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MSC SUSTAINABLE FISHERIES CERTIFICATION

DFPO Denmark North Sea & Skagerrak Saithe

Public Certification Report

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Glossary of Terms

ASCOBANS	(Bonn Convention's) Agreement on the Conservation of Small Cetaceans in the Atlanto-Scandian and Baltic.
ACOM	ICES Advisory Committee
ACFA	ICES Advisory Committee on Fisheries and Aquaculture
B_{pa}	Precautionary reference point for spawning stock biomass
B_{lim}	Limit biomass reference point, below which recruitment is expected to be impaired.
CFP	Common Fisheries Policy
CR	Council Regulation
DFPO	Danish Fisherman's Producer Organisation
DTU Aqua	Danish Technical University – National Institute of Aquatic Resources
EC	European Commission
EEZ	Exclusive Economic Zone
ETP	Endangered, threatened and protected species
EU	European Union
F	Fishing Mortality
F_{lim}	Limit reference point for fishing mortality that is expected to drive the stock to the biomass limit
F_{pa}	Precautionary reference point of fishing mortality expected to maintain the SSB at the precautionary reference point
FAM	MSC's Fisheries Assessment Methodology
FAO	United Nations Food and Agriculture Organisation
HCR	Harvest Control Rule
ICES	International Council for the Exploration of the Sea
ITQ	Individual Transferable Quota
IWC	International Whaling Commission
MCS	Monitoring, Control and Surveillance
MSC	Marine Stewardship Council
MSY	Maximum Sustainable Yield
NEA	North East Atlantic
NGO	Non-Governmental Organisation
OSPAR	Oslo-Paris Convention (Convention for the Protection of the Marine Environment of the North-East Atlantic)
P1	MSC Principle 1
P2	MSC Principle 2

P3	MSC Principle 3
PI	MSC Performance Indicator
RAC	Regional Advisory Council
SFO	Scottish Fisherman's Organisation Ltd.
SSB	Spawning Stock Biomass
TAC	Total Allowable Catch
UNCLOS	United Nations Convention on the Law of the Sea
VMS	Vessel Monitoring System
VPA	Virtual Population Analysis

Summary

» This report provides details of the MSC assessment process for Danish Fishermen's Producer Organisation (DFPO) fishery for **Denmark North Sea & Skagerrak Saithe**. The assessment process began in August 2009.

» This assessment covers Danish registered vessels as defined in section 2.1 of this report. This is to be interpreted in strict accordance with operational practices defined within this report, including adherence with the **DFPO Code of Conduct** defined in section 2.2 and (where applicable) the certificate sharing mechanism defined in Appendix 5. A full and up to date list of certified vessels will be maintained by the DFPO at http://www.msc-fiskere.dk/default.asp?id=35450.

» This assessment report covers a single target species, but assesses three different methods of capture. As a result there are 3 separate 'Units of Certification' and resulting scores for:

› Demersal trawl vessels including both otter trawl and fly shooting[1] (beam trawl is not included in this assessment)

› Danish Seine vessels

› Set net vessels (Gill & trammel net)

» Landings by Danish registered vessels using any other type of fishing gears are NOT covered by this certification.

» The assessment team for this fishery assessment comprised of Dr. Paul Medley, who acted as team leader and Principle 1 specialist; Ms. Fiona Nimmo who was responsible for evaluation of Principle 2; Prof. Sten Sverdrup-Jensen who was responsible for evaluation of Principle 3 and expert advisor Dr Antonio Hervás.

» Peer reviewers used for this report were Dr. Begoña Santos and Ms. Helen Davies.

» The Danish North Sea and Skagerrak saithe fishery is an important year round fishery. Fishing takes place almost exclusively in Norwegian and European waters of ICES division IV and IIIaN (North Sea and Skagerrak)

» A rigorous assessment of the wide ranging MSC Principles and Criteria was undertaken by the assessment team and detailed and fully referenced scoring rational is provided in the assessment tree provided in Appendix 3 of this report

Recommendation:

» On completion of the assessment and scoring process, the assessment team concluded that **Danish Fishermen's Producer Organisation (DFPO) fishery for Danish North Sea & Skagerrak Saithe be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries**. This includes all three specified gear types.

Rationale:

» There are a number of areas in which the fishery scored well:

› The stock status can be defined as sustainable; it is highly certain the stock is above the point where recruitment would be impaired and stock biomass is consistent with B_{MSY}.

[1] To be precautionary fly shooting has been assessed within 'demersal trawl' rather than within 'Danish seine' due to potential habitat interactions associated with gear hauling techniques for fly shooting.

- The available evidence suggests that the fishery is not causing negative impacts on retained and bycatch species. Management strategies to ensure that the fishery will not cause any negative impact of retained and bycatch species is in place.
- Understanding of the North Sea ecosystem functionality and the role of saithe in this ecosystem is considered adequate to inform fisheries management.
- The management system which governs the operation of the fleet and exploitation of the resource both at Danish and European level has been found to be robust, supported by fair consultation and comprehensive monitoring control and surveillance.
- Furthermore, recent and on-going improvements in the management system, increase confidence in its ability to deliver long term sustainable fisheries. It is noted that the Danish Ministry of Food, Agriculture and Fisheries are playing an important and positive role in the current reform of the EU Common Fishers Policy, supported by impressive pilot projects to demonstrate new approaches to fisheries management.

» 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 (at least within the 5 year lifespan of the certificate). Full explanation of these conditions is provided in section 8 of the report, but in brief, the areas covered by these conditions are:

- In relation to principle 1
- There is a condition raised for PI 1.2.3 information/monitoring. For the 2010 assessment, abundance indices used from commercial CPUE data and survey data was incomplete for its use in the assessment of the stock.
- In relation to Discarded Bycatch
- There is a condition raised for discarded bycatch against setnet fisheries, due to lack of available data. While interaction is considered likely to be low, information is required to determine the species that are taken to allow a full assessment of their biological status.
- In relation to ETP Species
  - There are conditions raised against all 3 gear types in relation to ETP species, although there is a slightly different emphasis according to gear – for example the focus for trawl fisheries is on skate bycatch, whereas the focus for setnet fisheries is more on harbour porpoise. Across all fleet sectors an improved management strategy and recording is required.
- In relation Habitat
  - Conditions are raised for both mobile gears (trawl and Danish Seine) in relation to habitat impacts. Fishing with demersal mobile gears is associated with damage to sensitive seabed habitats and non target benthic communities. The conditions require improvements in understanding and management response to mitigate this.

» Full explanation of how the DFPO intend to meet these conditions is provided in the client action plan in section 10 of the 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

1. Introduction

This report details the background, justification and results of Food Certification International's (FCI) assessment of the **DFPO Denmark North Sea & Skagerrak Saithe Fishery**, carried out by Food Certification International to the standard of the Marine Stewardship Council (MSC) sustainable fishery programme.

1.1 Scope

First and foremost, the purpose of this report is to provide a clear and auditable account of the process that was undertaken by the team of FCI assessors. The report aims to provide clear justification for the assessment scores that have been attributed to the fishery, and identify the sources of information that have been used to support these. This should enable subsequent surveillance or even re-certification teams to rapidly pin-point where the key challenges lie within the fishery, and quickly highlight any changes which may affect the overall sustainability of the fishery.

In order to provide useful background and information for a wider readership it is also useful to provide a more qualitative account of the fishery in question. However, it should be reiterated that no primary research has been undertaken to inform this report. The report is therefore not intended to comply with the standard editing norms expected for scientific journals. Instead it is intended that the report should be sufficiently clear and unambiguous to be reviewed by fisheries specialists, whist remaining sufficiently accessible to provide insight for interested readers throughout the supply chain – including consumers. This is a challenging balance to strike without alienating either readership.

1.2 Report structure

Early report sections provide the reader with a clear comprehension of the nature of the fishery, enabling a broader understanding of the issues debated by the team when scoring the fishery. For the purposes of precision, this begins with a description of the unit of certification, before expanding to outline some further background information, including details of the **Danish Fishermen's Producer Organisation**, the fleet, fishing operations and gear and the species itself.

Subsequent sections are then broadly aligned to the 3 MSC principles[2], which form the basic structure of the assessment, namely:

» **Principle 1:** Target stock status and harvest controls (summarised in **section 3**)

» **Principle 2:** Wider impacts of fishery operations (summarised in **section 4**)

» **Principle 3:** The management System (summarised in **section 5**)

Later sections of the report explain the procedures used to score the fishery, give details of the assessment team, and present the outcome of the team's deliberations. Finally the report provides a statement of the team's recommendations as to whether or not this fishery should go forward for certification to the standard of the Marine Stewardship Council, together with any conditions recommended.

2 Further information on the contents of the MSC principles and criteria are contained in Appendix 1.

1.3 Inspections & Consultations

The full assessment process commenced in August 2009, in February 2010 three members of the assessment team, supported by an FCI staff member undertook a site visit to Denmark, visiting Copenhagen, Hanstholm and Thyborøn. 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.

A complete list of those stakeholders interviewed in the fishery can be found in Section 6.3 of this report.

The scoring of the fishery against the MSC principles and criteria took place in Edinburgh (UK) from 8th to the 12th March 2010.

2. The Fishery

2.1 The Unit of Certification

Prior to providing a description of the fishery it is important to be clear about the precise extent of potential certification (ie. what is specifically being assessed). The MSC Guidelines to Certifiers specify that this 'Unit of Certification' is **"The fishery or fish stock (biologically distinct unit) combined with the fishing method/gear and practice (= vessel(s) and/or individual/s) pursuing the fish of that stock"**.

This clear definition is useful for both clients and assessors to categorically state what is included, and what is 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.

In this assessment, 3 fishing methods were assessed. As there are significant differences between these fishing methods, fishing areas and the vessels which use them, it was deemed appropriate to score them separately. Therefore in section 8 of the report a separate score and certification recommendation is provided for each of these UoCs in turn. The 3 units of certification for the fishery under consideration are set out below.

The fishery assessed for MSC certification is defined as:

Species:	Saithe, European pollock (*Pollachius virens*)
Stock:	North Sea Saithe
Geographical area:	ICES Subarea IV (North Sea) and Division IIIa West (Skagerrak)
Harvest method:	Demersal Trawl[3]
Client Group:	DFPO member vessels fishing for North Sea saithe[4]. A register of eligible vessels will be maintained at http://www.msc-fiskere.dk/default.asp?id=35450.
Other Eligible Fishers[5]:	Danish registered vessels fishing for North Sea saithe which are not currently members of the DFPO.

Species:	Saithe, European pollock (*Pollachius virens*)
Stock:	North Sea Saithe
Geographical area:	ICES area IV (North Sea) and Division IIIa West (Skagerrak)
Harvest method:	Setnets (Trammel net & Gill net)
Client Group:	DFPO member vessels fishing for North Sea saithe. A register of eligible vessels will be maintained at http://www.msc-fiskere.dk/default.asp?id=35450.

[3] Demersal trawl includes both otter trawl and fly shooting fishing methods (see 2.3.1 for full description on gear type)

[4] This is to be interpreted in strict accordance with operational practices defined in this report, in particular the DFPO Code of Conduct defined in section 2.2. This applies to all UoCs.

[5] Under strict conditions defined within the Certificate Sharing Mechanism for this fishery (Appendix 5). This applies to all UoCs.

Other Eligible Fishers:	Danish registered vessels fishing for North Sea saithe which are not currently members of the DFPO.

Species:	Saithe, European pollock (*Pollachius virens*)
Stock:	North Sea Saithe
Geographical area:	ICES area IV (North Sea) and Division IIIa West (Skagerrak)
Harvest method:	Danish Seine
Client Group:	DFPO member vessels fishing for North Sea saithe. A register of eligible vessels will be maintained at http://www.msc-fiskere.dk/default.asp?id=35450.
Other Eligible Fishers:	Danish registered vessels fishing for North Sea saithe which are not currently members of the DFPO.

2.2 The Danish Fisherman's Producer Organisation

2.2.1 Organisational structure and role

The Danish Fishermen's Producers Organisation (DFPO) obtained official recognition as an EU Producers Organisation (PO) in 1974, with the overarching objective of creating a balance between supply and demand in the market place for species to which minimum prices are applied under EU regulations. Additionally, the DFPO also oversees the withdrawal of fish from market in circumstances where landings are unable to obtain minimum withdrawal prices. Saithe is one of the species that fall within the EU minimum price scheme along with the other main commercial species landed by the EU fleet.

> European Union regulations establish a common market for fishery products, making it possible, in the interests of producers and consumers, for Producer Organisations to stabilise prices, balance supply and demand and ensure adequate supplies to a market.
>
> Council Regulation (EC) No 104/2000 of 17 December 1999 on the common organisation of the markets in fishery and aquaculture products.

DFPO members land approximately 60-65 % of the total Danish catches of these species. All active Danish vessels are eligible for membership of the DFPO. Members pay a landings levy to the DFPO for all landings of relevant species and in return the DFPO offers a safety-net in the form of guaranteed minimum payments, if members cannot sell their fish at the minimum prices stipulated by the EU. The members are then entitled to receive a guarantee payment or refund, which is generally at the same level as the withdrawal price itself.

The DFPO is structured as follows:

» **Members Council:** responsible for statute changes, election of chairman and board, and outlining official policy in relevant fields of responsibility.

» **Chairman and board:** responsible for setting minimum prices (regulations permit EC guide prices to be altered within +/- 10 %, according to current market situation). The board also fixes the level of guaranteed payment to members in case of withdrawals from the market.

» **Secretariat:** 21 employees (common with the Danish Fishermen's Association (DFA)), including a 1 DFPO chairman (and 1 DFA chair plus 2 vice-chairs), and responsible for all administrative matters.

DFPO cooperates closely with the Danish Fishermen's Association on most fishing related matters, nationally as well as internationally. DFPO also represents its members on a number of committees under the Danish Ministry of Food, Agriculture and Fishing. DFPO is also a member of the EAPO (European Association of Producers Organisations). In addition the DFPO also undertakes some business operations such as the production, and the leasing out of cold storage facilities to members primarily located in the smaller fishing ports. Unlike some other European Producer Organisations, the DFPO do not play any role in holding vessel quota, monitoring uptake or undertaking quota trading.

2.2.2 DFPO Code of Conduct

The code of conduct was first formally adopted by the Danish Fishermen Organisation in June 2008 and outlines the practices to meet the goals for sustainable and responsible behaviour in Danish fisheries. Sustainability and minimising environmental impact are the main objectives and although fleet financial performance is not mentioned directly, there is a clear recognition that economic sustainability (profitability) is a vital pre-requisite of more environmental and economic sustainability. In this respect the code therefore also includes elements in relation to areas likely to benefit vessel financial performance, such as catch handling and quality of the landings.

Since then, and as part of the MSC assessment process, the DFPO have added to and enhanced their existing members Code of Conduct to more accurately reflect that sustainability goals outlined in the MSC Principles and Criteria. This now includes additional recording commitments to collate relevant data to enable further management refinement. **Signing up to, and continued compliance with this Code of Conduct (including submitting relevant data records) will be a pre-requisite requirement of inclusion on the MSC certificate, and will be monitored and enforced by the DFPO.** A summary of the DFPO expanded Code of Conduct is provided in Figure 2.1.

For chain of custody purposes, the DFPO will keep an updated list of vessels that have signed up to this Code of Conduct and are recording relevant data and are therefore eligible to land plaice in accordance with this certification. A register of vessels is maintained at http://www.msc-fiskere.dk/default.asp?id=35450. [6]In time, this site will also be linked to the electronic traceability system the DFPO are currently building, so that once it is up and running, buyers will not have to perform a separate check.

Upon signature of the Code of Conduct a vessel will be sent:

» Recording sheets for relevant data on fishery interactions. This contains details of exactly what interactions to record (bycatch species, relevant ETP species, habitat interactions) and in what format the data should be recorded (weight, time, location etc.).

» Reporting instructions / requirements.

» A 'Wheelhouse-guide to protected species' listing all relevant ETP species will be produced and distributed to all members who have signed up to the revised Code of Conduct and who will be eligible to use the MSC certificates. The guide will contain images and species identification tricks for difficult-to-identify species such as skates and rays, produced in collaboration with the species identification experts at the Natural History Museum of Denmark.

[6] The link is in the middle of the page where it states: "Download fartøjslisten som PDF til print her." - the link being the word "her."

Although some areas of the CoC are purely commitments to good practice, there are specific reporting requirements which will can and will be monitored and enforced by the DFPO. All vessels which have signed up to the Code of Conduct and who are therefore eligible to sell their product as MSC certified are required to submit quarterly data reports to the DFPO (either directly or through their local Fishermen's Association).

A vessel which does not comply with the operational procedures in the Code of Conduct or who fail to submit the requisite data in the appropriate form will be contacted directly by DFPO staff and issued with a warning. Continued non-compliance will result in loss of the right of use of the MSC certificates for one year.

Additionally, any vessel which is successfully prosecuted for a fisheries violation which has material consequences for the sustainability of the fishery, on more than 1 occasion over a two year period will lose the right of use of the MSC certificates for one year and be removed from the vessel register.

Fig 2.1: Summary of some of the key relevant elements of the DFPO code of conduct.

Minimise unwanted catches and discards:	Minimise the environmental impact of fishing:
✓ No high-grading ✓ Fish in areas and at times with the lowest presence of unwanted species. ✓ Clear & open fleet communication regarding areas of undersized fish or unwanted species. ✓ Use and continue to develop selective gear for effective fishery. ✓ Efficient and appropriate use vessel quota-pools opportunites for rental, exchange etc. to adjust vessel quota to actual catches.	✓ Minimise fuel use and by use cleanest available fuel. ✓ Develop gear which minimises the harmful effects on the environment. ✓ Bring in-organic waste ashore – including waste caught in gear. ✓ Dispose of oil and other potentially environmentally damaging substances in designated harbour facilities of. ✓ Notify SOK (the Danish Navy operations centre responsible for pollution surveillance) whenever pollution encountered at sea. ✓ Recover lost fishing-gear, assisting fellow vessels and recording lost gear where recovery is not possible.
Avoid capture of marine mammals and other endangered or protected species.	**Open collaboration with other stakeholders:**
✓ The relevant species, and how to identify and record them, are described in a 'Wheelhouse-guide to protected species'. ✓ Record any capture events and if still alive, return to the sea as quickly and carefully as possible. ✓ Collected, aggregate and monitor data and pass to relevant scientific institutions for analysis. ✓ Use year 1 analysis to adopt DFPO plan to reduce impact (through guides, rules, research etc.), prioritising fisheries, species, seasons and areas with greatest interaction. ✓ The plan will be evaluated and adjusted annually after each new year of monitoring.	✓ With authorities and politicians on the development of policies and management. ✓ With researchers on the development of knowledge and data collection. ✓ With the control and monitoring agency on e.g. developing better logbooks and control strategies. ✓ With organisations in and around the fisheries' sector. ✓ With environmental NGOs on e.g. common advice to The European Commission. ✓ Welcome observers onboard DFPO vessels.
Safeguard crews	**Transparent information, traceability & quality**
✓ Ensure safety and good conditions for the crew at sea ✓ Ensure the continued appropriate education of our crew. ✓ Educate fishermen on interactions between fishing, fish stocks and their environment.	✓ Ensure correct and hygienic handling of catches. ✓ Disponibility of a system to monitor vessels geographical position by satellite (vessel monitoring system, VMS) and track catches with electronic logbooks. ✓ An advanced system of electronically traceable fish-boxes and electronic traceability from catch to consumer

2.3 Fishing Fleet & Fishing Method

All certified vessels are Danish registered, members of the DFPO and have signed up to the DFPO Code of Conduct. There are 3 different gear types covered in this assessment report; demersal trawl, Danish seine and set net (trammel & gill net). Details of each are set out below.

2.3.1 Demersal Trawl

Otter trawl

The demersal or bottom otter trawl (single, twin and pair) is a towed fishing gear designed and rigged to have bottom contact during fishing, towed by large trawl vessels, typically in excess of 15m. A demersal trawl is a cone-shaped net consisting of a body, closed by a codend and with lateral wings extending forward from the opening. The two towing warps lead from the vessel to the otter boards which act as paravanes to maintain the horizontal net opening. These boards typically weigh between 0.5–2 t and drag across the seabed (with potential to disrupt seabed structure and habitat). The boards are joined to the wing-end by the bridles which herd fish into the path of the net. The net opening is framed by a floating headline and ground gear designed according to the bottom condition to maximise the capture of demersal target species, whilst protecting the gear from damage. On very rough substrates special rock hopper gears are used.

Current regulations state that mesh size in the cod end must be a minimum of 110mm in EU waters[7] and 120 mm in Norwegian Territorial waters. Many Danish fishermen however choose to fish 120 mm all of the time, mainly because they fish both EU and Norwegian waters and practical considerations mean it is not feasible to change cod ends when crossing over and back into and out of the Norwegian sector.

Instruments to monitor gear performance are common in modern bottom otter trawling. Such instruments monitor geometry (door distance, vertical opening, bottom contact, trawl symmetry), trawl depth water temperature and the weight of catch in the trawl is also closely monitored (catch sensors) to give an indication of the appropriate moment to haul.

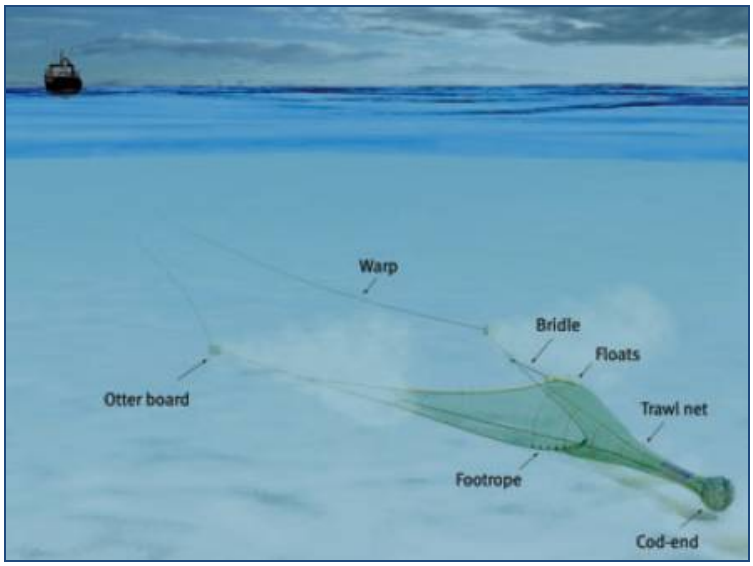
Fly shooting

Fly shooting, also known as Scottish seine or fly dragging is considered to be a cross between traditional Danish seining (see Section 2.3.3) and otter trawling (as described above). It is a ground fishing method for demersal fish where there the warps and net (conical net with two long wings and no otter boards) are laid out from a large buoy (which is not anchored as per Danish seine). The vessel encircles the fish as per method described for Danish seine, however when the vessel is back at the beginning of the first arm it does not haul in right away but moves / steams forward while the ropes and the net are pulled in. This action means that the net is, to a certain extent, trawled along the seabed.

[7] Although a smaller 80mm mesh size is permitted further south, in particular in the Dutch Beam trawl fishery, no such vessels are included in this assessment.

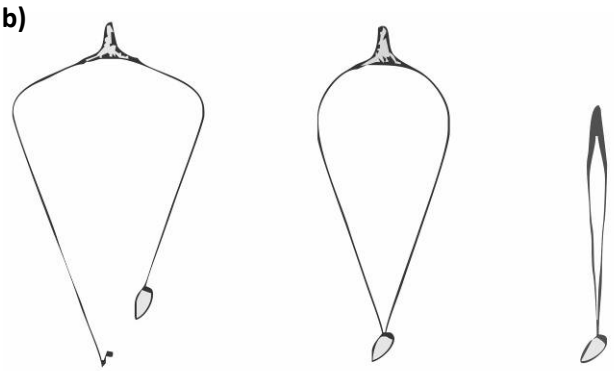
Figure 2.2: Vessel image / gear configuration for (a) otter trawl and (b) fly shooting

a)



Source: Galbraith & Rice 2004

b)



Data source: FAO Gear type Factsheet

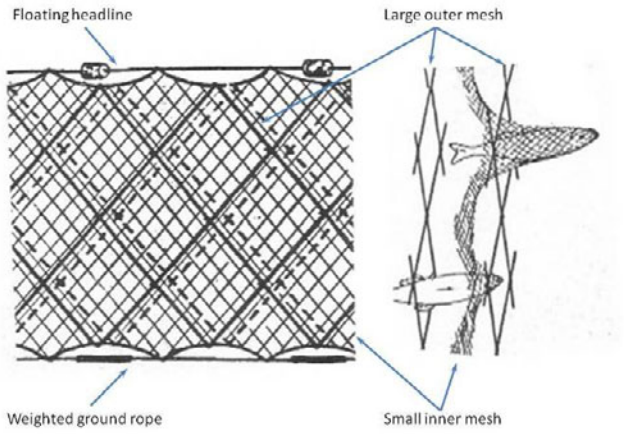
2.3.2 Trammel Net & Gill Net

Another fishing method employed in this fishery is a bottom set gill net with vessels specially designed for static gear operations, with a net hauler typically on the forward starboard quarter and sufficient deck space for sorting and storing the catch and for sorting and storing the nets. For most of the large set net vessels there is a covered shelter deck for all net handling and catch sorting.

The vessels make use of two different types of bottom set net, both of which are covered within this Unit of Certification; namely the Trammel Net and the gill net.

The trammel net used by this fleet is a triple mesh net, anchored to the seabed with a total height of around 1.5m. The inner central mesh is typically 150mm, sandwiched between 2 outer mesh layers (trammels) of 350mm. By having an inner panel of small mesh netting, loosely hung between the two outer panels of large mesh netting, when a fish strikes the net it pushes the small-meshed netting forward through the large mesh, forming a pocket in which it is trapped.

Fig 2.3: Typical trammel net configuration



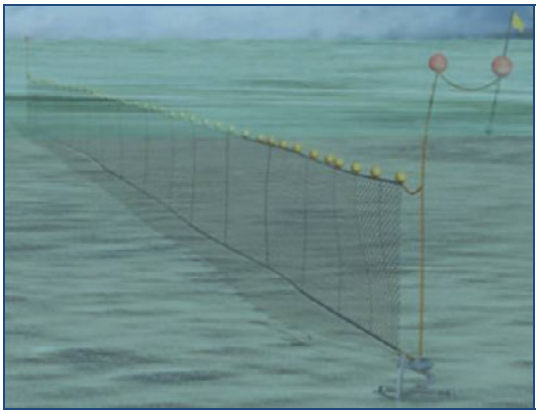
Data source: FAO Gear type Factsheet

A **gill net** consists of a single netting wall kept more or less vertical by a float line and a weighted ground line. The net is set on the bottom, and kept stationary by anchors on both ends and at 50m intervals. A gill net mesh size is chosen to allow only the head and gill covers of the targeted size of fish to pass through and be trapped. In this case, each net is approximately 3m high (from the seabed) and 50m long with a monofilament mesh size of typically 190mm. Typically as many as 100 lengths of nets are joined together and worked as a single net, making long nets sometimes up to several kilometres in length. Vessels in this fleet typically carry enough net to make 3 lines parallel lines of net, around 500m apart – these are then relatively easy to patrol, to ensure other vessels do not foul the gear.

The fishing properties of static nets are a function of many several parameters relating to the net including the mesh size, no of filaments making up the twine (monofilament v. multifilament), hanging ratio – the number of meshes mounted per unit length of head/footrope, mesh colour as well as physical dimensions in terms of length and net height (measured in meshes).

Both gill nets and trammel nets are set before dark, generally parallel to the tide. Nets are usually left in the water overnight and hauled during the day. Occasionally nets may have a longer soak time, for example as a result of bad weather, but this is to be avoided as the catch quickly deteriorates, both as a result of parasitic action and crabs which quickly destroy the trapped fish and are time consuming to remove from the net.

Fig 2.4: Diagram of typical gill net configuration



Source: Galbraith & Rice 2004

Although weighted and anchored, the nets are relatively light and can be flattened by the tide so nets will not normally set during spring tides – in particular in regions of highest current (in the south of the fishing region). Nets are marked by Dhan buoys' with the vessel identification and radar reflector.

Technically the gill net fishing season is year round, however due to the nature of the gear and the fishing characteristics of the net, there are far higher landings during the summer months. Due to the nature of the gear and vessel and crew ability to work the gear, nets are only shot or hauled in up to about wind speed of 20 m/s (Beaufort Force 6).

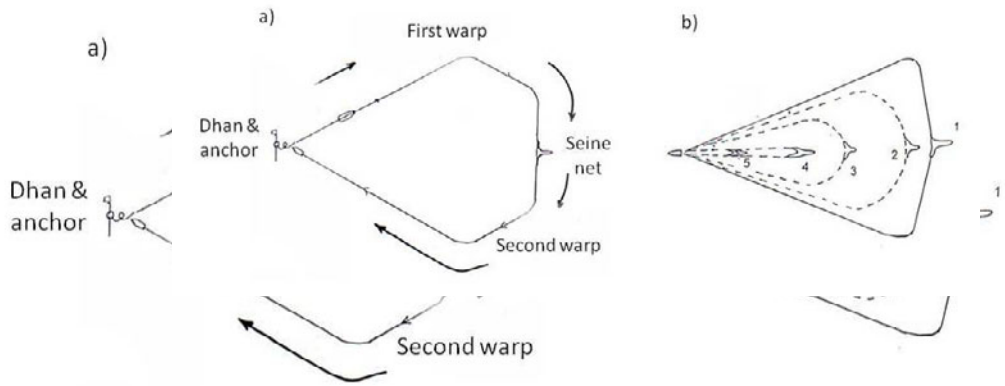
2.3.3 Danish Seine

The Danish Seine, or anchor seine, is a ground fishing method for demersal fish where there the warps and net (conical net with two long wings) are laid out from an anchored dhan buoy by the vessel. In order to surround the proposed fishing spot, the vessel steams a roughly triangular shaped course, firstly away from the dhan to one side of the spot paying out the first warp as it steams. The vessel then pays out net whilst passing astern of the fishing spot and finally returning to the dhan whilst paying out a second length of warp. The vessel then returns to the dhan buoy and secures to the anchor cable, in order to keep the vessel stationary whilst hauling.

Hauling of the net is slow at first, with the two net warps herding fish towards the path of the net as they close. As hauling proceeds, winch speed increases and the net begins to move in the direction of tow, with the lateral wings of the net increasingly acting to herd the fish. When the ropes are nearly closed haul speed increases again enabling the net to capture the remaining fish in its path. Finally the net is bought alongside the ship (or ships stern depending on vessel configuration) to allow the cod end to be craned / winched aboard and emptied.

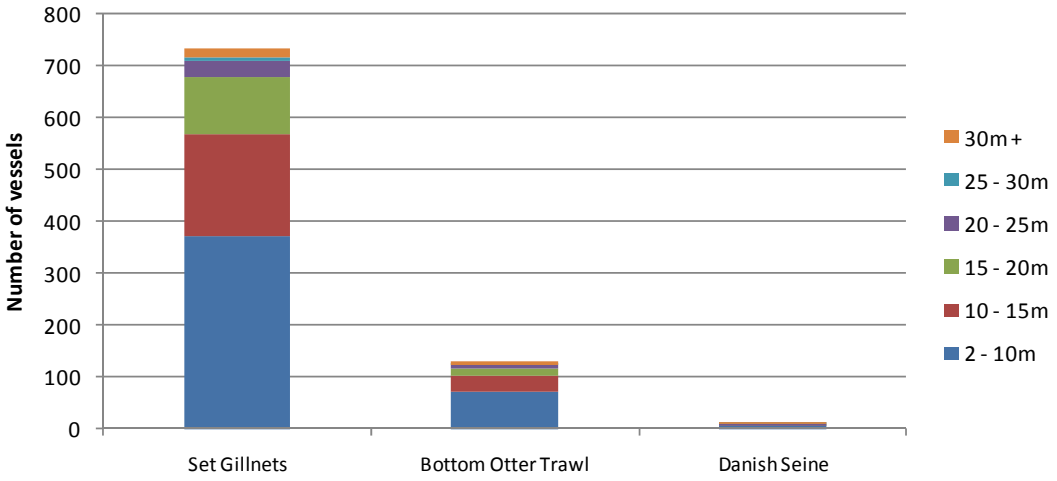
Although Danish seine gear is generally lighter than trawl gear, with neither heavy trawl doors or clump weight, the gear is robust and strong to withstand abrasion over the seabed. The seine nets are generally made up from the same twisted polyethylene twines used by the demersal trawl fleet, with a weighted ground rope which may be supplemented by light rubber discs or bobbins for rougher ground.

Fig 2.5: Typical Danish Seining setting (a) and hauling (b) process



Data source: FAO Gear type Factsheet

Figure 2.6: Estimated number of DFPO members per gear type and vessel size



Source: cross reference between Fisheries Directorate vessel registration and DFPO member list

2.4 Target species

The target species for the fishery under certification is North Sea and Skagerrak saithe (*Pollachius virens*) (Danish: mørksej). As indicated initially, 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:

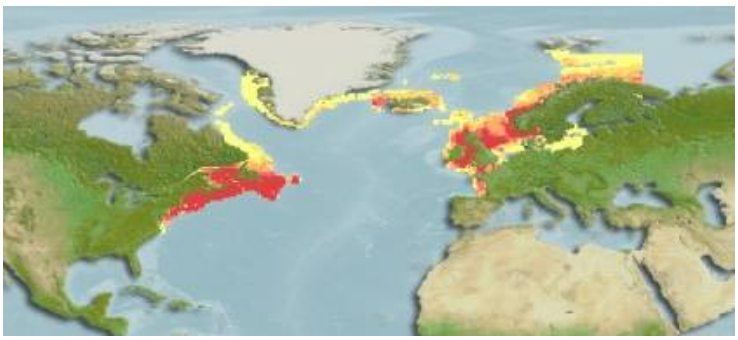
» Fishbase: http://www.fishbase.org

» ICES Fishmap: http://www.ices.dk/marineworld/ices-fishmap.asp

2.4.1 Geographic Range

Saithe is distributed in the eastern Atlantic from the Bay of Biscay top Iceland, Spitzbergen and the Barent Sea, and in the western Atlantic from North Carolina to southwest Greenland (Fig 2.7). The distribution if saithe in the area in the are of assessment concentrates in the northern part of the North Sea and in the Skagerrak and Kattegat, along the shelf edge. Juvenile saithe (< 30 cm) are most abundant in inshore waters, while the concentrate in sea lochs. As a result of the juvenile saithe distribution, recrutiment indices are difficult to be estimated, being this one of the major source of uncertianty in the assessment of the saithe stock. Adult saithe (≥30 cm) are widely distributed, with a clear zone of high abundance along the edge of the Norwegian Deep (Fig 2.11).

Figure 2.7: chart of Global Distribution of Saithe (*Pollachius virens*).



Source: Fishbase

2.4.2 Lifecycle

Spawning takes place from January (in the southern part of the distribution area) to May (further north) and generally occur along the edge of the continental shelf. On average a female saithe produces 750 eggs per gram body weight. Saithe eggs are buoyant, rising into the water column after fertilization. The pelagic larval stage lasts for three to four months. Juvenile saithe migrates inshore waters along the west and south coast of Norway, the coast of Shetland and the coast of Scotland. They remain close to the shore during the first three year of life, after which they move offshore where they remain throughout the adult stage. Tagging experiments have shown migration between the Norwegian coast, Faroes and Iceland.

Males and females have similar growth rates, although females reach slightly larger sizes. Maturity is reached at age 6 and maximum age is approximately 20 years (130 cm), although the major proportion of the catch consists of 3-7 years old fish.

2.4.3 Diet

The primary prey of juvenile saithe are crustaceans. Euphausiids, in particular *Meganyctiphanes norvegica*, are the most important crustacean prey of juveniles. Larval and juvenile fish, including herring, cod, and sandeel also form part of small saithe diet (Luca *et al*., 1999). Adult feed almost entirely on pelagic and demersal fish, including herring, Norway pout, haddock and sandeel. Euphausids and other invertebrates are also consumed.

2.5 Catches and landings

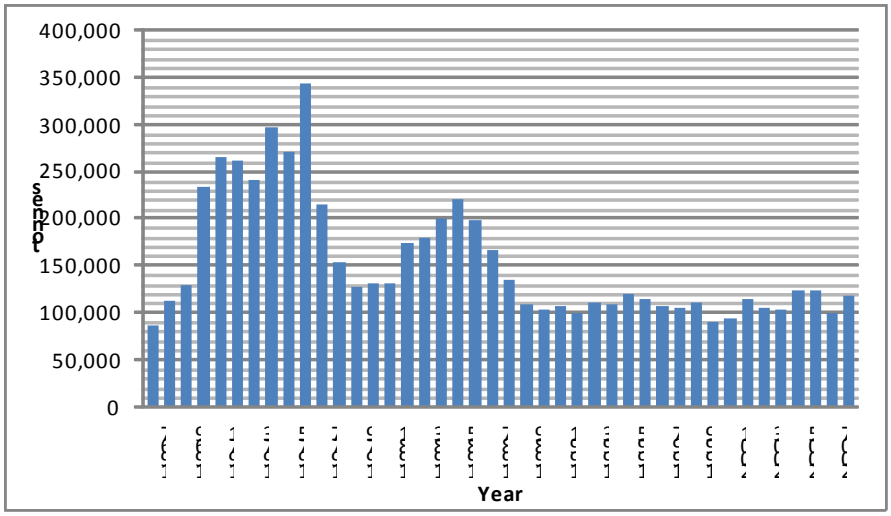
2.5.1 Landing patterns and trends

Total landings of North Sea saithe, by fleets of all nationalities and all ICES subdivisions was 119305 tonnes in 2008. The historic trend in landings is presented in Figure 2.8. Landings increased from 1967 to the highest observed landings levels in the mid-1970s. After 1976 the landings decreased, remained stable between 1979 and 1981 and increased again from 1981 to 1985. From 1985 landings decreased and levelled off in 1989 to a stable level that has fluctuated around 100,000 tonnes since.

During the last 7 years (2002-2008), TAC levels have been higher than reported landings (Fig 2.9). Information from fishers indicates that this is due to a combination of very low prices for saithe and high fuel prices. However, there are also claims that lower landings also indicate lower abundance of saithe.

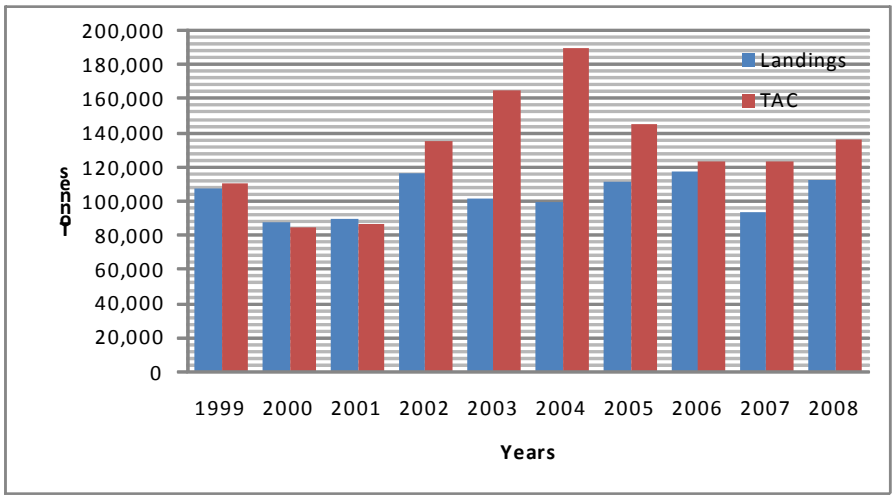
Norway lands the majority of saithe accounting for over 50% of the landings. France, Germany, UK and Denmark landings mostly complete the other 50% of the landings (Fig 2.10). Denmark accounted for 6% of the overall landings, measured as the average landings from 1999-2008.

Fig 2.8. Historic trend in landings of saithe in ICES sub-Areas IV, VI and Division IIIa



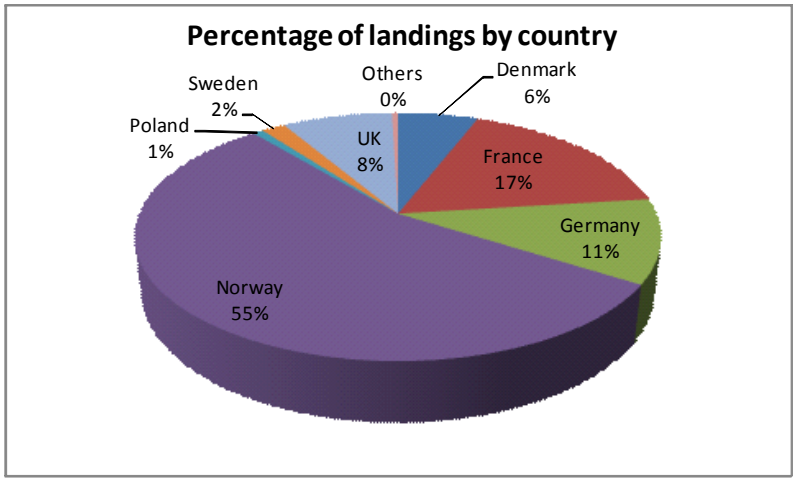
Data source: ICES, 2009

Figure 2.9. Landings compared to TAC year in Su-Areas IV and IIIa and years 1999-2008. IIIa



Data source: ICES, 2009

Figure 2.10. Percentage of landings by country calculated as the average landings of years 1999-2008



Data source: ICES Advice 2009

2.5.2 Catching Areas and Landing ports

The main fishing area for saithe for the Danish fleet is the North Sea and Skagerrak (ICES Sub-Areas IV and IIIa), which accounts for some 50% and 45% of all Danish saithe landings, respectively (fig. 2.11-2.14). The remaining small percentage comes from the Kattegat (also ICES Sub-Area IIIa) and the Norwegian Sea (IIa). 98.5% of saithe is landed by demersal trawls, 96.8% of which are 15 or over m in length and most of the remaining are between 10-15 m (Table 2.1)

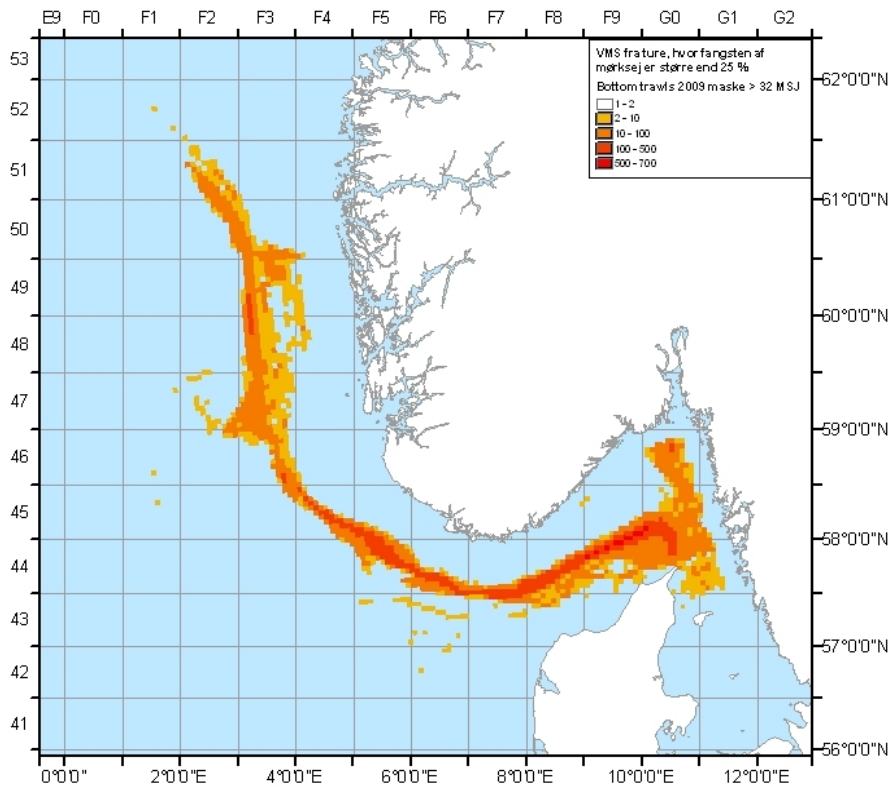
The majority of saithe landings by the Danish fleet are into fishing ports are shown in Fig 2.15. The most important port for saithe landings by the Danish fleet is Hanstholm, followed by Hirtshals, Skagen, Thyboron and Strandby.

