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MSC SUSTAINABLE FISHERIES CERTIFICATION

SSPO Swedish West Coast Rope Grown Mussel Fishery



Public Certification Report

January 2014

Prepared For:

Swedish Shellfish Producer Organisation

Prepared By:

Food Certification International Ltd.



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Glossary of terms

CAG	Catch and Grow
CFP	Common Fisheries Policy
CR	Certification Requirements
ETP	Endangered Threatened and Protected
FAM	MSC's Fisheries Assessment Methodology
FCI	Food Certification International
HCR	Harvest Control Rule
ICES	International Council for Exploration of the Seas
ISBF	Introduced Species Based Fisheries
P1	MSC Principle 1
P2	MSC Principle 2
P3	MSC Principle 3
PI	MSC Performance Indicator
PSA	Productivity Susceptibility Analysis
RBF	Risk Based Framework
SGU	Geological Survey of Sweden
SICA	Scale Intensity Consequence Analysis
SSPO	Swedish Shellfish Producers Organisation
UoC	Unit of Certification
WWF	World Wildlife Fund

1. Executive Summary

- » This report provides details of the MSC assessment process for the SSPO Swedish West Coast Rope Grown Mussel fishery for Swedish Shellfish Producer Organisation (SSPO). The assessment process began in November 2012 and was concluded on a date to be determined.
- » A comprehensive programme of stakeholder consultations were 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 **Actual Eligibility Date** for this assessment is 31st May 2013
- » The assessment team for this fishery assessment comprised of Mr Rod Cappell, who acted as team leader and primary Principle 3 specialist and Ms Veronica Sund who was primarily responsible for evaluation of Principle 2. Paul Macintyre was responsible for traceability / chain of custody considerations.

Client strengths

- » Low ecosystem impact due to low intensity production
- » Robust environmental regulations at a national level
- » Comprehensive fisheries and environmental management at a national and regional level

Client weaknesses

- » The view that mussel farming is not only benign, but beneficial to the environment has resulted in limited information required from producers and limited fisheries-specific management to date.

Determination

On completion of the assessment and scoring process, the assessment team concluded that the fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any MSC Criteria.

It is therefore determined that the **SSPO Swedish West Coast Rope Grown Mussel fishery should be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.**

Rationale

- » There are a number of areas which reflect positively on the fishery:
- » Limited habitat impact and avoidance of sensitive habitats such as eel grass.
- » Comprehensive fisheries/aquaculture licensing at a national level.

Conditions & Recommendations

- » However, a number of criteria which contribute to the overall assessment score scored less than the unconditional pass mark, and therefore trigger a binding condition to be placed on the fishery, which must be addressed in a specified timeframe (within the 5 year lifespan of the certificate). Full explanation of these conditions is provided in **Section 1.3** of the report, but in brief, the areas covered by these conditions are:
 - › Producers provide more information on ETP species and other key species such as eider
 - › Assessment of habitat types at proposed production areas

- › Fishery-specific management is required that sets measurable short and long term objectives with a research plan to support management.
- » In addition, the assessment team made two recommendations: that (1) a more strategic approach to the future development of the mussel sector be considered and (2) non-lethal control of eiders be considered within the ETP strategy. As these are not the result of a failure to meet the unconditional pass mark, they are non-binding; however in the opinion of the assessment team, they would make a positive contribution to ongoing efforts to ensure the long-term sustainability of the fishery. Details of the recommendations are provided in **Section 6.3.1** of this report.

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.

FCI Ltd confirm that this fishery is within scope.

2. Authorship and Peer Reviewers

2.1 Assessment Team

Assessment team leader: Rod Cappell

Primarily responsible for assessment under Principle 3

Rod Cappell is Director with Poseidon based in Northern Ireland and has over 18 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 UK work includes a review of the Green Paper and CFP reform proposals for the Scottish Government's Inquiry into Future Fisheries Management and exploring economic approaches to reform of the English inshore sector for Defra under the SAIF programme. He is currently holding workshops around Northern Ireland exploring the management of inshore crab fisheries. Rod has also worked on a variety of European fisheries projects this year including project managing a review of effort management in a number of Member States and contributing to Regulatory Impact Assessments of numerous EC policies, including CFP reform.

Rod's MSC experience has included a variety of UK and European fisheries at pre-assessment and main assessment level. He has recently completed the certification process for a Dutch fishing company targeting North Sea plaice and is currently lead auditor for a nationwide assessment of key Dutch fisheries. Rod undertook a large assessment of Bay of Bengal pelagic fisheries based on the MSC standard where fisheries improvement plans will be developed and. He also contributed to a global overview of environmental gains achieved by MSC fisheries for the Marine Stewardship Council.

Expert team member: Veronica Sund

Primarily responsible for assessment under Principle 2

Employment

Has worked as a Marine Biologist at SIK The Swedish Institute for Food and Biotechnology with Life Cycle Assessments (LCAs) of seafood, including fisheries, for 4 years. Other work tasks include presentations at International conferences in the field as well as environmental educations for companies.

Previous experience from MSC assessments from the surveillance of 'Astrid fiske' herring fishery (2011) giving good understanding of the MSC principles and Criteria for Sustainable Fishing, MSC Fisheries Certification Methodology and MSC Chain of Custody Standard and Methodology. She has also participated in MSC workshops and a workshop on traceability of eco-labeled seafood.

Veronica is a member of the Swedish eco-label KRAV's fishery expert committee, where she assessed 10-15 fisheries in 2010 and 2011 (on-going work in 2012 and 2013). Stock evaluations are a central part of the work, primarily on Norwegian and Swedish fisheries. The KRAV work has contributed to her knowledge and skills regarding the local conditions in these fisheries. She is experienced in interpreting scientific fishery assessments and advice, as well as assessing fishery managements. She has good understanding of the management systems used in fisheries in the Northeast Atlantic region.

Studies

Studies in Marine Ecology at Gothenburg University (2005-2008). The bachelor thesis was an environmental assessment of two seafood products from fisheries producing two inter-exchangeable products from cod and Alaska pollock. The thesis included an LCA and an evaluation of the ecosystem impacts of the fisheries, regarding state of target species stocks, by-catch and discard situation (Sund, 2009).

Expert advisor: Paul Macintyre

MSC Chain of Custody and Traceability specialist / Lead Auditor

15 years of management experience within the aquaculture and fish processing sectors. 20 years' experience auditing ISO, HACCP, BRC, GlobalGAP, organic and conventional farming operations within the aquaculture production and fish processing sectors and including MSC Chain of Custody since 2005. ISO 9001 Lead Auditor (QMI 1991); Registered Organic Inspector (DEFRA); Diploma in Advanced Food Hygiene (Queen Margaret University Edinburgh); BRC v5 Food Manufacturing Auditor BRC (London and Manchester); GlobalGAP IFA Trainer (GlobalGAP Cologne); RYA Yachtmaster Offshore (RYA Southport); Diploma Photography (Photography Institute)

2.1.1 Peer Reviewers

Peer reviewers used for this report were Dr Geir Honneland and Prof Gavin Burnell. A summary CV for each is available in the **Assessment downloads** section of the fishery's entry on the MSC website.

2.1.2 RBF Training

Rod Cappell has been fully trained in the use of the MSC's Risk Based Framework (RBF).

It was announced that the RBF may be used to score the habitats and ecosystem outcome, however information was provided at the start of the site visit illustrating sufficient information was available for this fishery assessment and the RBF was not used.

3. Description of the Fishery

3.1 Unit(s) of Certification and scope of certification sought

Food Certification International Ltd. confirm that the fishery is within scope of the MSC certification sought for the assessment as defined.

Prior to providing a description of the fishery it is important to be clear about the precise extent of potential certification. The MSC Guidelines to Certifiers specify that the unit of certification (UoC) is **“The fishery or fish stock (biologically distinct unit) combined with the fishing method / gear and practice (= vessel(s) and / or individuals pursuing the fish of that stock)”**.

This clear definition is useful for both clients and assessors to categorically state what was included in the assessment, and what was not. This is also crucial for any repeat assessment visits, or if any additional vessels are wishing to join the certificate at a later date. The unit of certification for the fishery under consideration is as set out below.

The fishery assessed for MSC certification is defined as:

Species:	Blue Mussel (<i>Mytilus edulis</i>)
Stock:	Swedish Skagerrak & Kattegat Mussels
Geographical area:	Skagerrak & Kattegat, ICES subdivision IIIa – Swedish territorial waters.
Harvest method:	Ropes
Client Group:	All Swedish Shellfish Producers Organisation (SSPO) members harvesting Blue mussels using ropes in ICES Division IIIa
Other Eligible Fishers:	None

Please note that whilst the Unit of Certification details the full extent of what is being assessed, it is the full and complete Public Certification Report that precisely defines the exact nature of certification for this fishery.

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

3.1.1 Scope of Assessment in Relation to Enhanced Fisheries

The cultivation of mussels is defined as an enhanced catch-and-grow (CAG) bivalve fishery for the purpose of this pre 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 of seed is not involved in the cultivation system. Seed translocation is defined here as movement of seed which pose 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 understood to be using rope collectors. Seed collected in this way is only relocated a small distance, within the same water body/ecosystem, with distances between locations being less 50 km.

Hence, this pre-assessment determined that hand raking 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**. Also it has been assessed that the cultivation of mussels does not pose a risk to the productivity of the wild population. Therefore the assessment team determines that according the MSC assessment methodology (MSC Certification Requirements version 1.2, Annex CK) principle 1 would not have to be included during the certification full assessment.

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

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

3.2 Overview of the fishery

3.2.1 Swedish Shellfish Producer Organisation

The client for this certification is Swedish Shellfish Producer Organisation (SSPO)

Fishery Ownership

The fishery seeking certification is the Swedish Shellfish Producer Organisation, consisting 9 shellfish grower companies active on the Swedish west coast. Each company owns its own farms and they work together in the producer organisation with overarching purposes such as representing the industry towards authorities. Today 6 of the companies currently farm blue mussels, the others farm oysters.

History of the Fishery

Blue mussels have been farmed in Sweden for about 40 years and the production level has been quite stable over time, with a maximum production of 2500 tonnes. The harvest of farmed mussels in 2012 was 1531 tonnes (Swedish Food Administration statistics) with the vast majority farmed by a single company, Scanfjord.

Organisational Structure

SSPO was founded in 2007 and represents the shellfish producers on the Swedish west coast as of today. The producer organization has besides the chairman agency staff for the finance function. The members work actively with various issues regarding the organisation.

SSPO mainly works with industry-wide issues such as the environment, control, technology and marketing activities and representing the industry towards authorities.

SSPO is currently working on a guide for permit issues, which also includes a Code of Conduct.

Area Under Evaluation

All farms are situated at the Swedish west coast, from Strömstad in the North to Västra Frölunda in the South. The area under evaluation is the sea areas Skagerrak and Kattegat, situated within ICES subarea IIIa,

The locations of the companies in the Swedish Shellfish Producer Organisation are marked on the map of the Swedish west coast, Figure 1.

Figure 1: Map of Skagerrak and Kattegat



(Source: wikipedia.org)

[illegible]

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A specialist division
of Acura



Figure 3: Mussel farm locations on Swedish west coast



(Source: SSPO)

* Tjärnö vattenbruk is no longer part of the PO.

3.2.2 Species and Fishing Practice

Species type/s

The target species for the fishery under certification is blue mussel, *Mytilus edulis*. This report does not intend to provide a scientifically comprehensive description of the species. Interested readers should refer to sources that have been useful in compiling the following summary description of the species.

These include:

- » FAO species fact sheets: <http://www.fao.org/fishery/species/search/en>
- » http://www.fao.org/fishery/culturedspecies/Mytilus_edulis/en
- » http://genimpact.imr.no/_data/page/7650/mussels.pdf
- » Popescu, I. (2010.) Fisheries in Sweden. European Parliament Directorate General for Internal Policies. Policy Department B: Structural and Cohesion Policies.

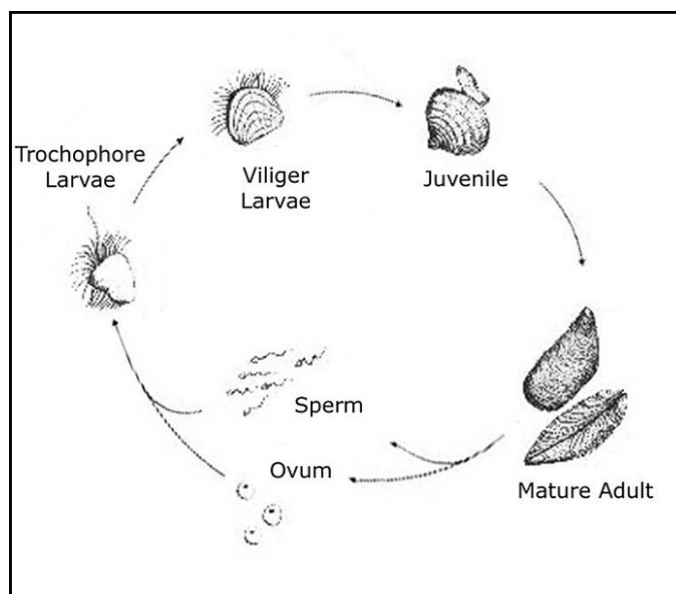
Summary description

Blue mussels (*Mytilus 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. 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. 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. Mussels are filter feeder, drawing in seawater, which is filtered through the gills. Mussels are dioecious, though rare instances of hermaphroditism have been reported. Generally the potential spawning season vary according to location, but the main spat-fall is generally in early summer.

Mussels are generally ready to spawn by the time they are one year old. During spawning eggs and sperm are released to the water column and fertilization occurs externally. After fertilization occurs, the fertilised zygotes undergo several metamorphoses before settlement (Figure 4). Mussels settle after the sixth larval stage, the planktonic life of *Mytilus spp* 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 4: Lifecycle of *Mytilus spp*.



(Source: <http://www.weichtiere.at/Mollusks/Muscheln/miesmuschel.html>)

Geographic distribution of *Mytilus* spp.

Within the genus *Mytilus* there are three species found in Europe: *Mytilus edulis*, *M. galloprovincialis* and *M. trossulus*. *M. edulis* is the species assessed in this certification and it does not overlap with any other *Mytilus* species on the Swedish west coast. The spatial distribution of the three species is shown in Figure 5, where *M. edulis* is marked with purple, *M. trossulus* light blue and *M. galloprovincialis* in orange.

Figure 5: Approximate distribution of *Mytilus* species within Europe*



* *M. galloprovincialis* has now been identified in Scotland

(Source: <http://genimpact.imr.no/data/page/7650/mussels.pdf>)

Management History

Cultivation of mussels using "long-line" method has been performed in Sweden since the mid 70's and was at its peak around 2500 tons (1987). A major reason for the decline in the 80's was the increased spread of toxic algae, which affected and still affects mussel farms over throughout Europe. The companies that started up in the 70's - and 80's were small and could not manage to deliver the mussels during the periods poison algae struck, prompting tangible effects on liquidity and profitability. Methods of sampling toxin presence have evolved over the years and today, this is not a major obstacle to development of the industry.

In 2003, the Swedish blue mussel production, which came from five farming businesses was nearly 1 800 tons and had a market value of around 7.5 million SEK. However granted cultivation permits totaled up to more than 10 000 tons in Västra Götaland. Thus, only a few of those were actively utilized (Sanchez et al., 2004)). The situation is similar today, around 1500 tons are harvested each year, although there are permits given for approximately 13 000 tons (20 000 tons per production cycle, which is approximately 18 months). Since the production has not even reached the level for the total permits given, the production volume of today is not regarded as a problem. The permitted

production is assessed against a total production volume of 50 000 tons, which is calculated as the potential production volume along the Swedish west coast (Odd Lindahl, personal comment), based on a production of 300 tons of mussels per hectare of sea surface in 12-18 months. This is based on that each hectare of mussel farm requires between 15-25 hectares of primary production in the form of phytoplankton as feed for the mussels. The calculation is based on the long term mean from 1985-2006 for annual primary production which was $243\text{gCm}^{-2}\text{year}^{-1}$ (Lindahl, 2007.)

Fishing Practices

Rope Grown Mussel aquaculture cultivation system

Catch and Growth fisheries are defined as fishery production systems that involve wild harvest followed by a grow-out phase. Mussel farming collects their own stock from the wild spat-fall and settled spat is grown on ropes, or bands, suspended from either surface longlines or rafts.

A typical longline in the production system under assessment 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 conditions. The length of the longline is generally around 200 m and is generally suspended at depth of approximately 6 metres. The spacing of the plastic floats (buoys) depends upon their buoyancy and the expected load upon the line. The separation between long lines is largely dependent upon the size of the servicing vessel or the productivity requirements. The overall dimension of each site is also tailored to the license condition.

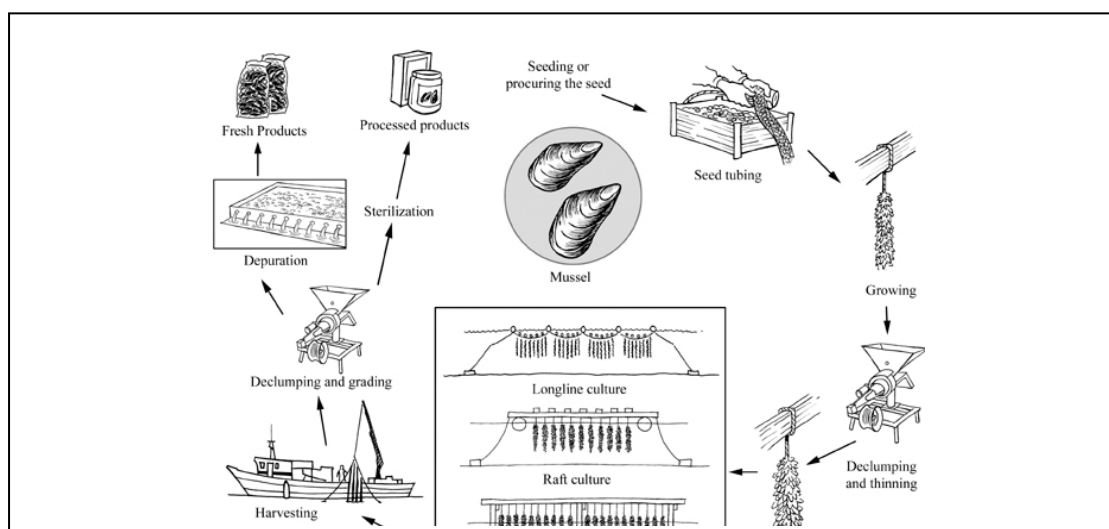
Longline culture allows highly mechanized culture and can yield 18-20 tonnes/ha/yr. A multi-longline system has also been developed in Norway and Sweden, using 7-9 headlines. Control of buoyancy is necessary for this system. Floats are connected together by horizontal lines that support a large number of vertical ropes where mussels are grown. Thinning and reseeded onto grow-out ropes or into stockings are carried out until the mussels reach marketable size.

The rope droppers, on which the mussels are grown, are usually 18 mm in diameter although there are a wide variety of designs available on the market.

Droppers are generally between 6-24 m in length, depending on water depth (1-2 metres above the sea bed level). Droppers may be tied to the headlines at between 5-6 m apart, depending on local tidal conditions.

For harvesting 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 around 120 kg of marketable mussels. Small mussels may be re-tubed and returned to the sea for further growth.

Figure 6: *Mytilus spp* production cycle.



