003 and 2004 he managed fishing and processing companies in the Gambia handling fish from industrial and artisanal fisheries, and he maintains his contacts with the Gambian seafood industry.
In addition, however, he has long association with the shellfish fisheries of the Wadden Sea and neighbouring areas of northwest Europe, and he has been involved in efforts to achieve MSC certification of the North Sea brown shrimp fishery – acting as technical advisor to this multi-stakeholder initiative, and sitting on the project's management board.
Through this work and several other MSC certifications he has become particularly familiar with the MSC certification process (and indirectly with the GASS/DD assessment methodology). Between the years 1998 and 2003 he was a Member of the European Sustainable Use Specialist Group, Fisheries Working Group of IUCN.

Expert advisor: Paul Macintyre
Paul started working in the Aquaculture sector in 1975, managing salmon farms and processing factories for a large multi-national before transferring in 1990 to aquaculture audit and inspection.
During the last 25 years Paul has carried out over 3,000 audits and inspections of aquaculture and fish processing operations across the UK salmon and trout industry and internationally in the cod, tilapia and shrimp aquaculture sectors. Paul's primary interest is

salmonids however his role as Aquaculture Director with Acoura Marine has involved him in the development and trial audit of a number of new aquaculture and agricultural standards. Paul is a qualified Lead Assessor and approved to audit BRC, MSC / ASC Chain of Custody, GlobalGAP, Organic Aquaculture, Freedom Food, Label Rouge, Best Aquaculture Practices, ASC Salmon and Friend of the Sea. Paul also audits to UK and French retailer standards.

2.1.1 Peer Reviewers

Peer reviewers used for this report were Andrew Brand and John Tremblay. A summary CV for each is available in the **Assessment downloads** section of the fishery's entry on the MSC website.

John Tremblay Dr. Tremblay has over 35 years of experience in marine fisheries ecology and biology. He has a Ph.D. in Marine Biology from Dalhousie University (1991), and M.Sc. (1982) and B.Sc. Degrees (1979) from the University of Guelph. From 1983 to 2015 he was with the Science Branch of Fisheries and Oceans Canada (DFO). His areas of expertise include the population ecology of invertebrates, stock assessment of decapod crustacea, and communication of fisheries science with stakeholders and peers. He has participated extensively in peer review processes as a team leader and as a reviewer. As head of the Maritimes Region Lobster Unit at the Bedford Institute of Oceanography (BIO) for 10 years, he was responsible for regular assessments of the most valuable commercial species in Canada. John has 32 publications in peer-reviewed journals covering topics such as the early life history of scallops and lobsters, trends in populations of invertebrates and fish in relation to the environment, Page 2 of 2 catchability in traps, and lobster growth and movement. The topics of over 50 technical publications which he co-authored include assessments of lobsters, crabs and scallops, and methods for estimating abundance of decapod crustacea. He retired from DFO in 2015 and is currently a Scientist Emeritus at BIO.

Andrew Brand Dr Andy Brand worked for the University of Liverpool for 40 years on the academic staff of the Port Erin Marine Laboratory, Isle of Man, retiring in 2006 as Director of the Laboratory. During this time he developed large research programmes on the biology, ecology, aquaculture and fisheries of bivalve molluscs, especially scallops, and on the environmental impact of scallop dredging. Andy has had extensive fishery management and environmental assessment consultancy experience, including contracts with government departments and industry, and has been a member of ICES Working Groups on herring, scallops and ecosystem effects of fishing. In addition to work in the Irish Sea, he has advised on scallops and fisheries management in Alaska, Argentina, Australia, Bermuda, Chile, Ireland, France and the Philippines. He is now an Honorary Senior Fellow of the University of Liverpool and works as an independent shellfisheries consultant. He has recent experience as an Assessor, Auditor and Peer Reviewer for Marine Stewardship Council certifications of scallop, mussel, oyster, various clam and herring fisheries in Wales, Isle of Man, the Faroes, Ireland, Denmark, Holland, Spain, India, Japan, USA and Canada.

2.1.2 RBF Training

RBF was not used for this fishery assessment.

3 Description of the Fishery

3.1 Unit(s) of Assessment and Proposed Unit of Certification (UoC)

Acoura Marine Ltd confirm that the fishery is within scope of the MSC certification sought following the assessment as defined below.

UoA 1:

Species:	Blue Mussel (*Mytulis spp.)*
Stock:	Blue Mussel (spp.) wild stock of the Shetland Islands
Geographical area:	The Shetland Islands, North-east Atlantic, within FAO Statistical Area 27 and ICES area IVa.
Harvest method:	Rope
Client Group:	Seafood Shetland (incorporating Shetland Fish Processors and Shellfish Growers) members harvesting rope grown mussels in the Shetland Islands.
Other Eligible Fishers:	None

UoA 2:

Species:	Blue Mussel (*Mytulis spp.)*
Stock:	Blue Mussel (spp.) wild stock in Scottish waters
Geographical area:	Scottish coastal waters ranging from Argyll to Sutherland, within FAO Statistical Area 27 and ICES area VIa
Harvest method:	Rope
Client Group:	Scottish Shellfish Marketing Group (SSMG) members harvesting rope grown mussels in Scottish coastal waters.
Other Eligible Fishers:	None

The proposed Units Of Certification for this fishery are as below:

Species:	Blue Mussel (*Mytulis spp.)*
Stock:	Blue Mussel (spp.) wild stock of the Shetland Islands
Geographical area:	The Shetland Islands, North-east Atlantic, within FAO Statistical Area 27 and ICES area IVa.
Harvest method:	Rope
Client Group:	Seafood Shetland (incorporating Shetland Fish Processors and Shellfish Growers) members.

Species:	Blue Mussel (*Mytulis spp.)*
Stock:	Blue Mussel (spp.) wild stock in Scottish waters
Geographical area:	Scottish coastal waters ranging from Argyll to Sutherland, within FAO Statistical Area 27 and ICES area VIa
Harvest method:	Rope
Client Group:	Scottish Shellfish Marketing Group (SSMG) members.

This Unit of Assessment was used as it is compliant with client wishes for assessment coverage and in full conformity with MSC criteria.

3.2 Final UoC(s)

The final Unit Of Certification for this fishery is as defined below. This has not changed throughout the process. Alternatively provide rationale for why this has changed.

Species:	Blue Mussel (*Mytulis spp.)*
Stock:	Blue Mussel (spp.) wild stock of the Shetland Islands
Geographical area:	The Shetland Islands, North-east Atlantic, within FAO Statistical Area 27 and ICES area IVa.
Harvest method:	Rope
Client Group:	Seafood Shetland (incorporating Shetland Fish Processors and Shellfish Growers) members.

Species:	Blue Mussel (*Mytulis spp.)*
Stock:	Blue Mussel (spp.) wild stock in Scottish waters
Geographical area:	Scottish coastal waters ranging from Argyll to Sutherland, within FAO Statistical Area 27 and ICES area VIa
Harvest method:	Rope
Client Group:	Scottish Shellfish Marketing Group (SSMG) members.

3.2.1 Total Allowable Catch (TAC) and Catch Data

Mussels are not harvested under TAC, however recent production tonnages are presented below.

Table 1. TAC and Catch Data

Total Scottish mussel production for most recent fishing year (2015):		**7,270 tonnes**
Unit of Certification share of the total Scottish mussel production established for the fishery in most recent fishing year		
Shetland Islands	**UoC 1**	**5,565 tonnes**
Scottish coastal waters ranging from Argyll to Sutherland	**UoC 2**	**827 tonnes**
Client share of the total Scottish mussel production in most recent fishing year:		**88% (6392 tonnes)**
Total greenweight catch taken by the client group in the two most recent calendar years:		**2014: 6685 t. 2015: 6392 t.**

3.2.2 Scope of Assessment in Relation to Enhanced Fisheries

The cultivation of mussels on ropes is defined as an enhanced catch-and-grow (CAG) bivalve fishery for the purpose of this re-assessment.

The MSC certification requirements for CAG bivalve fisheries determine that Principle 1 does not need to be included in the assessment in those cases where translocation is not involved in the cultivation system and there is no evidence that the fishery negatively impacts the parent stock. Seed translocation is defined here as movement of seed which poses a risk to the genetic diversity of the wild population (CR Annex CK and GCR Annex GCK).

The main method for the collection of seed in this fishery is using rope collectors at the same site where the on-growing takes place which means that there is no translocation taking place. Since the spat used is collected by providing additional substrate (ropes) the settlement of this spat can be considered additional to naturally occurring settlement and there is no risk that there would be any impact on the size or productivity of the parent stock. Hence, this assessment determined that the fishery does not pose a risk to the genetic diversity of the wild population and the fishery is defined as enhanced catch-and-grow (CAG) bivalve fishery without translocation. Therefore the assessment team determines that according the MSC assessment methodology (MSC Certification Requirements version 1.2, Annex CK) Principle 1 and the performance indicators 2.1. Bycatch species and 2.2 Retained species are also not to be scored in this assessment.

3.2.3 Scope of Assessment in Relation to Introduced Species Based Fisheries (ISBF)

The Blue mussel (*Mytilus edulis*) is native to Scottish and Shetland waters and therefore requirements in relation to ISBF do not apply to this assessment.

3.3 Overview of the fishery

3.3.1 SSMG & Seafood Shetland

The clients for this certification are SSMG & Seafood Shetland.

Certificate holder:

Address: **The Scottish Shellfish Marketing Group (SSMG)**
The Motherwell Food Park
Bellshill, ML4

Seafood Shetland
Stewart Building
Lerwick
Shetland, ZE1 0LL

Contact Name: Ruth Henderson
Tel: +44(0) 1595 693 644
Email: ruth@fishuk.net

Mussel farming was encouraged by the Zetland County Council, now Shetland Islands Council (SIC) and the Highlands and Islands Development Board in the mid-1970s. Early experiments revealed that mussels could grow in Shetland, quality was good and the product marketable. In the early 1980s, SIC established a grant support scheme which garnered further interest. A growers' association which was established in 1984/85 became involved in supplying product to mainland customers, principally high-end restaurants.

Mussel farming methods and technology did not overcome the labour-intensive nature of harvesting and grading and consequently interest waned as more lucrative job opportunities became available in the oil and salmon farming industries. Some sites continued to produce stock, however, and interest resumed in the early 1990s, with those who had been involved in early experimental mussel farming realising the business potential. Others became involved and the industry was reborn. Operators invested in longline culture systems, larger harvesting workboats, shore-based handling facilities and mussel cleaning machinery. The Shetland farmers became professional and efficient quickly and developments continue today through the adoption of other methods (notably continuous culture systems common in New Zealand) and adaptation and development of skills and knowledge gained by being involved in fishing or salmon farming. Mainland production developed along similar lines around the same time with the SSMG being formed in 1992. The mainland mussel farming industry is located in many rural communities on the West Coast of Scotland. In 2014 the industry had a value of around £2 million producing a total of 1600 tonnes of which 766 tonnes were that of Scottish Shellfish members.
Scottish Shellfish currently has six farms in these remote areas of the West Coast and these farms employee around thirty employees in various roles.

3.3.2 Organisational Structure

Seafood Shetland was formed in 2003 following the merger of Shetland Fish Processors' Association and Shetland Shellfish Growers' Association and represents the interests of Shetland's fish processing and shellfish growing companies. It comprises a fish processors' sub-committee and a shellfish growers' sub-committee, both with Chairman and Vice-Chairman. Seafood Shetland employs two staff and operates from an office in the Shetland Seafood Centre, Stewart Building in Lerwick, Shetland.
Scottish Shellfish Marketing Group Ltd (SSMG) was incorporated as an Industrial & Provident Society in 1992. SSMG is the marketing and processing arm of a cooperative group of mussel and oyster farmers, supplying shellfish products to a range of customers including UK supermarket retailers, Food Service and Export.

3.3.3 Code of Conduct

In 2005 the Association of Scottish Shellfish Growers (ASSG) developed a code of good practice with the objective of ensuring that activities are managed in an environmentally responsible and sustainable manner that is in harmony with the needs of other marine and shoreline users.
Seafood Shetland and the Scottish Shellfish Marketing group are members of the ASSG and enjoy a close working relationship with the ASSG.

3.3.4 Fishing Method and Farm sites

Catch and Growth fisheries are defined as fishery production systems that involve wild harvest followed by a grown-out phase. Mussel farming in Scotland mainland and Shetland Islands sites collects stock from the wild spat-fall and the settled spat is grown on ropes suspended from longlines. A typical longline would consist of either a single or double head-rope supported by plastic floats at regular intervals.
The overall dimension of each production area (number of sites and number of lines per site) is tailored to the license condition.
The length of the line is generally between 200– 400 m. The spacing of the plastic floats (buoys) depends upon their buoyancy and the expected load upon the line.
Generally, they are spaced at up to 3 m apart. Rope of between 20 – 32 mm diameters is commonly used for the headlines. The separation between long-lines is largely dependent

upon the size of the servicing vessel. The overall dimension of each site is also tailored to the license condition.
The rope droppers, on which the mussels are grown, are usually 12 mm in diameter although there are a wide variety of designs available on the market. Plastic-pegs or discs may be inserted through the twist of the rope to provide additional support for the mussels. Droppers are generally between 6 – 10 m in length, depending on the depth of the water. Droppers may be tied to the headlines at between 0.45 – 1 m apart, depending upon local tidal conditions.
Rope-grown mussel cultivators collect their own stock from the wild spat-fall. The rope droppers are coiled so that they remain in the top 2-3 m of the water column and they are placed on the line in time to collect the natural spat. Spat settlement occurs generally in April-May in Scotland mainland and Shetland Islands (although earlier and later spawning also may take place). Mussels can spawn several times during the year. Depending upon the location and size at harvest, the first 'crop' of rope-grown mussels can be obtained in between 2-3 years when mussels attain marketable size.
Each dropper is raised from the water and the mussels removed either by hand or by machine. They may then be transferred to a shore-based facility or the next stages may take place on-board the harvesting vessel. The mussels are separated, washed and graded, again by hand or automated line. Each dropper may yield between 5 – 7 kg of marketable mussels. Small mussels may be re-tubed and returned to the sea for further growth.

Mussels' farms covered by this assessment are presented in **Table 2** and **Table 3** for Seafood Shetland Client Group and Scottish Shellfish Marketing Group Client Group, respectively.

An up to date list of sites can be obtained by contacting FCI using the following details:
Contact Name: Billy Hynes
Contact Email: fisheries@acoura.com
Contact Tel: +44(0)131 335 6662

Table 2 Members farms of Seafood Shetland

Company Name (SS)
A. & C. Tait
Angus Walterson
Blueshell Mussels Ltd
C. & A. Thomason Ltd
Cribba Sound Ltd
East Voe Shellfish Ltd
G. Duncan
Hunter Shellfish Ltd
Northmaven Marine Ltd
Olnafirth Sea Farm Ltd
Peter Tait
Pund Shellfish
Sandsound Mussels
Scottish SeaFarms
Seafield Mussels
Selivoe Shellfish
Shetland Mussels Ltd
SI Seafarms Ltd
Suthravoe Shellfish
Unst Shellfish
Vementry Aquaculture
Zetland Mussels

Source: client

Table 3. Members farms of Scottish Shellfish Marketing Group

Company Name (SSMG)
Blueshell Mussels Ltd
Cribba Sound Shellfish Ltd
East Voe Shellfish Ltd
Fassfern Mussels
Hunter Shellfish Ltd
Loch Laxford Shellfish Ltd
Loch Eishort Mussel Culture
Inverlussa Shellfish
Northmaven Marine Ltd
Olnafirth Sea Farm Ltd
Sandsound Mussels
Selivoe Shellfish
Shetland Mussels Ltd
Unst Shellfish Ltd

Source: client

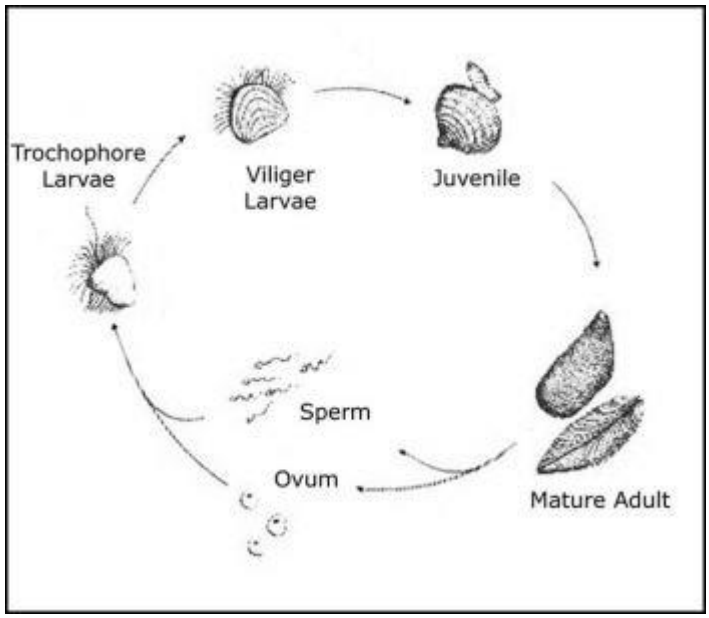
3.3.5 Target species.

The target species for the fishery under certification is *Mytulis spp. (Blue mussel).*

3.3.6 Life Cycle

Blue mussels (*Mytulis spp.*) are semi-sessile epibenthic bivalves that can tolerate wide variation in salinity, desiccation, and temperature and oxygen concentration, characteristic that result in the ability to occupy a large variety of microhabitats. Blue mussels are anchored to a secure substrate, which include; rocks, stones, gravel, shingle and dead shells. These characteristics make mussel an ideal species to grow on ropes (**Figure 1**).
The bathymetric range of distribution covers, mostly, the littoral to sub littoral zones (<99 m) of oceanic and polyhaline to mesohaline estuarine environments. The life cycle can be divided into the free swimming larval phase and the largely sedentary juvenile and adult phase. The blue mussel is a filter feeder, drawing in seawater, which is filtered through the gills. The blue mussel is dioecious, though rare instances of hermaphrodism have been reported. Generally the potential spawning season vary according to location, but the main spat-fall is generally in early summer.
Mussels generally produce gametes and are ready to spawn by the time they are one year old. During spawning eggs and sperm are released to the water column and fertilisation occurs externally. After fertilization occurs, the fertilised zygotes undergo several metamorphoses before settlement (**Figure 1**). Mussels settle after the sixth larval stage, the planktonic life of *Mytilus edulis* varies from 2-4 weeks depending on temperature, food supply and availability of suitable settlement substratum. The growth rate mussel depends largely on the availability of food.

Figure 1. Life cycle of blue mussel



Source to follow

3.3.7 Geographic distribution of Mytulis spp.

In Europe there are three species of mussel, all in the genus *Mytilus*: *Mytilus edulis*, *M. galloprovincialis* and *M.trossulus. M. edulis* occurs along the North East Atlantic coast from northern Norway south to the coast of France (**Figure 2**). Its distribution overlaps with the Mediterranean mussel (*Mytilus galloprovencialis*) and their taxonomic differentiation remains a debate. M. trossulus inhabit sea water with low salinity and is found extensively in the Baltic Sea. *Mytilus trossulus, Mytilus galloprovincialis*, and their hybrids with the Scottish native species of mussel, *M. edulis*, are rare in Scotland, but have been detected in populations of mussels (Beaumont et al. 2008; Dias et al. 2008). *M. trossulus*, which is rare in natural populations from exposed intertidal shores, can be abundant in more sheltered

environments like marina pontoons and enhance fisheries ropes at farms (Dias et al. 2008, 2009).

Figure 2. Geographic distribution of Mytulis Spp. Distribution of gealloprovincialis, edulis and trussulus showed in orange, purple and blue, respectively.

Source: http://genimpact.imr.no/__data/page/7650/mussels.pdf

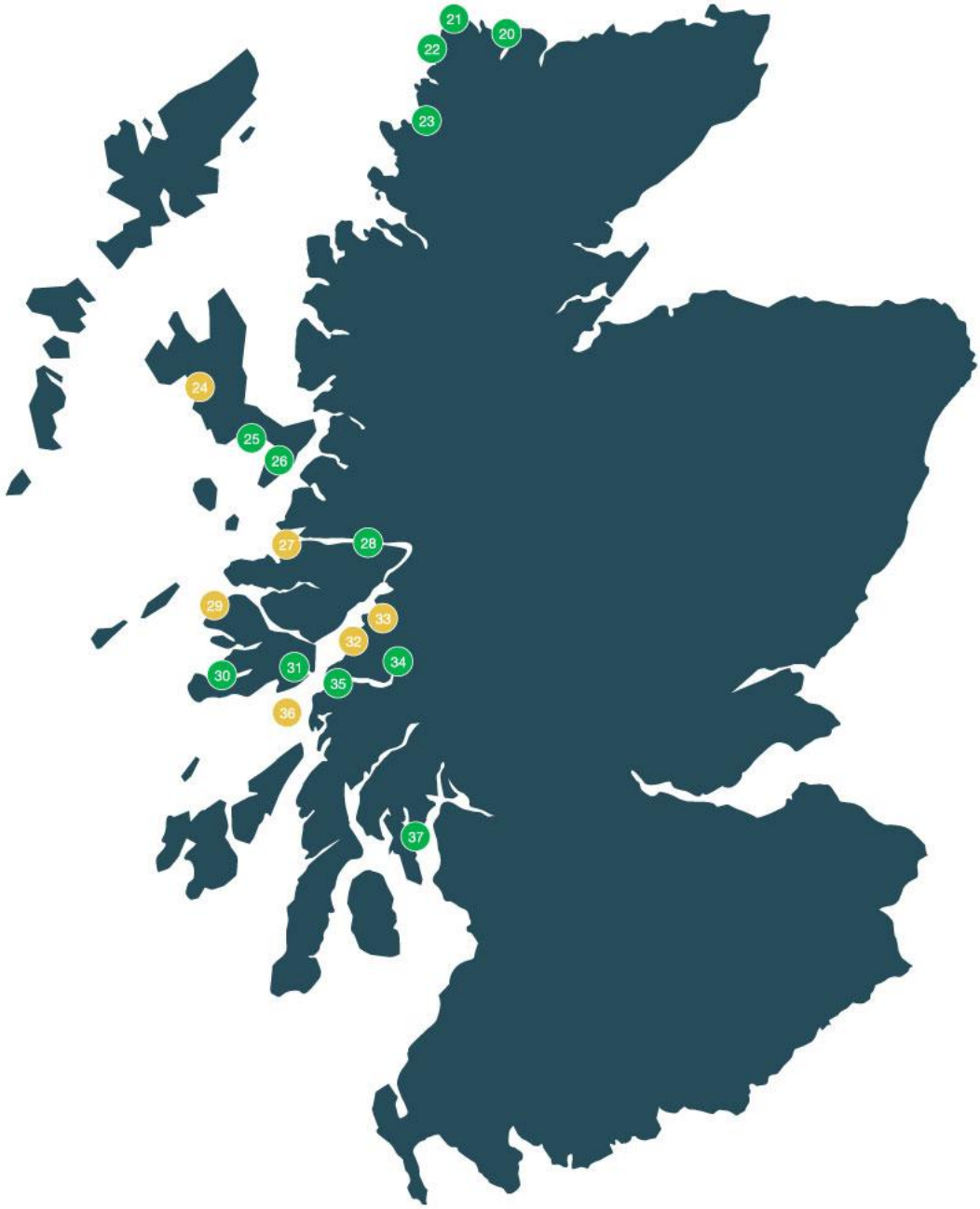
3.3.8 Evaluation Area

Figure 3 and 4 show maps with geographic location of Seafood Shetland and SSMG mussel farms.

Figure 3. Map showing location of Seafood Shetland mussel farms

source: scottishshellfish.co.uk

Figure 4. Map showing location of SSMG mussel farms



source: scottishshellfish.co.uk

3.3.9 Catches and landings

Mussel production has grown significantly since 1986. Shetland mussel harvesting began in 1991 and now forms the majority of Scottish mussel production. Table 4 shows trends in mussel production for Scotland and the proportion that is harvested from the Shetland Islands.

Table 4 - Mussel production (for consumption) in Scotland and Shetland's contribution to Scottish total landings.

Year	Scottish Tonnage	Shetland's Contribution to Scottish Total	Percent of production from Shetland
1986	262	*	
1987	271	*	
1988	384	*	
1989	346	*	
1990	462	*	
1991	1,024	6	0.6
1992	923	10	1.1
1993	708	2	0.3
1994	716	19	2.7
1995	882	21	2.4
1996	1,072	10	0.9
1997	1,307	96	7.3
1998	1,355	175	12.9
1999	1,400	196	14
2000	2,003	372	18.6
2001	2,988	822	27.5
2002	3,236	1,246	38.5
2003	3,632	1,552	42.7
2004	4,223	2,188	51.8
2005	4,135	2,150	52
2006	4,219	2,284	54.1
2007	4,806	2,605	54.2
2008	5,869	3,506	59.7
2009	6,302	3,698	58.7
2010	7,199	3,840	53.3
2011	6,996	4,567	65.3
2012	6,277	4,340	69.1
2013	6,757	4,337	64.2
2014	7,683	5,919	77.0
2015	7,270	5,565	76.5

Source: Client

3.4 Principle One: Target Species Background

Principle 1 of the Marine Stewardship Council standard states that:
A fishery must be conducted in a manner that does not lead to over fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.
Principle 1 covers all fishing activity on the entire *mytilus spp.* stock - not just the fishery undergoing certification. However, the fishery under certification would be expected to meet all management requirements, such as providing appropriate data and complying with controls, therefore demonstrably not adding to problems even if the problems will not cause the certification to fail.
Blue mussels (*Mytulis edulis*) are semi-sessile epibenthic bivalves that can tolerate wide variation in salinity, desiccation, and temperature and oxygen concentration, characteristic that result in the ability to occupy a large variety of microhabitats. Mussels naturally anchor to a secure substrate, which include; rocks, stones, gravel, shingle and dead shells.
Seed translocation is defined as movement of seed, which pose a risk to the genetic diversity of the wild population (CR Annex CK and GCR Annex GCK). This enhanced catch and grow fishery uses ropes hung from longlines to provide substrate for seed to attach and grow on to marketable size. Translocation is therefore judged not to occur in this fishery and does not pose a risk to the genetic diversity of the wild population. The fishery is defined as enhanced catch-and-grow (CAG) bivalve fishery **without translocation.**

Mussels generally produce gametes and are ready to spawn by the time they are one year old. During spawning eggs and sperm are released to the water column and fertilisation occurs externally. After fertilization occurs, the fertilised zygotes undergo several metamorphoses before settlement. Mussels settle after the sixth larval stage, the planktonic life of *Mytilus edulis* varies from 2-4 weeks depending on temperature, food supply and availability of suitable settlement substratum.

Ropes provide extra habitat for mussels increasing larvae survivability and therefore increasing the mussel population biomass. It has therefore been assessed that the cultivation of mussels does not pose a risk to the productivity of the wild population. The assessment team determines that according the MSC assessment methodology (MSC Certification Requirements version 1.3, Annex CK) principle 1 does not have to be included during this certification full assessment.

3.5 Principle Two: Ecosystem Background

Principle 2 of the Marine Stewardship Council standard states that:
Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent ecologically related species) on which the fishery depends.
The following section of the report highlights some of the key characteristics of the fishery under assessment with regard to its wider impact on the ecosystem.
As this is an enhanced catch and grow fishery, Performance Indicators 2.1 (retained species) and 2.2 (discard species) are not required to be considered.