Table 2.1. Percentage of landings per gear type and vessel category

Gear type	Vessel length category			Total
	<10	10-15	>=15	
Demersal-otter trawl	0.01%	1.65%	96.82%	98.48%
Set nets	0.10%	0.24%	0.29%	0.63%
Danish seine	0.00%	0.00%	0.39%	0.40%
Fly shooting	0.00%	0.00%	0.20%	0.20%
Other gear types	0.03%	0.00%	0.26%	0.29%

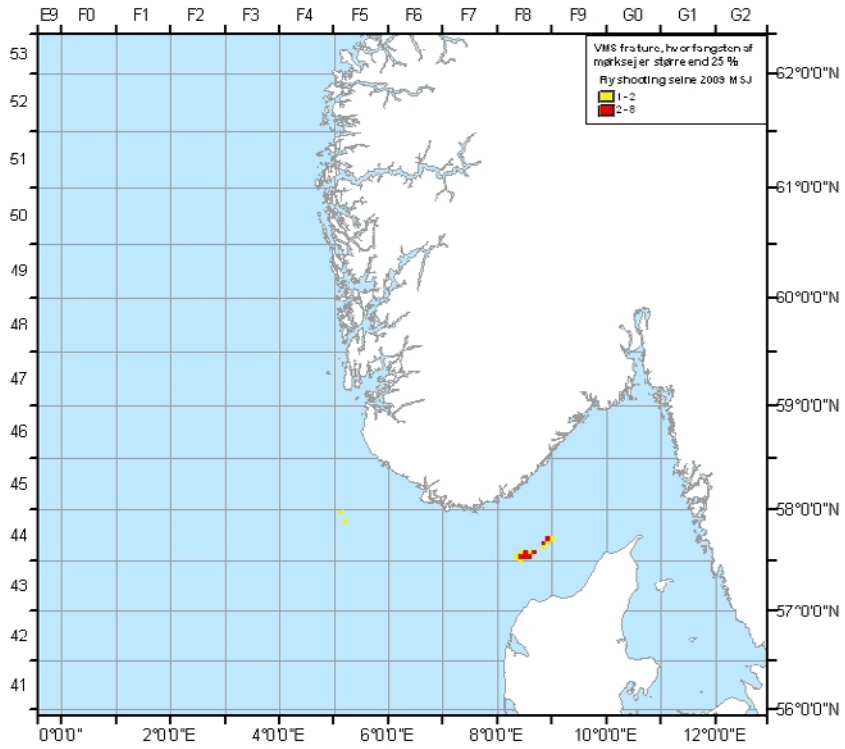
Data source: Fisheries Directorate

Figure 2.11: Annual aggregated vessel monitoring system (VMS) plots for Danish saithe landings from the otter- demersal trawl fishery



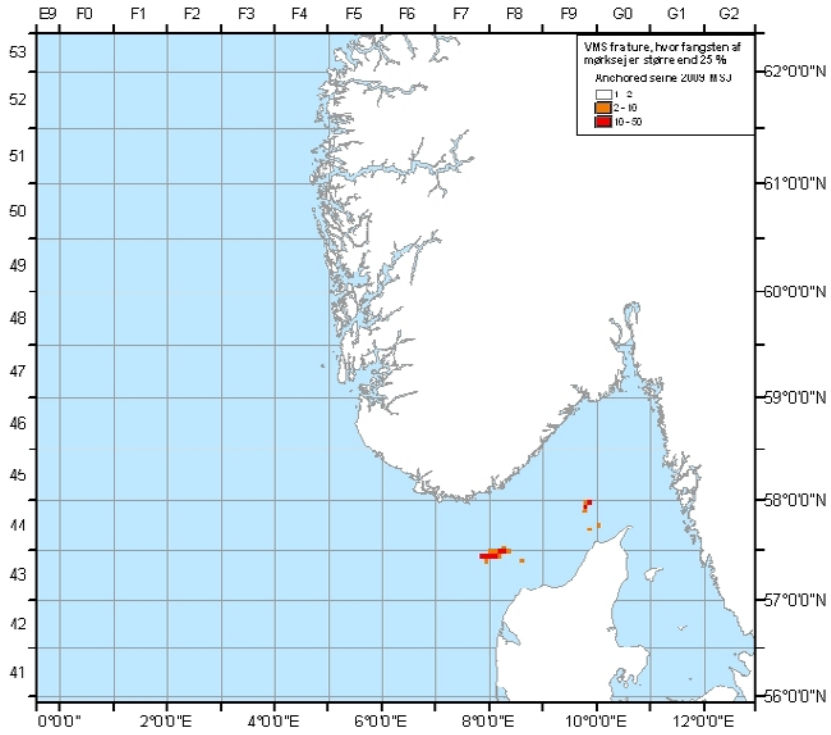
DTU Aqua, 2009

Figure 2.12: Annual aggregated vessel monitoring system (VMS) plots for Danish saithe landings from the fly shooting (Scottish seine) fishery



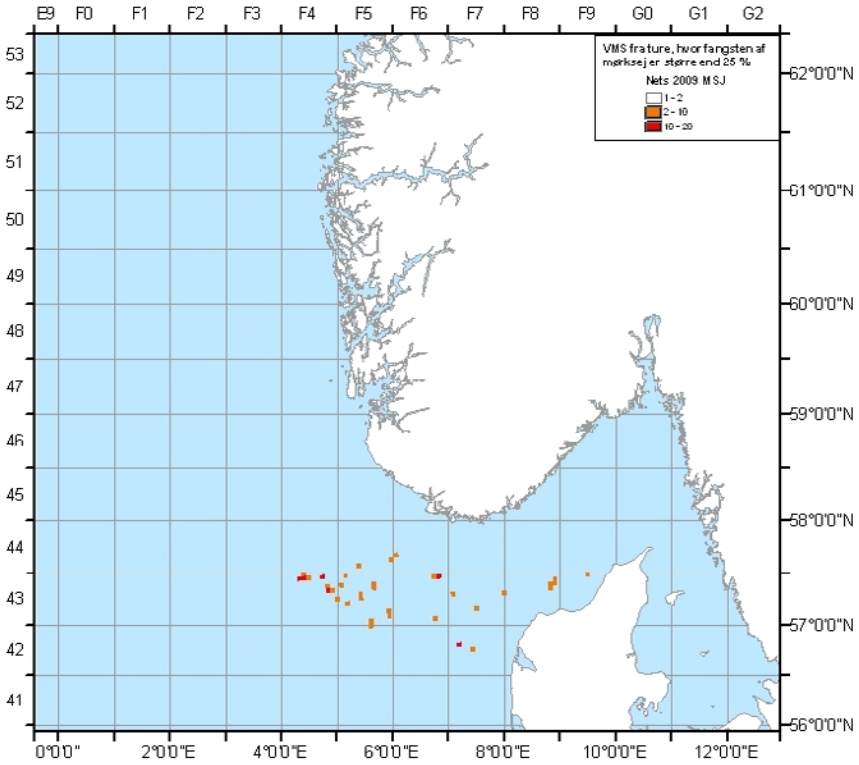
DTU Aqua, 2009

Figure 2.13: Annual aggregated vessel monitoring system (VMS) plots for Danish saithe landings from the Danish seine fishery



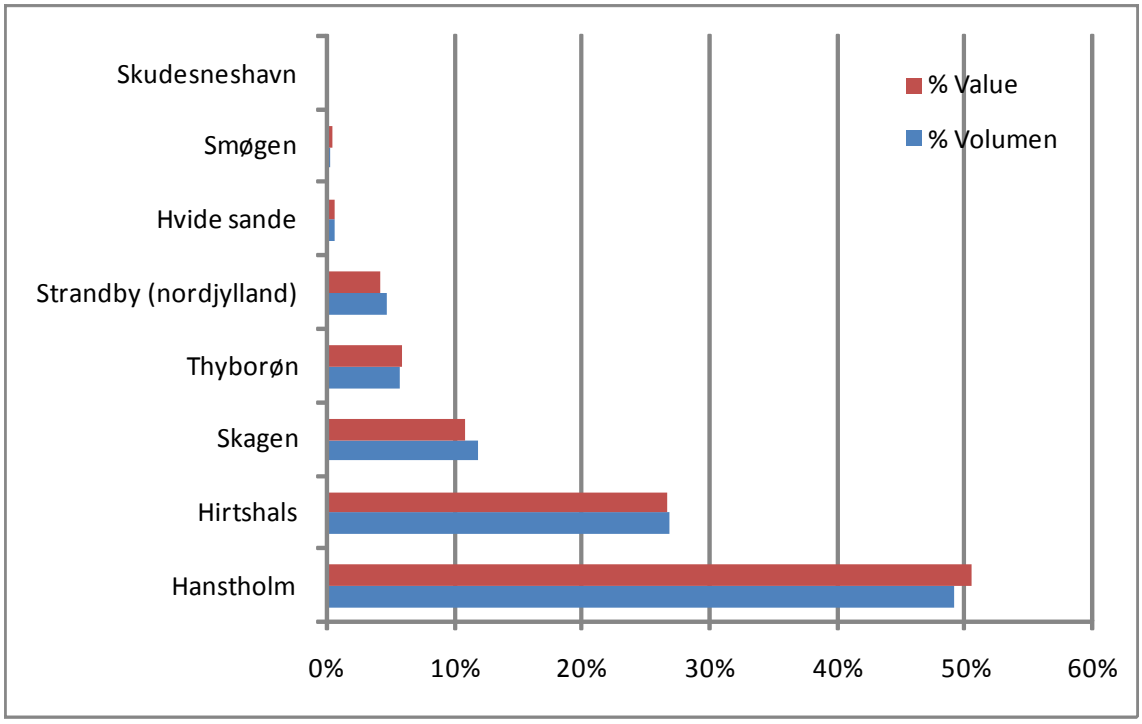
DTU Aqua, 2009

Figure 2.14: Annual aggregated vessel monitoring system (VMS) plots for Danish saithe landings from the set net fishery



DTU Aqua, 2009

Figure 2.15: 2008 Landings of saithe by the Danish Registered Fleet by harbour



Data source: Fisheries Directorate

2.5.3 Internal division of catch allocations

Saithe quota is divided within Denmark using a system of Individual Transferable Quotas (ITQs). The objective of this programme was to facilitate modernisation in the pelagic fleet and improve the profitability of the demersal fishing fleet through a substantial capacity reduction, thereby reducing the pressure on demersal fish stocks (in particular from discard and high grading).

Moves began in 2003, firstly in the pelagic sector with a system of fixed quota allocations being attached to vessels, based on track record. Over time the system has evolved to be applicable to a wider number of species, including demersal species (such as saithe). Since 2009 this system has become a full system of Individual Transferable Quota (ITQ), where the quota allocation is no longer fixed to a given vessel.

Vessels can pool their quota allocations. Typically these "quota pools" are formed on a regional basis. Vessels can easily arrange quota leases or swaps within the pool to ensure efficient use of the pool's fleet capacity, and at the same time discards related to vessel quota limitations are minimised. In 2009 there were 11 such quota pools comprising a total of 709 vessels. Quota loans between fishing vessels outside quota pools are also permitted with some limitations. The most important pools for saithe are Hanstholm Puljeselskab (65%, vessel from Hanstholm), Dansk Puljefiskeri (19%-vessels from Hvide Sande, Thorsminde, Thyboron, Hirtshals and Bornholm) and Strandbypuljen (14%-vessels from Strandby)

3. Target stock status & harvest controls (P1)

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 North East Atlantic stock - Saithe in Subarea IV (North Sea), Division IIIa (Skagerrak), and Subarea VI (West of Scotland and Rockall) 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.

In the following section the key factors which are relevant to Principle 1 are outlined. The primary sources of information on this section are:

» ICES. 2008. 6.3.3.3. EC request on management plan for North Sea saithe. *In*: Report of the ICES Advisory Committee 2008. ICES Advice, 2008. Book 6, 326 pp.

» ICES 2008. 6.4.12 Saithe in Subarea IV (North Sea), Division IIIa (Skagerrak), and Subarea VI (West of Scotland and Rockall). *In*: Report of the ICES Advisory Committee 2008. ICES Advice, 2008. Book 6, 326 pp.

» ICES. 2009. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak - Combined Spring and Autumn (WGNSSK), 6 - 12 May 2009, ICES Headquarters, Copenhagen.. 1028 pp.

» ICES. 2009. 6.4.12 Saithe in Subarea IV (North Sea), Division IIIa (Skagerrak), and Subarea VI (West of Scotland and Rockall). Book 6. ICES Advice 2009.

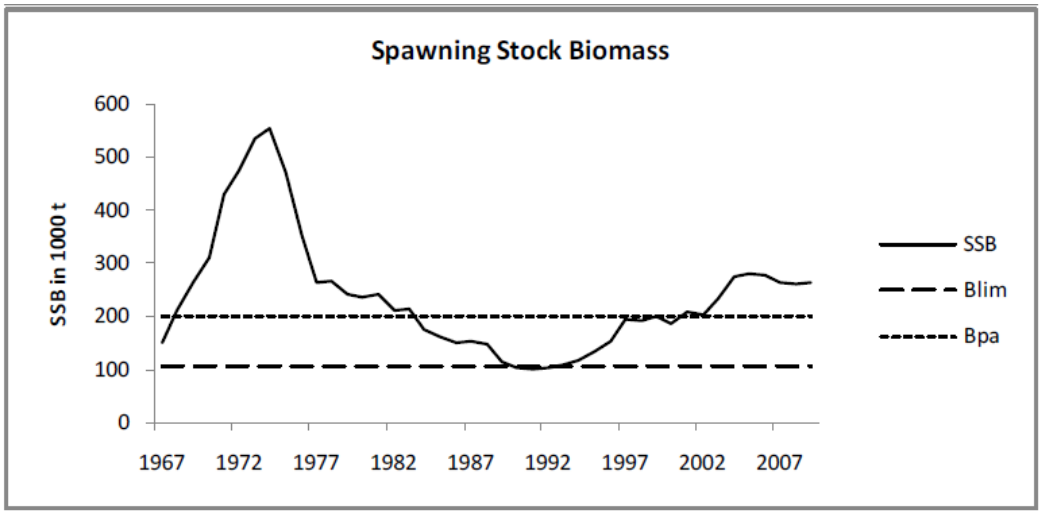
3.1 Status of the Stock

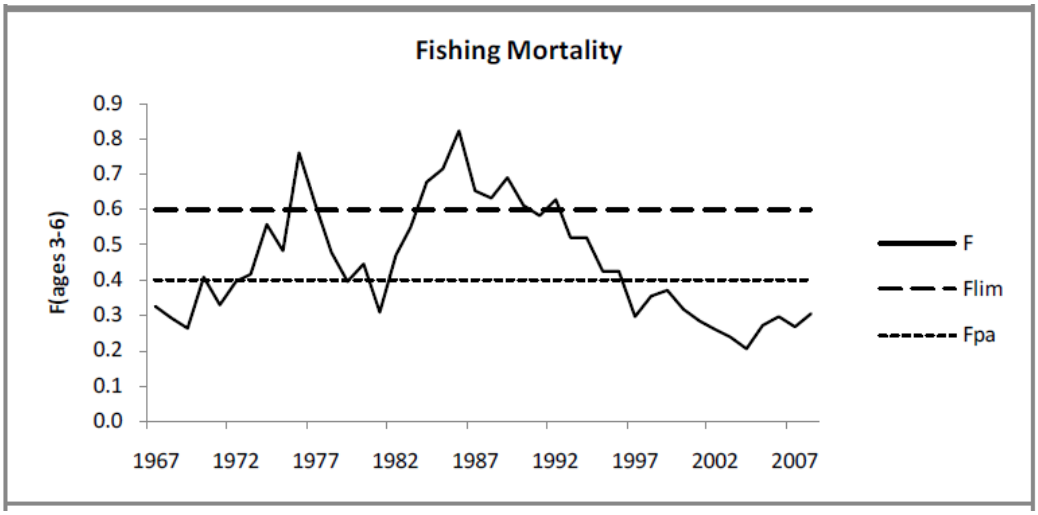
There is a high degree of certainty that the stock is above the point where recruitment would be impaired. After failing to a low level in 1992, SSB has increased progressively (Figure 3.1). Since year 2001, the Spawning Stock Biomass (SSB) has been above the precautionary biomass reference point (B_{pa}). In 2009, SSB was estimated at 263,377 tonnes, above B_{pa}, estimated at 200,000 tonnes. ICES management advice classifies the stock as at “Full reproductive capacity”.

Since year 2001, fishing mortality has been at or below the fishing mortality rate (F_{target}) of 0.3 y-1 (Figure 3.1). In 2009, fishing mortality (calculated as the average of the mortality in 2006-2008) was estimated at 0.29. For this reason, ICES management advice classifies the stock as being “Harvested sustainably” (when measuring fishing mortality in relation to precautionary limits) and “Appropriate” (when measuring fishing mortality in relation to agreed target).

The projection for 2010 suggests that SSB will decrease to 235,000 tonnes and SSB is predicted to be reduced to around B_{pa} levels over the next few years. The major sources of uncertainty in the estimates are: (1) the lack of information on year-class strength for ages 1-3 and (2) the necessity of using commercial CPUE as abundance index as the survey series only contain usable information for ages 3-6. However, only very large relative errors will make a large impact on the forecast and therefore the assessment estimates can be considered as reliable.

Fig 3.1. Historical trend of Spawning Stock Biomass (top) and fishing mortality (bottom).





Source: ICES advice 2009. Book 6

3.2 Reference Points

Reference points for the North Sea saithe stock were estimated in 1998 and their appropriateness for the assessment and management for the stock has been evaluated yearly since then, even if not changed. Biomass and fishing mortality based reference are shown in Table 3.1.

Biological Limit Reference Points

The limit biomass reference point (B_{lim} = B_{loss}) is defined as the smallest spawning biomass observed in the series of annual values of the spawning biomass B_{lim} can be defined as a non-parametric limit reference point as its determination does not depend on any particular stock recruitment model. B_{lim} was set at 106,000 tonnes (in year 1998), biomass above which reduced recruitment was not observed (Figure 3.2).

The limit fishing mortality reference point is estimated as F_{loss}, and is defined as the fishing mortality that leads the stock biomass to fall below B_{lim} in the long term. F_{loss} is estimated at 0.6 year^{-1}.

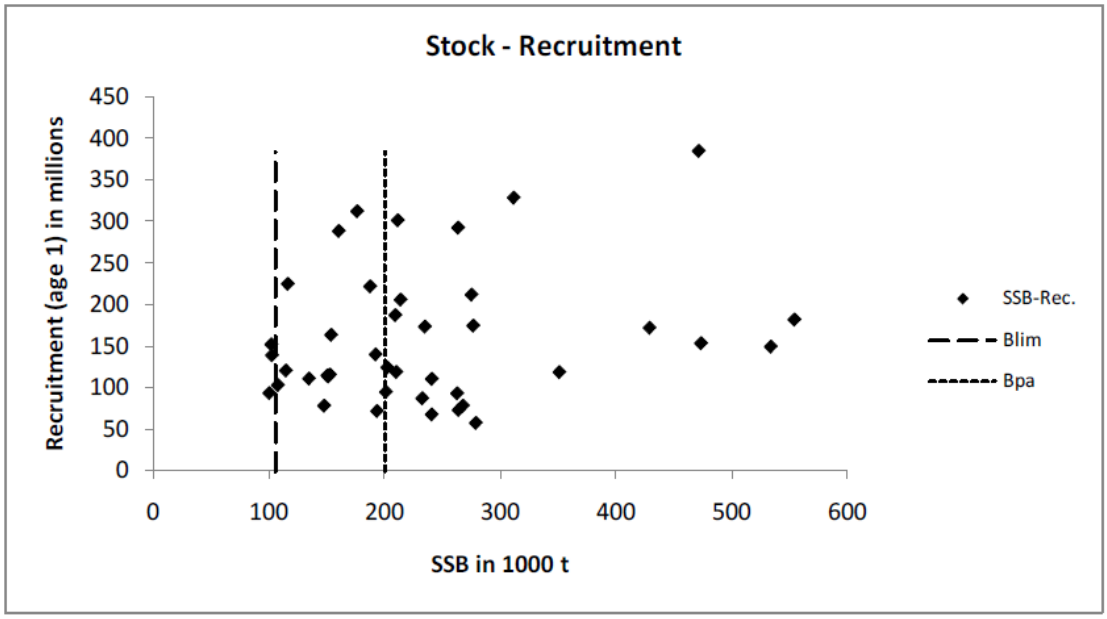
Precautionary reference Points

Based on the application of the precautionary approach, ICES advice is that for stock and fisheries there should be a high probability that SSB is above a limit B_{lim} below which recruitment become impaired. Hence, the definition of precautionary reference points B_{pa} (higher than B_{lim}) and F_{pa} (lower than F_{lim}) takes into account uncertainty related to the estimation of fishing mortality rates and spawning stock biomass in order to ensure a high probability of avoiding recruitment failure. For the North Sea saithe stock, B_{pa} is set at 200,000 tonnes and is defined as the biomass that affords a high probability of maintaining SSB above B_{lim}, and F_{pa} is set at 0.4 year-1 and is defined as the fishing mortality that in the long term should lead to only 10% probability that the SSB falls below B_{pa}.

Target Reference Points

A target fishing mortality based reference point (F_{target}) set at 0.3 years^{-1} was established in 2005, following the EU-Norway management agreement. Based on simulations tests (see section 3.5), ICES consider that F_{target} is consistent with high long term yields and a low risk of depleting the productivity potential of the stock.

Fig 3.2. Stock recruitment relationship



Source: ICES 2009 Advice. Book 6

Table 3.1: Reference points used for the stock assessment. The fishing mortality reference points are consistent with per-recruit reference points. The basis for B_{loss} is the history of estimated biomass. Floss is estimated as the fishing mortality above which the stock would be expected to decline to an equilibrium spawning stock below the lowest observed value (i.e. B_{loss}).

	Type	Value	Technical Basis
Precautionary Approach	B_{lim}	106,000 t	B_{lim}=B_{loss}, the biomass above which reduced recruitment has not been observed.
	B_{pa}	200,000 t	Affords a high probability of maintaining SSB above B_{lim} Trigger reference point used in the current management agreed between EU-Norway in 2008.
	F_{lim}	0.6	F_{lim} =F_{loss}, the fishing mortality estimated to lead to stock falling below B_{lim} in the long term.
	F_{pa}	0.4	Fishing mortality that in the long term should lead to only 10% probability that the SSB falls below B_{pa}
Target	F_{mgt}	0.3	EU-Norway management plan

Source: ICES, 2009a

3.3 Rebuilding Status

A rebuilding strategy is not required.

3.4 Harvest Strategy

There is an appropriate mechanism to contain harvest and maintain stock size at a precautionary level defined by the limit and target reference points. This is primarily the total allowance catch (TAC) which is adjusted each year in response to scientific advice. The TAC is divided into quotas among Member States. The mechanisms to allocate fishing quotas among Member States can be summarised as follows:

1. ICES provide scientific advice on the status of the stock. The ICES Advisory Committee (ACOM) proposes a TAC selected from a range of TAC options, including those that are consistent with the precautionary approach and the EU-Norway management plan (see section 3.5). This is done on an annual basis.
2. The final TAC is decided by the European Council of Ministers following annual negotiation between the Commission and Norway. They are not obliged to follow ICES's advice; however, since 2001 the TAC for saithe has been set at or slightly below the level proposed by ICES.
3. This TAC is then divided between the EU and Norway by negotiations
4. The EU TAC is then divided between Members States. In 2010, Denmark received a TAC of 4,357 tonnes

Technical conservation measures designed for the fishery targeting North Sea saithe (ICES subdivisions IV and IIIa) include:

1. Kilo-Watts-days at sea for vessels with more by-catch than 5% of each cod, plaice and sole.
2. Minimum landing Size of 35 cm

3. Minimum mesh size: it is possible to use a mesh size range of 110-119 mm, provided catches consist of at least 70% of saithe and less than 3% of cod. This exception however does not apply to Norwegian waters, where the minimum mesh size for all human consumption fishing is 120 mm.

The Harvest Strategy has not been fully tested. The Harvest Strategy includes a Management Procedure (MP) through which the resource is managed using a fully specified set of rules incorporating feedback control. However simulation tests do not account for a range of uncertainties regarding population status (i.e. unrecorded fishing mortality due to discarding and misreporting, SSB assessment estimates) and biological parameters (i.e. weight at age, maturity and natural mortality). Therefore the harvest strategy has not been fully tested as measurements and implementations errors and major changes in the productivity of the stock were not included in the analysis.

However the stock assessment gives annual feedback to management on how well they are achieving their objectives reflected in the limit and target reference points. Information provided by the stock assessment include: 1. Levels of fishing mortality compared to the Target Fishing Mortality, 2. Levels of SSB compared to the biomass reference points (B_{pa} and B_{lim})(see Section 3.7). Monitoring is in place as a tool for the collection of information needed for the assessment of the stock (see Section 3.6).

3.5 Harvest Control Rule and Tools

A well defined control rule is in place that is consistent with the harvest strategy and ensures that the recommended exploitation rate is reduced consistent with the reference points. The decision rules are set in the EU-Norway agreement for 2008, indicating target and precautionary values for biomass and fishing mortality as shown in Fig 3.3.

ICES evaluation of these decision rules determined that they are consistent with the precautionary approach in the short term conditional on the absence of major changes in the productivity and the absence of measurement and implementation error. In 2007, the evaluation of F_{target} = 0.3 was carried out as part of the evaluation of the Harvest Control Rules (HCR) established under the EC-Norway management plan. Stochastic simulations were used, in which recruitment was modelled as a stochastic variable dependent on spawning-stock biomass. Other population parameters (weight-at-age, maturity, and natural mortality) were assumed known precisely and time invariant.

Stochastic simulation results indicate that F_{target} around 0.3 is consistent with high long term yields and a low risk of depleting the productivity potential of the stock. However, a target F below 0.3, or an increase in the precautionary biomass reference point (B_{pa}) threshold, are likely to give similar long term yields with lower risk in the medium term of SSB failing below biological safe limits. Uncertainty related to temporal variability in population biological parameters (weight-at-age, maturity, and natural mortality) and assessment bias (i.e. unknown discard mortality) determine that ICES evaluate the use of current reference points consistent with the precautionary approach in the short term. Therefore, ICES consider that an evaluation of HCR should be carried out in a regular basis every 3-5 years.

Since the introduction of the management plan, the TAC has been set at levels consistent with the level proposed by ICES and landings (official and ICES landings, which include unallocated landings, see section 3.6) have not exceeded the set TAC (Fig 3.4). Hence, available evidence indicates that the TAC as a management tool is appropriate and effective in achieving the exploitation levels under the HCR. However, the reported landings have been lower than the set TACs during the past seven years. Information from fishes indicates that this is due to very low prices for saithe combined with

high fuel prices. However, there are also claims that the abundance of saithe has been reduced in most recent years

Fig. 3.3. Arrangement on the EU-Norway management plan of the North Sea and West of Scotland and the Skagerrak saithe management plan

In 2008 EU and Norway renewed the existing agreement on "a long term plan for the saithe stock in the Skagerrak, the North Sea and west of Scotland, which is consistent with a precautionary approach and designed to provide for sustainable fisheries and high yields. The plan should consist of the following elements,

1. *Every effort shall be made to maintain a minimum level of Spawning biomass (SSB) greater than 106 000 tonnes (Blim).*
2. *Where the SSB is estimated to be above 200 000 tonnes the Parties agreed to restrict their fishing on the basis of a TAC consistent with a fishing mortality rate of no more than 0.30 for appropriate age groups.*
3. *Where the SSB is estimated to be below 200 000 tonnes but above 106 000 tonnes The TAC shall not exceed a level which, on the basis of a scientific evaluation by ICES, will result in a fishing mortality rate equal to 0.30-0.20*(200 000-SSB)/94 000.*
4. *Where the SSB is estimated by the ICES to be below the minimum level of SSB of 106 000 tonnes the TAC shall be set at a level corresponding to a fishing mortality rate of no more than 0.1.*
5. *Where the rules in paragraphs 2 and 3 would lead to a TAC which deviates by more than 15% from the TAC the preceding year the Parties shall fix a TAC that is no more than 15% greater or 15% less than the TAC of the preceding year.*
6. *Notwithstanding paragraph 5 the Parties may where considered appropriate reduce the TAC by more than 15% compared to the TAC of the preceding year.*
7. *A review of this arrangement shall take place no later than 31 December 2012.*

Source: ICES Advice 2008

Fig 3.4. ICES Advice on TAC (Predicted landings corresponding to single-stock exploitation boundaries), Agreed TAC, official and ICES landings (including unallocated landings).

Year	ICES Advice 2004 onwards: Single-Stock Exploitation Boundaries	Predicted landings corresp. to advice	Predicted landings corresp. to single-stock exploitation boundaries	Agreed TAC	Official landings	ICES landings
2000	Reduce F by 30%	75		85	85	87
2001	Reduce F by 20%	87		87	88	90
2002	$F < F_{pa}$	<135		135	113	117
2003	$F < F_{pa}$	<176		165	105	102
2004	$F < F_{pa}$		<211	190	87	100
2005	F according to man. plan	*	<137	145	111	112
2006	F according to man. plan ($<F_{pa}$)	*	<123	123	111	117
2007	F according to man. plan ($<F_{pa}$)	*	<124	123	87	94
2008	F according to man. plan ($<F_{pa}$)	*	<137	136	115	112
2009	F according to man. plan ($<F_{pa}$)	*	<126	126		
2010	F according to man. plan ($<F_{pa}$)	*	<107			

Weights in '000 t.

* Single-stock boundary and the exploitation of this stock should be conducted in the context of mixed fisheries.

source: ICES Advice 2009

3.6 Information and Monitoring

This performance indicator is assessed in relation to the adequacy of the information for the stock assessment. While this assessment will need the component of the fishery being certified to meet the recommended scientific monitoring, there are no special requirements.

The geographical range of North Sea saithe stock is well known. Present biological knowledge shows that saithe in Division Iva, IIIa and VIa belong to the same stock units. There seems to be a similar recruitment pattern and the spawning areas in these divisions are not separated (ICES, 1995).

The life history is clearly documented and well understood from eggs to spawning (see section 2). Multispecies Virtual Population Analysis (VPA) estimates are available on natural mortality (ICES, 1990). A natural mortality rate of 0.2 year-1 is used for all ages and years based on stock assessment estimations (ICES, 2006).

Extensive research has been carried out in the North Sea with the aim of understanding the interactions between different components of the ecosystem, including fish population dynamics and its relation with the marine ecology and physical oceanography. A wide range of information on the North Sea Ecosystem has been collected from different ICES working group and used for undertaking an Integrated Ecosystem Assessment of the North Sea (IEA).

The stock assessment relies on three main types of data:

» Total Catch: European logbooks provide the source of catch data.

» Catch composition data: These are obtained from biological sampling of landings data and provide information on stock structure. The stock assessment requires catches broken down by age.

» Abundance index: Abundance indices are available and monitored through the use of dependent (commercial fleet) and independent (surveys) data. Abundance indices are used as tuning indices for calibration purposes in the assessment of the stock.

Total Catch

Landings of the fleet being certified are accurately recorded trough the use of the European Logbooks. The use of logbooks is required for vessels of length greater than 10m in EU and Norwegian waters. Catch and effort information obtained from the EU logbooks include; kilograms of saithe caught per day, number of hours fish per day and ICES subdivision where fishing operations occur.

However, landing from the industrial fleet are only specified when saithe is delivered separately, and therefore bycatch of saithe that has not been separated from the bulk catch, is not reported.

The total landings in 2008 in areas IIIa and IV are considerably lower than the TAC, as was also the case in the 6 previous years. Information from fishermen indicates that low prices for saithe combined with high fuel prices maybe be causing this, but there are also claims that the abundance of saithe has been reduced in the most recent years. Saithe is also taken as unintentional by-catch in other fisheries, and discards may occur if the vessel do not have saithe quota.

Catch Sampling

Sampling the catch is carried out to gather biological information for the assessment of the stock. The age composition, weight-at-age in the catch and population and the maturity-at-age are obtained through biological sampling. Biological sampling information is provided by countries holding the majority of the TAC (Denmark, Germany, France, Norway, UK (England), and UK (Scotland) for Area IV and only UK (Scotland) for area VI)

Declined in the mean weight at age was observed since the 90's, but now seems to be halted. There is insufficient information to establish whether this decline in linked to environmental changes. The reduced growth rates have an effect on stock productivity and therefore ICES recommend that the consequences need to be further explored. Due to the stock structure (saithe remains in inshore waters until the age of 3), there is poor reliability of the recruitment estimate (age 3), being this a major problem for saithe assessment.

Abundance Indices

Abundance indices are available and monitored through the use of dependent (commercial fleet) and independent (surveys) data. Two surveys can be distinguished:

1. The Norwegian acoustic survey. It provides abundance indices for ages 3-6 and has been running since 1995 in an annual basis.
2. The International Bottom Trawl Survey (IBTS). It provides information on abundance for ages 3 to 5 and data is available since 1991. This survey is also carried out in an annual basis. Norway carried out in years 2006-2008 another acoustic survey along the western coast of Norway to estimate abundance indices for saithe between 2 and 4 years old (when the saithe is distributed along the coast of Norway). However, the Norwegian acoustic survey was not conducted after year 2008.

The use of commercial fleet data for the estimation of abundance indices results from the lack of information on saithe of ages older than 6 years. Three commercial series of effort and catch at age are available and monitored frequently:

1. French fresh fish trawl, which provides information on relative abundance for age range 3-9. Data is available since year 1990.
2. German bottom trawl, which provides information on relative abundance for age range 3-9. Data is available since year 1995
3. Norwegian bottom trawl, which provides information on relative abundance for age range 3-9. Data is available since year 1980.

Commercial CPUE is used for tuning purposes in the assessment of the stock. This is necessary as the survey series that are used only contain usable information for ages 3-6. The use of CPUE as an abundance index can be biased due to hyperstability that occur when commercial catches remain high while population abundance drops. This may occur when vessels are able to locate high fish concentrations independently of population size.

To improve the reliability of the information about the year class strength before age 4, IMR in Norway has since 2006 carried out an acoustic recruitment survey for saithe (ages 2-4) along the Norwegian west coast. The usefulness of this survey has not yet been evaluated and at least another couple of years are needed before it can be fully evaluated. The acoustic recruitment survey was not conducted in 2009 and therefore significant new information on year class 3 has not been available since 2009.

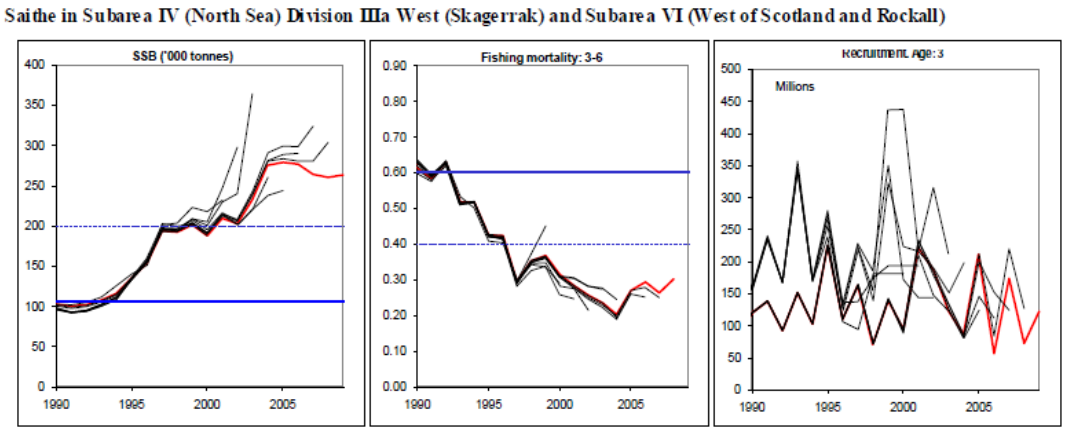
Abundance indices were incomplete in year 2010 for the update assessment of the stock (ICES, 2010). The French demersal trawl CPUE data was not provided for its use in the assessment of the stock. The IBTS Q3 was provided, but Norway did not participate in the cruise in 2009, normally this party covers large part of the distribution area of the larger saithe. It was not possible to adapt the remaining cruise plans to fully cover up for the missing Norwegian stations. As a result of this the assessment of the stock could no be update in year 2010.

3.7 Stock Assessment

The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points. The stock assessment method is Extended Survivors Analysis (XSA), which is a standard virtual population analysis method used by ICES. It uses catch-at-age data and abundance indices to estimate the fishing mortality and population size of each age in each year. The name arises because of the focus on obtaining the best estimates of survivors from fishing and natural mortality, which are used to derive SSB, the indicator most of interest. Data on the biology of the species to fit the model is available and include growth, age, natural mortality and maturity. However, it is assumed that natural mortality does not vary with age and temporal variability in maturity is not accounted for.

The XSA method does not include an integrated approach for probabilistic outputs, such as standard errors, confidence intervals or probability profiles for statistics of interest. Instead, main areas of uncertainty are assessed through simulations and projections testing the harvest control rule. Sources of uncertainty are related to recruitment estimates and the use of CPUE for the estimation of abundance indices. The working group examined the reliability of the estimates and concluded that the assessment is reliable and consistent. Retrospective features for F and SSB seems fairly good for the most recent years, except for recruitment (Fig. 3.5).

Fig 3.5. Historical performance of the saithe assessment.



Source: ICES 2009 Advice

4. Environmental Elements (P2)

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.

4.1 Retained species

Retained species are those that have been caught and landed together with saithe, the target species under assessment.

The Danish demersal trawl fleet lands saithe as part of a mixed fishery targeting roundfish and flatfish on the western edge of the Norwegian Trench in the North Sea almost exclusively in the Norwegian zone and target roundfish, flatfish and *Nephrops* on the southern edge of the Norwegian Trench in the Skagerrak in the EU and Norwegian zones. Saithe is therefore essentially taken by two demersal trawl fisheries; one in the North Sea and one in the Skagerrak and so data on retained species has been presented separately for these regions.

The Danish set net fishery primarily targets cod in the North Sea and cod and plaice in the Skagerrak; saithe along with many other roundfish and flatfish are also taken in this fishery.

The Danish vessels deploying Danish seine and landing saithe are predominately recorded to operate in the Skagerrak. This is a targeted plaice fishery, which makes up two thirds of the landings by volume, and landed roundfish namely cod, haddock and saithe as well as other flatfish species.

The volumes of retained species landed in conjunction with North Sea and Skagerrak saithe are shown in Tables 4.1, 4.2, 4.3 and 4.4 for the otter trawl, fly shooting, Danish seine and set net fisheries respectively.

This data has been analysed based on raw data for all landings by Danish vessels in 2008 aggregated by month, ICES Division, ICES square, landing port, gear type and vessel length category. Data were sorted to identify landings of over 1 tonne of saithe per month, coupled with all landings of other species with identical landing characteristics i.e. where the month, ICES Division, ICES square, landing port, gear type and vessel length category were identical. This allowed the retained species taken in conjunction with the saithe fishery to be monitored to a high degree of certainty.

All of the gears under assessment operate in mixed fisheries where a number of species are targeted together. In this assessment saithe is considered a primary target species for the demersal trawl fleet. While it forms a small, but important, part of the other fisheries under assessment it is not the primary target species which are cod and plaice in both the set net and Danish seine fisheries and haddock in the fly shooting fishery. Despite not being the *primary* target species in these aforementioned fisheries, saithe is still considered a target species as part of the mixed fisheries.

Data has been analysed (as described above) to ensure an appropriate representation of the weight of all target species taken when saithe is also landed in these fisheries. The data presented in the preceding tables do not therefore represent the total landings of cod, plaice, haddock etc taken by Danish vessels operating these gears, but shows the associated volume when more than 1 tonne of saithe is landed in any one month.

Species shown in bold in Tables 4.1, 4.2, 4.3 and 4.4 are considered main retained species. Explanation for their inclusion as main retained species is provided in the scoring justifications in Appendix 3.

Landings of *Pandalus* are recorded as a retained species of the saithe fishery. However this demersal trawl fishery is targeted by nets of 35 mm mesh size and therefore not assessed within the trawl Unit of Certification.

Table 4.1 Live weight (tonnes) of retained species in the demersal trawl saithe fishery, 2008. Species in bold represent main retained species.

Species	North Sea				Skagerrak		Total (IV+IIIa)	% of catch (IV+IIIa)
	IVa	IVb	Total IV	% catch IV	IIIa	% of catch IIIa		
Saithe	**3,929.59**	**381.67**	**4,311.26**	**22.12%**	**3,467.44**	**18.03%**	**7,778.70**	**20.09%**
Nephrops	**430.40**	**36.38**	**466.78**	**2.39%**	**1,488.12**	**7.74%**	**1,954.90**	**5.05%**
Atlantic Cod	**684.85**	**268.59**	**953.44**	**4.89%**	**928.31**	**4.83%**	**1,881.75**	**4.86%**
Pandalus	55.47		55.47	0.28%	1,636.27	8.51%	1,691.73	4.37%
European Plaice	**8.96**	**107.70**	**116.66**	**0.60%**	**1,068.76**	**5.56%**	**1,185.42**	**3.06%**
Monkfish	849.99	58.20	908.19	4.66%	218.07	1.13%	1,126.26	2.91%
Haddock	196.49	98.50	294.99	1.51%	610.76	3.18%	905.75	2.34%
European Hake	501.33	20.34	521.67	2.68%	342.22	1.78%	863.88	2.23%
Witch Flounder	184.45	20.21	204.66	1.05%	356.10	1.85%	560.76	1.45%
Ling	397.09	15.23	412.32	2.12%	44.51	0.23%	456.83	1.18%
Common Dab	0.61	16.66	17.26	0.09%	126.62	0.66%	143.88	0.37%
Pollack	80.02	8.94	88.97	0.46%	46.50	0.24%	135.47	0.35%
Lemon Sole	15.93	10.28	26.21	0.13%	93.53	0.49%	119.74	0.31%
Whiting	31.35	2.58	33.93	0.17%	29.80	0.15%	63.73	0.16%
Atlantic Halibut	35.75	3.65	39.41	0.20%	10.23	0.05%	49.64	0.13%
Tusk	45.13	0.26	45.38	0.23%	0.36	0.00%	45.75	0.12%
Turbot	2.57	4.84	7.41	0.04%	37.06	0.19%	44.47	0.11%
Cuttlefish	5.42	2.47	7.88	0.04%	25.70	0.13%	33.58	0.09%
Catfish	14.31	2.97	17.29	0.09%	12.02	0.06%	29.31	0.08%
Common Sole	0.03	1.42	1.46	0.01%	27.69	0.14%	29.15	0.08%
Megrim	26.40	0.01	26.41	0.14%		0.00%	26.41	0.07%
Rays + Skates	18.49	0.13	18.63	0.10%	1.82	0.01%	20.44	0.05%
Spurdog	3.66	2.66	6.31	0.03%	11.73	0.06%	18.04	0.05%
Brill	0.21	1.00	1.22	0.01%	12.70	0.07%	13.92	0.04%
Unknown Species	4.08	0.62	4.71	0.02%	4.80	0.02%	9.50	0.02%
Long-Rough Dab	6.56	0.02	6.58	0.03%	0.09	0.00%	6.67	0.02%
Lumpfish	0.37	0.11	0.48	0.00%	6.00	0.03%	6.47	0.02%
Grey Gurnard	0.83	0.25	1.08	0.01%	4.59	0.02%	5.67	0.01%
Marine Crabs	0.05	0.65	0.69	0.00%	4.90	0.03%	5.59	0.01%

Species	North Sea				Skagerrak		Total (IV+IIIa)	% of catch (IV+IIIa)
	IVa	IVb	Total IV	% catch IV	IIIa	% of catch IIIa		
Tub Gurnard	0.11	0.23	0.34	0.00%	3.26	0.02%	3.60	0.01%
Edible Crab	0.05	0.42	0.47	0.00%	3.06	0.02%	3.53	0.01%
Beaked Redfish	2.25	0.02	2.27	0.01%	0.11	0.00%	2.38	0.01%
Blue Ling	1.36	0.01	1.37	0.01%	0.12	0.00%	1.49	0.00%
Atlantic Mackerel	0.03	0.01	0.04	0.00%	1.28	0.01%	1.32	0.00%
European Flounder		0.06	0.06	0.00%	0.84	0.00%	0.90	0.00%
Mullets		0.04	0.04	0.00%	0.83	0.00%	0.87	0.00%
Greater Weever		0.02	0.02	0.00%	0.72	0.00%	0.75	0.00%
European Lobster	0.12	0.16	0.28	0.00%	0.44	0.00%	0.73	0.00%
Golden Redfish	0.43	0.03	0.46	0.00%	0.10	0.00%	0.56	0.00%
Tope	0.03	0.04	0.07	0.00%	0.24	0.00%	0.31	0.00%
Northern Pike	0.14		0.14	0.00%	0.13	0.00%	0.27	0.00%
Roundnose Grenadier	0.02		0.02	0.00%	0.16	0.00%	0.18	0.00%
Porbeagle	0.08		0.08	0.00%	0.05	0.00%	0.13	0.00%
Skate (Raja Batis)	0.04	0.01	0.05	0.00%	0.07	0.00%	0.13	0.00%
European Perch		0.00	0.00	0.00%	0.04	0.00%	0.04	0.00%
Grand Total	13,297.23	6,194.72	19,491.95	100.00%	19,233.97	100.00%	38,725.92	100.00%

DTU Aqua, 2010

Table 4.2 Live weight (tonnes) of retained species in the fly shooting saithe fishery, 2008. Species in bold represent main retained species.

Species	Total landings (IIIa Skagerrak)	% of catch
Haddock	**51.82**	**61.35%**
Saithe	**15.09**	**17.86%**
European Hake	**7.23**	**8.56%**
Atlantic Cod	**4.96**	**5.88%**
European Plaice	2.61	3.09%
Pollack	0.87	1.03%
Witch Flounder	0.60	0.71%
Lemon Sole	0.28	0.33%
Monkfish	0.18	0.22%
Ling	0.16	0.18%
Whiting	0.13	0.15%
Common Dab	0.12	0.14%
Catfish	0.03	0.04%
Atlantic Halibut	0.03	0.03%
Turbot	0.03	0.03%

Picked Dogfish	0.02	0.02%
Cuttlefish	0.01	0.01%

DTU Aqua, 2010

Table 4.3 Live weight (tonnes) of retained species in the Danish seine saithe fishery, 2008. Species in bold represent main retained species.

Species	Total landings (IIIa Skagerrak)	% of catch
European Plaice	**330.58**	**61.86%**
Atlantic Cod	**67.57**	**12.64%**
Haddock	**55.65**	**10.41%**
Saithe	**24.25**	**4.54%**
Witch Flounder	19.27	3.61%
Common Dab	12.22	2.29%
European Hake	9.48	1.77%
Lemon Sole	8.12	1.52%
Pollack	2.07	0.39%
Catfish	1.59	0.30%
Monkfish	1.27	0.24%
Atlantic Halibut	0.53	0.10%
Ling	0.49	0.09%
Grey Gurnard	0.32	0.06%
European Flounder	0.29	0.05%
Cuttlefish	0.17	0.03%
Turbot	0.15	0.03%
Brill	0.10	0.02%
Common Sole	0.08	0.01%
Whiting	0.07	0.01%
Picked Dogfish	0.05	0.01%
Tub Gurnard	0.03	0.01%
Lumpfish	0.01	0.00%
Unknown Species	0.01	0.00%
Grand Total	**534.37**	**100.00%**

DTU Aqua, 2010

Table 4.4 Live weight (tonnes) of retained species in the set net saithe fishery, 2008. Species in bold represent main retained species.

Species	North Sea		Skagerrak		Total	% of catch
	IV	% of catch	IIIa	% of catch		
Atlantic Cod	**66.75**	**56.04%**	**54.81**	**50.65%**	**121.56**	**53.47%**
European Plaice	**0.49**	**0.41%**	**24.01**	**22.19%**	**24.50**	**10.78%**
Saithe	**14.19**	**11.91%**	**9.33**	**8.62%**	**23.51**	**10.34%**
Haddock	**18.05**	**15.16%**	**0.07**	**0.07%**	**18.13**	**7.97%**
European Hake	**9.94**	**8.34%**	**0.23**	**0.21%**	**10.17**	**4.47%**
Common Sole	0.01	0.01%	2.50	2.31%	2.51	1.10%
Lemon Sole	0.08	0.07%	2.19	2.02%	2.27	1.00%
Monkfish	1.09	0.91%	1.05	0.97%	2.13	0.94%
Ling	1.66	1.40%	0.33	0.31%	2.00	0.88%
Marine Crabs	0.05	0.04%	1.09	1.01%	1.14	0.50%
Common Dab	0.03	0.03%	0.58	0.53%	0.61	0.27%
Brill	0.03	0.03%	0.47	0.43%	0.50	0.22%
Unknown Species	0.18	0.15%	0.11	0.10%	0.29	0.13%
Turbot	0.06	0.05%	0.15	0.14%	0.21	0.09%
Catfish	0.15	0.13%	0.03	0.02%	0.18	0.08%
European Flounder	0.00	0.00%	0.14	0.13%	0.14	0.06%
Spurdog	0.11	0.09%	0.02	0.02%	0.13	0.06%
Lumpfish	0.00	0.00%	0.11	0.10%	0.11	0.05%
Atlantic Mackerel	0.09	0.08%	0.00	0.00%	0.09	0.04%
Tope	0.09	0.07%	0.00	0.00%	0.09	0.04%
European Lobster	0.06	0.05%	0.01	0.01%	0.07	0.03%
Atlantic Halibut	0.05	0.04%	0.00	0.00%	0.05	0.02%
Edible Crab	0.05	0.04%	0.00	0.00%	0.05	0.02%
Mullets	0.00	0.00%	0.03	0.03%	0.03	0.01%
Tub Gurnard	0.01	0.01%	0.00	0.00%	0.02	0.01%
Grey Gurnard	0.00	0.00%	0.01	0.01%	0.01	0.00%
Tusk	0.01	0.01%	0.00	0.00%	0.01	0.00%
Witch Flounder	0.00	0.00%	0.00	0.00%	0.01	0.00%
Grand Total	119.11	100.00%	108.21	100.00%	227.32	100.00%

DTU Aqua, 2010

As discussed saithe is not the *primary* target species for the set net, Danish seine or fly shooting fisheries. The TAC and Danish quota for the primary species targeted in these fisheries for cod, plaice and haddock are presented in Table 4.5.

The volume of these primary target species landed in association with saithe are presented in Table 4.6. The volume of cod removed by the Danish seine fishery (landing saithe) equates to 2.7% of the Danish quota for the Skaggerak (area IIIaN); the volume removed by the set net fishery equates to 2.2% of Denmark quota in the Skaggerak and 1.8% in the North Sea and EC waters of IIa. The

volume of plaice removed by the Danish seine fishery (landing saithe) equates to 4.5% of the Danish quota for this area and 3.5% of the total TAC. The volume of haddock removed from Skaggerak by the fly shooting and Danish seine fisheries (landing saithe) equates to 2.5 and 2.7% of the Danish quota and 1.8 and 1.9% of the TAC respectively.

Table 4.5 2008 TAC and Danish quota for cod, plaice and haddock. (note 2008 values used to allow proportions of landings to be assessed)

	DK quota		TAC	
	IIIa	IV & IIa	IIIa	IV & IIa
Cod	2,532	3,761	3,165	22,152
Plaice	7,280	9,575	9,350	49,000
Haddock	2,080	1,920	2,856	46,444

Data source: EC, 2010

Table 4.6 Weight (tonnes) of cod, plaice and haddock landed in association with saithe in fly shooting (FS), Danish seine (DS) and set net (SN) fisheries and the corresponding proportions that these values represent compared with Danish quota and TAC (all 2008 data).