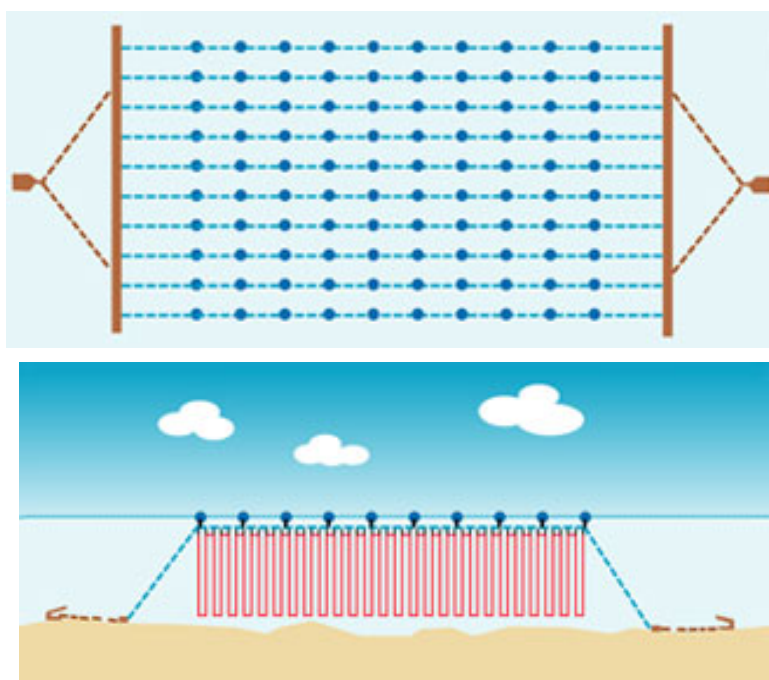
(Source: <http://www.fao.org/fishery/culturedspecies/Mytilusgalloprovincialis/en>)

Two types of farming systems are used by the companies in the Producer Organisation, the Scanfjord System and the Smart Farm. Both systems are based on the same principle, mussel larvae settle on bands suspended in the water and are grown on these bands until harvested.

Scanfjord system

The Scanfjord system (also known as the long-line system) is the most commonly used farming system in Sweden. Approximately 34 units are in place today. Scanfjord system is built with long lines submerged in the water, from which bands or ropes are attached hanging down in the water column, to a meter over the sea bottom, at depths greater than 7-8 meters. The unit is anchored to the sea bottom (lines are attached to the sea floor) and held up in the water column by barrels working as buoys. The long lines could be up to 200 m long and the bands hang on the long lines with 5 m between each band. The bands hang down to about 5-6 meters deep and are 15 mm wide. Bands can be used many times, in fact they get more efficient after having been used a few times.

Figure 7: Scanfjord Farming system, vertical view & horizontal views



(Source: Scanfjord, <http://www.scanfjord.se/ind2b.html>)

Figure 8: Scanfjord mussel farm



(Source: Photo by Veronica Sund)

Smart farm

The main difference between the Scanfjord system and Smart farm lies in the handling of the equipment where the Smart Farm is more automated, for instance a special machine is used for harvesting the mussels under water. The system is developed to minimize labor and cope with harsh weather conditions. Smart Farm requires a larger economic investment, but gives a lower maintenance and harvesting cost due to less need for labor. This is thought to give a lower expense per ton of harvested mussels in comparison to long line farming.

The “fishing net” on the Smart farm is held up with long pipes made of polyethylene regarded as less visible than barrels, and therefore easier to accept for people living in the surroundings. Since the smart farm mussels grow on a net with mesh size of about 30 cm, the growth builds “a wall” of mussels. The mussels attach better to the net than a band, which gives lower incidence rates with mussels falling to the bottom.

Figure 9: Smart farm harvesting system



(Source: Smart Farm AS)

Table 1 presents a list of SSPO member companies at the time of the site visit. An up to date member company list can be obtained by contacting FCI using the following details:

MSC Fisheries Department

Contact Email: fisheries@foodcertint.com

Contact Tel: +44(0)1463 223 039 (FCI main number)

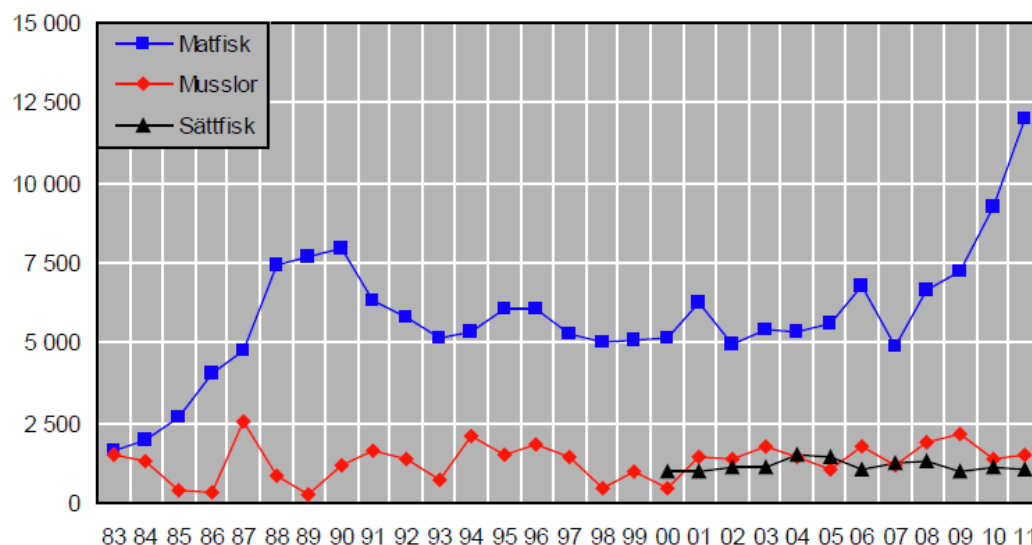
Table 1 - List of member companies in the SSPO

Name - Current mussel growers
Scanfjord AB
Saltea Seafood AB
Västkustmusslor HB
Grebbestads musslor och Ostron AB
Svenska Ekomusslor AB
Orust Shellfish AB
Name - Potential mussel growers (currently farming oysters)
Grebbestadsbo AB
Karingo AB
Ostrea Sverige AB

(Source: SSPO)

Historical Fishing Levels

Figure 10: Swedish aquaculture production in tonnes fresh weight 1983-2011 (Mussel in red = mussels)



(Source: Produktion inom svenskt vattenbruk 1983–2011. Sveriges officiella statistik, statistiska meddelanden, JO 60 SM 1201, Vattenbruk 2011/Aquaculture in Sweden 2011)

3.2.3 Administrative Framework

User Rights (Legal and Customary Framework)

Mussel production by the SSPO client group occurs in Swedish inshore waters less than one nautical mile from shore and often within 300m of shore. The County Administrative Board, in line with requirements under Sweden's Environmental Code and the Fisheries Act, issues permits for production operations. Ownership of the seabed and water out to 300m is generally private and permission from the landowner must be sought, while elsewhere and beyond 300m ownership is by the state and a contract is provided by the Swedish Judicial Board to allow the use of a given area for mussel production. Permission is granted for five years in the first instance, but following a number of five-yearly renewals the permit can be extended to ten years.

Involvement of Other Entities

- » Livsmedelsverket (Swedish Food Administration) - testing water and product for biotoxin and bacteria levels.
- » State Veterinary Institute – disease outbreaks.
- » Maritime Administration and the Board of Transport – responsible for navigation issues (checking farm markers & buoys)

3.3 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 edulis* 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 (*Mytilus 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 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 fabric bands 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 to the MSC assessment methodology (MSC Certification Requirements version 1.2, Annex CK) principle 1 would not have to be included during this certification full assessment.

3.4 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.

Endangered, threatened or protected species (ETP)

According to MSC methodology, ETP species are defined as those that are recognised as such by national legislation and/or binding international agreement (e.g. CITES) to which the jurisdictions controlling the fishery under assessment are party. Species that appear exclusively on non-binding lists such as 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.

Mussel culture on ropes is not likely to affect protected or endangered fish species so these are not considered in this assessment. 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, changed prey abundance due to phytoplankton depletion, exclusion by farm structures, reduced or increasing prey availability, disturbance (noise or boat activity), creation of resting places on floats within farms (Lloyd, 2003).

According to the Swedish Red List (2010) produced by Artdatabanken, SLU, (Swedish University of Agricultural Sciences) the species in these species groups along the Swedish west coast defined as nearly threatened (NT), vulnerable (VU), endangered (EN) and critically endangered (CR) are presented in Table 2. Officially only the species defined as VU, EN and CR are considered threatened (WWF, 2013), and are hence marked red in the table. Defining ETP as VU, EN and CR (threatened species) means the eider duck – the only bird interacting with the mussel farms - does not fall under this definition.

Table 2 - Mammals and birds in the area present on the Swedish Red list

Latin name	Common name	Red list category
<i>Gavia stellata</i>	Red-throated Diver	Nearly threatened (NT)
<i>Podiceps auritus</i>	Slavonian grebe	Nearly threatened (NT)
<i>Aythya marila</i>	Scaup	Vulnerable (VU)
<i>Somateria mollissima</i>	Eider	Nearly threatened (NT)
<i>Melanitta fusca</i>	Velvet Scoter	Nearly threatened (NT)
<i>Limosa limosa</i>	Black-tailed godwit	Critically endangered (CR)
<i>Larus argentatus</i>	European Herring Gull	Nearly threatened (NT)
<i>Larus fuscus</i>	Lesser Black-backed Gull	Nearly threatened (NT)
<i>Rissa tridactyla</i>	Kittiwake	Endangered (EN)
<i>Sterna sandvicensis</i>	Sandwich tern	Endangered (EN)
<i>Sternula albifrons</i>	Little tern	Vulnerable (VU)
<i>Cephus grylle</i>	Black Guillemot	Nearly threatened (NT)
<i>Phocoena phocoena</i>	Harbour porpoise	Vulnerable (VU)

(Source: SLU)

The Birds Directive includes eider duck in Annex II part B. The following is stated for species included in Annex II in the Birds directive: "Owing to their population level, geographical distribution and reproductive rate throughout the Community, the species listed in Annex II may be hunted under national legislation. Member States shall ensure that the hunting of these species does not jeopardise conservation efforts in their distribution area." And for birds listed in Annex II part B the following is stated: "The species referred to in Annex II, Part B may be hunted only in the Member States in respect of which they are indicated." (EC, 2010). This means that according to the Birds directive hunting on the species is not banned in the European Union. This indicates that the species is not considered critically endangered on European level. Eider is listed in Annex III of the Bern Convention (protected species) and AEWA (African-Euroasian Waterbird Agreement) (Artdatabanken, 2010).

Since this enhanced fishery is not using an active fishing gear accidental catch of ETP species could happen only through attachment to the ropes the mussels grow on, or to the mussels. There could however be interactions between the mussel farms and ETP species.

Birds

The only ETP interaction known is that of eider duck (*Somateria mollissima*) – if using a broader definition of ETP species, also including Nearly Threatened species. Eiders are not naturally included under the definition of ETP since they are not part of a category that per definition means "threatened". There are however clear interactions with the fishery and eider, and since it is the only bird species interacting with the farms it is still included in the assessment in this report.

Eider duck is the main mussel predator present on the farms. The eider ducks can dive to great depths to reach this food source. Blue mussels are the staple food for eider ducks and hence the large quantities of blue mussels that appear in a mussel farm attract these birds, often in large numbers. Eiders feeding on the mussels pose a large threat to the productivity of the farm and are therefore seen as nuisances by the mussel farmers. Farmers can apply for a permit from the County Administrative Board to shoot eiders. Shooting one eider, or just shooting in the air, can be effective, but only for the moment (client information). According to the client, farmers do not shoot more than 10 eider ducks per year, and they sometimes appear in hundreds, which explains why this is not an effective method to keep the eiders away. According to the County Administrative Board in Västra Götaland the total permits given in 2012 was 60 eider males (50+10) and in 2011 100 eider males (50+50) (Barbro Buhrman at the County Administrative Board pers comm, March 8 2013). In 2011 50 eiders were shot under these permits. The statistics for used permits for 2012 is not yet publicly available (March 2013). The hunting season is August 21 – January 31.

According to the farmers shooting eiders is however not effective in the long run and the only effective measure taken is to guard the farms by being present on spot, to hinder the birds from feasting on the mussels (Anders Granhed, Scanfjord). Eider ducks are as previously mentioned listed on the Swedish red list by Artdatabanken (2010) in the category Nearly Threatened (NT). This is due to population simulations that predict a future decline in the population, which could be up to 50% in 20 years. The decline in the eider duck population in Sweden is not yet well understood, but one hypothesis is that it could be coupled to changes in the supply of mussels of suitable quality. Another possible reason may be deficiency of vitamin B1 (thiamin) (SLU, 2010). A recent update of this assessment text (2012) states that the reasons for the population decline observed with a decreasing number of females might be due to predation from the growing population of white-tailed eagle and mink. The potential lower availability of mussels might also be due to warmer winters (SLU, 2012). The eider had a very favorable population trend in Sweden during the period 1975-1995 when the stock more than doubled. Older inventory data is shaky and difficult to interpret at regional level, but the increase was likely similar in the entire population.

Since 1995, however, the Swedish stock declined steadily and the total number of nesting birds was in 2010 estimated to be around 80% of the total number in 1975 (Statens offentliga utredningar (State Official Reports), 2012.).

Inventories of eider ducks are made on a regular basis (January and September) as part of the Duck inventories founded by the Swedish Environmental Protection Agency. This is a part of the national environmental monitoring, and is done according to the International Waterfowl Census (IWC). The inventory in the form of midwinter counts has been performed since 1967 and September counts

started in 1973. The midwinter counts have been done in a standardized way since 1987 (Nilsson & Månsson, 2012).

When looking at numbers of birds in statistics it is important to note that these numbers are dependent on weather conditions, and since the temperature in September 2011 was higher than average this has affected the population number which has been higher than usual since more birds remained before flying to their wintering areas.

In abundance index calculations eiders are found to be at a much lower levels in comparison to the population numbers in the early 70's to early 80's, see Table 3. Even though the population has reduced, there were still 360 000 pairs in Sweden in 2010, which made the bird fall under the definition 'commonly occurring' (Artdatabanken, 2010).

Table 3 - Eider index from latest yearly count

September indices for different species in 2010 and 2011 with changes in the indices between the years. Moreover the totals for 2011 are given for the 149 sites included in the index calculations. Mean index for the years 1973-1982 is set to 100.

ART	INDEX		FÖRÄNDRING Change %	ANTAL 2011 Total 2011
	2010	2011		
Gräsand <i>Anas platyrhynchos</i>	54	46	-15	13139
Kricka <i>Anas crecca</i>	59	101	71	15008
Bläsand <i>Anas penelope</i>	143	198	38	16553
Vigg <i>Aythya fuligula</i>	109	124	14	6218
Knipa <i>Bucephala clangula</i>	71	143	101	3785
Ejder <i>Somateria mollissima</i>	62	70	13	6178
Småskrake <i>Mergus serrator</i>	85	89	4	353
Storskrake <i>Mergus merganser</i>	148	150	2	68
Knölsvan <i>Cygnus olor</i>	78	81	4	7102
Skäggdopping <i>Podiceps cristatus</i>	26	18	-31	1290
Storskarv V <i>Phalacrocorax carbo</i>	343	427	25	5612
Sothöna <i>Fulica atra</i>	50	29	-42	2604

(Source: Nilsson & Månsson, 2012)

Another picture of the eider population in Sweden is presented in the chart below (Looking at the Swedish west coast population of eider ducks, the part of the national population that might be subject to influence from the mussel farms assessed, a decrease is thus not thought to be happening when looking at recent published counts.

An increase in the number of overwintering birds, rather than a decrease, is observed in this area. In 2009, 52 000 eiders were present in the inventory performed, as compared to 1987/1989 when there was less than 10, 000 birds. In 2004 the number was 48 300 (Nilsson, 2012).

Mussel farms are not thought to pose a risk to the development of a stable population size of eider ducks, the farms might rather contribute to the abundance of the species by providing a food source, and also increasing the natural occurrence of blue mussels by spreading larvae which might increase the natural abundance in the area. The small number of birds shot is not considered to affect the population size of eider ducks (around 52 000) on the Swedish west coast) where numbers for both January and September inventories are presented. According to the authors the January inventory has a better spread and higher representativeness in comparison to the September inventory when looking at the west coast Bohuslän population (which is the area where the assessed mussel farms are located). The January inventories (bottom chart) show a high variability with the index being above 100 except for a temporary dip a few years ago.

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Figure 11: Eider index from September and January inventory in several Swedish locals.

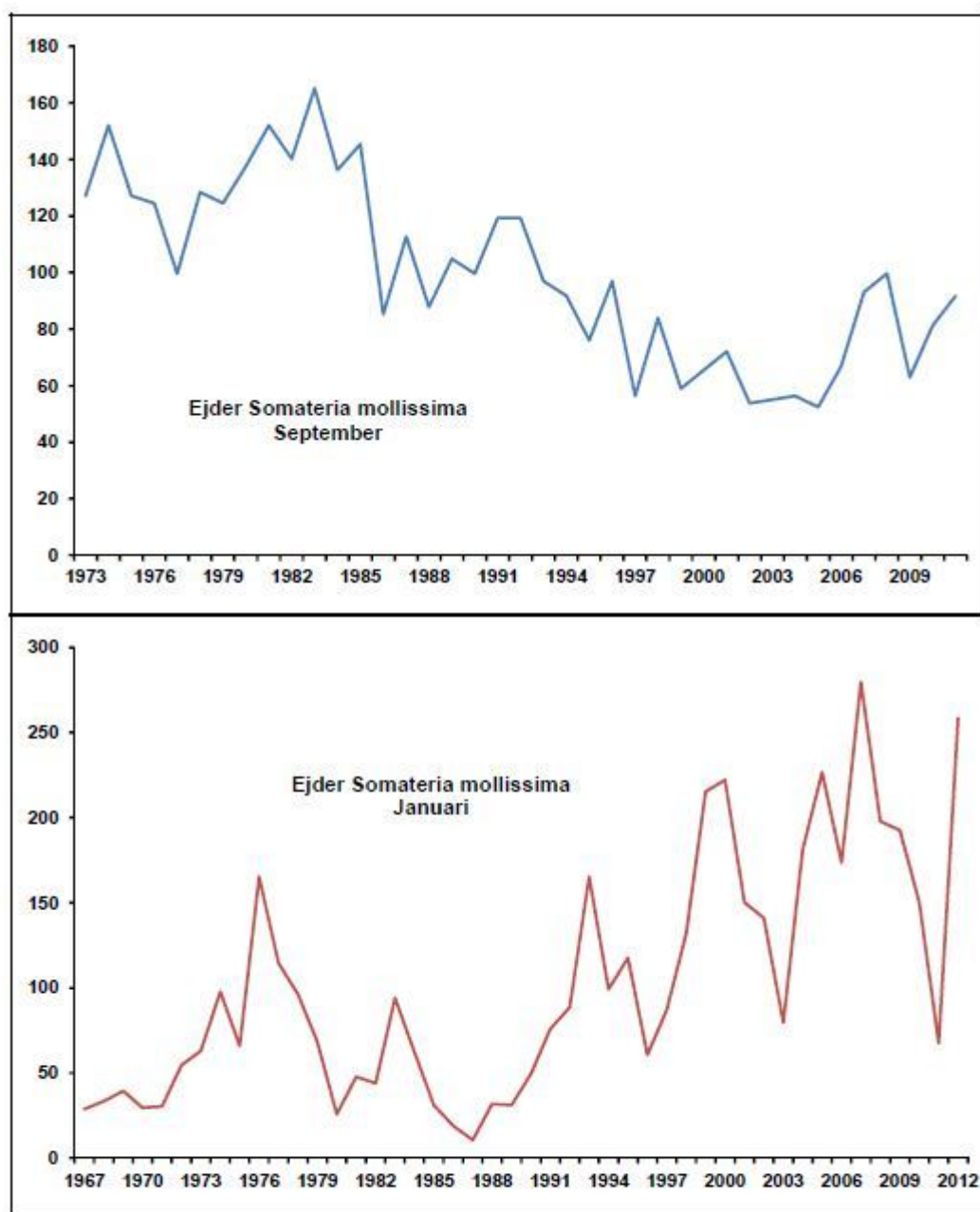


Fig. 18. Index för ejder *Somateria mollissima* i Sverige september 1973 -2011 och januari 1967-2012.
Indices for Eider *Somateria mollissima* in Sweden in September 1973-2011 and January 1967-2012.