3.5.1 Endangered, threatened or protected species (ETP)

The MSC defines Endangered Threatened & Protected (ETP) species as those that are recognised by national legislation or international agreements to which the jurisdiction controlling the fishery under assessment is party and those species that are listed in Appendix 1 of the Convention on International Trade in Endangered Species (CITES). Species that are appear exclusively on non-binding lists such as ASCOBANS, IUCN Red List, OSPAR, HELCOM or that are only the subject of intergovernmental recognition (such as FAO International Plans of Action) and that are not included under national legislation or binding international agreement are not considered as ETP under MSC protocols.

CITES Appendix I lists species that are the most endangered among CITES-listed animals and plants. They are threatened with extinction and CITES prohibits international trade in specimens of these species with some exeptions, for instance for scientific research. Appendix 1 of CITES has been accessed by the team at the CITES website (see reference). As the United Kingdom is a member of the EU the species protected by the EU Habitat Directive (Annex II) and the Birds Directive (Council Directive 2009/147/EC) should also be considered ETP species.

The EU Bird Directive aims to protect all European wild birds and the habitats of listed species, in particular through the designation of Special Protection Areas (SPA). Under this assessment all birds species listed in the EU Bird Directive are considered ETP species. Under this PI, only those effects of rope grown mussel cultivation that may reasonably be expected to affect ETP species are considered. Mussel culture on ropes is not likely to affect protected or endangered fish species like sharks and rays or fish species protected by the Habitat Directive so these are not considered. The species groups where impacts are considered possible are marine mammals and birds. Possible effects are: entanglement in mussel farm structures and spat catching structures, ingestion of litter from farms, exclusion by farm structures, reduced or increasing prey availability, disturbance (noise or boat activity), creation of resting places on floats within farms (Lloyd, 2003).

Marine mammals

Species listed in CITES Appendix 1 that sometimes occur in the coastal waters of the west coast of Scotland and Shetland (among others) are Minke whale (*Balaenoptera acutorostrata*), sperm whales (*Physeter microcephalus) and Orca (Orcinus orca)*. Marine mammals that are listed in Annex II of the Habitat Directive are Harbour porpoise (*Phocoena phocoena*), Harbour seal (*Phoca vitulina*) and Grey seal (*Halichoerus grypus*).Other species that occur like Sperm whales (*Physeter microcephalus*), Orca (*Orcinus orca*), , Long finned pilot whale (*Globicephala melas*), Risso's dolphin (*Grampus griseus*) and Atlantic white-sided dolphin (*Lagenorhynchus acutus*) are protected under Annex IV of the Habitat Directive.

Whales like Minke whales and Orcas are now regularly seen inside the Scottish lochs and Shetland Island voes but no entanglements of whales in mussel ropes have ever been reported in the UK. From New Zealand there are a few known records of whales being entangled in mussel farm structures (ropes). There have been no reports of dolphin entanglement in lines in New Zealand (Loyd, 2003). It is assumed that baleen whales are more prone to entanglement than dolphins because they don't echo-locate.

Mussel culture can affect the prey abundance for fish eating marine mammals. It is known that structures in the water can attract fish where they can seek shelter. The epifauna on the mussel ropes could provide some fish species with an extra food supply (Lopez, 1984). Under the Conservation of Seals Act 1970 and the Marine (Scotland) Act 2010 the Natural Environmental Research Council (NERC) has a duty to provide information on the number and distribution of seals in the UK. Annual grey seal pup counts have been made since 1960 and counts of moulting common seals since 1988 (SMRU, 2010). NERC has appointed a Special Committee on Seals (SCOS) to formulate scientific advice on the management of seal populations.

Common seals and harbor seals are present in most Scottish Lochs and Shetland Island voes where mussel rope farming is practiced. Although pinnipeds frequently become entangled in fishing nets, none have been reported entangled in ropes and they are unlikely to be entangled in mussel farm structures (Lloyd, 2003). Since the entanglement of marine mammels in mussel ropes has never happened since rope mussel culture started in western Scotland and the Shetland Islands is can be considered a higly unlikely event (especially when the lines are covered with a layer of mussels) and it is therefore concluded that there is a high degree of certainty that the effects of the fishery concerning marine mammals are within limits of national and international requirements for protection of ETP species.

Figure 5. August distribution of harbour seals in Scotland. Source: SCOS 2015.

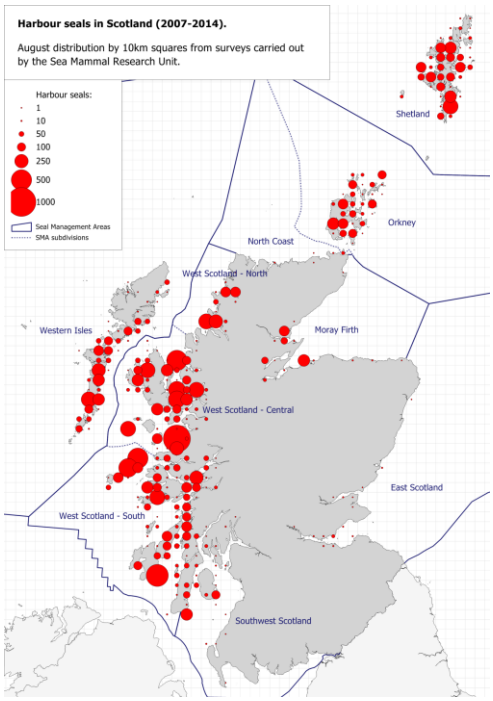
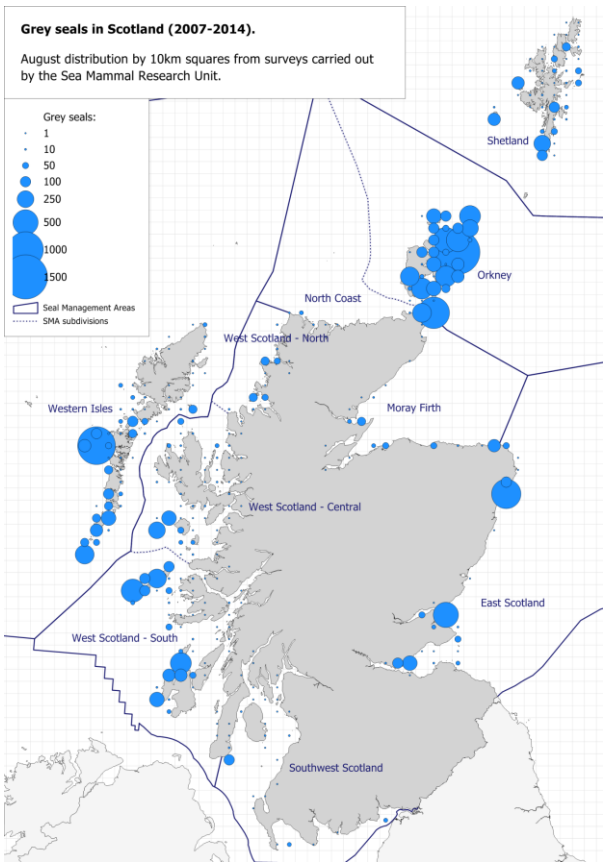


Figure 6. August distribution of grey seals in Scotland. Source: SCOS 2015



Birds

A large number of birds species are present or regularly seen in Scottish lochs and Shetland voes where mussel rope culture is practised. Diving species that could be affected (among others) are: Great Northern Diver. (*Gavia immer*), Common Scoter (*Melanitta nigra*),

Common merganser (*Mergus merganser*), Atlantic puffin (*Fratercula arctica*), Common guillemot (*Uria aalge) and Common Eider duck (Somateria mollissima).* Direct effect from mussel culture on long lines on birds species are not to be expected in this fishery (Roycroft et al., 2004). There is no chance that birds are unintentially caught on a hook or in an net since these gears are not used. The mussel rope is a passive gear. The only possibly significant interaction between birds and mussel rope culture is the interaction between mussel farming and eider ducks. Eider ducks can dive to depths of up to 30 m and feed on marine invertebrates (e.g. mussels). Numbers of Eider duck are known to be increasing in areas associated with mariculture in northern Europe and have been found to alter their seasonal pattern of movements to taken advantage of farming practices due to farmed mussels being more preferable to a potential predator than wild ones (Beveridge, 2001). Eider ducks are feeding on the cultured mussels and when present in larger numbers can completely strip a mussel line from mussels. The consequence is that mussel farmers in Scotland and Shetland constantly monitor the number of birds present in the vicinity of their structures and that they will scare away larger groups of eider ducks. The usual way of doing this is by approaching the birds with a motor boat with the result that they will move away from the farm.

The presence of people working at the structures when harvesting or doing other work will keep the eider ducks away (Ross & Furness, 2000). Some mussel farms use protector (or exclusion) nets in order to keep the eider ducks away from the mussel ropes. This can lead to the entanglement of eider ducks in these nets. Varennes et al. (2013) investigated the effectiveness of exclusion nets in Canada and concluded that nets with a maximum mesh size of 15 cm with large twine size are the safest for eider ducks. Nets with thin twine and large mesh size were more likely to cause bird entanglement.

The literature about the interaction between eider ducks and mussel farming in Scotland (Galbraith, 1992) concentrates on minimizing the impact of eider ducks on mussel farming. Impacts on eider duck populations are not estimated (T. Wilding, pers. comm.). The mussel farms probably increase the food supply for eider ducks because they increase the mussel stock. It is likely that the cultured mussel will result in an increased spat fall in the areas were mussel culture takes place.

In the UK the numbers of eider ducks are monitored under the Wetland Bird Survey (WeBs). WeBS is a joint scheme of the British Trust for Ornithology (BTO), Royal Society for the Protection of Birds (RSPB) and Joint Nature Conservation Committee (JNCC), in association with Wildfowl & Wetlands Trust (WWT), to monitor non-breeding water birds in the UK. The principal aims of the scheme are to identify population sizes, determine trends in numbers and distribution, and identify important sites for water birds.

The overall British trend over the course of the last twenty years has shown a slow, yet consistent, decline in numbers of Eiders. In the WeBs report eiders in Shetland are listed as a separate population from those elsewhere in Britain. Relatively few Eiders are counted at the small number of sites on Shetland which are monitored routinely through WeBS. Therefore the report mentions the results of the seabird monitoring programme by the Shetland Oil Terminal Environmental Advisory Group (SOTEAG).

The SOTEAG seabird monitoring programme has been carried out full-time since 1978 and has surveyed seabird populations throughout Shetland. A full survey of the moulting population undertaken by SOTEAG in August 2015 generated a total of 4610 birds in Shetland (Heubeck & Mellor 2016). This was only 17 birds less than the number that was estimated in 2012 (4627) so after a reduction in numbers since 2009 (5782 birds) the population seems to have stabilized. Overall, 82% of the population was associated with aquaculture sites in August 2015, compared to 64% in August 2012.

In recent years the client group has developed eider observation sheets and farms were supplied with eider observation records to provide data on interactions at farms. Results to

date indicate that eider/mussel farm interactions have reduced in Shetland. The client has also reported that the use of predator nets is not common practice. Usually when large numbers of eider ducks are seen in close proximity to the mussel ropes, somebody will be sent to the farm with a small boat and stay around until the birds leave the site. It seems that eider ducks have become accustomed to this practice and now mainly feed from natural mussel beds or at salmon farm structures. For Scottish mainland sites, eider interactions with mussel farms were not raised as an issue by environmental organisations.

Figure 7. Distribution of Eider ducks in Shetland Islands (scource: SIMSP)

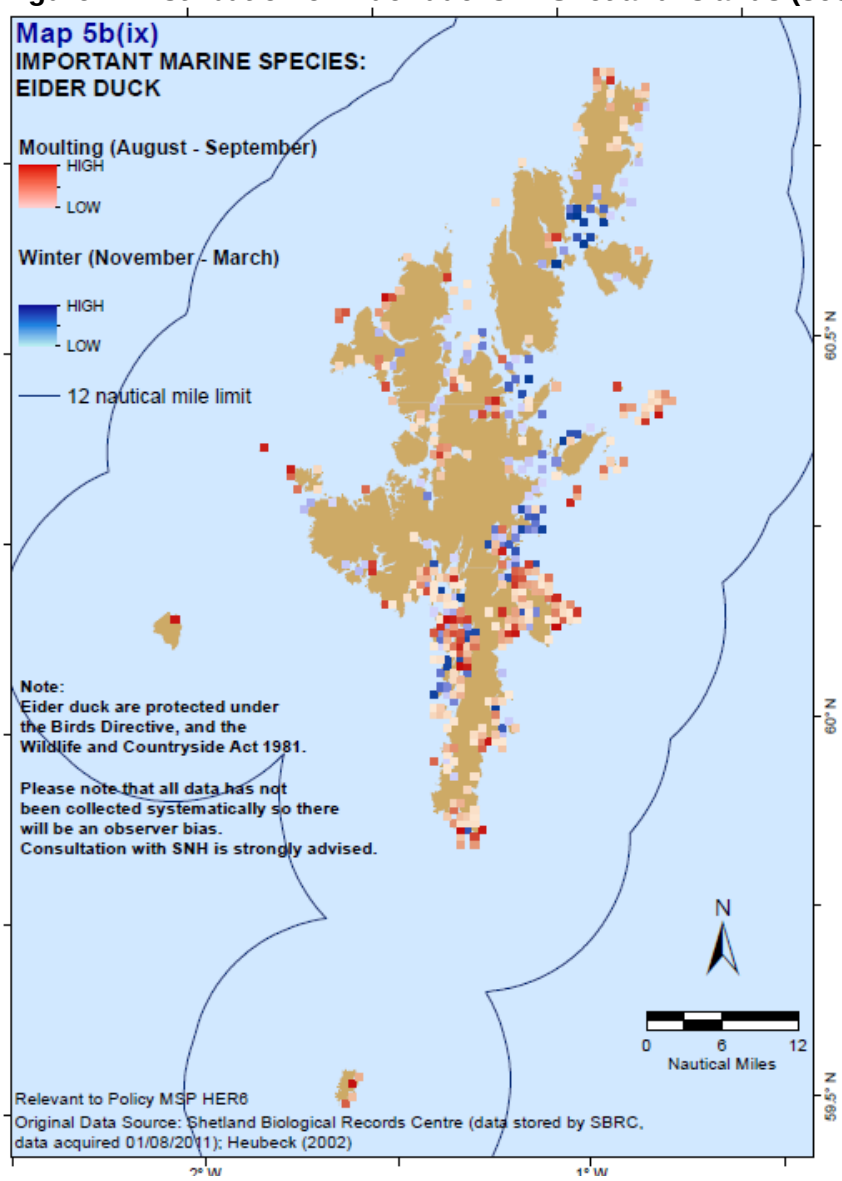
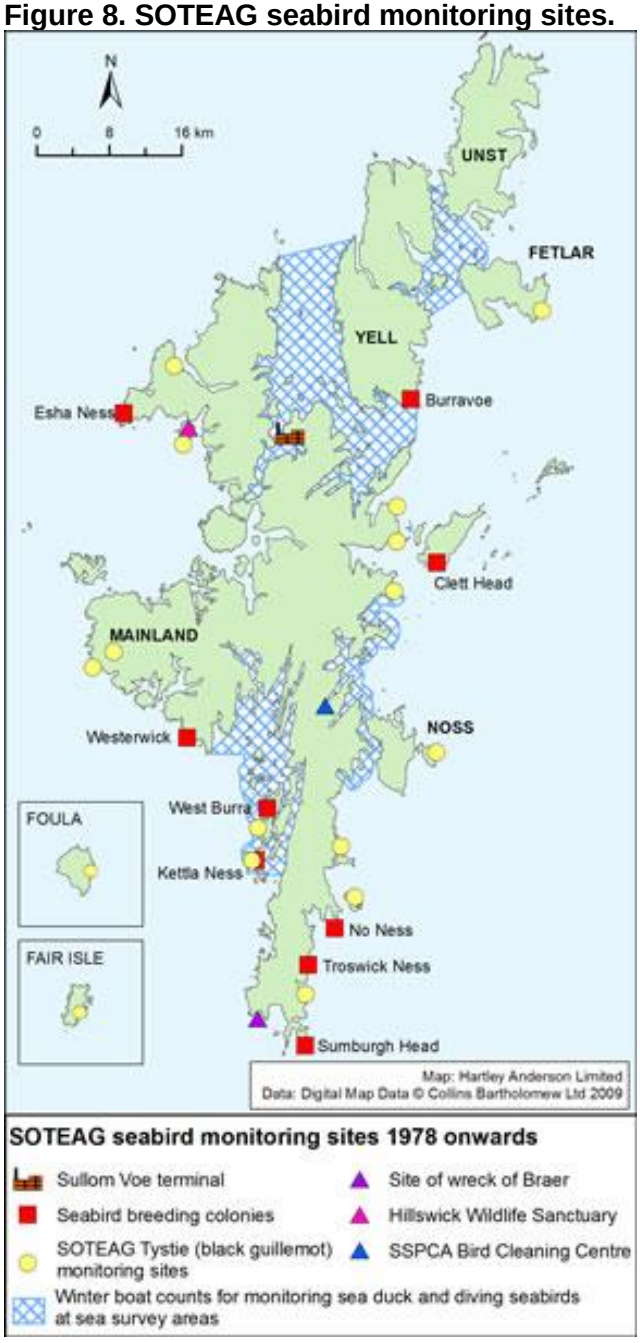


Figure 8. SOTEAG seabird monitoring sites.



Source: Heubeck & Mellor, 2016

3.5.2 Habitats

Literature reports indicate a variety of effects of shellfish farming activities on the benthic marine environment. Mussel farms can modify the benthic environment (habitat) on the seabed below them in a number of ways. Deposits of live mussels, broken shells, and other farm debris build up below the growing lines and, in the absence of strong currents, these deposits can increase sedimentation rates by reducing water flow across the seabed. Seabed debris and clumps of live mussels on, and beneath, growing lines are colonized by a variety of organisms: ascidians, bryozoans, sponges, bivalves, calcareous polychaetes, and seaweeds. (Kaspar et al. 1985). These aggregations can provide a reef-like habitat for a variety of mobile fauna including fish, crustaceans, starfish, sea urchins, and other echinoderms (Tenore et al. 1985).

The deposition of faeces and pseudofaeces from the mussels can lead to organic enrichment of the sediments below mussel farms. In farms where there is little water flow, organic enrichment of the benthos can create anaerobic and acidic conditions which result in elevated levels of sulphides and ammonium (Tenore et al., 1985). Organic enrichment of the sediments beneath mussel farms and resulting anoxic conditions cause declines in the abundance of large, deep-burrowing species of molluscs, echinoderms, crustaceans and polychaetes. Tenore *et al*. (1982) contrasted the benthic regimes of two Spanish coastal embayments: an intensive mussel culture area (approximately 2000 mussel culture rafts), and an extensive mussel culture area (<100 mussel culture rafts). It was found that forty years of intensive mussel culture (2000 rafts) resulted in a generally low biomass and low diversity polychaete-nematode dominated assemblage in the benthic macrofauna, with decreased biomass within farmed areas. This is in comparison to less intensive mussel culture (<100 rafts) maintaining a highly diverse benthic community in the culture area. Grant *et al*. (1995), studied the impacts of mussel culture on benthic community composition and found that the community was dominated by molluscs attracted to the enriched organic matter (a product of biodeposition) and the mussels that had fallen from lines. Overall, the impact of the culture operation on the benthic community appeared to be minor, with little impact on species diversity evident as a result of mussel culture. Generally, there can be a shift in the food webs away from predominantly suspension-feeding organisms to deposit-feeding faunas.

The severity of benthic impacts, however, is not consistent as studies have revealed effects varying from severe impacts on all examined parameters to low impacts on only few of the parameters (Hatcher et al.,1994), and some studies could not detect any significant effects (Crawford et al. 2003). Several studies on organic enrichment of the seabed from shellfish farming have concluded that the effect is small, and much less than that caused by finfish farming. In contrast to conditions observed under some salmon farms, no extensive mats of bacteria or spontaneous outgassing were observed and no major changes in benthic infauna to species tolerant of high organic loadings were found. Charmberlain et al. (2001) compared two sites in south western Ireland in conjunction with current characteristics. At one farm the benthic community was subjected to higher sedimentation and organic enrichment. On this farm reduced macrobenthic infauna diversity was recorded and this effect was restricted to a radius of 40 m around the farm. At the other farm no such effects of mussel biodeposits were recorded and a diverse macrobenthic community persisted. Charmberlain concluded that the differences were caused by differences in local current patterns. Due to the low settling velocities of the particles involved, slight variations in current velocity and direction and water depth around the farms could have a great effect on the dispersion of the biodeposits and thus on rate of organic enrichment within the dispersion area. He concluded therefore that the potential of a mussel farm to impact the benthic community greatly depended on hydrographic conditions. Other factors determining the impact would be the production tonnage of the farm (stocking density) (Kaiser et al., 1998) and the food available for the mussels. Details of environmental impacts of bivalve mariculture on the environment are also given in reviews by Kaiser et al. (1998) and Keeley (2009). Keeley concludes that in general, the effects are usually difficult to detect within 20-50 m of the farm site and that water depth and current speeds are the two most important factors in determining the effect of a farm on the seabed. Kaiser et al. (1998) concluded that environmental changes as a result of shellfish farming can be minimized by using appropriate culture techniques.

From the scientific literature it can be concluded that the impact of rope mussel culture on bottom habitats in Scottish lochs and Shetland voes strongly depends on the existing water currents, stocking densities, water depth and the presence of more sensitive habitats under or near the mussel ropes.
Both in Scotland and Shetland the local (planning) authorities and the industry have shown to be very well aware of this (SIC, 2012). Mussel farmers know that they will experience a reduced growth of their mussel on their farm when stocking densities are too high. Local authorities in Shetland apply a model to calculate the carrying capacity of a certain water

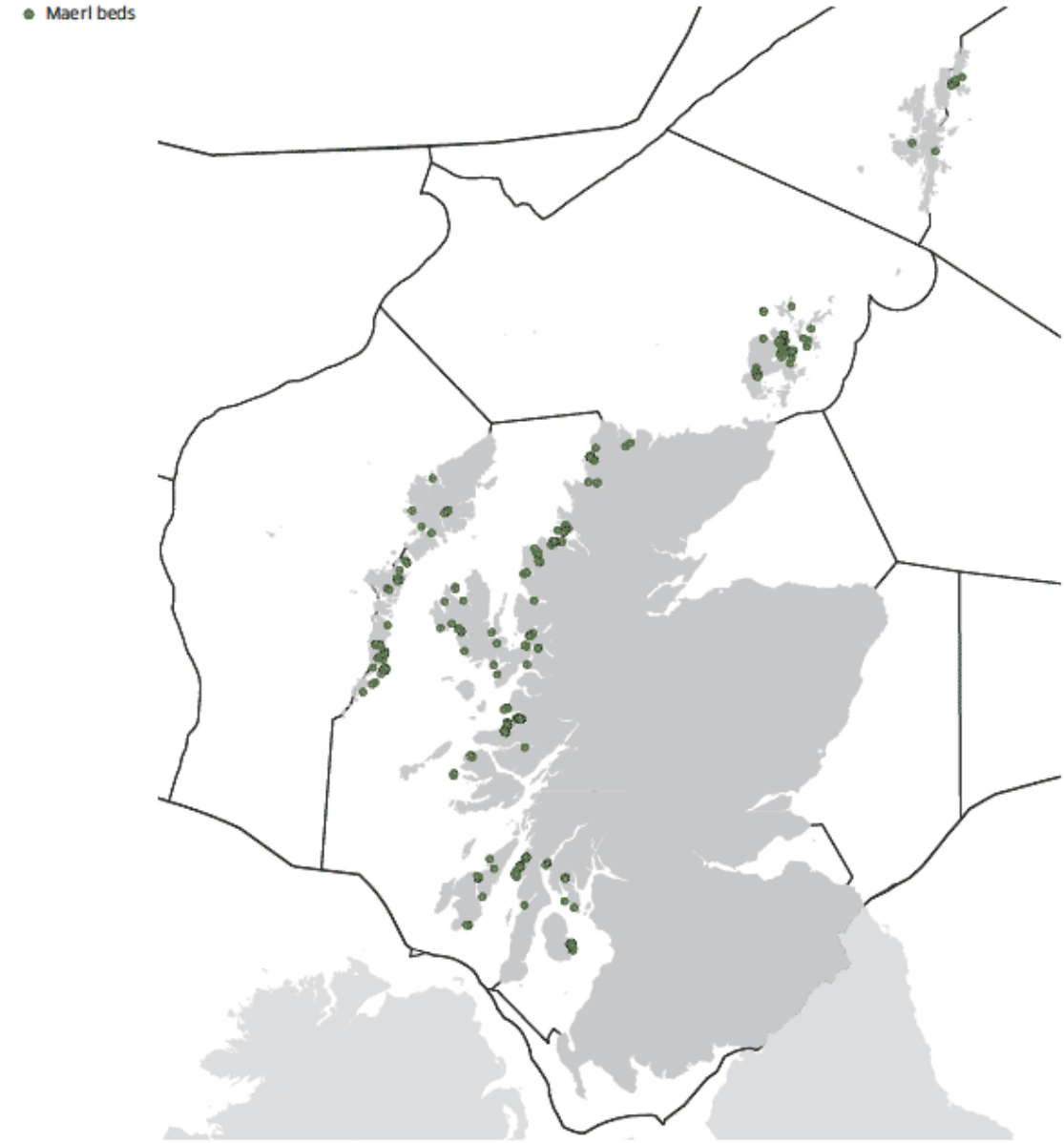
body were applications are made. Also in Scotland the issue of licensing is taking account of the number of lines that a loch could sustain. This strategy has resulted in mussel farms of limited size is all lochs and voes. The result of this practice being that even if the bottom habitats under the sites would be impacted that these impacts are limited in size and scale and that in comparison with the total distribution of the bottom habitats present in the lochs and voes. Even more important is the implemented strategy of protection of the more sensitive habitats like horse mussel beds and mearl beds. No planning permissions are given for (or near) locations were these sensitive habitats are located. This means that mussel farms are not located on sites were they could do serious harm to sensitive habitats

Impacts of mussel culture on bottom habitats in Shetland have been surveyed at mussel farm sites by means of a video survey. The scope of the survey was to make a general appraisal of the impact of mussel farming activity on the seabed and benthic fauna under the farms (Angus, 2010). For the survey four different farms at different locations were selected to give a cross section of farms and location types. Three farms were located within relatively sheltered “voes” (non-fjordic inlets) as most farms are in Shetland whereas the fourth location was more exposed. The survey showed that the sediment type on the three sheltered farms was fine muddy sand. On the fourth location the seabed type was medium sand with some gravel. The survey report concludes that there was no apparent anoxia or bubbling from the sediment. No gross change to sediment composition was evident in comparison to control stations. Active macrofauna were present at all stations. High densities of scavenging common starfish were frequently observed at localised drop-off locations. At all stations drop of mussels were seen and it was concluded that after the flesh is consumed by starfish the shells will remain for longer time and through bio turbidity enter in the sediment. No gross change to sediment composition was evident in comparison to control stations. Active macrofauna were present at all stations. High densities of scavenging common starfish were frequently observed at localised drop-off locations. At all stations, mussels were seen and it was concluded that after the flesh is consumed by starfish the shells will remain for longer time and through bio turbidity enter in the sediment.