Gear	FS	DS	SN	
Area	IIIaN	IIIaN	IIIaN	IV & IIa
Weight (tonnes) landed with saithe				
Cod	4.96	67.57	54.81	66.75
Plaice	2.61	330.58	24.01	0.49
Haddock	51.82	55.65	0.07	18.05
Proportion of Denmark quota				
Cod	0.20%	2.67%	2.16%	1.77%
Plaice	0.04%	4.54%	0.33%	0.01%
Haddock	2.49%	2.68%	0.00%	0.94%
Proportion of TAC				
Cod	0.16%	2.13%	1.73%	0.30%
Plaice	0.03%	3.54%	0.26%	0.00%
Haddock	1.81%	1.95%	0.00%	0.04%

Data source: EC,2010; DTU Aqua, 2010

4.2 Bycatch (including discarding)

All units of certification have in place measures that are specifically designed to reduce or eliminate discarding within fisheries. The recent European ban on high grading, which came into force on 1st January 2010, acts to minimise discarding across all North Sea and Skaggerak fisheries, although level of enforcement is unknown. The Norwegian ban on discarding is also applicable for Danish vessels fishing within the Norwegian EZ. There are closed areas including Real Time Closures specifically designed to protect juvenile nursing grounds.

4.2.1 Demersal trawl (otter trawl and fly shooting)

Table 4.7 presents data on discarding for demersal trawl in the North Sea and Skagerrak from 2000 to 2008. The data represents the calculated discards from each fleet métier in tonnes over this nine year period. This is based on an average of 150 demersal trawl trips in the North Sea (equating to

~1000 hauls), and approximately 200 demersal trawl trips in the Skagerrak (650 hauls). Figure 4.1 presents the trend in discards from 2004 to 2008 for the top discarded species.

These data indicate that a number of species are discarded once the retained catch has been sorted from the bulk catch. The highest proportion of discards is of the starry ray (22% of all discards by weight) followed by undersize saithe, cod and haddock. Note that the latter three species are being scored elsewhere in the assessment under P1 (saithe) and P2 retained species (cod and haddock). In the towed gear fisheries, many of the technical measures have stipulated changes to codend mesh size or the inclusion of square-mesh escape panels (Enever et al, 2009). Interactions with other species, such as seabird, are considered rare.

4.2.2 Danish seine

Table 4.8 presents data on discarding for Danish seine in the Skagerrak from 2000 to 2008. The data represents the calculated discards from each fleet métier in tonnes over this nine year period. This is based on an average of 80 Danish seine trips in the Skagerrak (~280 hauls). Figure 4.2 presents the trend in discards from 2004 to 2008 for the top discarded species.

Main discard species for Danish seine fishery in North Sea and Skagerrak are undersize plaice, cod and haddock (which are assessed under Retained Species). Main discard species are starry ray and common dab. The estimated total discard volumes for the fishery have declined substantially in recent years according to observer data, however data are not weighted according to effort levels. The main discard species are all non quota species of limited commercial interest. Common dab are reported to be amongst the top ten most abundant fish species in the North Sea, while starry ray is the most abundant elasmobranch. The Danish seine fishery is subject to the same technical control measures as the demersal trawl fishery.

4.2.3 Set net

Table 4.9 presents data on discarding for gill net vessels in the North Sea from 1995 to 2008. The data represents the total calculated discards in tonnes over this fourteen year period. Figure 4.3 presents the trend in discards from 2004 to 2008 (note that trips were only undertaken in 2006 and 2008 during this period).

The levels of discarding within the set net fishery are low and practically all fish captured are retained. Data records a small level of discarding of common dab and starry ray, which as described above are abundant within the North Sea. Some undersize cod discarding is recorded which is assessed under Retained Species.

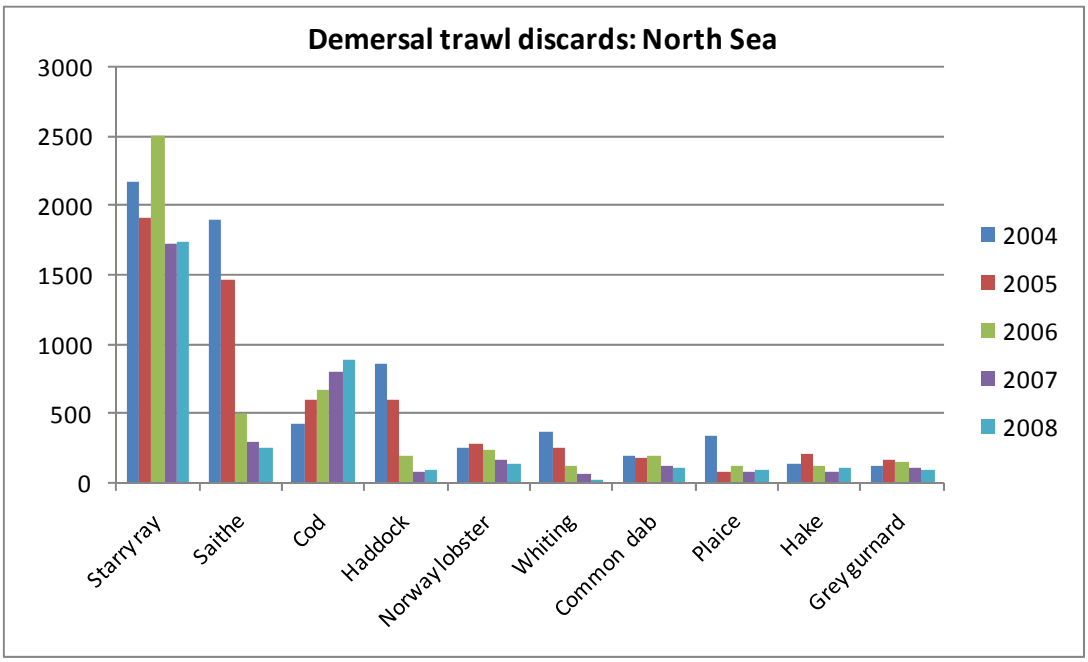
Set nets have the ability to continue to catch fish for varying periods of time in the event that they become lost. Gear can be lost in a number of ways – it can become tangled up with mobile gears, can be swept away in extremes of current and or weather, or surface dhan buoys that mark the gears location can become separated from the gear. In the event that gear is lost, it is normal for vessels to attempt to recover it by grappling for it on the seabed, which may or may not be successful. While there is potential for gear to become lost, fishermen try very hard to avoid such an event as it results in expensive replacement costs. Fishermen are required to record the amount of gear that they leave port with and they must account for it on their return, in the onboard logbooks. In this way it is possible to estimate the total quantity of gear that is lost in set net fisheries, although this does not currently appear to happen.

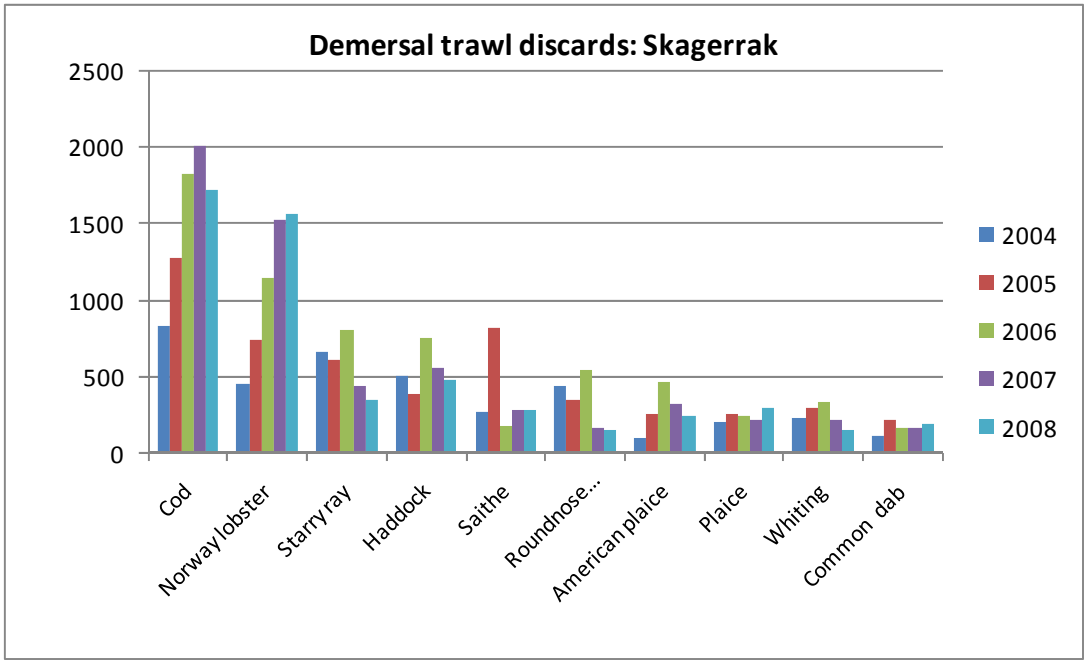
Table 4.7 Calculated discards (tonnes) from all Danish demersal trawl fisheries in the North Sea and Skagerrak in 2008 (DTU Aqua, 2010). Data has been extrapolated by DTU Aqua (2010) based on actual observer trip discard percentages.

	North Sea	Skagerrak	Total	% total discards
Cod	883	1716	2599	25%
Starry ray	1737	350	2087	20%
Norway lobster	136	1562	1698	16%
Haddock	93	484	577	6%
Saithe	257	281	538	5%
Plaice	101	293	394	4%
American plaice	94	242	336	3%
Common dab	115	197	312	3%
Hake	105	166	271	3%
Rabbitfish	171	70	240	2%
Whiting	29	150	180	2%
Roundnose grenadier	6	154	160	2%
Grey gurnard	99	18	117	1%
Blue whiting	57	53	110	1%
Witch	61	34	95	1%
Velletvely	66	6	72	1%
Thornback ray(roker)	27	41	68	1%
Monk	58	1	59	1%
Other	231	205	436	4%
Grand Total	4327	6021	10348	96%

Based on data provided by DTU Aqua, 2010

Figure 4.1 Trends in top discarded species based on total calculated discards per year for entire Danish demersal trawl fleet operating in North Sea (top) and Skagerrak (bottom) from 2004 to 2008 (based on data provided by DTU Aqua, 2010





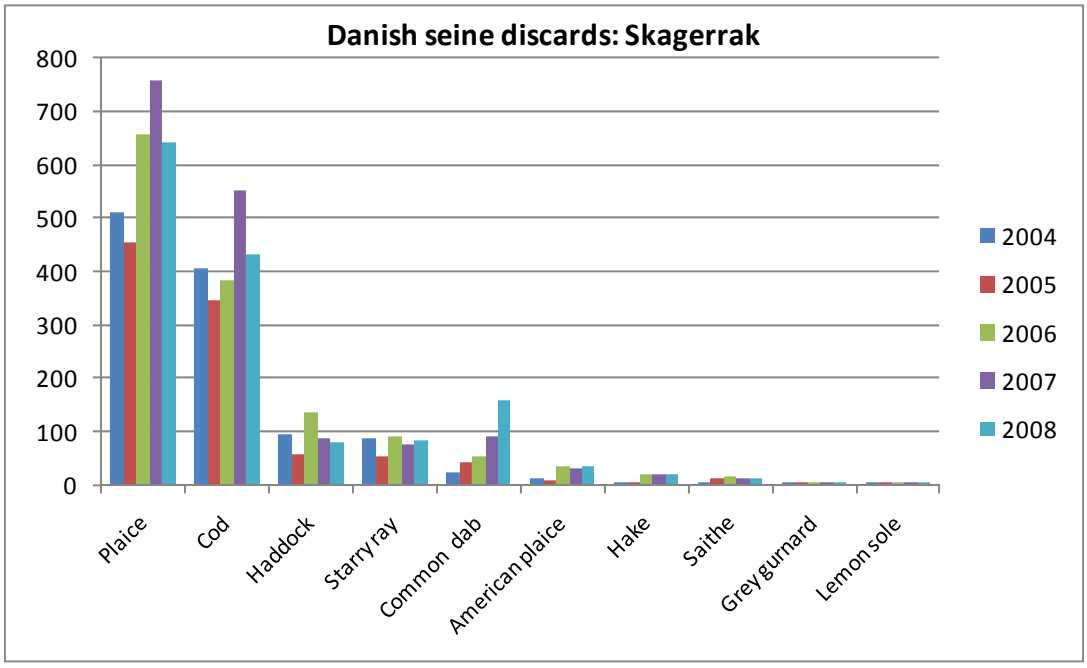
based on data provided by DTU Aqua, 2010

Table 4.8 **Calculated discards (tonnes) from all Danish Danish seine fisheries in the Skagerrak from 2000 to 2008 (based on data provided by DTU Aqua, 2010)**

Species	Skagerrak, discard	% of total discards
Plaice	643.06	43.15%
Cod	432.77	29.04%
Common dab	157.71	10.58%
Starry ray	81.60	5.48%
Haddock	79.92	5.36%
American plaice	35.64	2.39%
Hake	20.83	1.40%
Saithe	10.52	0.71%
Thornback ray(roker)	7.52	0.50%
Grey gurnard	3.91	0.26%
Sculpin	3.41	0.23%
Red gurnard	2.41	0.16%
Conger eel	2.39	0.16%
Squids, octopusses	2.12	0.14%
Whiting	1.90	0.13%
Witch	0.96	0.06%
Lemon sole	0.78	0.05%
Herring	0.66	0.04%
Turbot	0.54	0.04%
Skate (raja batis)	0.41	0.03%
Other	1.07	0.07%
TOTAL	1490.16	100%

Based on data provided by DTU Aqua, 2010

Figure 4.2 Trend in top discarded species in Danish seine Skagerrak fisheries presented as average per observer trip from 2004 to 2008



Based on data provided by DTU Aqua, 2010

Table 4.9 Calculated discards (tonnes) from all Danish gill net fisheries in the North Sea from 1995 to 2008

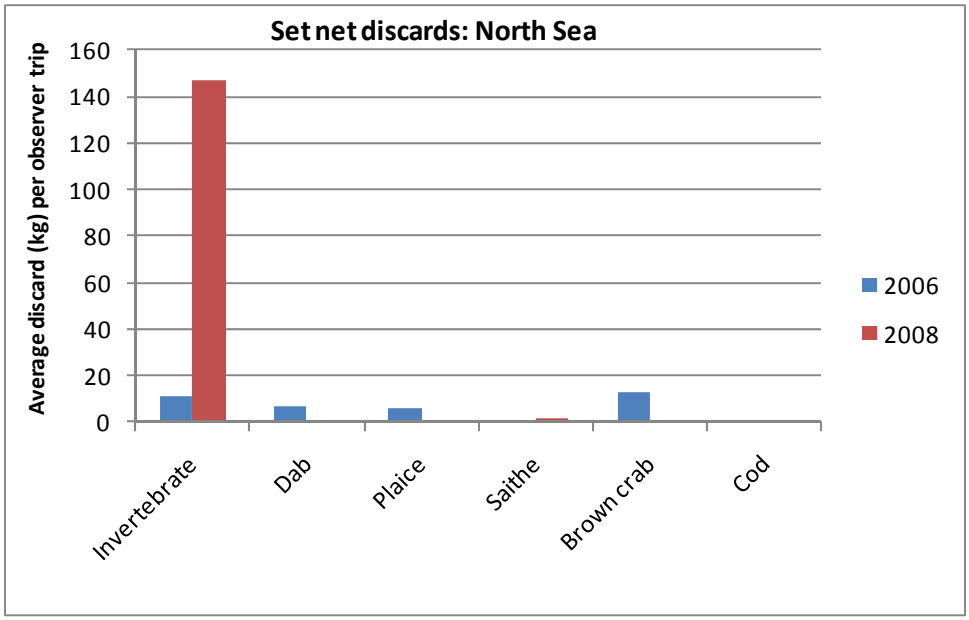
Species	North Sea
Dab	7.71
Cod	3.56
Starry ray	3.49
Plaice	0.93
Turbot	0.79
Mackerel	0.66
Whiting	0.42
Lumpfish	0.31
Sole	0.24
Monkfish	0.19
Grey gurnard	0.18
Haddock	0.17
Invertebrates	0.16

Species	North Sea
Saithe	0.14
Ling	0.13
Horse mackerel	0.11
Hake	0.08
Flounder	0.03
Pollack	0.02
Picked dogfish	0.02
Ray	0.02
Brill	0.01
Brown crab	0.01
Blue whiting	0.01
Pout	0.01

Grand total	19.47

based on data provided by DTU Aqua, 2010

Figure 4.3 Trend in all discarded species in Danish set net North Sea fisheries presented as average per observer trip from 2004 to 2008



based on data provided by DTU Aqua, 2010

4.3 Endangered, threatened and 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 and OSPAR 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.

Most capture fisheries have at least some potential to interact with Endangered, Threatened or Protected species. The ETP interaction profile for each gear type varies and is greatly influenced by the manner in which it is utilised. Factors such as frequency of use, duration of deployment, season, and location all play a role in defining a gear types ETP interaction profile.

In general, populations of endangered, threatened and protected (ETP) species are well studied and in the North Sea and Skagerrak, with considerable levels of work undertaken in relation to the regular monitoring of fishing activity through the deployment of onboard scientific observers, capture of anecdotal information, and a wide range of EU and nationally funded research programmes.

The team assessed species listed under the following legislation / conventions (Table 4.10):

» CITES Appendix II

» Habitats Directive Annex II

» Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)

» BERN Convention

» EC Regulations 43/2009 and 23/2010 which prohibit landing of certain species (therefore protecting them)

As discussed species included solely within OSPAR and IUCN red list (which are not translated into national legislation or international binging agreements) are not assessed under ETP. However OSPAR and IUCN have been used as data sources to inform assessment of those species which are ETP.

Table 4.10 Protection of species and determination of inclusion within ETP category

Species	CITES APP II	Habitats Directive Annex II	BONN inc. Ascobans	BERN	EC 43/2009 23/2010
Harbour Porpoise *Phocoena phocoena*			App IV	App II	
Harbour Seal *Phoca vitulina*					
Grey Seal *Halichoerus grypus*			App II	App III	
Ringed seal *Phoca hispida*			App II	App III	
Angel shark *Squatina squatina*					
Common Skate *Dipturus batis*					
Spurdog *Squalus acanthias*					
Basking shark *Cetorhinus maximus*					
Sturgeon *Acipenser sturio*		Priority			

During the assessment of the saithe fisheries, the assessment team have considered the above list of species in the context of the potential interactions with individual units of certification. The result of this analysis determined the Outcome Status score. To score well, a fishery must be conducted in a manner that ensures ETP impacts fall within acceptable limits (as defined under legislation and /or binding agreements that are in place).

Harbour porpoise

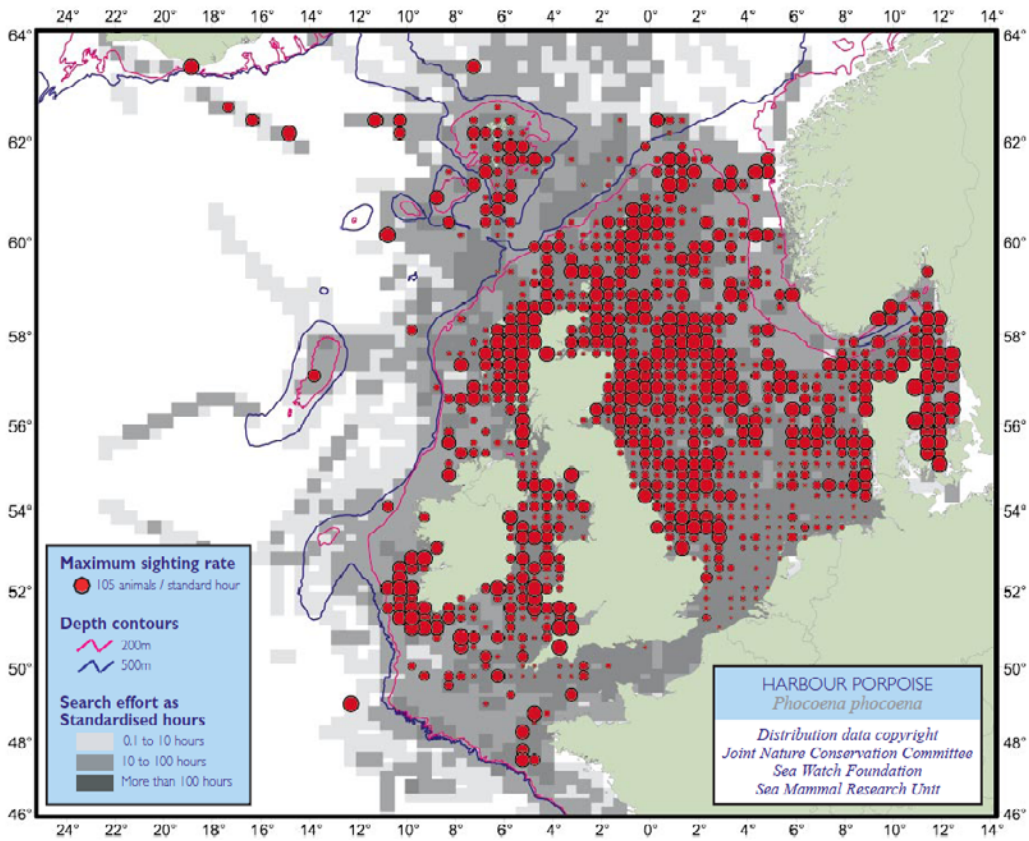
The harbour porpoise *Phocoena phocoena* is listed in annex II and IV of the Habitats Directive (92/43/EEC), annex II of the Bern convention, annex II of the Bonn convention and annex II of the Convention on the international Trade in Endangered Species (CITES). Furthermore, it is the flagship species in the "Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas" (ASCOBANS). ASCOBANS was concluded in 1991 under the auspices of the Convention on Migratory Species (CMS or Bonn Convention) and entered into force in 1994. Ten Member States are party to the agreement, including Denmark. The agreement seeks to formalise and coordinate efforts to conserve the small cetacean species shared between member countries in the ASCOBANS Area, conscious that the management of threats to their existence, such as bycatch, habitat deterioration and other anthropogenic disturbance, requires concerted and coordinated responses, given that migrating cetaceans regularly cross national boundaries. A Conservation and Management Plan forming part of the Agreement obliges Parties to engage in habitat conservation and management, surveys and research, pollution mitigation and public information.

At the Third Meeting of Parties to ASCOBANS in 2000 a resolution was passed to address the issue of incidental capture of Harbour porpoise. Resolution No. 3, concerning incidental take of small cetaceans, sets a clear limit for incidental bycatch. Following the advice of the International Whaling Commission (IWC) / ASCOBANS Working Group on Harbour porpoises, the Meeting defined "unacceptable interactions" as being a total anthropogenic removal above 1.7% of the best available estimate of abundance and set the intermediate precautionary objective of reducing bycatches to less than 1% of the best available population estimate.

The gear of most concern in relation to interactions with this species is set nets. The Harbour porpoise is unable to detect the presence of nylon mesh in water and entanglement risks are high for this species in both gillnet and trammel net fisheries.

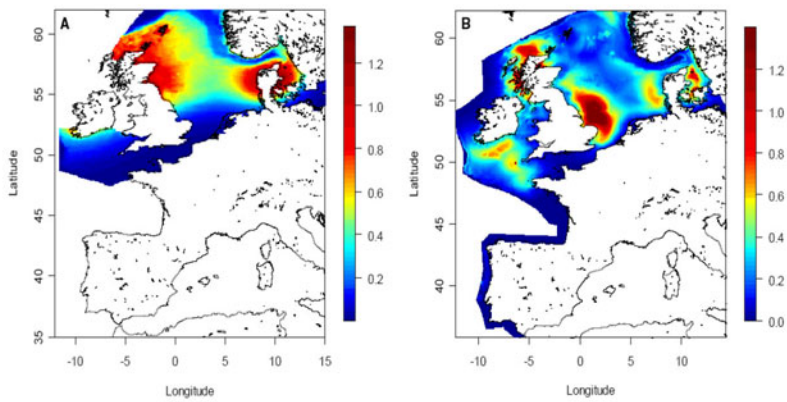
The harbour porpoise is reported as the most abundant cetacean in north-eastern European shelf waters with North Sea populations estimated at 280,000 and Skagerrak at 36,000 individuals (Hammond et al, 1995 as cited in JNCC, 2003). Areas of highest population density are believed to be in the Belt Sea to the east of Denmark and in the north-western North Sea, in water shallower than 100m. The distribution of harbour porpoise is presented in Figure 4.4.

Figure 4.4 Distribution of harbour porpoise



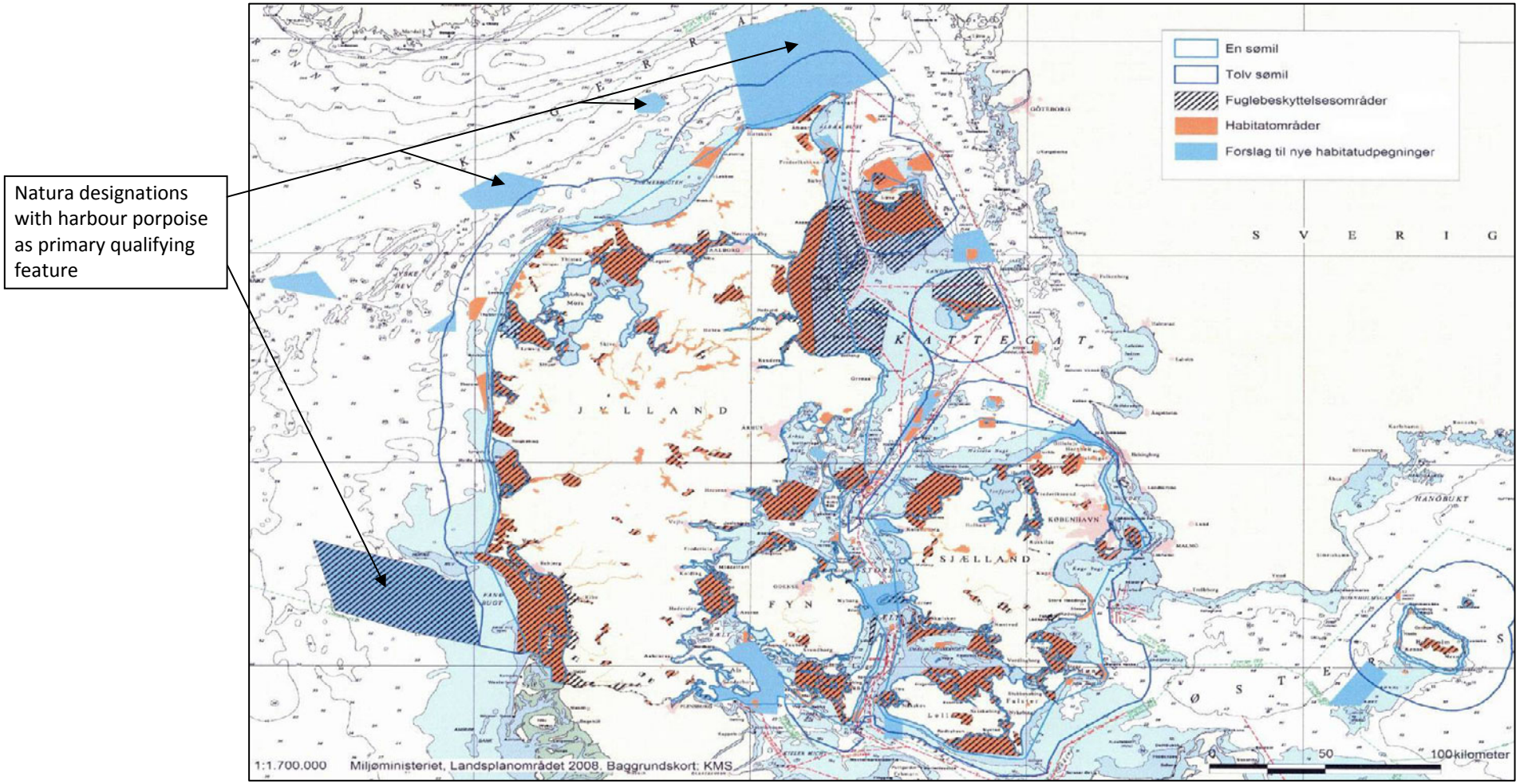
JNCC, 2002

Figure 4.5 Density surface modelling of the SCANS I survey in 1994 (panel A) and SCANS II survey in 2005 (panel B) based on the visual sightings. The colours indicate the absolute density in animals/km2



Hammond et al. in prep as cited in Teilmann *et al.,* 2008

Figure 4.6 Natura sites designated in 2009 and 2010: striped areas for birds, orange areas for habitats and blue areas for 2010 designations. Those in the North Sea and Skagerrak designated for harbour porpoise are indicated



Directorate, 2010

Two major abundance surveys have been conducted - SCANS in 1994 and SCANS-II in 2005 – the results of which are presented in Figure 4.5.

Four recently designated Natura sites within Danish waters of the North Sea and Skagerrak have harbour porpoise as the primary qualifying feature (Figure 4.6). Sites were identified by studying areas of high harbour porpoise density with particular focus on the distribution in the breeding season.

The harbour porpoise is listed in annex II and IV of the Habitats Directive (92/43/EEC), annex II of the Bern convention, annex II of the Bonn convention and annex II of the Convention on the international Trade in Endangered Species (CITES). Furthermore, it is covered by the terms of the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS, a regional agreement under the Bonn Convention) (Teilmann et al., 2008).

Interaction between harbour porpoise and set nets is well documented and it is for this reason that they are included within the assessment for the saithe set net fishery.

Harbour, grey and ringed seal

Common or harbour seals *Phoca vitulina* have a near-circumpolar distribution, with at least four subspecies recognised, from the eastern and western Pacific and eastern and western Atlantic. Only the eastern Atlantic subspecies *P. vitulina* occurs in Europe, where its range extends from Iceland and northern Norway southwards to northern France, including the Kattegat/Skagerrak and south-western Baltic. The UK population represents about 5% of the world population of *P. vitulina*, and approximately 50% of the EU population. The harbour seal is the most common seal in Denmark.

Harbour seals are most commonly found hauled out on sandflats and estuaries and rocky shores. Pups swim almost immediately after birth and so seals can breed on sheltered tidal areas where banks allow access to deep water. Seals may range widely in search of prey, but individuals often return to favoured haul-out sites.

Combining recent estimates yields a world-wide population of 350,000 to 500,000 animals (IUCN, 2010). Population dynamics of regional subpopulations vary dramatically, with recent large-scale declines in the northern UK populations, rapid increases punctuated by major population crashes due to disease events in the Wadden Sea, southern England, Kattegat and Skagerrak populations and gradual increase after near extinction in the 1970s in the Baltic (Thompson and Härkönen, 2008). Harbour seal are classified as least concern by IUCN redlist.

Grey Seals *Halichoerus grypus* in Europe are most abundant around the British Isles, but can also be found along the coasts of Norway and the Baltic Sea. In the North Sea, most of the grey seals live around the Scottish islands, along the British coast and in Cornwall. This population represents 40% of the world population of grey seals and 95% of the European population. There were around 30,000 grey seals in the whole of the North Sea in 1965. This number rose to 100,000 in 1988. In the beginning of the 21st century, the British population counted 124,300 animals. The population has grown particularly fast since the end of the 1970s, when an end came to giving licenses for commercial hunting.

Over the past 25 years, the grey seal population in the North Sea increased on average at 5% per year, while founding a number of new colonies (Abt and Engler, 2009). This continuing, well documented increase in overall population and most subpopulations, together with low levels of localized hunting and widespread conservation measures result in the grey seal being classified as least concern by IUCN. The current global population size based on pup production estimates is >400,000 (IUCN, 2010).

Grey seals spend most of the year at sea, and may range widely in search of prey. They come ashore in autumn to form breeding colonies on rocky shores, beaches, in caves, occasionally on sandbanks,

and on small largely uninhabited islands. In such locations they may spread some distance from the shore and ascend to considerable heights (JNCC, 2002) .

In Denmark, the grey seal is distributed around Gedser, Anholt, and the southern parts of the Jutland Wadden Sea.

Ringed seals *Pusa hispida* have a circumpolar distribution throughout the Arctic Basin including records of individuals near the North Pole. Ringed seals are considered vagrant to Denmark i.e. they are not native in this area.

Published world-wide population estimates exist including 6-7 million (Stirling and Calvert 1979; as cited in Kovacs et al 2008) and 2.5 million (Miyazaki 2002; as cited in Kovacs et al 2008). Decreased pup production and survival have recently been documented in some areas that have been attributed to climate change. Ringed seal are classified as least concern by IUCN redlist.

Angel shark

The angel shark *Squatina squatina* was historically common over large areas of the coastal, continental and insular shelf of Northeast Atlantic, from southern Norway, Sweden and the Shetland Islands to Morocco, West Sahara and the Canary Islands, and in the Mediterranean and Black Seas. It occurs on or near mud or sandy seabed from close inshore to the outer shelf (5 m to at least 150 m depth).

The angle shark was historically taken as a bycatch in trawling fisheries across most of its range.

IUCN has assessed this species as Critically Endangered and it is now considered to be locally extinct in the North Sea (ICES ACFM 2005) and extremely rare elsewhere. For this reason it is not deemed appropriate to include the angel shark in assessments for any saithe Unit of Certification.

Common skate

The common skate *Dipturus batis* was formerly widely distributed over much of the North Sea but has declined throughout its range and is now only found rarely, mainly in the northern North Sea (ICES Advice 2008, Book 6: 6.4.30). It is the largest of the European batoid fish, reaching lengths of 285 cm and weights of 100kg. It is a demersal species and frequently inhabits coastal areas and shelf seas. Fisheries independent surveys that have informed ICES Working Group reports found the distribution of common skate to occur across depths of 85-1000 m.

The magnitude of decline is differentially well documented in various areas, but it is known to have severely declined in most shelf areas (ICES, 2002). For example, *D.batis* has been commercially extinct in the Irish Sea for some years (Brander,1981) and has declined severely in the North Sea (Walker & Hislop, 1998). The decline of the common skate has been described as the first clear case of a fish species brought to the brink of extinction by commercial fishing (Brander,1981).

The common skate was assessed by IUCN as 'Endangered' in 2000 and upgraded to 'Critically Endangered' in 2006, suggesting it 'is facing an extremely high risk of extinction in the wild'(IUCN, 2008).

Until recently landings of all skate and ray species have been amalgamated and reported under the category 'skates and rays' making the determination of individual species decline difficult. Furthermore, species identification can be an issue, especially when they are landed with no nose or tail.

Given the information provided in the retained and discard data it is considered likely that the demersal trawl fleet will interact with this species.

Spurdog

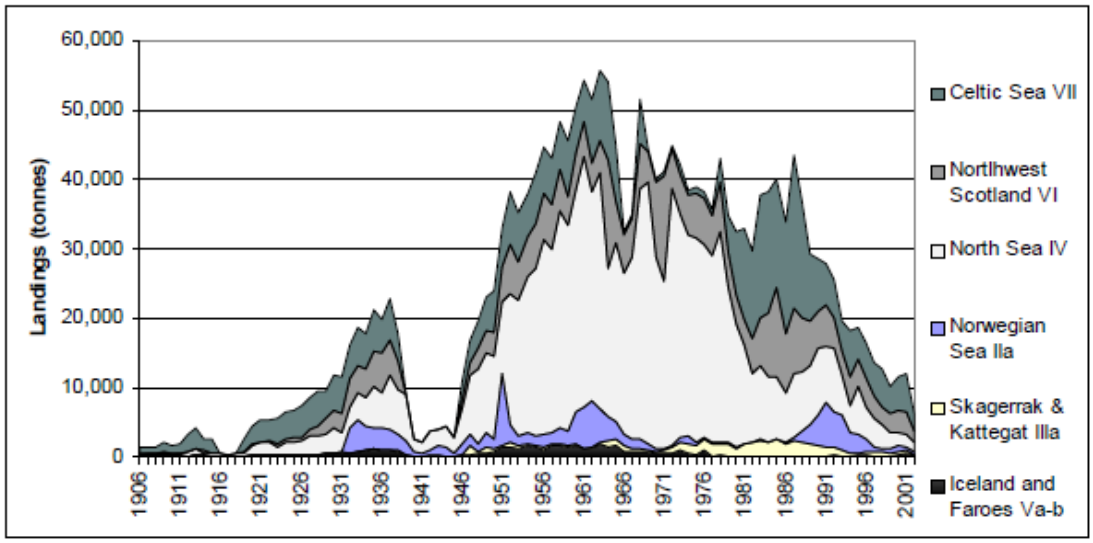
Spurdog *Squalus acanthias* occurs throughout the water column along the continental shelf of north-west Europe and has been recorded to depths of 900 m, but is most common from 10–200 m.

During the 1980s spurdog were an important by-catch of trawl fisheries as well as targeted fisheries. The majority of the landings are from the Norwegian Sea (IIa), Kattegat and Skagerrak (IIIa), North Sea (IV), North-West Scotland (VIa), Irish and Celtic Seas (sub-area VII) and northern Bay of Biscay (VIIIa) (ICES Fishmap, 2010). Landings trends since 1906 to 2002 are presented in Figure 4.7.

Warnings of overfishing of the Scottish-Norwegian sector of the Northeast Atlantic stock commenced in the 1960s (Holden 1968 as cited in Fordham *et al.* 2006). The Norwegian fishery had collapsed by 1978 (Hjertenes 1980 as cited in Fordham *et al.* 2006). The North Sea fishery declined steeply from a peak in the early 1970s to 10% of former landings in recent years, and target fisheries here were closed in 2007. The Celtic Seas fisheries peaked in 1987, before declining steeply

Landings have subsequently declined and there is currently zero TAC for this species. EC Regulation 43/2010 prohibits a targeted fishery for spurdog and only allows a small percentage to be taken as bycatch. Due to the Norwegian ban on discards, any spurdog caught in the Norwegian Zone must be retained (and can be landed into Danish ports).

Figure 4.7 Landings of spurdog from 1906 to 2002



ICES, 2007

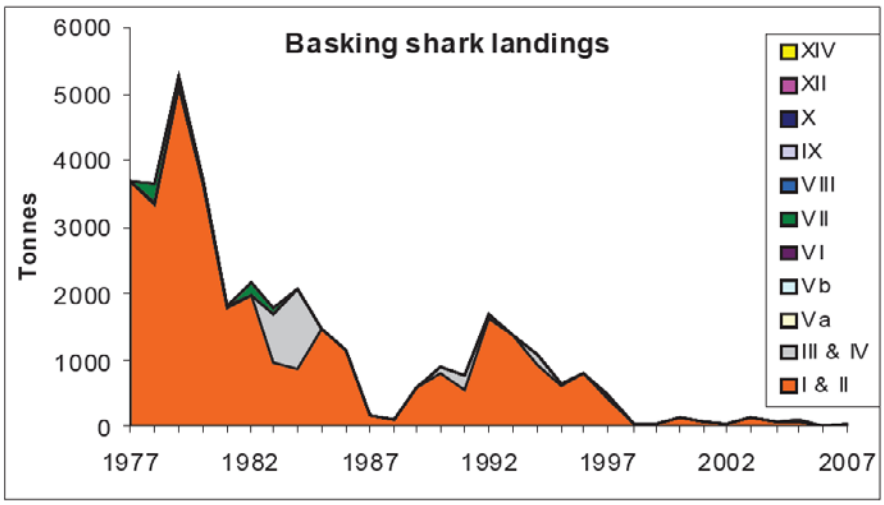
Basking shark

The basking shark *Cetorhinus maximus* is a migratory species, moving into coastal waters where it is known to congregate in a few favoured areas at certain times of the year (e.g. Compagno, 1984). Satellite tagging work has shown that the sharks remain in continental shelf edges during winter spending more of their time at greater depths than near the surface (OSPAR Commission, 2008).

The basking shark is a very large, long-lived species with a reproductive capacity that is considered to be relatively low even for an elasmobranch.

Latest figures from ICES and cover landings up to the year 2007, show a small number of basking sharks continue to be landed in ICES Division I and II. Landings have not been recorded from ICES Division III and IV since 1995 (Figure 4.8). It is unknown which gear types are responsible for basking shark landings presented in Figure 4.8.

Figure 4.8 Total landings (tonnes) of basking sharks in the northeast Atlantic, 1977 to 2007.



Data source: ICES, 2009

Sturgeon

The Common or Baltic sturgeon, *Acipenser sturio*, is the only sturgeon species which inhabited all major European river systems and the adjacent coastal sea regions. It is a migratory species reproducing in fresh water and then moving into the sea until ready to spawn again.

The sturgeon is listed on Annexes II & IV of the EC Habitats & Species Directive, the Bern Convention and the Bonn Convention. It was classified as Critically Endangered by IUCN in 1996. It is also protected under Appendix I of CITES.

Due to a variety of human interactions including fishing, impact to important habitats, construction of dams, gravel extraction and pollution, the sturgeon is now considered almost extinct. Small stocks seem to persist in the Rioni River, Georgia and Gironde River, France. For this reason it is not deemed appropriate to include the sturgeon in assessments for any saithe Unit of Certification.

Birds

Birds in the context of set nets relates to incidental capture of diving seabirds. Although widely acknowledged, bird bycatch has not been the focus of many directed studies that seek to investigate the bird bycatch profile of the different set net types used in different areas of European waters.

Most Danish set net fisheries occur in waters less than 60m deep – well within the diving range of several species – and in close proximity to coastal bird roosts, nesting sites and designated Special Protected Areas. It is therefore highly likely that bird bycatch is significant in the North Sea and Skaggerak set net fisheries

The bird populations of the North Sea area are of global importance. There are 31 species of seabirds breeding along the coasts and major seabird colonies living along the rocky coasts in the northern part of the North Sea. Some 10 million seabirds are present at most times of the year, but migrations and seasonal shifts are pronounced, and none of the species is endemic. Many shorebirds, such as waders and ducks, feed in inter-tidal areas along the coast.

The North Sea coasts support more than 50 % of the world's common terns and great skuas. A further twelve species, such as the common scooter, are present in numbers exceeding 10 % of their total estimated populations (OSPAR, 2000).

The Skagerrak and south west Norwegian Trench is recognised as having six species of seabirds in internationally important numbers amounting to ~850,000 individuals that use the area at different times of the year. This area is shown as number 4 in Figure 4.9. It is situated along the southern and eastern edges of the Norwegian trench around the 100m contour line, with depth ranges from 20-400m. Three currents with different salinities flow into the area from the west and the oceanographic regime is dominated by a central highly saline current of Atlantic origin. Upwelling events driven by several mechanisms are frequent in the area and work to enhance the availability of foods to seabirds (Skov *et al.*, 2007).

The birds in the area prey on small fish and invertebrates and scavenge on discards from commercial fisheries. It is thought that the birds using the area are mainly dependant on the availability of small fish.

The six species of international importance are:

» Little Auk *Alle alle*

» Razorbill *Alca torda*

» Guillemot *Uria aalge*

» Herring gull *Larus argentatus*

» Great skua *Stercorarius skua*

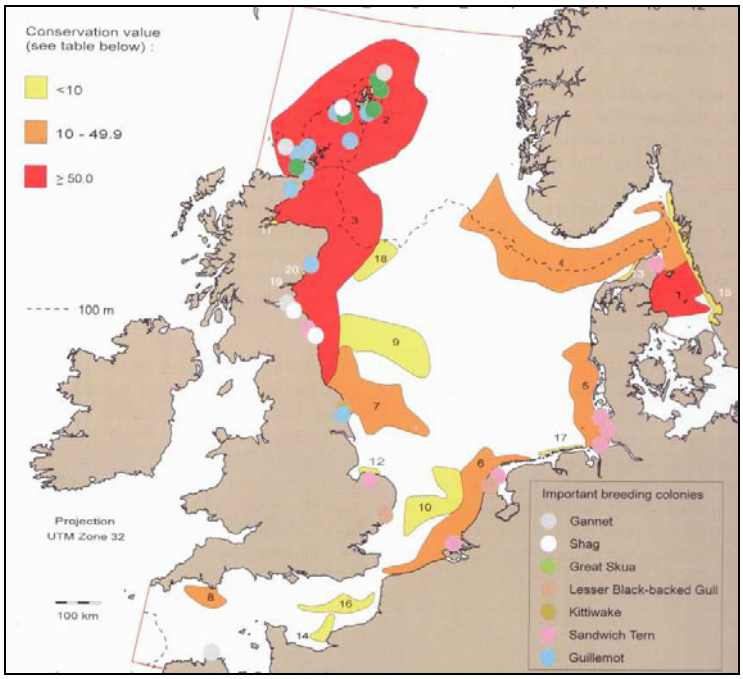
» Gannet *Morus bassanus*

Of these species the razorbill and guillemot have Danish Special Protected Areas (SPAs) designated for their protection. All Danish marine SPAs are shown in Figure 4.6.

In 1995 it was estimated that the most numerous bird wintering in this area was the Little Auk with an average of just over 700,000, representing ~25% of the biogeographic population. The most important period for this species is from December to February (Figure 4.10a), but October and November are also important months for this species when there distribution extends further into the central North Sea.

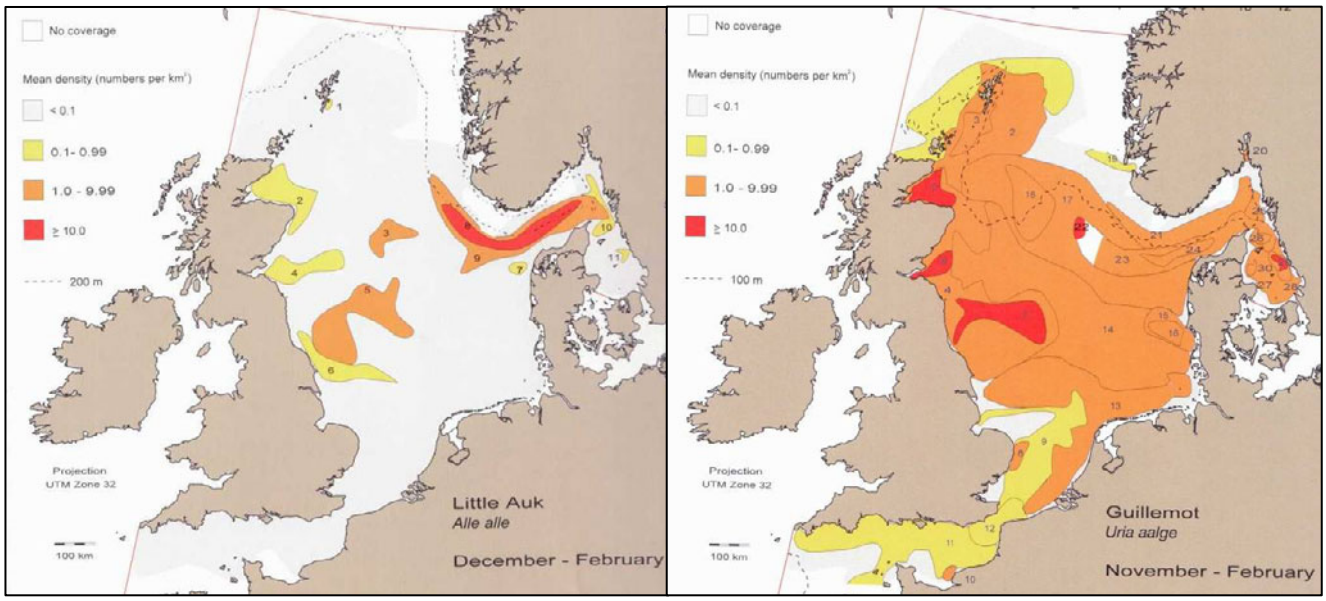
The Guillemot is also present in significant numbers although it is recognised that the Britain Isles hold the highest proportions. Approximately 5% of birds from these British colonies raise their young and winter in the southern parts of the Norwegian trench (Figure 4.10b).