(Source: Nilsson & Månsson, 2012)

Other animals that are known to occur on mussel farms are sea squirts and starfish. Sea squirts settle on the farms and are a nuisance to the farmers since they use space that mussels could settle on instead. Starfish are not liked by the farmers, since they prey on the mussels. Starfish predation is avoided by using ropes short enough to avoid seafloor contact. There are no known occurrences of interaction between threatened starfish species and mussel farms, only interactions with the common starfish (*Asterias rubens*), which is not a threatened species.

There are two species of sea squirts considered vulnerable on the Swedish Redlist, i.e. *Cnemidocarpa mollispina* and *Ascidia prunum*. *Cnemidocarpa mollispina* has been numerous in the 60's in the Öresund area in Sweden (not close to the mussel farms under assessment) but is now scarcely seen. It lives on 27-40 meters depth and would therefore not exist on the mussel farms, even if farms were established in the area. *Ascidia prunum* only exists on deep rocky bottoms and has only been spotted twice in the Koster area in Sweden (Artdatabanken 2010), and is hence not interacting with mussel farms.

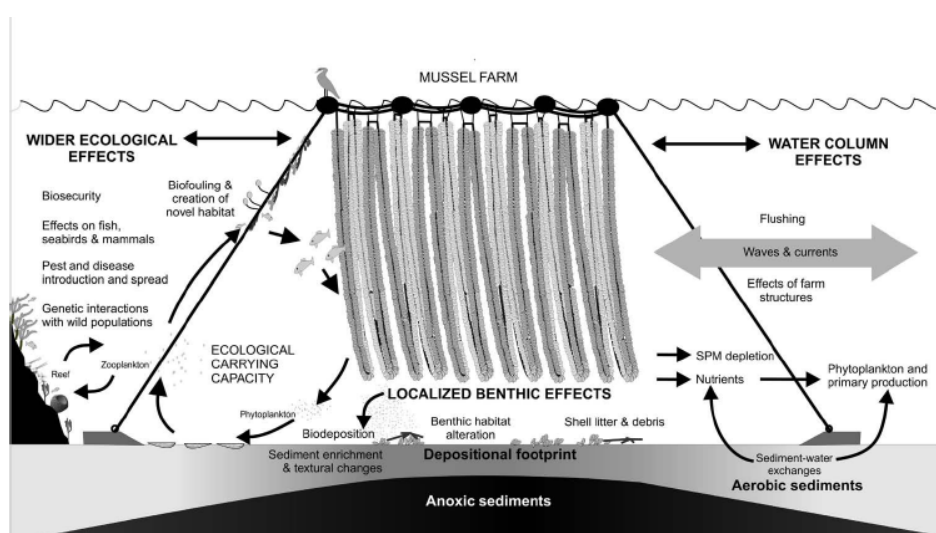
Habitats

The assessment area (Skagerrak & Kattegat) is a biologically diverse area, forming an ecological link between the more saline waters of the North Sea and the more brackish waters of the Baltic. Several vulnerable habitat species are known to occur in the area, such as *Lophelia pertusa* and species of seapens. Although there are some closed areas, there are also some areas where good habitat status exists, where mussel production could, in theory, still be permitted.

In terms of assessing the risk of mussel farming on the habitat structure, organic enrichment and smothering by shell debris is the main factor to consider. 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.

- » The rain of faeces and pseudofaeces from the mussel crop 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) (Figure 12).

Figure 12: Schematic of potential ecological effects from long-line cultivation of mussel and associated spat catching



(Source: Keeley, 2009)

A study on the effects of mussel farming activity on the benthic nitrogen cycle, comparing 3 farming sites before and after (1.5 years) establishments of farms found that there was among other an increase in sedimentation and benthic nitrogen flow at all three studied farms. The nitrogen deposits were shown to be recycled into the water column to a higher degree than on reference stations.

When assessing the total nitrogen contribution from the farms, in relation to the removal via mussel harvesting it was established that there was a net uptake of nitrogen from the farms, as only 26-40% of the amount corresponding to the harvested nitrogen was released to the water column by deposits from the mussels (Carlsson et al., 2012).

The extent of habitat impact is most often site-specific and relates to a variety of factors including the following (MSC Certification Requirements, Annex GCK):

- » Scale, duration and intensity of shellfish production
- » Growing practices and methods
- » Concentration of suspended organic matter available for shellfish filtration
- » Water depth and sedimentation rate
- » Local currents and prevailing winds

The scale and intensity of the cultivation system in Sweden can currently be defined as low; the cultivation area has been selected on the basis of the oceanographic patterns, phytoplankton production and habitats types with the objective of not having an impact on the environment.

The offshore location of the farm characterized by strong sea currents determines that it is likely that the organic enrichment of the sediments below mussel farms will not be significant.

The type of habitat that the mussel farms operate in is typically the habitats occurring in soft mud, as this is the most commonly occurring bottom substrate type on the Swedish west coast. Light yellow shows this bottom substrate type in Figure 13 (Hallberg et al., 2010). Some units may have rocky bottom under the farm, defined as 'bedrock' in the chart below, marked with red. Substrate maps with high enough resolution to define what specific type of bottom substrate that is present under a specific farm is not present today, and therefore this information could be inventoried during all new mussel farming permits assessments, as this information is valuable when assessing the potential impact on the habitat for a proposed farm.

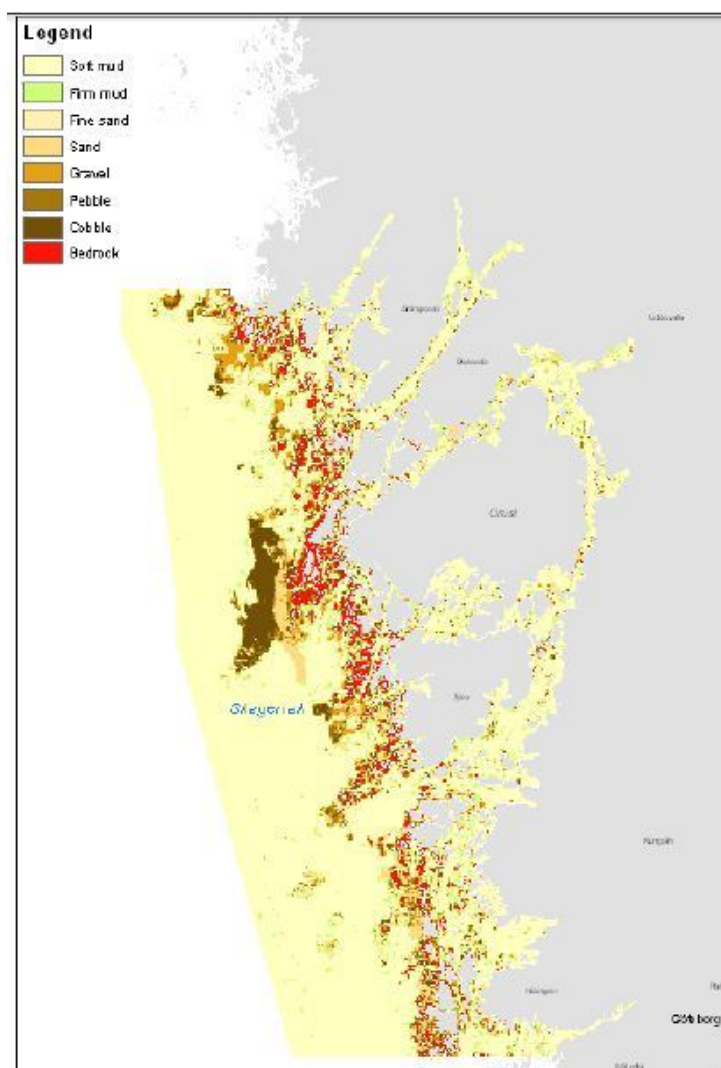
Geological Survey of Sweden (SGU) has since the late 1960s conducted mapping of Swedish sea benthic geological composition and structure. The purpose of this mapping is to produce information that is needed as a basis for social planning and decisions on use and protection of marine areas. SGU has previously developed coarse habitat maps for both the Baltic Sea and the Swedish west coast through the project BALANCE, and this information has now been further developed by SGU through converting SGU's marine geological information to substrate classes according to EUNIS - European University Information Systems Organization (Naturvårdsverket, Swedish Environmental Protection Agency, 2009). In the BALANCE project marine environmental information is compiled which makes this information searchable and readily available for decision makers in spatial planning in the Baltic Sea region, including Skagerrak and Kattegat (SGU, 2007).

The positive environmental impact of mussel farms is that they remove nutrients from the water column that otherwise could be the cause of eutrophication. A mussel farming area of 1 ha requires 15-25 ha of primary production. Habitats sensitive to fluctuation in nutrient deposition should be avoided when choosing a spot for a mussel farm since the main environmental impact from mussel farms is the local enrichment of nutrients in the vicinity of the farm, from the mussel feces. The feces consists of nitrogen and phosphorous, and the increased level of these substances can cause oxygen depletion when the nutrients are decomposed, and this in turn may alter the benthic fauna under the mussel farms. The change is typically towards fewer individuals, smaller biomass and fewer species. It is also common that the fauna change from larger to smaller species.

Another effect of organic enrichment is that nutrients may leak from the sediment; one example of such a nutrient is ammonium. The effects of the organic enrichment is to a high degree dependent on the local physical conditions at the farm site, if current conditions give a good water exchange or not.

Farms are favorable established at a site with good water exchange, and not in the close vicinity of *Zostera*, i.e. eelgrass, beds. These are habitats sensitive to eutrophication, and works as a nursing ground for many fish species. They typically occur in areas with a smaller depth of 6 meters, which is not in the usual depth range for placement of farms, since the long line system most commonly used on the Swedish west coast requires a depth of at least 7-8 meters. This makes this issue less of a problem (Länsstyrelsen i Hallands län (Halland County Administrative Board), 2011). Since mussels need good supply of plankton for fast growth mussel farms are placed on locations with good water exchange, which makes the problems with eutrophication under the farm site less common.

Figure 13: Bottom substrates on the Swedish west coast north of Gothenburg



(Source: Hallberg et al., 2010)

To establish a mussel farm in a Natura 2000 area a special permit is required that can be applied for from the county Administrative Board. This is also the case for establishing a farm in shore protected areas. Then you apply for an exempt from the shore protection from the County Administrative board. The County Administrative Board forwards the application for comment to the Maritime Administration, the Transport Board and the concerned municipality (Jarl Svahn, County Administrative Board, pers comm. January 2013).

Ecosystem impacts

Phytoplankton depletion can occur in suspended mussel culture if the ecological carrying capacity of the body of water in which the farms are located is exceeded. Ecological carrying capacity can be defined as the stocking or farm density above which unacceptable ecological impacts begin to manifest. This happens when the removal of phytoplankton by all mussel farms in the water body outstrips the capacity of the ecosystem to replenish the supply, resulting in adverse conditions for the ecosystem functioning. Hence, the oceanography of the area where the farm is located together with the density of production determines that it is very unlikely that the capacity of the ecosystem is being reached or exceeded. It has been measured that one hectare of mussel farm requires between 15-25 hectares of primary production (Lindahl, O., 2007) which gives a hint of how much mussel production can be sustained in a specific area.

This number is of course calculated from a set level of primary production, and the number used is the long term mean for primary production between 1985-2006 ($230 \text{ gC m}^{-2} \text{ year}^{-1}$).

To be certain that a mussel farm in a specific area does not alter the ecosystem functions by removing too much of the primary productivity measurements and calculations of primary production in the area and the mussels' predicted removal of this should be performed. This should be a requirement in the mussel farming application process.

Measurements of actual primary production levels in the vicinity of the farm should also be performed on a regular basis as long as the farm is in use, to be able to hinder trophic effects that could be the result of an increased nutrient uptake, and/or a decreased primary production.

On the level the fishery is performed on today there is not thought to be a risk of removing too large amounts of primary production but an assurance that this will not happen in the future should however be included in the farming permit application process.

In addition to primary production it is also important to have knowledge about the effect of the faeces produced by the farm. This is not the case today, as no monitoring of the benthic habitat under the farm is required from legislation or permit regulations. Monitoring of the habitat under a proposed farm should be performed before a farm is established, by for instance sediment profile imaging, to get a picture of what the 'natural state' is in the area. If threatened organisms sensitive to excess nutrient loads are present the farm should be established in another area. Oxygen levels in the sediment (if present, the bottom substrate could be rocky bottom) should be measured and a species inventory should be performed. This should be done even after the farm is established, on a regular basis, to reveal any changes attributed to the ecosystem under the farm. If undesirable changes have occurred an action plan to revoke these changes should be established, or the farm needs to be moved.

A study by Nunes et al., 2011 developed a model for assessing the nutrient load coupled to mussel farming in a fjord-like bay called Killary harbor (Ireland). Results showed that even though the bivalve farms produce nitrogen from both natural sedimentation from algae and detritus and from mussel feces this contribution to organic enrichment in the sediment has no significant negative effect. There is however a net positive effect from the mussels' removal of phytoplankton that both increases the light penetration and reduces eutrophication, which is viewed upon as an ecosystem service.

3.5 Principle Three: Management System Background

Principle 3 of the Marine Stewardship Council standard states that:

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.

In the following section of the report a brief description is made of the key characteristics of the management system in place to ensure the sustainable exploitation of the fishery under assessment.

3.5.1 Legislative framework

EU

Sweden 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 Swedish 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. However, in order to ensure that smaller vessels could continue to fish close to their home ports, a coastal band was reserved for local fishermen who have traditionally fished these areas – it is within these waters (out to 6 nautical miles) that the Swedish shellfish fishery under assessment takes place.

The CFP was reviewed thoroughly in 2002 and the current basic fisheries regulation (No.2731/2002) was adopted by the Council of Ministers on 20th December 2002. The current policy is under review, and a revised policy is likely to be agreed in 2013. The scope of the CFP extends to conservation, management and exploitation of living aquatic resources and aquaculture, as well as processing and marketing of fishery products, covering related activities, both within EU waters and by any member state vessel or national – with due regard to the UN Convention on the Law of the Sea (UNCLOS) and without prejudice to the primary responsibility of the flag State.

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.

National

Implementation of the CFP at a national level is carried out through the individual Member States. The main enabling legislation is the Swedish Code of Statutes 1994:1716 on fisheries and aquaculture (building upon the Fisheries Act 1993:787). The Swedish Government has powers to take non-discriminatory fishery conservation measures within 12 miles. The main tools available to the Swedish Government to regulate fisheries in these areas are through restrictive licensing or other measures set out in 1994:1716.

In Sweden responsibility for inshore fisheries management is devolved to the Swedish Marine and Water Authority (SwAM). However this fishery (mussel production) is now the responsibility of the Board of Agriculture and County Administrative Boards. The National Food Administration is responsible for biotoxin testing and product sampling to assess whether mussels can be harvested and are fit for sale. Waters along the West Coast are classified by the NFA for growing mussels.

Local

Decisions over mussel farm licensing are devolved to a regional level and to the 21 County Administrative Boards (Länsstyrelserna). The great majority of Swedish mussels production (and all included in this UoC) occurs within the boundaries of the Västra Götalands County Administrative Board.

Local management is in the form of the local planning framework (as guided by the national planning framework). Local authorities require operators to seek planning approval for production sites and associated landside infrastructure.

In most instances there is a land owner who also owns the adjacent body of water (out to 300m). Those wishing to site a farm within this area must have agreement from the land owner and a fee is paid. Elsewhere waters are owned by the state and the Judicial Board produces a contract for growers.

3.5.2 Consultation, Roles & Responsibilities

There are several organisations involved in the management and operation of the fisheries concerned. While there is some complexity in management arrangements, particularly with the implementation of shore protection regulations within 300m of shore (under the Environmental Code), where the municipality has jurisdiction, roles are well defined and well understood.

Management is in the form of production permits and planning licenses issued by the County Administrative Board and the Local Authority respectively. These agencies undertake consultation in relation to any management changes or proposed strategic developments. There is always a referral from the County administrative board to the municipality even if not within 300m to make them aware of the application and give the opportunity to respond.

Scientific advice is provided by various Universities, (Tjarno and Gothenburg). There is no sector-wide research plan in place.

Industry representation is in the form of the Swedish Shellfish Producers Organisation (SSPO), the client for this assessment, which acts as a sector representative, but does not currently undertake any marketing functions for the sector.

3.5.3 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). 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, Sweden has long-term environmental objectives consistent with P2 principles and criteria under the Environmental Code:

1. human health and the environment are protected against damage and detriment, whether caused by pollutants or other impacts;
2. valuable natural and cultural environments are protected and preserved;
3. biological diversity is preserved;
4. the use of land, water and the physical environment in general is such as to secure a long term good management in ecological, social, cultural and economic terms; and
5. reuse and recycling, as well as other management of materials, raw materials and energy are encouraged with a view to establishing and maintaining natural cycles.

...and sector management objectives consistent with P1 & P2 under the national aquaculture strategy, Swedish aquaculture - A Green Economy in the blue fields. Strategy 2012-2020. Its vision is "Swedish aquaculture is a growing, profitable and sustainable industry with an ethical production."

The targets set out in the strategy are:

- » Production increases through improved competitiveness.
- » Swedish aquaculture produces good and healthy food demanded by consumers both in Sweden and in rest of the world.
- » Swedish aquaculture produces way fish for fishing tourism needs and conservation purposes.
- » Swedish aquaculture characterized by the interaction between industry, researchers, NGOs and government.

- » Reducing the administrative burden and clear rules promote the development of enterprises.
- » Swedish aquaculture is characterized by low environmental impact.
- » Swedish aquaculture contributes to an ecologically, economically and socially sustainable food.
- » New reproductive technologies are developed and cultivation of more species tested through collaboration between industry and research.
- » Swedish aquaculture characterized prevention health promotion and healthy animals.
- » Swedish aquaculture has access to breeding material of high quality.
- » Politicians at all levels and other stakeholders perceive Swedish aquaculture as a safe, long-term and successful sector.
- » Local politicians and other local players are investing in Swedish aquaculture.
- » A majority of the municipalities identify and include suitable sites for aquaculture in their comprehensive plans.