The Scottish Shellfish Marketing Group (SSMG) has commissioned research on bottom sediments under three larger farms in Scotland (Clift Sound & Loch Eriboll) and Shetland (Ronass Voe) in order to assess to which extent the bottom under the farms is impacted by farming. The sites were sampled in June 2013 and this survey was repeated in July 2015 to monitor any changes over time at these sites. In all instances the samples consisted of soft, very fine sand and shell fragments. The 2013 sample from the Ronas Voe site also contained mussel shells, common tower shells (*Turritella communis)* and sea squirts (*Ascidia spp*). Qualitative examination did not show any H2S smell. From all samples organic matter, total carbon, total Phosphorus, total Nitrogen and Redox values were analysed. In the 2015 report the results of the 2013 and 2015 surveys were compared. It was concluded that organic carbon and total carbon is relatively low at all sites and this remains the case for both surveys. In 2015 total Phosphorus was lower at all sites. Redox values indicated good oxygenation throughout all samples with no negative readings recorded. Based on these physio-chemical analysis of sediments the team concludes that there are no indications of organic enrichment of the benthos under the sites to the extent that anaerobic conditions are created that could result in declines in the abundance of large, deep-burrowing species of molluscs, echinoderms, crustaceans and polychaetes.

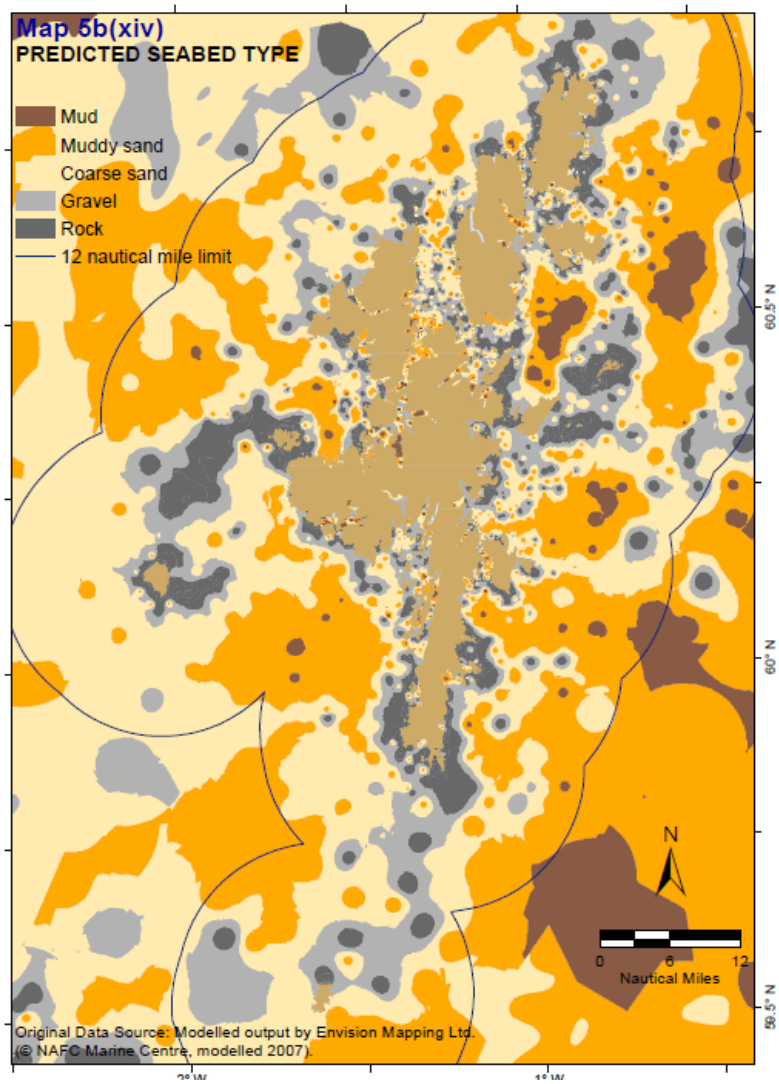
The Marine (Scotland) Act 2010 and the Marine and Coastal Access Act provide for marine planning of Scottish waters out to 200 nautical miles and give new marine conservation responsibilities. The Marine Atlas has been made as a key step in the development of a national marine plan for Scotland. The Marine Atlas presents data to ensure that policies developed in the national marine plan are informed by the fullest data possible. These maps provide a fairly good understanding were sensitive or protected habitats are located **(Figure 9)**. For Shetland also a Marine Atlas has been made as part of the marine spatial plan for the Shetland islands. As a result of these developments for both Scotland as Shetland advanced maps of the marine seabed of lochs (called ‘voes’ is Shetland) exist (**Figure 10**).

Figure 9: Map showing mearl beds in Scottish waters.



Source: Marine Atlas for Scotland; http://www.gov.scot/Publications/2011/03/16182005/48

Figure 10. Predicted seabed type map Shetland Islands



Source: SSMEI Marine Atlas

JNCC and Scottish Natural Heritage (SNH) have applied the Site Selection Guidelines to identify Nature Conservation MPAs that together with existing protected areas will form a network of MPAs. The process will also help Scotland meet its contribution to UK commitments under international conventions and legislation such as the Convention on Biological Diversity, and the OSPAR Convention for an ecologically coherent network of MPAs.

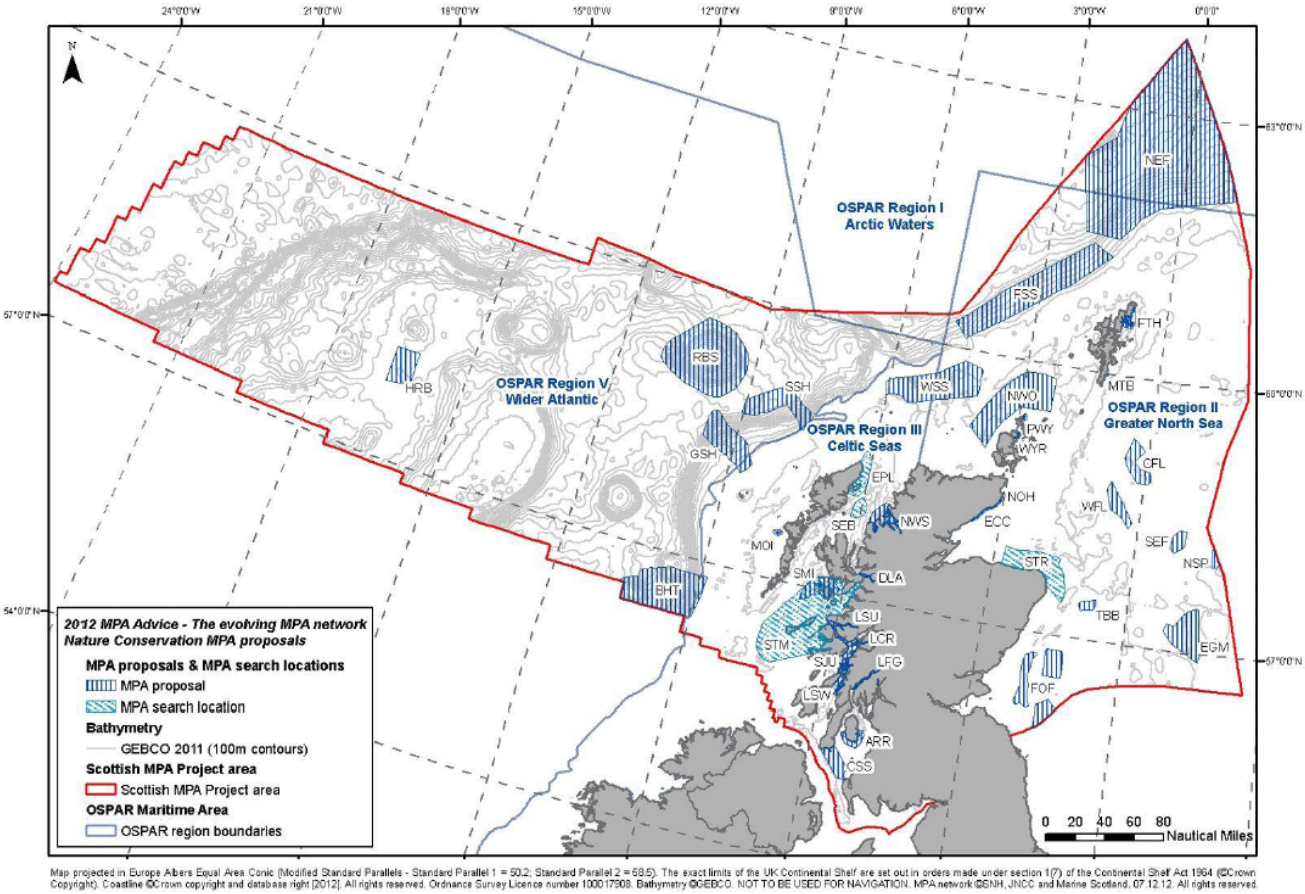
The Scottish Marine Atlas and the Shetland islands Spatial Plan provide an overvieuw of marine protected areas (MPAs) in Scotland and Shetland islands.
The term 'MPA' is used for different types of protected areas in the marine environment. Scotland (along with the rest of the UK) has a number of MPAs.The following types of MPAs make up the Scottish MPA network:
– Special Areas of Conservation (SACs)
– Special Protection Areas (SPAs)
– Nature Conservation MPAs
– Sites of Special Scientific Interest (SSSIs)
– Ramsar sites

Nature conservation MPAs are regions of the seas and coasts where wildlife is protected from damage and disturbance. Nature Conservation MPAs are identified for features (the

collective term for species, habitats and geology) that the Scottish Government believes require additional protection.

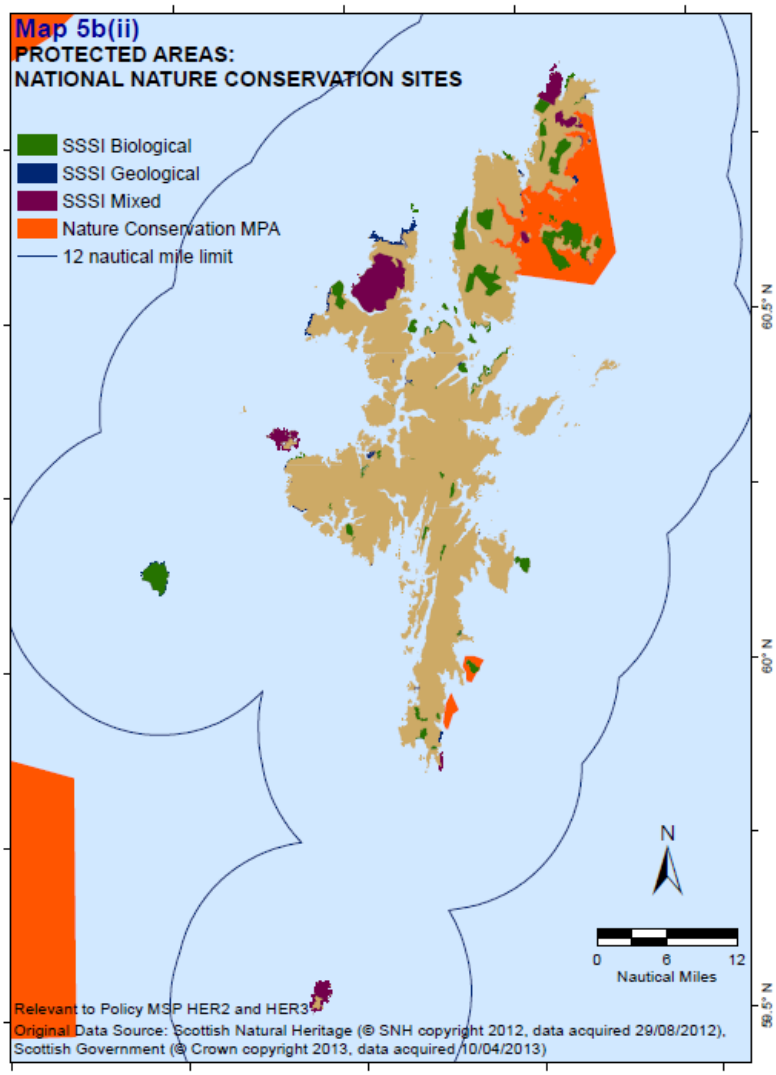
In July 2014, 30 Nature Conservation MPAs were designated in the seas around Scotland, of which 13 are offshore.

Figure 11. Natura Conservation MPA proposals in Scottish waters (http://www.gov.scot/Publications/2012/12/6655/7)



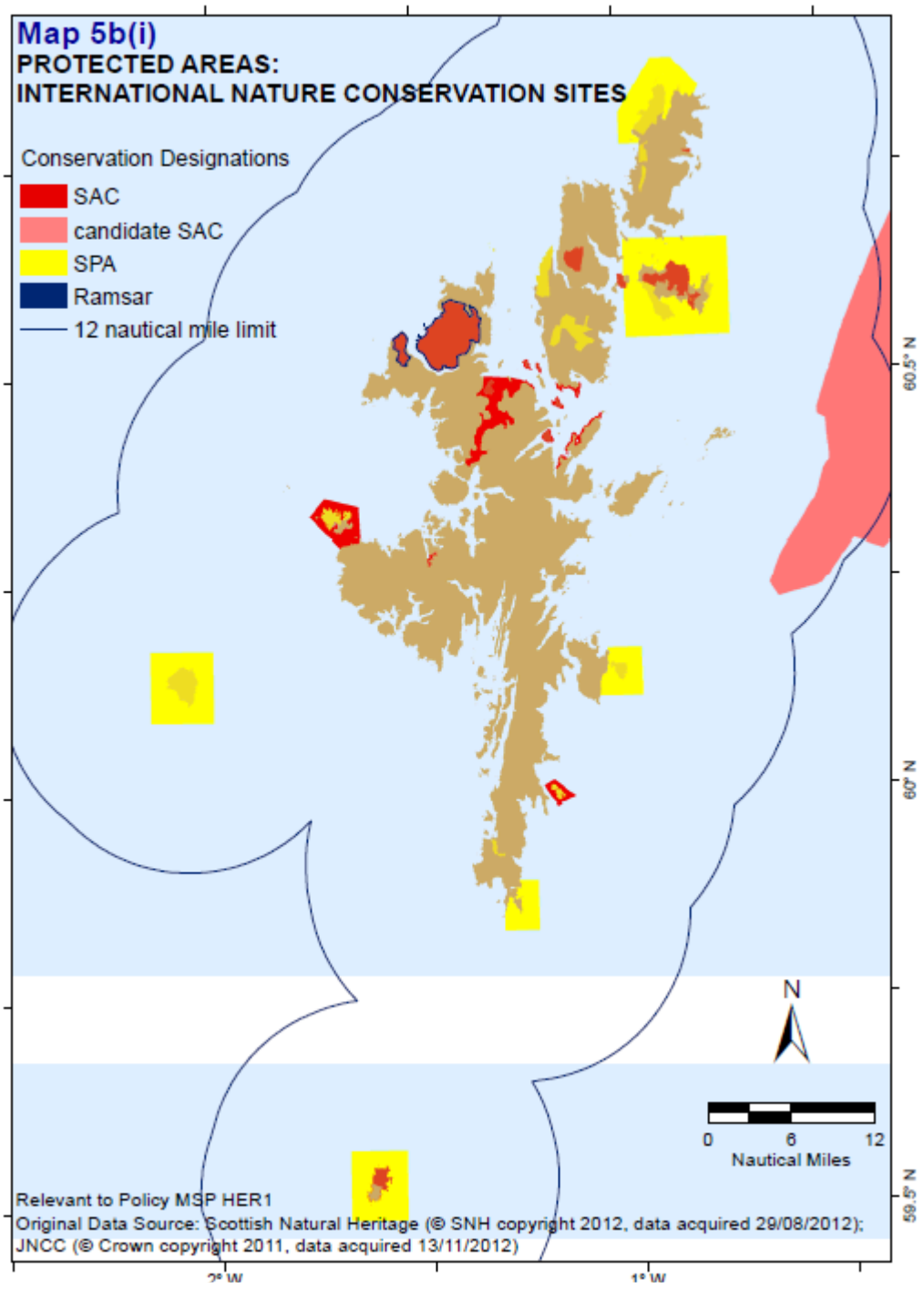
There are two nature conservation MPA areas in Shetland, 'Fetlar to Haroldswick' and 'Mousa to Boddam' (**Figure 12**). The Fetlar to Haroldswick (**Figure 14**) MPA incorporates the sea area used for foraging by black guillemots while the inlets, sounds and stretches of open coastline
support a range of seabed habitats and species. This includes extensive and biologically diverse maerl and horse mussel beds, as well as more widely distributed shallow tide-swept sands with burrowing bivalves and coarser sediment communities representative of Scotland's seas more generally. The Mousa to Boddam MPA (**Figure 15**) encompasses the known extent of sandeel grounds in two distinct areas around the island of Mousa and off the coast at Boddam, south-east Shetland. The MPA contains the area of most consistent and reliable sandeel recruitment in Shetland. Around Mousa, the MPA overlaps an existing Special Area of Conservation (SAC) designated for reefs, sea caves and harbour seals (**Figure 13)**

Figure 12. National Nature Conservation MPA's in Shetland. (In the north-east the Fetlar to Harroldswick MPA and in the south-east the Moussa to Boddam MPA)



Source: SSMEI Marine Atlas

Figure 13. Protected Areas in Shetland.



Source: SSMEI Marine Atlas

Figure 14. Fetlar to Haroldswick MPA

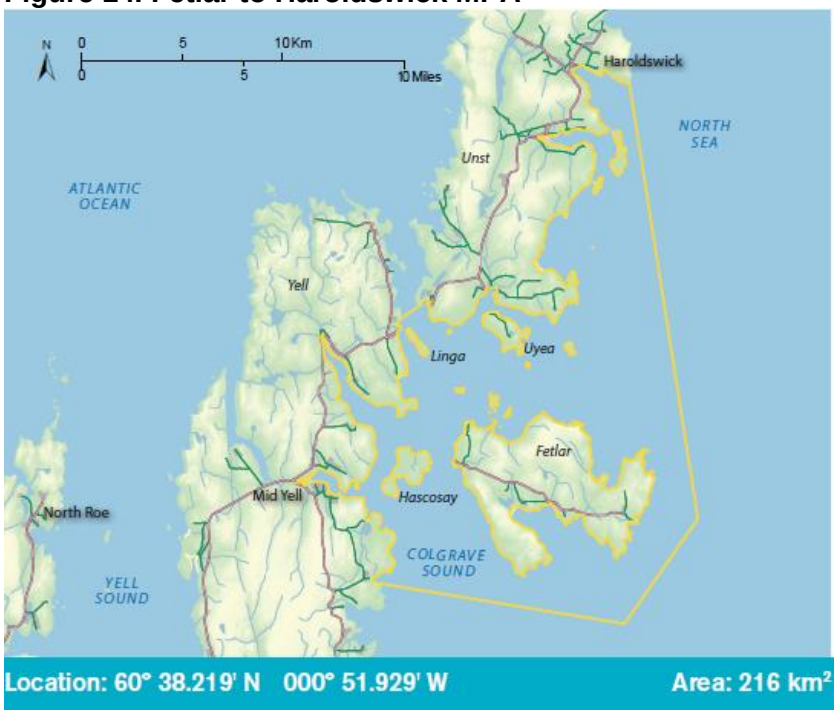
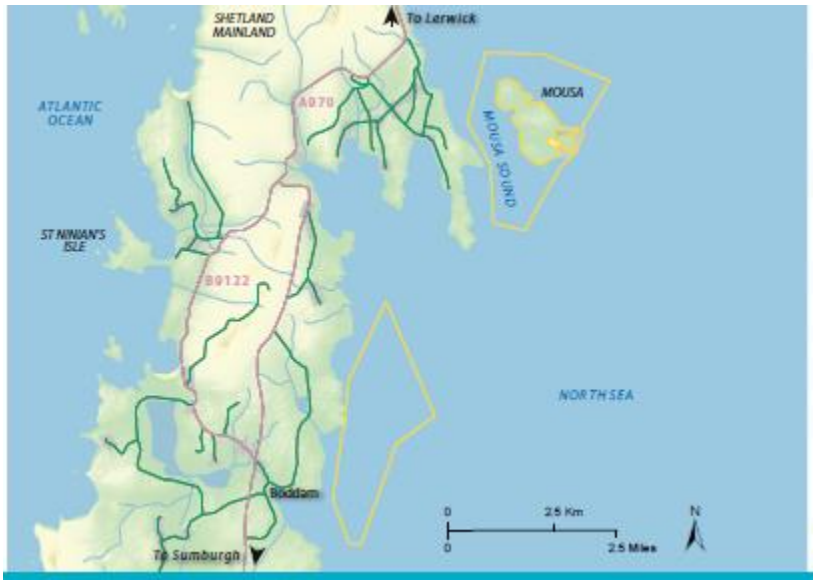


Figure 15. Moussa to Boddam MPA



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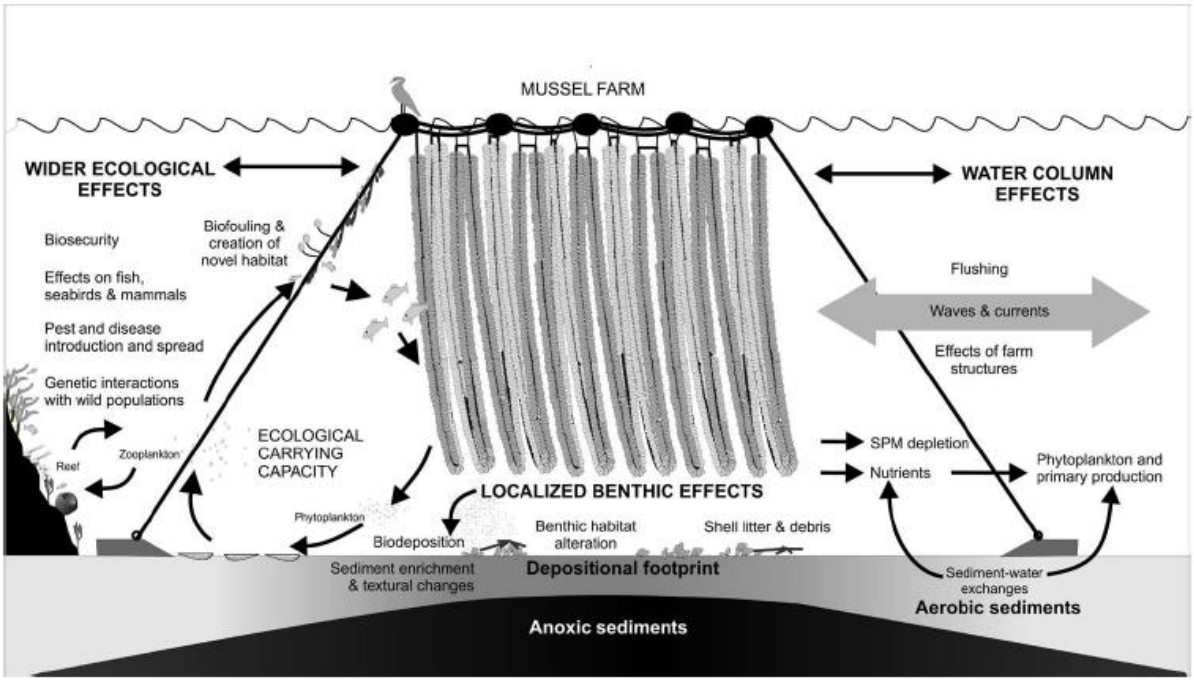
3.5.3 Ecosystem

Studies have been conducted on the environmental impacts of mussel culture in various parts of the world. These studies show that mussel farming has ecological effects on the seabed and on the water column (Keeley, 2009; Ingles & Gust, 2003). Besides these two generally well-studied issues there are some wider ecological issues connected to mussel farming. Structures are put in the water and therefore marine farms function as mid-water artificial reefs that provide a food source, breeding habitat, and refuge from predators for some species. Potential effects of these artificial structures on seabirds and marine mammals (seals, dolphins and whales) relate mainly to entanglement in structures and gear and habitat exclusion. This issue has been discussed under PI 2.3.1: ETP. It is known that aquaculture structures can be reservoirs for the establishment of invasive species. Finally the mussel culture can have an effect on the genetics of the mussel population.

The physical presence of marine farms can alter and reduce current speeds, which may impact biological processes. At the present scale of development in Scotland and Shetland these issues are not considered significant here. Pelagic impacts further include the depletion of phytoplankton and/or the alteration of nitrogen cycles in the water column.

Figure 16. Schematic of potential ecological effects from long-line cultivation of mussel and associated spat catching



Source: Keeley, 2009

The large concentrations of mussels found in mussel farms can extract a significant proportion of phytoplankton. Mussel farms act as biological filters and influence the types and amount of food available in the water column. This in turn has the potential to have top-down effects on the wider ecosystem by influencing the amount of resources available at the base of the food web. Due to high density cultures and relatively high filtration capacity of mussels, the concept of carrying capacity has been focused on the depletion of food within the water column.

In order to understand the magnitude of the effects of mussel farms, bio-physical models have been used to assist in understanding the cumulative spatial impacts of mussel farms on these primary resources in New Zealand (Keeley, 2009). These studies have focused on the levels of culture that reduce the food in the water to concentrations where they begin to affect the growth of the culture itself. This approach relates to production carrying capacity (i.e. the stocking density of bivalves at which harvests are maximised (Inglis et al., 2000) or the physical carrying capacity of a given coastal area (i.e. the total area of marine farms that can be accommodated in the available physical space (Inglis et al. 2000). Carrying capacity of mussel farming can also be defined in relation to ecological effects, or what is termed ecological carrying capacity.

Ecological carrying capacity has been defined for shellfish aquaculture by Inglis et al. (2000) as “the stocking or farm density which causes unacceptable ecological impacts”. In Scotland work on carrying capacity of lochs has been carried out by Tett (2007) in the framework of the SARF 12 project. Gibbs (2007) provides some guidance as to what sustainability performance indicators may be acceptable for assessing the level of interaction between bivalve culture and the water column environment. These can be applied to various farm locations as a means of identifying any limitations relating to existing environmental characteristics (e.g. hydrodynamics, phytoplankton biomass etc.).

Mussel farms also result in a concentration and redistribution of nutrients (Christensen, 2003). Farmed mussels and other associated fauna release dissolved sources of nitrogen (*e.g.* ammonium) directly into the water column as metabolic waste products. Water column nitrogen concentrations can also be increased due to enhanced benthic re-mineralisation rates beneath the farm (*i.e.* the microbial breakdown of mussel biodeposits on the sediment surface and flux of ammonium into the water column). Localised nutrient enrichment could effectively stimulate production of algae attached to the mussels and culture lines (Black 2001). Although the impacts of shellfish farming on cycling of nitrogen may be considerable, a range of factors exist which may influence nitrogen cycling in any one body of water. These include farm-specific factors (scale of operation, production density etc.), natural processes (tidal exchange) and external sources of N (natural, domestic and agri-industrial sources of N). Such high degree of variability in nitrogen renders it intrinsically difficult to measure in the context of environmental effects of mussel farming. Oxygen is consumed through respiration by the mussels and associated fouling organisms on the culture lines. This can be exacerbated by enhanced benthic oxygen consumption due to deposition and decomposition of particulate organic materials beneath farms. Ammonium released by mussels is immediately available for localised phytoplankton production in surface waters (Kasper *et al*. 1985). However, large-scale commercially intensive bivalve aquaculture may lead to depletion of nutrients, particularly nitrogen which plays a crucial role in the productivity of a coastal ecosystem and may lead to localised food-limitation for bivalve production (Kasper *et al*. 1985). In summary, bivalve aquaculture may impact the pelagic environment through the alteration of nutrient cycling, but such impacts may only be expected to occur where high density bivalve aquaculture occurs.