Figure 4.9 Location and extent of areas and breeding colonies of international importance for seabirds in the North Sea, Skagerrak and Kattegat



Skov *et al.*, 1995

Figure 4.10 Distribution and density of Little Auk (a) and Guillemot (b) in the North Sea, Skagerrak and Kattegat

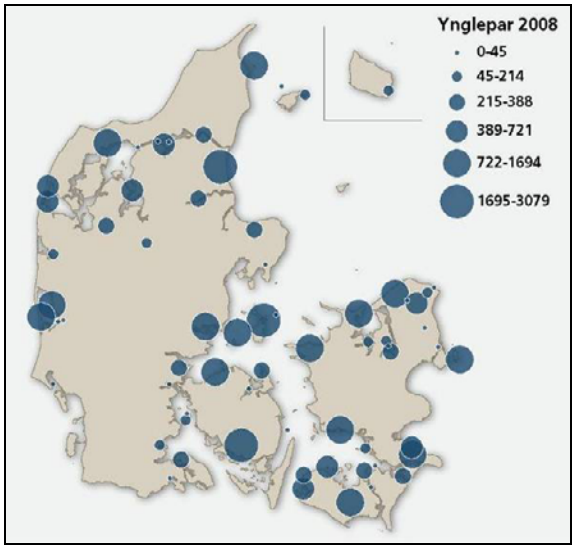


Skov *et al.*, 1995

Denmark has seen a strong and steady increase in cormorant population since the 1970s. When in its peak during autumn numbers reach 250,000, with approximately 30 thousand of these overwintering in Denmark. The cormorant feeds solely on fish and eats around 500 grams a day. The location and diving range of cormorants together with location and setting procedures for set nets mean that potential for interactions exist. Management plans have been in place since 1992 which aim to prevent unacceptable damage to fisheries and at the same time to protect the cormorant as a common breeding bird in Denmark.

It is however clear that this is a coastal species (Figure 4.11) and that the primary area of conflict in Denmark is with the coastal fisheries, namely pound nets (Thauront, 2009). It is therefore considered unlikely to have any significant interaction with saithe landed by demersal trawl, set nets and Danish seine.

Figure 4.11 Distribution and size of cormorant colonies in Denmark, 2008



Cormorant Management Plan, 2002-2008

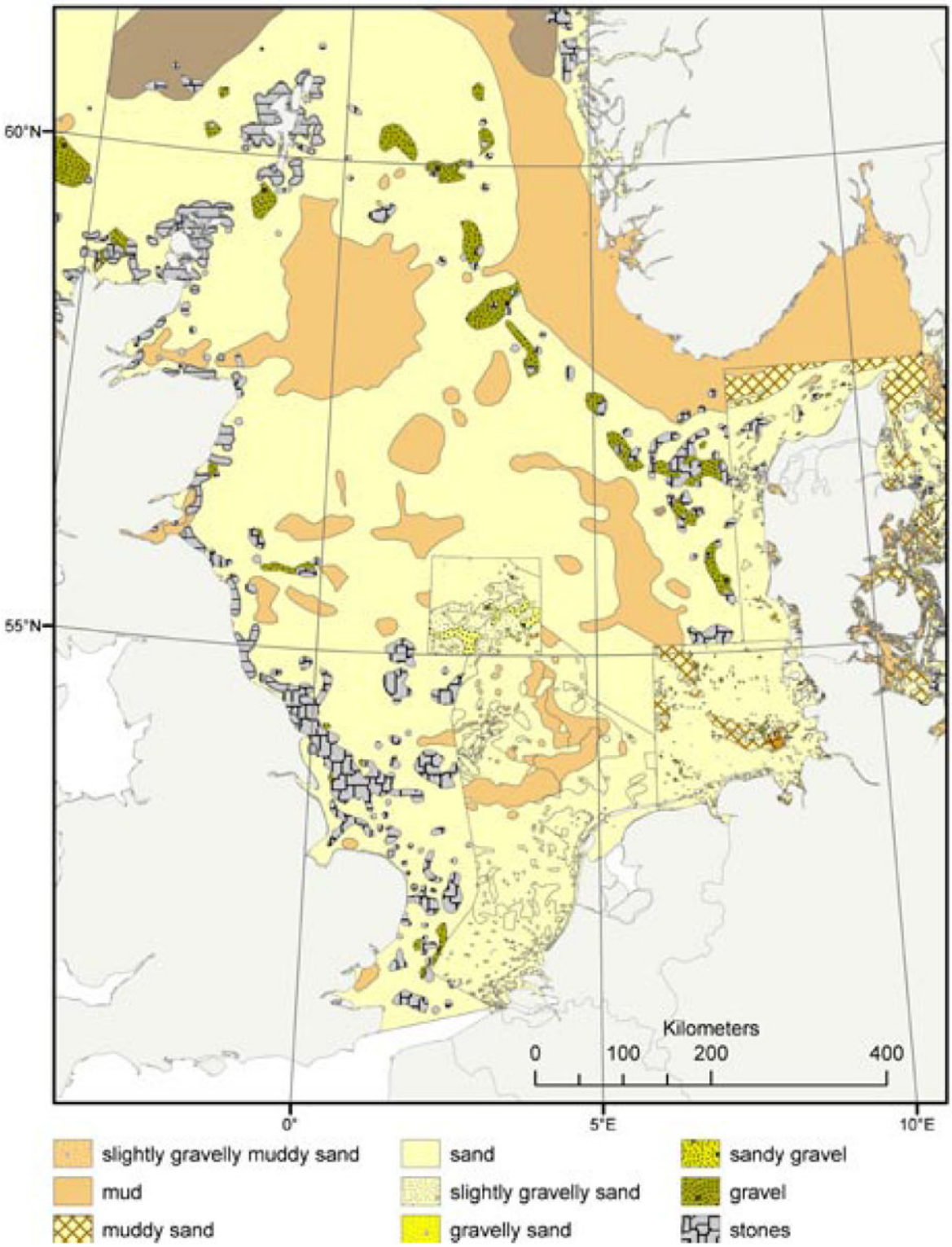
4.4 Habitat

The North Sea is a shallow and rather young ecosystem formed by the flooding of a landmass some 20 000 years ago. Its coasts and waters are still being colonised by new species from the Atlantic.

As the North Sea is shallow, there is a strong coupling between benthic and pelagic processes, making the region extremely productive (Walday and Kroglund, 2002).

The seabeds are predominantly sand, with mud and muddy sand in deeper parts. Gravelly areas and rock occur in small patches throughout, but tend not to appear across muddy areas (Figure 4.12).

Figure 4.12 Aggregated sediment map of the North Sea



Schlüter and Jerosch, 2009

Threatened and declining species and habitats are listed by OSPAR and available geographically for some biotopes through NBN Gateway (2010).

» Carbonate mounds

» Deep sea sponge aggregations

» Intertidal mudflats

» Intertidal mudflats - sub-type estuarine

» Intertidal mudflats - sub-type marine

» Intertidal *Mytilus edulis* beds on mixed and sandy sediments

» Littoral chalk communities

» *Lophelia pertusa* reefs

» Maerl beds

» *Modiolus modiolus* horse mussel beds

» Oceanic ridges with hydrothermal vents/fields

» *Ostrea edulis* beds

» *Sabellaria spinulosa* reefs

» Seamounts

» Seapens and burrowing megafauna communities

» *Zostera* beds including *Z. marina* and *Z. noltii* beds

The distribution of these species and habitats have been studied together with the VMS data for Danish demersal trawlers, Danish seiners and set netters targeting saithe to establish any potential for overlap.

Based on studying OSPAR/NBN Gateway data it is assessed that the following species may occur across saithe fishing grounds: *Lophelia pertusa* reefs, *Zostera* beds *Z. Marina* and seapens and burrowing megafauna communities. Based on information collated by WWF it is considered that deep sea sponges may potentially occur at the edge of saithe fishing grounds, however it is noted that NBN Gateway does not concur with this finding. These species and habitats are discussed further below and presented in Figures 4.13 and 4.14.

Lophelia pertusa is a cold water, reef-forming coral which has a wide geographic distribution and occur within a depth range of 200m to greater than 2,000m. It is reported that the biological diversity of the *Lophelia* reef community can be three times as high as the surrounding soft sediment (OSPAR, 2008).

The delicate structure and slow growth rate (6mm per year) of *Lophelia* makes them particularly vulnerable to physical damage. Evidence from sidescan sonar and underwater photography show crushed reefs and damage that is likely attributed to fishing such as bottom trawling and entanglement from lost nets (Bett *et al*., 2001: Wheeler *et al.,* 2001; Fosså *et al.,* 2000). Closed areas for certain gear types have been introduced in some areas to protect *L.pertusa* reefs

Zostera seagrass beds develop in intertidal and shallow subtidal areas on sands and muds. They may be found in marine inlets and bays but also in other areas, such as lagoons and channels, which are sheltered from significant wave action. One record does appear to occur in an area that may be fished, but given *Zostera* habitat requirements it is unlikely that the commercial fisheries under assessment have any interaction with this species.

Seapens and burrowing megafauna communities are characterised by plains of fine mud, at water depths ranging from 15-200 m or more, which are heavily bioturbated by burrowing megafauna with burrows and mounds typically forming a prominent feature of the sediment surface. These communities are defined by the presence of one or either of two groups of animals, sea pens (e.g. *Pennatula phosphorea* or *Virgularia mirabilis*) and/or burrowing decapod crustaceans (e.g. *Nephrops norvegicus, Calocaris macandreae, Upogebia* spp. and *Callianassa* spp.). Due to the presence of *Nephrops* it is clear that such grounds are often targeted by commercial fisheries.

Deep sea sponge aggregations are principally composed of sponges from two classes: *Hexactinellida* and *Demospongia* which are known to occur between depths of 250- 1,300m (Bett & Rice, 1992 as cited in OSPAR, 2008). Deep-sea sponge aggregations can occur on both on soft and hard substrata, preferring similar habitats to the cold-water corals and so are often found at the same location. Due to their body structure, sponges are sensitive to increased turbidity, which can lead to smothering. However, physical disturbance to the seabed is the main threat to this species. Sponges are known to be taken in fishing nets but less is known about the effects of those that are not brought up, for example, dislodging or smothering.

Danish marine habitats that are protected as Natura sites are shown in Figure 4.6. WWF recently produced a document titles Towards Good Environmental Status which sets out proposals for a network of Marine Protected Areas (MPAs) for the North Sea. As part of this and as previously mentioned, WWF have mapped deep water sponges (Figure 4.14) which, based on evidence from a number of sources, appear to occur adjacent to the Norwegian Trench. Furthermore it is proposed that blue belts be designated as specially managed areas to compliment MPAs (Figure 4.15).

The criteria used for locating the Blue Belts are (WWF, 2009):

» Representation and connectivity - by ranging from the coasts offshore, from shallow to deep water, they include as much habitat heterogeneity as possible and provide an ecological link between the habitats represented in individual MPAs; and

» Importance for OSPAR listed species and habitats

It is well documented that fishing gear may cause damage to substrates and benthic habitats by altering sediment structure and destroying benthic organisms. Furthermore, few areas of the North Sea are unfished and undamaged by demersal trawling (Frid *et al*., 1999). Structural changes may have long-term negative effects on the structure and productivity of the benthic community, such as:

» Shifts from larger, longer-lived benthic species to smaller more opportunistic species (Lindeboom and de Groot, 1998);

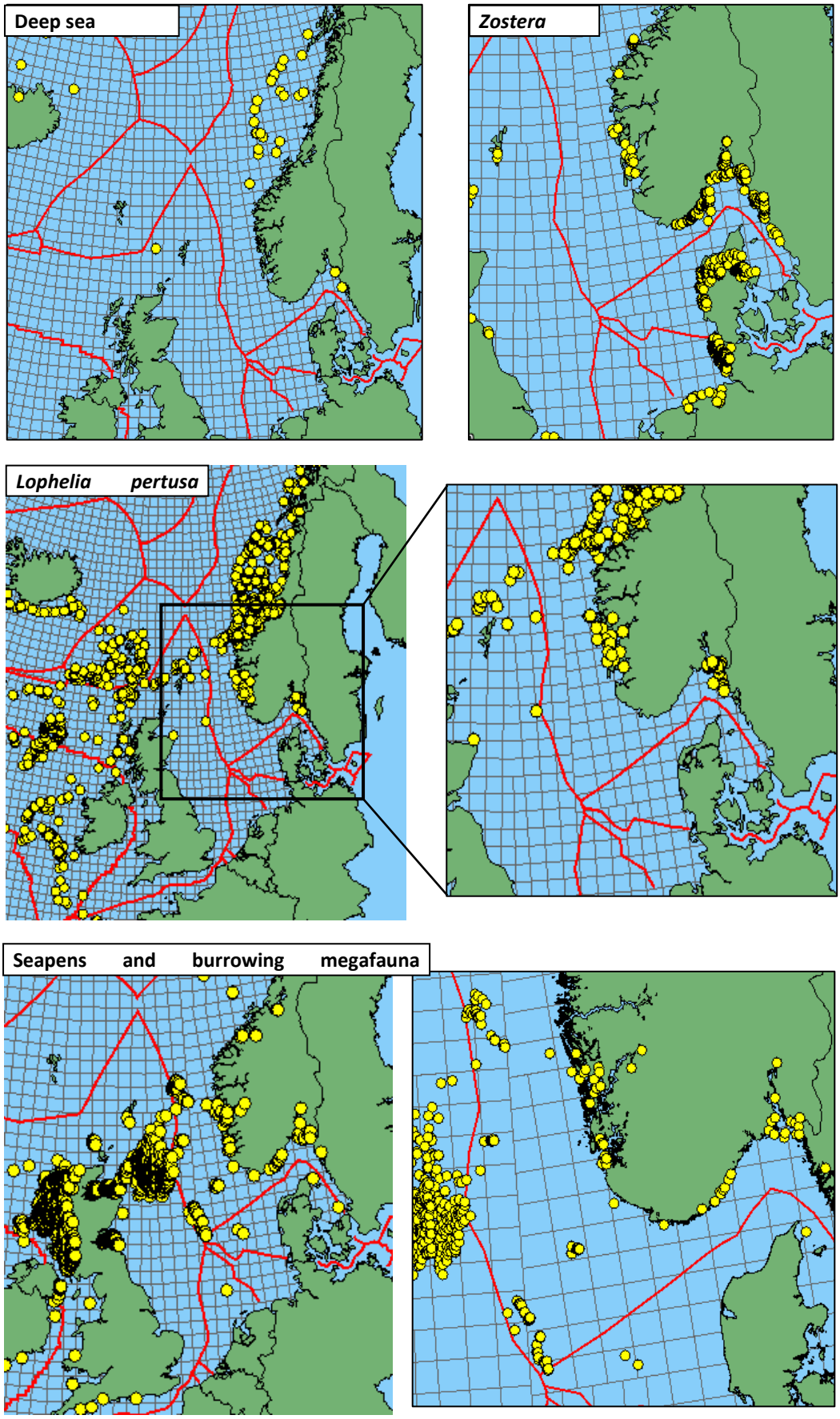
» Decrease in the abundance of gadoids and increase in flatfish, resulting in increased predation pressure on the benthos (ICES, 1999);

» Attraction of demersal bottom feeders, such as cod and plaice, to the trawling sites to feed on benthic invertebrates, which can be more susceptible to predation by damage from trawling.

These indirect effects on fish diets and benthic predation rates result in changes in the nutritional dynamics and community structure, which are important determinants of the functioning of the benthic ecosystem (OSPAR, 2000).

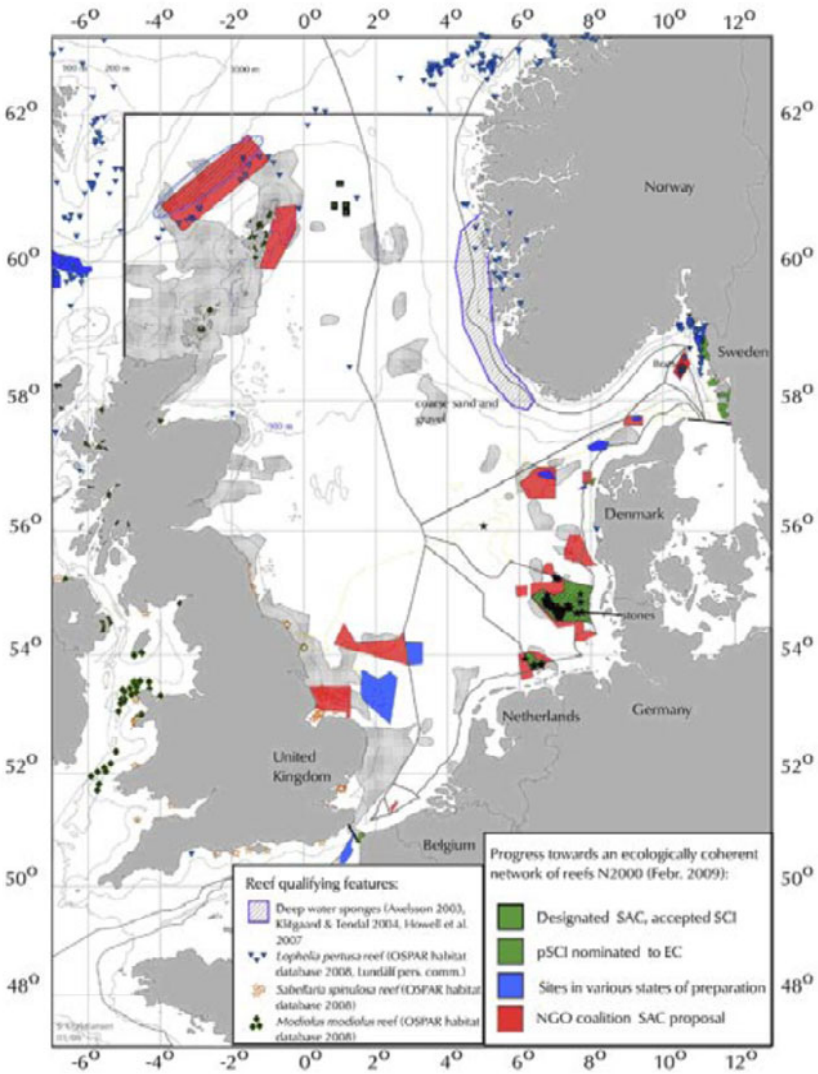
Studies of the effects of fisheries on the benthos are complicated because fishing disturbance has been occurring for more than 100 years and trawling is not distributed homogeneously. Some areas of the bottom are visited more than 400 times a year, and others not at all (Rijnsdorp *et al*., 1992).

Figure 4.13 OSPAR Threatened and/or Declining Species and Habitats



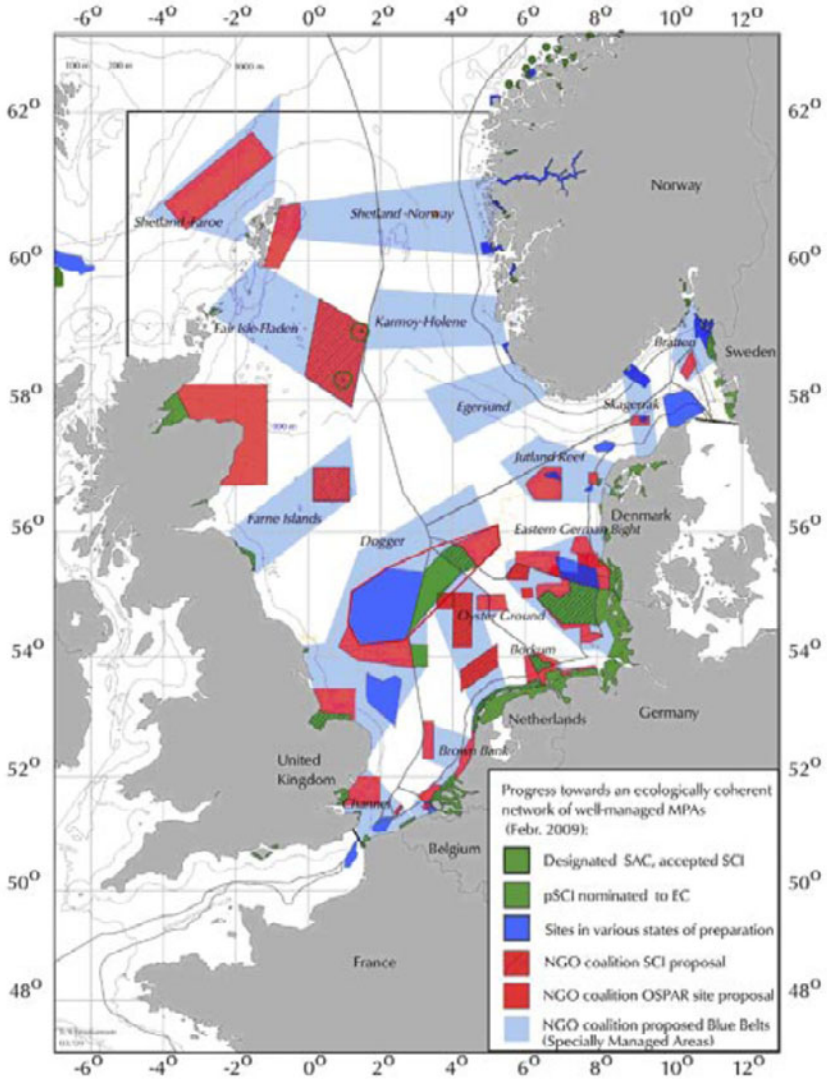
NBN Gateway, **2010**

Figure 4.14 WWF proposal for North Sea MPA network- Habitats Directive - Reefs. Supportive information



WWF, 2009

Figure 4.15 WWF proposal towards an ecologically coherent network of MPAs - Blue Belts to complement MPAs



WWF, 2009

4.5 Ecosystem impacts

There is considerable knowledge of the habitats and ecosystem of the North Sea and Skagerrak region.

The food web (see Figure 4.16 for simplified version) is well understood in the North Sea and CEFAS recently published an ecosystem model to support an ecosystem approach to fisheries management in the North Sea (Mackinson and Daskalov, 2008).

Ecosystem models are tools that allow the effects of different management measures on the ecosystem to be understood, for example MPAs. Mackinson and Daskalov (2008) state that "*The model is best designed to address questions regarding processes that occur over the whole North Sea and on time scales greater than one year. As such the model is designed to help address strategic long-term questions such as those relating to the long-term ecosystem effects of changes in fishing activity and climate. It is not useful for short-term tactical question regarding fisheries management. It is complementary to existing approaches; helping managers and policy makers by giving them a view of the possible surprising and counter-intuitive effects of particular management and policy options".*

In managing potential habitat and ecosystem impacts in the North Sea, industry and management authorities are guided by relevant conventions and agreements, such as:

» Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) 1992;

» Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS) 1994 and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) 1991;

» Trilateral Wadden Sea Cooperation;

» International Conferences on the Protection of the North Sea (North Sea Conference) 1984;

» EU Birds and Habitats Directives 1992;

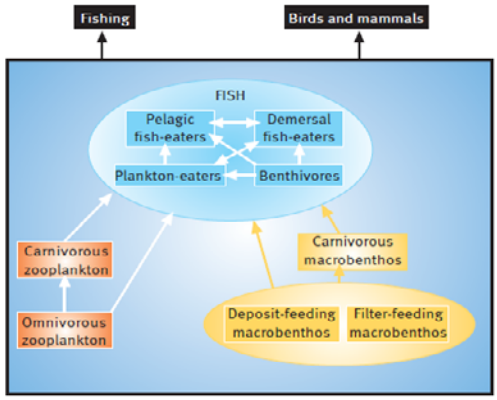
» Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) 1979;

» Ramsar Convention 1971

» The Convention on Biological Diversity was signed at the UN Rio Conference on Environment and Development (1992).

The Danish fleet targeting saithe has systems in place that work towards minimising any wider ecosystem impacts. More sophisticated assessments of impact such as carbon foot printing or waste from fish processing are not required as part of the MSC assessment.

Figure 4.16 Simplified structure of the North Sea food web



FRS, 2006

5. Administrative context (P3)

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.

5.1 Governance & Policy

Legislative Framework

The saithe resource in the North Sea and Skagerrak (ICES areas IV and IIIa) is predominantly exploited by Norway (53% of TAC), France (24% of TAC), Germany (10% of TAC), UK (8% of TAC) and Denmark (4% of TAC).

For vessels registered in Member States of the European Union, participation in this fishery is subject to the Common Fisheries Policy of the EU. This policy came into being in the form we recognise today in 1983. It was reviewed thoroughly in 2002 and the current basic fisheries regulation (No.2371/2002) was adopted by the Council of Ministers on 20 December 2002.

This regulation sets out the strategic aims of the CFP and enables the Council of Ministers, or in certain cases the Commission, to make more detailed Regulations on such issues as control requirements, fleet structure, technical conservation, marketing and annual total allowable catches (TAC) etc. Outside of the CFP framework other EU legislation deals with habitats and species protection; such legislation is also relevant to fisheries management and to the activities of fishermen.

At the national level implementation of the CFP is the responsibility of individual Member States – governed by the EC legislation itself, or by primary and secondary national legislation enacted in conformity with the EC legislation. National fisheries administrations are responsible for a range of management and regulatory duties, including:

» management of fleet activity,

» management of national quota,

» monitoring and control of all fisheries occurring within national jurisdiction,

» collection, collation and transmitting of key fishery data, and

» undertaking at least a base range of scientific monitoring and development work.

The Danish fleet exploiting the saithe resource in the North Sea and Skagerrak does so primarily by fishing within the Norwegian EEZ. (57% of landings in 2009). As such, the fleet is not only required to comply with EU and Danish legislation, but is also required to comply with relevant Norwegian legislation and practices.

Consultation, Roles & Responsibilities

The main institutions involved in management of the North Sea and Skagerrak saithe fishery are:

» ICES ACOM – provides the forum for consolidation of scientific work undertaken by scientists in participating national institutions (through relevant Expert Groups), and the delivery of advice on how best to manage fish stocks –including North Sea and Skagerrak saithe

» DG MARE of the European Commission – responsible for advising on the management of

» European fisheries through the Common Fisheries Policy

» STECF – the fisheries scientific committee of the European Commission providing advice to the Commission on all aspects of fisheries science

» Danish Ministry of Food, Agriculture and Fisheries responsible for overall management

» of Danish fisheries Danish Directorate of Fisheries responsible for monitoring, control and surveillance of the Danish fishing fleet and other vessels fishing within Danish jurisdiction, including the monitoring and management of vessel quota uptake

» Danish Fishermen's Association – responsible for representation of the interests of

» the Danish demersal fleet and fishermen

» Danish Seafood Association – responsible for representation of all Danish fish processing companies

» Danish Fishermen's Producer Organisation (DFPO) – responsible among others for certification of the Danish demersal fishing vessels to the highest standards of sustainable practice. Members of the DFPO must abide with the DFPO "Code of Conduct" to qualify for such certification.

» The North Sea Regional Advisory Council (NSRAC) – one of six advisory councils established by industry and the European Commission for the purposes of securing industry views and advice on the management of demersal fisheries.

All of these institutions have well established protocols covering their purpose, roles, operation, representation, consultation, decision-making, dissemination of policy, plans, decisions and information, and both internal and external review of practices and performance.

Objectives

The saithe fishery in the North Sea and Skagerrak is managed through an management agreement established in 1977 between Norway and the EU and updated annually thereafter. Under this agreement a management plan for saithe in the North Sea and Skagerrak was first implemented in 2006. The main points of this plan include (as per 1 January 2009):

» Maintaining the SSB above 106.000 tonnes (B_{lim});

» Setting a TAC consistent with a fishing mortality of 0.30 if SSB is above 200.000 tonnes, between 0.20 and 0.30 if SSB is 106.000 - 200.000 tonnes and 0.10 if SSB is below 106.000 tonnes.

There are clear procedures that are regularly used for the measurement of SSB and F, and for measurement of performance relative to SSB and F. These are consolidated and reported upon by the relevant ICES Expert Groups and Committees. The saithe long-term management plan is up for assessment in 2012.

Incentives

In general, the CFP includes very few positive incentives for the individual fisher to fish sustainably. This in combination with long-term low economic performance in most segments of the EU fleet has meant that the task of ensuring sustainable exploitation of the fish resources has rested with the authorities (EU and MS) rather than with the industry. This has implied that the incentive focus has for a long time been on negative incentives such as penalties for non-compliance with rules and regulations. This has made it difficult to achieve the goals formulated in the CFP.

The Green Paper on the Reform of the CFP in 2012 therefore puts focus on possible measures to encourage the fishing industry to take more responsibility in implementing the CFP. Among the measures mentioned are:

» Results-based management instead of rules on how to fish. This would leave it with the industry to demonstrate that it operates responsibly in return for access to fishing.

» Rights-based management schemes to encourage the industry to eliminate surplus capacity and invest more efficiently.

In Denmark the adoption in 2007 of a new management scheme introducing Individual Transferable Rights (ITQ) throughout the industry[8] and allowing for the formation of "vessel quota pools" has provided vessel owners with incentives to undertake operational planning on a long-term basis and avoid quota related discards, - both in support of sustainable fishing.

Since the 2002 revision of the CFP, subsidies that contribute to unsustainable fishing have stopped. There is no support to increase capacity, or to compensate for low catches. The industry does not pay directly for management or science, though on balance this is not considered a subsidy to fleet operation.

Some NGOs have in the past questioned whether development support through the EC's structural funding mechanisms to the fishery sector –the European Fisheries Fund (EFF) – constitutes continuing subsidy to the sector. In recent rounds of such development funding, financing restrictions have been tightened.

A preferential tax system is applied to fuel across all EU primary production sectors. This is deemed by some to constitute a subsidy to operation. It is difficult to sustain this argument on a relative basis, as on the whole, European countries apply a far higher level of taxation on fuel than any other economic block in the world (with the exception of Japan).

5.2 Fishery Specific Management System

The saithe fishery in the North Sea and Skagerrak is managed in line with the long-term objectives established under the EU – Norway fisheries agreement, and in line with the advice provided by ICES. This is interpreted and applied at EU, national and fleet levels through a tiered process of review, consultation and planning – in conformity with EU and national policy. This includes a range of input and output controls.

At an operational level short-term objectives are primarily represented by output controls linked to the annual setting of Total Allowable Catch (TAC). Achievement against this annual target is monitored at national level on a monthly basis. The TAC for saithe in the North Sea and Skagerrak is established in the course of the annual consultations between Norway and the EU taking into consideration the advice provided by ICES. Management is by agreed Reference Points and Harvest Control Rule as well as real time closures (RTC) when needed to protect juveniles. RTC-system is to be evaluated in 2010.

The allocation of the TAC to between the two parties is also agreed at this time. That allocated to the EC is distributed between Member States according to the "Relative Stability" allocation key established at the time of the foundation of the CFP. In respect of the Danish demersal fleet relevant quota allocation is shared out between vessels on the basis of quota rights established on the basis of historic track records on fish landings plus transfers arising from trade in the entitlement to fish quota.

[8] The ITR scheme includes all commercial fishing vessels with an annual turnover above €35.000.

The allocation of the TAC to between the two parties is also agreed at this time. That allocated to the EC is distributed between Member States according to the "Relative Stability" allocation key established at the time of the foundation of the CFP. In respect of the Danish demersal fleet relevant quota allocation is shared out between vessels on the basis of quota rights established on the basis of historic track records on fish landings plus transfers arising from trade in the entitlement to fish quota. The allocation system applied is effectively synonymous with Individual Transferable Quotas (ITQs). Quotas may be re-distributed on a temporary (annual) basis) trough quota lease or swaps among members of "vessel quota pools". At present there are 11 such pools in Denmark and they are responsible for managing the uptake of quota by their respective members. The Danish Fisheries Directorate monitors the individual quota uptake on a day-to-day basis from sales notes from first hand sales and among others informs the quota pool managers hereof. The facility exists to stop the fishery nationally once the quota is taken up.

Compliance & enforcement

Denmark is a Member State of the European Union, and its fisheries are subject to the principles and practices of the Common Fisheries Policy. Elements of Member State compliance with EC Regulations are captured in the annual EC fisheries compliance scoreboard[9]. The activities of the Danish vessels fishing for saithe in the North Sea and Skagerrak are tracked by satellite, and their catches and landings are monitored through logbook declarations, inspections at-sea and onshore, and supply chain monitoring. The key elements of this system are also upheld by the Norwegian administration, and data is shared between the Member States of the European Union and between the EU and Norway. In this way the activities of the Danish fleet can be comprehensively monitored by the Danish authorities, even where fishing is undertaken in Norwegian waters, and where landings are made to ports outside Denmark.

In relation to saithe TAC, there is a clear system of data collection, testing and feedback, and there is regular inspection of landings. When Danish vessels are fishing in the "Norwegian zone" there are regular inspections at sea by the Norwegian navy, and fleet activity is monitored by aerial surveillance and through a satellite mediated VMS (Vessel Monitoring System). All non-Norwegian vessels fishing in Norwegian waters are required to comply with relevant Norwegian legislation, and to make themselves available for inspection by the Norwegian Navy at nominated points inside the Norwegian EEZ before being cleared to "cross the line" into EU waters.

The machinery of the EU and Norwegian MCS systems (operational procedures) is well developed, is in place, and is applied in a clear and transparent way. Non-compliance is dealt with by the relevant national authorities through their criminal justice systems, and using agreed and tested procedures. It has been confirmed by the Danish Fisheries Directorate that the Danish vessels targeting saithe are operating in compliance of the rules. At least three vessels targeting saithe in the North Sea and Skagerrak are part of the Danish "Fully documented fishery" experiment where all fishing operations are video documented.

Although the system appears robust and effective, as detailed above, it stops short of being *high confidence* for a number of reasons, among them a relatively low observer / inspections coverage, a focus of inspections (both at sea and on landing) on cod (as opposed to other species), unclear how the high grading ban is enforced at sea. It is notable that the landings size / weight profile of vessels taking part in the "Fully documented fishery" pilot study suggests that high grading is likely to still occur. It is also recognised that there is still a low level of discard sampling. However, it is also recognised that the Danish Ministry is actively pushing for a solution in these areas and the DFPO Code of Conduct instruct members holding MSC certificates to avoid high grading and report systematically on observations of importance to the effective management of the fishery.

[9] http://ec.europa.eu/competition/state_aid/studies_reports/studies_reports.html

Decision making & Dispute Resolution

At the international scale, decisions are taken in relation to the overall level of the TAC (based on ICES advice), and how this is allocated between the EU and Norway. The Danish vessels having saithe quota rights all receive a share of the EU quota. All EU member states have signed up to the CFP, and are bound by European legislation. Disputes between Member States and the Commission are resolved in the Council of Ministers. Where appropriate, European legislation is enacted at the national level through relevant primary and secondary legislation. Formal procedures apply for the resolution of disputes through the European Court of Justice and the national court systems.

Extensive consultative processes are in place at national and European levels to debate policy, plans and management, and recent years have seen the introduction of more formal procedures to incorporate a wider stakeholder community within such consultations. Key institutions in this regard are the Advisory Committee on Fisheries and Aquaculture (ACFA) - which comprises a contact group at the European level for all stakeholders at national and regional levels – and the Regional Advisory Councils (RACs) – which comprise a contact group dealing with particular fisheries at the regional level. There is a North Sea RAC that deals with issues relating to amongst others the North Sea Saithe.

Within the fisheries administrative structures of the member state there are a wide range of bodies and committees through which problems can be raised and disputes debated and resolutions found. In Denmark the Fisheries Law (2008) establishes two Advisory Committees relevant to the saithe fishery: 1. The EU-fisheries Committee (§5 Committee) which advises on EU fisheries policy matters and the rules and regulations needed to implement the CFP and 2. The Committee on Commercial Fisheries (§6 Committee) which advises on the planning and management of the commercial fisheries, including fleet capacity, fishing gear use etc. and on the first hand sale of fish. Members of the Committees represent the Association of Danish Fishermen, the association Danish Aquaculture, the Producer Organisations, The Danish Seafood Association, the Association of Employers in the Fish Processing Industry, the Association of Danish Fish Meal and Fish Oil Producers, the Business Council of the Labour Movement, and the WWF.

Outside the machinery of government, there are a range of institutional solutions to dispute resolution – through the professional associations (at local, regional and national levels).

Research Plan

The core backdrop to the management of the saithe fishery is the advice provided by the ICES Advisory Committee (ACOM) which draws on the on-going work of international scientists from relevant research laboratories and institutions on the stock biology and marine science. Scientific research and assessment is carried out by ICES Working Groups and specialist study groups. The assessments are reviewed and evaluated by the ICES Advisory Committee (ACOM) which then provides advice on the status of target and non-target stocks to the European Commission and Norway. ICES advice, via Commission proposals, informs the annual EU Council of Ministers regulation establishing management measures, in particular TACs and quotas.

Stock assessment and data gathering methodologies are regularly reviewed - at STECF and ICES level and at the level of the contributing laboratories and research institutions. Within ICES, a methods working group keeps methods for fish stock assessment under regular review, and there are specific working groups dealing with various issues relevant to the fishery such as e.g. he precautionary approach, discards, biological sampling etc.

Scientists from the Danish DTU-Aqua are actively involved in research in demersal fish stocks in the North Sea and relevant ICES expert groups. Given the particular importance of the North Sea and Skagerrak saithe stock to the Norwegian fishery economy, most of the relevant research on this

stock is undertaken by the Norwegian scientific establishment, albeit in cooperation with scientists from other relevant fishing countries.

At a more local level, research on fishing techniques, bycatch reduction, and improvements in technology are encouraged and applied through regular cooperation between the Danish fishing industry, national authorities and research institutions supported by funding from EC funding mechanisms and national research funds.

Management Evaluation

The management system is subject to regular internal review (as required by the CFP). This occurs at every level of the system with policy documents formulated at the European Commission level as a result of initiatives at international, European, member state, and sub-national levels. These policies and resulting operational plans and practices are then subject to wide consultation before ratification, and prescribed monitoring and evaluation processes after ratification. These systems also include formal consultation and review processes involving all EC Member State fisheries administrations, and committees such as ACOM (the body through which ICES provides formal advice), STECF (the committee by which the European Commission seeks expert opinion on fisheries), the Advisory Committee on Fisheries and Aquaculture (ACFA) dealing with industry concerns at a European / "horizontal" level), and the Regional Advisory Councils (RACs) dealing with regionally specific technical issues (of which the body specifically incorporating saithe fishing interests is the North Sea RAC).

A wide range of normative monitoring of fisheries practice and the work of the various management institutions also takes place. This includes data collection on vessels (vessel register), fleet activity (days at sea, VMS), landings, catches (through observer programmes including the "fully documented fisheries" programme), and operating economics (costs and earnings surveys). In terms of institutional performance, regular monitoring against performance targets is undertaken in respect of statistics collection, quota management, aerial, at sea, and on-shore inspections, checks across the audit trail, fisheries enforcement (including prosecutions), and the nature and extent of development support to the sector. On balance, management plans are modified on an annual basis, and the various review processes do ensure that systems adapt to changing circumstances, and are subject to critical inspection. There are various checks and balances of the management system in place, but it has to be said that this is not always a regular, rapid or formalised process.

The saithe fishery is an industrial scale activity, in terms of scale and intensity of both the Danish fishery and indeed the international fishery. Control, management and administration are designed accordingly. Specifically the management system, which includes complex and comprehensive MCS (Monitoring, Control, Surveillance), is appropriate to the scale of this consolidated, modern and large-scale fishery. In addition the harvest control rule, agreed between Norway and the EU which determines the level of the TAC is reviewed by ICES scientists.

6. Background to the Evaluation

6.1 Assessment Team

Assessment team leader: Dr. Paul Medley

Lead assessor, fishery scientist / stock assessment specialist with particular responsibility for assessment under Principles 1

Dr Paul Medley is an experienced fishery scientist and population analyst and modeller, with wide knowledge and experience in the assessment of pelagic stocks (amongst a range of marine fish stocks and ecosystems). He holds a first degree in Biology and Computer Science (1st class honours) from the University of York, and a doctorate from Imperial College, London, based on a thesis *"Interaction between Longline and Purse Seine in the South-West Pacific Tuna Fishery*".

He has travelled widely and worked with a range of fishery systems and biological stocks, both as principal researcher and as evaluator. He is familiar with MSC assessment procedures, having participated in a significant number of MSC full assessments across a range of fisheries, undertaken a substantial number of pre-assessments and acted as peer reviewer in still others.

He is familiar with a wide range of fisheries in the North East Atlantic and other parts of the world, and over the period 2000 to 2005 he has been serving with the Centre for Independent Experts, University of Miami, as an evaluator of various US fishery research programmes. He has been working with the MSC on the development of guidelines for certification of small scale, data poor fisheries. He is based in York.

Expert team member: Ms. Fiona Nimmo

Fishery scientist and industry analyst with particular responsibility for assessment under Principle 2

Fiona Nimmo is a senior consultant specialising in fisheries, marine management and energy projects. With degrees in both chemical engineering and marine biology, she has a solid background in science that allows her to adapt to challenging projects. Fiona has over six years of experience in commercial fisheries, impact assessments and natural fish and shellfish resources. She has experience of fisheries within the North Sea, Irish Sea, Atlantic Ocean and English Channel. Impact assessments are undertaken with due regard to the sensitivity of specific habitats and species. Fiona therefore has experience across a diverse range of marine habitats such as sandbanks, biogenic reefs and mearl beds, and species including marine mammals (both cetaceans and seals), sharks (such as basking shark and various ray species) and fish and shellfish (including herring, mackerel, plaice, sole, salmon, lobster, edible crab, *Nephrop*s, scallop etc).

Fiona has completed a number MSC pre assessments for UK fisheries and is currently involved in the pre-assessment for 33 Danish fisheries. She has undertaken commercial fisheries and natural fish resource assessments for EIA studies for various marine developments including large offshore wind farms. She has contributed to product flow analysis for the Marine Fisheries Agency and the South East Economic Development Agency and recently completed a Regulatory Impact Assessment of marine extensions to Special Protected Areas (SPA) for the Scottish Government. This project focused on the potential impacts of commercial fisheries on the SPA sites designated to protect seabird species.

Fiona is currently involved in developing a Model Management Plan and Guidance for Scottish Inshore Fishery Groups and reviewing objectives and measures for brown crab management for the UK and Ireland Crab Working Group

Expert team member: Prof. Sten Sverdrup-Jensen

Fisheries economist with particular responsibility for assessment under principle 3.

Sten has more than 30 years of experience with Danish and international fisheries. In 1978-81 he was the Director of the North Jutland County/Aalborg University Fisheries Research Group undertaking the first EU fisheries research project in Denmark. As founding director of Danish Institute of Fisheries Technology 1981-87 Sten Sverdrup-Jensen was involved in various research and consultancy projects focusing on fisheries management and development in Denmark.

After leading a global evaluation of EU fisheries development aid Sten Sverdrup-Jensen in 1991 took up a position as Planning Adviser to the Director General and Acting Director of Social Science Division at ICLARM (now World Fish Center). Upon his return to Denmark Sten Sverdrup-Jensen in 1993 was the founding director of IFM and involved in research and consultancy work related primarily to institutional aspects of fisheries management for a range of Danish and international clients. After having served as Chief Technical Adviser to Danida/Mekong River Commission on the establishment of fisheries R&D institutes in Cambodia and Laos in 1999-2002 Sten Sverdrup-Jensen re-joined IFM and took up positions as Senior Researcher and Acting Director/Head of Centre.

His most recent research work relates to EU fisheries (e.g. Indicators for Fisheries Management in Europe, IMAGE). His most recent expert assignments include studies on a) Economic and Social impacts of the proposed scenarios for a long term management plan for Baltic pelagic fisheries and b) Impact Assessment Studies related to the 2012 revision of the CFP, both commissioned by the DG MARE as well as the assessment of Danish pelagic fisheries for MSC certification. In 2008 Sten Sverdrup-Jensen was appointed Professor (adj.) at Aalborg University.

Expert advisor: Dr. Antonio Hervás

Dr. Antonio Hervás is Food Certification International Fisheries Development Manager.

He is an established Fisheries Scientist specialized in quantitative stock assessment methods and the design of management strategies for the sustainable exploitation of the fish resources. Dr. Hervás holds a Bsc in Marine Sciences, a Higher Diploma (postgraduate course) in Fisheries Management, Development and Conservation and a PhD in the development of stock assessment procedures. From 2001 to 2008 he worked as a fisheries scientist for the assessment on mollusc stock of Ireland at Trinity College Dublin and at the marine Science-MRI at the National University of Ireland, Galway. During this time Dr. Hervás was an active member of the National Shellfish Management Framework with responsibilities on providing scientific advice on the status of mollusc stocks for their management. During this time Dr. Hervás published several peer reviewed papers, technical reports and has acted as peer reviewer for the ICES Journal of Marine Science. From 2009, Dr. Hervás acted as Team Leader and Principle 1 expert against the MSC standard.

Expert Advisor: Martin Gill

Martin Gill, the Managing Director of FCI, coordinated the assessment process, and participated as a team member during the assessment as required. Martin is a marine biologist and fisheries specialist, a former staff member of the Copenhagen-based Eurofish international fishery development organisation, and is a shareholder and board member of Food Certification International.

Martin was appointed as Executive Director of Food Certification (Scotland) Ltd in June 2002 and led a successful management buyout in early 2007. He joined from a five year period with FAO EASTFISH, a Food and Agriculture Organisation of the United Nations project providing a fish marketing and investment service for Central and Eastern Europe based in Copenhagen. (This project is now known as Eurofish). Among other duties he acted as the founding editor of the organisation's Eurofish magazine.

A graduate in Marine Biology from University College, Swansea, he was also a former Editor of World Fishing magazine for 5 years and has contributed since 1992 to the Encyclopaedia Britannica Book of the Year with the commercial fisheries section.

6.2 Public Consultation

Public announcements of the progression of the assessment were made as follows:

Date	Announcement	Method of notification
31/08/2009	notification of commencement of assessment	notification on MSC website
17/12/2009	nomination of Assessment Team candidates	notification on MSC website
23/11/2009	solicitation of inputs to stakeholder consultation and assessment	email, phone and mail

25/01/2010	announcement of Assessment Tree and Scoring Guideposts	notification on MSC website
25/01/2010	announcement of assessment visit and convening of stakeholder consultation meetings	direct email, notification on MSC website
22-26/02/2010	assessment visit	Advertisement in Fiskeritidende
11/05/2010	notification of Proposed Peer Reviewers	Notification on MSC website
11/11/10	notification of Public Comment Draft Report	Notification on MSC website
13/01/11	notification of Final Report	Notification on MSC website

6.3 Stakeholder Consultation

6.3.1 Extent of available information

A total of 13 stakeholder individuals and organisations having relevant interest in the DFPO Danish North Sea plaice 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 the Danish Press, Fiskeritidende.

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. Records of all interviews and consultations are kept by FCI and form an important part of the audit trail of assessment.

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.

6.3.2 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.

6.3.3 Stakeholder Interview programme

Following the collation of general information on the fishery, a number of meetings with key stakeholders were scheduled to discuss the assessment. These meetings were held as follows:

Name	Position	Organisation
Jonathan Jacobsen	Client representative	DFPO
Per Nielsen	Skipper	
Flemming Neilsen	Skipper	
Johnny Puolsem	Skipper	
Alfred Fisker	Skipper	
Jørgen Dalskov	Head of section for Public Sector Consultancy	DTU Aqua (National Institute of Aquatic Resources)
Morten Vinther	Senior Advisor	
Marie Storr-Paulsen	Head of Monitoring	

Lotte Kindt	Mammal scientist	
Ulla Wiborg + others	Coordinator for certification, traceability etc	Fisheries Directorate & Inspectorate
Arne Madsen	Head of Fisheries Inspection	Fisheries Directorate & Inspectorate
Mr Ole Poulsen	Head of fisheries policy	Ministry of FAF
Christoph Mathiesen	Programme Officer, Fisheries & Aquaculture,	WWF Denmark
Inger Näslund	Marine & Fisheries Conservation Officer	WWF Sweden
Sally Clink	Secretariat	Baltic RAC
Magnus Eckeskog	Assistant Secretary	
Karsten Kristensen	NGO Representative	United Federation of Danish Workers
Jesper Kobbero	NGO Representative	Alliance of Social & Ecological Consumer Organisation

All relevant stakeholders were able to attend meetings during the site visit or at other scheduled times. A record of the meeting is held in file by the certification body. No stakeholders chose to make written submissions instead of attending a meeting with the assessment team. The assessment team were therefore able to get a full understanding of the range of stakeholder views and draw upon relevant expertise or additional sources of material. The scope of views and the identified sources have, where relevant, been used in the scoring of the fishery and are referenced accordingly in the assessment tree. There are therefore no additional written submissions from stakeholders, nor issues of concern, over and above normal scoring practice, which require additional mention over and above normal reporting.