Production increases as a long-term objective are based on estimates of carrying capacity (by Tjarno laboratory) up to 50,000t. Existing permits grant 15-20,000t but less than 2,000t is currently produced. Existing and future production would be framed within environmental management objectives that ensure sustainable development.

3.5.4 Incentives

There is some financial support up to 30% (15% from the European Fisheries Fund and 15% from national monies) to establish and expand mussel production. There is the belief that mussel production is beneficial to the environment as a nitrogen sink, and is proposed as a form of biological filtration. Mussel producers therefore believe that a subsidy should be provided per kg of nitrogen removed at harvest. The Swedish Aquaculture Strategy supports this view: "Swedish aquaculture is a positive force in environmental efforts by providing environmental services such as absorption of nitrogen and phosphorus." However, financial support for nitrogen removal is not occurring at present and there are no firm plans to create additional incentives to establish production for this purpose.

3.5.6 Fishery Specific Management System

Stakeholders report that a strategic plan for the shellfish sector is in the process of being developed. While the Swedish Aquaculture strategy is 2012-2020, the National Action Plan (NAP) for Aquaculture has an end date of 2013 and it is unclear whether the strategic plan will be developed by then. As such there is no formal fishery-specific management of mussel production within Sweden beyond the permitting system (County Administrative Board) and management by individual farms. There is no co-ordinated management or code of practice agreed between producers e.g. via the SSPO.

3.5.7 Compliance & Enforcement

Managers (County Administrative Board) report that compliance is high. Officers check compliance with licence conditions, specifically the co-ordinates and number of lines in place. The permit may be revoked if issues are not addressed, though this has not occurred. The Maritime Administration and the Transport Board check compliance with location and navigation requirements. 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. Gear is removed if owners cannot be identified and issues addressed.

3.5.8 Decision Making & Dispute Resolution

there is no form used in the application for permit. Applicants discuss what information is needed with the County Administrative Board. Decision-making by the management authority (County

Administrative Board) is based on the Environmental code requirements in relation to shore protection and the fisheries legislation. It is informed by a statutory consultation process. Permitting decisions are not published, although they are public documents and can be requested.

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.

3.5.9 Involvement of Other Entities

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

- » Food Safety Authority is responsible for bio-toxin testing, water classification and product sampling
- » The Coast Guard has responsibility for ensuring appropriate navigation markings are in place at production sites.
- » Swedish Veterinary Institute is responsible for animal disease control, including mussels.

4. Evaluation Procedure

4.1 Harmonised Fishery Assessment

At the time of writing, 6 MSC assessments had already been completed on this type of fishery and production system (detailed below) and findings presented in published assessment reports. In addition there is 1 MSC assessment currently underway (also detailed below).

These 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.

Completed assessments

- » Denmark Blue Shell Mussel:
<http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/denmark-blue-shell-mussel/denmark-blue-shell-mussel>
- » Isefjord & East Jutland Danish Blue Shell Mussel:
<http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified>
- » Limfjord Blue Shell Mussel (Rope Grown):
<http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified>
Shetland and Scottish Mainland Rope Grown Mussel
http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/shetland_and_scottish_mainland_rope_grown_mussel_enhanced_fishery
- » Netherlands suspended mussel
<http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/netherlands-suspended-culture-mussel>
- » Germany and Lower Saxony mussel dredge and mussel culture
<http://www.msc.org/track-a-fishery/fisheries-search/germany-lower-saxony-mussel-dredge-and-mussel>

Assessments in progress

- » Chilean suspended mussel culture Toralla
<http://www.msc.org/track-a-fishery/fisheries-search/chilean-mussel-fishery-and-suspended-culture>

Several blue mussel dredge fisheries are also certified or in assessment. Details of these can be found on the MSC website: <http://www.msc.org/track-a-fishery/fisheries-search>

4.1.1 Harmonisation Details

With a member of the team involved with previous CAG mussel assessments, a formal harmonisation meeting was not necessary. Harmonisation was undertaken by comparing this current assessment with three certified CAG suspended mussel assessments: Shetland and Scottish Mainland, Netherland suspended mussel and Limfjord. The Fiskbranchens Baltic cod assessment was also reviewed to compare fisheries management scoring relating to Sweden.

The overall result of scoring across the suspended mussel assessments was the same with individual scoring differences relating to differences in each country's inshore marine management and aquaculture licensing requirements and the extent to which fisheries-specific management had been adopted.

For principle 2, both this assessment and the Scottish assessment resulted in conditions for 2.3.3 (ETP information) with the Scottish assessment also setting a condition on habitat information compared to this assessments condition on habitat management (relating to the need for more habitat consideration in the permitting system).

This assessment scored lowest under 3.2 Fishery-specific management, requiring four conditions. The Dutch and Scottish assessments both required three conditions under 3.2, while the comprehensive system outlined in the Linfjord assessment resulted in high scores and no conditions under 3.2

4.2 Previous assessments

This is the first MSC for the client operations involved.

4.3 Assessment Methodologies

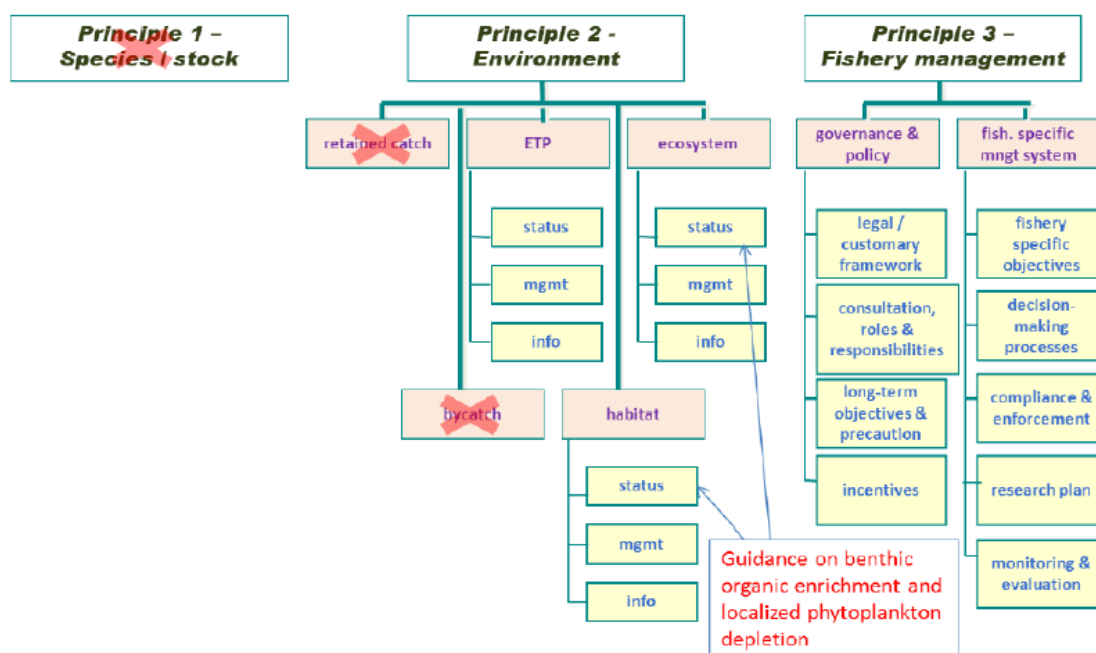
This fishery was assessed using version 1.2 of the MSC Certification Requirements and version 1.2 of the MSC Full Assessment Reporting Template.

4.3.1 Assessment Tree

The Default Assessment tree was modified in line with Annex CK relating to enhanced catch and grow (CAG) fisheries. No translocation is identified in the fishery and therefore P1 was not scored.

Changes Made to the Default Assessment Tree

Figure 14: Assessment tree for enhanced catch and grow (CAG) bivalve fisheries with no translocation (in which seed is collected using spat collectors)



(Source: MSC)

4.4 Evaluation Processes and Techniques

4.4.1 Site Visits

In January, 2013, 2 members of the assessment team, supported by an FCI staff member, undertook a site visit to Gothenburg, Sweden. This enabled a scheduled programme of consultations to take place with key stakeholders in the fishery – including skippers, scientists, fishery protection officers, NGOs, fishery managers and technical support staff. Prior notification of this site visit was issued on the MSC website and in Göteborgs-Posten in order that all relevant stakeholders were aware of the opportunity to meet with the assessment team.

Itinerary of field activities

Day 1 – 28/01/13 - Gothenburg

- » On day 1, the assessment team met with the client and two stakeholders (A Swedish scientist undertaking research on mussel production and the Board of Agriculture aquaculture lead) to discuss the fishery under assessment and provide an opportunity for interested parties to submit comments, additional information or ask questions of the assessment team.

Day 2 – 29/01/13 - Mollosund

- » On day 2, the assessment team visited the Scanfjord company and its nearby production site. The team also met with another mussel & oyster farmer to discuss the fishery under assessment. This was to provide further detail on the production methods and practice in use under this fishery assessment and to give the owners an opportunity to provide any feedback or comments they wished in an open and transparent manner.

Day 3 – 30/01/13 - Gothenburg

- » On day 3, the assessment team met with WWF Sweden remotely via skype to discuss the fishery and raise any areas of concern or provide information relevant to the fishery.

Day 4 & 5 – 01/02/13 - Gothenburg

- » On days 4 & 5 the assessment team undertook scoring of the fishery followed by a closing meeting with the client.

Additional individuals contacted during field activities

Prior to the site visit (due to unavailability during the site visit) the assessment team interviewed the Permitting Officer for Västtra Götalands County Administrative Board. This provided additional detail on permitting requirements and management arrangements associated with the fishery as well as identifying additional stakeholders to approach in relation to the assessment.

4.4.2 Consultations

Stakeholder issues

Written and verbal representations were provided to the assessment team expressing a range of views, opinions and concerns. The team is of the view that matters raised have been adequately debated and addressed as a part of the scoring process for this fishery, and that none of the issues raised, therefore, require separate attention beyond that represented in this report.

Interview Programme

Following the collation of general information on the fishery, a number of meetings with key stakeholders were scheduled by the team to fill in information gaps and to explore and discuss areas of concern.

Meetings were held as follows:

Table 4 - Interview Programme

Bengt Gunnarsson	Client	Swedish Shellfish Producer Organisation
Odd Lindahl	Biological Oceanographer and Marine Ecologist	University Of Gothenburg Biological & Environmental Sciences
Ulrika Bergman	Fisheries Division / Board of Agriculture	the Swedish Board of Agriculture with the promoting of Swedish aquaculture
Anders Granhed	Scarfjord mussel farmer	Swedish Shellfish Producer Organisation
Bjorn Zetterberg	Mussel Farmer	Saltea Seafood
Sven Kollberg	Aquaculturist, Board Member - Mussels	Swedish Aquaculture Association - Vattenbrukarnas Riksförbund (VRF)
Charlotta Järnmark	Conservation Officer Fisheries and WWF Sweden Marine	

Source: FCI assessment team

Summary of Information Obtained

The interviews with stakeholders clarified the permitting and management requirements, identified available information and research associated with the fishery. The meetings also provided the opportunity for stakeholders to learn more about the MSC process and aspects being considered in the assessment.

No major concerns were raised by stakeholders in relation to the environmental impact of the mussel fishery, which has remained at a comparatively small scale in Sweden despite the potentially for substantially more production that has been permitted. Mussel production is portrayed in Sweden as an environmentally beneficial activity, able to remove nitrogen from eutrophic waters and therefore largely exempt from requirements under the Environmental Code (other than shoreline protection within 300m of shore).

There is an expectation that the Swedish industry will grow in the coming years. A multi-stakeholder group coordinated by the Board of Agriculture is tasked with developing an action plan to manage and support expansion of the sector, but this is in its early stages.

4.4.3 Evaluation Techniques

Public Consultation

A total of 8 stakeholder individuals and organisations having relevant interest in the assessment were identified and consulted during this assessment. The interest of others not appearing on this list was solicited through the postings on the MSC website, and by advertising in Göteborgs-Posten. These were felt to be the most appropriate media for making these public announcements as Göteborgs-Posten has significant readership / uptake in the primary stakeholder locations for this fishery and the processes used on the MSC website for tracking and announcing the various stages of the assessment as it progresses - from Full Announcement through to Certification - form an ideal tool through which to channel stakeholder interest and keep them abreast of the important stages of the assessment as a whole.

Initial approaches were made by email and followed up by phone. Issues raised during correspondence were investigated during research and information gathering activities, and during interviews.

Most stakeholders contacted during this exercise either indicated that they had no direct interest in this fishery assessment, or that they had no particular cause for concern with regard to its assessment to the MSC standard.

Process

The MSC is dedicated to promoting “well-managed” and “sustainable” fisheries, and the MSC initiative focuses on identifying such fisheries through means of independent third-party assessments and certification. Once certified, fisheries are awarded the opportunity to utilise an MSC promoted eco-label to gain economic advantages in the marketplace. Through certification and eco-labelling the MSC works to promote and encourage better management of world fisheries, many of which have been suggested to suffer from poor management.

The MSC Principles and Criteria for Sustainable Fisheries form the standard against which the fishery is assessed and are organised in terms of three principles:

- » **MSC Principle 1** - Resource Sustainability
- » **MSC Principle 2** - Ecosystem Sustainability
- » **MSC Principle 3** - Management Systems

A fuller description of the MSC Principles and Criteria and a graphical representation of the assessment tree is presented as **Appendix 1a** to this report.

The MSC Principles and Criteria provide the overall requirements necessary for certification of a sustainably managed fishery. To facilitate assessment of any given fishery against this standard, these Criteria are further split into Sub-criteria. Sub-criteria represent separate areas of important information (e.g. Sub-criterion 1.1.1. requires a sufficient level of information on the target species and stock, 1.1.2 requires information on the effects of the fishery on the stock and so on). These Sub-criteria, therefore, provide a detailed checklist of factors necessary to meet the MSC Criteria in the same way as the Criteria provide the factors necessary to meet each Principle.

Below each Sub-criterion, individual ‘Performance Indicators’ (PIs) are identified. It is at this level that the performance of the fishery is measured. Altogether, assessment of this fishery against the MSC standard is achieved through measurement of 31 Performance Indicators. The Principles and their supporting Criteria, Sub-criteria and Performance Indicators that have been used by the assessment team to assess this fishery are incorporated into the scoring sheets (**Appendix 1.1**).

Scoring of the attributes of this fishery against the MSC Principles and Criteria involves the following process:

- » Decision to use the MSC Default Assessment Tree contained within the MSC Certification Requirements (Annex CB)
- » Description of the justification as to why a particular score has been given to each sub-criterion
- » Allocation of a score (out of 100) to each Performance Indicator

In order to make the assessment process as clear and transparent as possible, the Scoring Guideposts are presented in the scoring table and describe the level of performance necessary to achieve **100** (represents the level of performance for a Performance Indicator that would be expected in a theoretically 'perfect' fishery), **80** (defines the unconditional pass mark for a Performance Indicator for that type of fishery), and **60** (defines the minimum, conditional pass mark for each Performance Indicator for that type of fishery). The Assessment Tree and Scoring Guideposts for the SSPO Swedish West Coast Rope Grown Mussel fishery are shown as **Appendix 1.1** to this report.

Scoring outcomes

There are two, coupled, scoring requirements that constitute the Marine Stewardship Council's minimum threshold for a sustainable fishery:

- » The fishery must obtain a score of 80 or more for each of the MSC's three Principles, based on the weighted average score for all Criteria and Sub-criteria under each Principle.
- » The fishery must obtain a score of 60 or more for each Performance Indicator.

A score below 80 at the Principle level or 60 for any individual Performance Indicator would represent a level of performance that causes the fishery to automatically fail the assessment. A score of 80 or above for all three Principles results in a pass.

5. Traceability

5.1 Eligibility Date

The **Actual Eligibility Date** for this fishery will be 31st May 2013. This means that any product from the certified operators following that date will be eligible to enter the chain of custody as certified product if and when certification is ultimately granted. The rationale for this date is that it meets with the client's wishes, for commercial reasons, for the date to be set at the earliest point at which the Certification Requirements allow.

The measures taken by the client to account for risks within the traceability of the fishery – and therefore generating confidence in the use of this date for target eligibility – are detailed in the rest of this section.

The assessment team. The systems were also assessed as sufficient for products to enter into further certified chains of custody and be eligible to carry the MSC ecolabel.

5.2 Traceability within the Fishery

Traceability up to the point of first landing has been scrutinised as part of this assessment and the positive results reflect that the systems in place are deemed adequate to ensure fish is caught in a legal manner and is accurately recorded. The report and assessment trees describe these systems in more detail, but briefly traceability can be verified by:

- » assessing the capability for maintaining traceability and separation, including: direct dispatch from farms, registered dispatch centre or depuration/purification systems and
- » systems in place are deemed adequate to ensure mussel is caught in a legal manner and is accurately recorded.

5.2.1 Evaluation of Risk of Vessels Fishing Outside of UoC

All production by member operators occurs within Swedish waters within the management regime assessed.

Management authorities set the location and extent of production by Swedish mussels producers as part of licence conditions and the authorities regularly check compliance with this condition. This minimises the risk of production from non-licensed areas entering the system.

5.2.2 Risk of Substitution of Mixing Certified / Non-Certified Catch

There is no risk that certified and non-certified product will be mixed as:

- > All Swedish mussel producers that had production in 2012 are members of the SSPO.
- > All production by member farms is included within the UoC with all operating production systems described in section 3.2.2.
- > The location of production lines is indicated on maps and can be traced through all transport, grow-out and harvest documentation. Mussels are harvested from a single site and transported to shore for grading/processing.
- > The batch harvesting process enables the identification of specific production lines for all product entering factories and/or for onward sale. This enables MSC certified product to be distinguished.
- > The mussel growers supply the processing facility with a registration form that states if the mussels are produced under the MSC framework. The form contains information on the location of production and contact information to the mussel farmer. This form is also sent to the controlling authority, the National Food Administration.
- > All packaging facilities handling MSC mussels are included in the Chain of Custody, making them responsible for tracking of their raw material inputs.

5.2.3 At-Sea Processing

There is no at-sea processing.

5.2.4 Trans-Shipment

There is no transshipment of product.

5.3 Eligibility to Enter Further Chains of Custody

Only Blue Mussel (*Mytilus edulis*) caught in the manner defined in the Unit of Certification (**Section 3.1**) under restrictions detailed throughout the body of the final Public Certification Report for this fishery 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 Swedish Shellfish Producer Organisation does not require its own chain of custody certificate.

5.3.1 Eligible points of landing

All mussels are landed to the Swedish mainland or islands along the Swedish west coast nearby to production areas. The mussels are landed in connection to the localities. The localities are shown on the map in Figure 3. The majority is shipped to Scandjörds Mollösund by boat, where a facility for washing and packaging is located 100m from shore. Another relatively large delivery location is Ekomusslor in Kolhättan, located north of Svanesund, which has a facility close to shore. Other delivery locations with smaller volumes are Amhult's pier in Åbyfjorden and occasional piers that are located close to a farm. When there is no processing facility in connection to the landing location, the mussels are sent to the processing facilities mentioned, as well as Bryggudden in Sannäs or to facilities in the Netherlands, France, Denmark or Germany.