It can be concluded that extensive work on the pelagic effects of mussel culture has been done and this work will continue with the extension of mussel farming. All information considered points towards the conclusion that impacts vary depending on numerous factors such as farm size, crop density, water depth, currents and season. Large effects are seen only in situations with a high concentration of mussels in water bodies with a limited water exchange.

Both in Scotland and Shetland the local authorities and the industry have shown to be very well aware of this. Mussel farmers know that they will experience a reduced growth of their mussel on their farm when stocking densities are too high. Local authorities in Shetland apply a model to calculate the carrying capacity of a certain water body were applications are made. Also in Scotland the issue of licensing is taking account of the number of lines that a loch could sustain.

As stated above other ecosystem impacts from mussel culture can result from the fact that the mussel lines can provide an artificial habitat for many species. Rocha et al (2009) found that mussel farms provide a habitat for several invasive tunicate species. The arrival of the Japanese skeleton shrimp *Caprella mutica* in Scotland illustrates the potential of the introduction of new species. Because the suspended mussel culture does not import mussels from other areas the risks in the Scottish and Shetland for unintentional movement of non-native species is considered low.

The epifauna on the mussel lines provides an additional food source for some fish species. Lopez et al. (1984) concluded that one effect of intense mussel aquaculture in Spain has been to change the food habits of some fish species from predominantly infauna to raft epifauna diet. The mussel rafts can also provide shelter for some fish.

3.6 Principle Three: Management System Background

3.6.1 Governance & Policy

EU

The UK is a Member State of the European Union, and its fisheries are therefore subject to the principles and practices of the Common Fisheries Policy (CFP) of the EU. Although there is considerable local management (see below), the EU rules of the Common Fisheries Policy do none-the-less still apply to Scottish shellfish fisheries.
The first EU common measures in the fishing sector date from 1970, when it was agreed that, in principle, EU fishermen should have equal access to Member States' waters.
A revised CFP came into force in 2014 and the current basic fisheries regulation (No.1380/2013) details the CFP objectives, including:
"TheCFP shall ensure that fishing and aquaculture activities are environmentally sustainable in the long-term and are managed in a way that is consistent with the objectives of achieving economic, social and employment benefits, and of contributing to the availability of food supplies."

Outside the CFP framework other EU legislation dealing with habitats and species protection is also relevant to fisheries management and to operators in the fishery.

In 2013 the EU published Strategic Guildelines for the Sustainable Development of Aquaculture, COM (2013) 229. These note the significance of the Water Framework Directive (Directive 2000/60/EC) and the Marine Strategy Framework Directive (Directive 2008/56/EC) in ensuring healthy aquatic systems that are essential for sustainable aquaculture.

National

Implementation of the CFP at a national level is carried out through the individual Member States. In Scotland responsibility for inshore fisheries management is devolved from the UK to the Scottish Government. EC-wide measures relate to technical measures (permitted fishing gears, minimum landing sizes, etc.) and establishing fishing opportunities for certain species in particular sea areas the form of quota or effort limits. This fishery is not regarded as a pressure stock and is not subject to such restrictions.
The main UK enabling legislation is the Sea Fish (Conservation) Act 1992. The Scotland Act 1998 sets out the powers devolved from UK Government in London, to the Scottish Government in Edinburgh. The Scottish Government has powers to take non-discriminatory fishery conservation measures within 12 miles. The main tools available to Scottish Ministers to regulate fisheries in these areas are through restrictive licensing or other measures set out in the Inshore Fishing (Scotland) Act 1984.

The Aquaculture and Fisheries (Scotland) Act 2013 updates the 2007 Act, which layed down provisions for Scottish Ministers to provide practical guidance and good practice for operators of shellfish farms. The revised act aims to "ensure that farmed and wild fisheries - and their interactions with each other - continue to be managed effectively, maximising their combined contribution to supporting sustainable economic growth with due regard to the wider marine environment." (Scottish Government, 2013).

The fishery under assessment is also viewed as a development that is subject to the Scottish planning framework under the Town & Country Planning (Scotland) Acts.
Scottish Planning Policy (Scottish Government, 2010) states:
There are a number of regulatory controls covering aquaculture in addition to planning permission, including the rights and interests of the Crown Estate as owners of the seabed. The planning system should not duplicate other control regimes such as controlled activities

regulation licences from SEPA or fish health, sea lice and containment regulation by Marine Scotland. Planning authorities and applicants should engage with other regulators to improve understanding of relevant requirements. Voluntary Codes of Good Practice have been produced by aquaculture stakeholders which address a range of issues outwith planning control such as equipment design, security, management and operational practices. These codes provide the basis for certification of standards and practices put forward in support of planning applications for aquaculture developments.

Operators must apply for a Crown Estate lease and are required to pay rent on an annual basis; however the planning approval now rests with local authorities.

Local

Local management is via Local Authority planning which is informed by the local planning framework (guided by the national planning framework). The local authorities where member sites are based (Shetland Island Council and a number of Scottish mainland councils including Argyll & Bute Council and Highland Council) require that operators seek planning approval for production sites and associated landside infrastructure.

The local authorities ensure that developments are consistent with the area development plans and require that prospective developments are publicised to provide opportunity for local stakeholders to comment and potentially object to proposals.

3.6.2 Consultation, Roles & Responsibilities

There are several organisations involved in the management and operation of the fisheries concerned. While there is complexity in management arrangements with a large number of agencies with management responsibilities, their roles are well defined and well understood. There have also been recent attempts to streamline both marine management and planning with the creation of Marine Scotland in 2010 and the Scottish planning process, as described in the recent independent review (Poseidon, 2016).

Management is in the form of production and planning licenses issued by Marine Scotland and the Local Authority respectively. A Crown Estate lease is also required, giving an additional management oversight. These agencies undertake consultation in relation to any management changes or proposed strategic developments.

Scientific advice is provided by Marine Scotland Science, which is responsible for collection the annual shellfish farm production survey, and regional expertise in the form of NAFC Marine Centre in Shetland and The Scottish Association of Marine Science (SAMS) in Oban. There is no sector-wide research plan in place, but in response to the client has . Research needs are identified and commissioned by the Scottish Aquaculture Research Forum (SARF).

Industry representation is in the form of the Association of Scottish Shellfish Growers (ASSG) and Seafood Shetland (most Shetland operators are members of both groups). The ASSG annual conference is an important dissemination route for most mussel research that is undertaken. The Scottish Shellfish Marketing Group (SSMG) is an important industry grouping as it includes many of Scotland's major mussel producers, but its remit does not formally extend to sector representation.

The Ministerial Group for Sustainable Aquaculture (MGSA) was established in May 2013 to replace the Ministerial Group on Aquaculture (MGA). Its aim is to support Scotland's aquaculture industry to achieve sustainable growth targets by 2020, with due regard to the marine environment, while also ensuring the implementation of: A Fresh Start - the renewed Strategic Framework for Scottish Aquaculture. The MGSA includes four working groups of particular relevance to mussel farming: Shellfish, Capacity, Interactions and Science &

Research. Ruth Henderson (Seafood Shetland) chairs the Shellfish Working Group, on which SSMG are also members. Both Seafood Shetland and SSMG are members on the other aforementioned Working Groups. All relevant stakeholders sit on the groups including:

- The Scottish Government Minister for Environment and Climate Change;
- Marine Scotland;
- Scottish Association for Marine Science (SAMS);
- Scottish Aquaculture Research Forum (SARF);
- Scottish Environmental Protection Agency (SEPA);
- Scottish Natural Heritage (SNH);
- Scottish Water;
- Food Standards Agency;
- The Crown Estate;
- CoSLA;
- Seafish;
- Shellfish industry; and
- Shellfish processors.

Other stakeholders, such as RSPB are invited to join specific meetings should their input on particular agenda items be required. The first MGSA meeting on Shellfish took place on 5 June 2013. On 1 September 2016 the 9th meeting of the MGSA was held. Further details on the groups are available on the Scottish Government website, in particular:
http://www.scotland.gov.uk/Topics/marine/Fish-Shellfish/MGSA
http://www.scotland.gov.uk/Topics/marine/Fish-Shellfish/MGSA/Shellfishwg

3.6.3 Objectives

Objectives for the sector are defined by a number of high-level strategic documents, including at EU level the CFP and the Marine Strategy Framework Directive (MSFD), which requires marine environments to achieve good ecological status by 2020.
The MSFD was transposed into UK legislation on 15 July 2010. The Directive requires Member States (MSs) to prepare national strategies to manage their seas to achieve or maintain Good Environmental Status (GES) by 2020.
At a national level, Scotland has long-term objectives associated with all fisheries and aquaculture management policies relevant to the fishery. The Scottish Strategic Framework for inshore fisheries sets out high-level objectives for inshore fisheries in Scotland and the rationale behind these. High-level objectives are:

» **Biological**: to conserve, enhance and restore commercial stocks in the inshore and its supporting ecosystem.

» **Economic**: to optimise long-term and sustained economic return to communities dependent on inshore fisheries, and to promote quality initiatives.

» **Environmental**: to maintain and restore the quality of the inshore marine environment for fisheries and for wildlife.

» **Social**: to recognise historical fishing practices and traditional ways of life in managing inshore fisheries, to manage change, and to interact proactively with other activities in the marine environment.

» **Governance**: to develop and implement a transparent, accountable and flexible management structure that places fishermen at the centre of the decision making process and that is underpinned by adequate information, legislation and enforcement.

Objectives for the future development of the aquaculture sector are laid out in ‘A Fresh Start’, the 2009 revision of the Strategic Framework for Scottish Aquaculture published in 2003. The long-term objectives are:

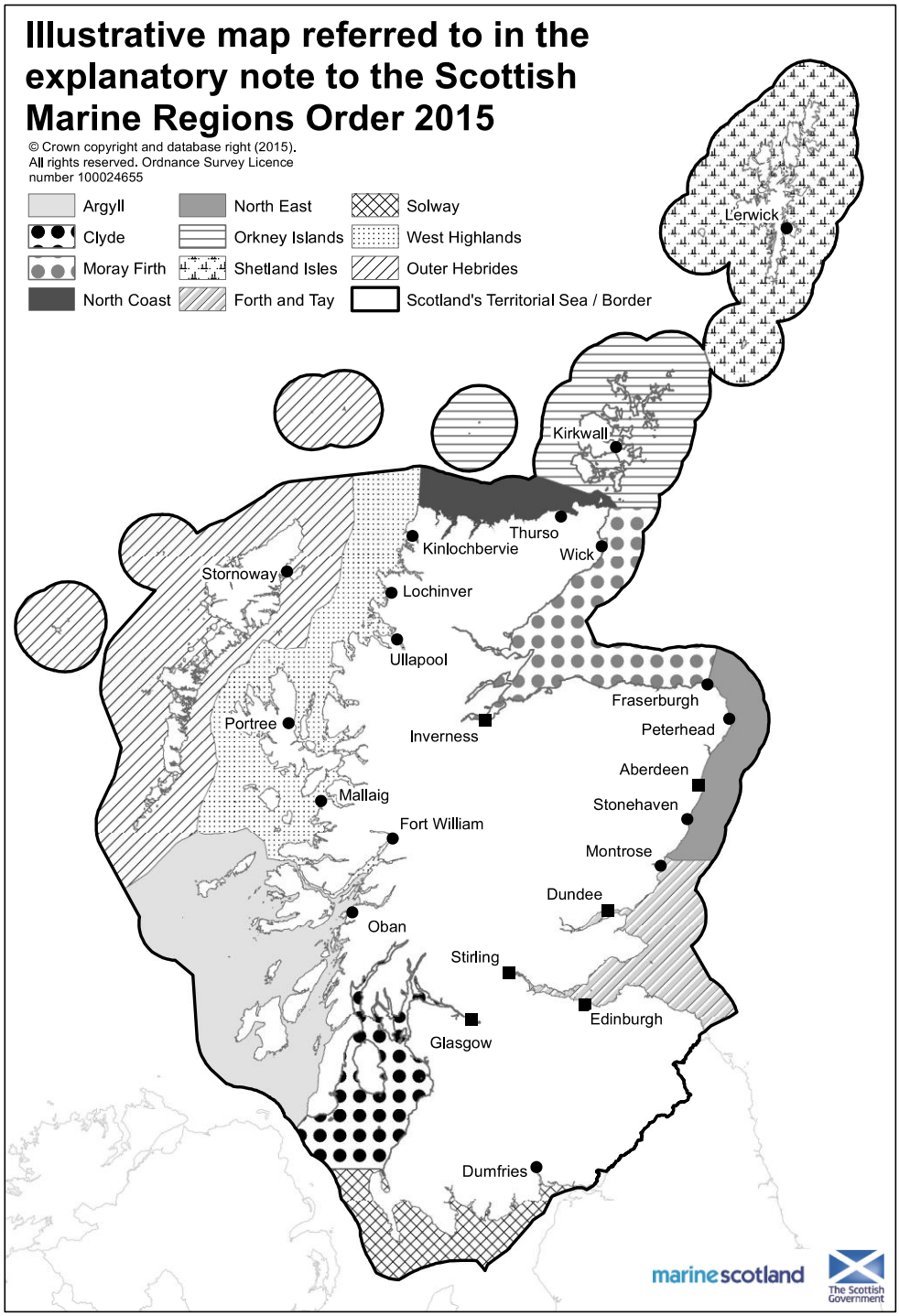
- **Sustainable Growth:** The aquaculture industry is ambitious to grow but growth must be sustainable. Growth must be within the carrying capacity of the aquatic environment and balanced against the needs of others.
- **Economic principle:** Farmed fish and shellfish industries should be able to fulfil their ambitions for growth, be market-led with a focus on quality leading to improved economic returns for the industry and greater market stability.
- **Environmental principle:** Farmed fish and shellfish industries should act as a good neighbour by minimising risks to biodiversity and impact on the environment and other aquatic activities. Growth should be within the carrying capacity of the environment.
- **Social principle:** Farmed fish and shellfish industries should underpin strong local communities and provide benefits to those communities.

The Marine (Scotland) Act 2010 requires that a national marine plan be developed. The plan has an explicit objective by 2020 to "increase the sustainable production of shellfish, mussels especially, by at least 100%. While this is a production-based long-term objective it is framed within environmental management objectives that ensure sustainable development.

The Scottish National Marine Plan, supported by eleven regional marine plans, sets the wider context within which planning operates. The Scottish Marine Regions Order came into force in May 2015 defining marine region boundaries as per figure 17 below. Regional marine plans are being developed for these marine regions.

The planning permission procedure requires information to be considered on environmental aspects, including carrying capacity and habitat and ETP interactions; the latter is largely informed by the site's proximity to Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), as well as other environmental designations. So while a formal Environmental Impact Assessment is not required for mussel farming, environmental parameters are still considered within the planning process and consulted on with the relevant statutory environmental organizations. This planning process is consistent for sites in Shetland and mainland Scotland.

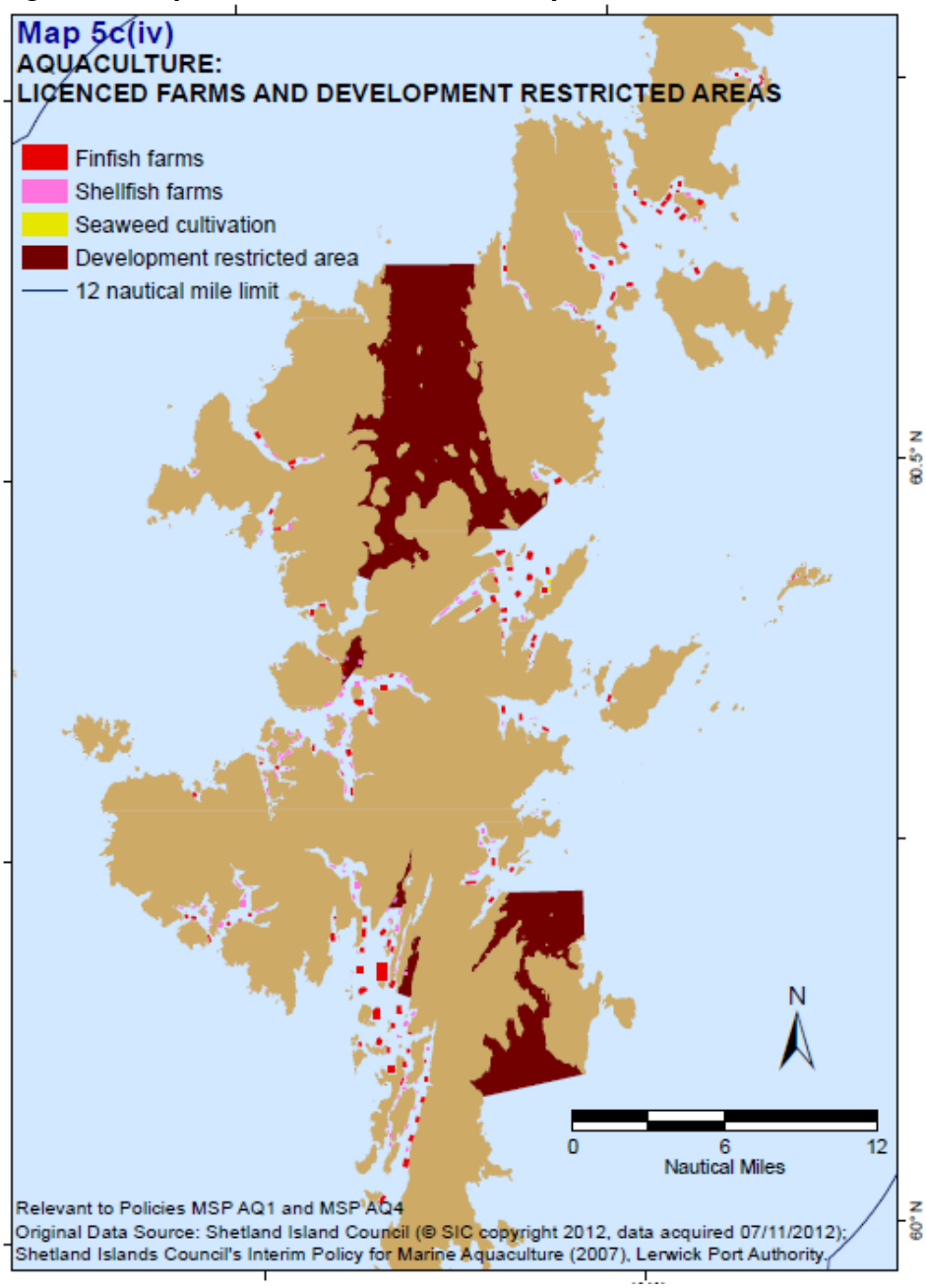
Figure 17. Scottish Marine Regions



source: Marine Scotland

Shetland has led the way in Scotland in developing local marine planning. The Shetland Integrated Marine Spatial Plan (SIMSP) recognises aquaculture as a key maritime activity for Shetland but does establish areas where aquaculture development is restricted (figure 18).

Figure 18. Aquaculture restricted development areas in Shetland



source: SIMSP

3.6.4 Incentives

The key incentive for responsible fishing is linked to the production licence, Crown Estate lease and planning permission, which will not be granted without confidence that operators are acting sustainably. For example, the Crown Estate lease was extended from 10 years to 25 years in 2010. A condition of the lease is that tenants:

» Use their best endeavours to avoid any unnecessary interference with, damage to or destruction of wildlife, flora and fauna and their natural habitat.

» If oyster beds or mussel scalps naturally exist or form on the subjects or any part thereof, not to crop the same and to preserve the oysters and mussels.

There is an implicit assumption that suspended mussel culture is relatively benign to the marine environment and therefore there are no requirements for an Environmental Impact Assessment (EIA) as there is with fin fish culture.

Funding in the form of the European Maritime and Fisheries Fund (EMFF) A pre-requisiste of the EMFF is that each member state prepares a Multi-annual plan for Aquaculture so that funding of the sector is done in a strategic manner.

3.7 Fishery Specific Management System

Management of the Scottish and Shetland mussel fisheries, i.e. fishery-specific management, includes the implementation of the Scottish aquaculture management system, as applicable to shellfish farming systems. Specific oversight of this management is provided by the MGSA Shellfish Working Group.

Fishery-specific planning is also informed by planning policy:

» The National Planning Policy Guidance 14 (NPPG 14): Natural Heritage set out the approach to assessing development proposals in relation to protecting sites of international, national and local importance.

» The Scottish Planning Policy 22 (SPP22) establishes that following the requirement established in the EC Birds and Habitats Directives, particular procedures must be applied when planning authorities consider any proposals that might affect Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) (known as Natura 2000 sites). Any proposed development which is likely to have a significant effect on the interests for which a Natura 2000 site is designated must be subject to an appropriate assessment. The requirement for Appropriate Assessment of plans or projects is outlined in Article 6(3) and (4) of the European Communities (1992) Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora ("Habitat Directive").

» Under the SSP22, other designated areas should be acknowledged (e.g. Sites of Special Scientific Interest (SSSIs) defined in Nature Conservation (Scotland) Act 2004)

» In promoting the sustainable development of aquaculture, SSP22 establishes that planning authorities should be proactive in identifying areas which have the potential to accommodate development and areas that do not. In this regard the SSP22 denotes the carrying capacity of the area of interest should be taken into account when considering application for aquaculture.

» Furthermore, SSP22 establishes that the precautionary approach should be invoked in situations where an insufficiency of scientific evidence does not provide for a decision that a development will not cause significant irreversible damage to natural heritage sites.

In response to a condition set under the first assessment of this fishery, fishery-specific management was further enhanced by a management plan developed by Seafood Shetland and SSMG. Key aims and objectives stated in the plan are:

- To ensure a successful future for the Scottish shellfish aquaculture sector, by assisting to advance its current successful status in a sustainable, respectful and thoughtful manner, acknowledging all fellow-users of the coastal marine environment in which it operates and upon which it depends for its economic well- being and future prosperity.

- To ensure that the sector pursues a market-led agenda, focussing on quality assurance to secure enhanced economic opportunities for its continued and future success.

- To continue to address MSC recommendations in the short-term; to realise MSC's maximum benefits for the sector; and aspire to retain MSC accreditation in the future.

Farm management planning informs the SSMG three-year production plan and this is guided by the ASSG Code of Good Practice. This is a voluntary code and while the principles are supported by the Scottish Government, this is not explicit within the fisheries management system. In relation to carrying capacity the objective is to: 'address carrying capacity concerns' proposing that Growers shall:

» Ensure that sites are located in areas where carrying capacity appears (via pilot project) to be robust

» Record growth rates each year in order to indirectly monitor any potential variation in carrying capacity

» Endeavour to address any reasonable public concerns regarding carrying capacity in a timely and proactive manner

» Continue to participate in research regarding carrying capacity limitations and issues

3.7.1 Compliance & Enforcement

Managers (planning officers in local authorities and Crown Estate officers) report that compliance is high. Officers check compliance with licence conditions, specifically the co-ordinates and number of lines in place. Any non-compliance is addressed through alerting the operators of a non-compliance with a licence such as the location of lines and/or the need for improved marker buoys.

3.7.2 Decision Making & Dispute Resolution

Decision-making by the management authority (Marine Scotland) is informed and by a statutory consultation process. There is further dialogue with the industry via an industry forum that was established under the Strategic Framework for Scottish Aquaculture, reformed as the MGSA Shellfish Working Group.
As part of the wider local authority planning process, decisions on planning applications are transparent (via published minutes of planning committees) subject to an appeals process.
Management officers inform operators of any non-compliances. The operators address these; if on the rare occasion these are not addressed, the license and lease are revoked.

3.8 Involvement of Other Entities

There are a number of other entities involved with the production of mussels, notably:

» Food Standards (Scotland) responsible for bio-toxin testing and

» Scottish Environmental Protection Agency (SEPA) responsible for ensuring water quality.

4 Evaluation Procedure

4.1 Harmonised Fishery Assessment

At the time of writing, the following MSC assessments had already been completed that overlap with this assessment in terms of sea area or production method (detailed below) and findings presented in published assessment reports. No MSC assessments overlapping this fishery are currently underway.

Completed assessments

» Limfjord Blue Shell Mussel (Rope grown)

http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/limfjordblueshellmusselrope%20grown/

» Netherlands Suspended Culture mussel

http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/netherlands-suspended-culture-mussel

» SSPO Swedish West Coast Rope-grown mussel

http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/sspo-swedish-west-coast-rope-grown-mussel

» Companhia de Pescarias do Algarve rope grown Mediterranean mussel fishery

https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/companhia-de-pescarias-do-algarve-s-a-portugal-atlantic-s-e-algarve-coast-rope-grown-mussel/assessment-downloads

These previous assessments formed an important background resource for the assessment team - collating and reporting on available stock and fishery information, as well as highlighting areas of stakeholder and assessment team concerns.

4.2 Previous assessments

The previous assessment resulted in five conditions for the fishery. These were all closed by the fourth surveillance audit.

Summary of Previous Assessment Conditions

Condition	PI(s)	Year closed	Justification
1 Eider duck management	2.3.3	3	Evidence that information shortcomings are addressed
2 Habitat information	2.4.3	3	Improved habitat information.
3 Management plan	3.2.1	2	Client developed management plan
4 Research plan	3.2.4	2	Client developed research plan
5 Review of plan	3.2.5	4	Evidence of review procedures

4.3 Assessment Methodologies

This re-assessment uses the reporting template V2.0 and V1.3 of the MSC standard. The modifications to the default assessment tree for enhanced fishery was used as set out in Annex CK of the Fishery Certification Requirements v1.3.

4.4 Evaluation Processes and Techniques

4.4.1 Site Visits

The site visit was undertaken in Lerwick between 26th and 29th September 2016 at the Seafood Shetland offices and attended by both members of the assessment team.

4.4.2 Consultations

Meetings were held with:

- The client group (Seafood Shetland and SSMG)
- Scottish Natual Heritage (Scottish environmental agency)
- NAFC Marine Centre (Shetland-based scientific advisers)
- Shetland Island Council
- Shetland mussel farmers

The client provided the assessment team with a list of member farms; the Scottish mussels management plan; Minutes of working group meetings and examples of licenses and assessments.

With SNH the team discussed ETP, particularly eider interactions and development planning. NAFC provided information on recent research, including a project to establish a mussel hatchery on Shetland.

4.4.3 Evaluation Techniques

Stakeholders were contacted by email and via the MSC updates.

The RBF was not used in this re-assessment. It was also not used for the original assessment.
In line with v1.3 Fisheries Certification Requirements, Annex CK, for enhanced bivalve fisheries, P1 and P2 elements on retained and bycatch (2.1 and 2.2) were not assessed.

5 Traceability

5.1 Eligibility Date

The target eligibility date is from the end of the first certificate, i.e. 2nd May 2017.

5.2 Traceability within the Fishery

Table 4 presents the traceability elements of the fishery. The SSMG shared with the assessment team their traceability documentation describing the system in place.