6.4 Other Certification Evaluations and Harmonisation

Three assessments of North Sea Saithe have been undertaken and completed. Details of these assessments are:

» Euronor saithe: fishing company based in Boulogne-sur-Mer, France. Saithe is fished with bottom trawl. Certification body: MacAlister Elliott and Partners.

http://www.msc.org/track-a-fishery/certified/north-east-atlantic/euronor-saithe

» Norway North Sea saithe trawl, gill-net, purse-seine, Danish seine and handline (including electronic winches – multiple hooks with lures). Certification body: Moody Marine.

http://www.msc.org/track-a-fishery/certified/north-east-atlantic/norway-north-sea-saithe

» Germany North Sea saithe demersal trawl. Certification body: Moody Marine.

http://www.msc.org/track-a-fishery/certified/north-east-atlantic/Germany-North-Sea-saithe-trawl

In addition, two further assessments of North Sea saithe are currently underway at the time of writing for this report. Details of these are as follows:

» UK Fisheries/DFFU/Doggerbank Group saithe. Certification body: McAlister Elliott & Partners

http://www.msc.org/track-a-fishery/in-assessment/north-east-atlantic/UK-saithe

» Scapêche and Compagnie de Pêche de St. Malo saithe. Certification body: McAlister Elliott & Partners

http://www.msc.org/track-a-fishery/in-assessment/north-east-atlantic/Scapeche-and-CoPSM-saithe

No official harmonisation meeting has taken place between the CBs that certified these fisheries and FCI as the team found the scores and conditions of these other fisheries to be similar to their findings for this fishery. As such, harmonisation meetings, as such, were not required by the assessment findings.

6.5 Information sources used

The principal sources of information used in this assessment process derive from information presented to the team by the client and fishery managers, by information derived as a result of interviews and consultations with members of the fishing industry, processors, regulators, and other stakeholders, and as a result of literature search.

The primary sources of information on this stock and the fishery are the:

» ICES. 2009. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak - Combined Spring and Autumn (WGNSSK), 6 - 12 May 2009, ICES Headquarters, Copenhagen.. 1028 pp.

» ICES. 2009. 6.4.12 Saithe in Subarea IV (North Sea), Division IIIa (Skagerrak), and Subarea VI (West of Scotland and Rockall). Book 6. ICES Advice 2009.

» WGECO. 2008. Report of the Working Group on Ecosystem Effects of Fishing Activities (WGECO). May 6–13 2008 Copenhagen, Denmark

» WGRED. 2008 Report of the Working Group for Regional Ecosystem Description (WGRED) ICES CM 2008/ACOM:47.

» WGSAM. 2008. Report of the Working Group on Multi-species Assessment Methods (WGSAM). 6–10 October 2008. ICES Headquarters, Copenhagen. ICES CM 2008/RMC:06

» WKFMMPA. 2008. Report of the Workshop on Fisheries Management in Marine Protected Areas 2-4 June 2008. ICES Headquarters, Copenhagen, Denmark.

Taken in combination these provide a clear consolidated view of the stock, the fisheries that exploit the stock, and the science behind advice on the management of the stock. In addition a number of other sources have been used in this assessment, which are detailed in full in Appendix 2.

7. Scoring

7.1 Scoring Methodology

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 Ps & Cs and a graphical representation of the assessment tree is presented as **Appendix 1** 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 3**).

Scoring of the attributes of this fishery against the MSC Ps & Cs involves the following process:

» Decision to use the MSC Default Assessment Tree contained within the MSC Fishery Assessment Methodology (FAM v2).

» 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 fishery is shown as **Appendix 3** 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; and

» 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.

7.2 Scoring

The assessment team convened a scoring meeting from 8th to 12th March 2010 in Edinburgh (UK). The output of these meetings is shown in the scoring sheets forming **Appendix 3** to this report. The scores allocated to the assessment tree at Sub-criterion, Criterion and Principle levels are shown schematically in **Table 7.1**. The weighted scores for those sub-criteria where a score of below 80 has been allocated at Performance Indicator level – and thus triggering the placing of a condition to bring that element up to good industry practice - are indicated in **red**.

Further details are provided below on those areas where current practices are considered to be below good industry practice. In all cases however, these are not sufficiently below best practice to warrant an automatic failure (i.e. none score less than 60).

In each of these cases a condition is placed upon the fishery as a requirement of certification, further explanation of the attached conditions[10] is provided in section 8.3. Further elaboration on the justification for the scores is provided in the relevant performance indicator in the assessment tree in Appendix 3.

Summary of scores are detailed on the following page ...

[10] In some cases several of the issues of concern raised in the scoring and outlined here, are covered by a single condition.

Figure 7.1: Summary of the scores for Denmark North Sea & Skagerrak saithe

Principle 1 – Stock Status / Harvest Control Rules			All gear types
1.1.1	Outcome (status)	Stock status	90
1.1.2		Reference Points	80
1.1.3		Stock Rebuilding	N/A
1.2.1	Management	Harvest Strategy	95
1.2.2		Harvest control rules & tools	80
1.2.3		Information & monitoring	75
1.2.4		Assessment of stock status	85

Principle 2 – Wider Ecosystem Impacts			Trawl	Danish Seine	Set Net
2.1.1	Retained Species	Outcome (status)	80	80	80
2.1.2		Management	90	90	90
2.1.3		Information	90	90	90
2.2.1	Bycatch	Outcome (status)	80	80	80
2.2.2		Management	90	90	90
2.2.3		Information	85	85	85
2.3.1	ETP Species	Outcome (status)	75	75	75
2.3.2		Management	60	60	60
2.3.3		Information	80	80	60
2.4.1	Habitats	Outcome (status)	60	80	90
2.4.2		Management	75	80	80
2.4.3		Information	80	80	80
2.5.1	Ecosystem	Outcome (status)	85	85	85
2.5.2		Management	80	80	80
2.5.3		Information	90	90	90

Principle 3 – Management / Governance			All gear types
3.1.1	Governance & Policy	Legal & customary framework	95
3.1.2		Consultation, roles & responsibilities	85
3.1.3		Long term objectives	100
3.1.4		Incentives for sustainable fishing	80
3.2.1	Fishery-specific Management System	Fishery specific objectives	80
3.2.2		Decision making processes	80
3.2.3		Compliance & enforcement	85
3.2.4		Research plan	80
3.2.5		Management performance evaluation	85

8. Certification Recommendation

The actual Eligibility Date is 1st September 2010

8.1 Overall Scores

The Performance of the saithe fishery in relation to MSC Principles 1, 2 and 3 is summarised below:

Table 7.2. MSC Principles 1, 2 and 3 overall score

MSC Principle	Fishery Performance		
	Bottom Trawl	Danish Seine	Set Nets
Principle 1: Sustainability of Exploited Stock	84.4 - PASS		
Principle 2: Maintenance of Ecosystem	80.0 - PASS	81.6 - PASS	81 - PASS
Principle 3: Effective Management System	86 - PASS		

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 DFPO Denmark North Sea & Skagerrak saithe fishery be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.

This determination was confirmed by the FCI Certification Sub-Committee following a decision by the assessment team and review by peer reviewers and stakeholders.

8.2 Conditions

The fishery attained a score of below 80 against a number of Performance Indicators, as indicated in Table 7.1. The assessment team has therefore set a number of conditions for continuing certification that the Danish Fish Producers Organisation, as the client for certification, is required to address. The conditions are applied to improve performance to at least the 80 level within a period set by the certification body but no longer than the term of the certification.

Further elaboration on the justification for the scores is provided in the relevant performance indicator in the assessment tree in Appendix 3.

As a standard condition of certification, the client shall develop an 'Action Plan' for meeting the conditions for continued certification, to be approved by Food Certification International.

The conditions are associated with Principle 2. There are no conditions associated with Principles 1 and 3.

All Danish Saithe Units of Certification have scored less than 80 all performance indicators for Endangered Threatened and Protected species. Otter trawl scored below 80 in two performance indicators (outcome and management) for Habitat. There are no conditions associated with retained species, by-catch or ecosystems.

In evaluating fishery performance the five principle 2 components (Retained, bycatch, ETP, habitats & ecosystems) are evaluated at performance indicator level according to i) Outcome Status ii) Management and iii) Information. Although conditions are grouped at component level (ie. habitats), for the suggested action within each condition the distinction between status, management and information is retained to clearly assist the client in addressing the requirements of one or more conditions.

To assist further in providing clarity and comprehensive explanation, principle 2 conditions are grouped according to Unit of Certification, taking each gear type in turn. This results in considerable potential overlap or even apparent repetition within a single Unit of Certification as well as between different Units of Certification. These overlaps provide an opportunity for a strategic approach to addressing principle 2 conditions across all fleet sectors, thereby streamlining the processes and initiatives that need to be implemented in order to address all conditions that apply to the Danish North Sea saithe fisheries.

In setting conditions for the certification to proceed, it is the intention of the certification body to assist the fishery attain 'best practice' in the areas where scoring has made it necessary for conditions to be applied. Conditions, associated timescales and relevant Performance Indicators are set out below.

Principle 1 Conditions

All Units of Certification

Condition 1	Information & Monitoring
Performance Indicators:	All gears **1.2.3 - Information / monitoring** Relevant information is collected to support the harvest strategy **Score: 75**
Timelines	1 year of certification – provide assessment team with evidence that DFPO is addressing the need for ensuring good quality data on abundance indices for the assessment of the stock. 5 years of certification – see that the assessment of the stock is being updated as established by the ICES assessment protocols.
Summary of issues	For the 2010 assessment, abundance indices used from commercial CPUE data and survey data was incomplete for its use in the assessment of the stock. As a result of this the assessment of the stock could no be update in year 2010.
Suggested Action	Work with relevant stakeholders to ensure that abundance indices are available and monitored with sufficient frequency to support the harvest control rule.

Principle 2 Conditions

Demersal trawl Unit of Certification

Condition DT1	Endangered, Threatened and Protected Species
Performance Indicators:	Demersal trawl (including otter trawl and fly shooting) **2.3.1 - Status** 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. **Score: 75** **2.3.2 - Management strategy** The fishery has in place precautionary management strategies designed to: -meet national and international requirements; -ensure the fishery does not pose a risk of serious or irreversible harm to ETP species; -ensure the fishery does not hinder recovery of ETP species; and -minimise mortality of ETP species. **Score: 60**
Timelines	by the 1st Surveillance audit – develop and implement full ETP management strategy and recording protocols by the 2nd Surveillance Audit – provide analysis of generated data and show how this is integrated into revised management.
Summary of issues	Landings data for Danish demersal trawlers targeting saithe in 2008 clearly indicate that common skate and spurdog are caught and landed in association with this saithe fishery in the North Sea and Skagerrak. EC regulation 43/2009 (which came into force in January 2009) prohibits the landing of common skate by EU vessels. In addition EC regulation 23/2010 stresses this ban for common skate and further sets a zero TAC for spurdog with an allowed bycatch of 10% of the 2009 Danish quota. It is noted that Danish vessels may still land common skate and spurdog taken in the Norwegian sector. However, landing statistics from 2009 and Jan-May 2010 reveal that common skate and spurdog continue to be landed from both EU and Norwegian zones, by Danish vessels. Early indications indicate that there is a risk of this bycatch limit being exceeded, in part due to a lack of broad awareness of restrictions. While it is not possible to determine if these landings are specifically related to the saithe fishery, it is expected to be so.
Suggested Action	Demonstrate a clear commitment to eliminating landings of common skate and spurdog, ensuring landings do not exceed those set by EC Regulations, as described above. Develop and implement a full strategy in relation to managing all ETP species encountered by the fishery, including having *in place and operational* an appropriate Code of Conduct for responsible fishing, which explicitly refers to ETP species, and which introduces robust and reliable means to monitor, manage and reduce or eliminate impacts on ETP species, including establishment and implementation of procedures to maximise live release. ETP species listed in Table 4.10 together with protected bird species should be included within this strategy. Liaise with Norway in harmonising management measures for common skate to enable the release of live common skate (which is currently illegal in Norway due to ban on discarding). Provide data and analysis to comprehensively clarify the impact of demersal trawling on ETP species including number of live releases. This could be achieved through the operation of the ETP log on certified vessels, cooperating in scientific research and increased observer coverage. Liaise with scientists to ensure data gathered is relevant, robust and useful to include (for example) date and area of capture, numbers, length or weight as well as condition on release. Collate & analyse all data generated in relation to ETP on an annual basis for all certified vessels and use to inform strategy development and make available to relevant authorities.

Condition DT2	Habitats
Performance Indicators:	Demersal trawl (including otter trawl and fly shooting) **2.4.1 - Status** The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function. **Score: 60** **2.4.2 - Management strategy** 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. **Score: 75**
Timelines	By 1st surveillance audit – Develop a spatial plan for the fishery which incorporates new habitat data and integrates habitat considerations into the CoC including measures to reduce unacceptable impacts on sensitive habitats such as gear modifications, avoidance and area closures. This should include special attention to management measures within Natura2000 sites to protect and maintain the biodiversity of these sites. Within 5 years of certification – Demonstrate data generated and research undertaken (including new data from Natura 2000 site monitoring) is shaping the development of management strategy to mitigate adverse habitat impacts including due regard to Natura 2000 sites, while plans for management of activities within these sites are being drafted.
Summary of issues	Demersal trawling is associated with damage to sensitive seabed habitats and non target benthic communities. Effort from the Danish saithe demersal trawl fisheries is focused along the Norwegian trench in the North Sea and Skagerrak. The seabed over this area is not homogenous and available broad scale habitat maps show that the area comprises a mosaic of different seabed habitats. Accordingly, it is likely that there is variation in the sensitivity to the effects of trawling across the range of affected habitats. While datasets and maps that have been available to the assessment team do to some extent indicate the presence of known sensitive habitats or communities in the areas fished, the resolution of such maps has not been adequate to assess the range of these habitats or sufficient for the purpose of evaluating the fishery at SG80.
Suggested Action	Provide detailed habitat and / or seabed community maps for all areas of the North Sea ICES Area IV and Skagerrak ICES Area IIIa West where demersal trawling for saithe and other species occurs – with particular focus on most sensitively fished areas and special attention for areas of deep sea sponge and soft coral communities in the Skagerrak area. It is not intended that the DFPO should have to produce such maps, as it is likely that significant additional relevant information already exists within governments and EU research organisations that share an interest in the North Sea and Skagerrak. Maintain a record of all potential sources consulted. Include strategic provisions relating to protecting vulnerable seabed habitats in the Code of Conduct, such as gear modifications, avoidance and area closures of sensitive habitats. A log for recording encounters with vulnerable seabed habitats should be established and maintained as part of the Code of Conduct on all certified vessels. This could include an undertaking to explore technical measures to reduce unacceptable impacts where identified, such as the use of semi-pelagic otter trawl doors and voluntary area closures. The CoC should encourage vessels and fishermen to participate in the collecting information about benthos and benthic features. Use resulting information and any new data (e.g. from Natura 2000 site monitoring) to enhance management strategy of the impacts of the fishery to seabed habitats at least to a point where measures combine into a cohesive, reactive and documented strategy that shows an understanding of how the management measures work together to achieve the objective of minimising impacts to seabed habitats.

Setnet Unit of Certification

Condition SN1	ETP Species
Performance Indicators:	Set net 2.3.1, 2.3.2, 2.3.3 **2.3.1 - Status** 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. **Score: 75** **2.3.2 - Management strategy** The fishery has in place precautionary management strategies designed to: -meet national and international requirements; -ensure the fishery does not pose a risk of serious or irreversible harm to ETP species; -ensure the fishery does not hinder recovery of ETP species; and -minimise mortality of ETP species. **Score: 60** **2.3.3 - Information / monitoring** Relevant information is collected to support the management of fishery impacts on ETP species, including: -information for the development of the management strategy; -information to assess the effectiveness of the management strategy; and -information to determine the outcome status of ETP species. **Score: 60**
Timelines	By 1st surveillance audit – Fully implement comprehensive Code of Conduct and on board reporting By 2nd surveillance audit – Show results of data analysis and theoretical and practical evaluation of potential management measures
Summary of issues	While the incidental capture of harbour porpoise within the saithe set net fishery is likely to be within international and national limits, it is considered that the combined rate of Harbour porpoise bycatch in all North Sea fisheries is unsustainable. Furthermore, data on the level of interaction within the Skagerrak is unknown. The scale of North Sea and Skagerrak Harbour porpoise bycatch in Danish set net fisheries is therefore a potential cause for concern. Furthermore it is recognised that the magnitude and significance of seabird mortality caused by set nets, both inshore and offshore, remains largely unknown due to low levels of monitoring.
Suggested Action	Develop and implement a full strategy to manage all Endangered, Threatened and Protected species that may be affected by the fishery, which includes an appropriate Code of Conduct which explicitly refers to ETP species that have been identified during the assessment and which introduces robust and reliable means to monitor, manage and reduce or eliminate impacts. Evaluate the nature and scale of interactions between the setnet fisheries and Harbour porpoise, seals and other ETP within both inshore and offshore DFPO North Sea and Skagerrak setnet fleet segments, as well as across the range of gear types in use. This should be complemented by an observer programme, conducted by independent bodies/organisations and should cover at all seasons and areas. ETP species listed in Table 4.10 together with protected bird species should be included within this strategy. This data should be used to accurately profile the ETP species bycatch in Danish North Sea and Skagerrak demersal set net fisheries and be used to refine management strategies, with information being made fully and freely available to appropriate bodies and a summary of the data provided for inclusion within annual surveillance audit reports.

Danish Seine Unit of Certification

Condition DS1	ETP Species
Performance Indicators:	Danish Seine 2.3.1, 2.3.2 **2.3.1 - Status** 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. **Score: 75** **2.3.2 - Management strategy** The fishery has in place precautionary management strategies designed to: -meet national and international requirements; -ensure the fishery does not pose a risk of serious or irreversible harm to ETP species; -ensure the fishery does not hinder recovery of ETP species; and -minimise mortality of ETP species. **Score: 60**
Timelines	by the 1st Surveillance audit – develop and implement full ETP management strategy and recording protocols by the 2nd Surveillance Audit – provide analysis of generated data and show how this is integrated into revised management.
Summary of issues	Landings data for Danish seiners targeting saithe in 2008 clearly indicate that common skate and spurdog are caught and landed in association with this saithe fishery in the North Sea and Skagerrak. EC regulation 43/2009 (which came into force in January 2009) prohibits the landing of common skate by EU vessels. In addition EC regulation 23/2010 stresses this ban for common skate and further sets a zero TAC for spurdog with an allowed bycatch of 10% of the 2009 Danish quota. It is noted that Danish vessels may still land common skate and spurdog taken in the Norwegian sector. However, landing statistics from 2009 and Jan-May 2010 reveal that common skate and spurdog continue to be landed from both EU and Norwegian zones, by Danish vessels. Early indications indicate that there is a risk of this bycatch limit being exceeded, in part due to a lack of broad awareness of restrictions. While it is not possible to determine if these landings are specifically related to the saithe fishery, it is expected to be so.
Suggested Action	Demonstrate a clear commitment to eliminating landings of common skate and spurdog, ensuring landings do not exceed those set by EC Regulations, as described above. Develop and implement a full strategy in relation to managing all ETP species encountered by the fishery, including having *in place and operational* an appropriate Code of Conduct for responsible fishing, which explicitly refers to ETP species, and which introduces robust and reliable means to monitor, manage and reduce or eliminate impacts on ETP species, including establishment and implementation of procedures to maximise live release. Liaise with Norway in harmonising management measures for common skate to enable the release of live common skate (which is currently illegal in Norway due to ban on discarding). Provide data and analysis to comprehensively clarify the impact of Danish seine on ETP species including number of live releases. This could be achieved through the operation of the ETP log on certified vessels, cooperating in scientific research and increased observer coverage. Liaise with scientists to ensure data gathered is relevant, robust and useful to include (for example) date and area of capture, numbers, length or weight as well as condition on release. Collate & analyse all data generated in relation to ETP on an annual basis for all certified vessels and use to inform strategy development and make available to relevant authorities.

8.3 Recommendations

In addition to the above Conditions, it is also considered that there are areas of performance that the team would like to see improvements in, despite the fact that they relate to Performance Indicators where the client vessels scored 80 or better.

The assessment team has made a number of recommendations. These are not required to maintain certification but would improve the performance of the fishery against the MSC Principles and Criteria. Accordingly, the action taken and timescales are at the discretion of the client.

Recommendations are made in respect of:

Retained species outcome status of cod: *It is recognised that it is too early to evaluate whether the management plan in place for cod has been and/or continues to be effective. It is therefore recommended that future surveillance audits review ICES advice for cod carefully and ensure the fishery continues to operate within TAC and quotas for this species and where necessary reviews practises accordingly.*

Bycatch species outcome status: *The work undertaken by the Danish industry to trial and implement catch quotas through the Fully Documented Fishery scheme is commendable. However no data has been made available from these trails, other than reporting related to successful use of CCTV systems. It is therefore recommended that catch composition data is collated where possible from vessels within the UoC that are part of the Fully Documented Fishery scheme and that these data be presented at future surveillance audits.*

ETP information for demersal trawl and Danish seine vessels: *Ensure that data collected as part of strategy implementation remains sufficient to allow levels of mortality to be assessed and trends to be measured.*

9. Limit of Identification of Landings

This assessment relates only to the fishery defined in **Section 2.1** up to the point of landing in Danish registered ports or registered ports in the EU and Norway, by Danish registered vessels to processing plants, auctions, or storage facilities that have been approved to the MSC Chain of Custody Standard.

Within this the only eligible vessels will be those which:

» have signed up to the DFPO expanded Code of Conduct;

» undertake to comply with the associated reporting requirements as part of the Code of Conduct;

» are fully compliant with the requirements of the code;

» **are listed on the live on-line vessel register** at:

http://www.msc-fiskere.dk/default.asp?id=35450 [11]

9.1 Traceability

Although landings are mostly into Danish ports, certified vessels may also land into other EU countries. All landings made to non-Danish ports are subject to the same scrutiny and reporting procedures and there is a well established mechanism to enable port-of-landing authorities to report the landing to the relevant Danish authorities in a timely fashion.

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:

» No transhipment

» A geographically restricted fishery enabling concentrated inspection effort.

» Accurate reporting – log books and sales notes (regularly inspected and cross-checked)

» Verified landings data (including data on other retained species) are used for official monitoring of quota up-take and national statistics.

» A high level and sophisticated system of at sea monitoring, control and surveillance, both in EU waters, including routine boarding and inspection, spotter planes, reporting to checkpoints when crossing international boundaries, VMS.

» Close cooperation between EU regulatory and enforcement authorities and no immunity from prosecution in other jurisdictions.

» Reporting prior to landing with limited tolerance

» A high level of inspection of landings prior to unloading. Officially calibrated weighing systems of landing. Routine inspection of entire factory process.

The above is considered sufficient to ensure fish and fish products invoiced as such by the fishery originate from within the evaluated fishery and no specific risk factors have been identified.

[11] The DFPO undertake to ensure that this web address remains unchanged. In event of this web address changing, contact should be made direct to the DFPO at the address at the front of this report.

9.2. Processing at sea etc

There is no at-sea processing of saithe, with the exception of one vessel named *Kingfisher,* which produces saithe fillets.

9.3 Point of Landing

Table 9.1 shows landings ports and percentage from the total landed. Saithe is landed almost exclusively in Danish ports. However, there are no restrictions defining port of landing, over and above those stated in national fishing regulations (for example vessels must land to registered ports). There is no requirement for the vessels to land at ports named in this report. There are no specific risk factors after the point of landing which need to be highlighted or that may influence chain of custody assessments.

Table 9.1. Main saithe landings ports

Port Name	Proportion of total landings
Hanstholm	0.49
Hirtshals	0.27
Skagen	0.12
Thyborøn	0.06
Strandby (nordjylland)	0.05
Hvide sande	0.01

Source: Client

9.4 Eligibility to Enter Chains of Custody

Only North Sea and Skagerrak saithe caught by Danish registered vessels in the manner defined in the Unit of Certification (section 2.1) shall be eligible to enter the chain of custody, and only where fish is landed to a MSC chain of custody certified business. Chain of Custody should commence following the first point of landing at which point the product shall be eligible to carry the MSC logo. There are no restrictions on the certified product entering further chains of custody. DFPO does not require its own chain of custody certificate.

The actual Eligibility Date for this fishery will be the 1st September 2010. This means that any fish caught by the certified fleet (as defined above) following that date will be eligible to enter the chain of custody as certified product. The rationale for this date is that it meets with the client's wish, for commercial reasons, for target eligibility to be set on this date, which falls well within the guidelines and requirements of the MSC certification process as defined in TAB Directive 21(v2). 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 – can be found in the Traceability subdivision of this section of the report (pp. 78-79).

10. Client Agreement to the Conditions

The agreed and signed client Action Plan to meet the Conditions of Certification outlined in Section 8, serves as a client agreement to those conditions, as detailed below:

10.1 Client Action Plan

The Danish Fishermen's Producers' Organisation is actively committed to sustainable and rational exploitation of marine living resources, through continually improving our knowledge of the sea, the management of our fisheries and minimising the environmental impact of what we do – all the while delivering seafood of the highest quality. Accordingly, and arising from the conditions of certification, the DFPO will undertake to implement the following action plan in relation to the conditions of certification.

All Units of Certification

» Condition 1: Principle 1/Information & Monitoring – All gears

The DFPO does not have much direct influence on the availability of the data that was missing for the 2010 ICES stock assessment. We will however exert the indirect influence we do have, through the NSRAC and/or other channels, to ensure that the necessary data are made available for future stock assessments which underpin the harvest control rule.

Action: Contacts through the relevant channels, within the first year of certification. Subsequently if the problems re-surfaces.

Documented: At the first audit – and later audits if relevant.

Demersal Trawl Unit of Certification

» Condition DT 1: Endangered, Threatened and Protected Species

Since the MSC assessment process brought to light the issue of skate and spurdog in EU-waters, the DFPO has been using all its means of communication to ensure that Danish fishermen are aware of the prohibition of landing. We will continue to do so until landings are zero.

Action: Ongoing, as long as required.

Documented: At first audit (and subsequent if necessary).

Regarding ETP species in general the DFPO has created an operational expansion of its current Code of Conduct, to be signed and complied with by all members wishing to use the MSC certificate. This Code includes a requirement to record all interactions with ETP-species. To this end each vessel will be equipped with a wheel-house guide clearly identifying each relevant species and how to handle and record them. The guide and recording requirements will be designed in cooperation with relevant scientific institutions.

Action: Signing and recording, from the first day of using the certificate. Full wheel-house guide with species identification published before the end of 2010.

Documented: At first audit.

After each year of recording, data will be analysed in cooperation with the scientific institutions. On the basis of this analysis, existing scientific information and results from e.g. observer and CCTV monitoring projects, the DFPO will identify additional targeted measures to be included in the Code of Conduct to minimize the level of interactions with ETP species focusing on those fisheries, species, seasons and areas where the available knowledge indicates specific problems. The measures will be evaluated and adjusted accordingly after each full year of monitoring.

Action: Analysis, immediately after the first full year of records – and subsequently every year. Additional measures developed and implemented after analysis – duration depending on the complexity of the issues, but at the very least before the next audit.

Documented: At second audit and onwards.

» Condition DT 2: Habitats

Detailed integrated habitat maps for the North Sea are currently being collated in the EUSeaMap project which includes the Danish Agency for Spatial and Environmental Planning. The DFPO will cooperate with this agency and DTU Aqua to provide overlays of fishing activities and habitat maps to identify potential impacts on vulnerable areas.

Action: Overlays produced within the first year of certification.

Documented: At first audit.

Indicator catches of vulnerable habitats will be identified in cooperation with scientific institutions and included in the recording requirements under the expanded Code of Conduct.

Action: Ongoing. Reporting requirements included from the first day of using the certificate.

Documented: At first audit.

On the basis of the monitoring and identified potential impacts, and in cooperation with the institutions and authorities, the DFPO will adopt a strategy to reduce the impacts on vulnerable habitats, including necessary mitigation or avoidance measures in the Code of Conduct, as well as further research or gear development needs. As the EIAs and corresponding management measures for marine Natura 2000 sites are developed by the national authorities, these results and measures will also be incorporated into the DFPO habitat strategy.

Action: Analysis of monitoring after each full year. The timing of the development and implementation of further measures will depend greatly on complexity of the issues and whether further research or gear development is necessary. Natura 2000 related measures will depend upon the timing of the public processes. It is intended that the monitoring and measures should form a cohesive and reactive strategy at least by the fourth audit.

Documented: At second audit and onwards.

Setnet Unit of Certification

» Condition SN 1: Endangered, Threatened and Protected Species

The DFPO has created an operational expansion of its current Code of Conduct, to be signed and complied with by all members wishing to use the MSC certificate. This includes a requirement to record all interactions with ETP-species, including harbour porpoise and sea-birds. To this end each vessel will be equipped with a wheel-house guide clearly identifying each relevant species and how to handle and record them. The guide and recording requirements will be designed in cooperation with relevant scientific institutions.

Action: Signing and recording, from the first day of using the certificate. Full wheel-house guide with species identification published before the end of 2010.

Documented: At first audit.

After each year of recording, data will be analysed in cooperation with the scientific institutions. On the basis of this analysis, existing scientific information and other monitoring projects (such as the

current CCTV coverage of incidental harbour porpoise by-catch in set net fisheries) the DFPO will identify additional targeted measures to be included in the Code of Conduct to minimize the level of interactions with ETP species focusing on those fisheries, species, seasons and areas where the available knowledge indicates specific problems. The measures will be evaluated and adjusted accordingly after each full year of monitoring.

Action: Analysis, immediately after the first full year of records – and subsequently every year. Additional measures developed and implemented after analysis – duration depending on the complexity of the issues, but at the very least before the next audit.

Documented: At second audit and onwards.

Danish Seine Unit of Certification

» Condition DS 1: Endangered, Threatened and Protected Species

Since the MSC assessment process brought to light the issue of skate and spurdog in EU-waters, the DFPO has been using all its means of communication to ensure that Danish fishermen are aware of the discard requirement. We will continue to do so until landings are zero.

Action: Ongoing, as long as required.

Documented: At first audit (and subsequent if necessary).

Regarding ETP species in general the DFPO has created an operational expansion of its current Code of Conduct, to be signed and complied with by all members wishing to use the MSC certificate. This Code includes a requirement to record all interactions with ETP-species. To this end each vessel will be equipped with a wheel-house guide clearly identifying each relevant species and how to handle and record them. The guide and recording requirements will be designed in cooperation with relevant scientific institutions.

Action: Signing and recording, from the first day of using the certificate. Full wheel-house guide with species identification published before the end of 2010.

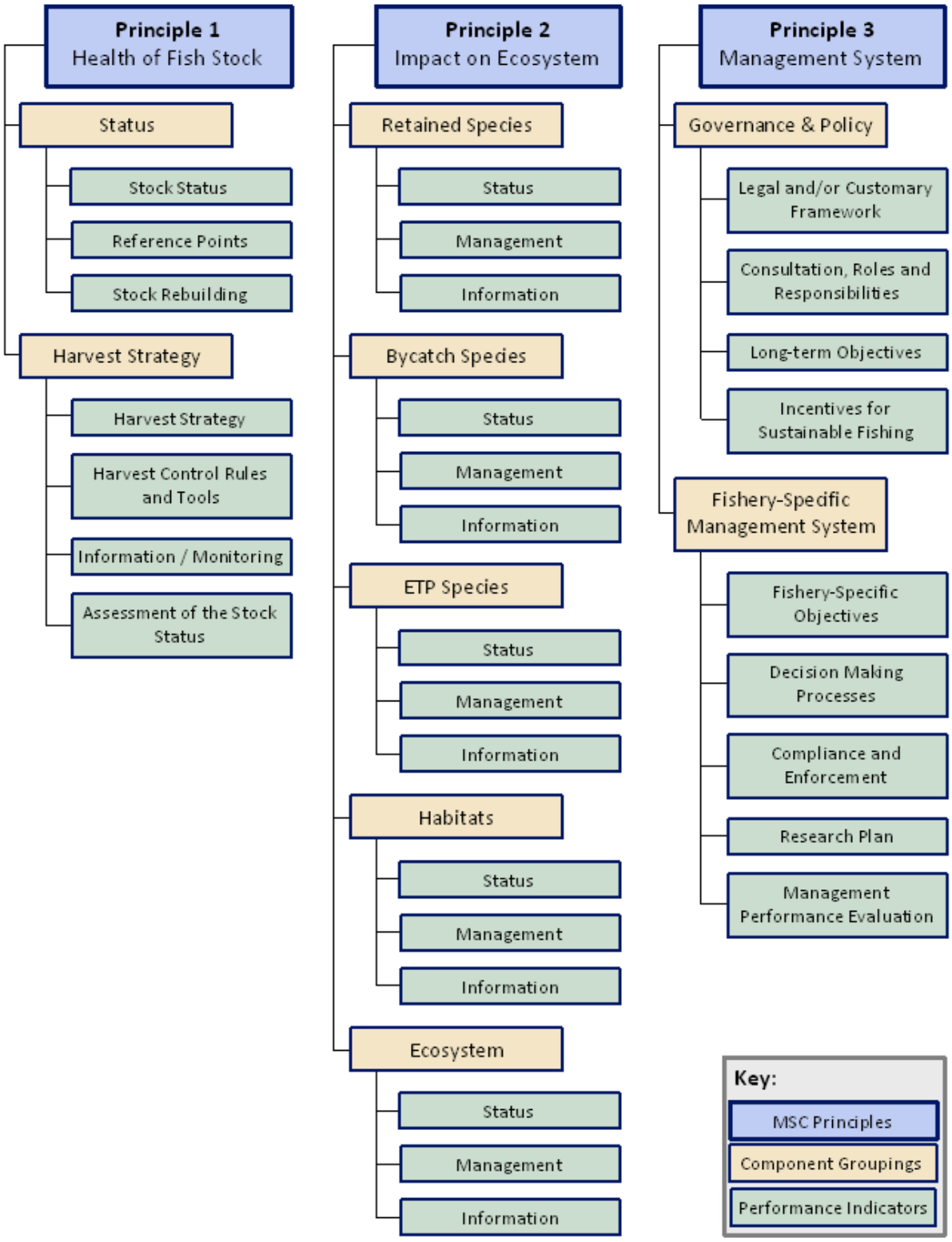
Documented: At first audit.

After each year of recording, data will be analysed in cooperation with the scientific institutions. On the basis of this analysis, existing scientific information and results from e.g. observer and CCTV monitoring projects, the DFPO will identify additional targeted measures to be included in the Code of Conduct to minimize the level of interactions with ETP species focusing on those fisheries, species, seasons and areas where the available knowledge indicates specific problems. The measures will be evaluated and adjusted accordingly after each full year of monitoring.

Action: Analysis, immediately after the first full year of records – and subsequently every year. Additional measures developed and implemented after analysis – duration depending on the complexity of the issues, but at the very least before the next audit.

Documented: At second audit and onwards.

Appendix 1 – MSC Ps & Cs



Below is a much-simplified summary of the MSC Principles and Criteria, to be used for over-view purposes only. For a fuller description, including scoring guideposts under each Performance Indicator, reference should be made to the full assessment tree, complete with scores and

justification, contained in Appendix 3 of this report. Alternately a fuller description of the MSC Principles and Criteria can be obtained from the MSC website (www.msc.org).

Principle 1

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

Intent:

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

Status

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

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

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

Harvest strategy / management

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

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

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

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

Principle 2

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

Intent:

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

Retained species / Bycatch / ETP species

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

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

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

Habitat & Ecosystem

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

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

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

Principle 3

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

Intent:

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

Governance and policy

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

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

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

Fishery specific management system

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

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

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

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

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Appendix 3 – Assessment Tree / Scoring sheets

The following Assessment Tree includes description of the Scoring Guideposts (SGs) and Performance Indicators (PIs) used to score the fishery. The Assessment Tree provides detailed justification for all scores attributed to the fishery, in a way which is clearly auditable by future assessors.

1	**A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.**			
1.1	**Management Outcomes**			
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
1.1.1	**Stock Status** The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired. The stock is at or fluctuating around its target reference point.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired. There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Score:	**90**
There is a high degree of certainty that the stock is above the point where recruitment would be impaired and the stock has been fluctuating around its target reference point over recent years. However there is uncertainty related to the level of the stock in relation to Bmsy in the near future. Therefore Issue 2 SG 100 was not awarded.	
Justification	

There is a high degree of certainty that the stock is above the point where recruitment would be impaired.

There is high degree of certainty that the stock is above the point where recruitment is impaired. An score of 100 was awarded to issue 1 based on the temporal trends in SSB levels in relation to precautionary biomass limit reference points and temporal trends in current Fishing Mortality ($F_{current}$) compared to the precautionary and target fishing mortality reference points.

The SSB in 2009 was estimated to be 263,377 tonnes, above the precautionary limit reference point (B_{pa} = 200,000 tonnes). SSB is estimated to have been above Bpa since 2001. From 2001 onwards, F has been at or below the target fishing mortality of 0.3. Therefore SG 100 Issue 1 was met (Same justification applies for SG 80 Issue 1).

The stock is at or fluctuating around its target reference point.

Spawning Stock Biomass levels have been above Bpa since 2001 and $F_{current}$ since 2001 has been at or below F target. Therefore the Issue 2-SG 80 is met.

There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Spawning Stock Biomass levels have been above Bpa since 2001 and $F_{current}$ since 2001 has been at or below F target. An F target of around 0.3 will give high long term yields of around 100,000 tonnes and SSB is predicted to fluctuate around Bpa in the long term, achieving a low risk of depleting the productive potential of the stock.

Technically speaking the Issue 2-SG 100 is met. However, there is a large uncertainty around the long term predictions and therefore the assessment team decided not to award Issue 2-SG 100.

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	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
1.1.2	**Reference Points** Limit and target reference points are appropriate for the stock.	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated. The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity. The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome. For low trophic level species, the target reference point takes into account the ecological role of the stock.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues. The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

Score:	**80**

Reference points are appropriate for the stock and can be estimated. The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity. There is an implicit biomass target reference point which is consistent with Bmsy. The Fishing mortality target is set at a value consistent with achieving high long-term yields and a low risk of depleting the productivity potential of the stock

Justification

Reference points are appropriate for the stock and can be estimated.

Reference points are appropriate for the stock. They have been estimated for this specific stock by the ICES Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK) taking uncertainty into account. Therefore SG 100 Issue 1 (repeated guidepost) was met.

The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity

The limit reference point is set at Blim, determined as the lowest point at which no affect on recruitment was observed. This is reasonable practice, and provides a low risk of impairing reproductive capacity.

The target reference point is such that the stock is maintained at a level consistent with BMSY or some measure or surrogate with similar intent or outcome

There is no explicit biomass target reference point. However, there is an implicit biomass target reference point which is consistent with Bmsy in that the fishing mortality target adopted by the EU-Norway long term management plan is set at a value consistent with achieving high long-term yields and a low risk of depleting the productivity potential of the stock. Fmsy from a Y/R analysis is estimated at 0.32 (Ages 3-6).

The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues

The limit reference point is set at Blim, determined as the lowest point at which no affect on recruitment was observed. This is reasonable practice, and provides a low risk of impairing reproductive capacity. However does not have extra precaution built in. Blim set for the management of this species is defined as Bloss or the lowest observed spawning stock, which does not have extra precaution built in. Therefore SG 100 Issue 2 was not met.

The target reference point is such that the stock is maintained at a level consistent with BMSY or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

There is no explicit biomass target reference point. However, there is an implicit biomass target reference point which is consistent with Bmsy in that the fishing mortality target adopted by the EU-Norway long term management plan consistent

with achieving high long-term yields and a low risk of depleting the productivity potential of the stock. Fmsy from a Y/R analysis is estimated at 0.32 (Ages 3-6).

However, F target has been evaluated to be valid in the short term (< 4 years). Recent reductions in recruitment levels and growth rates indicates that the productivity of the saithe stock in the study area has declined. The influence of the maturity ogive from the observed decrease in the weight at age is believed to cause a reduction in the spawning capacity of the stock. This is not accounted for in the estimation of reference points. Therefore this SG 100 Issue 3 was not met.

References

ICES. 2008. 6.4.12 Saithe in Subarea IV (North Sea), Division IIIa (Skagerrak), and Subarea VI (West of Scotland and Rockall). Book 6. ICES Advice 2008.

ICES. 2009. 6.4.12 Saithe in Subarea IV (North Sea), Division IIIa (Skagerrak), and Subarea VI (West of Scotland and Rockall). Book 6. ICES Advice 2009.

ICES. 2009. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak - Combined Spring and Autumn (WGNSSK), 6 - 12 May 2009, ICES Headquarters, Copenhagen.. 1028 pp.

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
1.1.3	**Stock Rebuilding** Where the stock is depleted, there is evidence of stock rebuilding.	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place. Monitoring is in place to determine whether they are effective in rebuilding the stock within a specified timeframe.	Where stocks are depleted rebuilding strategies are in place. There is evidence that they are rebuilding stocks, or it is highly likely based on simulation modelling or previous performance that they will be able to rebuild the stock within a specified timeframe.	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the shortest practicable timeframe.

Score:	**N/A**
Justification	
The stock status around its target, so rebuilding is not required and this performance indicator does not apply	
References	

1.2	Harvest Strategy (management)			
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
1.2.1	**Harvest Strategy** There is a robust and precautionary harvest strategy in place	The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points. The harvest strategy is likely to work based on prior experience or plausible argument. Monitoring is in place that is expected to determine whether the harvest strategy is working.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points. The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points. The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels. The harvest strategy is periodically reviewed and improved as necessary.

Score: 95	

The harvest strategy is responsive to the state of the stock and is designed and are working together to achieve stock management objectives reflected in the target and limit reference points. Although the Harvest Strategy has not been fully, the stock assessment gives annual feedback to management on how well they are achieving their objectives tested. Evidence exists, that the harvest strategy is achieving its objectives. Also, the harvest strategy is periodically reviewed since the established of the 2005 management plan.

Justification

The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.

The different elements of the Harvest Strategy are consistent. The TAC and technical measures (i.e. minimum mesh size) are designed to achieve management objectives reflected in the Target and Limit reference points. The TAC is evaluated annually and recommendations are made by the management authority based on the decision rules and state of the stock.

The elements of the Harvest Strategy, represented by the countries exploiting this stock, are designed and are working together to achieve stock management objectives reflected in the target and limit reference points:

- Annual landings (including unallocated landings) calculated as the sum of individual states' members landings have not exceed the TAC since year 2001.
- Technical measures are adopted by each country
- Independent (surveys) and dependent (commercial fleet) data is collected by member countries which account for most significant landings, including Denmark, and is used in the assessment of the stock, which provide information on the state of the stock for the management of the fishery.

The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives

The harvest strategy has not been fully tested (Issue 2 SG 100 not met). However, the stock assessment gives annual feedback to management on how well they are achieving their objectives. Information provided by the stock assessment include: 1. Levels of fishing mortality compared to the Target Fishing Mortality, 2. Levels of SSB compared to the biomass reference points (Bpa and Blim). Monitoring is in place as a tool for the collection of information needed for the assessment of the stock (see 1.2.3). Evidence exists, in the form of ICES advice, that the harvest strategy is achieving its objectives. Therefore the assessment team awarded an 80 score to Issue 2.

The harvest strategy is periodically reviewed and improved as necessary

The harvest strategy is periodically reviewed and has been improved. Reference points and the harvest control rules

established under the 2005 management plan were reviewed in year 2007. In 2008 the long term management plan for the saithe stock in the Skagerrak, the North Sea and west of Scotland was renewed and will be reviewed no later than Dec 2012.

References

ICES. 2008. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak - Spring and Autumn (WGNSSK), 1-8 May and, ICES Copenhagen and By Correspondence. Diane. 960 pp.

ICES. 2009. 6.4.12 Saithe in Subarea IV (North Sea), Division IIIa (Skagerrak), and Subarea VI (West of Scotland and Rockall). Book 6. ICES Advice 2009.

ICES. 2009. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak - Combined Spring and Autumn (WGNSSK), 6 - 12 May 2009, ICES Headquarters, Copenhagen.. 1028 pp.

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
1.2.2	**Harvest control rules and tools** There are well defined and effective harvest control rules in place	Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached. There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached. The selection of the harvest control rules takes into account the main uncertainties. Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.	The design of the harvest control rules take into account a wide range of uncertainties. Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

Score:	**80**

There is a well-defined harvest control rule that is precautionary and takes into account the main uncertainties. There is also evidence that indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest Control Rules. Thus, all issues at SG 80 are met.

Justification

Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached

A well defined control rule is in place that is consistent with the harvest strategy and ensures that the recommended exploitation rate is reduced consistent with the reference points. The current decisions rules are set out very clearly in the EU-Norway agreement implemented from 1st January 2005. ICES concluded that the plan is precautionary in the short term conditional on the absence of major changes in the productivity and the absence of measurement and implementation error (WGNSSK, 2009; ICES Advice 2008, Book 6)

The selection of the harvest control rules takes into account the main uncertainties.

The harvest control rule is precautionary. The current target fishing mortality of 0.3 yr-1 is considered reasonable for a species with this life history and has been tested using simulations that evaluate the likely effects and consequences of applying the HCR. Uncertainties tested include variability in recruitment. Uncertainties over future catches, fishing mortality and SSB are considered along with the risk that the SSB falls below Blim in any year, and therefore implicitly form part of the control rule evaluation.

However the evaluation of the HCR do not account for the wide range of uncertainty, including; density dependence in growth, changes in natural mortality, changes in discarding or catch reporting practices, environmentally-driven changes in recruitment, and changes in maturation. Therefore issue 2 SG 100 is not met.

Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.

The primary tool is the TAC, which is used to achieve the exploitation levels required under the harvest control rule. The TAC is set as follows: (1) ICES provide scientific advice on the status of the stock. (2) The ICES Advisory Committee proposes a TAC consistent with the requirements of the HCR, (3) and a TAC is adopted by management (following negotiations between Norway and the European Commission). This is done in an annual basis.

Since the introduction of the management plan, the TAC has been set at levels consistent with the level proposed by ICES and official landings have not exceeded the set TAC. Hence, available evidence indicates that the TAC as a management tool is appropriate and effective in achieving the exploitation levels under the HCR.

However, the reported landings have been lower than the set TACs during the past seven years. Information from fishes indicates that this is due to very low prices for saithe combined with high fuel prices. However, there are also claims that the abundance of saithe has been reduced in most recent years. The assessment team determined that that the appropriateness of the TAC was not clearly shown as the effectiveness of this tool could be due to external causes (i.e. low

saithe prices and high fuel price, or low abundance).
References
ICES. 2008. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak - Spring and Autumn(WGNSSK), 1-8 May and, ICES Copenhagen and By Correspondence. Diane. 960 pp. ICES. 2008. 6.4.12 Saithe in Subarea IV (North Sea), Division IIIa (Skagerrak), and Subarea VI (West of Scotland and Rockall). Book 6. ICES Advice 2008. ICES. 2009. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak - Combined Spring and Autumn (WGNSSK), 6 - 12 May 2009, ICES Headquarters, Copenhagen.. 1028 pp.

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
1.2.3	**Information / monitoring** Relevant information is collected to support the harvest strategy	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy. Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy. Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule. There is good information on all other fishery removals from the stock.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available. All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.