The National Food Administration is the authority responsible for the traceability in handling mussels in Sweden, and the procedure for opening areas (in relation to biotoxin testing), which is done by sampling the area where the farming will take place, for analysis by NFA. A landing form and a registration document for bivalve molluscs must be sent to the NFA, which is the controlling authority. The mussel farmer supplies the processing establishment with the registration document. The registration document is also sent to NFA as well as kept by the farmer for at least 1 year. Information supplied in the document includes the location of harvest, i.e. longitude and latitude, amount landed, harvesting date etc. (see Appendix 4 Registration document for bivalve molluscs).

5.3.2 Parties eligible to use the fishery certificate

There are no other eligible fishers.

5.4 Eligibility of Inseparable or Practically Inseparable (IPI) stock(s) to Enter Further Chains of Custody

Mytilus edulis is native to Sweden and has been found to hybridise with *Mytilus trossulus*, which is considered to be part of the *Mytilus edulis* complex. While hybridization takes place wherever *M. trossulus* and *M. edulis* meet, the extent of hybridization varies between the different contact areas and there is no evidence of a collapse toward a hybrid swarm unlike in the Baltic. (Vainola & Streklov, 2011) Consequently *M. edulis* is determined as the only species within the UoC and the two are not considered to be IPI stocks. No other mussel species are encountered in its production.

6. Evaluation Results

6.1 Principle Level Scores

Table 5 - Final Principle Scores

Principle	Score
Principle 1 – Target Species	n/a
Principle 2 - Ecosystem	82.8
Principle 3 – Management System	80.3

Source: FCI assessment team

6.2 Summary of Scores

Principle	Component	PI No.	Performance Indicator (PI)	Score
One	Outcome	1.1.1	Stock status	n/a
		1.1.2	Reference points	n/a
		1.1.3	Stock rebuilding	n/a
	Management	1.2.1	Harvest strategy	n/a
		1.2.2	Harvest control rules & tools	n/a
		1.2.3	Information & monitoring	n/a
		1.2.4	Assessment of stock status	n/a
Two	Retained species	2.1.1	Outcome	n/a
		2.1.2	Management	n/a
		2.1.3	Information	n/a
	Bycatch species	2.2.1	Outcome	n/a
		2.2.2	Management	n/a
		2.2.3	Information	n/a
	ETP species	2.3.1	Outcome	80
		2.3.2	Management	80
		2.3.3	Information	75
	Habitats	2.4.1	Outcome	90
		2.4.2	Management	75
		2.4.3	Information	85
	Ecosystem	2.5.1	Outcome	90
		2.5.2	Management	80
		2.5.3	Information	90
Three	Governance and policy	3.1.1	Legal & customary framework	95
		3.1.2	Consultation, roles & responsibilities	85
		3.1.3	Long term objectives	90
		3.1.4	Incentives for sustainable fishing	80
	Fishery specific management system	3.2.1	Fishery specific objectives	70
		3.2.2	Decision making processes	80
		3.2.3	Compliance & enforcement	75
		3.2.4	Research plan	70
		3.2.5	Management performance evaluation	70

6.3 Summary of Conditions

Table 6: Summary of Conditions

Condition number	Condition	Performance Indicator
1	Fishery management should contain a reporting requirement on interaction with ETP species and any other species deemed necessary (such as Eider). The reported information should be sufficient to measure trends and support a full strategy to manage impacts on ETP species.	2.3.3 ETP species information
2	Habitat types at proposed production areas should be assessed and reported as part of the application process. This should be of sufficient detail for confidence that the partial strategy (of permitting production areas) will work in relation to habitats.	2.4.2 Habitats management
3	Develop and implement a fishery management system with measurable short and long-term objectives that are consistent with MSC principles and criteria.	3.2.1 Fishery-specific objectives
4	Implement an MCS system that can demonstrate the ability to enforce relevant management measures, strategies and/or rules.	3.2.3 Compliance & enforcement
5	Produce a research plan that 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.	3.2.4 Research plan
6	Ensure the fishery-specific management system is subject to regular internal and occasional external review.	3.2.5 Management performance evaluation

Source: FCI assessment team

6.3.1 Recommendations

There are two recommendations for this fishery. Please see details below:

Recommendation 1

The conditions reflect the comparatively limited information required during permit application, the limited reporting by established farms and the lack of a fishery-specific management system. The assessment team appreciates this is due to the small scale of the sector and the contention that mussel farming is beneficial to the environment.

Mussel farming has the potential to adversely impact the local environment if the siting or scale of farms is inappropriate. The intent to substantially expand production from the present level and the large amount of potential production already permitted highlights the need for a strategic approach to development of the mussel sector. It is therefore recommended that a management plan be developed for the sector that would provide a comprehensive framework for the information and management elements identified by the conditions. A mussel sector management plan may form part of the planned National Action Plan in development, which at the time of the site visit was at an early stage of development.

Recommendation 2

It is suggested that the strategy to manage impacts on ETP species (condition 1) should include consideration of non-lethal control mechanisms for hindering seabirds feeding on mussels in the farms.

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 against any MSC Criteria.

It is therefore determined that the **SSPO Swedish West Coast Rope Grown Mussel fishery should be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.**

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

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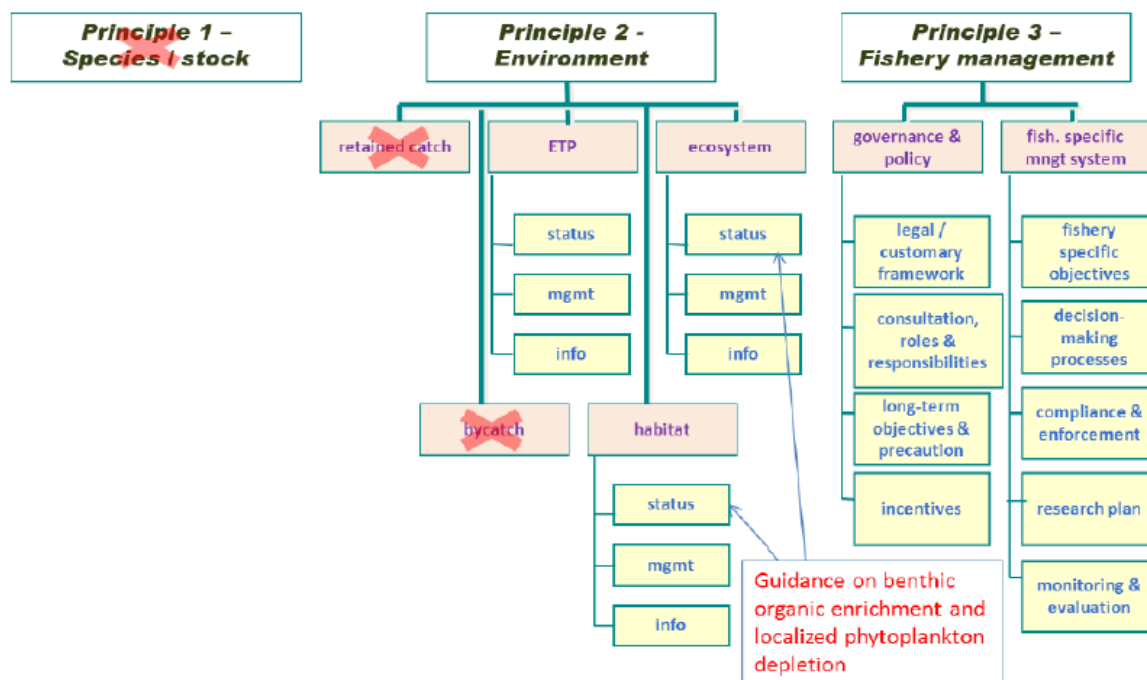
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Appendix 1. Scoring and Rationale

Appendix 1a – MSC Principles & Criteria

Figure 15: Assessment tree for enhanced catch and grow (CAG) bivalve fisheries with no translocation (in which seed is collected using spat collectors)



Above is a much-simplified summary of the MSC Principles and Criteria scored in this assessment, to be used for over-view purposes only. A fuller description, including scoring guideposts under each Performance Indicator, can be obtained from the MSC website (www.msc.org).

Principle 1 (Not scored for this assessment)

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.

The cultivation of mussels is defined as an **enhanced catch-and-grow (CAG) bivalve fishery** for the purpose of this pre 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 of seed is not involved in the cultivation system. Seed translocation is defined here as movement of seed which pose a risk to the genetic diversity of the wild population (CR Annex CK and GCR Annex GCK).

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 not scored in this assessment

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

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.
			Table 2 presents the ETP species considered relevant to this assessment. Information provided has identified no interaction between ETP species and the fishery. Eider duck ('nearly threatened' according to Swedish red list) was discussed with stakeholders since there is an interaction between the eiders and the mussel farms. This was portrayed as positive for the eider ducks feeding on the mussels as the farms may increase the food source for the birds. Eider duck is not regarded as a threatened species according to CITES. The Birds Directive does not prohibit hunting on the species as long as conservation measures at a national level are sustained, which indicates that the species is not considered critically endangered on European level. A small numbers of male eiders (<100, which corresponds to less than 0.2% of the west coast population) are shot by farmers each year, mainly to scare other eiders away as they are regarded as a nuisance when they occur in large numbers and feed on the mussels.
	b	Y	The fishery meets national and international requirements for 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.
			Known direct effects are unlikely to create unacceptable impacts to ETP species.
80	a	Y	Consultation indicated no significant effects (seals could sometimes be attracted to the farming site by the presence of fish that occurs due to high concentration of feed for them – since they feed on mussels. There are however no reported incidents of entanglement in the fishing gear)
			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.
	b	Y	As per 60a above, effects are known and no interactions reported, therefore highly likely to be within limits of national and international requirements for protection of ETP species.
			Direct effects are highly unlikely to create unacceptable impacts to ETP species.
	c	Y	As per 60b above, the fishery is highly unlikely to create unacceptable impacts to ETP species.
			Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.
			Seals could sometimes be attracted to the farming site by the presence of fish that occurs due to high concentration of feed for them. Spat from the

			farm might contribute to the natural population of mussel so that you get an increase in the occurrence of mussels in the area
100	a	N	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.
			No research has been identified to provide a high degree of certainty.
	b	N	There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species.
			No research providing that high degree of confidence
	c	N	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
			No research providing that high degree of confidence
References			<div>» SLU (Swedish University of Agricultural Sciences), 2010. Artdatabankens rödlista 2010 (National Red List, 2010)</div> <div>» CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA (CITES) Appendices I, II and III valid from 25 September 2012.</div> <div>» EC, 2010. Birds directive</div> <div>» EC, 2006. Habitats directive</div> <div>» Consultation with stakeholders and client information</div>
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 2.3.2 (alternate – table CB15a guidance document)

PI 2.3.2		The fishery has in place precautionary management strategies designed to:	
		<ul style="list-style-type: none"> • 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. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There are measures in place that minimise mortality, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.
			Sweden has for a long time had a comprehensive protection of species of wild animals and plants. The protection is governed by Species Protection Ordinance, Hunting Act and the Environmental Code.
			Since Sweden is a part of the European Union they also follow the Habitats Directive and Birds directive. A total of 230 species of birds are protected under Swedish law.
			The ETP species identified in Table 2 presents mammals and birds defined as threatened on different levels. The only mammal included on the list is harbor porpoise. The former Board of Fisheries and the Environmental Protection Agency jointly developed an action plan to preserve the harbor porpoise, the only cetacean species that occur year-round in Swedish waters. By-catch in fisheries, pollution and ever increasing boat traffic are some of the main causes of porpoises around the Swedish coast decreases.
	B	Y	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).
			The general experience is that measures for protecting the ETP species related to this fishery are likely to work since shooting eiders is an activity that people in the vicinity take notice of. Killing the birds is not appreciated by many in the community and therefore there is a low risk of farmers shooting too many birds since they are dependent on their neighbors for being able to continue their farming activity. There is a risk that dissatisfied neighbors may appeal against the exempt from the shore protection that the farmer received from the municipalities and County Administrative Boards.
80	A	Y	There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, that is designed to be highly likely to achieve national and international requirements for the protection of ETP species.
			There is no obvious direct impact, and minimal risk of mortality. 50 male eiders were shot in 2011 by the mussel farmers with permissions. There is no other hunt on eiders. Shooting permissions are managed by the County Administrative Board to ensure there is no significant impact on the eider population. In Sweden The ministry of Agriculture is responsible for management of hunting, and the hunt is monitored and controlled by the Environmental Protection Agency. The next level is The County Administrative Boards that control the hunt on a more regional level. There

PI 2.3.2		The fishery has in place precautionary management strategies designed to: <ul style="list-style-type: none"> • 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. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>is a county game committee with representatives from different businesses dependent on nature, as well as environmental protection interests, who give advice to the County Administrative Board regarding hunting.</p> <p>Application for culling can be made to the EPA or the County Administrative Board. The EPA delegates the decision on hunting of predators to the county administrative boards that have reproducing strain of the species in the county.</p> <p>When an application for culling comes in a stepwise assessment of the need for culling is made and decision is based on this.</p>
	B	Y	<p>There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved.</p> <p>Permissions to shoot 60 eider males were issued in 2012. In 2011 permissions to shoot 100 males were issued, and 50 were shot. Permits are issued by the County Administrative Board.</p>
	C	Y	<p>There is evidence that the strategy is being implemented successfully.</p> <p>Even though there are permits to shoot eiders these are not used to their full extent, the small numbers that are shot (50 in 2011) would not hinder any recovery of eider as if specified by management plans.</p>
	a	N	<p>There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality that is designed to achieve above national and international requirements for the protection of ETP species.</p> <p>No strategy in place from the farms</p>
	b	N	<p>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.</p> <p>No strategy in place from the farms</p>
	c	N	<p>There is clear evidence that the strategy is being implemented successfully.</p> <p>No strategy in place from the farms</p>
100	d	N	<p>There is evidence that the strategy is achieving its objective.</p> <p>No strategy in place from the farms</p>
References		<p>» Barbro Buhrman, County Administrative Board, personal comment over the phone March 8 2013</p> <p>» Jägareförbundet (hunting society), 2005</p>	

PI 2.3.2		The fishery has in place precautionary management strategies designed to: <ul style="list-style-type: none"> • 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. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
			» Conservation of Arctic Flora and Fauna, 1997. » Naturvårdsverket, Swedish Environmental protection agency, 2008. » Naturvårdsverket, Swedish Environmental protection agency, 2013.
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 2.3.3

PI 2.3.3		Relevant information is collected to support the management of fishery impacts on ETP species including: <ul style="list-style-type: none"> • 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. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.
			The county administrative board of Västra Götaland issued permits for shooting 60 eider males (50+10) in 2012 and in 2011 100 eider males (50+50). In 2011 50 eiders were shot from these permits. The statistics for used permits for 2012 is not yet publicly available (March 2013). Permits for a small number of eiders are being issued, in comparison to the total population (approximately 52 000 eiders). Farmers state that they have permissions to shoot but do not use these since there are more effective measures for keeping eiders from feeding on the farms, being present near the farms is the most efficient method. Shooting eiders also gives bad credit to the farmers amongst the municipality's inhabitants.
	b	Y	Information is adequate to broadly understand the impact of the fishery on ETP species.
			There is information present on the total numbers of eiders being shot and estimations of total population of eiders on the west coast. The number of eiders being shot is a very small portion of the total population.
	c	Y	Information is adequate to support measures to manage the impacts on ETP species.
			There is information present on the total numbers of eiders being shot and estimations of total population of eiders on the west coast. The number of eiders being shot is a very small portion of the estimated total population.
80	a	Y	Sufficient data are available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.
			There are requirements of reporting what the farmers actually shoot in relation to their permits.
	b	Y	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.
			The numbers shot are very low in relation to population estimates, and the shooting licenses issued are very precautionary, for only a small number of eiders. Therefore it is no threat to the protection and recovery of this ETP species.
	c	N	Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.
			The information available on number of Eider shot is sufficient to measure trends and could contribute to a strategy to manage the species.

PI 2.3.3		Relevant information is collected to support the management of fishery impacts on ETP species including: <ul style="list-style-type: none">Information for the development of the management strategy;Information to assess the effectiveness of the management strategy; andInformation to determine the outcome status of ETP species.	
SG	Issue	Met? (Y/N)	Justification/Rationale
			However there is not reported to be any impact on ETP species and therefore no reporting requirement.
100	a		Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty.
	b		Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.
	c		Information is adequate to support a comprehensive strategy to manage impacts, minimise mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.
References		» Barbro Buhrman, County Administrative Board, personal comment over the phone March 8 2013 » Nilsson, 2012. » SSPO member comments	
OVERALL PERFORMANCE INDICATOR SCORE:			75
CONDITION NUMBER (if relevant):			1

Evaluation Table: 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	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
60	a	Y	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
			<p>Figure 14 in the report shows the types of bottom substrates occurring on the Swedish west coast north of Gothenburg, where the farms are mostly located. The most commonly occurring bottom substrate according to this map is soft mud and this information is validated by the farmers in the producer organization.</p> <p>Soft mud is the most commonly occurring bottom substrate type, and bedrock is also covering a large part of the area - the farms only cover small parts of the habitat types so it is not likely it would reduce the function of these habitat types.</p>
80	a	Y	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
			<p>Figure 14 in the report shows the types of bottom substrates occurring on the Swedish west coast north of Gothenburg, where most of the farms are located. The most commonly occurring bottom substrate according to this map is soft mud and this information is validated by the farmers in the producer organization.</p> <p>Since soft mud is the most commonly occurring bottom substrate type, the farms only cover a small part of the habitat type so it is not likely it would reduce the function of this habitat types. Farms may also occur where the bottom substrate is bedrock, and this bottom substrate covers a considerable part of the west coast area, and is therefore not likely to reduce the function of this habitat structure.</p>
100	a	P	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.
			<p>Studies on nitrogen flux in mussel farms in Sweden and Ireland have shown that even though there is bio-deposition from mussel farms the net effect of mussel farms is a removal of nitrogen that is beneficial in eutrophic areas such as the coastal waters of the Swedish west coast.</p> <p>Evidence is not comprehensive throughout the mussel farming area, therefore a partial score is awarded.</p>
References			<p>» Carlsson et al., 2012</p> <p>» Nunes et al., 2011</p> <p>» Lindahl et al., 2005</p>
OVERALL PERFORMANCE INDICATOR SCORE:			90
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.
			There is a permit license that the applicant seeks from the County Administrative Board. In these rules it is stated that farms are not allowed to be located over eelgrass habitat and these areas are known.
	b	Y	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).
			The Permitting system is a measure that has proved to be effective in controlling development.
80	a	Y	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.
			The shore protection (strandskydd), in the environmental code along with the licensing permit process works as a partial strategy. Natura 2000 framework is also a partial strategy
	b	N	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.
			The permitting system does not appear to be restrictive because habitat definition for the farm location is not included in the information needed to be filled in in the permit application process. While this is considered by the Country Administrative Board in reaching a decision, there is not a formal requirement to present evidence of habitat type as part of permitting.
	c	Y	There is some evidence that the partial strategy is being implemented successfully.
			The County Administrative Board in Västra Götaland issues permits, with the shore protection respected and the Natura 2000 implemented. To establish a mussel farm in a Natura 2000 area a special permit from the County Administrative Board is required. Mussel farming in Natura 2000 areas is however not considered as an environmentally disturbing activity per se.
100	a		There is a strategy in place for managing the impact of the fishery on habitat types.
	b		Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved.
	c		There is clear evidence that that strategy is being implemented successfully.