Table 4 Traceability Factors within the Fishery:

Traceability Factor	**Description of risk factor if present. Where applicable, a description of relevant mitigation measures or traceability systems (this can include the role of existing regulatory or fishery management controls)**
Potential for non-certified gear/s to be used within the fishery	Some farms grow specific lines with spat imported from Ireland. These lines are colour-coded as non-MSC product. The production plans specify the requirements for harvesting of MSC or non-MSC mussel.
Potential for vessels from the UoC to fish outside the UoC or in different geographical areas (on the same trips or different trips)	Production is 'static' based on geographically specific lines within each farm, making it not possible for mussels to be harvested from elsewhere.
Potential for vessels outside of the UoC or client group fishing the same stock	Only mussel from spat gathered at the Scottish and Shetland farms are included under the certificate.
Risks of mixing between certified and non-certified catch during storage, transport, or handling activities (including transport at sea and on land, points of landing, and sales at auction)	Mussels are stored and transported by land in batches. A comprehensive traceability system is in place from point of harvest. A mussel harvesting sheet includes date, boat, and sequential line numbers. Tags on each bag define the batch, continuing through to Bellshill (SSMG processing facility)
Risks of mixing between certified and non-certified catch during processing activities (at-sea and/or before subsequent Chain of Custody)	There are non-risk factors at first point of landing. Mussels are put into food-grade bulk bags and sent to the processor (the SSMG is the most important processor in Scotland). Risk factors are identified at the processing point as, not all of the mussel processed at SSMG will be covered by the certificate. Therefore a robust system is in place at the processor plan for the separation of MSC mussels from non-MSC mussel in order to ensure the traceability of the product. Risk factors occur before change of product ownership.
Risks of mixing between certified and non-certified catch during transhipment	No transphipment occurs in the fishery.
Any other risks of substitution between fish from the UoC (certified catch) and fish from outside this unit (non-certified	No. Registration documents are required in the transport of live shellfish – each document has a unique

catch) before subsequent Chain of Custody is required	reference number and local authority approval.

5.3 Eligibility to Enter Further Chains of Custody

Only blue mussels caught by certified farms specified in **Section 3.3.4** of this report, caught in the manner defined in the Unit of Assessment shall be eligible to enter the chain of custody. Chain of Custody should commence following the first point of landing, at which point the product shall be eligible to carry the MSC logo (under restrictions imposed by the MSC Chain of Custody standard). There are no restrictions on the fully certified product entering further chains of custody. The Shetland & Scottish Mainland Rope Grown mussel enhanced fishery does not require its own chain of custody certificate.

6 Evaluation Results

6.1 Principle Level Scores

Table 5: Final Principle Scores

Final Principle Scores	
Principle	**Score**
Principle 1 – Target Species	n/a
Principle 2 – Ecosystem	83.3
Principle 3 – Management System	92

6.2 Summary of PI Level Scores

Table 6: Summary of Performance Indicator Scores

Prin-ciple	Component	PI No.	Performance Indicator (PI)	Score
One	Outcome	1.1.1	Stock status	
		1.1.2	Reference points	
		1.1.3	Stock rebuilding	
	Management	1.2.1	Harvest strategy	
		1.2.	Harvest control rules & tools	
		1.2.	Information & monitoring	
		1.2.	Assessment of stock status	
Two	Retained species	2.1.	Outcome	80
		2.1.	Management	80
		2.1.	Information	80
	Bycatch species	2.2.	Outcome	80
		2.2.	Management	80
		2.2.	Information	80
	ETP species	2.3.	Outcome	85
		2.3.	Management	85
		2.3.	Information	80
	Habitats	2.4.	Outcome	90
		2.4.	Management	85
		2.4.	Information	85
	Ecosystem	2.5.	Outcome	80
		2.5.	Management	95
		2.5.	Information	85
Thre	Governance and policy	3.1.1	Legal & customary	95
		3.1.2	Consultation, roles &	95
		3.1.3	Long term objectives	100
		3.1.4	Incentives for sustainable	90
	Fishery specific management system	3.2.	Fishery specific objectives	80
		3.2.	Decision making processes	85
		3.2.	Compliance & enforcement	100
		3.2.4	Research plan	90
		3.2.5	Management performance	90

6.3 Summary of Conditions

All previous conditions were closed by year 4 surveillance.

No new conditions are set for this fishery.

6.4 Determination, Formal Conclusion and Agreement

The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 (and 80) against any MSC Criteria.

It is therefore determined that the **Shetland and Scottish Mainland Rope Grown mussel Enhanced fishery** should be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.

The decision to uphold this determination was confirmed by Acoura's decision making entity following a recommendation by the assessment team, and review by stakeholders and peer- reviewers.

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Appendices

Appendix 1a – MSC Principles & Criteria

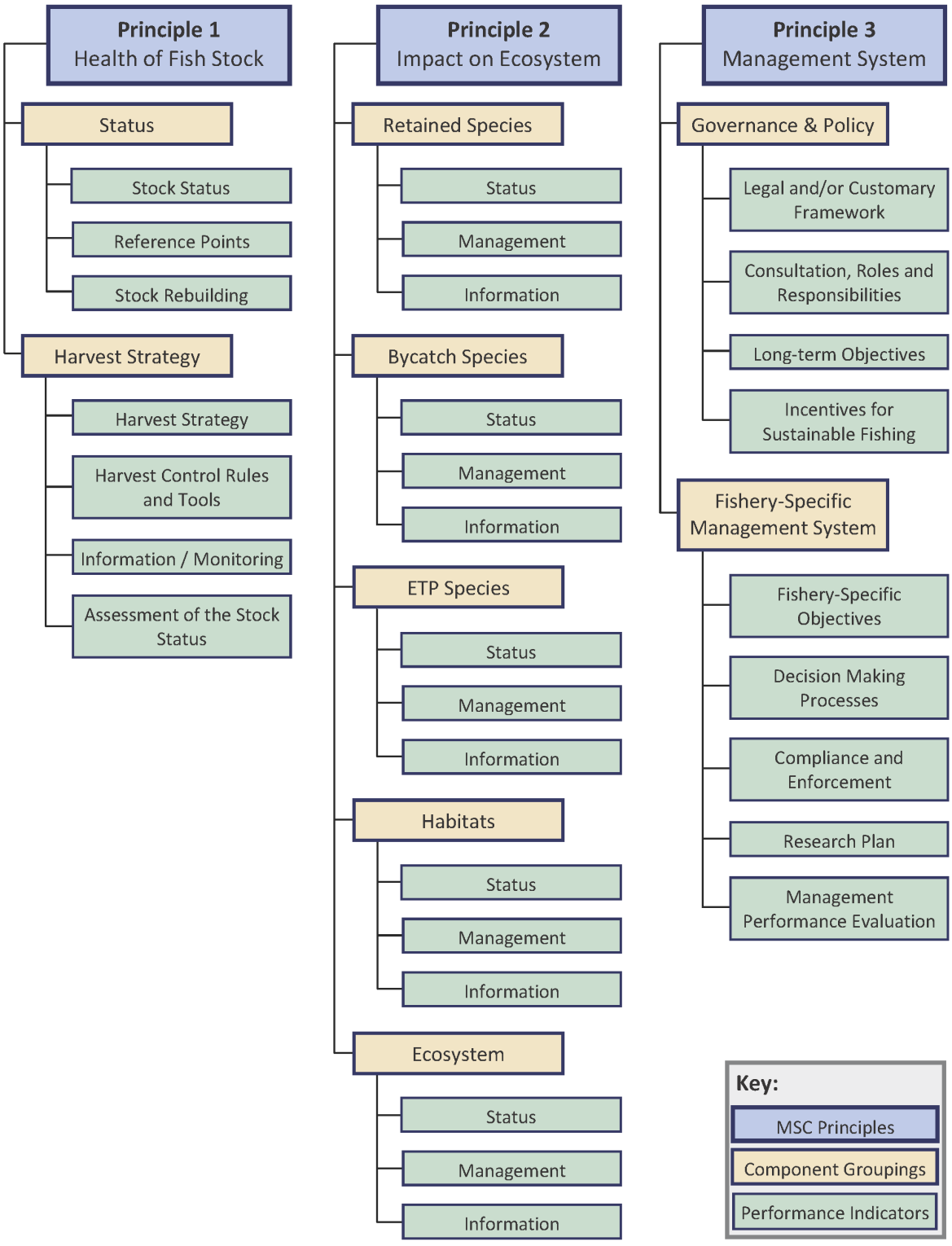

Figure A1 – Graphic of MSC Principles and Criteria

Below is a much-simplified summary of the MSC Principles and Criteria, to be used for over-view purposes only. A fuller descriptionof the MSC Principles and Criteria can be obtained from the MSC website (www.msc.org).

Principle 1

A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.

Intent:
The intent of this Principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short-term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

Status

» The stock is at a level that maintains high productivity and has a low probability of recruitment overfishing.

» Limit and target reference points are appropriate for the stock (or some measure or surrogate with similar intent or outcome).

» Where the stock is depleted, there is evidence of stock rebuilding and rebuilding strategies are in place with reasonable expectation that they will succeed.

Harvest strategy / management

» There is a robust and precautionary harvest strategy in place, which is responsive to the state of the stock and is designed to achieve stock management objectives.

» There are well defined and effective harvest control rules in place that endeavour to maintain stocks at target levels.

» Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.

» The stock assessment is appropriate for the stock and for the harvest control rule, takes into account uncertainty, and is evaluating stock status relative to reference points.

Principle 2

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends

Intent:
The intent of this Principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

Retained species / Bycatch / ETP species

» Main species are highly likely to be within biologically based limits or if outside the limits there is a full strategy of demonstrably effective management measures.

» There is a strategy in place for managing these species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species.

» Information is sufficient to quantitatively estimate outcome status and support a full strategy to manage main retained / bycatch and ETP species.

Habitat & Ecosystem

» The fishery does not cause serious or irreversible harm to habitat or ecosystem structure and function, considered on a regional or bioregional basis.

» There is a strategy and measures in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types.

» The nature, distribution and vulnerability of all main habitat types and ecosystem functions in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery and there is reliable information on the spatial extent, timing and location of use of the fishing gear.

Principle 3

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

Intent:
The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

Governance and policy

» The management system exists within an appropriate and effective legal and/or customary framework that is capable of delivering sustainable fisheries and observes the legal & customary rights of people and incorporates an appropriate dispute resolution framework.

» Functions, roles and responsibilities of organisations and individuals involved in the management process are explicitly defined and well understood. The management system includes consultation processes.

» The management policy has clear long-term objectives, incorporates the precautionary approach and does not operate with subsidies that contribute to unsustainable fishing.

Fishery specific management system

» Short and long term objectives are explicit within the fishery's management system.

» Decision-making processes respond to relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner.

» A monitoring, control and surveillance system has been implemented. Sanctions to deal with non-compliance exist and there is no evidence of systematic non-compliance.

» A research plan provides the management system with reliable and timely information and results are disseminated to all interested parties in a timely fashion.

Appendix 1.1 Performance Indicator Scores and Rationale

For enhanced catch & grow fisheries without translocation:

-Principle 1 is not assessed.

-Components 2.1 Retained species and component 2.2 Bycatch species are not assessed

Evaluation Table for PI 2.3.1

PI 2.3.1		**The fishery meets national and international requirements for the protection of ETP species** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.	The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.	There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species.
	Met?	Y	Y	N

	Justification	The MSC defines Endangered Threatened & Protected (ETP) species as those that are recognised by national legislation or international agreements to which the jurisdiction controlling the fishery under assessment is party and those species that are listed in Appendix 1 of the Convention on International Trade in Endangered Species (CITES). Species that are appear exclusively on non-binding lists such as ASCOBANS, IUCN Red List, OSPAR, HELCOM or that are only the subject of intergovernmental recognition (such as FAO International Plans of Action) and that are not included under national legislation or binding international agreement are not considered as ETP under MSC protocols. CITES Appendix I lists species that are the most endangered among CITES-listed animals and plants. They are threatened with extinction and CITES prohibits international trade in specimens of these species with some exeptions, for instance for scientific research. Appendix 1 of CITES has been accessed by the team at the CITES website (see CITES reference). As the United Kingdom is a member of the EU the species protected by the EU Habitat Directive and the Birds Directive (Council Directive 2009/147/EC) should also be considered ETP species. The EU Bird Directive aims to protect all European wild birds and the habitats of listed species, in particular through the designation of Special Protection Areas (SPA). Under this assessment all birds species listed in the EU Bird Directive are considered ETP species. Under this PI, only those effects of rope grown mussel cultivation that may reasonably be expected to affect ETP species are considered. Mussel culture on ropes is not likely to affect protected or endangered fish species like sharks and rays or fish species protected by the Habitat Directive so these species groups are not considered. The species groups where impacts are considered possible are marine mammals and birds. Possible effects are: entanglement in mussel farm structures and spat catching structures, ingestion of litter from farms, exclusion by farm structures, reduced or increased prey availability, disturbance (noise or boat activity), creation of resting places on floats within farms (Lloyd, 2003). <u>Marine mammals</u> A species listed in CITES Appendix 1 that sometimes occur in the coastal waters of the west coast of Scotland and Shetland is the minke whales (*Balaenoptera acutorostrata*). Marine mammals that are listed in Annex II of the Habitat Directive are Harbour porpoise *(Phocoena phocoena),* Harbour seal (Phoca vitulina) and Grey seal (*Halichoerus grypus*).*Other species that occur like* Sperm whales (*Physeter microcephalus*), Orca (*Orcinus orca), , Long finned pilot whale (Globicephala melas),* Risso's dolphin *(Grampus griseus)* and Atlantic white-sided dolphin *(Lagenorhynchus acutus)* are protected under Annex IV of the Habitat Directive.

Whales like Minke whales and Orcas are regularly seen inside the Scottish lochs and Shetland Island voes but no entanglements of whales in mussel ropes have ever been reported in the UK. From New Zealand there are a few known records of whales being entangled in mussel farm structures (ropes). There have been no reports of dolphin entanglement in lines in New Zealand (Loyd, 2003). It is assumed that baleen whales are more prone to entanglement than dolphins because they don't echolocate

Common seals and harbor seals are present in most Scottish Lochs and Shetland Island voes where mussel rope farming is practiced. Although pinnipeds frequently become entangled in fishing nets, none have been reported entangled in ropes and they are unlikely to be entangled in mussel farm structures (Lloyd, 2003). Since the entanglement of marine mammels in mussel ropes has never happened and must therefore be considered a higly unlikely event (especially when the lines are covered with a layer of mussels) it is concluded that there is a high degree of certainty that the effects of the fishery concerning marine mammals are within limits of national and international requirements for protection of ETP species.

Birds

A large number of birds species are present or regularly seen in Scottish lochs and Shetland voes where mussel rope culture is practised. Diving species that could be affected (among others) are: Great Northern Diver. (*Gavia immer*), Common Scoter (*Melanitta nigra*), Common merganser (*Mergus merganser*), Atlantic puffin (*Fratercula arctica*), Common guillemot (*Uria aalge) and Common Eider duck (Somateria mollissima).* Direct effect from mussel culture on long lines on birds species are not to be expected in this fishery (Roycroft et al., 2004). There is no chance that birds are unintentially caught on a hook or in an net since these gears are not used. The mussel rope is a passive gear. The only possibly significant interaction between birds and mussel rope culture is the interaction between mussel farming and eider ducks. Eider ducks can dive to depths of up to 30 m and feed on marine invertebrates (e.g. mussels). Numbers of Eider duck are known to be increasing in areas associated with mariculture in northern Europe and have been found to alter their seasonal pattern of movements to taken advantage of farming practices due to farmed mussels being more preferable to a potential predator than wild ones (Beveridge, 2001). Eider ducks are feeding on the cultured mussels and when present in larger numbers can completely strip a mussel line from mussels. The consequence is that mussel farmers in Scotland and Shetland constantly monitor the number of birds present in the vicinity of their structures and that they will scare away larger groups of eider ducks. The usual way of doing this is by approaching the birds with a motor boat and chase them far away. The presence of people working at the structures when harvesting of doing other work will keep the eider ducks away (Ross & Furness, 2000). Some mussel farms use protector (or exclusion) nets in order to keep the eider ducks away from the mussel ropes. This can lead to the entanglement of eider ducks in these net. Varennes et al. (2013) investigated the effectiveness of exclusion nets in Canada and concluded that nets with a maximum mesh size of 15 cm with large twine size the most safe for eider ducks. Nets with thin twine and large mesh size were more likely to cause bird entanglement.

		In recent years the client group has developed eider observation sheets and farms were supplied with eider observation records to provide data on interactions at farms. Results to date indicate that eider ducks are regularly present near mussel sites but that the numbers are mostly limited to 2 to 20 birds. Only in a few occasions more than 20 birds have been counted. Client has also reported that at most mussel sites predator nets are not used and no drownings have been reported since the introduction of the observation sheets. The common practice at all sites is that in case larger numbers of eider ducks are seen in close proximity of the mussel ropes somebody will be sent to the farm with a small boat and stay around until the birds leave the site. It seems that eider ducks have come accustomed to this practice and now mainly feed from natural mussel beds or on salmon farm structures. On the Scottishmainland eider interactions with mussel farms were not specifically been raised as an issue by environmental organisations in relation to Scottish mainland sites. The team concluded that the drowning of an eider ducks in a predator net will occur very occasionally at the few sites were these nets are still in use if it happens at all. The effect is higly likely highly likely within limits of national and international requirements for protection of ETP species. The team has also considered the issue of disturbance of eider ducks and concludes that cultured mussels are an additional food supply and although eider ducks will be disturbed when trying to feed on farmed mussels the overall effect of the mussel culture is highly likely within limits of national and international requirements for protection of ETP species. Therefore SG80a is met. Since the previous conclusion is partly based on the fact that interactions with eider duchs with this fishery are not considered an issue it can not be concluded that there is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species and therefore SG100a is not met.		
b	**Guidepost**	Known direct effects are unlikely to create unacceptable impacts to ETP species.	Direct effects are highly unlikely to create unacceptable impacts to ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species.
	Met?	Y	Y	N
	Justification	As described under SG80a it is highly unlikely that direct effects create unacceptable impacts of the mussel culture activities on ETP species (marine mammals or bird species). While eider interactions have been reduced and are properly managed, it cannot be stated with a high degree of confidence that the fishery has no significant detrimental direct effects on this species and SG 100 is not met.		
c	**Guidepost**		Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
	Met?		Y	Y

	Justification	Mussel farms probably increase the food supply for eider ducks because they increase the mussel stock (Beveridge, 2001). It is likely that the cultured mussel will result in an increased spat fall in the areas were mussel culture takes place. It is very unlikely that this indirect effect of the activity creates unacceptable impacts to ETP species. Indirect effects on ETP species by mussel culture activities could also be an impact on food availability due to the filtering capacities of the mussels. A reduction in algae or phytoplankton could for example result in less fish and thus less food for species higher up in the food chain. However since the culture areas are all connected to the open sea area and the food supply is constantly renewed it is highly unlikely that the culture activity has a significant impact on the food supply of birds and marine mammals. Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts. Thus SG80c is met. There is also a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species and SG100 is met as well.
References		» http://www.cites.org/eng/app/appendices.php » Lloyd, B.D., 2003. Potential effects of mussel farming on New Zealand's marine mammals and seabirds. Discussion Paper, Published by New Zealand Department of Conservation, Wellington, New Zealand. » Beveridge, M.C.M., 2001. Aquaculture and wildlife interactions (English) In: Environmental impact assessment of Mediterranean aquaculture farms; Proceedings of the seminar of the CIHEAM network on technology of aquaculture in the Mediterranean (TECAM), jointly organized by CIHEAM and FAO, Zaragoza (Spain), 17-21 January 2000 ; Cahiers Options Mediterranean's (France) , v. 55 Uriarte, A. (ed.) Basurco, B. (ed.) / International Centre for Advanced Mediterranean Agronomic Studies, Zaragoza (Spain). Mediterranean Agronomic Inst.; FAO, Rome (Italy). Plant Production and Protection Div., 2001, p. 57-66. » Lloyd, B.D., 2003. Potential effects of mussel farming on New Zealand's marine mammals and seabirds. Discussion Paper, Published by New Zealand Department of Conservation, Wellington, New Zealand. » Ross, B.P. & R.W. Furness. 2000. Minimising the impact of eider ducks on mussel farming. Report. University of Glasgow. » Roycroft, D.; Kelly, T. C.; Lewis, L. J. (2004). Birds, seals and the suspension culture of mussels in Bantry Bay, a non-seaduck area in Southwest Ireland. Estuarine, Coastal and Shelf Science, Volume 61, Issue 4, p. 703-712. » Varennes É, Hanssen SA, Bonardelli J, Guillemette M (2013) Sea duck predation in mussel farms: the best nets for excluding common eiders safely and efficiently. Aquacult Environ Interact 4:31-39

OVERALL PERFORMANCE INDICATOR SCORE:	**85**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.3.2

PI 2.3.2		**The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place that minimise mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.
	Met?	Y	Y	Y

	Justification	Firstly the fact that the mussel ropes are immobile and from stiff rope material means that it is nearly impossible that a seal or a bird will be entangled in the ropes. The use of immobile ropes can be considered as an implicit strategy to manage the fisheries impact on ETP species. Secondly strategies that have been formulated for Scotland are directed at managing impacts on ETP species. Species conservation is mentioned as one of the three pillars of the approach to marine conservation which forms the basis of the 'strategy for marine nature conservation in Scotland's seas (Marine Scotland, 2011). This strategy includes a commitment to develop a Marine Protected Area (MPA) network to meet international commitments such as World Summit on sustainable Development, Convention on Biological Diversity, OSPAR and Natura 2000. 'The Marine (Scotland) Act 2010 and the UK Marine & Coastal Access Act 2009 have come into force and provide a new framework for managing the seas, including a system of marine planning and enhanced marine conservation and enforcement powers. All species of wild birds are protected by the EU Birds Directive and unlawful capture or killing, destruction of nests, taking of eggs and disturbance of birds is prohibited. The EU Habitats Directive requires strict protection of a number of marine species of European importance in Annex II and IV. In Scotland's marine environment these most notably include all species of cetaceans as well as turtles and some fish. The Wildlife and Countryside Act provides equivalent protection under domestic legislation for some other marine species such as basking shark. These species are protected wherever they are found and not only in protected areas. The species protected under the Act are subject to review every five years Seals are protected by the Marine (Scotland) Act which repeals the Conservation of Seals Act 1970. Seal Conservation Areas have been introduced in Orkney, Shetland, Western Isles, Moray Firth and other parts of the east coast of Scotland and it is now an offence to kill, take or injure a seal at any time unless a licence has been provided. Biodiversity Action Plans have also been developed for a range of marine species (mammals, fish, invertebrates and algae) and outline a wider range of actions. Other species measures include compilation of a list of Priority Marine Features for Scotland's seas. Through the MPA's, SPA's (birds) and SAC's (seals & otters) that have already been implemented the impact of the mussel culture on ETP species can be regulated.

		The protection of ETP species plays an important role in the marine planning processes. In case an application would be made in or close to a SAC (seals or others) the applicant could be asked to do an appropriate assessment as required by article 6 of the Habitat Directive. In case of significant impact on conservation goals a license will not be issued. Possible impacts on ETP species will also be considered during the pre-application discussion or would be put forward by stakeholders (SNH or RSPB) during the consultation stages. Applicants would then be advised to consider applying for another location with less impact on ETP species. The team concludes that there is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species. Therefore SG100 is met.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved.	The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.
	Met?	Y	Y	N

	Justification	From the stakeholders consultations the team has learned that the protection of ETP species plays an important role in marine planning. In case an application would be made in or close to a SAC (seals or others) the applicant could be asked to do an appropriate assessment as required by article 6 of the Habitat Directive. In case of significant impact on conservation goals a license will not be issued. Possible impacts on ETP species will also be considered during the pre-application discussion or would be put forward by stakeholders (SNH or RSPB) during the consultation stages (M. Holmes, pers. Comm.). Applicants would then be advised to consider applying for another location with less impact on ETP species. As a consequence there is an objective basis for confidence that the strategies applied result in the minimization of impacts on ETP species. The Association of Scottish Shellfish Growers (ASSG) has implemented a Shellfish Industry Code of Good Practice in 2005. Seafood Shetland introduced a similar code in 2007. Members of ASSG formally sign up to follow the recommendations of the code and therefore have clearly expressed their commitment to respect the interests of other stakeholders in the coastal zone, including local authorities, The Crown Estate and environmental interests (such as SNH). One objective of the code is: 'to minimize the impact of shellfish farming activities on all wildlife". Good practice includes: "Endeavour to secure and regularly maintain predator netting such that diving birds do not get caught in it." And "Ensure that birds and their nests are not destroyed." In 2004 SNH has drafted an Eider Duck Action plan. Among the actions described is the liaison with the aquaculture industry to establish an appropriate protocol to reduce predation of mussels by eiders and to reduce disturbance. This action has resulted in the involvement of SNH in the drafting of the Code of Practice of Shetland Seafood in which the issue of disturbance of eider ducks is addressed. Considering the strategies that are applied, the close cooperation between the clients and environmental stakeholders and the fact that environmental stakeholders did not consider eider interactions with mussel as an issue the team concludes that there is an objective basis for confidence that the strategies described will work and be effective in minimizing the impact on ETP species. Therefore SG80 is met. Since there is no quantative analysis of interactions with ETP species available SG100b is not met.		
c	**Guidepost**		There is evidence that the strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	N

	Justification	Suspended mussel culture sites on the Scottish mainland and in Shetland are operational now for three decades and no mortality of marine mammals has been reported. Not by fishermen or by independent inspectors. This can be regarded as evidence that the strategy (type of structures used) is being implemented successfully for marine mammals. In 2004 SNH has drafted an Eider Duck Action plan. Among the actions described is the liaison with the aquaculture industry to establish an appropriate protocol to reduce predation of mussels by eiders and to reduce disturbance. This action has resulted in the involvement of SNH in the drafting of the Code of Practice of Shetland Seafood in which the issue of disturbance of eider ducks is addressed. The Shetland Islands Council policy for aquaculture (2012) prescribes that all aquaculture proposals must demonstrate that anti-predator measures, permitted through the granting of planning permission, deter or prevent predation through use of methods which are non-lethal and do not cause any significant harm. For the avoidance of doubt the use of monofilament nets for such purposes is not permitted. The Code of Practice objective is to ensure that exclusion techniques (e.g. the use of predator netting) minimise harm to birds or other wildlife. Predator nets should have a mesh size that prevents entanglement and be tensioned through suspended weights. The effectiveness of this strategy is supported by scientific research (Varennes et al., 2013). The team concluded on the basis of the information given that the strategy developed is to reduce the predation of mussels by eider ducks as much as possible without hurting the animals or affecting the population negatively. The information provided shows that the use of exclusion nets is not a common practice and if they are used they have to be rigged in such a way that birds can not get entangled in them. The the use of (soft rope) monofilament nets is not allowed. It is therefore highly unlikely that significant numbers of birds could drown and this issue has also not been raised by environmental NGO's (SNH). All mussel growers in Scotland or Shetland Islands have formally signed up to follow the recommendations of the Code of Practice of either ASSG or Seafood Shetland. The Codes clearly state that any method of deterrant should be non lethal toward predators (e.g. bird). The codes also state that mussel growers should endeavour to secure and regularly maintain predator netting such that diving birds do not get caught in it. The close cooperation between the shellfish industry and stakeholders like SNH and RSPB in developing codes of good practice for the industry, the fact that there are no indications (not from observation sheets nor from any stakeholder) that the drowning of birds actually takes place, and the fact that eider interactions with mussel farms were not specifically been raised as an issue by these environmental organisations are regarded by the team as evidence that the strategy is being implemented successfully. Therefore SG80 is met. Since observation records have not been provided by all farms the evidence is not complete and therefore it can not be concluded that there is clear evidence and SG100c is not met.