Score:	**75**

Justification

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

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

Stock Structure: The life history is clearly documented and well understood from eggs to spawning. The geographic distribution of juveniles (age 3) and adult saithe differ. Juvenile saithe are distributed along the west and south coast of Norway, the coast of Shetlands and the coast of Scotland. At around the age 3 the individuals gradually migrate from the coastal areas to the northern part of the North Sea (57 N – 62 N).

Adult saithe (> 70 cm) has a highly migratory feeding behaviour and migrations extend from far into the Norwegian Sea to the Norwegian coast.

Tagging experiments have shown that take places between all saithe stock components in the northeast Atlantic. In particular, exchange between the saithe stock north of 62N (Northeast Arctic saithe) and saithe in the North Sea has been observed.

Catch-at-age data are available for the stock and feed into a Virtual population analysis used to assess the stock Landing at age data by fleet are supplied by countries holding the majority of the TAC (Denmark, Germany, France, Norway, UK (England), and UK (Scotland) for Area IV and only UK (Scotland) for area VI).

Stock Productivity: Information of weight at age data indicates that stock productivity has been reduced as consequence of a reduction in growth rates. A sharp decline in the mean weight at age was observed from the mid 90's, but now seems to be halted. There is insufficient information to establish weather this decline is liked to changes in the environment. However, there are no indications that the observed decline in weight at age is density dependent.

Fleet Structure:

Saithe in the North Sea are mainly taken in a direct trawl fishery in deep water along the Northern Shelf edge and the Norwegian trench. Norwegian, French, and German trawlers take the majority of the catches. The Fleet effort distribution is well monitored through the use of the VMS, information that is used for the analysis of the CPUE data and the

construction of abundance indices from the commercial fleet.

Other information such gear fleet design (type of gear used and mesh size) and gear selectivity is well understood and used in the assessment of the stock.

A score of 100 is not awarded to Issue 1 as comprehensive information on stock productivity (not known the reason for the decline in weight at age), and stock abundance (surveys). Not all age classes are detected through the use of surveys and CPUE is used instead as abundance index. CPUE as abundance index has associated a high degree of uncertainty. CPUE may fail to track changes in abundance. A main source of uncertainty is related to hyperstability; that occur when commercial catches remain high while population abundance drops. This may occur when vessels are able to locate high fish concentrations independently of population size.

Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule,

The total landings are recorded. Catch data is recorded by fishing vessels through the use of the EU logbook. Landing data thus is submitted by each EU member country for its use in the assessment of the stock. Landing data from the industrial fleet are only specified when saithe is delivered separately, and therefore by-catch of saithe that has not been separated from the bulk catch, will not be reported as saithe. The Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK) provides its own landings estimations including unallocated catches, to the assessment replacing the official landings.

Since the fish are distributed inshore until they are about 3 years old, discarding of young fish is assumed not significant (Assumption based on the distribution of the fishing effort versus distribution of young fish (< age 3)). Some discarding might occur in mixed fisheries when the saithe quota is reached. However removals due to discarding are not considered significant and are not included in the assessment of the stock. Ages 1 and 2 are mainly distributed close to the shores and are very scarce in the main fishing areas for saithe. Therefore, these ages-groups are not relevant for discarding practices in the North Sea.

Biological sampling provides age composition, weight at age and maturity at age data. These information is provided by countries holding the majority of the TAC (Denmark, Germany, France, Norway, UK (England), and UK (Scotland) for Area IV and only UK (Scotland) for area VI). Fecundity with size has been adequately established but motoring to detect trends and shifts are not in place.

One or more indicators are available. However are not being monitored with sufficient frequency to support the harvest control rule.

Abundance indices are available and monitored through the use of dependent (commercial fleet) and independent (surveys) data. Two surveys can be distinguished:

1. The Norwegian acoustic survey. It provides abundance indices for ages 3-6 and has been running since 1995 in an annual basis.
2. The International Bottom Trawl Survey (IBTS). It provides information on abundance for ages 3 to 5 and data is available since 1991. This survey is also carried out in an annual basis. Norway carried out in years 2006-2008 an acoustic survey along the western coast of Norway to estimate abundance indices for saithe between 2 and 4 years old (when the saithe is distributed along the coast of Norway). However, the Norwegian acoustic survey was not conducted after year 2008.

The use of commercial fleet data for the estimation of abundance indices results from the lack of information on saithe of ages older than 6 years. Three commercial series of effort and catch at age are available and monitored frequently:

1. French demersal trawl, which provides information on relative abundance for age range 3-9. Data is available since year 1990.
2. German bottom trawl, which provides information on relative abundance for age range 3-9. Data is available since year 1995
3. Norwegian bottom trawl, which provides information on relative abundance for age range 3-9. Data is available since year 1980.

For the 2010 assessment, the French demersal trawl CPUE data was not provided for its use in the assessment of the stock. The IBTS Q3 was provided, but Norway did not participate in the cruise in 2009, normally this party covers large part of the distribution area of the larger saithe. It was not possible to adapt the remaining cruise plans to fully cover up for the missing Norwegian stations. As a result of this the assessment of the stock could no be update in year 2010.

These missing and incomplete abundance indices determined that issue 2/SG 80 was not met and a condition was raised.

There is good information on all other fishery removals from the stock.

The information on all fishery removals is complete. Sources of uncertainty regarding fishery removals are:

1. Discarding: Some discarding might occur in mixed fisheries when the saithe quota is reached. However removals due to discarding are not considered significant

2. Landing data from the industrial fleet are only specified when saithe is delivered separately, and therefore by-catch of saithe that has not been separated from the bulk catch, will not be reported as saithe. The Working Group provides its own landings estimations including unallocated catches, to the assessment replacing the official landings. This source of uncertainty is not considered significant for the comprehensiveness of the assessment if the stock status.

All information required by the harvest control rule is monitored with high frequency and a high degree of certainty and there is a good understanding of the inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.

All information required by the harvest control rule is NOT monitored:

- The major uncertainty is the lack of information on year class strength for ages 1-3. Norway began an acoustic survey in 2006 to measure the relative abundance of saithe between 2 and 4 years old. However this survey is not currently being carried out.
- There are no discard estimates for the majority of this fishery. However, the level of discard is considered small compared to the total catch of saithe

Therefore the assessment team considered that this Issue 2 Scoring Guidepost was not met.

References

ICES. 2009. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak - Combined Spring and Autumn (WGNSSK), 6 - 12 May 2009, ICES Headquarters, Copenhagen.. 1028 pp.

ICES. 2009. 6.4.12 Saithe in Subarea IV (North Sea), Division IIIa (Skagerrak), and Subarea VI (West of Scotland and Rockall). Book 6. ICES Advice 2009.

ICES. 2010. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, 5 12

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
1.2.4	**Assessment of stock status** There is an adequate assessment of the stock status	The assessment estimates stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
		The major sources of uncertainty are identified.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way. The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			The stock assessment is subject to peer review.	The assessment has been internally and externally peer reviewed.

Score:	**85**

A detailed assessment is conducted regularly to evaluate stock status relative to reference points. In addition, the assessment has been tested and effects of potential data errors have been explored. Together, these meet two 100 guideposts. Uncertainty is accounted for in the assessment through statistical treatment of the data and sensitivity analyses and it is subject to the peer review through the working group, meeting two 80 requirements.

Justification

The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points

The estimates of biomass and fishing mortality are currently made annually and directly compared to target, trigger and limit reference points. Data on the biology of the species to fit the model is available and include growth, age, natural mortality and maturity. However, it is assumed that natural mortality does not vary with age and temporal variability in maturity is not accounted for. Therefore issue 1 scoring guidepost 100 was not awarded.

The assessment takes uncertainty into account.

Main areas of uncertainty are assessed through simulations and projections testing the harvest control rule.

However, the assessment approach could improve in terms of decreasing uncertainty related to:

1. The estimation of recruitment indices. The Norwegian acoustic survey for the measurement of relative abundance of recruits is not currently being carried out. And
2. The use of commercial CPUE for the estimation of abundance indices. Improvements in data analysis could decrease the uncertainty related to the representativeness of CPUE as an abundance index. For instance, an improvement in the monitoring of the fleet's spatial concentration would decrease uncertainty in the estimates related to Hyperstability.

In addition to the above areas for improvement the fitting method is not fully probabilistic and only point estimates are reported for management purposes. Consideration to risk has been given in developing the harvest control rule, but there is no explicit treatment of risk particularly in relation to the main uncertainties, such as recruitment and abundance indices estimates.

Therefore the assessment team considered that issue 2 Scoring Guidepost 100 was not met.

The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

The assessment is considered reliable and consistent by the Advisory Committee (ACOM) review Group at ICES. Effects of potential data errors have been explored and the Working Group estimated that only very large relative errors will make a large impact on the stock assessment predictions. Analyses have been focused on assessing the consistency in the catch at

age data used for assessment and the reliability of the assessment results.

The stock assessment is subject to peer review.

The stock assessment is subject to peer review through the working group process. A review is undertaken by the Scientific, Technical and Economic Committee for Fisheries (STECF). While external review is conducted on ICES stock assessments, these reviews are not routine.

References

ICES. 2009. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak - Combined Spring and Autumn (WGNSSK), 6 - 12 May 2009, ICES Headquarters, Copenhagen.. 1028 pp.

ICES. 2009. 6.4.12 Saithe in Subarea IV (North Sea), Division IIIa (Skagerrak), and Subarea VI (West of Scotland and Rockall). Book 6. ICES Advice 2009.

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.**

Demersal Trawl

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.1.1	**Status** The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.	Main retained species are likely to be within biologically based limits or if outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species. If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.	Main retained species are highly likely to be within biologically based limits, or if outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.	There is a high degree of certainty that retained species are within biologically based limits. Target reference points are defined and retained species are at or fluctuating around their target reference points.
Score:	**80**			

Summary: Demersal trawl

The main retained species for the saithe demersal trawl fishery are Atlantic cod, *Nephrops,* plaice and hake. All of these species are assessed as being highly likely to be within biologically based limits or having a partial strategy of demonstrably effective management measures. These species are not to a high degree of certainty within biologically based limits, nor are they all fluctuating around their target reference points. For this reason none of the main retained species could score above 80.

SG 100 refers to all retained species, which as shown in Section 4.1 Table 4.1 includes the category 'skates and rays'. It is therefore not possible to identify all retained catch to species level based on current data, albeit for a small proportion of the catch. Furthermore there are many non-quota retained species that do not have stock assessments or defined reference points. It is therefore assessed that none of the SG100 issues can be met and the overall score cannot be above 80.

Justification: Demersal trawl

Atlantic cod – North Sea and Skagerrak

Evidence of retained species

The saithe trawl fishery landed ~25% of the cod quota for Danish vessels in the North Sea and ~37% of the Skagerrak quota. Cod accounted for 5% of the total saithe fishery in both the North Sea and Skagerrak. It has therefore assessed as a main retained species.

Status of retained species

ICES classifies the cod stock in the North Sea, Eastern Channel and Skagerrak as suffering reduced reproductive capacity and as being at risk of being harvested unsustainably. SSB has remained below B_{lim} since 1999, reaching its historical low in 2006 from which point it has increased to current levels.

There are a number of measures in place specifically designed to manage the impact on the cod stocks by all

fisheries retaining cod from the North Sea and Skagerrak, including:

- EU-Norway agreement management plan
- EU Long Term Management plan with consistent aims as EU-Norway agreement
- TACs and quotas – including introduction of FKA (Vessel Quota Share) in 2007
- Minimum mesh sizes – 110mm in EU and 120mm in Norwegian zone (note that the majority of saithe grounds are within the Norwegian zone and therefore 120mm are used)
- Real time closures
- Fully documented fishery. Of note one Danish vessel that is responsible for 10% of Danish saithe landings has been and continues to be part of this scheme.

In 2008 a target fishing mortality of 0.4 was set in a new management plan implementing a new linked effort management between the EU and Norway. The 2008 TACs were set very close to levels advised by ICES, however the 2008 advice from ICES for NS Cod was for a zero catch in 2009 because ICES did not consider the former recovery plan precautionary. However the ICES advice for 2010 indicates that catches of cod can be allowed under the new management agreement. This change in advice is because the new management agreement is considered to be consistent with the precautionary approach. In December 2008 the European Commission and Norway agreed on a new cod management plan implementing a new system of linked effort management with a target fishing mortality of 0.4. ICES has evaluated the EC management plan in March 2009 and concluded that this management plan is in accordance with the precautionary approach only if implemented and enforced adequately. The management plan is seen to be effective and recent landings have been within the agreed TAC for the stock.

Advice for the North Sea and Skagerrak stock in 2010 stipulates a fishing mortality of 65% of F2008 equating to ~40,300 tonnes. Historical TACs have been below this level since 2003. The 2010 quota for cod landed by all nations from IV, IIIa (including Skagerrak and Kattegat) and IIa is 38,724 tonnes and is therefore set below ICES advice. The Danish cod quota for 2010 equates to 17% of the overall IV and IIa quota and 80% of the Skagerrak quota. Given the proportion of cod landed within the Danish saithe trawl fishery, it can be deduced that it is responsible for taking 7% of the total cod quota in the North Sea and Skagerrak.

ICES evaluated the EC management plan in 2009 and found it to be in accordance with the precautionary approach if it is implemented and enforced adequately. There is no evidence to suggest that the Danish saithe fleet are not implementing and complying with these measures. The voluntary adoption of the CCTV Fully Documented Fishery by 6 vessels in 2008-2009 and 30 vessels in 2010 is of particular note when scoring this Performance Indicator.

The combined measures presented above form a cohesive strategy for cod management and while SSB does still remain below B_{lim}, these measures are shown to be demonstrably effective with SSB continuing to rise from 2006 levels.

Given the management measures in place and the proportion of cod taken by the saithe trawl fishery (5% of the total catch; 7% of total cod quota in North Sea and Skagerrak and 30% of Danish cod quota), it is assessed that this fishery does not hinder the recovery and rebuilding of the cod stocks.

Atlantic cod in the North Sea and Skagerrak meets all of the retained species outcome status SG60 and SG80 issues and therefore scores 80.

***Nephrops* – Skagerrak**

Evidence of retained species

In association with the saithe demersal trawl fishery, approximately 1,500 tonnes of *Nephrops* were landed in the Skagerrak area, representing ~8% of the total catch composition for this area. Furthermore this represents 39% of the Danish *Nephrops* quota for the Skagerrak. *Nephrops* are therefore considered a retained species for the saithe demersal trawl fishery in the Skagerrak.

Status of retained species

There are two Functional Units in Division IIIa: Skagerrak and Kattegat. The exploitation of these *Nephrops* stocks is assessed based on combined landings per unit effort data for Denmark and Sweden since 1990. The 2008 assessment concluded that the stocks and current levels of exploitation in both functional units appear to be sustainable. Furthermore, high catch rates of small *Nephrops* in 2007 are thought to indicate strong

recruitment. The 2008 assessment found no signs of overexploitation in Division IIIa. The most recent assessment data compiled in 2009 do not indicate any changes in the state of the stock.

Nephrops in the Skagerrak functional unit are therefore highly likely to be within biologically based limits.

Nephrops in the Skagerrak meets all of the retained species outcome status SG60 and SG80 issues and therefore scores 80.

Plaice – Skagerrak

Evidence of retained species

The saithe trawl fishery landed over 1,000 tonnes of plaice from the Skagerrak area, representing 4.6% of the total catch composition. The plaice quota for the Skagerrak in 2008 was 9,350 tonnes, 7,280 of which were allocated to Danish vessels. The saithe trawl fishery therefore accounted for 11% of the total plaice catch for this area and 15% of the Danish quota. While the proportion of plaice taken within the saithe fishery is lower than 5% of the catch composition, the importance of this species to the Danish fishery reflects its inclusion as a main retained species.

Status of retained species

The EU is the main management authority for plaice in IIIa, with management measures including:

- TACs and quotas
- Minimum landing size of 27cm
- Stock assessments and scientific and technical advice in relation to management of Skagerrak and Kattegat flatfish stocks is provided to ACOM by ICES through the Working Group on North Sea and Skagerrak demersal stocks (WGNSSK).
- EU-Norway agreement in relation to shared fisheries

ICES states that the new available analysis for the stock in 2008 has provided no reason for changing the 2007 advice (ICES Advice 2009, Book 6). Last analytical assessment accepted by the WG was in 2004. .

The 2007 stock assessment results suggest that the stock is over-exploited and over-exploitation is continuing. The SSB has overall been decreasing since 1992 and has been below Bpa (24,000 tonnes) since 1996. However it is noted that the SSB has increased across 2005-2007 due to a succession of good recruitments 2003-2005, after a decade of below average recruitment. Despite this, the latest year classes (2004-2005) are estimated to be low. However, scientific advice states that the surveys, which are indicative of trends only, show that abundance and recruitment of plaice in Skagerrak (and Kattegat) have been substantially higher in the last 6-7 years, compared with measurements in the 1990s.

The Seafish Responsible Sourcing guide states that the plaice Skagerrak (and Kattegat) stock appears to be stable. Furthermore ICES advice states that landings should not exceed levels recorded in 2006, which to date they have not. The 2010 quota has remained unchanged since 2008 at 9,350 tonnes for all plaice fisheries in Skagerrak, 78% of which is allocated to the Danish fleet. The Danish saithe demersal trawl fishery operating within the Skagerrak is responsible for landing 15% of the Danish plaice quota from this area.

Given the above evidence the team assess that the saithe trawl fishery does not pose a risk of serious or irreversible harm to the Skagerrak plaice stocks. Although outside biologically based limits there is a partial strategy of demonstrably effective management measures in place such that the Danish saithe demersal trawl fishery does not hinder recovery and rebuilding of the plaice stocks within the Skagerrak.

Plaice in the Skagerrak meets all of the retained species outcome status SG60 and SG80 issues and therefore scores 80.

Hake – North Sea and Skagerrak

Evidence of retained species

Approximately 7 tonnes of hake are landed with the saithe fly shooting fishery which equates to ~8% of the catch composition. This volume of hake relates to only ~1% of the Danish quota for ICES Divisions IIIa,b,c,d.

Status of retained species

The hake stock assessed by ICES is considered to occur across Division IIIa, Subareas IV, VI, and VII, and Divisions

VIIIa,b,d.

Based on the most recent estimates of SSB (in 2009) and fishing mortality (in 2008) ICES classifies the stock as being at full reproductive capacity and being harvested sustainably. ICES 2010 advice indicates that the state of stock is unknown but trends-based assessment indicates an increase in SSB

However, F_{target} has not been set to be consistent with B_{msy} and therefore in relation to high long term yield the fishery is classified as overfished. Nevertheless, SSB was estimated in 2009 to be just above Bpa, and F has been around Fpa since 2001. Furthermore recruitment has been recorded as being relatively stable over the last decade.

Given the very low proportion of Danish hake quota taken by this fishery it is considered that the saithe set net fishery has a very low risk to this species.

As a result of this very low risk, together with the current stock status, it is assessed that hake in the North Sea meets all of the retained species outcome status SG60 and SG80 issues and therefore scores 80.

Haddock – North Sea and Skagerrak

Evidence of retained species

Approximately 52 tonnes of haddock are taken, equating to ~60% of the catch composition of the saithe fly shooting fishery. This volume of haddock is ~3% of the Danish quota for ICES divisions IIIa,b,c,d.

Status of retained species

ICES classify the haddock stock within the North Sea and Skagerrak as having full reproductive capacity and being harvested sustainably. Although SSB has been declining since 2002, 2009 estimations put SSB above B_{pa}. Furthermore fishing mortality was estimated in 2008 to be below F_{pa} and below target F_{HCR}.

The haddock stock is highly likely to be within biologically based limits and therefore meets all of the SG60 and SG80 issues.

Minor retained species

Minor retained species of this fishery include monkfish, witch flounder and ling.

SG 100 refers to all retained species, which as shown in Section 4.1 Table 4.1 includes the category 'skates and rays'. It is therefore not possible to identify all retained catch to species level based on current data, albeit for a small proportion of the catch. Furthermore there are many non-quota retained species that do not have stock assessments or defined reference points. It is therefore assessed that none of the SG100 issues can be met and the overall score cannot be above 80.

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ICES 2009, Book 6: 6.4.3 Haddock in Subarea IV (North Sea) and Division IIIa West (Skagerrak) Corrected November 2009

ICES 2009, Book 9: 9.4 Widely Distributed and Migratory Stocks 9.4.1 Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d) (Northern stock)

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Danish Seine				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.1.1	**Status** The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.	Main retained species are likely to be within biologically based limits or if outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species. If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.	Main retained species are highly likely to be within biologically based limits, or if outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.	There is a high degree of certainty that retained species are within biologically based limits. Target reference points are defined and retained species are at or fluctuating around their target reference points.
Score: 80				

Summary: Danish seine

The main retained species for the saithe Danish seine fishery are plaice, Atlantic cod and haddock. All of these species are assessed as being highly likely to be within biologically based limits or having a partial strategy of demonstrably effective management measures. Cod and plaice (which make up the majority of the retained species) are not to a high degree of certainty within biologically based limits, nor are they all fluctuating around their target reference points and therefore the main retained species could score above 80.

SG 100 refers to all retained species, which as shown in Section 4.1 Table 4.2 includes the category 'skates and rays' along with 'unknown species'. It is therefore not possible to identify all retained catch to species level, albeit for a small proportion of the catch. Furthermore there are many non-quota retained species that do not have stock assessments or defined reference points. It is therefore assessed that none of the SG100 issues can be met and the overall score cannot be above 80.

Justification: Danish seine

Plaice – Skagerrak

Evidence of retained species

Plaice makes up 62% of the catch composition in the Skagerrak from trips that record over 1 tonne of saithe landed by Danish seine. The Danish seine fishery in the Skagerrak that is landing significant amounts of saithe is therefore primarily targeting plaice. While the catch composition of plaice may seem proportionally high, the volume equates to 4.5% of the Danish plaice quota in the Skagerrak. Nevertheless, with such a high catch composition, plaice are considered a main retained species.

Status of retained species

As described under status of retained species for demersal trawl, plaice in the Skagerrak meets all of the retained species outcome status SG60 and SG80 issues and therefore scores 80.

Atlantic cod – Skagerrak

Evidence of retained species

Approximately 68 tonnes of cod are taken, equating to ~13% of the catch composition of the saithe Danish

seine fishery. This volume of cod makes up less than 3% of the Danish quota for Skagerrak. The proportion of cod taken in the Skagerrak is actually greater that the saithe composition (4.5%) and for this reason it is included as a retained species.

Status of retained species

As described under status of retained species for demersal trawl, Atlantic cod in the Skagerrak meets all of the retained species outcome status SG60 and SG80 issues and therefore scores 80.

Haddock – Skagerrak

Evidence of retained species

Approximately 56 tonnes of haddock are taken, equating to ~10% of the catch composition of the saithe Danish seine fishery. This volume of haddock makes up less than 3% of the Danish quota for Skagerrak. The proportion of haddock taken in the Skagerrak is actually greater that the saithe composition (4.5%) and for this reason it is included as a retained species.

Status of retained species

As described under status of retained species for set nets, haddock in the Skagerrak meets all of the retained species outcome status SG60 and SG80 issues and therefore scores 80.

Minor retained species

Minor retained species of this fishery include witch flounder, common dab, hake and lemon sole.

SG 100 refers to all retained species, which as shown in Section 4.1 Table 4.1 includes the category 'skates and rays'. It is therefore not possible to identify all retained catch to species level based on current data, albeit for a small proportion of the catch. Furthermore there are many non-quota retained species that do not have stock assessments or defined reference points. It is therefore assessed that none of the SG100 issues can be met and the overall score cannot be above 80.

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ICES 2009, Book 6: 6.4.6 Plaice in Division IIIa (Skagerrak – Kattegat)

ICES 2009, Book 6: 6.4.2 Cod in Subarea IV (North Sea), Division VIId (Eastern Channel), and IIIa West (Skagerrak)

ICES 2009, Book 6: 6.4.3 Haddock in Subarea IV (North Sea) and Division IIIa West (Skagerrak) Corrected November 2009

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Set Nets				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.1.1	**Status** The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.	Main retained species are likely to be within biologically based limits or if outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species. If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.	Main retained species are highly likely to be within biologically based limits, or if outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.	There is a high degree of certainty that retained species are within biologically based limits. Target reference points are defined and retained species are at or fluctuating around their target reference points.
Score: 80				

Summary: Set nets

The main retained species for the saithe Danish set net fishery are Atlantic cod, hake, plaice and haddock. All of these species are assessed as being highly likely to be within biologically based limits or having a partial strategy of demonstrably effective management measures. Cod (which makes up the majority of the retained species) is not to a high degree of certainty within biologically based limits, or fluctuating around its target reference points and therefore the main retained species could not score above 80.

SG 100 refers to all retained species, which as shown in Section 4.1 Table 4.3 includes the category 'skates and rays' along with 'unknown species'. It is therefore not possible to identify all retained catch to species level, albeit for a small proportion of the catch. Furthermore there are many non-quota retained species that do not have stock assessments or defined reference points. It is therefore assessed that none of the SG100 issues can be met and the overall score cannot be above 80.

Justification: Set nets

Atlantic cod – North Sea and Skagerrak

Evidence of retained species

Cod makes up 50% of the catch composition in the Skagerrak and 56% in the North Sea from trips that record over 1 tonne of saithe landed by set nets. The set net fishery in the North Sea and Skagerrak that are landing significant amounts of saithe are therefore primarily targeting cod. While the catch composition of cod may seem proportionally high they are relatively small when compared to the cod quotas for these areas, indeed this fishery only takes 1.7% of the Danish North Sea quota and 2.2% of the Skagerrak quota. Nevertheless, with such a high catch composition, cod are considered a main retained species.

Status of retained species

Table 4.6 presents that proportion of cod landed in conjunction with the saithe fishery in relation to the Danish quota and overall TAC. The saithe fishery lands 2% of the Danish quota for cod in the Skagerrak and 1.7% in the North Sea and 1.7% of total TAC in Skaggerak and 0.3% in the North Sea. Given the low proportion of Danish cod quota taken by this fishery it is considered that the saithe set net fishery has a very low risk to cod.

As described under status of retained species for demersal trawl, Atlantic cod in the North Sea and Skagerrak

meets all of the retained species outcome status SG60 and SG80 issues and therefore scores 80.

Hake – North Sea

Evidence of retained species

Approximately 10 tonnes of hake are landed with the saithe set net fishery which equates to ~8% of the catch composition. This volume of hake relates to only ~1% of the Danish quota for ICES Divisions IIa and IV. However, saithe itself make up 11% of the catch composition and therefore 8% is a significant amount and warrants inclusion as a retained species.

Status of retained species

The hake stock assessed by ICES is considered to occur across Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d.

Based on the most recent estimates of SSB (in 2009) and fishing mortality (in 2008) ICES classifies the stock as being at full reproductive capacity and being harvested sustainably. ICES 2010 advice indicates that the state of stock is unknown but trends-based assessment indicates an increase in SSB

However, F_{target} has not been set to be consistent with B_{msy} and therefore in relation to high long term yield the fishery is classified as overfished. Nevertheless, SSB was estimated in 2009 to be just above Bpa, and F has been around Fpa since 2001. Furthermore recruitment has been recorded as being relatively stable over the last decade.

Given the very low proportion of Danish hake quota taken by this fishery it is considered that the saithe set net fishery has a very low risk to this species.

As a result of this very low risk, together with the current stock status, it is assessed that hake in the North Sea meets all of the retained species outcome status SG60 and SG80 issues and therefore scores 80.

Haddock – North Sea and Skagerrak

Evidence of retained species

Approximately 18 tonnes of haddock are taken, equating to ~15% of the catch composition of the saithe set net fishery. This volume of haddock is less than 1% of the Danish quota for ICES divisions IIa and IV. The proportion of haddock taken is actually greater that the saithe composition (11%) and for this reason it is included as a retained species.

Status of retained species

ICES classify the haddock stock within the North Sea and Skagerrak as having full reproductive capacity and being harvested sustainably. Although SSB has been declining since 2002, 2009 estimations put SSB above B_{pa}. Furthermore fishing mortality was estimated in 2008 to be below F_{pa} and below target F_{HCR}.

The haddock stock is highly likely to be within biologically based limits and therefore meets all of the SG60 and SG80 issues.

Plaice – Skagerrak

Evidence of retained species

Approximately 24 tonnes of plaice are taken, equating to ~22% of the catch composition of the saithe set net fishery. This volume of plaice makes up 0.3% of the Danish quota for Skagerrak. The proportion of plaice taken in the Skagerrak is actually greater that the saithe composition (11%) and for this reason it is included as a retained species.

Status of retained species

Given the very low proportion of Danish plaice quota taken by this fishery it is considered that the saithe set net fishery has a very low risk to this species.

As described under status of retained species for demersal trawl, plaice in the Skagerrak meets all of the retained species outcome status SG60 and SG80 issues and therefore scores 80.

Minor retained species

Minor retained species of this fishery include common sole, lemon sole and monkfish.

SG 100 refers to all retained species, which as shown in Section 4.1 Table 4.1 includes the category 'skates and rays'. It is therefore not possible to identify all retained catch to species level based on current data, albeit for a small proportion of the catch. Furthermore there are many non-quota retained species that do not have stock assessments or defined reference points. It is therefore assessed that none of the SG100 issues can be met and the overall score cannot be above 80.

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ICES 2009, Book 9: 9.4 Widely Distributed and Migratory Stocks 9.4.1 Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d) (Northern stock)

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Demersal trawl, Danish seine and set nets

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.1.2	**Management strategy** There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species.	There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a partial strategy in place, if necessary that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.	There is a strategy in place for managing retained species.
		The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports high confidence that the strategy will work.
				There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring.
			There is some evidence that the partial strategy is being implemented successfully.	There is some evidence that the strategy is achieving its overall objective.

Score: 90

Summary: Demersal trawl, Danish seine and set nets

There are strategies in place for managing retained species landed in association with the saithe demersal otter trawl, Danish seine and set net fisheries, together with some evidence that these strategies are achieving their overall objectives. This is the case for all of the main retained species and a large proportion of the other retained species. For this reason the team assess it to be appropriate to award the first and last SG100 issues.

It has, however, been assessed by the team that none of these strategies have appropriate testing to support with high confidence that they will work, nor is there clear evidence that they are being implemented successfully and intended changes are occurring. The second and third SG100 issues have therefore not been awarded.

Justification: Demersal otter trawl, Danish seine and set nets

There is a strategy in place for managing retained species in the form of species specific measures, area management and technical measures including the following:

- TACs and Quotas
- Minimum landing sizes and minimum marketing standards
- Closed areas
- Technical gear restrictions
- Cod recovery plan and days at sea
- Ban on high grading
- Ban on discards in Norwegian zone

TACs and Quotas

Total Allowable Catch (TAC) values are set annually by the EU Council for specific species/stocks within the Exclusive Economic Zones (EEZs) of the EU Member States. TACs are then divided, based on a fixed scale, between the Member States into national quotas. Table 1 illustrates where a Danish quota has been set for each of the retained

species from the saithe demersal otter trawl, Danish seine and set net fisheries. Approximately one third of the retained species do not have an allocated quota. All of the main retained species have an annual quota and are therefore considered pressure stocks.

Landings statistics are recorded from logbook and sales notes data on a daily basis. This allows trends and a total volume of species landed to be monitored and provides evidence that the overall objective of TACs and quotas are being achieved.

Table 1 Record of where Quotas, Minimum Landing Sizes and Minimum Marketing Sizes are in place for all retained species landed from demersal otter trawl, Danish seine and set net fisheries. Species in bold represent the main retained species. Note that landings of common skate are prohibited.

Species	Quota	MinLS	MinMS	Species	Quota	MinLS	MinMS
Atlantic Cod	Y	Y	Y	Long-Rough Dab			
Atlantic Halibut				Lumpfish	Y		
Atlantic Mackerel	Y	Y	Y	Marine Crabs		Y	
Beaked Redfish	Y		Y	Megrim	Y	Y	Y
Blue Ling	Y	Y		Monkfish	Y		Y
Brill	Y			Mullets			
Wolfish				Northern Prawn (*Pandalus*)	Y		Y
Common Dab	Y		Y	Northern Pike			
Common Sole	Y	Y	Y	**Norway Lobster (*Nephrops*)**	Y	Y	Y
Cuttlefish			Y	Spurdog			
Edible Crab		Y	Y	Pollack	Y	Y	Y
European Flounder	Y			Porbeagle	Y		
European Hake	Y	Y	Y	Rays + Skates	Y		
European Lobster		Y		Roundnose Grenadier	Y		
European Perch				Saithe	Y	Y	Y
European Plaice	Y	Y	Y	Common skate (Raja Batis)			Y
Golden Redfish	Y		Y	Tope			
Greater Weever				Tub Gurnard			Y
Grey Gurnard			Y	Turbot	Y		
Haddock	Y	Y	Y	Tusk	Y		
Lemon Sole	Y		Y	Whiting	Y	Y	Y
Ling	Y	Y	Y	Witch Flounder	Y		

Minimum landing sizes and minimum marketing standards

The EU minimum sizes are set out in Annex XII of Regulation No 850/98. The EU regulation states that undersized animals are not to be retained on board, transhipped, landed, transported, stored, sold, displayed or offered for sale and must be returned immediately to the sea. Species that have a minimum landing size are presented in Table 1.

The Council Regulation (EC) No 2406/96 sets out common marketing standards for certain fishery products primarily relating to improving product quality.

Along with a number of freshness criteria there is a requirement that fishery products be graded on the basis of size according to weight and/or size. It is under this regulation that a minimum marketing size is established which indirectly acts as a minimum landing size for certain species as shown in Table 1.

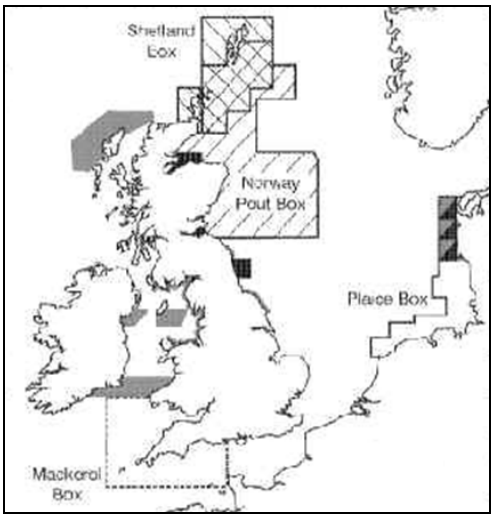
Sales notes record size categories of fish and shellfish landed and act as evidence that this management measure is achieving its overall objective.

Closed areas

Closed boxes

There are a number of fixed closed areas or boxes within the North Sea as shown in Figure 1. These have various restrictions relating to number and nationality of vessels that can fish in the area (Shetland box), power of vessels allowed to operate in the area (plaice box), gear restrictions such as mesh size (Norway pout box) and seasonal restrictions (Patch bank, Norway). While these restrictions are applicable to Danish vessels, they do not occur across the grounds targeted by the Danish saithe fisheries as shown by the VMS plots in Figures 2.10-2.13 in the main report. Nevertheless these measures limit effort and therefore directly or indirectly manage the retained species stocks.

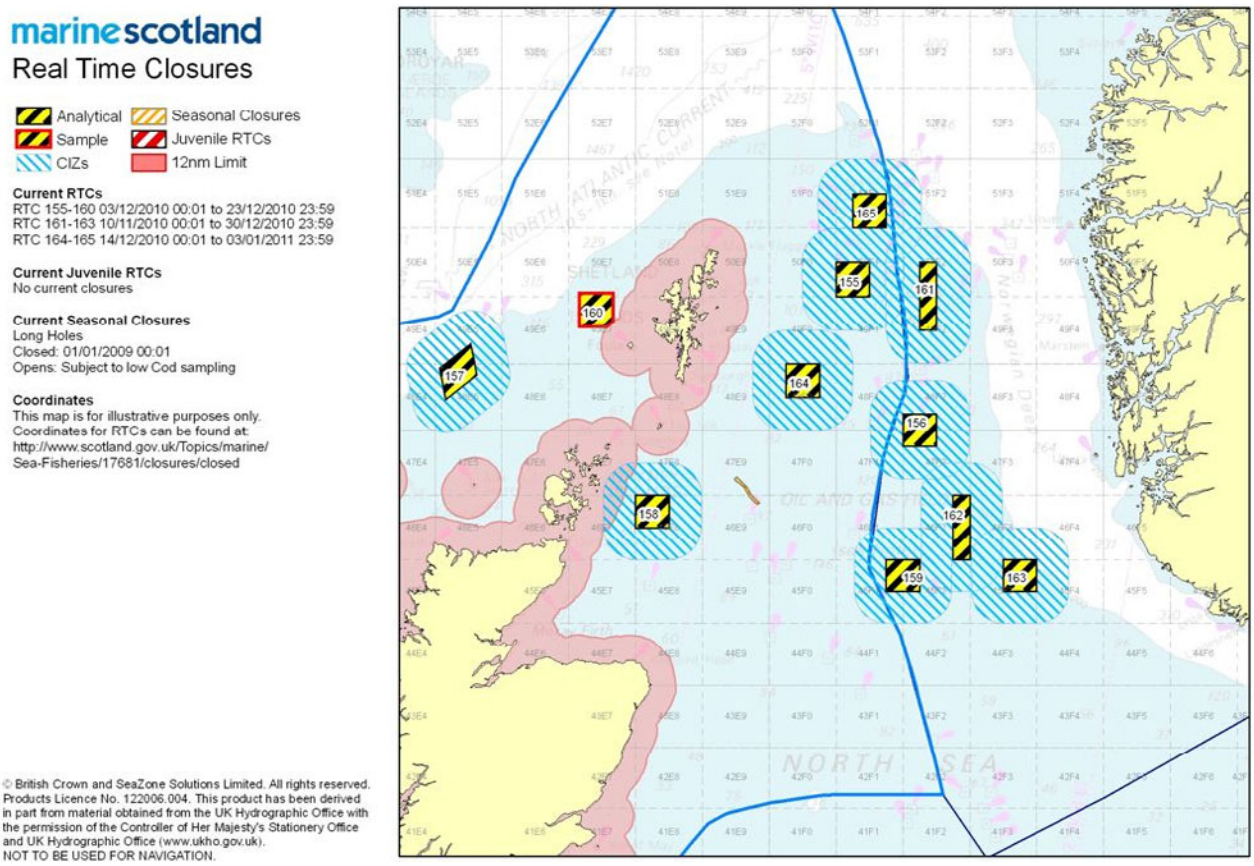
Figure 1. Closed areas in the North Sea



Real Time Closures

A Real Time Closure (RTC) system is in place for the North Sea and Skagerrak as part of an agreement between the EC and Norway. This is designed to protect juvenile cod, haddock, whiting and saithe by closing an area for 21 days when a 200kg catch sample contains more than 15% of these juvenile species. This closure also indirectly protects all species within the area for the 21 day period. RTCs are monitored on a real time basis and as shown in Figure 2 are likely to occur over the saithe fishing grounds. There will be a full review of RTCs in June 2010.

Figure 2. Current Real Time Closures (Marine Scotland, 2010)



Technical gear restrictions

Demersal otter trawl gear within the EU zone operates with a minimum mesh size of 110mm, while in the Norwegian zone the minimum mesh size is 120mm. The majority of saithe landed from the North Sea is done so from the Norwegian zone and therefore 120mm mesh sizes are used. Consultation indicates that when moving from Norwegian to EU zone vessels operate the same gear therefore using 120mm across both areas.

The 120mm mesh size is known to increase the age of capture of most demersal species of fish. Furthermore the voluntary use of square mesh panels by some vessels is known to further improve selectivity.

Research has been undertaken by FRS et al (2006) to investigate the survival rates of fish being passed through a trawl. The study, called Project Survival was conducted by the Institute of Marine Research, Norway; Fisheries Research Services, and the Scotland and Danish Institute for Fisheries Research, funded by the EU Commission looked at the survivability of various gadoid (cod, haddock, saithe, and whiting) species after escaping the codend, either through an excluder or through the mesh. It was found that the mortality of juveniles that escape the codend is much higher than those of more mature fish, most likely due to the injuries and stress associated with the capture itself. It was also found that fish that escaped at the surface, juvenile or adult and amongst all gadoid species, had a very high mortality rate most likely due to hyperbaric injuries and suffocation at the surface. Of the gadoid species, cod (and saithe in the Barents Sea) appear to be least affected by the trauma of capture and escape and both cod and whiting were found to have high survival rates after passing through the codend of a trawl. Additional management measures are in place for cod selectivity which came into force during 2009 (EU-Norway Agreement, 2008) including:

- To ensure that cod quota is taken up steadily throughout the year quota uptake is monitored to quarterly targets. Technical changes are required where volumes of cod reach more than 10% above the target.
- Technical / selectivity measures, such as eliminator trawls (including BACOMA and T90), are also required if 90% of the cod quota has been taken at any time before 15th November ensuring sufficient escapement so that the remaining 10% is not likely to be exceeded.

Cod recovery plan and Days at Sea

At the December 2002 Fisheries Council Member States agreed to reduce their fishing effort on cod by 65% and to implement a Cod Recovery Plan with limits on days at sea (for vessels over 10m) to achieve this. There are many papers that review the success or failure of the Cod Recovery Plan.

The 2008 advice from ICES for this stock was a zero catch in 2009 because it did not consider the former recovery plan precautionary. However, in December 2008 the European Commission and Norway agreed on a new cod management plan implementing a new system of linked effort management with a new target fishing mortality.

ICES evaluated this management plan in March 2009 and concluded that it is consistent with the precautionary approach if it is implemented and enforced adequately.

The 2010 ICES advice therefore allows catches of cod to be taken under this new management agreement.

Other measures

Other measures that are known to have a positive impact on retained species include a ban on high grading for Danish vessels and a ban on discarding in the Norwegian zone. These will be discussed in 2.2.2 Bycatch Management.

References

COUNCIL REGULATION (EC) No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy

Council Regulation (EC) No 2406/96 of 26 November 1996 laying down common marketing standards for certain fishery products

COUNCIL REGULATION (EC) No 850/98 of 30 March 1998 for the conservation of fishery resources through technical measures for the protection of juveniles of marine organisms ANNEX XII MINIMUM SIZES

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Vestergaard N., Squires D., and Kirkley J.E. 2003 for FAO Measures of Capacity in a Multispecies Danish Fishery

Demersal trawl, Danish seine and set nets				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.1.3	**Information / monitoring** Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species.	Qualitative information is available on the amount of main retained species taken by the fishery. Information is adequate to qualitatively assess outcome status with respect to biologically based limits. Information is adequate to support measures to manage main retained species.	Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery. Information is sufficient to estimate outcome status with respect to biologically based limits. Information is adequate to support a partial strategy to manage main retained species. 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 strategy).	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations. Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. Information is adequate to support a comprehensive strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective. Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.
Score: 90				

Summary: Demersal trawl, Danish seine and set nets

Accurate data has been provided to allow determination of volumes and value of all retained species landed in conjunction with the saithe demersal trawl, Danish seine and set net fisheries. This information is both accurate and verifiable and provides data to inform the status of these species and to inform the associated TACs and quotas. Information is recorded within a 5% tolerance on onboard logbooks for all retained species. Information is collected centrally by the Ministry and is adequate to determine the risk posed by the fishery as well as the effectiveness of the strategy to manage retained species. Information on retained species catch can be verified from source log sheets and can be cross referenced with landings inspection reports and at sea inspection reports. It is concluded that monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.

The first and fourth SG100 issues have therefore been met.

Information is assessed as being sufficient to estimate outcome status with respect to biologically based limits and adequate to support partial strategies to manage main retained species. All of the SG80 issues are therefore met.

Justification: Demersal trawl, Danish seine and set nets

Raw data for all landings by Danish vessels in 2008 were provided by month, ICES Division, ICES square, landing port, gear type and vessel length category. Data were sorted to identify landings of over 1 tonne of saithe coupled with all landings of other species with identical landing characteristics i.e. where the month, ICES Division, ICES square, landing port, gear type and vessel length category were identical. This allowed the retained species taken in conjunction with the saithe fishery to be monitored to a high degree of certainty.

This data was available for all gear types and therefore provided accurate and verifiable catch data that is monitored in sufficient detail to assess ongoing mortalities to all retained species.

Given that all of the main retained species are managed by TACs and quotas, as are approximately two thirds of the other retained species it was assessed that information is sufficient to estimate outcome status of the retained species.

The category 'skates and rays' is acknowledged under Status 2.1.1 as not allowing status of all retained species to be determined. However EC Regulations 43/2009, which came into force on 16th January 2009, requires the following five species of ray to be recorded separately: Cuckoo ray (*Leucoraja naevus*), Thornback ray (*Raja clavata*), Blonde ray (*Raja brachyura*) Spotted ray (*Raja montagui*) and Starry ray (*Amblyraja radiate*) and is therefore expected to resolve this issue.

While the data have not yet collated in sufficient time series to allow status to be assessed for all species, it is considered that as per EC 43/2009 sufficient information is being collected to species level. The wheelhouse guide (as per ETP condition) will further assist identification and reporting.

Information is adequate to support the strategies presented in 2.1.2. However it is assessed by the team that information is not adequate to assess with a high degree of certainty whether the strategy is achieving its objective.

Information available for the retained species associated with the demersal trawl, Danish seine and set net saithe fisheries meet all of the SG80 issues and two of the SG100 issues and therefore scores 90.

References

DTU Aqua. 2010. Landings statistics

ICES 2009, Book 6 and Book 9 Fisheries advice

2.2	Discarded species (also known as "bycatch" or "discards")			
Demersal trawl				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.2.1	**Status** The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups.	Main bycatch species are likely to be within biologically based limits, or if outside such limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding. If the status is poorly known there are measures or practices in place that are expected result in the fishery not causing the bycatch species to be biologically based limits or hindering recovery.	Main bycatch species are highly likely to be within biologically based limits or if outside such limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.	There is a high degree of certainty that bycatch species are within biologically based limits.
Score: 80				

Summary: Demersal trawl

The main bycatch species, as listed below, are assessed as being either highly likely to be within biologically based limits and/or having a partial strategy in place (TACs, size standards, area closures etc) of which the management measures are demonstrably effective and ensure the saithe fishery does not hinder recover or rebuilding.

Justification: Demersal trawl

Fishery observer data collected on board Danish demersal trawlers fishing in the North Sea and Skagerrak from 2004-2008 found highest volumes of discards for the following species:

North Sea

- Starry ray
- Cod
- Saithe
- Norway lobster
- Common dab
- Haddock
- Grey gurnard
- Hake
- Plaice

Skagerrak

- Cod
- Norway lobster
- Haddock
- Starry ray
- American plaice
- Roundnose grenadier
- Plaice
- Saithe
- Whiting
- Common dab

The observer trips are non target species specific and capture a snapshot of discarding by a particular vessel, in a particular location, at a particular time. Data is available by area allowing a distinction to be made between North Sea and Skagerrak discarded species.

As per FAM Section 7.1.5 and 7.3.1 it is not appropriate to re-consider or re-score cod, haddock and hake from the North Sea and cod, *Nephrops*, haddock and plaice form the Skagerrak as these species have already been considered under 2.1 Retained species. Similarly saithe will not be scored under discards because discards of this

target species have been considered under Principle 1.

The species therefore being considered under demersal trawl discards for the North Sea and Skagerrak are as follows:

North Sea

- Starry ray
- Norway lobster
- Common dab
- Grey gurnard
- Plaice

»

Skagerrak

- Starry ray
- Long rough dab
- Roundnose grenadier
- Whiting
- Common dab

»

Starry ray – North Sea and Skagerrak

In the central and northern North Sea, starry ray *Amblyraja radiata* is the most abundant skate and ray species. Observer data reveals that this species is discarded in high volumes in both the North Sea and Skagerrak. This has been corroborated with consultation that further indicates the species is of little commercial importance due to its small size and lack of 'wing' flesh.

Seafish Responsible Guide reports that the catch-per-unit-effort for starry ray has increased in the 1980s and, although it has recently declined, starry ray remains one of the most abundant rays in the North Sea.

An estimate of the biomass of starry ray in the North Sea was undertaken by Vinther and Sparholt (1991) and found to be approximately 100 000 t as a mean over 1977–1988.