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
	d		There is some evidence that the strategy is achieving its objective.
References		»	Personal comment Jarl Svahn, County Administrative Board, Västra Götaland.
		»	Shore protection exempt decisions for mussel farms in Borgile fjord from County Administrative Board in Västra Götaland.
		»	County Administrative Board in Västra Götaland, 2011.
OVERALL PERFORMANCE INDICATOR SCORE:			75
CONDITION NUMBER (if relevant):			2

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There is basic understanding of the types and distribution of main habitats in the area of the fishery.
			Benthic substrate mapping inventories have been performed. See figure 14 in report. SGU have developed a process for converting marine geological information to substrate information used by EUNIS for defining surface sediments, and from this habitats can be defined. Previous work in the EU project BALANCE provides a compilation of environmental data about the Baltic Sea region (including Skagerrak and Kattegat) with meta data for marine spatial planning.
	b	Y	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.
			Benthic substrate mapping inventories have been performed. See figure 14 in report. SGU have developed a process for converting marine geological information to substrate information used by EUNIS for defining surface sediments, and from this habitats can be defined. Previous work in the EU project BALANCE provides a compilation of environmental data about the Baltic Sea region (including Skagerrak and Kattegat) with meta data for marine spatial planning.
80	a	Y	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.
			There is good knowledge of habitat types and their vulnerability at a scale appropriate to the developments in the fishery.
			See also Justification/Rationale for 60a above.
	b	Y	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 information on what impacts the fishery might have on the habitat is there, but this is not used in any specified way for evaluation at the moment. See also Justification/Rationale for 60 b above.
	c	Y	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).	
			The County administrative Board knows where the farms are located and since they are responsible for the permitting process they determine increase in risk to the habitat. There has also been performed habitat mapping where the mussel farms are located, through the work of SGU.	
			See also Justification/Rationale for 60a and b above.	
100	a	Y	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.	
			Vulnerable habitat types are included in the assessments made in the EU BALANCE project.	
			See also Justification/Rationale for 60a and b above.	
	b	N	The physical impacts of the gear on the habitat types have been quantified fully.	
			The Carlsson paper quantifies habitat impact for a few (3) mussel farms, in relation to the nitrogen cycle. This does not suggest full quantification of impacts.	
			See also Justification/Rationale for 60a and b above.	
c	N	Changes in habitat distributions over time are measured.		
		There is no current requirement to report habitat for the continuation of production permits. Habitat distribution appears to only be reviewed on an ad hoc basis via projects such as the EU Balance mentioned above.		
			See also Justification/Rationale for 60a and b above.	
References			<div>» Carlsson et al., 2012</div> <div>» Naturvårdsverket, Swedish Environmental Protection Agency, 2009.</div> <div>» SGU, 2007.</div> <div>» Balance, 2008.</div>	
OVERALL PERFORMANCE INDICATOR SCORE:				85
CONDITION NUMBER (if relevant):				

Evaluation Table: 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	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
60	a	Y	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.
			<p>The key elements for consideration under this performance indicator are nitrogen cycle and phytoplankton growth.</p> <p>Removal of nitrogen (nitrogen cycle) was modeled in a study assessing farms in the Gullmar fjord In Sweden, where it was shown that 20% of the net nitrogen transport was eliminated by mussel farming. This inhibits eutrophication and is hence a positive ecosystem effect. Net removal of nitrogen from farms is also shown in Nunes et al., 2011.</p> <p>Phytoplankton growth can be affected by mussel farms since the mussels remove phytoplankton from the water column. The primary production needed to sustain a certain production volume of mussels has been calculated by Odd Lindahl (2007), based on the primary production at the Gullmar fjord mouth. These estimations are extrapolated for the west coast and the potential production volume from these calculations (50 000 tonnes) is used by management (County Administrative Board) for assessing farming permit applications. Since current production is below 2,000t and this information is present, the risk of serious or irreversible harm is considered low.</p>
80	a	Y	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.
			As per 60a above.
100	a	P	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.
			<p>Nitrogen cycle: Studies on nitrogen flux in mussel farms in Sweden and Ireland have shown that even though there is biodeposition from mussel farms the net effect of mussel farms is a removal of nitrogen that is beneficial in eutrophic areas such as the coastal waters of the Swedish west coast.</p> <p>Phytoplankton: A single research project with limited geographical scope of a single fjord was then extrapolated up to assess a large geographic area. As primary production can vary significantly, this research is therefore not sufficient to be considered as evidence of phytoplankton impacts.</p>
References			<p>» Lindahl, 2007.</p> <p>» Lindahl, et al., 2005.</p> <p>» Personal comment Jarl Svahn January 2013</p> <p>» Nunes et al., 2011</p>

PI 2.5.1		The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
OVERALL PERFORMANCE INDICATOR SCORE:			90
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There are measures in place, if necessary.
			There is a permitting system in place and the scale of the industry is very small (approximately 1 500 tons per year), therefore limiting measures have not been implemented and production expansion is advocated in the Aquaculture Strategy (Jordbruks Verket, 2012).
	b	Y	The measures take into account potential impacts of the fishery on key elements of the ecosystem.
			The activity is exempted from the environmental code (except in relation to the shore protection) due to evidence that it might have a positive effect on the ecosystem (hinders eutrophication).
	c	Y	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).
			The general experience is that the permitting system is controlling the development of the sector, which remains very small in comparison to other European countries.
80	a	Y	There is a partial strategy in place, if necessary.
			The Environmental code and the permitting system constitute a partial strategy.
	b	Y	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 fact that exemption from the environmental code could be revoked if the scale of the mussel farming sector increases to a level that could affect the ecosystem shows that the ecosystem is taken into account in the permitting system.
	c	Y	The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).
			The general experience is that the permitting system is controlling the development of the sector, which remains very small in comparison to other European countries.
	d	Y	There is some evidence that the measures comprising the partial strategy are being implemented successfully.
			Permitting system is being adhered to according to stakeholders. Environmental code comprising the shore protection is implemented and often stops mussel farms from being established as decisions that allow mussel farms to get exempted from the shore protection are appealed.

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
100	a	N	There is a strategy that consists of a plan, in place.
			There is a strategy, but not yet an action plan in place (proposed developed in 2013)
	b	N	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.
			No plan is currently in place
	c	N	The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.
			A full strategy is not in place and therefore specific measures within that strategy are yet to be developed.
	d	N	There is evidence that the measures are being implemented successfully.
			A full strategy is not in place and therefore specific measures within that strategy are yet to be developed.
References		» Jordbruks Verket (2012) Swedish Aquaculture Strategy: A Green Economy in Blue Fields: 2012-2020 (Board of Agriculture)	
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 2.5.3

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity).
			Information about the ecosystem services provided by the Skagerrak area, and basic information about the ecosystem in form of explanations about primary production, food web dynamics, biodiversity, habitats, resilience, biological regulation, genetic resources, trophic interactions and threatened species etc. are compiled in the report from the Swedish EPA (Garpe, 2008). Carbon, nitrogen, oxygen and hydro biological cycles are also explained.
	b	Y	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail.
			Garpe, 2008 discusses the environmental benefits and threats of mussel farming. Lindahl et al., 2005, Lindahl & Kollberg 2009 and Lindahl 2011 all deal with the potential and actual impacts of mussel farming on the surrounding environment. Nunes et al., 2011 assesses the nitrogen removal effects of mussel farming, in relation to the mussels' nitrogen deposits.
80	a	Y	Information is adequate to broadly understand the key elements of the ecosystem.
			Information about the ecosystem services provided by the Skagerrak area, and basic information about the ecosystem in form of explanations about primary production, food web dynamics, biodiversity, habitats, resilience, biological regulation, genetic resources, trophic interactions and threatened species etc. are compiled in the report from the Swedish EPA (Garpe, 2008). Carbon, nitrogen, oxygen and hydro biological cycles are also explained.
	b	Y	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail.
			Modeling of the environmental impacts of mussels in Gullmar fjord was performed by Lindahl et al., 2005. Another study assessing the impacts of mussel farms in Killary harbour in Ireland developed a tool for assessing the environmental effect of bivalve farming in the bay, and found that the system's eutrophication status can be classified as Moderate Low, with a future trend of No Change (Nunes et al., 2011).
	c	Y	The mussel farms assessed in this MSC assessment are close to shore, i.e. coastal, and their localities hence corresponds to the localities studied in the two named studies. Therefore their environmental impacts are likely to be on the same scale as the impacts observed in the named studies.
			The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known.
			Information about the ecosystem services provided by the Skagerrak area, and basic information about the ecosystem in form of explanations about primary production, food web dynamics, biodiversity, habitats, resilience, biological regulation, genetic resources, trophic interactions and threatened

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
SG	Issue	Met? (Y/N)	Justification/Rationale	
			species etc. are compiled in the report from the Swedish EPA (Garpe, 2008). Carbon, nitrogen, oxygen and hydro biological cycles are also explained.	
	d	Y	<p>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.</p> <p>Modeling of the environmental impacts of mussels in Gullmar fjord was performed by Lindahl et al., 2005. Another study assessing the impacts of mussel farms in Killary harbour in Ireland developed a tool for assessing the environmental effect of bivalve farming in the bay, and found that the system's eutrophication status can be classified as Moderate Low, with a future trend of No Change (Nunes et a., 2011).</p> <p>The mussel farms assessed in this MSC assessment are close to shore, i.e. coastal, and their localities hence corresponds to the localities studied in the two named studies. Therefore their environmental impacts are likely to be on the same scale as the impacts observed in the named studies.</p>	
	e	Y	<p>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).</p> <p>Regular monitoring is presented in Havet report series published by havsmiljöinstitutet (the Marine Institute - A collaboration between Umeå University, Stockholm University, Linnaeus University and the University of Gothenburg).</p>	
	100	a	N	<p>Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated.</p> <p>Modeling of the environmental impacts of mussels in Gullmar fjord was performed by Lindahl et al., 2005. Another study assessing the impacts of mussel farms in Killary harbour in Ireland developed a tool for assessing the environmental effect of bivalve farming in the bay, and found that the system's eutrophication status can be classified as Moderate Low, with a future trend of No Change (Nunes et a., 2011).</p> <p>The mussel farms assessed in this MSC assessment are close to shore, i.e. coastal, and their localities hence corresponds to the localities studied in the two named studies. However the ecosystem interactions in the specific locations of the mussel farms under assessment have not been investigated and therefore SG100a is not met.</p>
		b	Y	<p>The impacts of the fishery on target, Bycatch and ETP species are identified and the main functions of these Components in the ecosystem are understood.</p> <p>Impacts on ETP species comprises eider ducks feeding on the mussels. This has a positive effect (on the eiders) since the eiders are provided with an extra feed source. Effects on target species may be the addition of extra larvae to the natural population of blue mussels in the vicinity of the farm.</p>
	c	Y	Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the	

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem	
SG	Issue	Met? (Y/N)	Justification/Rationale
			ecosystem to be inferred.
			Elements: nitrogen cycle and phytoplankton levels. Mussel farms are shown not to have a negative effect on the nitrogen cycle but rather a positive effect by removing excess nitrogen in eutrophicated areas (Nunes et al., 2011 & Lindahl et al., 2005). Amount of phytoplankton removal by mussel farms has been measured by assessing the primary production needed for sustaining a certain amount of mussel production (Lindahl et al., 2005).
	d	N	Information is sufficient to support the development of strategies to manage ecosystem impacts.
			Farms don't all monitor nutrient and phytoplankton levels (although they do sample for bio toxins).
References		» Lindahl et al., 2005 » Nunes et al., 2011 » Garpe, 2008	
OVERALL PERFORMANCE INDICATOR SCORE:			90
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 3.1.1

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; • 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. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.
			Management of Swedish fisheries is under the EC CFP via the Fisheries Regulation 1993. The Environmental Code provides overarching legislation protecting the environment. Mussel production is exempt from restrictions (except for within 300m as part of shore protection measures) as it is deemed positive in terms of eutrophication. Sweden has also committed to requirements under the Habitats and Birds Directives (EC, 2006 & EC, 2010).
	b	Y	The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.
			Fisheries Regulation 1993 includes a mechanism to resolve legal disputes within the system. The Municipality Planning systems include objection and appeal processes.
	c	Y	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 of the fishery.
			Fisheries and planning regulations are consistent with other national laws, including The Environmental Code.
	d	Y	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.
			Swedish Code of Statutes (1950) and the Environmental Code (1999) define water ownership and beach protection. Fisheries regulations 1993 recognize the freedom of Swedish citizens to fish.
80	b	Y	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.
			<p>The Swedish Code of Statutes (Fiskerilagen 1993), SFS1993:787 sets out the mechanism for resolving disputes:</p> <p>Decisions under this Act or the regulations made under the Act may be appealed to First Board of Agriculture, the decision concerning aquaculture, or 2nd Sea and Water Authority of the other questions.</p>

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; • 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. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
			Sea and Water Authority and the Board's decision in individual cases under this Act or the regulations that have been issued under the Act may be appealed to the administrative court. Sea and Water Authority's decisions in individual cases under Council Regulation (EC) No 1224/2009 may be appealed to the administrative court. Decisions on transfer of dots under Article 92.2 of Regulation (EC) No 1224/2009 may not be appealed. Leave to appeal is required for an appeal to the Appeal. Act (2012:524).
	c	y	The management system or fishery is attempting to comply in a timely fashion within binding judicial decisions arising from any legal challenges.
			The Swedish Code of Statutes (Fiskerilagen 1993), SFS1993:787 sets out the
	d	y	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.
			Swedish National Strategic Plan for fisheries section under EFF (1198/2006) describes socio-economic objectives in accordance with the Lisbon treaty.
100	b	N	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.
			The fisheries statutes set out a process for resolution of legal disputes, ultimately leading to resolution in the Swedish Judicial system.
			The aquaculture permitting system as described by stakeholders appears comparatively informal in terms of the application process, involving discussions with County Administrative Board officers and applicants.
	c	Y	The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.
			While the aquaculture permitting system may not be completely transparent, the dialogue-based system can pro-actively avoid legal disputes.
	d	Y	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.
			The EU CFP (EC, 2002) sets out a formal commitment to the legal and customary rights of people dependent on fishing, through a commitment to relative stability (meaning Member States are consistently allocated the same proportion of particular stocks):

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; • 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. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
			<p>“In view of the precarious economic state of the fishing industry and the dependence of certain coastal communities on fishing, it is necessary to ensure relative stability of fishing activities by the allocation of fishing opportunities among the Member States, based upon a predictable share of the stocks for each Member State.”</p> <p>How the allocation is divided within member states is then laid out at national level. The recent adoption an ITQ system for the Swedish pelagic sector is based on the principle of historic rights (based on track records). In the Swedish demersal fisheries vessel allocations are made on a weekly/quarterly basis (2010). The National Strategic Plan for the fisheries sector 2007-2013 explicitly considers fishing communities and includes a number of socio-economic objectives, which can be achieved whilst remaining consistent with P1 & 2 (stock management & ecosystem) objectives. It is of note that these objectives also seek to be in accordance with the Lisbon Strategy for growth and employment: These include:</p> <ul style="list-style-type: none"> » Maintenance of employment in fishing areas / avoid population decline » Facilitating new entrants to the fishing industry » Integrated / strategic development of ports – including rural or niche ports » Ensure local communities are vibrant and the quality of life is high.
References			<ul style="list-style-type: none"> » EC 2002. Council Regulation No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy. Official Journal of the European Union L 358, 59-80. » EC, 2006. Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora » EC, 2010. DIRECTIVE 2009/147/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 30 November 2009 on the conservation of wild birds » Law on EU regulations and the Common Fisheries Policy (Lag om EG:s förordningar och den gemensamma fiskeripolitiken), SFS 1994:1709 » Swedish Code of Statutes (Fiskerilagen 1993), SFS1993:787 » Swedish National Strategic Plan for the fisheries sector 2007-2013 (in accordance with EC reg. no 1198/2006)

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; • 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. 	
SG	Issue	Met? (Y/N)	Justification/Rationale
OVERALL PERFORMANCE INDICATOR SCORE:			95
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	<p>Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.</p> <p>Key organisations in the management of Swedish Fisheries are known, as are those involved in aquaculture permitting at a national, provincial and local level.</p> <p>Section 3.3 of this assessment report provides a description of the key roles and responsibility in the fishery management process. Briefly, these include:</p> <ul style="list-style-type: none"> » Management / administration: EU DG Mare, Swedish Ministry of Agriculture and Swedish Board of Fisheries (SBF),(Fiskeriverket) and Swedish Board of Agriculture (for aquaculture) » Scientific Advice: ICES, EU's STECF & ACOM, SBF (Department for Development and Research). » Control & Enforcement: EU Community Fisheries Control Agency (CFCA), SBF, Swedish Coast Guard. » Industry Representation: Swedish Fishermen's Federation (SFR), Federation of Swedish Fish Industries (FR) and for this fishery the Swedish Shellfish Producer Organisation (SSPO) <p>In each of the cases highlighted above there is clear and transparent explanation provided (most simply found on their respective websites) on the roles and responsibilities – both for those with statutory and non-statutory roles.</p>
	b	Y	<p>The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.</p> <p>The EU-level management system is informed by extensive consultation with Member States and wider stakeholders for key regulatory developments such as CFP reform (every 10 years).</p> <p>The Green paper on the reform of the CFP (EC, 2009) expressly states that its purpose is “to trigger and encourage public debate and to elicit views on the future CFP. The Commission invites all interested parties to comment on the questions set out in this Green Paper”. Clear guidelines are provided on how, where and when to respond. The Swedish Government and industry and other interested parties have actively taken up the opportunity to respond,</p> <p>National strategies and action plans are developed by number of stakeholders with extensive consultation.</p>

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
80	a	Y	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.
			As per 60a above, the role and responsibilities of the organisations are explicitly defined in fisheries law.
	b	Y	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.
			As per 60b above. The CFP reform process demonstrates the breadth of EC consultation across Member States. Measures implemented in Sweden are also consulted upon.
	c	Y	The consultation process provides opportunity for all interested and affected parties to be involved.
			The planning system provides opportunity for other parties to object and for applicants to appeal decisions. Environmental agencies are consulted in relation to changes/additions to the Environmental Code.
100	a	Y	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.
			As per 60a above, the role and responsibilities of the organisations are explicitly defined and well understood in fisheries law.
	b	N	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.
			The planning system accepts relevant information, but does not always explain how this is used or not used.
	c	N	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.
			The consultation process on planning does not facilitate effective engagement of other parties (lack of publication of applications/decisions).