d	**Guidepost**			There is evidence that the strategy is achieving its objective.
	Met?			N
	Justification	Although it is clear that strategies are implemented successfully and there is some evidence from observation records that interactions have reduced there is no specific research undertaken into the effectiveness of the strategies implemented and therefore it can not be concluded that there is evidence that the strategies are achieving their objectives. Therefore SG100d is not met.		
References		» Marine Scotland & The Scottish Government, A strategy for marine nature conservation in Scotland's seas. March 2011. » Varennes É, Hanssen SA, Bonardelli J, Guillemette M (2013) Sea duck predation in mussel farms: the best nets for excluding common eiders safely and efficiently. Aquacult Environ Interact 4:31-39 » ASSG, 2015. CODE OF GOOD PRACTICE. http://assg.org.uk/#/code-of-practice/4536619829 »		
OVERALL PERFORMANCE INDICATOR SCORE:				**85**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.3.3

PI 2.3.3		**Relevant information is collected to support the management of fishery impacts on ETP species, including:** • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.	Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.	Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty.
	Met?	Y	Y	N

	Justification	The impact of mussel rope culture on ETP species was evaluated under PI 2.3.1 and it was concluded that there has not been any reports of mortality of marine mammals caused by this activity and that the impact on birds is limited to the deterrence of eider ducks. The available information allows for the conclusion that the fishery related mortality of marine mammals is zero or in any case neglible and thus the available information on marine mamals can be considered. sufficient to allow fishery related mortality and the impact of fishing to be quantitatively estimated for marine mammals. In the UK the number of eider ducks is monitored under the Wetland Bird Survey (Webs). WeBS are a joint scheme of the British Trust for Ornithology (BTO), Royal Society for the Protection of Birds (RSPB) and Joint Nature Conservation Committee (JNCC), in association with Wildfowl & Wetlands Trust (WWT), to monitor non-breeding waterbirds in the UK. The principal aims of the scheme are to identify population sizes, determine trends in numbers and distribution, and identify important sites for water birds. The 2010 report (Holt, 2011) presents total numbers counted in the most recent year in Great Britain and Northern Ireland. The overall British trend over the course of the last twenty years has shown a slow, yet consistent, decline in numbers of Eiders. In the WeBs report eiders in Shetland are listed as a separate population from those elsewhere in Britain. Relatively few Eiders are counted at the small number of sites on Shetland which are monitored routinely through WeBS. Therefore the report mentions the results of the seabird monitoring programme by the Shetland Oil Terminal Environmental Advisory Group (SOTEAG). The SOTEAG seabird monitoring programme has been carried out full-time since 1978 and has surveyed seabird populations throughout Shetland. A full survey of the moulting population undertaken by SOTEAG in August 2015 generated a total of 4610 birds in Shetland (Heubeck & Mellor 2016). This was only 17 birds less than the number that was estimated in 2012 (4627) so after a reduction in numbers since 2009 (5782 birds) the population seems to have stabilized. Overall, 82% of the population was associated with aquaculture sites in August 2015, compared to 64% in August 2012. As described under 2.3.1. and 2.3.2 the main deterrant measure used by mussel growers is by approaching the birds with a motor boat and chase them away from the mussel site. This deterrant method is non lethal and will (temporarily) prevent the eider ducks from feeding on the cultured mussels. In quantitative terms this has no detrimental impact on the eider duck populations. Concerning the use of predator nets it was concluded that this use is no common practice and if employed the nets have to rigged in such a way that diving birds do not get caught in it (Code of Good Practice). The nets are used as a non lethal deterrant and neither from from observation sheets nor from stakeholders the team has spoken to, the team has learned that the drowning of birds actually takes place. It might occasionally take place but it must be considered highly unlikely that this would concern more than 10 birds on an annual basis if it happens at all. The team therefore concludes that there is sufficient information to conclude that fishery related mortality and the impact of fishing can also be quantitatively estimated for eider ducks.

		On the basis of the above it can be concluded that SG80a is met for both marine mammals and eider ducks. The information is not sufficient to enable a high degree of certainty re. outcome status and therefore SG100a is not met.		
b	**Guidepost**	Information is adequate to broadly understand the impact of the fishery on ETP species.	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.	Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.
	Met?	Y	Y	N
	Justification	Information on interactions with marine mammals and the development of bird populations shows that the impact on marine mammals is (virtually) absent and that the impact on the eider duck population is small and not considered an issue by environmental NGOs. The team therefore concludes that the information is sufficient to determine that the mussel culture is not a threat to protection and recovery of the ETP species and SG80b is met.		
c	**Guidepost**	Information is adequate to support measures to manage the impacts on ETP species.	Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.	Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.
	Met?	Y	Y	N

	Justification	Through the work of the above mentioned organisations a wealth of information is available on marine mammals and birds in Scottish and Shetland waters. Populations are monitored and the monitoring results in valuable information concerning the status of ETP species. Next to these more general monitoring of ETP species a more species specific monitoring is in place for eider ducks present at the mussel sites and the non lethal deterrant methods that are employed (if any). The information from eider observation sheets (in Shetland) shows that at many sites the number of eider ducks are limited and that no form of deterrant is used. At some sites the birds are scared away but in all intstances the deterrant methods are non lethal as prescribed in the Codes of Good Practice. The available in information in the form of the monitoring of the eider duck populations in Scotland and Shetland Islands is sufficient to measure trends in these populations. The available information on eider duck interactions is also sufficient to support a full strategy for this fishery to manage impacts on eider ducks. On the basis of the available information measures have been implemented (in Code of Good Practice) to prevent any lethal deterrant method. It can therefore be concluded that Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species and thus SG80c is met. The place The information available is not adequate to evaluate with a high degree of certainty whether the strategy laid down in the Code of Practice is achieving its objectives. Therefore SG100c is not met.
References		» Heubeck, M. & M. Mellor, 2016. SOTEAG ORNITHOLOGICAL MONITORING PROGRAMME, 2015 SUMMARY REPORT, Aberdeen Institute of Coastal Science and Management, University of Aberdeen, February 2016.. » SCOS, 2015. Scientific Advice on Matters Related to the Management of Seal Populations: 2015.
OVERALL PERFORMANCE INDICATOR SCORE:		**80**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.4.1

PI 2.4.1		The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
	Met?	Y	Y	P
	Justification	From scientific research on rope mussel farming it is known that rope mussel farms can have an impact on the bottom and benthic habitats (Gallardi, 2014). Firstly deposits of live mussels, broken shells, and other farm debris build up below the growing lines and, in the absence of strong currents, these deposits can increase sedimentation rates by reducing water flow across the seabed. These aggregations can also provide a reef-like habitat for a variety of mobile fauna including fish, crustaceans, starfish, sea urchins, and other echinoderms (Tenore et al. 1985; Ysebaert et al, 2009) Secondly the rain of faeces and pseudofaeces from the mussels on the ropes can lead to organic enrichment of the sediments below mussel farms. In farms where there is little water flow, organic enrichment of the benthos can create anaerobic and acidic conditions which result in elevated levels of sulphides and ammonium (Tenore et al., 1985). Organic enrichment of the sediments beneath mussel farms and resulting anoxic conditions cause declines in the abundance of large, deep-burrowing species of molluscs, echinoderms, crustaceans and polychaetes. Tenore *et al*. (1982) compared the benthic regimes of two Spanish coastal embayments: an intensive mussel culture area (approximately 2000 mussel culture rafts), and an extensive mussel culture area (less than 100 mussel culture rafts). It was found that forty years of intensive mussel culture (2000 rafts) resulted in a generally low biomass and a low diversity polychaete-nematode dominated assemblage in the benthic macrofauna. This is in comparison to less intensive mussel culture (<100 rafts) maintaining a highly diverse benthic community in the culture area. Grant *et al*. (1995) studied the impacts of mussel culture on benthic community composition and found that the community was dominated by molluscs attracted to the enriched organic matter (a product of biodeposition) and the mussels that had fallen from lines. Grant concluded that overall, the impact of the culture operation on the benthic community appeared to be minor, with little impact on species diversity evident as a result of mussel culture. And that generally, there can be a shift in the food webs away from predominantly suspension-feeding organisms to deposit-feeding faunas. The severity of benthic impacts, however, is not consistent and depends on many factors as studies have revealed effects varying from severe impacts on all examined parameters to low impacts on only few of the parameters (Hatcher et al.,1994), and some studies could not detect any significant effects at all (Crawford et al. 2003).		

		Several studies on organic enrichment of the seabed from shellfish farming have concluded that the effect is small, and much less than that caused by finfish farming. In contrast to conditions observed under some salmon farms, no extensive mats of bacteria or spontaneous outgassing were observed and no major changes in benthic were found. Charmberlain et al. (2001) compared two sites in in southwestern Ireland in conjunction with water current characteristics. At one farm the benthic community was subjected to higher sedimentation and organic enrichment. On this farm reduced macrobenthic infauna diversity was recorded and this effect was restricted to a radius of 40 m around the farm. At the other farm no such effects of mussel biodeposits were recorded and a diverse macrobenthic community persisted. Charmberlain concluded that the differences were caused by differences in local current patterns. Due to the low settling velocities of the particles involved, slight variations in current velocity and direction and water depth around the farms had a great effect on the dispersion of the biodeposits and thus on rate of organic enrichment within the dispersion area. Chamberlain et al. concluded therefore that the potential of a mussel farm to impact the benthic community greatly depended on hydrographic conditions. Other factors determining the impact would be the production tonnage of the farm (stocking density) (Kaiser et al., 1998) and the food available for the mussels. Details of environmental impacts of bivalve mariculture on the environment are also given in reviews by Kaiser et al. (1998) and Keeley (2009). Keeley concludes that in general, the effects are usually difficult to detect within 20-50 m of the farm site and that water depth and current speeds are the two most important factors in determining the effect of a farm on the seabed. Kaiser et al. (1998) concluded that environmental changes as a result of shellfish farming can be minimized by using appropriate culture techniques. From the scientific literature it can be concluded that the impact of rope mussel culture on bottom habitats in Scottish lochs and Shetland voes strongly depends on the existing water currents, stocking densities, water depth and the presence of more sensitive habitats under or near the mussel ropes. Both in Scotland and Shetland the local (planning) authorities and the industry have shown to be very well aware of this (SIC, 2012). Mussel farmers know that they will experience a reduced growth of their mussel on their farm when stocking densities are too high. Local authorities in Shetland apply a model to calculate the carrying capacity of a certain water body were applications are made. Also in Scotland the issue of licensing is taking account of the number of lines that a loch could sustain. This strategy has resulted in mussel farms of limited size is all lochs and voes. The result of this practice being that even if the bottom habitats under the sites would be impacted that these impacts are limited in size and scale and that in comparison with the total distribution of the bottom habitats present in the lochs and voes. Even more important is the implemented strategy of protection of the more sensitive habitats like horse mussel beds and mearl beds. No planning permissions are given for (or near) locations were these sensitive habitats are located. This means that mussel farms are not located on sites were they could do serious harm to sensitive habitats. Impacts of mussel culture on bottom habitats in Shetland have been surveyed at mussel farm sites in Shetland by means of a video survey. The scope of the survey was to make a general appraisal of the impact of mussel farming activity on the seabed and benthic fauna under the farms (Angus, 2010). For the survey four different farms at different locations were selected to give a cross section of farms and location types. Three farms

		were located within relatively sheltered “voes” (non-fjordic inlets) as most farms are in Shetland whereas the fourth location was more exposed. The survey showed that the sediment type on the three sheltered farms was fine muddy sand. On the fourth location the seabed type was medium sand with some gravel. The survey report concludes that there was no apparent anoxia or bubbling from the sediment. No gross change to sediment composition was evident in comparison to control stations. Active macrofauna were present at all stations. High densities of scavenging common starfish were frequently observed at localised drop-off locations. At all stations drop of mussels were seen and it was concluded that after the flesh is consumed by starfish the shells will remain for longer time and through bio turbidity enter in the sediment. The ScottishShellfish Marketing Group (SSMG) has commissioned research on bottom sediments under three larger farms in Scotland (Clift Sound & Loch Eriboll) and Shetland (Ronas Voe) in order to assess to which extent the bottom under the farms is impacted by farming. The sites were sampled in June 2013 and this survey was repeated in July 2015 to monitor any changes over time at these sites. In all instances the samples consisted of soft, very fine sand and shell fragments. The 2013 sample from the Ronas Voe site also contained mussel shells, common tower shells (Turritella communis) and sea squirts (Ascidia spp). Qualitative examination did not show any H2S smell. From all samples organic matter, total carbon, total Phosphorus, total Nitrogen and Redox values were analysed. In the 2015 report the results of the 2013 and 2015 surveys were compared. It was concluded that organic carbon and total carbon is relatively low at all sites and this remains the case for both surveys. In 2015 total Phosphorus was lower at all sites. Redox values indicated good oxygenation throughout all samples with no negative readings recorded. Based on these physio-chemical analysis of sediments the team concludes that there are no indications of organic enrichment of the benthos under the sites to the extent that anaerobic conditions are created that could result in declines in the abundance of large, deep-burrowing species of molluscs, echinoderms, crustaceans and polychaetes. Besides the effects of the rain of pseudo feaces the mussel lines are kept on their place by 2 anchors at both ends of the ropes. These anchors could affect bottom habitats at the time they are placed. However the area that these anchors could affect are relatively small and the anchors form a substrate for benthic species that are associated with hard substrate (McKinsey et al. 2011). Therefore the impact of thse anchors on bottom habitat can be considered negligible. Based on the results of the surveys carried out, the strategies that are applied in selecting sites for rope mussel culture and prescribing farm size and the protection of sensitive habitats the team concludes that it is highly unlikely that rope mussel culture in Scottishlochs and Shetland voes reduces habitat structure and function to a point where there would be serious or irreversible harm. Therefore SG80 is met. Since the amount of survey results concerning habitat impacts under the mussel sites is limited to 3 farms it can be concluded that there is some evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. This however is not sufficient to award a score of 100 since SG100a requires that there is evidence and not some evidence. Therefore it is concluded that SG100a is partly met and a score of 90 is awarded.

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OVERALL PERFORMANCE INDICATOR SCORE:	**90**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.4.2

PI 2.4.2		**There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a strategy in place for managing the impact of the fishery on habitat types.
	Met?	Y	Y	Y

	Justification	The Scottish national planning policy for fish farming is set out in paragraphs 104 – 109 of the Scottish Planning Policy (SPP). This states that Development Plans should identify areas that are potentially suitable for new or modified developments and sensitive areas that are unlikely to be appropriate for such developments. In identifying such areas the Plan should take into account a number of factors including carrying capacity, landscape and seascape, natural heritage, conflict with other users and other regulatory controlled areas. The site selection for mussel farms is a planning issue for which the responsibility is devolved to local authorities. Permissions for mussel farms in both Scotland an Shetland are only awarded after an informed judgement based on the best available evidence through the application and consultation procedures. Applicants are advised to involve in pre-application consultation because this should reduce survey work and prevent delays in the development consent process. Through the pre-application consultation aquaculture developers would be able to predict with greater certainty were development is likely to be acceptable and were it is not. For instance on Shetland developers are advised to consider the siting of the proposal using the Shetland Islands Marine Spatial Plan (SIMSP) and consult with staff of the Marine Institute (NAFC) for advice. In this way applicants would be informed were sensitive habitats are located and they can apply for a location were there a no sensitive habitats and thus with a much greater chance of success. When a formal application is made to the Shetland Islands Council (SIC) the council will forward the application to a list of stakeholders including nature conservation bodies like SNH and RSPB. The involvement of NSH and RSPB is an extra guarantee that the nature conservation objectives will be considered in the planning process. Applications (in Shetland) are considered in terms of the Aquaculture Policy (2012). Permission will only be granted for sites whose production will not have significant adverse effects for the environment of the site under application. For Scotland the procedures a comparable with the ones described here for Shetland. Through the marine planning procedures applications for sites with horse mussel bed, maerl beds or other sensitive habitats (priority marine features) will not be made and if they were made they would not be granted. In case a new site (or additional mussel line) is in close vicinity of a sensitive habitat the developer will be obliged to have the ankers put by divers on the seabed as to prevent the mooring of the site to damage these habitats. The planning processes that are in place in both Scotland and Shetland can be condidered ass a comprehensive strategie for managing the impact of the fishery on habitat types. Therefor SG100a is met.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved.
	Met?	Y	Y	N

	Justification	The location of the habitats involved is known through seabed mapping (GIS). The location of mussel farms is also known since the coordinates of the sites are described in the license. The location of all mussel culture sites is exactly allocated. Inspectors control the site location and the allocated number of lines. From scientific literature it is generally accepted that the impacts of mussel farms are determined by water speed, water depth, farm size and stocking densities. These parameters are known and kept under strict control. There is thus some objective basis for confidence, that is based on information about the fishery and the habitats involved, that the partial strategy will work. Therefore SG80b is met. Since the information on impacts below the mussel sites is limited is can not be concluded that testing supports high confidence that the strategy will work. Therefore SG100b is not met.		
c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	N
	Justification	The location of mussel culture sites is easy to determine using GPS. Therefore it is quite certain that the installations are only present on allocated sites. As long as mussel farms are not located over sensitive habitats it is evident that negative impacts are prevented and therefore there is some evidence that the partial strategy is being implemented successfully and SG80c is met. Since the information on impacts below the mussel sites is limited is can not be concluded that there is clear evidence that the strategy is implemented successfully. Therefore SG100c is not met.		
d	**Guidepost**			There is some evidence that the strategy is achieving its objective.
	Met?			N
	Justification	Since the information on impacts below the mussel sites is limited is can not be concluded that there is some evidence that the strategy is achieving its objective. Therefore SG100c is not met.		
References		Marine Scotland, 2009. Locational Guidelines for the Authorization of Marine Fish Farms in Scottish Waters – Policy Guidance Note. Scottish Executive, 2007 Circular 1/2007: *Planning Controls for Marine Fish Farming.* Scottish Government, 2010. ScottishPlanning Policy. February 2010. Shetland Islands Council, 2012. Aquaculture Policy, Supplementary Guidance (SG) tot The Shetland Local Development Plan 2012 Appendix 10. Shetland Islands Council, 2015. Shetland Islands Marine Spatial Plan (SIMSP).		
OVERALL PERFORMANCE INDICATOR SCORE:				**85**

CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.4.3

PI 2.4.3		Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There is basic understanding of the types and distribution of main habitats in the area of the fishery.	The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery.	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.
	Met?	Y	Y	N
	Justification	The Marine (Scotland) Act 2010 and the Marine and Coastal Access Act provide for marine planning of Scottish waters out to 200 nautical miles and give new marine conservation responsibilities. The Marine Atlas has been made as a key step in the development of a national marine plan for Scotland. The Marine Atlas presents data to ensure that policies developed in the national marine plan are informed by the fullest data possible. These maps provide a fairly good understanding were sensitive or protected habitats are located. For Shetland also a Marine Atlas has been made as part of the marine spatial plan for the Shetland islands. As a result of these developments for both Scotland as Shetland advanced maps of the marine seabed of lochs (called 'voes' is Shetland) exist. The team has concluded therefore that the nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery. Therefore SG80a is met.SG100 is not met since it can not be concluded that the distribution of all habitat types is known over there range.		
b	**Guidepost**	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.	Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.	The physical impacts of the gear on the habitat types have been quantified fully.
	Met?	Y	Y	N

	Justification	All mussel farming takes place on the basis of a license of the Crown Estate and local marine planning. Therefore the locations and the spatial extent of the mussel farms are exactly known. The locations of (sensitive) habitats in the lochs and voes are known as a result of seabed mapping. The sensitivity of habitats is known from scientific research (Huntington, 2006). No mussel culture activities are allowed over sensitive habitats. Muddy and sandy habitats are considered the least sensitive to the impacts of mussel culture. Sufficient scientific information is available to identify the nature of the possible impacts on these habitats (Weise, 2009; Keeley, 2009; Angus, 2010; Chamberlain, 2001; Hatcher, 1994). Therefore there is sufficient information available to identify the effects of mussel culture on habitats types and to conclude that SG80 is met. From scientific literature it is generally accepted that the impacts of mussel farms are determined by water speed, water depth, farm size and stocking densities. The potential of a mussel farm to impact the benthic community greatly depends on hydrographic conditions. Some physical parameters of the sediments under 3 mussel farms have been studied but it can not be concluded that physical impacts have been quantified fully. Therefore SG100 is not met.		
c	**Guidepost**		Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Changes in habitat distributions over time are measured.
	Met?		Y	Y
	Justification	As described under SG80b the exact locations of the fishery are known and the locations of mussel farm can not change unnoticed. So there are at all times sufficient data to detect any changes in the operations of the fishery that could increase risks to habitats. The distribution of sensitive habitats is known and as long as farms are not overstocked outcome indicaters are not likely to change. Since overstocking a farm will reduce growth rates of mussels it is considered highly unlikely that this occurs. The maps in the Marine Atlas and the Spatial Plan of Shetland Islands are regularly updated when a new location of a sensitive habitat is found. It can thus be concluded that sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures. Since is can also be concluded that habitat distributions over time are measured SG100c is also met met.		
References		Marine Scotland, 2009. Locational Guidelines for the Authorization of Marine Fish Farms in Scottish Waters – Policy Guidance Note. Scottish Executive, 2007 Circular 1/2007: *Planning Controls for Marine Fish Farming.* Scottish Government, 2010. ScottishPlanning Policy. February 2010.		

	Shetland Islands Council planning policy for aquaculture, 2012.
OVERALL PERFORMANCE INDICATOR SCORE:	**85**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.5.1

PI 2.5.1		**The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	Y	Y	N

	Justification	Studies have been conducted on the environmental impacts of mussel culture in various parts of the world. These studies show that mussel farming has ecological effects on the seabed and on the water column (Keeley, 2009; Ingles & Gust, 2003; Ysebaert et al., 2009; Gallardi, 2014). The effects on the seabed are discussed under PI 2.4.1. Habitat. The issue of effects on the water column will be discussed below. Besides these two generally well-studied issues there are some wider ecological issues connected to mussel farming. Structures are put in the water and therefore marine farms function as mid-water artificial reefs that provide a food source, breeding habitat, and refuge from predators for some species. Potential effects of these artificial structures on seabirds and marine mammals (seals, dolphins and whales) relate mainly to entanglement in structures and gear and habitat exclusion. This issue has been discussed under PI 2.3.1. ETP. It is known that aquaculture structures can be reservoirs for the establishment of invasive species. Finally the mussel culture can have an effect on the genetics of the mussel population. This issue is discussed under Principle 1. The physical presence of marine farms can alter and reduce current speeds, which may impact biological processes. At the present scale of development in Scotland and Shetland these issues are not considered significant here. Pelagic impacts further include the depletion of phytoplankton and/or the alteration of nitrogen cycles in the water column. The large concentrations of mussels found in mussel farms can extract a significant proportion of phytoplankton. Mussel farms act as biological filters and influence the types and amount of food available in the water column. This in turn has the potential to have top-down effects on the wider ecosystem by influencing the amount of resources available at the base of the food web. Due to high density cultures and relatively high filtration capacity of mussels, the concept of carrying capacity has been focused on the depletion of food within the water column. In order to understand the magnitude of the effects of mussel farms, bio-physical models have been used to assist in understanding the cumulative spatial impacts of mussel farms on these primary resources in New Zealand (Keeley, 2009). These studies have focused on the levels of culture that reduce the food in the water to concentrations where they begin to affect the growth of the culture itself. This approach relates to production carrying capacity (i.e. the stocking density of bivalves at which harvests is maximised (Inglis et al., 2000) or the physical carrying capacity of a given coastal area (i.e. the total area of marine farms that can be accommodated in the available physical space (Inglis et al. 2000). Carrying capacity of mussel farming can also be defined in relation to ecological effects, or what is termed ecological carrying capacity. Ecological carrying capacity has been defined for shellfish aquaculture by Inglis et al. (2000) as “the stocking or farm density which causes unacceptable ecological impacts”. In Scotland work on carrying capacity of lochs has been carried out by Tett (2007) in the framework of the SARF 12 project. Gibbs (2007) provides some guidance as to what sustainability performance indicators may be acceptable for assessing the level of interaction between bivalve culture and the water column environment. These can be applied to various farm locations as a means of identifying any limitations relating to existing environmental characteristics (e.g. hydrodynamics, phytoplankton biomass etc.).

		Mussel farms also result in a concentration and redistribution of nutrients (Christensen, 2003). Farmed mussels and other associated fauna release dissolved sources of nitrogen (e.g. ammonium) directly into the water column as metabolic waste products. Water column nitrogen concentrations can also be increased due to enhanced benthic re-mineralisation rates beneath the farm (i.e. the microbial breakdown of mussel biodeposits on the sediment surface and flux of ammonium into the water column). Localised nutrient enrichment could effectively stimulate production of algae attached to the mussels and culture lines (Black 2001). Although the impacts of shellfish farming on cycling of nitrogen may be considerable, a range of factors exist which may influence nitrogen cycling in any one body of water. These include farm-specific factors (scale of operation, production density etc.), natural processes (tidal exchange) and external sources of N (natural, domestic and agri-industrial sources of N). Such high degree of variability in nitrogen renders it intrinsically difficult to measure in the context of environmental effects of mussel farming. Oxygen is consumed through respiration by the mussels and associated fouling organisms on the culture lines. This can be exacerbated by enhanced benthic oxygen consumption due to deposition and decomposition of particulate organic materials beneath farms. Ammonium released by mussels is immediately available for localised phytoplankton production in surface waters (Kasper et al. 1985). However, large-scale commercially intensive bivalve aquaculture may lead to depletion of nutrients, particularly nitrogen which plays a crucial role in the productivity of a coastal ecosystem and may lead to localised food-limitation for bivalve production (Kasper et al. 1985). In summary, bivalve aquaculture may impact the pelagic environment through the alteration of nutrient cycling, but such impacts may only be expected to occur where high density bivalve aquaculture occurs. It can be concluded that extensive work on the pelagic effects of mussel culture has been done and this work will continue with the extension of mussel farming. All information considered points towards the conclusion that impacts vary depending on numerous factors such as farm size, crop density, water depth, currents and season (see for a thorough overview: Galardi, 2014). Large effects are seen only in situations with a high concentration of mussels in water bodies with a limited water exchange. Both in Scotland and Shetland the local authorities and the industry have shown to be very well aware of this. Mussel farmers know that they will experience a reduced growth of their mussel on their farm when stocking densities are too high. Local authorities in Shetland apply a model to calculate the carrying capacity of a certain water body were applications are made. Also in Scotland the issue of licensing is taking account of the number of lines that a loch could sustain. As stated above other ecosystem impacts from mussel culture can result from the fact that the mussel lines can provide an artificial habitat for many species. Rocha et al (2009) found that mussel farms provide a habitat for several invasive tunicate species. The arrival of the Japanese skeleton shrimp Caprella mutica in Scotland illustrates the potential of the introduction of new species. Because the suspended mussel culture does not import mussels from other areas the risks in the Scottish and Shetland for unintentional movement of non-native species is considered low.