ICES 2008 advice on demersal elasmobranchs in the North Sea provides a qualitative summary of the general status of the major species based on surveys and landings. The starry ray stock is described as stable.

Elasmobranchs are typically slow growing, have a high age-at-maturity and a low reproductive capacity. ICES advise that measures to afford protection to the largest individuals should be considered. The starry ray is one of the smallest species of skate and ray with normal maximum growth up to 70 cm(although individuals up to 100cm have been recorded). The starry ray is listed as of least concern on the IUCN list.

From the available evidence it is assessed that the starry ray is highly likely to be within biologically based limits.

Starry ray in the North Sea and Skagerrak meets all of the bycatch species outcome status SG60 and SG80 issues and therefore scores 80.

***Nephrops* – North Sea**

Nephrops in the North Sea are assessed as eight separate functional units:

- Botney Gut - Silver Pit
- Farn Deeps
- Fladen Ground
- Firth of Forth
- Moray Firth
- Noup
- Norwegian Deep

The saithe demersal trawling effort is concentrated along a deep trench as shown by VMS data in Figure 2.10, main report. This fishery is therefore likely to interact with the Norwegian Deep *Nephrops* functional unit.

ICES advice in 2009 is biannual and therefore covers both 2009 and 2010. ICES report that landings per unit effort recorded from the Norwegian Deep have been relatively stable over the last 14 years and suggest that current levels of exploitation are sustainable. A slight increase in mean size in the catches in 2007 could indicate a reduced exploitation pressure.

ICES 2008 advice suggests that only part of the Norwegian Deep stock is currently being exploited and there may be potential to expand this fishery to new grounds. The saithe demersal trawl fishery interacts with a relatively

small proportion of the Norwegian Deep *Nephrops* functional unit.

Given that the stock is not overexploited and that the trend in lpue does not indicate any decline in stock abundance it is assessed that the Norwegian Deep *Nephrops* functional unit is highly likely to be within biologically based limits.

The Norwegian Deep *Nephrops* functional unit in the North Sea meets all of the bycatch species outcome status SG60 and SG80 issues and therefore scores 80.

Common dab – North Sea & Skagerrak

Common dab *Limanda limanda* is considered the most abundant flatfish species within the North Sea with an estimated biomass of about 2 million tonnes. It is considered the main dominant flatfish species within the North Sea.

While the exact status of the stock is unknown, dab is managed by TACs in the North Sea ICES division. This, together with discard management strategy, provides sufficient mitigation to ensure that the saithe demersal trawl fishery does not hinder the recovery and rebuilding of dab in the North Sea.

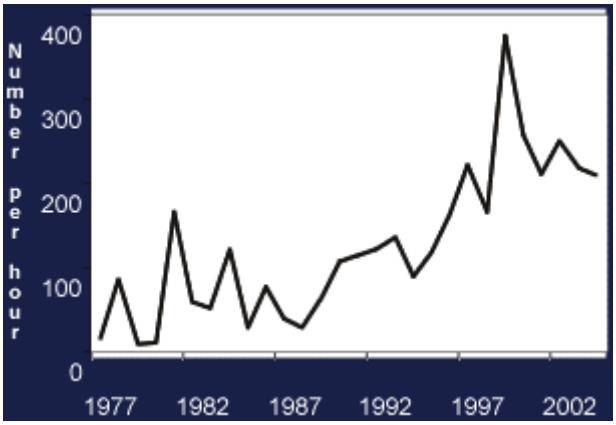
Common dab in the North Sea meets all of the bycatch species outcome status SG60 and SG80 issues and therefore scores 80.

Grey gurnard – North Sea

Grey gurnard *Eutrigla gurnadus* is a widely distributed demersal species in the North Sea that has been ranked frequently among the 10 dominant species (Floeter et al, 2005).

ICES FishMap indicates that the spawning stock biomass, fishing mortality and stock status are unknown. However, survey catches show a marked increase since the late 1980s (Figure 3).

Figure 3. Avg catch rates of grey gurnard in North Sea (ICES FishMap)



There is a strategy in place to minimise discard levels (as discussed under management). It is believed by the team that these are sufficient to ensure that the saithe demersal trawl fishery does not hinder the recovery or rebuilding of the grey gurnard within the North Sea.

Grey gurnard in the North Sea meets all of the bycatch species outcome status SG60 and SG80 issues and therefore scores 80.

Plaice – North Sea

ICES advice in 2009 states that based on the most recent estimate of SSB and fishing mortality, the plaice stock in the North Sea has full reproductive capacity and is being harvested sustainably. SSB is estimated to have increased above the Bpa. Fishing mortality is estimated to have decreased to below Fpa and Ftarget. The recruitment has been of average strength since 2005 and was just below the long-term average in 2008.

Plaice in the North Sea is therefore highly likely to be within biologically based limits.

Plaice in the North Sea meets all of the bycatch species outcome status SG60 and SG80 issues and therefore scores 80.

Long rough dab – Skagerrak

The long rough dab *Hippoglossoides platessoides* is considered to be an abundant flatfish species within the North Sea, Skagerrak and Kattegat.

Figure 4. Average distribution of long rough dab by size class (Heessen & Daan, 1996)

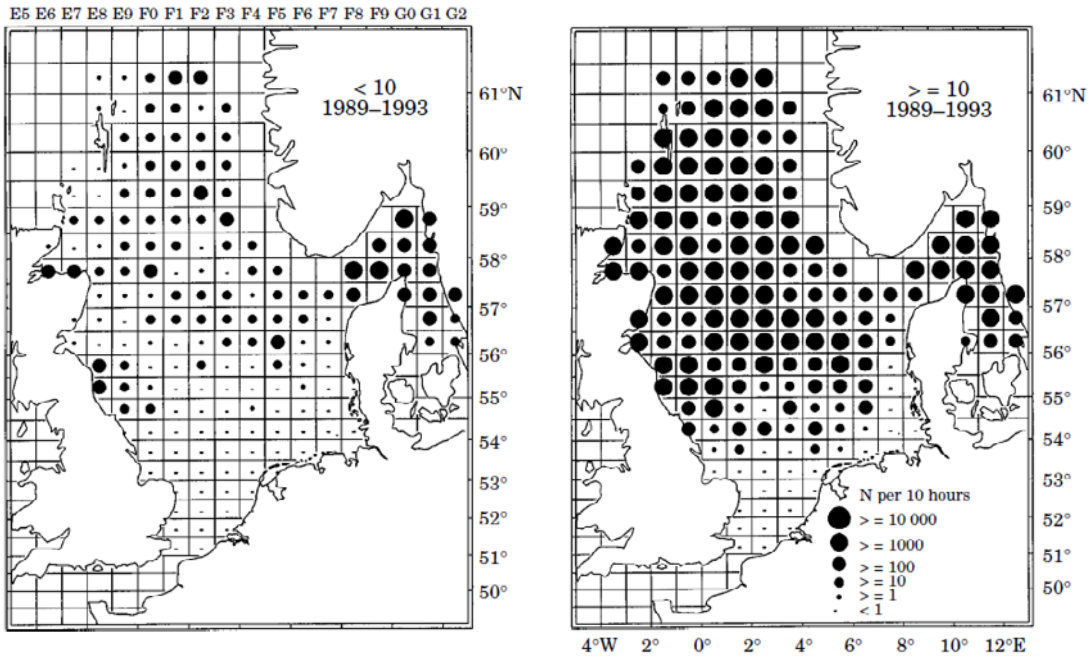


Figure 4 presents the average distribution of this species (number per hour fishing) for juveniles (<10) and adults (≥10). While adults appear highly abundant throughout the North Sea, Skagerrak and Kattegat, juveniles are particularly abundant in the Skagerrak and Kattegat suggesting a separate population (Heessen & Daan, 1996).

In 2004 Fraser and Greentstreet reported that long rough dab biomass in the North Sea has remained relatively constant over a six-year period from 1998 to 2003, at about 25,000 tonnes.

The evidence suggests that long rough dab are abundant; however the status of the stock in the Skagerrak is unknown.

It is assessed that the discard management strategy (described under 2.2.2) provides sufficient mitigation to ensure that the saithe demersal trawl fishery does not hinder the recovery and rebuilding of the long rough dab in the Skagerrak.

Long rough dab in the Skagerrak meets all of the bycatch species outcome status SG60 and SG80 issues and therefore scores 80.

Roundnose grenadier – Skagerrak

ICES 2009 advice states that due to its low productivity, roundnose grenadier can only sustain low rates of exploitation and catches should be constrained to 1000 tonnes, which corresponds to the catch level before the expansion of the fishery (1988 1991). The fishery should not be allowed to expand again unless it can be shown that it is sustainable.

Statistics show that 1 tonne of roundnose grenadier was landed by Danish vessels and that this was entirely from the Skagerrak. The current 2010 TAC for Denmark in ICES Division III is 804 tonnes which remains unchanged from 2009 and represents a 15% reduction from 2008.

The status of the stock in the Skagerrak is unknown, however there is a partial strategy in the form of a TAC and therefore mitigation is sufficient to ensure that the saithe trawl fishery does not hinder the recover or rebuilding of this stock.

Roundnose grenadier in the Skagerrak meets all of the bycatch species outcome status SG60 and SG80 issues and therefore scores 80.

Whiting – Skagerrak

Landings of whiting in the Skagerrak are predominately for the fish meal industry. The whiting stock in ICES Division IIIa is managed by a TAC and recorded landings have been lower than the set TAC since 1991.

ICES advice in 2009 remains unchanged from 2007 advice which states that the landings should be less than the average (2003–2005) landings of 1050 tonnes as a precautionary value to restrict the potential for significant re-expansion of the fishery and misreporting from other regions. The 2010 Danish TAC is set at 232 tonnes.

The status of the whiting stock in the Skagerrak is unknown due to inadequate information being available for the evaluation of spawning stock or fishing mortality. However, the stock is managed by a TAC which is shown to be affective and should ensure that the saithe demersal trawl does not hinder the recovery and rebuilding of whiting in the Skagerrak.

Whiting in the Skagerrak meets all of the bycatch species outcome status SG60 and SG80 issues and therefore scores 80.

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Floeter J., Kempf A., Vinther M., Schrum C. and Temming A. (2005) Grey gurnard (Eutrigla gurnadus) in the North Sea: an emerging key predator? Can. J. Fish. Aquat. Sci. 62(8): 1853–1864

ICES 2009 Book 9: 9.4.15 Roundnose grenadier (Coryphaenoides rupestris) in all areas

ICES Advice 2008, Book 6 6.4.14.4 Nephrops in Norwegian Deeps (FU 32)

ICES Advice 2008, Book 6: 6.4.30 Demersal elasmobranchs in the North Sea (Subarea IV), Skagerrak (Division IIIa), and eastern English Channel (Division VIId)

ICES Advice 2009, Book 6 6.4.14.7 Nephrops in Norwegian Deeps (FU 32)

ICES Advice 2009, Book 6: 6.4.4 Whiting in Division IIIa (Skagerrak – Kattegat)

ICES Advice 2009, Book 6: 6.4.7 Plaice in Subarea IV (North Sea)

ICES Fish Map: Grey Gurnard http://www.ices.dk/marineworld/fishmap/ices/default.asp?id=Grey Gurnard

Rijnsdorp A. D., Vethaak A. And van Leeuwen 1992. Population biology of dab Limanda limanda in the southeastern North Sea Mar. Ecol. Prog. Ser Vol 91: 19-35.

Seafish(2009) Responsible sourcing guide: skates & rays

Vinther and Sparholt (1991) The biomass of starry ray (Raja radiata) in the North Sea. Journal du Conseil: ICES Journal of Marine Science 1991 47(3):295-302

Danish seine				
2.2.1	**Status** The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups.	Main bycatch species are likely to be within biologically based limits, or if outside such limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding. If the status is poorly known there are measures or practices in place that are expected result in the fishery not causing the bycatch species to be biologically based limits or hindering recovery.	Main bycatch species are highly likely to be within biologically based limits or if outside such limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.	There is a high degree of certainty that bycatch species are within biologically based limits.
Score: 80				

Summary: Danish seine

The main bycatch species, as listed below, are assessed as being either highly likely to be within biologically based limits and/or having a partial strategy in place (TACs, size standards, area closures etc) of which the management measures are demonstrably effective and ensure the saithe fishery does not hinder recover or rebuilding.

Justification: Danish seine

The large majority of landings of saithe targeted by Danish seines are only recorded for the Skagerrak area. It is therefore assumed that any discarding data for Danish seining in the North Sea is not relevant to the saithe fishery and will not be considered further.

Fishery observer data collected on board Danish seiners fishing in the Skagerrak from 2004-2008 found highest volumes of discards for the following species:

Skagerrak

- Plaice
- Cod
- Haddock
- Starry ray
- Common dab
- Long rough dab
- Hake
- Saithe
- Grey gurnard

As per FAM Section 7.1.5 and 7.3.1 it is not appropriate to re-consider or re-score plaice, cod, hake and haddock from the Skagerrak as these species have already been considered under 2.1 Retained species. Similarly saithe will not be scored under bycatch because discards of this target species have been considered under Principle 1.

Furthermore, starry ray, common dab and long rough dab have been scored under demersal trawl bycatch and will therefore not be repeated. Also information presented for grey gurnard is consistent for both the North Sea and Skagerrak and therefore will not be repeated.

All bycatch (discarded) species associated with Danish seine in the Skagerrak meet all of the bycatch species outcome status SG60 and SG80 issues and therefore score 80.

References

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DTU Aqua. 2010. Discard observer data for demersal trawl and Danish seine from 2000 to 2008.

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Heessen, H. J. L., and Daan, N. 1996. Long-term trends in ten non-target North Sea fish species. – ICES Journal of Marine Science, 53: 1063–1078

ICES Advice 2008, Book 6: 6.4.30 Demersal elasmobranchs in the North Sea (Subarea IV), Skagerrak (Division IIIa), and eastern English Channel (Division VIId)

ICES Fish Map: Grey Gurnard http://www.ices.dk/marineworld/fishmap/ices/default.asp?id=Grey Gurnard

Rijnsdorp A. D., Vethaak A. And van Leeuwen 1992. Population biology of dab Limanda limanda in the southeastern North Sea Mar. Ecol. Prog. Ser Vol 91: 19-35.

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Set nets				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.2.1	**Status** The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups.	Main bycatch species are likely to be within biologically based limits, or if outside such limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding. If the status is poorly known there are measures or practices in place that are expected result in the fishery not causing the bycatch species to be biologically based limits or hindering recovery.	Main bycatch species are highly likely to be within biologically based limits or if outside such limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.	There is a high degree of certainty that bycatch species are within biologically based limits.
Score: 80				

Summary: Set nets

The main bycatch species, as listed below, are assessed as being either highly likely to be within biologically based limits and/or having a partial strategy in place (TACs, size standards, area closures etc) of which the management measures are demonstrably effective and ensure the saithe fishery does not hinder recover or rebuilding.

Justification: Set nets

Fishery observer data collected on board Danish set net vessels fishing from 1995-2008 found highest volumes of discards for the following species:

- Common dab
- Cod
- Starry ray
- Plaice

Discard levels within the set net fishery are very low compared to other fishing methods including demersal trawl and Danish seine (see Tables 4.4-4.6 in main report).

As per FAM Section 7.1.5 and 7.3.1 it is not appropriate to re-consider or re-score plaice and cod as these species have already been considered under 2.1 Retained species. Furthermore, starry ray and common dab have been scored under demersal trawl bycatch and will therefore not be repeated.

All bycatch (discarded) species associated with set nets meet all of the bycatch species outcome status SG60 and SG80 issues and therefore score 80.

Note that all interaction with birds is considered under ETP.

Ghost fishing of set nets is considered under bycatch since one of the major impacts related to this is the continuous catching of target and non target species and therefore unobserved fishing mortality (as per FAM definition 7.3.1).

Lost static nets that have been deployed on open ground are shown to undergo an initial sharp decrease in net

height followed by a prolonged period of slow decrease in net height and increased degradation and tangling due to catches and biofouling. Fishing may, however, continue at significant rates (Carr and Cooper, 1987; Brothers, 1992).

Programmes to examine the impact of ghost fishing have been performed such as the EU FANTARED 2 project and the recent review undertaken for FAO (Macfadyen *et al*., 2009).

Anecdotal evidence collated during the site visit suggests that lost gear incidents rarely occur and that all efforts are made to retrieve gear. However it is not possible to determine the full extent of these events in relation to the saithe set net fishery with a high degree of certainty, although the risk is considered low, given the scale of the fishery.

For this reason it is felt that it is not possible to score 100 and given the low risk posed by the saithe set net fishery a score of 80 has been awarded.

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ICES CM 2009 ACOM Advisory Committee: 10 Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak - Combined Spring and Autumn

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Macfadyen G., Huntington T. and Cappell R. 2009. Abandoned, lost or otherwise discarded fishing gear FAO FISHERIES AND AQUACULTURE TECHNICAL PAPER 523

Ministry of Food. 2006. Report on discards in Danish Fisheries

Nakashima, T. & Matsuoka, T. 2004. Ghost-fishing ability decreasing over time for lost bottom-gillnet and estimation of total number of mortality. *Nippon Suisan Gakkaishi,* 70(5): 728–737.

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Demersal trawl, Danish seine and set nets				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.2.2	**Management strategy** There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations.	There are measures in place, if necessary, which are expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery. The measures are considered likely to work, based on plausible argument (eg. general experience, theory or comparison with similar fisheries/species).	There is a partial strategy in place, if necessary, for managing bycatch that is expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery. There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or the species involved. There is some evidence that the partial strategy is being implemented successfully.	There is a strategy in place for managing and minimising bycatch. The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports high confidence that the strategy will work. There is some evidence that the strategy is achieving its objective. There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring.
Score: 90				

Summary: Demersal trawl, Danish seine and set nets

It is assessed that there are clear strategies in place for managing and minimising discards. Many of these have primarily been developed for protection of juvenile cod, but in doing so also protect other fish species. Of particular importance is the ban on high grading. Some evidence is available to demonstrate that these strategies are being implemented successfully and the intended changes are occurring.

Justification: Demersal trawl, Danish seine and set nets

There is a strategy in place for managing bycatch (discarded) species including the following measures:

- Closed areas
- Technical gear restrictions
- Cod recovery plan and days at sea
- Ban on high grading
- Ban on discards in Norwegian zone
- Observer programmes and Fully Documented Fishery
- DFPO Code of Conduct (lost gear)

Closed areas, technical gear restrictions, the cod recovery plan and days at sea have been discussed under 2.1.2 for retained species. Although the details are not repeated in this section, these measures are appropriate to bycatch species and have been taken into consideration for scoring.

Ban on high grading

High-grading is the practice of discarding low-value small fish in order to fill the quota allotted with higher-value big fish and therefore increase the value of the catch.

The Danish Directorate of Fisheries issued an Ordinance regulating the fisheries in 2010 and some fisheries conditions in subsequent years (Control Order 2010) in December 2009. Under Annex 7 of this Control Order it is forbidden to discard certain species (Table 2) if they can be landed legally i.e. within minimum landing size.

Table 2 Species listed under Annex 7 of Control Order 2010 (Danish Directorate of Fisheries, 2009)

Species illegal to high grade			
Blue ling	Haddock	*Nephrops*	Sandeel
Blue whiting	Hake	Norway pout	Skate
Brill	Herring	*Pangasus*	Sole
Capelin	Horse mackerel	Plaice	Sprat
Cod	Lemon sole	Porbeagle shark	Spurdog
Dab	Ling	Ray	Turbot
Flounder	Mackerel	Roundnose grenadier	Tusk
Greater argentine	Megrim	Saithe	Whiting
Greenland halibut	Monkfish	Salmon	Witch

While this ban on high grading is not easily enforceable at sea, it should be detectable through monitoring the size distribution of landings.

Ban on discards in Norwegian zone

Norway introduced a ban on discards in 1987 specifically for cod stocks. This discard ban is now in place for most commercial fish species in Norwegian waters.

Observer programmes and Fully Documented Fishery

Observer trips are required for a certain proportion of specific fishing fleets to record discard levels associated with the fishery. Data from demersal trawl and Danish seine observer trips during 2000-2008 have been provided for this assessment.

As an alternative to on-board observers, DTU Aqua has piloted a Fully Documented Fishery scheme from 2008-2009 on 6 vessels, including a demersal trawler that lands 10% of the Danish saithe quota. The scheme uses CCTV to record discards (primarily focused on cod) and issues Catch Quotas to vessels to allow for the discarded/undersized fish to be accounted against the vessel's quota. To date the scheme has tested the use of CCTV to record discards and has found it to be accurate and more economically viable than the use of on-board observers. Data on levels of discards from this scheme have been collated but are not publically available.

The scheme is being further implemented in 2010 to 30 Danish vessels.

DFPO Code of Conduct

The DFPO have developed a Code of Conduct which in relation to ETP states:

"We seek to minimise the environmental consequences of our fishing by ... being generally aware of the optimal use of our gear. We do our utmost to bring up lost fishing-gear, help each other with this whenever we can – and when the gear cannot be brought up it is recorded in the attached form."

Individual DFPO vessel use of MSC certificates will be subject to them signing up to and comply with the Code of Conduct.

While it is understood that this Code of Conduct works towards minimising and recording loss of gear, it is not possible to define it as a strategy because it has not been demonstrated to be working which is a clear requirement under FAM Section 7.1.22. It is therefore considered part of a partial strategy.

Score

Given the above details it is assessed by the team that there are strategies in place for managing and minimising bycatch (discards), and there is some evidence that these strategies are achieving their overall objective. In

particular the Real Time Closures and ban on high-grading have allowed these issues to be met.

While some testing has been undertaken it does not support with high confidence that the strategies will work. Furthermore while there is some evidence that the strategies are being implemented successfully, it is not clear that the intended changes are occurring.

It is assessed by the team that bycatch management strategies for demersal trawl, Danish seine and set net saithe fisheries meet all of the SG80 issues and the first and third SG100 issues and therefore both score 90.

References

COMMISSION REGULATION (EC) No 356/2005 of 1 March 2005 laying down detailed rules for the marking and identification of passive fishing gear and beam trawls

COMMISSION REGULATION (EC) No 356/2005 of 1 March 2005 laying down detailed rules for the marking and identification of passive fishing gear and beam trawls

COUNCIL REGULATION (EC) No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy

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Danish Directorate of Fisheries (2009) Bekendtgørelse om regulering af fiskeriet i 2010 og visse vilkår for fiskeriet I følgende år (Reguleringsbekendtgørelsen 2010)

ICES CM 2009 ACOM Advisory Committee: 39 Report of the Planning Group on Commercial Catches, Discards and Biological Sampling

ICES CM 2009 FTC Fisheries Technology Committee:07 Report of the Working Group on Quantifying all Fishing Mortality

Seafish. 2009. Discards – new developments in 2009 as at 19 December 2009

Demersal trawl, Danish seine and set nets				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.2.3	**Information / monitoring** Information on the nature and amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch.	Qualitative information is available on the amount of main bycatch species affected by the fishery. Information is adequate to broadly understand outcome status with respect to biologically based limits. Information is adequate to support measures to manage bycatch.	Qualitative information and some quantitative information are available on the amount of main bycatch species affected by the fishery. Information is sufficient to estimate outcome status with respect to biologically based limits. Information is adequate to support a partial strategy to manage main bycatch species. Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).	Accurate and verifiable information is available on the amount of all bycatch and the consequences for the status of affected populations. Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty. Information is adequate to support a comprehensive strategy to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective. Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.
Score:	**85**			

Summary: Demersal trawl, Danish seine and set nets

Available data on discarding within the demersal trawl, Danish seine and set net fleets is quantitative and sufficient to estimate outcome status and support partial strategies for management. Data continues to be collected to detect any increase in risk posed by the fishery to these discarded species. Monitoring allows the ongoing mortality to be determined for all discarded species. A score of 85 is therefore awarded to all UoCs.

Justification: Demersal trawl and Danish seine

Qualitative information and some quantitative information are available on the amount of main bycatch species affected by the fishery. Ongoing fishing fleet discard sampling programmes provide accurate and verifiable data in relation to the nature and scale of discarding in the North Sea and Skagerrak trawl, seine and set net fisheries. Data provided by DTU is based on observer reporting. The level of information that is available in relation to discarding is adequate to determine the risk posed by the fishery for the status of affected populations, as well the effectiveness of the management strategy.

Information is sufficient to estimate outcome status with respect to biologically based limits. However, quantitative information is not sufficient to undertake stock assessments for all discarded species due to uncertainties surrounding levels of discards, as well as other factors and so biologically based limits cannot be determined with a high degree of certainty.

Information is adequate to support a partial strategy to manage main bycatch species. Available qualitative and quantitative information in relation to bycatch for the fisheries and is deemed sufficient to support measures that serve to limit the implications of bycatch levels for affected species.

Routine monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species. Bycatch sampling is conducted on an ongoing basis and records quantify all species captured and not retained. Data collected are adequate for monitoring bycatch rates and are used by DTU Aqua to evaluate ongoing

mortalities to bycatch species. It is assessed that all SG 60 and SG80 issues are met and that the last SG100 issue is met and therefore a score of 85 is awarded.
References
DTU Aqua. 2010. Discard observer data for demersal trawl and Danish seine from 2000 to 2008. Fraser H. and Greentstreet S. 2004. 1ST Annual Report on Groundfish Assemblage Species Composition and Diversity. Fisheries Research Services Collaborative Report No 10/04 ICES CM 2009/ACOM:31. Report of the Benchmark and Data Compilation Workshop for Flatfish (WKFLAT 2009) ICES Fish Map The North Sea Fish Community http://www.ices.dk/marineworld/fishmap/pdfs/fishcommunity.pdf Kelleher K. 2005 Discards in the world's marine fisheries: An update. FAO FISHERIES TECHNICAL PAPER 470 Ministry of Food. 2006. Report on discards in Danish Fisheries

2.3	Endangered, Threatened and Protected (ETP) species			
Demersal trawl and Danish seine				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.3.1	**Status** 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 effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species. Known direct effects are unlikely to create unacceptable impacts to ETP species.	The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. Direct effects are highly unlikely to create unacceptable impacts to ETP species. Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.	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. There is a high degree of confidence that there are no significant detrimental effects (direct and indirect) of the fishery on ETP species.
Score:	**75**			

Summary: Demersal trawl and Danish seine

The main interaction between demersal trawl, Danish seine and ETP species is with common skate and spurdog. National and international requirements for protection stipulate zero TACs for these species, with a small allowance for bycatch landings of spurdog. It is noted that common skate and spurdog caught in the Norwegian zone, where the majority of demersal trawling for saithe occurs, can legally be landed in the EU. It is therefore assessed that the effects of the fishery are known and highly likely to be within required limits. However, it is not possible to say with confidence that the fishery is highly unlikely to create unacceptable impacts. A score of 75 has therefore been awarded for both common skate and spurdog.

Justification: Demersal trawl and Danish seine

The ETP species to be included within the assessment for demersal trawl have been decided based on three factors:

- Temporal range of the species
- Spatial range of the species
- Evidence of interaction with the fishing gear.

Marine mammals

Cetaceans and seals are known to interact with demersal trawlers to forage on the fish discarded and on occasion to manipulate the codend to access the catch. Such interaction have been reported in the Mediterranean (Gonzalvo, 2008), Gulf of Mexico (Leatherwood, 1975), Australia (Corkeron et al., 1990) and elsewhere around the world (Fertl and Leatherwood, 1997; Broadhurst, 1998; Chilvers and Corkeron, 2001).

Seals are known to occasionally attempt to enter mobile gears where they may become entrapped and drown, however this is a rare event and anecdotal information from the fishery suggests that numbers killed or injured in this way are low and the fishery is not believed to present a significant risk to either Harbour seal *Phoca vitulina*, Grey seal *Halichoerus grypus* or Ringed seal *Phoca hispida* populations. Angel shark *Squatina squatina* would potentially be a significant ETP species in the North Sea, however it is considered extinct in the North Sea and Skagerrak (IUCN, 2010) and the trawl fishery is not expected to interact with this species, although it has been implicated in the extinction of Angel shark within the North Sea.

It is recognised that marine mammal mortalities caused by demersal trawl fisheries are rare, with evidence

supporting that lethal interactions are more closely linked with other gear types such as set nets and purse seines (Fertl and Leatherwood, 1997; Vinther, 1999; Kindt-Larsen and Dalskov, 2010). This is reflected in EU Regulation 812 2004 which requires on-board observers to monitor incidental catches of cetaceans and has a clear emphasis on set nets and pelagic fisheries.

Consultation during the site visit with both fishermen and DTU Aqua confirm that capture of marine mammals by Danish demersal trawlers is rare.

Birds

The Skagerrak and North Sea Norwegian Trench is recognised for the occurrence of six bird species in internationally importance numbers: Little Auk *Alle alle, r*azorbill *Alca torda,* guillemot *Uria aalge,* herring gull *Larus argentatus*, great skua *Stercorarius skua,* gannet *Morus bassanus* (Skov et al., 1995). Given the diving depth range of marine birds their interaction is limited to when demersal trawl nets are at, or close to, the surface during shooting and hauling. Entanglement during this activity is recognised as being more significant in pelagic gear due to the greater overall size of nets and large mesh sizes. Discarding data (DTU Aqua, 2010) further confirms that interactions with bird species and demersal trawl and seine gear is rare.

Elasmobranchs

Skate *Dipturus batis* and spurdog *Squalus acanthias* are known to interact with the demersal trawl and Danish seine fisheries and are assessed below. Evidence suggests that interactions with basking shark are more significant to fixed gear such as set nets (Wildlife Trust, 2008) and longlining (FAO, 2003).

Spurdog are classified in the IUCN Red List of threatened species as Vulnerable globally and Critically Endangered in the Northeast Atlantic, meaning stocks around Europe have decreased by at least 95% (Fordham *et al*, 2006).

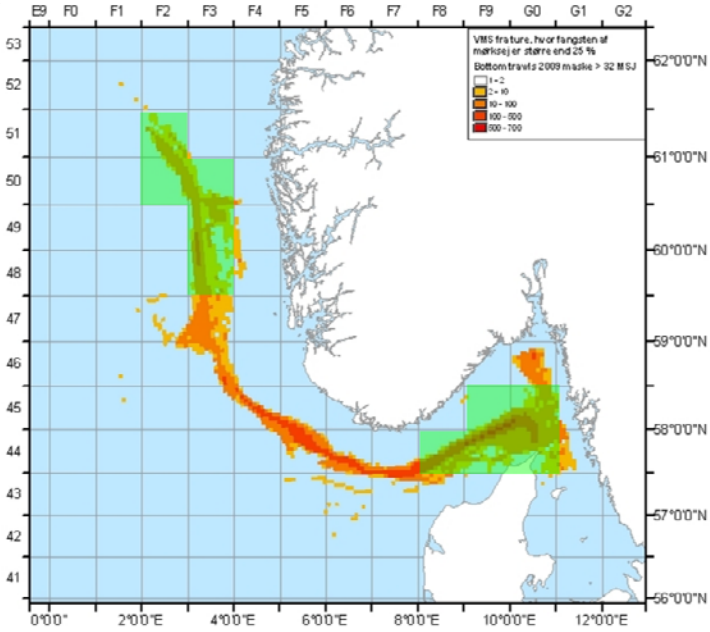
Table 3 presents landings of skate, skate and ray and spurdog by all Danish vessels from 2006 to 2010. The distinction of skate to species level can be seen from 2008 onwards. Information collated for retained species indicates that the saithe demersal trawl fishery is responsible for 80% (0.13 tonnes) of the skate landings and ~27% (18 tonnes) of the spurdog landings. It is therefore reasonable to assume that these species continue to be landed by the saithe demersal trawl fishery in 2009 and 2010. The distribution of skate, skate and ray and spurdog landings by ICES square is shown against VMS data for Danish demersal trawlers landing saithe in Figure 5. This further confirms that skate and spurdog landings are associated with the saithe demersal trawl fishery, with 'hotspots' of landings from effort in the north and in Skagerrak.

Table 3 Landings of skate, skate & ray and spurdog, tonnes, by Danish vessels from 2006-2010 (Directorate of Fisheries, 2010).

Species	2006	2007	2008	2009	2010
Skate			0.16	2.4	0.629
Skate & ray	51.1	34.2	27.77	34.7	21.709
Spurdog	95.0	64.76	67.27	72	6.25

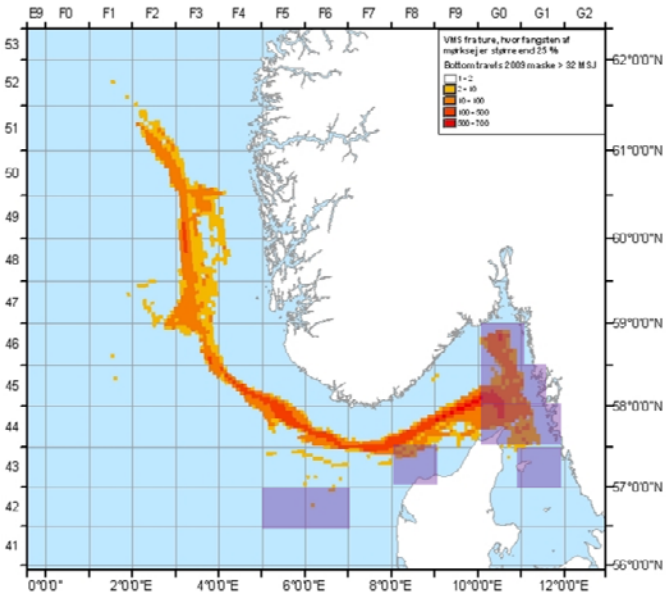
Figures 5 Distribution of skate (green squares), spurdog (purple squares) and skate and rays (green squares) landings in relation to saithe demersal trawl VMS data (DTU Aqua, 2010) and global geographical range of common skate and spurdog (IUCN, 2010)

Common skate landed by saithe trawl fishery



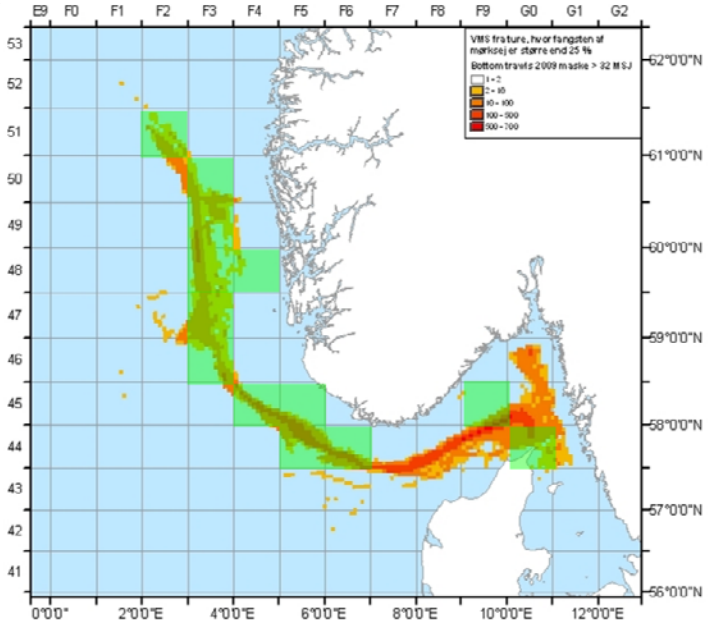
Global distribution of common skate

Spurdog landed by saithe trawl fishery



Global distribution of spurdog

Skates and rays landed by saithe trawl fishery



Landings of skate from the EU zone are prohibited under EC regulations 43/2009 and 23/2010 and landings of spurdog from the EU zone are restricted by EC 23/2010. Landings of skate are recorded in 2009 and 2010 partly because catches taken in the Norwegian zone cannot be discarded and must be landed in either Norway or the EU; this has been confirmed by the Danish Fisheries Directorate. For this reason the effect of the saithe demersal trawl fishery is assessed as being highly likely to be within limits of national and international requirements for protection.

With the detail available in retained species and discards it is assessed that the effects of the fishery i.e. level of capture and discarding of skate and spurdog is known. Given the recent decline in spurdog and skate and the fact that these species are still taken by the fishery, regardless of whether they are landed or not, it is unclear whether the direct effects are highly unlikely to create unacceptable impacts. In 2009, landed volumes of skate peaked, as a consequence of identification to species level within the statistics, and this equated to approximately 27-44 individuals (based on an average weight of 54-88kg).

Given this small number, together with the distinct area targeted by the saithe demersal trawl as shown by VMS data it is unlikely that this fishery will create unacceptable impacts to either skate or spurdog.

Spurdog is known to predominantly feed on pelagic prey and invertebrates. Skate also have a wide ranging diet including other rays and numerous species of demersal fish. The indirect effect of removing saithe is therefore unlikely to create unacceptable impacts. Other indirect effects, such as habitat destruction, are also unlikely to be of major significance given the wide depth range of skate and spurdog and the distinct area targeted for saithe by demersal trawlers.

From the above evidence it is assessed that the interaction of the saithe fishery with ETP species meets all of the SG60 issues and the first and last SG80 issues. A score of 75 is therefore awarded.

This has triggered Conditions OT 1 and DS 1.

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Set nets

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.3.1	**Status** 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 effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species. Known direct effects are unlikely to create unacceptable impacts to ETP species.	The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. Direct effects are highly unlikely to create unacceptable impacts to ETP species. Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.	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. There is a high degree of confidence that there are no significant detrimental effects (direct and indirect) of the fishery on ETP species.
Score:	**75**			

Summary: Set nets

It is considered that the saithe set net fishery meets national and international requirements for protection. For the majority of ETP species assessed all of the SG80 issues are met, except for harbour porpoise which do not score above 60. An overall score of 75 has therefore been awarded.

Justification: Set nets

Seal, birds and elasmobranchs

Interaction between seabirds and set net fisheries are predominately recorded in coastal waters. The most numerous victim of set net fisheries bycatch in the North Sea and Baltic Sea is the long-tailed duck *Clangula hyemalis* and other sea duck and diving duck species (Zydelis *et al.*, 2009). However, the most common species taken as bycatch in Denmark is the cormorant *Phalacrocorax carbo* (Table 4).

Table 4. The order of magnitude of reported bycatch estimates by set nets and countries with the most frequent bycatch of waterbird species in the Baltic Sea and the North Sea and the respective wintering numbers. Country codes: SE – Sweden, EE – Estonia, LV – Latvia, LT – Lithuania, PL – Poland, DE – Germany, DK – Denmark, NL – Netherlands, UK – United Kingdom (Skov et al., 2007 as cited in Zydelis *et al*, 2009)

Species	Order of magnitude of reported bycatch numbers	Wintering numbers (1987–1995)[a]	Countries with the most frequent bycatch[b]
Red-throated diver *Gavia stellata* and Black-throated diver *Gavia arctica*	Hundreds	>100,000	SE, LV, LT, PL, DE
Red-necked grebe *Podiceps grisegena*	Tens to hundreds	7500	PL, DE
Great crested grebe *Podiceps cristatus*	Thousands	25,300	EE, LV, LT, PL, DE, NL
Slavonian grebe *Podiceps auritus*	Tens	1850	PL, DE
Great cormorant *Phalacrocorax carbo*	Thousands	33,400	SE, DE, DK, NL
Tufted duck *Aythya fuligula*	Thousands	330,000	EE, PL, DE, NL
Greater scaup *Aythya marila*	Thousands	160,000	PL, DE, NL
Common eider *Somateria mollissima*	Thousands	1500,000	SE, PL, DE
Steller's eider *Polysticta stelleri*	Tens	7000	EE, LT
Long-tailed duck *Clangula hyemalis*	Tens of thousands	4300,000	SE, EE, LV, LT, PL, DE
Common scoter *Melanitta nigra*	Thousands	1353,000	PL, DE
Velvet scoter *Melanitta fusca*	Thousands	1054,000	LV, LT, PL
Goldeneye *Bucephala clangula*	Thousands	139,000	SE, NL
Smew *Mergellus albellus*	Tens to hundreds	17,250	PL, NL
Red-breasted merganser *Mergus serrator*	Hundreds	54,000	SE, PL, NL
Goosander *Mergus merganser*	Hundreds	76,000	SE, EE, LT, NL
Razorbill *Alca torda*	Hundreds	480,000	SE, PL, UK
Common guillemot *Uria aalge*	Thousands	1650,000	SE, UK
Black guillemot *Cephus grylle grylle*	Hundreds	27,500	EE, LT, PL

a These estimates do not include birds wintering in IJsselmeer and Markermeer.
b No bird bycatch information was available from Denmark, except for great cormorant, Finland, Belgium and France.

The cormorant population in Denmark is well documented (DOF, 2010). Values for breeding stock and wintering

stock have been rising since records began with a plateau in breeding stock from 1995 onwards. Figure 6 presents the prevalence of cormorant by month for records from 2003-2009. This clearly indicated that the most important months for cormorant are August to October inclusive.

Figure6 Prevalence of Cormorant in Denmark, based on entries in DOF database for 2003-2009. The values indicate the average number of individuals logged per. reporting, in 10-day periods seasonally across 2003-2009 (DOF, 2010)

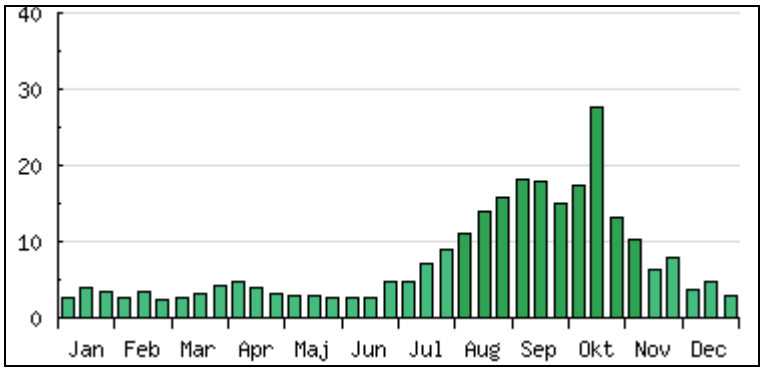
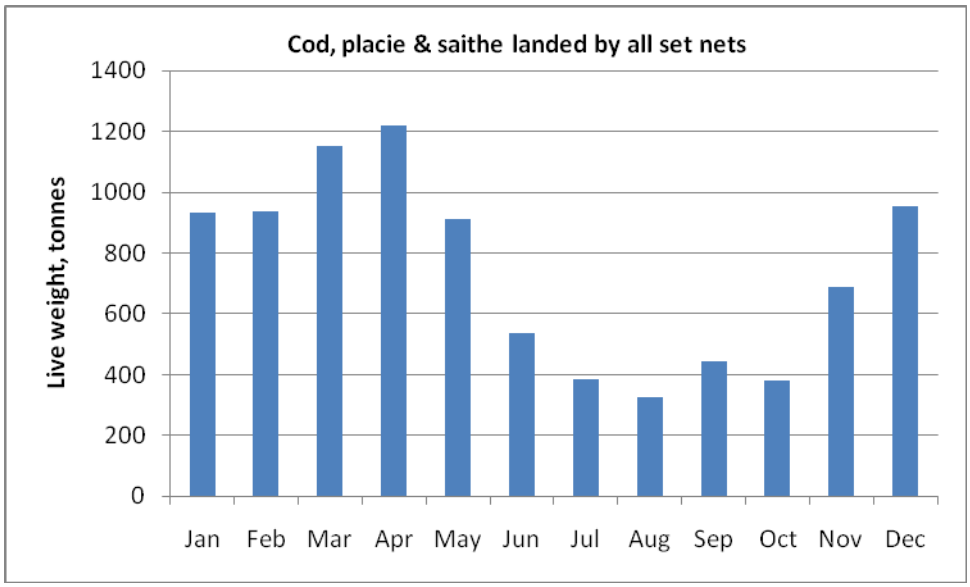


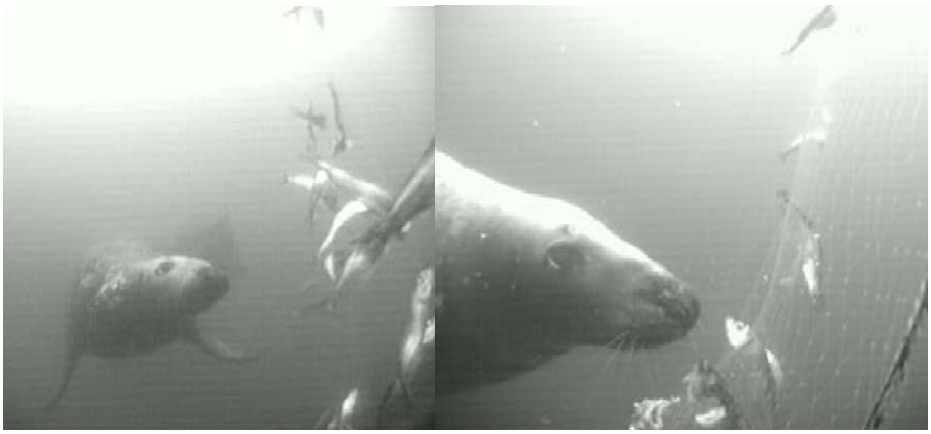
Figure 7 presents set net landings by Danish vessels in 2008 per month targeting the main fisheries that take saithe as a retained catch (cod and plaice). Landings peak from December to May and appear to drop during the peak months for Cormorant. It is therefore assessed that the risk to cormorants posed by the set net fisheries landing saithe is low.

Figure 7. Combined landings, tonnes, of cod, plaice and saithe caught by all Danish vessels deploying set nets in 2008 (from data provided by DTU Aqua, 2010)



The interaction between seals and set net fisheries is primarily focused on seals grazing from fish captured in set nets (Figure 8, Königson, 2007). Seals are recorded to raid nets, consuming a significant part of the catch. Seals can pick the fish out from the nets without leaving any remains, or simply eat the body of the fish leaving the head intact to be brought onboard.

Figure 8. Seal grazing from Swedish set nets (Königson, 2007)



Nevertheless seal entanglement does occur and it has been reported in a Swedish study, based on a telephone survey with 16 % of all Swedish commercial fishermen, that about 450 grey seals were by-caught in the Swedish commercial fisheries in the Northern Baltic in the year 2001. In the Gulf of Bothnia, about 50 ringed seals were by-caught, while more than 400 harbour seals were by-caught off the west coast of Sweden (Lunneryd et al. 2004). Furthermore research indicates that the fisheries for cod and flatfish with bottom-set nets are the fisheries where most seals get entangled, and the species most affected is the grey seal (Königson, 2007). The study concludes that current levels of seal by-catch cannot be considered a serious threat to the Swedish seal populations, as all three seal species have demonstrated strong population growth in recent years.

While seals actively consume fish caught by set nets, other species are thought to have been affected indirectly by the removal of their prey by commercial fisheries. This is particularly well documented for seabirds (Tasker and Furness, 1996). It is, however, difficult to separate the effects of fishing from natural changes in species abundance due to environmental changes in, for example, temperature and currents, or from man-made changes, such as increases in nutrients. Two fish species that are widely preyed upon by seabirds are sandeel and sprat. While saithe may be taken by marine mammals and elasmobranchs they are consumed as part of a wider diet of many demersal species and invertebrates. It is therefore considered that the indirect effect of removing saithe as a potential food source is negligible.

While interaction between Danish set net fisheries and Harbour seal, grey seal, spurdog, birds (in particular cormorant) and basking shark are recorded, it is considered that due to the scale and location of the saithe set net fishery it does not pose a risk of serious or irreversible harm to these species. That is not to say that the larger set net fisheries of cod and plaice (where saithe is taken as a retained species) pose such a low level of risk, but that the scale of the saithe set net fishery must be taken into consideration in assessing the risk to these ETP species.

National legislation for birds and seals are represented by Denmark's implementation of the Habitats and Birds Directives in designating Natura 2000 sites including Special Areas of Conservation and Special Protected Areas (see Figure 4.6). Denmark designated a series of Natura 2000 sites in 2009 and 2010, eight of which have harbour seal as a qualifying feature and 21 of which have grey seal as qualifying feature. The development of management plans for these sites are underway. Only one of these sites lies in the North Sea and Skagerrak area and is out with the effort presented in VMS figures. The development of management plans for all activities in the SACs and SPAs are underway and involve a transparent consultation process. Due to the location of the set nets that are landing saithe, interaction within the existing Natura network is highly unlikely to create unacceptable impacts.