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	
SG	Issue	Met? (Y/N)	Justification/Rationale
References		»	EC (2009) COM 2009/163 final. GREEN PAPER. Reform of the Common Fisheries Policy
		»	In-depth views on the CFP-reform 2012 – contribution from the Swedish Government. Ministry of Agriculture (Regeringskansliet) July 2010.
OVERALL PERFORMANCE INDICATOR SCORE:			85
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
60	a	Y	Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are implicit within management policy
			The CFP & The Environmental Code have explicit long term objectives (see section 3.3) and the fisheries law implements and is explicitly compliant with these.
80	a	Y	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy.
			<p>The Swedish Ministry of Agriculture has complied with the requirements of the above regulation in the 'National Strategic Plan for the Swedish Fishing Industry 2007-2013'. This clearly sets out the national long term objectives:</p> <ul style="list-style-type: none">» achieve set environmental objectives by means of an eco-system-based approach in management» develop rural areas and create and maintain employment» improve the profitability of enterprises in the fisheries sector» increase understanding, knowledge and experience exchange» have well-informed consumers
100	a	P	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.
			<p>As 60a and 80a above. Long term objectives are in place to guide decision-making. Fisheries Management and aquaculture planning policy in Sweden are underpinned by the Environmental Code, which is an explicit requirement of Swedish ordinances.</p> <p>It is not stated that the precautionary approach is required by management policy and therefore a partial score is awarded.</p>
References			<ul style="list-style-type: none">» Swedish National Strategic Plan for the fisheries sector 2007-2013 (in accordance with EC reg. no 1198/2006)» The Environmental Code, 1998
OVERALL PERFORMANCE INDICATOR SCORE:			90
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/P/N)	Justification/Rationale
60	a	Y	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.
			<p>There are some minor forms of subsidy, which could be identified for this fishery. However, these do not contribute to unsustainable fishing and are consistent with MSC principles 1 and 2. These are:</p> <ul style="list-style-type: none">» The industry does not pay directly for management or science (although this is funded through taxation) which could be construed as effective subsidy.» A preferential tax system is applied to diesel across all EU primary production sectors, which could be considered a subsidy relative to other economic sectors, but this is difficult to argue for fisheries as a whole as European countries apply a far higher level of taxation on fuel than any other economic block in the world (with the exception of Japan).» The EC's structural funding mechanisms to the fishery sector –the European Fisheries Fund (EFF) – provides targeted financial support to the sector, but funding restrictions have been significantly tightened (focus on improvements in safety and environmental impact). <p>Subsidies are available for farm equipment as these are perceived to be positive for coastal eutrophication. Permitting system creates incentive to operate sustainably as each is associated with a defined area valid for 5 years.</p> <p>Farmers believe they should receive funding for the nitrogen removal service they provide. This has been investigated, but a system is not in place.</p>
80	a	Y	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.
			<p>As per 60 a above.</p> <p>No perverse incentives or subsidies, which contribute to unsustainable fishing practices have been identified.</p>
100	a	N	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 not contribute to unsustainable fishing practices.
			As per 60a & 80a above. However, the management system does not explicitly consider incentives in a regular review.
References			<ul style="list-style-type: none">» COUNCIL REGULATION (EC) No 1198/2006. On the European Fisheries Fund

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	
SG	Issue	Met? (Y/P/ N)	Justification/Rationale
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			

Evaluation Table: 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	
SG	Issue	Met? (Y/PN)	Justification/Rationale
60	a	Y	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.
			<p>The National Aquaculture Strategy (Jordbruks Verket, 2012) sets out a vision: "Swedish aquaculture is a growing, profitable and sustainable economic sector with an ethical production."</p> <p>NAS states ecological sustainability is defined as the long term preservation of the water and land ecosystem productivity and to decrease the impact on nature & human health to acceptable levels. Goals include:</p> <ul style="list-style-type: none">» Restocking for conservation reasons (salmonid, but mussel provides this also)» Swedish aquaculture is defined as having a low environmental impact <p>The majority of municipalities identify areas that are suitable for aquaculture development in their strategic development plans. The above long term objectives for Swedish aquaculture are implicit in the mussel management system.</p>
80	a	P	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.
			<p>As per 60a above. The National Aquaculture Strategy and the permitting system are underpinned by the Environmental Code, where general provisions include: <i>the use of land, water and the physical environment in general is such as to secure a long term good management in ecological, social, cultural and economic terms.</i></p> <p>As yet there is no management plan defining short or long term objectives for the fishery management system. A National Action Plan is expected in 2014, which should develop such (ideally measurable) objectives, but these are not currently evident for the mussel sector in the National Aquaculture Strategy.</p>
100	a		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.
			N/A
References			<ul style="list-style-type: none">» Jordbruks Verket (2012) Swedish Aquaculture Strategy: A Green Economy in Blue Fields: 2012-2020 (Board of Agriculture)» The Environmental Code, 1998
OVERALL PERFORMANCE INDICATOR SCORE:			70
CONDITION NUMBER (if relevant):			3

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.
			The County Administrative Board (Länsstyrelsen) permitting system for mussel farming and the local planning authority planning system apply the broader objectives of the fisheries act and the Environmental Code on a fishery-specific basis.
	b	Y	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.
			The Environmental code has exempted mussel farming from restrictions placed on other coastal developments as it is seen to be positive for the coastal environment. However, stakeholders contest that should serious issues emerge, this exemption would be addressed.
80	a	Y	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.
			The County Administrative Board (Länsstyrelsen) permitting system for mussel farming and the local planning authority planning systems are well established and seek to achieve wider fisheries management and sustainable development objectives at a fishery-specific level.
	b	Y	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.
			A multi-stakeholder process led by Board of Agriculture is ongoing to develop National Action Plan based on the National Aquaculture Strategy. To date research has provided evidence of the positive impact of mussel culture on coastal eutrophication. Processes are in place via Swedish Environmental Protection Agency and the Country Administrative Board to address serious issues should they emerge.
	c	Y	Decision-making processes use the precautionary approach and are based on best available information.
			There is a general assumption that mussel production is beneficial to the environment (removing nutrients to reduce coastal eutrophication) and therefore to be encouraged. The County Administrative Board states it uses a precautionary approach, with estimated carrying capacity of 50,000t, permitted production at around 20,000t with actual production under 2,000t. Current production levels are clearly well below carrying capacity. Carrying capacity estimate is based on information via a research project, but very little site-specific information is specified to support permit applications.

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives	
SG	Issue	Met? (Y/N)	Justification/Rationale
100	d	y	Explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
			The County Administrative Board (Länsstyrelsen) permitting system for mussel farming is informed by research, which has pointed to the beneficial localised impacts of mussel farming on nutrient levels in the coastal environment. The permitting officer is available to explain management actions or lack of action. A multi-stakeholder panel is in place that debates actions within a developing management plan.
	b	N	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.
			The mussel farm permitting process responds to issues arising in relation to Principle 2 via the Environmental Code underpinning Swedish public sector decision-making. However, it is not evident that the permitting system is responsive to all issues arising from research etc.
	d	N	Formal reporting to all interested stakeholders describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
			There is no formal reporting on how the management system responds to research findings, etc.
References		The Environmental Code, 1998 County Administrative Board (Länsstyrelsen) Permitting Officer interview	
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER (if relevant):			

Evaluation Table: PI 3.2.3

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Monitoring, control and surveillance mechanisms exist are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.
			The County Administrative Board (CAB) is responsible for control and surveillance, checking that the farm is laid out in the permitted area. Coastguard will also check that navigation lines are clear and the markers are adequate.
	b	Y	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.
			A bank guarantee is required to ensure all equipment is removed from the water if production ceases.
	c	Y	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.
			There is no evidence from stakeholders consulted that there is noncompliance with regulations.
80	a	N	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.
			While elements of an MCS system are evident, there is a lack of systematic MCS and the capacity of the client to enforce an MCS system may be limited.
	b	Y	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.
			All production sites require bank guarantees – these have not been invoked as there is no evidence of non-compliance.
	c	Y	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.
			Farmers are in communication with management authorities as and when required. This, along with oversight by the coastguard provides evidence of compliance.
	d	Y	There is no evidence of systematic non-compliance.
			Management authorities state that operators comply with permit requirements with no evidence of systematic non-compliance.
100	a		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.

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with	
SG	Issue	Met? (Y/N)	Justification/Rationale
			N/A
	b		Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
			N/A
	c		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.
			N/A
References		County Administrative Board (Länsstyrelsen) Permitting Officer interview Mussel farm operator interviews.	
OVERALL PERFORMANCE INDICATOR SCORE:			75
CONDITION NUMBER (if relevant):			4

Evaluation Table: PI 3.2.4

PI 3.2.4		The fishery has a research plan that addresses the information needs of management	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.
			There is a significant amount of research information available in relation to the fishery (see Principle 2 information) There is work going on at the Universities, as the University of Gothenburg, through a partnership with growers. This is done on a voluntary Basis, and is not a requirement.
	b	Y	Research results are available to interested parties.
			Farmers have been actively involved with much of the research and this has been made available to other interested parties.
80	a	N	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.
			There appears to be no strategic approach to the implementation of research activities. The National Aquaculture Strategy proposes that scientists be part of the development of the sector (and this has already begun with the establishment of Aquaculture Centre West), with research expected to be part of the NAP being developed for implementation in 2014.
	b	y	Research results are disseminated to all interested parties in a timely fashion.
			With the active involvement of producers in research, information is disseminated between interested parties in a timely manner.
100	a		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.
			N/A
	b		Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.
			N/A
References		» Jordbruks Verket (2012) Swedish Aquaculture Strategy: A Green Economy in Blue Fields: 2012-2020 (Board of Agriculture) » Länsstyrelsen Permitting Officer interview	
OVERALL PERFORMANCE INDICATOR SCORE:			70
CONDITION NUMBER (if relevant):			5

Evaluation Table: 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	
SG	Issue	Met? (Y/N)	Justification/Rationale
60	a	Y	The fishery has in place mechanisms to evaluate some parts of the management system.
			County Administrative Board issues permits under the Fisheries Regulation and the Environmental Code (if within the shoreline protection area). The Environmental Code may be subject to occasional evaluation and revision. Swedish public bodies are subject to occasional evaluation. Following institutional review, the Swedish Board of Fisheries was replaced by the Swedish Agency for Marine and Water Management (SwAM) - a new government authority and the Board of Agriculture took on responsibility for aquaculture.
	b	Y	The fishery-specific management system is subject to occasional internal review.
			The extent of fishery-specific management is currently the mussel farm permitting system under the CAB and oversight of the sector by SwAM. Evidence of occasional internal review is shown with the movement of aquaculture responsibilities to the Board of Agriculture as part of a comprehensive institutional reform process.
80	a	Y	The fishery has in place mechanisms to evaluate key parts of the management system
			As per 60a above. The key parts of the management system are subject to occasional evaluation as part of internal review processes in the CAB and the Board of Agriculture.
	b	N	The fishery-specific management system is subject to regular internal and occasional external review.
			As per 60b above. Currently fishery-specific management system is not explicit and as such has not been subject to regular review. It is expected that the National Action Plan will be subject to review, but this is not yet in place.
100	a		The fishery has in place mechanisms to evaluate all parts of the management system.
			N/A
	b		The fishery-specific management system is subject to regular internal and external review.
			N/A
References		» Jordbruks Verket (2012) Swedish Aquaculture Strategy: A Green Economy in Blue Fields: 2012-2020 (Board of Agriculture)	

OVERALL PERFORMANCE INDICATOR SCORE:	70
CONDITION NUMBER (if relevant):	6

Appendix 1.2 Conditions

There are six conditions for this fishery.

Condition 1

Performance Indicator	2.3.3.: Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.
Score	75
Rationale	The information available on number of Eider shot is sufficient to measure trends and could contribute to a strategy to manage the species. There is not thought to be any impact on ETP species and therefore no reporting requirement. There is literature that deals with sound control (Ross, B.P., L. Lien, and R.W. Furness. 2001. Use of underwater playback to reduce the impact of eider on mussel farms. ICES J. Mar. Sci. 58: 517-424)
Condition	Fishery management should contain a reporting requirement on interaction with ETP species and any other species deemed necessary (such as Eider). The reported information should be sufficient to measure trends and support a full strategy to manage impacts on ETP species.
Milestones	Year 1 – develop and agree reporting requirements. Summarize alternative non-lethal methods for handling eider problems in an 'eider control guide'. Year 2- implement reporting requirements. Implement the 'eider control guide' for the member companies, i.e. introduce a ban for shooting eiders among the member companies, along with presenting the alternative eider control measures.
Client action plan	From the SSPO side we will point to the fact that, there is almost no interaction with any ETP species. The system will be implemented where we also will try to estimate how much feeding with mussels which occur from the ropes.
Consultation on condition	Board of Agriculture and County Administrative Board

Condition 2

Performance Indicator	2.4.2 There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.
Score	75
Rationale	The permitting system does not appear to be restrictive because habitat definition for the farm location is not included in the information needed to be filled in in the permit application process. While this is considered by the Country Administrative Board in reaching a decision, there is not a formal requirement to present evidence of habitat type as part of permitting.
Condition	Habitat types at proposed production areas should be assessed and reported as part of the application process. This should be of sufficient detail for confidence that the partial strategy (of permitting production areas) will work in relation to habitats.
Milestones	Year 1 – develop and agree habitat reporting for new applications. Year 2 – implement habitat reporting
Client action plan	SSPO will try to develop the application process with "Länsstyrelsen". "Länsstyrelsen has confirmed that they will participate.
Consultation on condition	County Administrative Board

Condition 3

Performance Indicator	3.2.1: 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.
Score	70
Rationale	As yet there is no management plan defining short or long term objectives for the fishery management system. A National Action Plan is expected in 2014, which should develop such (ideally measurable) objectives, but these are not evident for the mussel sector in the National Aquaculture Strategy.
Condition	Develop and implement a fishery management system with measurable short and long-term objectives that are consistent with MSC principles and criteria.
Milestones	Year 1 – develop management or action plan with short and long term objectives. Year 2 – implement management or action plan.
Client action plan	SSPO will work as a part in the National Action Plan, which will be developed and ready during 2014 by "Jordbruksverket". It will then be implemented during 2015 in the mussel industry.
Consultation on condition	Board of Agriculture & multi-stakeholder group developing the Action Plan.

Condition 4

Performance Indicator	3.2.3: 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.
Score	75
Rationale	There is a lack of a systematic MCS process and client capacity to apply one may be limited.
Condition	Implement an MCS system that can demonstrate the ability to enforce relevant management measures, strategies and/or rules.
Milestones	Year 1 – develop an appropriate MCS system Year 2 – implement the MCS system Year 3 – report on MCS system performance
Client action plan	SSPO will develop and implement an appropriate MSC-system together with "Livsmedelsverket" who have a significant part of these issues and also "Länsstyrelsen"
Consultation on condition	Board of Agriculture, County Administrative Board, Coast Guard and any other parties relevant to MCS of mussel sector.

Condition 5

Performance Indicator	3.2.4: 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.
Score	70
Rationale	There is currently no strategic approach to the implementation of research activities. The National Aquaculture Strategy proposes that scientists be part of the development of the sector (and this has already begun with the establishment of Aquaculture Centre West), with research expected to be part of the NAP being developed for implementation in 2014.
Condition	Produce a research plan that 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.
Milestones	Year 1 – develop research plan Year 2 – implement research plan Year 4 – evidence of management system taking research findings into account
Client action plan	SSPO will together with "Vattenbrukscentrum Väst" develop a research plan for the mussel sector.
Consultation on condition	Board of Agriculture & multi-stakeholder group developing the Action Plan.

Condition 6

Performance Indicator	3.2.5: The fishery-specific management system is subject to regular internal and occasional external review.
Score	70
Rationale	There is no explicit fishery-specific management system and as such cannot be subject to review. It is expected that the National Action Plan will be subject to review, but this is not yet in place.
Condition	Ensure the fishery-specific management system is subject to regular internal and occasional external review.
Milestones	Year 1 – develop management plan review process Year 3 – implement management plan review process Year 4 – evidence of management plan taking review process findings into account.
Client action plan	SSPO will work as a part in the National Action Plan which will be developed and ready during 2014 by "Jordbruksverket". It will then be implemented during 2015 in the mussel industry.
Consultation on condition	Board of Agriculture & multi-stakeholder group developing the Action Plan.

Appendix 2. Peer Review Reports

Peer Reviewer 1

Overall Opinion

<i>Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?</i>	Yes	Certification Body Response
<u>Justification:</u> The assessment team concluded with a recommendation that the fishery be certified. This is an appropriate conclusion given that the average score for each of the two principles reviewed was well above 80 and no single score below 65. The assessment builds on relevant information about the fishery in question. The scoring is also compatible with previous CAG mussel assessments.		<i>Noted</i>

<i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?</i>	Yes	Certification Body Response
<u>Justification:</u> The conditions address the identified shortcomings of the fishery, with reasonable milestones throughout the certification period.		<i>Noted</i>

If included:

<i>Do you think the client action plan is sufficient to close the conditions raised?</i>	Yes	Certification Body Response
<u>Justification:</u> The client action plan addresses the conditions in an appropriate way		<i>Noted</i>

General Comments on the Assessment Report (optional)

A concise and informative report – a little thin on justification here and there, especially for P3.

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	N/A	N/A			
1.1.2	N/A	N/A			
1.1.3	N/A	N/A			
1.2.1	N/A	N/A			
1.2.2	N/A	N/A			
1.2.3	N/A	N/A			
1.2.4	N/A	N/A			
2.1.1	N/A	N/A			

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
2.1.2	N/A	N/A			
2.1.3	N/A	N/A			
2.2.1	N/A	N/A			
2.2.2	N/A	N/A			
2.2.3	N/A	N/A			
2.3.1	Yes	Yes		No comment.	Noted
2.3.2	Yes	Yes		No comment.	Noted
2.3.3	Yes	Yes	Yes	No comment.	Noted
2.4.1	Yes	Yes		No comment.	Noted
2.4.2	Yes	Yes	Yes	No comment.	Noted

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
2.4.3	Yes	Yes		The justification for SG80 and SG100 is rather thin. I assume the team had in mind that the justification for SG60 would be sufficient, but the information should be repeated for SG80 and SG100, or at least referred to at the next level.	Additional text and reference to previous SGs made.
2.5.1	Yes	Yes		No comment.	Noted
2.5.2	Yes	Yes		No comment.	Noted
2.5.3	Yes	Yes		No comment.	Noted
3.1.1	Yes	Yes		Text is obviously missing under 3.1.1 c) SG80.	Text added
3.1.2	Yes	No		No text is inserted under SG80 b).	Text added
3.1.3	Yes	No		It is not convincingly argued how the stated objectives are consistent	Additional text added to explain the partial

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
				with the precautionary approach (SG80 a)). Further, it is not quite clear how SG100 can be partially met as long as the justification says it is not explicitly stated that the objectives are required. The score might have to be reduced to 80 (if SG100 is not met instead of partially met) or below 80 (if justification is not given that the mentioned objectives are consistent with the precautionary approach). I assume the latter can easily be argued for, but I am more unsure about SG100.	score.
3.1.4	Yes	Yes		I agree. There is no evidence that the management system explicitly considers incentives in a regular review.	Noted

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
3.2.1	Yes	Yes	Yes	I agree. There is no management plan defining short and long term objectives.	Noted
3.2.2	No	No		3.2.2 a), b) and c) are ok. It is not quite clear to me how SG 80 can be met for d) as long as no evident explanations are provided on management action. The scoring might have to be reduced to 75 and a condition invoked. No references are provided for this PI.	Text revised to show 80d is met
3.2.3	No	Yes	Yes	I agree. There is no evidence of an MCS system being implemented (SG80 b)). SG80 c) is possibly also problematic, as it might be difficult to argue that there is some evidence to demonstrate compliance as long as there is no MCS system in place. I agree, however, that SG60 is met as there is no evidence of the opposite either (non-compliance). If the	Elements of an MCS system do exist, however there is no evidence of an MCS strategy (as a result of the low risk posed by mussel farms as perceived by authorities) preventing SG100 being met. Information resulted from stakeholder interviews (now referenced) rather than reports.

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
				assessment team agrees that SG80 is not met for c), the score must be reduced to 70. No references are provided for this PI.	
3.2.4	Yes	Yes	Yes	I agree. No evidence exists of a strategic approach to the implementation of research activities.	Noted
3.2.5	Yes	No	Yes	The justification for SG60 b) is a little thin. How exactly will 'the movement of aquaculture responsibilities to the Board of Agriculture' imply that the management system is subject to occasional internal review?	Additional text to justify score on 60b. Fishery-specific management extends to the CAB permitting system and oversight by SwAM, which are both within public bodies that are subject to occasional internal review. The institutional change described shows that this management is subject to occasional review.