		The epifauna on the mussel lines provides an additional food source for some fish species. Lopez et al. (1984) concluded that one effect of intense mussel aquaculture in Spain has been to change the food habits of some fish species from predominantly infauna to raft epifauna diet. The mussel rafts can also provide shelter for some fish. The team concludes that it is highly unlikely that the current mussel culture practice in Scotland and Shetland disrupt the key elements underlying ecosystem structure and function, to a point where there would be serious or irreversible harm to the environment and therefore SG80 a is met. Since the previous conclusion is partly based on general scientific literature on the subject of impacts of mussel rope culture and the scientific information on the impact of this fishery is rather limited it can not be concluded that there is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. Thus SG100a is not met.
References		» Black KD 2001. Sustainability of aquaculture. In: Black KD ed. Environmental impacts of aquaculture. Sheffield Academic Press, Sheffield, United Kingdom. Pp. 199–212. » Christensen 2003, Impacts of longline mussel farming on oxygen and nitrogen dynamics and biological communities of coastal sediments. » Gallardi, 2014. Effects of Bivalve Aquaculture on the Environment and Their Possible Mitigation: A Review. Fisheries Aquaculture Journal 5:3. http://dx.doi.org/10.4172/2150-3508.1000105 » Gibbs, M.T., 2007. Sustainability performance indicators for suspended bivalve aquaculture activities. Ecological Indicators 7: 94-107. » Hatcher, A., J. Grant and B. Schofield. 1994. Effects of suspended mussel culture (Mytilus spp.) on sedimentation, benthic respiration and sediment nutrient dynamics in a coastal bay. Mar. Ecol. Prog. Ser. 115: 219-235.

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» Lopez-Jamarl, J., Iglesias & and J. J. Otero. 1984. Contribution of infauna and mussel-raft epifauna to demersal fish diets. Marine Ecology Progress Series, Volume 15: 13-18, 1984.

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» Tett P. & E Portilla, M. Inall, P. Gillibrand, M. Gubbins & T. Amundrod, 2007. Modelling the Assimilative Capacity of Sea-Lochs. Final Report on SARF 012, November 18, 2007.

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OVERALL PERFORMANCE INDICATOR SCORE:	**80**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.5.2

PI 2.5.2		**There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary.	There is a partial strategy in place, if necessary.	There is a strategy that consists of a plan, in place.
	Met?	Y	Y	Y

	Justification	Mussel culture on ropes in its self is a form of “fishing’ that compared to other fishing practices like for instance trawling has a low impact on the ecosystem. The ‘fish’ that is taken from the system are grown on artificial extra substrate. In fact the mussel culture increases the mussel stock and does not compete with other predators by removing wild stock. The practice of mussel culture could therefore be considered as a strategy to reduce ecosystem impact. Nevertheless mussel culture has always an impact on the ecosystem and a strategy is necessary to keep impacts within acceptable limits. In this fishery several strategies can be identified. First and for all the site selection for the mussel farms as described under PI 2.4.2 is important. Negative impacts on habitats and marine features (protected species) are minimized by the strategies described under PI 2.3.2 and 2.4.2. The impact on the ecosystem is further controlled by controlling the number and size of mussel farms. To this end strategies are in place to ascertain that the industry operates within biological and assimilative carrying capacity of the environment. The objective to do this is formulated in the Strategic Framework 2003 and in “A fresh Start”. The strategy is implemented by the local authorities and the Crown Estate through licensing procedures. The SIC Interim Policy for Marine Aquaculture 2007 specifically states that: ‘The Council will assess applications for shellfish sites within a particular body of water with respect to its biological carrying capacity (i.e. the total shellfish biomass that can be sustained within a water body). Where the proposed new development or variation to an existing site results in the carrying capacity being significantly exceeded, the Council may be minded to refuse such applications.’ The Local Council applies a carrying capacity model for new sites that takes account of, volume of water, exchange of water and water depth. With this model the maximum tonnage of mussels that can be allowed is calculated. From this tonnage a maximum number of lines for which license is given is determined. (M. Holmes, pers. comm.). Similar procedures are applied by the local authorities in Scotland. On top of this strategy also the mussel farmers apply their own strategy of maximizing their production of high value mussels. This means producing mussel with a high flesh content. If they would stock their farms to dense mussels would not grow in an optimal way and selling price would be much lower. Therefore also the mussel farmers will try to work within the carrying capacity of their site. By doing this the ecosystem impacts on the scale of lochs and voes will be a restrained. Therefore it can be concluded that a strategy is in place that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance. The strategy is implemented through a Code of Conduct, environmental planning and spatial plans. It can therefore be concluded that the strategy consists of a plan and SG100 is met.

b	**Guidepost**	The measures take into account potential impacts of the fishery on key elements of the ecosystem.	The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.
	Met?	Y	Y	N
	Justification	Mussel culture on ropes in its self is a form of “fishing’ that compared to other fishing practices like for instance trawling has a low impact on the ecosystem. The ‘fish’ that is taken from the system are grown on artificial extra substrate. In fact the mussel culture increases the mussel stock and does not compete with other predators by removing wild stock. On top of this strategy also the mussel farmers apply their own strategy of maximizing their production of high value mussels. This means producing mussel with a high flesh content. If they would stock their farms to dense mussels would not grow in an optimal way and selling price would be much lower. Therefore also the mussel farmers will try to work within the carrying capacity of their site. By doing this the ecosystem impacts on the ecosystem will be restrained. The locations of the mussel farms are exactly known since the GPS coordinates of the sites are described in the regulation and the licenses that have been issued. Authorities control the site location and the allocated number of lines. From scientific literature it is generally accepted that the impacts of mussel farms are determined by water speed, water depth, farm size and stocking densities. Therefore it can be concluded that a strategy that consist of a plan is in place that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem. Therefore SG80b is met. However the plan and measures are not fully based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. The management strategy for the fishery does not address all components and elements of the ecosystem explicitly and therefore SG100b is not met.		

c	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.
	Met?	Y	Y	Y
	Justification	Location of mussel farms is known since the coordinates of the sites are described in the license. The location of all mussel culture sites is exactly allocated. Inspectors control the site location and the allocated number of lines on a regular basis. From scientific literature it is generally accepted that the impacts of mussel farms are determined by water speed, water depth, farm size and stocking densities. These parameters are known and kept under strict control. There is thus some objective basis for confidence that the measures are likely to work, based on prior experience, plausible argument or information directly from the fishery/ecosystems involved and therefore SG100 is met.		
d	**Guidepost**		There is some evidence that the measures comprising the partial strategy are being implemented successfully.	There is evidence that the measures are being implemented successfully.
	Met?		Y	Y
	Justification	The location of mussel culture sites is easy to determine using GPS. Therefore it is quite certain that the installations are only present on allocated sites. As long as mussel farms are not located over sensitive habitats it is evident that negative impacts are prevented and therefore there is evidence that the measures are being implemented successfully. Thus SG100d is met.		
References		Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations 1999 Marine (Scotland) Act 2010. Aquaculture and Fisheries (Scotland) Act 2007. Inshore Fishing (Scotland) Act 1984. Sea Fisheries (Shellfish) Act 1967. Association of Scottish Shellfish Growers, 2005 Code of Good Practice. A strategic Framework for Scottish Aquaculture, Scottish Government, 2003. Scottish Government, 2009 A Fresh Start: The renewed strategic framework for Scottish Aquaculture.		
OVERALL PERFORMANCE INDICATOR SCORE:				**95**

CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.5.3

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity).	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	Y	Y	
	Justification	There is extensive research carried out on the loch (and 'voes') ecosystems (Ross et al, 1993; Haggan & Pitcher, 2005). Haggan reconstructed trophic flows through the entire west coast of Scotland ecosystem using the Ecopath approach. Ross assessed the effects of potential disturbances on a sea-loch ecosystem as a result of nutrient enrichment. The existing Information on this ecosystem is adequate to broadly understand the functions of the key elements of the ecosystem. Therefore SG80a is met.		
b	**Guidepost**	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail.	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail.	Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated in detail.
	Met?	Y	Y	N
	Justification	The impacts that suspended mussel culture may have on the environment have been studied in all areas of the world were mussel culture takes place. Extensive work has been done and is published in scientific articles and books. The existing information on the impact of mussel farming is reviewed to make this information more accessible for policy makers, the industry and the general public (Keeley, 2009). From this information all possible (main) impacts from mussel culture can be inferred. Also in Scotland and Shetland research is carried out on the impacts of mussel culture (Tett, 2007; Wilding, 2011). Not all main impacts have been studied in detail yet. It can therefore be concluded that main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail. Therefore SG80 is met. Since not all main impacts have yet been studied in detail SG100b is not met.		

c	**Guidepost**		The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known.	The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood.
	Met?		Y	N
	Justification	Various studies have been done on the main components of the ecosystem. The role of mussels in the ecosystem for instance is described by Bayne (1991). On the epifauna on mussel lines (bycatch and discards) and their ecological roles information is available from several studies (LeBlanc, 1991; Lapointel, 1981; Lopez-Jamarl, 1984, Keeley, 2009.). On marine mammals and birds and their functions in the ecosystem numerous scientific papers exist (Lamber, 2002; Lloyd, 2003). It is concluded that the main functions of these components in the ecosystem are known and thus SG80c is met. SG100c is not met since not not all main functions of these components are well understood.		
d	**Guidepost**		Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.	Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred.
	Met?		Y	N
	Justification	All mussel farming takes place on the basis of a license of the Crown Estate and local marine planning. Therefore the locations and the spatial extent of the mussel farms are exactly known. This means that the scale and intensity of the activity is known. On the basis of this knowledge it is possible to have a general understanding of the impact of the fishery on the (carrying capacity of the) ecosystem. The limitations on the farms (based on simple water basin models) limit the impact on the ecosystem to an estimated and acceptable level. It is concluded that sufficient information is available on the impacts of the fishery on the Components to allow some of the main consequence for the ecosystem to be inferred and thus SG80d is met. SG100d is not met since it can not be concluded that there is not sufficient information on the elements of the ecosystem.		
e	**Guidepost**		Sufficient data continue to be collected to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Information is sufficient to support the development of strategies to manage ecosystem impacts.

	Met?		Y	Y
	Justification	Since the exact locations of the fishery are known and the locations of mussel farm can not change unnoticed. So there are at all times sufficient data to detect any changes in the operations of the fishery that could increase in risk levels. As long as mussel farms are not overstocked outcome indicaters are not likely to change. Since overstocking a farm will reduce growth rates of mussels it is considered highly unlikely that this occurs. It can thus be concluded that sufficient data continue to be collected to detect any increase in risk to ecosystem (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures. Therefore SG80e is met. Since there is extensive information on the different components of the ecosystem (eg habitat and ETP species) it can be concluded that there is sufficient information to support the development of strategies to manage ecosystem impacts and therefore SG100 is also met.		
References		Bayne, B.L. 1991. Introduction (Biology and Cultivation of Mussels), Aquaculture, 94, 2-3. Chamberlain, J., Fernandes, T., Read, P., Nickell, T., & Davies, I. (2001). The impact of biodeposits from suspended mussel (Mytilus edulis) culture on the surrounding surficial sediments. ICES Journal of Marine Science, 58(2), 411-416. Haggan, N. & T. Pitcher (editors), 2005 Ecosystem Simulation Models of Scotland's West Coast and Sea Lochs. Fisheries Centre, University of British Columbia, Fisheries Centre Research Reports, Vol. 13 No. 4 Pages: 67pp Keeley, N., Forrest, B., Hopkins, G., Gillespie, P., Knight, B., Webb, S., Clement, D., and Gardner, J. 2009. Review of the ecological effects of farming shellfish and other non-finfish species in New Zealand. Cawthron Report No. 1476, Cawthron Institute, Nelson, N.Z. Lopez-Jamarl, J., Iglesias & and J. J. Otero. 1984. Contribution of infauna and mussel-raft epifauna to demersal fish diets. Marine Ecology Progress Series, Volume 15: 13-18, 1984. LeBlanc, A., T. Landry & G. Miron, 2002. Fouling organisms in a mussel cultivation bay: their effect on nutrient uptake and release. Canadian Technical Report of Fisheries and Aquatic Sciences 2431. Lloyd, B.D., 2003. Potential effects of mussel farming on New Zealand's marine mammals and seabirds. Discussion Paper, Published by New Zealand Department of Conservation, Wellington, New Zealand Lambert, R. 2002. The Grey Seal in Britain: a twentieth century history of nature conservation success. Environment and History 8(4): 449-474. Lapointel, B.E., F. Xavier & J. M. Fuentes, 1981. Community Structure, Succession, and Production of Seaweeds Associated with Mussel-Rafts in the Ria de Arosa, N. W. Spain. Marine Ecology Progress Series, Vol. 5: 243-253, 1981. Tett P. & E Portilla, M. Inall, P. Gillibrand, M. Gubbins & T. Amundrod, 2007. Modelling the Assimilative Capacity of Sea-Lochs. Final Report on SARF 012, November 18, 2007 Ross, A.H., W.S.C. Gurney & M.R. Heath, (1993). Ecosystem models of		

	Scottish sea lochs for assessing the impact of nutrient enrichment ICES J. Mar. Sci. (1993) 50(4): 359-367. Wilding T., 2011. A systematic assessment of the environmental impact of Scottish shellfish farms, including benthos, water column and relevant special interactions (SARF53), Project description: http://www.smi.ac.uk/tom-wilding/sarf053.
OVERALL PERFORMANCE INDICATOR SCORE:	**85**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 3.1.1

PI 3.1.1		**The management system exists within an appropriate legal and/or customary framework which ensures that it:** • **Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and** • **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and** • **Incorporates an appropriate dispute resolution framework.**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There is an effective national legal system and a framework for cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and organised and effective cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	The fishery operates within Scottish territorial waters. With the devolution of UK fisheries management responsibilities to the Scottish Parliament, Scottish Ministers are responsible for the regulation of sea fishing around Scotland and within 12 nm of Scotland's coast, the Scottish Government has the ability to take non-discriminatory conservation measures, provided that the EU has not already legislated in this area. The Marine (Scotland) Act 2010 now provides overarching legislation to manage functions and activities in the Scottish marine area including provision about marine plans, licensing of marine activities, the protection of the area and its wildlife including seals and regulation of sea fisheries; and for connected purposes. Section 3 of the Act states on the 'Sustainable development and protection and enhancement of the health of the Scottish marine area': In exercising any function that affects the Scottish marine area under this Act— (a) the Scottish Ministers, and (b) public authorities must act in the way best calculated to further the achievement of sustainable development, including the protection and, where appropriate, enhancement of the health of that area, so far as is consistent with the proper exercise of that function. The Marine (Scotland) Act includes provisions for management of fisheries and aquaculture with binding procedures that are consistent with MSC P1 & P2 outcomes required at both a national and local level. (SG 100 is met).		

b	**Guidepost**	The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery.	The management system incorporates or subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.
	Met?	Y	Y	Y
	Justification	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective (SG1-100). This is evidenced in the planning system on the Scottish mainland and in Shetland that has a proven decision-making and appeals process. The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges (SG100). Management bodies do this through encouraging pre-application consultation and providing guidance.		
d	**Guidepost**	The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	Met?	Y	Y	N

	Justification	Shellfish production requires a lease from The Crown Estate, planning consent from the relevant Local Authority and a Marine Licence issued by Marine Scotland. These give consent to the producer to install structures in a defined area for a specific purpose and there is no commitment to the legal rights of people dependent on the (wild) fishery. The Marine (Scotland) Act states that a licence is required for a range of activities in the sea (including mussel farms) and that the Scottish Ministers must have regard to— (a) the need to protect the environment, (b) the need to protect human health, (c) the need to prevent interference with legitimate uses of the sea, (d) such other matters as the Ministers consider relevant. The management system therefore has a mechanism to observe the legal rights of people dependent on the fishery for food or livelihood and SG80 is met., The management system does not formally commit to their legal rights; hence SG100 is not met.
References		Marine (Scotland) Act 2010 http://www.legislation.gov.uk/asp/2010/5/introduction
OVERALL PERFORMANCE INDICATOR SCORE:		**95**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 3.1.2

PI 3.1.2		The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
	Met?	Y	Y	Y
	Justification	There is a clear division and understanding of responsibilities between international (EU) and national authorities. There are a number of organisations involved in the management process at a national and local level (see section 5). Consultation with those directly involved in the fishery has identified that the functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction (SG 100 is met).		
b	**Guidepost**	The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.
	Met?	Y	Y	N

	Justification	The fishery management system now includes consultation processes that regularly seek and accept relevant information, including local knowledge from fishers, etc. For the rope-grown mussel fishery the planning system also involves transparent consultation process (SG80 met). Regular consultation occurs via the industry forum the MSGA established under the Strategic Framework for Scottish Aquaculture, in which the Scottish Shellfish Marketing Group and Seafood Shetland are members. Planned quarterly meetings of the MSGA Shellfish Working Group can be supplemented by extraordinary meetings with regulators or the full group at the request of members. These mechanisms have improved engagement by the governing bodies with the industry, but the management system does not explicitly demonstrate consideration of the information and explains how it is used or not used (SG 100 not met).		
c	**Guidepost**		The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.
	Met?		Y	Y
	Justification	The consultation process includes public consultation on key development decisions and on policy development by the Scottish Government. This provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement (SG 100 is met).		
References		A Fresh Start: The renewed strategic framework for Scottish Aquaculture, Scottish Government, 2009……		
OVERALL PERFORMANCE INDICATOR SCORE:				**95**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.1.3

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are implicit within management policy	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.
	Met?	Y	Y	Y
	Justification	Long-term objectives are set under 'A Fresh Start': **Sustainable Growth** The aquaculture industry is ambitious to grow but growth must be sustainable. Growth must be within the carrying capacity of the aquatic environment and balanced against the needs of others. **Economic principle:** Farmed fish and shellfish industries should be able to fulfil their ambitions for growth, be market-led with a focus on quality leading to improved economic returns for the industry and greater market stability. **Environmental principle:** Farmed fish and shellfish industries should act as a good neighbour by minimising risks to biodiversity and impact on the environment and other aquatic activities. Growth should be within the carrying capacity of the environment. **Social principle:** Farmed fish and shellfish industries should underpin strong local communities and provide benefits to those communities. Similar long-term objectives and also explicit within the Marine Plan for Scotland, which ultimately published in 2015 and provides an overarching framework for the sector-based objectives listed above and therefore for this fishery the SG-100 is met.		
References		Scottish Government (2009) A Fresh Start: The renewed strategic framework for Scottish Aquaculture Marine (Scotland) Act, 2010 Scotland's National Marine Plan (2015) http://www.gov.scot/Topics/marine/seamanagement/national		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.1.4

PI 3.1.4		The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing practices.
	Met?	Y	Y	Partial
	Justification	Incentives in the form of subsidies for innovations in the fishery and culture are available through the European Maritime Fisheries Fund (EMFF). In response to criticisms of the previous funding programme, the EMFF required that a multi-annual plan for aquaculture be developed. This should better ensure incentives provided in the form of subsidies are consistent with P1 and P2 outcomes and ensures that perverse incentives do not arise (SG80 is met). The management policy for suspended mussel culture was evaluated as part of the process resulting in 'A Fresh Start' in 2009. There is therefore review of management policy or procedures to consider incentives and ensure that they do not contribute to unsustainable fishing practices, but these evaluations do not take place on a regular basis. (SG-100 is partially met).		
References		EMFF (2014) The European Maritime and Fisheries Fund (EC Reg. 508/2014) Scottish Government (2009) A Fresh Start: The renewed strategic framework for Scottish Aquaculture		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.2.1

PI 3.2.1	The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2		
Scoring Issue	SG 60	SG 80	SG 100

a	**Guidepost**	Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system	Short and long-term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.	Well defined and measurable short and long-term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.
	Met?	Y	Y	N

	Justification	General short and long-term objectives that are consistent with MSC Principles 1 and 2 are presented in A Fresh Start: the Renewed Strategic Framework for Scottish Aquaculture. The Environmental principle states "Farmed fish and shellfish industries should act as a good neighbour by minimising risks to biodiversity and impact on the environment and other aquatic activities. Growth should be within the carrying capacity of the environment." The objectives outlined in the Association of Scottish Shellfish Growers Code of Good Practice are more fishery-specific as these focus on shellfish growers. This is a voluntary code and while the principles are supported by the Scottish Government, this is not explicit within the fisheries management system. In relation to carrying capacity the objective is to: 'address carrying capacity concerns' proposing that Growers shall: • Ensure that sites are located in areas where carrying capacity appears (via pilot project) to be robust • Record growth rates each year in order to indirectly monitor any potential variation in carrying capacity • Endeavour to address any reasonable public concerns regarding carrying capacity in a timely and proactive manner • Continue to participate in research regarding carrying capacity limitations and issues In 2012 the client group established a management plan for Scottish mussels, which included the following key aims and objectives: • To ensure a successful future for the Scottish shellfish aquaculture sector, by assisting to advance its current successful status in a sustainable, respectful and thoughtful manner, acknowledging all fellow-users of the coastal marine environment in which it operates and upon which it depends for its economic well- being and future prosperity. • To ensure that the sector pursues a market-led agenda, focussing on quality assurance to secure enhanced economic opportunities for its continued and future success. • To continue to address MSC recommendations in the short-term; to realise MSC's maximum benefits for the sector; and aspire to retain MSC accreditation in the future. Given the above listed objectives set by various bodies associated with management of the fishery, clear short and long-term objectives are explicit within the management system and these are consistent with MSC principles 1 and 2 (SG-80 is met). Many of the objectives are not readily measurable, particularly in relation to P2 outcomes. For example the growth objective is only measureable in terms of production levels, rather than measurable impact on the environment. SG-100 is not met.
References		Association of Scottish Shellfish Growers (2005) Code of Good Practice Scottish Government (2009) A Fresh Start: The renewed strategic framework for Scottish Aquaculture SSMG/Seafood Shetland (2012) Management Plan by Seafood Shetland and the Scottish Shellfish Marketing Group (SSMG)

OVERALL PERFORMANCE INDICATOR SCORE:	**80**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 3.2.2

PI 3.2.2		**The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	Y	Y	
	Justification	Fishery-specific management at regulator and operator level does have well-established decision-making processes as described in section 3.6. These have resulted in revised strategies and measures, including revisions to the decision-making processes themselves, e.g. with the establishment of the Ministerial Group for Sustainable Aquaculture (MGSA) Shellfish Working Group (SG80 is met).		
b	**Guidepost**	Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	Met?	Y	Y	N

	Justification	The responses to emerging issues are discussed within the Ministerial Group for Sustainable Aquaculture (MGSA) Shellfish Working Group which meets quarterly to share knowledge, discuss serious issues and develop strategies, allowing industry, stakeholders and regulators to seek the best available information and adopt the precautionary approach (SG 60 is met). For example, the need to increase investor confidence has also been recently addressed with longer terms of lease (Crown Estate, 2010). There are clear procedures and planning in Scottish waters in relation to water quality and disease management in shellfish growing waters. Seafood Shetland and SSMG have a specific management plan for their industry specifying how issues associated with p1 and p2 objectives will be addressed. Seafood Shetland and SSMG have clearly carried out actions in the management plan within the timelines described. They have also discussed the management plan, the actions described and the information requirements from the MSC certification process within the MGSA Shellfish Working Group. Therefore, it can be concluded that the fishery specific management system includes effective decision making processes both at the governmental level and in the framework of the sectoral management plan. The resulting process is both timely and transparent in its response to serious issues and the industry forum supported by public consultation ensures that wider implications are taken into account (SG 80 is met). There are ongoing concerns over the length and complexity of the planning process and further revisions to the licensing process are still to be implemented. Therefore the requirement at SG100 for <u>all</u> issues to be addressed in a timely and adaptive manner is not evident and SG100 is not met.		
c	**Guidepost**		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Y	
	Justification	All legislation and strategies from the CFP at EU level down to the national level use the precautionary approach and are science-led, using the best available information from scientific bodies such as NAFC Marine Centre, Scottish Association of Marine Science (SAMS). Management bodies of SEPA and Marine Scotland have in-house scientific expertise to inform decision-making. Local authorities call upon this expertise via statutory consultation processes. Industry is also able to provide technical input via the MGSA Shellfish working group (SG80 is met).		

d	**Guidepost**	Some information on fishery performance and management action is generally available on request to stakeholders.	Information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders provides comprehensive information on fishery performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	Met?	Y	Y	N
	Justification	Regulators do have 'customer service commitments' and seek to be transparent in decision making. The MGSA Shellfish Working Group allows a forum for proactive fishery-specific management and for explicit explanations to be given for actions or lack of actions (SG 80 is met). While minutes are taken at the MGSA meetings, these are not considered formal reporting to all stakeholders and therefore SG 100 is not met.		
e	**Guidepost**	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	Y	Y	Y
	Justification	Scottish law requires that public sector management bodies comply with judicial decisions in a timely fashion (SG80 is met). The system acts proactively to avoid disputes reaching judicial proceedings through (a) in terms of development, advocating prior application discussions and (b) in terms of ongoing management, the establishment of the MGSA Shellfish working group to provide a platform for issues to be raised and addressed. SG100 is met.		
References		Crown Estate, 2010 Rent Review: Shellfish leases Seafood Shetland and SSMG Management Plan, 2012.		
OVERALL PERFORMANCE INDICATOR SCORE:				**85**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.2.3

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	Y	Y	Y
	Justification	This fishey is based on static production lines that can be observed by management bodies both in situ and remotely via satellite images (e.g. Google earth). Officers from the Crown Estate and the local authority monitor the number and position of lines to ensure compliance with conditions of license. Most instances of non-compliance relate to the number and positioning of lines. These can be easily checked visually and through use of GPS. The MCS system is comprehensive and appropriate to the scale of risk posed by the fishery. It has show to be consistently able to enforce management measures and rules (SG100 is met).		
b	**Guidepost**	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
	Met?	Y	Y	Y
	Justification	Few sanctions have been applied in the fishery as communication enables issues to be resolved. Sanctions to deal with non-compliance consist of discussion with the operator, followed by a written warning, fines and ultimately revocation of license. These are rarely but consistently applied and demonstrably provide effective deterrence (SG100 met).		

c	**Guidepost**	Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	Met?	Y	Y	Y
	Justification	Consultation with marine managers in the local authority indicates that compliance levels are high and there is no evidence of systematic non-compliance. The operators are integral to the data collection systems in the fishery as they provide production data to SSMG and to Marine Scotland as part of the annual shellfish production survey. They are now also providing information on eider numbers to nature conservation bodies. SG100 is met.		
d	**Guidepost**		There is no evidence of systematic non-compliance.	
	Met?		Y	
	Justification	Discussions with managers indicate a high degree of confidence that fishers comply with management system (SIC pers comm.) Therefore SG80 is met.		
References		SIC economic development officer pers comm. Marine Scotland Compliance fisheries officer pers comm.		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.2.4

PI 3.2.4		**The fishery has a research plan that addresses the information needs of management**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	Overall research associated with the fishery continues to be in an *ad hoc* manner via Marine Scotland Science or the Scottish Aquaculture Research Forum (SARF). This appears to be commissioned as required and therefore SG 60 is met. A Research Plan has been developed for the sector which initially aims to address the information shortcomings identified as part of the group's Marine Stewardship Council (MSC) accreditation. Additional research needs have also been identified, in line with the Ministerial Group for Sustainable Aquaculture - Aquaculture Science and Research Strategy (SG80 is met). The Strategy includes research requirements for finfish and shellfish aquaculture into the following topics (which are cross-referenced to actions within the client's research plan): » Nutrition; » Stock improvement; » Health and welfare; » Food safety and hygiene; » Technology and engineering; » Wild-farmed Interactions; » Markets, economics and social science; » Capacity; and » Blue biotechnology/growth. The research plan was initially focused on the MSC conditions, but this was then expanded upon and integrated into the sector-wide plan through the ministerial group, it is now considered to be a comprehensive plan providing a coherent and strategic approach to research (SG100 is met).		
b	**Guidepost**	Research results are available to interested parties.	Research results are disseminated to all interested parties in a timely fashion.	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.
	Met?	Y	Y	N

	Justification	Research results are disseminated to interested parties via the Scottish Government and SARF websites, the Scottish shellfish forum and the Association of Scottish Shellfish Growers (ASSG), particularly at its annual conference (SG 80 is met). All findings are not, however made widely and publicly available and therefore SG100 is not met.
References		» SARF aquaculture R&D database: http://www.sarf.org.uk/downloads/
OVERALL PERFORMANCE INDICATOR SCORE:		**90**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 3.2.5

PI 3.2.5		**There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives There is effective and timely review of the fishery-specific management system**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery has in place mechanisms to evaluate some parts of the management system.	The fishery has in place mechanisms to evaluate key parts of the management system	The fishery has in place mechanisms to evaluate all parts of the management system.
	Met?	Y	Y	N
	Justification	The various management system elements including the licensing & planning process, production and food safety are all subject to evaluation. It is therefore concluded that the key parts of the management system are evaluated. SG-80 is met. All parts of the management system are overseen by the MGSA Shellfish working group, but a mechanism for the comprehensive evaluation of all parts of the management system is lacking and SG100 is not met.		
b	**Guidepost**	The fishery-specific management system is subject to occasional internal review.	The fishery-specific management system is subject to regular internal and occasional external review.	The fishery-specific management system is subject to regular internal and external review.
	Met?	Y	Y	Y

	Justification	A Fresh Start, published in 2009 illustrates that the fishery-specific management system is subject to occasional internal review (SG-60 is met). The statutory and public consultation process ensures there is also occasional external review (SG80 is met). The Ministerial Group for Sustainable Aquaculture (MGSA) was established in May 2013 to replace the Ministerial Group on Aquaculture (MGA), which had been identified as the body to provide the necessary 'regular internal and external review'. The 2016 meeting minutes provided showed several agenda items illustrating this review function, including a Spatial Planning review, Animal Health Regs and discussion of a recent consenting review. The Shellfish Working Group of the Ministerial Group for Sustainable Aquaculture (MSGA) has accepted the task of reviewing Seafood Shetland and SSMG strategic management documents, including the reseach plan. Since SNH and other external organizations such as Seafish and Scottish Water are seated in MGSA it can be concluded that external review of the performance of the management system will take place regularly (SG100 is met).
References		Scottish Government, 2009 A Fresh Start: The renewed strategic framework for Scottish Aquaculture. MGSA Shellfish Working Group (2016). Meeting 9 Note and Actions. Wednesday 1st September 2016
OVERALL PERFORMANCE INDICATOR SCORE:		**90**
CONDITION NUMBER (if relevant):		

Appendix 1.2 Risk Based Framework (RBF) Outputs

RBF was not used in this assessment

Appendix 1.3 Conditions

All conditions were closed prior to re-assessment.