Peer Reviewer 2

Overall Opinion

<i>Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?</i>	YES	Certification Body Response
<u>Justification:</u> This fishery merits certification. I am confident that sufficient checks exist in the current EU, National and local legislation to ensure that it develops in an ecologically sustainable manner in conjunction with the set of 6 conditions set by the assessors.		

<i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?</i>	NO	Certification Body Response
<u>Justification:</u> Condition 1: This should include a requirement to research alternative non-lethal methods of predator control.		

If included:

<i>Do you think the client action plan is sufficient to close the conditions raised?</i>	YES	Certification Body Response
<u>Justification:</u> The timelines attached to the 6 conditions appear to be reasonable		

General Comments on the Assessment Report (optional)

Overall the report is prepared in an accessible format which makes the decision process easy to relate to the MSC guidelines and Principles. The breadth of experience of the assessors was appropriate to the evaluation of this fishery.

Performance Indicator Review

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	NO	NA	NA	Principle 1 was not scored as the assessors state that this longline mussel fishery is "catch and grow" and therefore under MSC guidelines the certification requirements do not need to be included. How is this so when a full assessment of Principle 1 criteria was carried out for the Danish Limfjord Rope Grown mussel fishery which also relies upon locally collected spat?	<p>Limfjord was certified under an earlier assessment methodology that did not make distinctions for enhanced catch and grow fisheries. It was guided by MSC TAB Directive D-001 Enhanced Fisheries v2.1 of 1st May 2010</p> <p>This fishery is certified under the most recent certification requirements using a modified assessment tree intended for enhanced catch and grow fisheries (Annex CK of Certification requirements 1.3, 2013). This is described in Appendix 1a.</p>
1.1.2				ditto	See response to 1.1.1 above.
1.1.3				ditto	See response to 1.1.1 above.
1.2.1				ditto	See response to 1.1.1 above.

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
1.2.2				ditto	See response to 1.1.1 above.
1.2.3				ditto	See response to 1.1.1 above.
1.2.4				ditto	See response to 1.1.1 above.
2.1.1	NO	NA	NA	The assessors did not score RETAINED NON TARGET SPECIES (2.1) or BYCATCH (2.2). Mussel longlines for ongrowing and spat collection will also attract settlement of other species and therefore change and influence local ecosystems. Both these criteria were evaluated for the Limfjord rope mussel fishery and so it is not clear why the Swedish fishery was treated differently.	Limfjord was certified under an earlier assessment methodology that did not make distinctions for enhanced catch and grow fisheries. It was guided by MSC TAB Directive D-001 Enhanced Fisheries v2.1 of 1 st May 2010 This fishery is certified under the most recent certification requirements using a modified assessment tree intended for enhanced catch and grow fisheries (Annex CK of Certification requirements 1.3, 2013). This is described in Appendix 1a.
2.1.2				DITTO	See response to 2.1.1 above

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
2.1.3				DITTO	See response to 2.1.1 above
				DITTO	See response to 2.1.1 above
2.2.1				DITTO	See response to 2.1.1 above
2.2.2				DITTO	See response to 2.1.1 above
2.2.3				DITTO	See response to 2.1.1 above
2.3.1	NO	YES	NA	Alternative methods of controlling eider such as sound (Ross, B.P., L. Lien, and R.W. Furness. 2001. Use of underwater playback to reduce the impact of eider on mussel farms. ICES J. Mar. Sci. 58: 517-424.) laser and anti predator nets were not considered.	Recommendation 2 is added suggesting non-lethal control is considered.
2.3.2	NO	YES	NA	Alternative eider control strategies should be investigated	See above

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
2.3.3	YES	YES	NO	One cited reference (Artdatabanken, 2010) mentions that recent eider population decline may be due to malnourishment arising from poor mussel quality. Competition for phytoplankton leading to poor condition mussels could become an issue with increasing production from longline.	<p>The impact on eider populations is likely to be positive in providing additional food sources.</p> <p>There is a commercial imperative to not exceed natural carrying capacity as meat yields would be poor. However the permitting process should take these potential environmental impacts into account.</p> <p>Added text in section 3.4 Birds: The decline in the eider duck population in Sweden is not yet well understood, but one hypothesis is that it could be coupled to changes in the supply of mussels of suitable quality. Another possible reason may be deficiency of vitamin B1 (thiamin) (SLU, 2010). A recent update of this assessment text (2012) states that the reasons for the population decline observed with a decreasing number of females might be due to predation from the growing population of white-tailed eagle and mink. The potential lower availability of mussels might also be due to warmer winters (SLU, 2012).</p>

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
2.4.1	YES	YES	NA	At the current scale of operation the west coast Swedish mussel longline industry is very unlikely to have a serious impact on local ecosystems.	Noted
2.4.2	YES	YES	YES	The SSPO have indicated that they will participate in habitat reporting.	Noted
YES	YES	YES	NA	The impact of the mussel longlines on benthic habitats is usually limited to about a 100m radius. In this fishery the majority of the seabed is reported as soft mud in areas with strong currents to disperse the faecal material.	Noted
2.5.1	NO	NO	NA	There is no evidence in the assessors report that the potential production of 50,000 tonnes (Lindahl pg 11 – 12 of report) takes into account the impact on local	Score reduced to 90 due to the points raised. Added text: The mussel farms assessed in this MSC assessment are close to shore, i.e. coastal, and their localities hence corresponds to 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
				filter feeders. Therefore an ecosystem sensitive carrying capacity models should be applied in future to predict the sustainable limits to onshore production in this area. In view of this a score of 80 would be more realistic. The quoted paper by Nunes et al 2011 outlines a suitable methodology.	localities studied in the two named studies. However the ecosystem interactions in the specific locations of the mussel farms under assessment have not been investigated and therefore SG100a is not met.
2.5.2	YES	YES	NA	The current permitting system and the environmental code are considered adequate to justify a score of 80.	Noted
2.5.3	YES	NO	NA	The assessors use two references (Lindahl et al, 2005 and Nunes et al, 2011) to support their argument that there is adequate knowledge on the impacts of the Swedish rope mussel industry on the Skagerrak area. Both papers refer to fjordic systems whereas the Skagerrak is a more open coastal system.. This	Text amended to Killary Harbour. Text added: The mussel farms assessed in this MSC assessment are close to shore, i.e. coastal, and their localities hence corresponds to the localities studied in the two named studies. Therefore their environmental impacts are likely to be on the same scale as the impacts observed in the named studies.

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
				confusion is not helped by their persistent mis quoting of the Irish study area as Kelleher Bay when in fact it is Killary Harbour. For this reason I feel that a score of 95 is not yet justified.	
3.1.1	YES	YES	NA	EU, National and regional legislation is adequate to manage the fishery in a sustainable and fair manner.	Noted
3.1.2	YES	YES	NA	Management processes are adequate, clear and transparent.	Noted
3.1.3	YES	YES	NA	EU and National Management policy is long term and strategic.	Noted
3.1.4	YES	YES	NA	There are no obvious subsidies for equipment or production.	Noted
3.2.1	YES	YES	YES	Longline mussel farming has the	Noted

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
				potential to be a net contributor to ecosystem services provided it is managed appropriately. The Swedish Shellfish Producers Organisation need to grow their industry in line with MSC principles as required by Condition 3.	
3.2.2	YES	YES	NA	There appears to be adequate consultation between all stakeholders. Although there is currently low production (2,000t) the permitted production needs to be based upon an ecosystem sensitive model to take account of "wild" filter feeders.	Noted
3.2.3	YES	YES	YES	Adequate monitoring and surveillance need to be implemented in line with MSC principles.	Noted

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
3.2.4	YES	YES	YES	Research Programmes need to be ongoing and long term to support this growing industry and give it the information required to make sound management decisions.	Noted
3.2.5	YES	YES	YES	There is an opportunity for the SSPO to inform and influence the National Action Plan so that this industry can develop in a proper framework of support and legislation.	Noted

Appendix 3. Stakeholder submissions

a. Written submissions from stakeholders received during consultation opportunities on the announcement of full assessment, proposed assessment team membership, proposed peer reviewers, proposal on the use or modification of the default assessment tree and use of the RBF.

No comments received

b. All written and a detailed summary of verbal submissions received during site visits pertaining to issues of concern material to the outcome of the assessment³ regarding the specific assessment.

No comments received

c. Explicit responses from the assessment team to submissions described in **a.** and **b.** above.

No comments received

Appendix 3.1 Amendments made to the PCDR following stakeholder consultation

MSC

Sent: Fri 08/11/2012 14:27

To: Fisheries Department

Subject: MSC Technical Oversight of SSPO Swedish West Coast Rope Grown mussel - PCDR.

Dear Lesley,

Please find attached MSC Technical Oversight of SSPO Swedish West Coast Rope Grown mussel with comments regarding to PCDR.

Let us know if any questions

Sergio Cansado

Fisheries Assessment Manager, Marine Stewardship Council

Ref.	Type of Finding	Page	Requirement	Reference	Details	PI
1	Guidance	35	CR-27.12.1.2 v.1.3	The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products: The possibility of vessels fishing outside of the unit of certification.	There are no details in this section explaining how the 'management regime' ensures that vessels only harvest mussels from with the UoC.	
FCI Response: Added to 5.2.1: Management authorities set the location and extent of production by Swedish mussels producers as part of licence conditions and the authorities regularly check compliance with this condition. This minimises the risk of production from non-licensed areas entering the system.						

2	Minor	35	CR-27.12.1.3 v.1.3	The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products. The opportunity of substitution of certified with non-certified fish prior or at landing.	There is no explanation about why there is no risk of substitution between MSC and non-MSC either at harvest or at landing. For example it does not reference whether the other species of mussels from adjacent regions could be substituted or whether other harvesters not part of the SSPO may harvest in this region.	
<p>FCI Response: Added to 5.2.2: There is no risk that certified and non-certified product will be mixed as:</p> <ul style="list-style-type: none"> » All Swedish mussel producers that had production in 2012 are members of the SSPO. » all production by member farms is included within the UoC with all operate the production systems described in section 3.2.2. » The location of the different lines is indicated on maps and can be traced through all transport, grow-out and harvest documentation. Mussels are harvested from a single site and transported to shore for grading/processing. » The batch harvesting process enables the identification of specific production lines for all product entering factories. This enables MSC certified product to be distinguished at the start of chain of custody certification. » >The mussel growers supply the processing facility with a registration form that states if the mussels are produced under the MSC framework. The form also contains other information such as location of production and contact information to the mussel farmer. This form is also sent to the controlling authority, the National Food Administration. » All packaging facilities handling MSC mussels are included in the Chain of Custody and therefore are responsible for tracking raw material inputs. » While it is expected that all Swedish mussel production will be eligible under the UoC (and therefore all product landed from Swedish licenced producers into Swedish factories will be certified). All Swedish mussel production must be clearly labelled with the country of origin in line with EU regulations. 						
3	Guidance	36	CR-27.12.1.6 v.1.3	The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products: The number and/or location of points of landing.	In 5.3.1 it is not specified that these landings are at ports controlled by the appropriate authorities.	
<p>FCI Response: Added to 5.3.1 All mussels are landed to the Swedish mainland or islands along the Swedish west coast nearby to production areas. The mussels are landed in connection to the localities. The localities are shown on the map in Figure 3. The majority is shipped to Scanfjord Mollösund by boat, where a facility for washing and packaging is located 100m from shore. Another relatively large delivery location is Ekomusslor in Kolhättan, located north of Svanesund, which has a facility close to shore. Other delivery locations with smaller volumes are Amhult's pier in Åbyfjorden and occasional piers that are located close to a farm. When there is no processing facility in connection to the landing location, the mussels are sent to the processing facilities mentioned, as well as Bryggudden in Sannäs or to facilities in the Netherlands, France, Denmark or Germany.</p> <p>The National Food Administration is the authority responsible for the traceability in handling mussels in Sweden, and the procedure for opening areas (in relation to biotoxin testing), which is done by sampling the area where the farming will take place, for analysis by NFA. A landing form and a registration document for bivalve molluscs must be sent to the NFA, which is the controlling authority. The mussel farmer supplies the processing establishment with the registration document. The registration document is also sent to NFA as well as kept by the farmer for at least 1 year. Information supplied in the document includes the location of harvest, i.e. longitude and latitude, amount landed, harvesting date etc. (see appendix Registration document for bivalve molluscs).</p>						
4	Guidance	36	CR-27.12.4 v.1.3	Where there are IPI stocks within the scope of certification teams shall follow Annex CH.	It could be beneficial to make in clear in report if IPI stocks are involved into certification or not.	

	<p>FCI Response:</p> <p>5.4 Eligibility of Inseparable or Practically Inseparable (IPI) stock(s) to Enter Further Chains of Custody</p> <p>Mytilus edulis is native to Sweden and has been found to hybridise with Mytilus trossulus, which is considered to be part of the Mytilus edulis complex. While hybridization takes place wherever M. trossulus and M. edulis meet, the extent of hybridization varies between the different contact areas and there is no evidence of a collapse toward a hybrid swarm unlike in the Baltic. (Vainola & Streklov, 2011) Consequently M. edulis is determined as the only species within the UoC and the two are not considered to be IPI stocks. No other mussel species are encountered in its production.</p>
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Sent: Fri 06/12/2012 09:56

To: Sergio Cansado

Subject: FCI to SG - FCI response to MSC comments – SweMus – 06 12 13

Dear Sergio

Please find attached FCI assessment team responses to your comments (above) sent on the PCDR for the SSPO Swedish West Coast Rope Grown Mussel Fishery.

These will also be included in the Final Report.

Many thanks, kind regards

Lesley Hamilton, Fisheries, FCI.

Appendix 4 Registration document for bivalve molluscs

1 (2)

Sänds till: Malin Persson
Livsmedelsverket
Skansverket
Bastionsgatan 16
451 81 Uddevalla
(tfn 0709-24 55 14)

Registreringsdokument för tväskaliga blötdjur/Registration document for bivalve molluscs

Enligt bilaga 3 i förordning (EG) nr 853 skall i samband med transporter av tväskaliga blötdjur en särskild registreringshandling upprättas. Originalen av registreringshandlingen skall skickas till Livsmedelsverkets officiella provtagare, en kopia bevaras hos upptagaren minst ett år och en kopia skall följa varje parti. (Anvisningar till nummer nedan, se sid 2)
According to appendix 3 in EC 2004/853 a registration document must accompany the batch when molluscs are harvested and transported to a dispatch establishment or relaying area. The top copy must be sent to the official inspector, the other one is kept by the gatherer at least one year and one copy must follow the batch.

1. Upptagare/Gatherer:	2. Adress/Address:	3. Tel/Phone number:
4. Destinationsanläggning/godkännandenummer: Establishment/approval number:	5. Adress/Address:	6. Tel/Phone number:

7. Ändamålet för upptag/The purpose of gathering:

Art av mussla/The species of bivalve molluscs: _____

☐ Förpackning/
Package
 ☐ Återutläggning/
Relaying area
 ☐ Rening/
Purification
 ☐ Beredning/
Processing

Förpackning avser skaldjur som ska konsumeras direkt för konsumtion av förpackade livsmedelsmusslor/Package means live bivalve molluscs packaged for direct consumption

Återutläggning = avser återutläggning för rening i havsvatten/Relaying area means relaying area for purification in sea water

Rening = avser rening i landbaserad reninganläggning/Purification means purification in land based purification establishments

Beredning = avser bearbetning genom särskild uppbottning/Processing means treatment by special heating

8. Ställe/plats (nummer)/ Location of the harvesting area (name/number):	9. Läge (latitud/ longitud)/ Location:	10. Partier/ Batch number	11. Klassificering/status/ Classification status	12. Fångstskedel (kg) Harvest quantity	13. Skördedatum/ Date of harvesting

Datum/Date _____

Underskrift av upptagare / Signed by gatherer



Adress: Box 622, 751 26 Uppsala
Telefon: 018-17 55 00
Telefax: 018-10 58 48
E-post: livsmedelsverket@slv.se
www.livsmedelsverket.se

Anvisningar till ifyllande av Registreringsdokument

1. **Upptagare:** Person som enskilt eller på uppdrag av företag skördar vilda eller odlade tvåskaliga blötdjur i syfte att salubildla dessa.
2. **Adressuppgifter:** Upptagarens adressuppgifter. När denna representerar ett företag skall företagets adressuppgifter anges.
3. **Telefon:** Upptagarens eller företagets telefonnummer.
4. **Destinationsanläggning:** Destinationsanläggningens namn eller godkännandenummer. Observera att denna kan vara en beredningsanläggning, leveransanläggning, reningsanläggning eller återutläggningsområde. I det senare fallet skall havsområdets officiella namn anges.
5. **Adressuppgifter:** Destinationsanläggningens adress.
6. **Telefon:** Destinationsanläggningens telefonnummer.
7. **Ändamålet för upptag:** Vedertaget namn på art av mussla eller vetenskapligt namn skall anges. I rutorna skall göras en markering av ändamålet för upptag.
8. **Skördeplats (namn/nr):** Skördeplatsen skall anges efter den officiella beteckning för havsområde enligt Länsstyrelsen i Västra Götalands föreskrift om musselvatten. Det är valfritt att ange antingen namnet på havsområdet eller numret. Inom parentes kan även närmare anges skördeplatsens namn.
9. **Läge (latitud och longitud):** Angivande av läge avser skördeplatsens nautiska position.
10. **Partier:** Med parti avses den mängd tvåskaliga blötdjur som tagits upp vid ett och samma tillfälle inom en begränsad del av ett havsområde. Vid upptag på flera ställen inom ett havsområde skall varje parti ges ett unikt löpnummer.
11. **Klassificeringsstatus:** Vid skörd skall anges havsområdets klassificeringsstatus. Observera att området måste förklarats "öppet" och att endast status "A" accepteras om musslorna skall gå ut direkt på marknaden via leveransanläggningar. Uppgift om klassificeringsstatus ges för varje havsområde på livsmedelsverkets webbplats www.slv.se/Livsmedelskontroll/Musselkontroll/Resultat för samtliga havsområden.
12. **Fångstmängd:** Fångstmängden avser den mängd i kilogram oarbetad vara som levereras vidare till nästa mottagare d.v.s Råvikt innan rensning.
13. **Skördedatum:** Datum för skörd av de tvåskaliga blötdjuren.

Appendix 5 Surveillance Plan - MSC Fisheries

Fishery Name: SSPO Swedish West Coast Rope Grown Mussel fishery

Determination of surveillance score:

Criteria	Surveillance Score	This fishery
1. Default Assessment Tree used		
Yes	0	
No	2	2
2. Number of conditions		
Zero conditions	0	
Between 1-5 conditions	1	
More than 5	2	2
3. Principle level scores		
greater than or equal to 85	0	
less than 85	2	2
4. Conditions on outcome PIs?		
Yes	2	
No	0	0
TOTAL		6

Surveillance plan:

Score from CR Table C3	Surveillance Category	Year 1	Year 2	Year 3	Year 4
6	Normal Surveillance]	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit & re-certification site visit

An overall surveillance score of 6 is calculated, suggesting a normal surveillance level. There are no other contributing factors to suggest that this should not be followed.