No PIs scored less than 80 at this re-assessment and no new conditions are raised.

Appendix 2 Peer Review Reports

Peer Reviewer 1

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**Certification Body Response**
Justification: This is a re-assessed fishery that has developed and matured, and largely addressed the deficiencies present at the initial assessment. The overall determination that this fishery should be certified according to the MSC principles and criteria is appropriate and correctly based on the findings of this assessment**.**		

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**Yes/No NA**	**Certification Body Response**
Justification: All Performance Indicators were scored at 80 or above, and therefore no conditions were raised.		

If included:

Do you think the client action plan is sufficient to close the conditions raised?	**Yes/No NA**	**Certification Body Response**
Justification:		

General Comments on the Assessment Report (optional)

In addition to the numerous spelling, grammatical, punctuation and formatting errors in this draft report there are a few issues that need attention.

1. Table 1 states that the most recent fishing year is 2014 but in the same table there is a greenweight catch for 2015. Are the data for the two UoC's for the same year? Needs an explanation.
2. Page 17 - Figure 4 has two different colour symbols. What do these represent? Needs a legend.
3. Page 19 states "Principle 1 covers all fishing activity on the entire *mytilus galloprovincialis* stock - not just the fishery undergoing certification". Much of this paragraph appears to be about *M. galloprovincialis* when it should be about *M. edulis.* Was this copied and pasted from some other report or is it just 2 separate typo's? This sections needs substantial editing.
4. Page 29 – The two nature conservation MPA's referred to in the text as present in Figure 10 are not actually labelled in Figure 10. One of them, 'Fetler to Haroldswick', appears later as Figure 12 but the other, Mousa to Boddam MPA, is stated to appear in Figure 11 but is not labelled. It would help clarity if more labels could be added to these diagrams.
5. General – in the narrative text there is quite a bit of repetition, with the same sentences or something very similar appearing more than once. Also, on page 37, there is an unfinished sentence in the penultimate paragraph.

6. The description of the longline systems in section 3.3.4 is very cursory. There is no mention of the type, weight, or size of anchors used and the likely impact of these on seabed habitats is not discussed or considered in the scoring tables. The distance apart of the longlines is also very vague ("largely dependent on the size of the servicing vessel") so this gives no indication of the number or density of anchors. The number of longlines and distance apart obviously varies between farms but at least give some approximate numbers.

Certification Body Response

Thank you for the comments.
Several further edits have been made to the text to improve readability.
There is reference to Mytilus galloprovincialis as hybridisation is discussed. Some further clarification in the text has been made. A map of the Moussa to Boddam MPA is now included to provide further clarity on the location of MPA's.
There is variation between farms in terms of the size and number of installed equipment such as anchorage and the length of longlines. Some of these details are, however, described in individual licences and therefore considered during the consenting process.

Performance Indicator Review

Please complete the table below for each Performance Indicator which are listed in the Certification Body's Public Certification Draft Report.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
1.1.1	NA			Principle 1 is not scored. CR v1.3 at CK2.1.3.1 states that If an enhanced CAG bivalve fishery does not involve translocations, and there is no evidence that it negatively impacts the parent stock, CABs may choose not to score Principle 1. The team has correctly applied this requirements.	
1.1.2	NA			Principle 1 is not scored.	
1.1.3	NA			Principle 1 is not scored.	
1.2.1	NA			Principle 1 is not scored.	
1.2.2	NA			Principle 1 is not scored.	
1.2.3	NA			Principle 1 is not scored.	
1.2.4	NA			Principle 1 is not scored.	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
2.1.1	NA			Retained species component not scored. CK 3.1.1 is correctly applied: "Enhanced CAG bivalve fisheries based solely on spat collection shall not be scored for the retained species PIs"	
2.1.2	NA			Retained species component not scored	
2.1.3	NA			Retained species component not scored	
2.2.1	NA			Bycatch species component not scored. CK 3.1.2 is correctly applied: "Enhanced CAG bivalve fisheries based solely on spat collection shall not be scored for the bycatch species PIs"	
2.2.2	NA			Bycatch species component not scored	
2.2.3	NA			Bycatch species component not scored	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
2.3.1	Yes	Yes	NA		
2.3.2	Yes	No	NA	The Justification for b) and c) does not state why SG100 is not met. With little or no interactions it could be argued that there is clear evidence that it is being implemented successfully, as indeed is stated in the justification for d)	The comment is correct. The following additional rational is provided to explain why SG100b and SG100c are not met: SG100b: Since there is no quantative analysis of interactions with ETP species available SG100b is not met. SG100c: Since observation records have not been provided by all farms the evidence is not complete and therefore it can not be concluded that there is clear evidence and SG110c is not met.
2.3.3	Yes	Yes	NA	OK – but I think the score may be a bit mean	
2.4.1	No	No	NA	The impact of the anchors on habitats is not evaluated. Also, the justification states that SG100 is not met because of the lack of "full evidence" but the text for	Concerning the impact of anchors the folowing text is added to the rational: Besides the effects of the rain of pseudo feaces the mussel lines are kept on their place by 2 anchors at both ends of the ropes. These anchors could affect

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
				SG100 only asks for "evidence". The scoring for this PI should be reconsidered	bottom habitats at the time they are placed. However the area that these anchors could affect are relatively small and the anchors form a substrate for benthic species that are associated with hard substrate. Therefore the impact of thse anchors on bottom habitat can be considered negligible. The score has been reconsidered and is increased to 90. The reational is amended to explain that the available evidence is not sufficient to conlcude that there is evidence. But since there is some evidence SG100a is partly met. Amended rational SG100a Since the amount of survey results concerning habitat impacts under the mussel sites is limited to 3 farms it can be concluded that there is some evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. This however is not sufficient to award a score of 100 since SG100a requires that there is evidence and not some evidence. Therefore it is concluded that SG100a is partly met and a score of 90 is awarded.
2.4.2	Yes	Yes	NA	I think this has perhaps been rather harshly marked as for d) there is certainly some evidence that the	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
				strategy is achieving its objective, which is what is required	
2.4.3	No	No	NA	a) The justification does not state why SG100 is not met. I would have thought that the distribution of vulnerable habitats was well known, and avoided in the planning process, so SG100 is met. Note also that in the justifications for b) and c) it states that the locations of sensitive habitats is known.	The following text has been added to th erational in order to explain why SG100 a is not met: SG100 is not met since it can not be concluded that the distribution of all habitat types is known over the range.
2.5.1	No	No	NA	One issue not discussed in the narrative text in section 3.4.3 or considered in the scoring tables for ecosystems is the potentially beneficial effects of the removal of nutrients from the system at harvest in the mitigation of eutrophication. Are there not any eutrophic locations in the Scottish locations considered here? There is excellent recent research on this in Limfjord, Denmark	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
				published in, for example, Petersen et al.2012, 2014; Nielsen, et al. 2016. More generally, the consideration of sediment chemistry beneath mussel farms would also benefit from the inclusion of these studies and also the work of Holmer et al. 2015.	
2.5.2	Yes	No	NA	a) The justification does not state why SG100 is not met. d) a) The justification does not state why SG100 is not met. The studies that show that ecosystem effects are small-scale and localized provide evidence that the strategy for restraining ecosystem impacts is being implemented successfully.	The score of SG100a and SG100d have been reconsidered and changed to 100. The overall score is consequently increased to 95. The following text is added to the rationals: SG100a: The strategy is implemented through a Code of Conduct, environmental planning and d the spatial plans. It can therefore be concluded that the strategy consists of a plan and SG100 is met. SG100d: The location of mussel culture sites is easy to determine using GPS. Therefore it is quite certain that the installations are only present on allocated sites. As long as mussel farms are not located over sensitive habitats it is evident that negative impacts are prevented and therefore there is evidence that the measures are is being implemented successfully
2.5.3	Yes	No	NA	c) The justification does not state why SG100 is not met. I would have	Further rational has been added to explain why SG100d is not met. There is sufficient information on

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
				thought that there is substantial knowledge and understanding of the main Components. e) I agree with the score but there is an important typo here. The final sentence should read 'SG100e is also met'	the main components but the scoring issue of SG100d also requires that there is sufficient informmation on the elements of the ecosystem.
3.1.1	Yes	No	NA	d) The justification for not meeting SG100 seems a rather dubious interpretation of words. Do the conditions under which the licences are granted not represent a formal commitment and a legal basis where rights are fully codified within the management system?	Text is revised to: Shellfish production requires a lease from The Crown Estate, planning consent from the relevant Local Authority and a Marine Licence issued by Marine Scotland. These give consent to the producer to install structures in a defined area for a specific purpose and there is no commitment to the legal rights of people dependent on the (wild) fishery. The Marine (Scotland) Act states that a licence is required for a range of activities in the sea (including mussel farms) and that the Scottish Ministers must have regard to— (a) the need to protect the environment, (b) the need to protect human health, (c) the need to prevent interference with legitimate uses of the sea,

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
					(d) such other matters as the Ministers consider relevant. The management system therefore has a mechanism to observe the legal rights of people dependent on the fishery for food or livelihood, but does not formally commit to their legal rights; hence SG3-100 is not met. Score is consistent with the original assessment and there has been no legislative change to warrant a change in score.
3.1.2	Yes	Yes	NA		
3.1.3	Yes	Yes	NA		
3.1.4	Yes	Yes	NA	I agree with the partial score regarding the regularity of review	
3.2.1	Yes	Yes	NA		

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
3.2.2	Yes	Yes	NA		
3.2.3	Yes	Yes	NA		
3.2.4	Yes	Yes	NA	Agreed. A comprehensive research plan was developed from the initial MSC assessment condition.	
3.2.5	Yes	Yes	NA		

Any Other Comments

Comments	Certification Body Response

For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	**Yes/No** **Yes**	**Certification Body Response:**
Justification: The report clearly describes the process by which spat is obtained and discusses why this fishery is defined as an enhanced catch and grow bivalve fishery, with no translocation taking place. With spat collected within the site there are no additional impacts arising from the enhancement activities.		

Peer Reviewer 2

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**Certification Body Response**
Justification: The report provides ample evidence in favor of the recertification of Shetland and Scottish Mainland Rope Grown Mussel Enhanced Fishery (referred to here as "Shetland/ Scottish Mussel Fishery"). If there is no translocation of mussel seed (the case for Shetland/ Scottish Mussel Fishery), P1 is not scored for enhanced catch-and-grow (CAG) bivalve fisheries because management is not based on reference points and the fishery cannot have negative effects on the wild stock (Annex CK Guidance, MSC Certification Requirements Guidance V1.3). The report provides sufficient evidence that the Shetland/ Scottish Mussel Fishery meets or exceeds a score of 80 for all Performance Indicators. The risks associated with bivalve rope culture are primarily related to effects on the benthos, and to a lesser extent, interaction with birds and mammals. The report reviews numerous publications that show that this activity does have effects on the ecosystem (with the potential for both negative and positive effects), but that they are minimal if sites are chosen carefully and stocking densities are not excessive. The report provides evidence that in the Shetland/ Scottish Mussel Fishery, systems are in place to manage the location and extent of mussel culture, to gather information on risks, and to minimize and manage impacts. In addition evidence is presented that appropriate management and research plans are in place and there is sufficient consultation.		

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**Yes**	**Certification Body Response**
Justification: No conditions are raised and this is appropriate given that the Shetland/ Scottish Mussel Fishery met all conditions raised after the first assessment, and there have been no developments that would require new conditions.		

If included:

Do you think the client action plan is sufficient to close the conditions raised?	**NA**	**Certification Body Response**
Justification: No conditions raised therefore no action plan needed.		

General Comments on the Assessment Report (optional)

There are a few PIs which I think warrant different scores (usually higher), but these will not change the overall conclusions.
While generally there is sufficient justification, for some PIs rationale is needed for why SG100 is not met.
Report should consider reference to the following reviews not cited in the report. None would cause major changes to the justifications, but might bolster the conclusion that bivalve rope culture effects are minimized if good protocols are in place for siting and density.

Ysebaert et al. 2009. Impacts of bottom and suspended cultures of mussels Mytilus spp. on the surrounding sedimentary environment and microbenthic biodiversity. Helgol Mar Res (2009) 63:59–74
McKindsey et al. 2011. Influence of suspended and off-bottom mussel culture on the sea bottom and benthic habitats: a review. Can. J. Zool. 89: 622-646.
Gallardi, 2014. Effects of Bivalve Aquaculture on the Environment and Their Possible Mitigation: A Review. Fisheries Aquaculture Journal 5:3.
http://dx.doi.org/10.4172/2150-3508.1000105

Lastly a note on “Principle One: Target Species Background”. This is currently unnumbered (should be 3.4?) and goes over some of the same material as in 3.3.5-3.3.7. In fact it introduces some confusion.

- 1st paragraph states “Principle 1 covers all fishing activity on the entire mytilus galloprovincialis stock - not just the fishery undergoing certification. However, the fishery under certification would be expected to meet all management requirements, such as providing appropriate data and complying with controls, therefore demonstrably not adding to problems even if the problems will not cause the certification to fail”
    - Doesn’t the above apply to Mytilus spp?
- in paragraph beginning “Mussels generally produce gametes…” it refers to the life cycle of M. galloprovincialis (as opposed to Mytilus spp) as if the ensuing text is unique to M. galloprovincialis.”

Please edit “Principle One: Target Species Background” to clarify and reduce by reference to 3.3.5-3.3.7

CAB response

Thank you for the additional reference, which we have reviewed and included in the rationale for 2.4.1 and in the reference list.

Performance Indicator Review

Please complete the table below for each Performance Indicator which are listed in the Certification Body's Public Certification Draft Report.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
1.1.1	NA	NA	NA	NA	
1.1.2	NA	NA	NA	NA	
1.1.3	NA	NA	NA	NA	
1.2.1	NA	NA	NA	NA	
1.2.2	NA	NA	NA	NA	
1.2.3	NA	NA	NA	NA	
1.2.4	NA	NA	NA	NA	
2.1.1	NA	NA	NA	NA	
2.1.2	NA	NA	NA	NA	
2.1.3	NA	NA	NA	NA	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
2.2.1	NA	NA	NA	NA	
2.2.2	NA	NA	NA	NA	
2.2.3	NA	NA	NA	NA	
2.3.1	Yes	No	NA	2.3.1a – scoring in table indicates SG100 is met. Supporting text does not explicitly state rationale for each SG but closing statement states "the overall effect of the mussel culture is highly likely within limits of national and international requirements for protection of ETP species. "Highly likely" would score an 80 for 2.3.1a. Overall score should be 85 (two 80 scores and one 100 score), not 95.	The comment is correct. SG100a is not met and therefore the overall score is adjusted to 85.
2.3.2	Yes	No	NA	2.3.2 b SG100 not met I assume because no quantitative analysis is available but SG100 not addressed in scoring justification text. 2.3.2 c SG100 not addressed in text and unclear why it is not met.	The comment is correct. The following additional rational is provided to explain why SG100b and SG100c are not met: SG100b: Since there is no quantative analysis of interactions with ETP species available SG100b is not met.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
					SG100c: Since observation records have not been provided by all farms the evidence is not complete and therefore it can not be concluded that there is clear evidence and SG110c is not met.
2.3.3	Yes	Yes	NA	No comment	
2.4.1	Yes	Yes	NA	Could be argued there is sufficient evidence that it is "highly unlikely…serious or irreversible harm" based on a plethora of scientific reviews (see general comments for additional reviews not cited) and SG100 is met. Key would be if it can be demonstrated that regulations on farm size and stocking density are rigorously followed.	The score has been reconsidered and is increased to 90. The reational is amended to explain that the available evidence is not sufficient to conclude that there is evidence. But since there is some evidence SG100a is partly met. Amended rational SG100a: Since the amount of survey results concerning habitat impacts under the mussel sites is limited to 3 farms it can be concluded that there is some evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. This however is not sufficient to award a score of 100 since SG100a requires that there is evidence and not some evidence. Therefore it is concluded that SG100a is partly met and a score of 90 is awarded.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
					The suggested references have been reviewed and they have been added to the references in the rational and to th ereference list.
2.4.2	Yes	Yes	NA	No comment	
2.4.3	Yes	Yes	NA	Justications provided sufficient and overall score appropriate. Balanced consideration of evidence provided for 3 scoring issues	
2.5.1	Yes	Yes	NA	Justications provided sufficient and scoring appropriate. Extensive consideration of evidence. (see general comments for additional reviews not cited)	Reference (Ysebeart, 2009 & Gallardi, 2014) added to the rational and the reference list.
2.5.2	Yes	No	NA	Scored at 85, a score of 95 is justified (three at 100, one at 80). 2.5.2 a - Recognition of an effect on ecosystem and need for a strategy clearly documented in scoring justifcation. I think there is sufficient	The score of SG100a and Sg100d have been reconsidered and changed to 100. The overall score for 2.5.2 has therefore been increased to 95. The following text is added to the rational: SG100a: The strategy is implemented through a Code of Conduct, environmental planning and d the

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
				evidence to score this at SG100 given there are numerous documents (Strategy, Code of Conduct 2005) which refer to good practices that will minimize enviornmental effect. These can be considered a plan. 2.5.2 b – agree with 80 score and justification 2.5.2 c – agree with score of 100 2.5.2 d –SG100 is justified as there is evidence that measures are successfully implemented	spatial plans. It can therefore be concluded that the strategy consists of a plan and SG100 is met. SG100d: The location of mussel culture sites is easy to determine using GPS. Therefore it is quite certain that the installations are only present on allocated sites. As long as mussel farms are not located over sensitive habitats it is evident that negative impacts are prevented and therefore there is evidence that the measures are is being implemented successfully
2.5.3	Yes	Yes	NA	Justications provided for 5 scoring issues are sufficient and scoring appropriate.	
3.1.1	Yes	Yes	NA	Justications provided for 4 scoring issues sufficient and scoring appropriate	
3.1.2	No	No	NA	3.1.2 b and c Refer to regular consultation. No evidence provided	Text revised accordingly

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
				for how often meetings or other forms of consultation occur. [3.2.2. indicates quarterly meeting…insert here]	
3.1.3	Yes	Yes	NA	One scoring issue; reference to "Fresh Start" doc provides justification for 100 score	
3.1.4	Yes	Yew	NA	One scoring issue; justification sufficient to support a 90 score.	
3.2.1	Yes	Yes	NA	One scoring issue; justification sufficient to support a 80 score	
3.2.2	Yes	Yes	NA	Could be scored a little higher but accept judgement of assessors. Scoring issue 3.2.2 b close but agree with descisioin that SG100 not quite met. Issue 3.2.2 d could be scored at 100 if minutes are made publicly available (and thus there is formal reporting to all interested stakeholders)	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response
3.2.3	Yes	Yes	NA	Justications provided for 4 scoring issues sufficient and score of 100 appropriate	
3.2.4	Yes	Yes	NA	Information provided in justification regarding research plan supports the score of 90	
3.2.5	No	No	NA	For SG100 of 3.2.5 b, it is assumed that presence of external groups provide external review. Please provide an example of an item discussed at an MGSA meeting that provides evidence of external review of fishery-specific management system	The MGSA is itself a mechanism for external review of the management system as it includes parties outside of the management bodies and the industry. Such external members include Seafish, SNH and Scottish Water. The 2016 meeting notes provided show a Spatial Planning review, Animal Health Regs and discussion of a recent consenting review.

Any Other Comments

Comments	Certification Body Response

For reports using the Risk-Based Framework:

Performance Indicator	Does the report clearly explain how the process used to determine risk using the RBF led to the stated outcome? Yes/No	Are the RBF risk scores well-referenced? Yes/No	Justification: Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Certification Body Response:
1.1.1				
2.1.1				
2.2.1				
2.4.1				
2.5.1				

For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	**Yes/No**	**Certification Body Response:**
Justification:		

Appendix 3 Stakeholder submissions

3.1 MSC Technical Oversight received 24th May 2017

MainID	SubID	Page Reference	Requirement Version	Oversight Description	Pi	CAB Comment
22285	26978	65, 67-69	FCR-7.10.6.2 v2.0	Additional rationale, particularly results from the observation records and on implementation on the Code of Practice of Shetland Seafood, would support scores given in the following ETP scoring issues: PI 2.3.2, SI c (SG80) Further information could be provided that the voluntary Code of Practice has been implemented successfully - e.g. how many farms participate, how is information provided verified? PI 2.3.3, SI a (SG80) It is stated that the fishery related mortalty of eider ducks 'although not exactly known is very small compared to population size and other causes of mortality…', but it is not clear from this what the scale of the impact of the fishery is, e.g. is in in the 10s, 100s, 1000s etc. Some quantiative information from the observation records or other sources would better support the conclusion that 'there is sufficient information to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.' PI 2.3.3., SI c (SG80) As with the point raised on PI 2.3.2 above, it would be useful to understand if sufficient information is provided (e.g. through observation records) to support the strategy elements such as the voluntary Code of Practice.	2.3.2, 2.3.3	Additional rational has been provided for PI 2.3.2, PI 2.3.3 and 2.3.1 as well. It is further explained at 2.3.1 that at most mussel sites no predator exclusion nets are used and and no drownings have been reported. A conclusion is added that the drowning of an eider ducks in a predator net will occur very occasionally at the few sites were these nets are still in use if it happens at all. At PI 2.3.2c it is added that Code of Practice of either ASSG or Seafood Shetland state that any method of deterrant should be non lethal toward predators (e.g. bird). The codes also state that mussel growers should endeavour to secure and regularly maintain predator netting such that diving birds do not get caught in it. It is also added that the use of (soft rope)

MainID	SubID	Page Reference	Requirement Version	Oversight Description	Pi	CAB Comment
						monofilament nets is not allowed and that it is therefore highly unlikely that significant numbers of birds could drown and this issue has also not been raised by environmental NGO's (SNH). At PI 2.3.3c it is added that the use of predator nets is no common practice and if employed the nets have to rigged in such a way that diving birds do not get caught in it (Code of Good Practice). The nets are used as a non lethal deterrant and neither from from observation sheets nor from stakeholders the team has spoken to, the team has learned that the drowning of birds actually takes place. It might occasionally take place but it must be considered highly unlikely that this would concern more than 10 birds on an annual basis if it happens at all.
22285	26979	page 46	FCR_7.12.1.5.b v2.0	Please specify the point of intended change of ownership, whether this happens as product is being transported to the Bellshill processing facility or after? This will help determine if the risk factor you identified to occur "before the change of		

MainID	SubID	Page Reference	Requirement Version	Oversight Description	Pi	CAB Comment
				ownership" can be effectively covered by a separate CoC certificate by SSMG processing site. (Page 46 Table 4 Row 6)		

Appendix 4 Surveillance Frequency

There are no conditions at this re-certification assessment and the level of information provided has previously been sufficient to enable remote surveillance.

A surveillance level of 1 is therefore proposed as per the Certification requirements:

7.23.4.3 The surveillance level for the fishery shall be determined on the basis of the confidence of the CAB in its ability to verify information, and progress towards meeting conditions, remotely.

a. Surveillance level 1 may only be chosen if, following an assessment or surveillance audit, the fishery has no outstanding conditions.

Table 4.1: Surveillance level rationale

Year	Surveillance activity	Number of auditors	Rationale
1	1 on-site surveillance audit 1 off-site surveillance audit 2 review of information	1 auditor for off-site and review of information. 1 auditor on-site with support from 1 auditor remotely for on-site surveillance	No conditions and fishery updates can be provided remotely. The CAB proposes to have an on-site audit at year 4 with 1 auditor on-site with remote support – this to ensure that all information is collected and in combination with re-assessment.

Table 4.2: Timing of surveillance audit

Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
1	26th June 2017	26th June 2018	.

Table 4.3: Fishery Surveillance Program

Surveillance Level	Year 1	Year 2	Year 3	Year 4
Level 1	Review of information	Off-site surveillance	Review of information	On-site surveillance audit & re-certification site visit

Appendix 5 Objections Process

(REQUIRED FOR THE PCR IN ASSESSMENTS WHERE AN OBJECTION WAS RAISED AND ACCEPTED BY AN INDEPENDENT ADJUDICATOR)

The report shall include all written decisions arising from an objection.

(Reference: FCR 7.19.1)