Basking shark are protected under Article 6 of EC No 43/2009 whereby it is prohibited for Community vessels to fish for, to retain on board, to tranship and to land this species. No evidence exists that Danish vessels are not complying with this regulation.

EC No 23/2010 imposes a zero TAC for spurdog with permitted retained by-catches up to 10 % of the 2009 quotas established in Annex Ia to Regulation (EC) No 43/2009 under the following conditions:

- a maximum landing size of 100 cm (total length) is respected, and
- the by-catches comprise less than 10 % of the total weight of marine organisms on board the fishing vessel.

No evidence of set net interactions or retention to this level have been recorded, retention of 0.5% of 2009 Denmark quota was landed in 2009 by the saithe set net fishery.

It is assessed that the effect of the saithe set net fishery on birds (including cormorants), seals, spurdog and basking shark is highly likely to be within national and international limits and that the direct effects are highly unlikely to create unacceptable impacts. Furthermore the indirect effect of removing saithe is unlikely to create unacceptable impacts for these species.

For seals, birds (including cormorants) and elasmobranchs (including spurdog) a score of 80 is awarded.

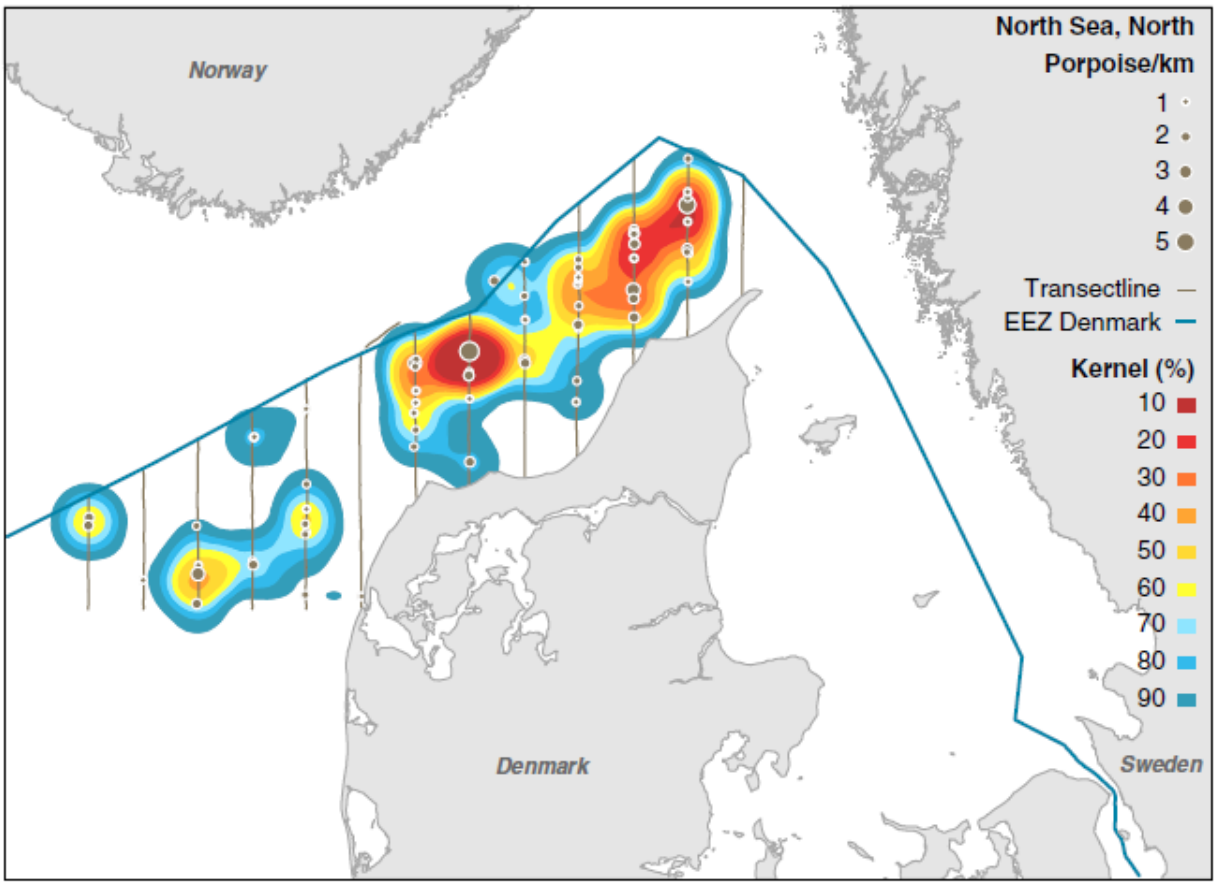
Cetaceans

The most abundant cetacean within Danish waters is the Harbour porpoise *Phocoena phocoena* and as such a great deal of research has been conducted to study the impacts of set net fisheries upon this species.

Of all cetaceans, set net fisheries pose a serious threat to the harbour porpoise as they are extremely susceptible to entanglement (Jefferson & Curry, 1994) due to their inability to detect the nets before collision (Kastelein *et al.* 1999).

Kernal density maps of Harbour porpoise (Figure 9, Teilmann *et* al, 2008) show that high densities occur to the north of Jutland and the north west area offshore from Thyboron. This latter region is where set net effort for saithe is focused i.e. where saithe make up >25% of the set net landings by volume.

Figure 9 Kernel density map of harbour porpoises based on 3 aerial surveys conducted in Skagerrak/northern North Sea in 2006-2007 covering the summer and fall from August to October (the lower percent the higher density). Observations and tracklines as well as the national border are shown (Teilmann *et al*, 2008)



A survey conducted in the eastern North Atlantic in July 2005 (SCANS II) gave a regional estimation of the harbour porpoise population within the North Sea at c. 231,000 (Hammond et al., 2008).

However, line transect surveys in July 1994 gave a North Sea estimate of North Sea c. 250,000 (Hammond et al., 2002). When comparing these surveys in more detail with attention to more regional values it is evident that

although overall values are similar there has been a decline in the northern North Sea and Danish waters from 239,000 to 120,000 and an increase in the central and southern North Sea, Channel and Celtic Shelf from 102,000 to 215,000. This is thought to represent a southwards range shift rather than actual changes in population size (Winship, 2009).

ICES referred to the findings of the SCANS II project for an abundance estimate (239,061 animals in the North Sea), but were unable to provide a complete bycatch estimate, nor state whether bycatch was below the 1.7% objective. In consequence, it has not been possible to state that the fishery is highly likely to meet international requirements for the protection of Harbour porpoise in the North Sea and Skagerrak.

A recent study by Kindt-Larsen and Dalskov (2010) examined a year of CCTV data collected on board a 14m Danish gillnetter to monitor marine mammal bycatch. In total three harbour porpoise, one harbour seal, two cormorants and one sea gull were taken over the one year, from Sep 2008 to Jul 2009. However, anecdotal evidence suggests that bycatch rates of harbour porpoise are higher than this, particularly in high density areas, with an average of up to ten harbour porpoise being taken by a large set net vessel over a year.

Vinther (1999) analysed data collected by independent observers to assess the bycatch of harbour porpoise in the Danish set net fisheries from 5,591 km nets from 1992 to 1998. During this period a total of 325 harbour porpoise were reported to be taken as bycatch. Vinther (1999) extrapolated the observed bycatch rate in relation to total fish landings of the Danish set net fleet to find an average annual harbour porpoise bycatch of 6,785 from the North Sea.

Vinther and Larsen (2004) suggest mean annual bycatch of Harbour porpoise may have been in the region of 5,500 animals per annum in Danish North Sea setnet fisheries between 1987 and 2001. It is estimated that the plaice fishery (one of the primary target species in the Danish set net fishery) accounted for an estimated average incidental capture of 820 Harbour porpoise during this period.

ASCOBANS Working Group on harbour porpoises advises that the maximum annual by-catch, assuming no uncertainty in any parameter, is 1.7% of the population size in that year. If uncertainty is considered, such as measurement error in estimating population size, maximum annual by-catch must be less than 1.7% (ASCOBANS, 2000).

Based on a population size of 239,061, incidental capture of Harbour porpoise (820) would result in a removal of 0.35% of the population.

It is therefore assessed that the effects of the set net fisheries on harbour porpoise are likely to be within limits national and international requirements. However, without accurate estimations of removal specific to the Skagerrak it is not possible to say the effects are highly likely to be within limits. Furthermore it is considered that the combined incidental capture of Harbour porpoise in all North Sea fisheries is unlikely to be sustainable.

It is assessed that direct effects are unlikely to create unacceptable impacts to harbour porpoise, but it cannot be said with confidence that it is highly unlikely unacceptable impacts may occur.

Harbour porpoise therefore meet none of the SG80 issues and score 60 for ETP status.

Given the range of scores (birds: 80, seals: 80, elasmobranchs: 80 and harbour porpoise: 60) an overall score of 75 is awarded to ETP outcome status.

This has triggered Condition SN 1.

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Demersal trawl and Danish seine				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.3.2	**Management strategy** The fishery has in place precautionary management strategies designed to: - meet national and international requirements; - ensure the fishery does not pose a risk of serious or irreversible harm to ETP species; - ensure the fishery does not hinder recovery of ETP species; and - minimise mortality of ETP species.	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. The measures are considered likely to work, based on plausible argument (eg. general experience, theory or comparison with similar fisheries/species).	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 an objective basis for confidence that the strategy will work, based on some information directly about the fishery and/or the species involved. There is evidence that the strategy is being implemented successfully.	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. 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. There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is evidence that the strategy is achieving its objective.
Score:	**60**			

Summary: Demersal trawl and Danish seine

It is assessed that the measures in place for managing ETP species are not sufficiently implemented to form a strategy. The measures do minimise mortality and are considered likely to work, therefore a score of 60 is awarded.

Justification: Demersal trawl and Danish seine

Skate

EC Regulations 43/2009, which came into force on 16th January 2009, requires the following five species of ray to be recorded separately: Cuckoo ray (*Leucoraja naevus*), Thornback ray (*Raja clavata*), Blonde ray (*Raja brachyura*) Spotted ray (*Raja montagui*) and Starry ray (*Amblyraja radiate*) and prohibits the retention or landing of common skate. The regulation requires prompt release of common skate unharmed to the extent practicable and encourages fisheries to develop and use techniques and equipment to facilitate the rapid and safe release of the species. This is further enforced by EU Regulations 23/2010 whereby it is prohibited for EU vessels to fish for, to retain on board, to tranship and to land common skate (amongst other species).

It is understood that the Fisheries Directorate allow landings of common skate that have been caught in the Norwegian zone, however statistics indicate that common skate continue to be landed from the EU zone (Table 5).

… see next page for Table 5

Table 5 Landings, kg, of spurdog and skate in 2010 by economic zone (Fisheries Directorate, 2010)

Species	Economic zone	2010 - live weight, kg					Sub-total	Total
		Jan	Feb	Mar	Apr	May (1-7th)		
Spurdog	EU	3,010	149	55	2,029	293	5,536	6,251
	Norway	337	35	53	272	18	715	
Skate & ray	EU	2,002	2,477	1,893	1,442	589	8,403	21,709
	Norway	352	2,045	8,245	2,332	332	13,306	
Skate	EU	95	27	87	110	6	325	629
	Norway	2	22	68	212	0	304	

While 43/2009 and 23/2010 are clearly measures to minimise mortality of common skate, they are not considered to form a strategy. By FAM definition a strategy represents a cohesive and strategic arrangement and should contain mechanisms for the modifications of fishing practices in the light of identification of unacceptable impacts. It is assessed by the team that operational procedures have not been put in place in relation to this management measure e.g. procedures for identifying skates and rays and procedures on what to do if common skate are encountered.

It is recognised that although there have been improvements in species-specific data, there is still confusion in identifying species at point of capture and further still at point of landing since most 'skates and rays' are landed without head or tail.

It is recognised that efforts are being made to assist fishermen in identifying ray species (although these are not in place yet) and further that a recent article was issued highlighting the EU regulations that prohibit common skate landings (Figure 10).

Figure 10. Article in Fiskeri Tidende 25th March 2010

Der må ikke landes skader

Landinger kan koste MSC-certificering for danske fiskere

Skaden er en rokkeart, men har særlige kendetegn både på over- og undersiden. (Illustrationer: Marc Dando)

Af Lone Hansen

Landinger af skader kan få stor betydning for MSC-certificeringen for dansk fiskeri. Derfor skal fiskere være meget opmærksomme på, hvilken art af rokker, de får ombord. Hvis det drejer sig om skader, skal de sættes ud igen, understreger Jonathan Broch Jacobsen, som står for MSC-arbejdet i Danske Fiskeres PO.

I en Bilag 6-meddelelse, der er udsendt 19. februar i år, slår Fiskeridirektoratet fast at "de for 2010 fastsatte kvoter for rokker i alle EU-farvande omfatter ikke arten skade (Dipturus batis). Fangster af denne art må ikke beholdes om bord, men skal straks genudsættes."

Det landingsforbud kan få stor betydning i forhold til MSC-certificeringen. Jonathan Broch Jacobsen forklarer:

- Når man ikke længere må lande skade, tæller den automatisk med blandt særligt beskyttede dyrearter ligesom fx marsvin. Og lander man ulovligt en særligt beskyttet dyreart, kan man simpelthen ikke bestå MSC's standard. Det vil øjeblikkeligt kunne ramme fiskerierne efter mørksej og Nordsøredspætte, som netop nu er i gang med at blive MSC-vurderet. Hvis de to fiskerier skal bestå certificeringen, skal forbuddet mod landinger overholdes 100 procent.

Et af problemerne med skader og andre rokker er, at det kan være svært at vide, hvilken art man står med i hænderne. Derfor har ekspert i fiskegenkendelse Henrik Carl fra projektet www.fiskeatlas.dk givet nogle tips til, hvordan man genkender skaden i forhold til beslægtede arter. Se faktaboksen nedenfor.

Jonathan Broch Jacobsen opfordrer også til, at andre, som håndterer landinger, er opmærksomme på forbuddet mod landing af skader.

- Udover at fiskerne selvfølgelig skal kunne sortere skader fra, er det vigtigt, at samlecentraler og andre, som sorterer fisk på land, også er opmærksomme på, at det er forbudt at lande skader. Yderligere har der også været forbud mod landinger af pighaj og sildehaj siden februar i år – så de skal også genudsættes, understreger han.

Genkend en skade

Som en del af arbejdet med MSC-certificeringen af dansk fiskeri vil der senere i år komme en styrehus-guide til genkendelse af særligt beskyttede arter – men indtil da kan ekspert i fiskegenkendelse Henrik Carl give nogle tips til, hvordan man genkender skaden, hvis man får den i fangsten.

Skaden er en stor (op til mere end to meter lang) rokkeart. Kroppen har form som en rombe, og snuden er spids – man sådan ser flere andre rokker også ud. Skaden kendes bedst fra andre spidsnudede rokker på, at:

- Skaden har lyse pletter på oversiden. Grundfarven er typisk mørkebrun, men kan variere en hel del.
- Langs halens midtlinje sidder mellem 12 og 18 torne – mens fx flere andre arter enten kun har 4–11 eller op mod 50.
- Undersiden er grå eller gråblå – ikke fx sort som hos sortbuget rokke.

FAKTA

The DFPO have developed a Code of Conduct which in relation to ETP states:

> *"We are continually working to avoid catches of marine mammals and other endangered or protected species.*
>
> *If we catch a protected species this is recorded and if it is still alive, it will be returned to the sea as quickly and carefully as possible.*
>
> *The relevant species, and how to record them, are described in the attached 'Wheelhouse-guide to protected species'.*

The recorded data are monitored by the DFPO and shared with relevant scientific institutions. After the first year of monitoring, the level of by-catch of protected species will be analysed. On the basis of this, the DFPO will adopt a plan to reduce the level (through guides, rules, research etc.) with a focus on those fisheries, species, seasons and areas where the monitoring indicates severe problems. The plan will be evaluated and adjusted annually after each new year of monitoring."

Individual DFPO vessel use of MSC certificates will be subject to a condition ensuring that vessels sign up and comply with the Code of Conduct.

While it is understood that this Code of Conduct works towards minimising interaction with ETP species, recording interaction and monitoring data, it is not possible to define it as a strategy because it has not been demonstrated to be working which is a clear requirement under FAM Section 7.1.22.

None of the SG80 issues can therefore be met and management of common skate therefore scores 60.

Spurdog

Spurdog are protected under EC Regulation 23/2010 which came into force on 14th January 2010.

This sets the TAC for IIIa and IV at zero to stop any targeted fishery for spurdog. By-catches are however permitted up to 10 % of the 2009 quotas established in Annex Ia to Regulation (EC) No 43/2009 under the following conditions:

- A maximum landing size of 100 cm (total length) is respected, and
- The by-catches comprise less than 10 % of the total weight of marine organisms on board the fishing vessel.

The regulation further states that catches not complying with these conditions or exceeding these quantities shall be promptly released unharmed to the extent practicable.

Table 3 indicates that 6.2 tonnes of spurdog have been landed by Danish vessels. Given the information on retained species and discards data it is highly likely that a proportion of this is associated with the saithe demersal trawl fishery. The situation whereby spurdog caught in the Norwegian zone cannot be discarded and landings into EU are permitted also exists for spurdog. From February 2010 onwards approximately 2.5 tonnes of spurdog have been landed from the EU zone. The 10% of 2009 Danish quota relates to 3.2 tonnes which has not been exceeded.

While this allows EC 23/2010 to be considered as a strategy and for the first SG80 to be met, it is not possible to score the second and third SG80 issues. Landing statistics from January 2010 to May 2010 show landings of spurdog and there is no confidence that this will stop once 10% TAC is reached. Furthermore confusion remains as to the paradoxical situation where Norwegian zone caught spurdog can be landed and whether this should be deducted from the TAC. While measures are considered likely to work, there is no information to support confidence that the strategy will work and no evidence that it is being implemented properly. A score of 65 is therefore awarded for spurdog management.

Given that an average of 60 and 65 cannot be made, the lowest of the scoring elements has been taken and therefore an overall score of 60 is awarded.

This has triggered Conditions DT 1 and DS 1.

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COUNCIL REGULATION (EC) No 43/2009 of 16 January 2009 fixing for 2009 the fishing opportunities and associated conditions for certain fish stocks and groups of fish stocks, applicable in Community waters and, for Community vessels, in waters where catch limitations are required

Council Regulation (EC) No 812/2004 of 26.4.2004 laying down measures concerning incidental catches of cetaceans in fisheries and amending (EC) No 88/98

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Set nets

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.3.2	**Management strategy** The fishery has in place precautionary management strategies designed to: - meet national and international requirements; - ensure the fishery does not pose a risk of serious or irreversible harm to ETP species; - ensure the fishery does not hinder recovery of ETP species; and - minimise mortality of ETP species.	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. The measures are considered likely to work, based on plausible argument (eg. general experience, theory or comparison with similar fisheries/species).	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 an objective basis for confidence that the strategy will work, based on some information directly about the fishery and/or the species involved. There is evidence that the strategy is being implemented successfully.	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. 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. There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is evidence that the strategy is achieving its objective.
Score:	**60**			

Summary: Set nets

It is considered that management measures which are likely to work to minimise mortality are in place. However, implementation of the strategy (namely the DFPO Code of Conduct) must be evident before SG80 can be met.

Justification: Set nets

Observers

EU regulation No 812/2004 lays down measures concerning monitoring of fisheries and measures to reduce incidental catches of cetaceans in gillnet fisheries (EU, 2004). A percentage of fisheries must have observer coverage to report on bycatch incidents for specific gear types. It is noted that this regulation does not require observers on board set net vessels operating within the North Sea.

Pingers

A number of experiments using acoustic alarms or pingers have effectively excluded harbour porpoises from bottom-set gill nets for instance in the Gulf of Maine (Kraus et al. 1997), along the Olympic Peninsula (Gearin et al. 2000), in the Bay of Fundy (Trippel et al. (2003) and in the North Sea (Larsen 1997). All of these studies show up to a 90% decrease in harbour porpoise bycatch. Evidence shows that pingers also reduce bycatch of other cetaceans such as common dolphins.

As per EC 812/ 2004 acoustic deterrents must be used in ICES IV and IIIa for the following fisheries:

(a) Any bottom-set gillnet or entangling net, or combination of these nets, the total length of which does not exceed 400m during the period 1 August to 31st October and
(b) Any bottom-set gillnet or entangling net with mesh sizes ≥ 220m throughout the year.

Part (a) above requires pingers to be used in areas IV and IIIa for nets that are shorter than 400m and therefore likely to be used over wrecks for the cod autumn fishery. It is noted that cod make up 50% of the catch volume in the Skagerrak and 56% in the North Sea for Danish set net vessels landing saithe and therefore this measure in

place for cod is applicable to saithe.

In 2006 experiments were conducted by Larsen and Krog (2007) to investigate the effects of increasing pinger spacing on harbour porpoise bycatch rates in bottom-set gillnets. Results from these experiments led to an increase in pinger spacing from 200 m (as stipulated in Annex III of Regulation 812) to 455 metres being implemented under national administrative law (ICES 2009, Larsen and Krog, 2007).

While it is recognised that pingers should not be used in all set net fisheries (and therefore potentially act as a barrier to cetaceans) it is considered that the regulations relating to pingers are not specifically designed for the saithe set net fishery (although saithe is likely to be taken in the cod fishery). It is therefore considered appropriate to treat to assess this as a measure to reduce mortality, rather than a strategy.

Natura sites

A number of marine Natura sites have recently been designated with harbour porpoise as the primary qualifying feature. Management plans are in the process of being developed to consider what measures may be necessary to protect the qualifying features including management of commercial fisheries. While it is recognized that these Natura sites allow Denmark to meet its obligations as set out in the Habitats and Birds Directives, they cannot yet be considered a strategy since management measures have not yet been decided or indeed implemented.

Cormorant Management Plan

From 1970 the Cormorant colonies have gradually become protected in Denmark and Europe. In 1992 the first Danish Cormorant Management Plan was set up. The plan that in use at the moment is from 2002-2008 and is under revision.

The management plan aims to prevent unacceptable damage to fisheries and at the same time to protect the cormorant as a common breeding bird in Denmark. While areas of conflict do overlap between cormorants and set nets, the majority of interaction is recorded in coastal pound nets, aquaculture and recreational fisheries. Management tools within the plan include modification to pound nets, scaring of birds, egg oiling and removal of nests to avoid new colonies and to reduce the size of existing colonies and scaring and shooting of birds during smolt migration. While this strategy is not specifically designed to manage cormorant interaction with set nets, it is considered a measure that will work towards minimising interactions.

Code of Conduct

The DFPO have developed a Code of Conduct which in relation to ETP states:

> *"We are continually working to avoid catches of marine mammals and other endangered or protected species.*
>
> *If we catch a protected species this is recorded and if it is still alive, it will be returned to the sea as quickly and carefully as possible.*
>
> *The relevant species, and how to record them, are described in the attached 'Wheelhouse-guide to protected species'.*
>
> *The recorded data are monitored by the DFPO and shared with relevant scientific institutions. After the first year of monitoring, the level of by-catch of protected species will be analysed. On the basis of this, the DFPO will adopt a plan to reduce the level (through guides, rules, research etc.) with a focus on those fisheries, species, seasons and areas where the monitoring indicates severe problems. The plan will be evaluated and adjusted annually after each new year of monitoring."*

Individual DFPO vessel use of MSC certificates will be subject to a condition ensuring that vessels sign up and comply with the Code of Conduct.

While it is understood that this Code of Conduct works towards minimising interaction with ETP species, recording interaction and monitoring data, it is not possible to define it as a strategy because it has not been demonstrated to be working which is a clear requirement under FAM Section 7.1.22.

Score

Considering the above evidence it is not possible to say that a strategy exists for managing the interaction of

saithe set net fisheries with ETP species. It is therefore assessed that none of the SG80 issues can be met. It is considered by the team that the measures set out above will minimise mortality, are expected to be highly likely to meet national and international requirements and are considered to work based on results from targeted scientific research.

A score of 60 is awarded for ETP management.

This has triggered Condition SN 1.

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COUNCIL REGULATION (EC) No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy

COUNCIL REGULATION (EC) No 43/2009 of 16 January 2009 fixing for 2009 the fishing opportunities and associated conditions for certain fish stocks and groups of fish stocks, applicable in Community waters and, for Community vessels, in waters where catch limitations are required

Council Regulation (EC) No 812/2004 of 26.4.2004 laying down measures concerning incidental catches of cetaceans in fisheries and amending (EC) No 88/98

COUNCIL REGULATION (EU) No 23/2010 of 14 January 2010 fixing for 2010 the fishing opportunities for certain fish stocks and groups of fish stocks, applicable in EU waters and, for EU vessels, in waters where catch limitations are required and amending Regulations (EC) No 1359/2008, (EC) No 754/2009, (EC) No 1226/2009 and (EC) No 1287/2009

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Demersal trawl and Danish Seine

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.3.3	**Information / monitoring** Relevant information is collected to support the management of fishery impacts on ETP species, including: - information for the development of the management strategy; - information to assess the effectiveness of the management strategy; and - information to determine the outcome status of ETP species.	Information is adequate to broadly understand the impact of the fishery on ETP species. Information is adequate to support measures to manage the impacts on ETP species Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a full strategy to manage impacts. Sufficient data are available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.	Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives. Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.
Score:	**80**			

Summary: Demersal trawl and Danish seine

Information is sufficient to inform a full strategy, whether or not this strategy has been implemented. However it is noted that information is sufficient since records of landings of these species are available. When the full strategy has been implemented, landings data will no longer be available and therefore recording should be required as per conditions DT 1 and DS 1. It is recommended that this is monitored at future surveillance audits.

Justification: Demersal trawl and Danish seine

The information available on discards from the observer programme, together with the detailed retained information and access to the live landings statistics through the Fisheries Directorates Dynamic Landings Database allows a clear picture to be gained in relation to the current threat of the saithe demersal trawl fishery on ETP species. This data is quantitative and currently allows the mortality to be recorded and the impact of the fishery to be quantitatively estimated.

The implementation of EU 43/2009 and 23/2010 and the associated restrictions on landings from the EU zone does not prevent skate and spurdog being caught and discarded. It can therefore be inferred that discard rates are likely to increase which will be recorded within the Code of Conduct. It is therefore assessed that the SG80 issues are met.

The saithe demersal trawl fishery therefore scores 80.

It is noted that information at the time of scoring is sufficient since records of landings of these species are available. When the full strategy has been implemented (i.e. these species are no longer landed), landings data will no longer be available and therefore recording should be required as per conditions DT 1 and DS 1.

It is recommended that this is reviewed at the first surveillance audit to ensure that data continues to be collected on the number of interactions and mortality rates of ETP species by demersal trawl and Danish seine.

References

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Set nets				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.3.3	**Information / monitoring** Relevant information is collected to support the management of fishery impacts on ETP species, including: - information for the development of the management strategy; - information to assess the effectiveness of the management strategy; and - information to determine the outcome status of ETP species.	Information is adequate to broadly understand the impact of the fishery on ETP species. Information is adequate to support measures to manage the impacts on ETP species Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a full strategy to manage impacts. Sufficient data are available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.	Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives. Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.
Score:	**60**			

Summary: Set nets

Relevant information is collated and analysed to allow an adequate understanding of the impacts on ETP species, to inform management measures and qualitatively assess mortality.

Justification: set nets

It has been determined that data is not sufficient to allow trends of interaction of the saithe set net fishery with ETP species to be measured quantitatively and support a full strategy. The first SG80 issue is therefore not met. Furthermore, the data presented has not been collected specifically in relation to the saithe set net fishery and accurate data is not available for the entire fleet (VMS data for under 15m vessels). The second SG80 can therefore not be met.

Despite this, a great deal of information is available on this topic and the dedicated work undertaken by DTU Aqua which is specific to the Danish fleet must be considered. It is believed that the research and information used to assess Outcome and Management allow all of the SG60 issues to be met and to determine whether or not the fishery is a threat to ETP species. In particular the work undertaken to quantitatively assess marine mammal mortality is recognised, but understood not to be specific to the saithe set net fishery. A score of 60 has been awarded.

This has triggered Condition SN1.

References

COUNCIL REGULATION (EC) No 43/2009 of 16 January 2009 fixing for 2009 the fishing opportunities and associated conditions for certain fish stocks and groups of fish stocks, applicable in Community waters and, for Community vessels, in waters where catch limitations are required

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2.4	Habitat			
Demersal trawl				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.4.1	**Status** The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function.	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
Score:	**60**			

Summary: Demersal trawl

It is assessed that the Danish saithe demersal trawl fishery is unlikely to overlap with sensitive habitats and therefore unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. However, it is recognised that demersal trawling causes widespread disturbance of sediments and benthic habitats and can have a negative impact on benthic fauna. It is therefore considered that the SG80 is not met and a score of 60 is awarded.

Justification: Demersal trawl

The saithe demersal otter trawl fishery is conducted in a very distinct location along the Norwegian trench as shown by VMS plots. The fly shooting is carried our within the same grounds as the otter trawling, albeit in a much smaller area which is situated North of Jutland. This area of seabed along the Norwegian trench is characterised by mud and gravely mud habitats (as shown in Figure 4.12 of main report). VMS data from Danish vessels is available for specific demersal trawl fisheries and therefore the area targeted for saithe can be determined with a high degree of certainty, for vessels over 15m.

The Unit of Certification includes all Danish demersal or otter trawl vessels landing saithe.

Bottom otter trawls encompass a large variety of designs, riggings and dimensions. Common components are a pair of otter boards or trawl doors, sweeps/bridles and one or more trawl nets (Valdemarsen et al. 2007). In a multirig configuration known as twin trawling, a weight called a clump, roller or sled is used to separate the two nets. Another form is pair trawling which is undertaken by two vessels that keep station some distance apart when towing which acts to hold open the net and therefore trawl doors are not necessary. With regard to impacting habitat it is the twin-rig trawl that has most interaction with the seabed, followed by the standard demersal trawl and then pair trawling.

The trawl doors and sled are generally made from steel and can each weigh up to 1 tonne. Trawl doors are positioned in such a way that the hydrodynamic forces, acting on them when the net is towed along the seabed, push the doors outwards and prevents the mouth of the net from closing.

The impact of bottom trawling on benthic habitats is well documented and varies depending on habitat structure and biotype.

OSPAR has established a list of threatened and/or declining species and habitats in the North-East Atlantic. The list provides an overview of the biodiversity in need of protection and is being used by the OSPAR Commission to guide the setting priorities for further work on the conservation and protection of marine biodiversity under Annex V of the OSPAR Convention.

NBN Gateway has mapped the occurance of these priority habitats and these are reviewed agained the area targeted by the Danish saithe demersal trawl fishery (Table 6).

Table 6. Occurrence of OSPAR habitats in relation to area targeted by saithe demersal trawl fishery (NBN Gateway, 2010)

OSPAR habitats	Occurrence	Relevant/Figure
Carbonate mounds	Only occurrence recorded west of Scotland and Ireland in VI and VII	No
Deep-sea sponge aggregations	Occur in areas adjacent to northern Norway and on the very east of Skagerrak adjacent to Norway and Swedish coast. As mapped by OSPAR it is out with area targeted by saithe demersal trawlers	No, see Figure 4.13, main report
Lophelia pertusa reefs	Recorded on the west coast of southern Norway, close to shore. Although run parallel to trawling effort, the areas of occurrence do not overlap and are ~15km away.	No, see Figure 4.13, main report
Maerl beds	One record in Central North Sea, but this is out with trawling area. Three records within the Kattegat but none in Skagerrak.	No
Modiolus modiolus horse mussel beds	One record on the very east of Skagerrak in a coastal location where Norwegian and Swedish borders meet. Occurrence around Shetland and North Norway. No overlap with saithe trawling grounds.	No
Oceanic ridges with hydrothermal vents/fields	Recorded in ICES Divisions Va and X but no occurrence within region being studied.	No
Ostrea edulis beds	Records in the very north of IVc, in the English Channel and west Scotland. None within trawl area being considered.	No
Sabellaria spinulosa reefs	Numerous records along west Germany coastline and around entire English coastline. None within regions being studied.	No
Seamounts	Recorded in ICES Divisions IIa, Vb, VI, VII, VIII, X and XII. None within region being studied.	No
Seapens and burrowing megafauna communities	Occurrence recorded throughout the North Sea. Potential overlap with the middle and northern areas of saithe trawling effort.	Yes, see Figure 4.13, main report
Zostera marina beds	Occurs throughout Skagerrak at inshore locations along Norwegian and Swedish coastlines, throughout Denmark's Limfjord and inshore on the west coast of south Norway. Occurs in depths up to 4m and so highly unlikely to be within area trawled.	No, see Figure 4.13, main report

The main habitat to overlap with the saithe demersal trawl fishery is therefore seapens and burrowing megafauna communities. These habitats are characterised by plains of fine mud, at water depths ranging from 15-200 m or more, which are heavily bioturbated by burrowing megafauna with burrows and mounds typically forming a prominent feature of the sediment surface. These communities are defined by the presence of one or either of two groups of animals, sea pens (e.g. *Pennatula phosphorea* or *Virgularia mirabilis*) and/or burrowing decapod crustaceans (e.g. *Nephrops norvegicus, Calocaris macandreae, Upogebia* spp. and *Callianassa* spp.). Due to the presence of *Nephrops* it is clear that such grounds are often targeted by commercial fisheries.

Given the depth of the saithe demersal trawl fishery it is unlikely to cause serious harm to the seapens and burrowing megafauna communities in the area.

Based on information collated by WWF it is considered that deep sea sponges may potentially occur at the edge of saithe fishing grounds, however it is noted that NBN Gateway does not concur with this finding (see Figures 4.10 and 4.11 of the main report).

It is known that demersal trawling has a significant initial effect on muddy-sand and mud habitats, but on the latter these effects have been shown to be short-lived with an apparent long-term, positive, post-trawl,

disturbance response (Kaiser et al, 2006). This positive response may represent an increase in the abundance of smaller-bodied fauna, but a possible overall decrease in biomass (Jennings et al. 2001 Duplisea et al. 2002).

The rates of recovery for benthic communities following intensive trawling disturbance may range from weeks to years, with rates of recovery depending on rates of immigration, recruitment and growth (Schratzberger and Jennings, 2002). Slow-growing large-biomass biota such as sponges and soft corals are known to take much longer to recover (up to 8 yr) than biota with shorter life-spans such as polychaetes (<1 yr) (Kaiser et al., 2006). The rates of recover also depend on the habitats impacted with research indicating that trawling impacts in sandy areas are less long-lived compared to in muddy areas (Rosenberg et al., 2003; Kaiser et al.,1998; Collie et al., 2000).

Reduced impact of bottom otter trawling on the seabed can basically be achieved by minimizing the impacted area and by reduction of the pressure of gear components on the bottom (Valdemarsen et al. 2007).

Given the above evidence together with the distinct location of the saithe trawl fishery it is considered by the team that the fishery is unlikely to reduce habitat structure to a point where there would be serious or irreversible harm and therefore the SG60 is met.

It is assessed by the team that given the above information, together with the scale of the Unit of Certification i.e. all Danish demersal trawl caught saithe, together with the fact that positional data is not available for the under 15m fleet (that do not have VMS) it is not possible to be confident that the fishery is highly unlikely to cause serious or irreversible harm to habitat structure. The SG80 is therefore not met and an overall score of 60 is awarded.

This has triggered Condition DT 2.

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Danish seine				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.4.1	**Status** The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function.	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
Score:	**80**			

Summary: Danish seine

It is assessed that the Danish seine saithe fishery is unlikely to overlap with sensitive habitats and given the scale of this fishery it is therefore highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. No evidence specific to the Danish saithe Danish seine fishery is available to score SG100.

Justification: Danish seine

Danish seine vessels operate by first anchoring a line to a marker buoy then travelling while paying out this line, known as a warp or drag line, followed by a net wing, a seine bag, the remaining wing and the second drag line. During this process the vessel sweeps in a big circle to cover a large area and then returns to the buoy. Using a rope-coiling machine the drag lines are hauled in and act to herd the fish towards the central net; the net is then hauled on board.

Danish seine do not use trawl doors and so the interaction with the seabed habitat is much lower than that of a demersal trawler. Danish seiners tend to operate in areas of flat ground that may have some gravelly rocky bottom which can prevent trawling gear.

While the habitat impact is less than many other gears, the act of hauling the drag lines and net could have significant impacts if sensitive habitats are present, such as corals and sponges. Deep water sponges and *Lophelia* reefs are mapped in Figure 4.13. There is no evidence of their presence across the area targeted by Danish seines landing saithe. It is therefore condsidered highly likely that Danish seines do not reduce the habitat structure to a point where there would be serious or irreversible harm and a score of 80 is awarded.

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Set nets

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.4.1	**Status** The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function.	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
Score:	**90**			

Summary: Set nets

It is assessed that the set net saithe fishery is unlikely to overlap with sensitive habitats and given the scale of this fishery it is therefore highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. Furthermore, with the available evidence (VMS and sensitive habitats and species mapping) it is considered the SG100 is somewhat met and so a score of 90 is appropriate.

Justification: Set nets

Gill and entangle nets are static and fixed to the seabed by anchors at each end and weights at the bottom of the nets. The nets generally do not move in less strong current are encountered which may cause dragging. Impacts are therefore restricted to dragging of anchors and weights along short distances of ground. These nets are often set on hard rocky ground or over wrecks to take advantage of ground that cannot be fished by mobile bottom trawlers. If dragging occurs or nets get lost this may result in entanglement around rocks or indeed sensitive habitats (the effect of ghost fishing is discussed in discarded bycatch). Furthermore nets which have torn free from one anchor are likley to become wrapped in a tight ball around the remaining anchorage point. Anecdotal evidence indicates that losing gear rarely happens; further, there is a clear economic incentive to prevent this occuring and to retrevie any lost nets.

Significant impacts, however, do have the potential to occur in areas of sensitive habitats such as corals and sponges. Deep water sponges and *Lophelia* reefs are mapped in Figure 4.13. There is no evidence of their presence across the area targeted by set nets landing saithe. It is therefore condsidered highly likely that set nets do not reduce the habitat structure to a point where there would be serious or irreversible harm.

Given the scale of the saithe set net fishery it is beleived that the level of risk it poses to habitats is very low. As a result of this low risk, together with the evidence presented above, it is considered appropraite to award a score of 90 to Habitat Outcome Status.

References

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NBN Gateway. 2010. Maps showing the distribution of habitats on the Initial OSPAR List of Threatened and/or Declining Species and Habitats http://data.nbn.org.uk/hosted/ospar/ospar.html

OSPAR Commission, 2008. Case Reports for the OSPAR List of threatened and/or declining species and habitats

Demersal trawl				
2.4.2	**Management strategy** 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.	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance. The measures are considered likely to work, based on plausible argument (eg. general experience, theory or comparison with similar fisheries/habitats).	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or habitats involved. There is some evidence that the partial strategy is being implemented successfully.	There is a strategy in place for managing the impact of the fishery on habitat types. The strategy is mainly based on information directly about the fishery and/or habitats involved, and testing supports high confidence that the strategy will work. There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective.
Score:	**75**			

Summary: Demersal trawl

It is considered that a partial strategy is in place to manage the impact of Danish saithe demersal trawlers on habitat structure and function. There is evidence that the partial strategy is being implemented and confidence that it will work. However, it is recognised that the partial strategy is not currently sufficient to achieve Outcome level 80 and therefore a score of 75 is awarded.

Justification: Demersal trawl

There are a number of measures in place that manage the potential impact of demersal trawling on habitats, including:

- TACs and quotas
- Days at Sea restrictions
- Closed areas including Real Time Closures (for 21 days)
- Introduction of FKA system
- DFPO Code of Conduct
- Natura sites

The TACs, quotas and days at sea as set out in EU Regulation 23/2010 restrict the level of effort, the time spent fishing and the volume of fish taken; they therefore act to reduce the number of tows and so reduce the level of habitat interaction. Landings statistics are recorded and reported against quotas on a regular basis therefore providing evidence of their successful implementation.

The Real Time Closures, as set out in the EU-Norway agreement, act to protect juvenile cod, haddock, whiting and saithe by closing an area for 21 days when a 200kg catch sample contains more than 15% of these juvenile species. This allows a short-term recovery for these areas. RTCs are monitored and recorded on a real time basis, therefore providing evidence of their successful implementation.

In January 2007 Denmark introduced a system of individual transferable quotas (ITQ), known as the FKA system, where national quotas are divided among the fleet with options to trade or pool between vessels. . This acted to substantially reduce the size of the Danish fleet with records of a 25% reduction over just 18 months. The number of vessels operating demersal trawl gear has significantly reduced and therefore it can be inferred that the number of tows has also reduced.

The DFPO Code of Conduct, which must be signed by a vessel before fish can be sold with MSC certification, states that "we seek to minimise the environmental consequences of our fishing by... developing gear which minimises the harmful effects on the environment...". While this cannot be considered a full strategy, it is recognised as a management measure.

A number of marine Natura sites have recently been designated with marine habitats as qualifying features. Management plans are in the process of being developed to consider what measures may be necessary to protect the qualifying features including management of commercial fisheries. While it is recognized that these Natura sites allow Denmark to meet its obligations as set out in the Habitats Directives, they cannot yet be considered a strategy since management measures have not yet been decided or indeed implemented.

It is considered that the above forms a partial strategy and manages or limits the habitat interaction of Danish demersal trawlers. There is evidence that these measures are being implemented specifically in relation to the saithe fishery, and therefore confidence that the partial strategy will work. However it is recognised that the Habitat Outcome has scored 60 and therefore due to the first Habitat Management SG80 issue a score of 80 cannot be awarded. Habitat Management is therefore awarded a score of 75, which triggers a condition.

This has triggered Condition DT 2.

References

COMMISSION REGULATION (EC) No 356/2005 of 1 March 2005 laying down detailed rules for the marking and identification of passive fishing gear and beam trawls

COUNCIL REGULATION (EC) No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy

Hiddink, J. G., Hutton, T., Jennings, S., and Kaiser, M. J. 2006. Predicting the effects of area closures and fishing effort restrictions on the production, biomass, and species richness of benthic invertebrate communities. e ICES Journal of Marine Science, 63: 822e830

ICES, 2008. Report of the Workshop on Fisheries Management in Marine Protected Areas

Danish seine and set nets				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.4.2	**Management strategy** 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.	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance. The measures are considered likely to work, based on plausible argument (eg. general experience, theory or comparison with similar fisheries/habitats).	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or habitats involved. There is some evidence that the partial strategy is being implemented successfully.	There is a strategy in place for managing the impact of the fishery on habitat types. The strategy is mainly based on information directly about the fishery and/or habitats involved, and testing supports high confidence that the strategy will work. There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective.
Score:	**80**			

Summary Danish seine and set nets

The management measures described for demersal trawl are also in place for Danish seine and set nets. Given the very low risk posed by these fisheries due to their scale it is deemed appropriate to award a score of 80.

Justification: Danish seine and set nets

The management measures set out within demersal trawling Management Strategy are also of relevance to the saithe set nets and Danish seine fisheries.

The criterion under management strategy states that the fishery does not pose a ***risk*** of serious or irreversible harm to habitat types. It is considered that the scale of the set net and Danish seine fisheries should be taken into consideration to assess requirements for a management strategy for habitat interaction.

Set nets land 0.6% of all Danish saithe; Danish seine lands just 0.4% - together they equate to 82 tonnes of saithe, compared to ~8,000 tonnes landed by demersal trawl.

Given that both set nets and Danish seine outcome status meet all SG80 issues a score of 80 is awarded.

References

COMMISSION REGULATION (EC) No 356/2005 of 1 March 2005 laying down detailed rules for the marking and identification of passive fishing gear and beam trawls

COUNCIL REGULATION (EC) No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy

DTU Aqua, 2010, Landing statistics.

Hiddink, J. G., Hutton, T., Jennings, S., and Kaiser, M. J. 2006. Predicting the effects of area closures and fishing effort restrictions on the production, biomass, and species richness of benthic invertebrate communities. e ICES Journal of Marine Science, 63: 822e830

ICES, 2008. Report of the Workshop on Fisheries Management in Marine Protected Areas

Demersal trawl, Danish seine and set nets				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.4.3	**Information / monitoring** 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.	There is a basic understanding of the types and distribution of main habitats in the area of the fishery. Information is adequate to broadly understand the main impacts of gear use on the main habitats, including spatial extent of interaction.	The nature, distribution and vulnerability of all main habitat types in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery. 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, timing and location of use of the fishing gear. 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 distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. Changes in habitat distributions over time are measured. The physical impacts of the gear on the habitat types have been quantified fully.
Score:	**80**			

Summary: Demersal trawl, Danish seine and set nets

Information is sufficient to determine the risk of the Danish saithe demersal trawl, Danish seine and set net fisheries on habitat structure and function and to monitor any change in this level of risk. All of SG80 issues are met. SG 100 has not been met since monitoring of under 15m vessel effort is not possible via VMS and the distribution of sensitive habitats are not fully known across their range.

Justification: Demersal trawl, Danish seine and set nets

The habitat structure of the North Sea and Skagerrak are well documented through sources of information such as the Digital Atlas of the North Sea (see Figure 4.12, main report) and MESH – Mapping European Seabed Habitats project.

Sensitive and vulnerable habitats as classified by OSPAR are available through interactive mapping on NBN Gateway which combines a number of data sources.

Detailed VMS data has been provided by DTU Aqua and mapped specifically for the saithe demersal trawl fishery (where saithe make up >25% of the catch). This data corroborates with anecdotal evidence collected during the site visit. The VMS data can be mapped on a time series basis and used to monitor any changes in fishing patterns. Landings statistics are provided to an ICES square level and therefore can be monitored to detect change, although it is noted that this is only to a scale of 30 nmile^2. The location, timing and extent of fishing can therefore be determined and monitored to detect any increase in fishing effort and therefore increase in risk to habitats. Furthermore information on fisheries impacts to habitats are collected by ICES and reported on an annual basis.

It is therefore considered that all of the SG80 issues are met.

While the NBN Gateway database provides information on surveys conducted to monitor sensitive habitats and biotopes it does not allow the full extent of their range to be determined. Changes in habitats are not measures for the extent of the demersal trawling ground and the impacts have not been fully quantified. None of the SG100 issues are therefore met.

References
OSPAR Commission, 2008. Case Reports for the OSPAR List of threatened and/or declining species and habitats NBN Gateway. 2010. Maps showing the distribution of habitats on the Initial OSPAR List of Threatened and/or Declining Species and Habitats http://data.nbn.org.uk/hosted/ospar/ospar.html Schlüter M and Jerosch K. 2009. Digital Atlas of the North Sea http://www.awi.de Wheeler, A.J., Billett, D.S.M., Masson, D.G. & Grehan, A.. (2001). The impact of benthic trawling on NE Atlantic coral ecosystems with particular reference to the northern Rockall Trough. ICES CM 2001/R:11.

2.5	Ecosystem			
Demersal trawl, Danish seine and set nets				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.5.1	**Status** The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function.	The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
Score:	**85**			

Summary: Demersal trawl, Danish seine and set nets

The fishery does not cause serious or irreversible harm to the key elements underlying ecosystem and function and there is some level of evidence to support this.

Justification: Demersal trawl, Danish seine and set nets

The function and structure of the North Sea ecosystem is well known, as is the role of saithe within this ecosystem. CEFAS recently published an ecosystem model of the North Sea (Mackinson and Daskalov, 2008) which documents the trophic level and predator-prey relationship between 68 different species, from cetacean to polychaete.

Ecosystem models are tools that allow the effects of different management measures on the ecosystem to be understood, for example MPAs. Mackinson and Daskalov (2008) state that "*The model is best designed to address questions regarding processes that occur over the whole North Sea and on time scales greater than one year. As such the model is designed to help address strategic long-term questions such as those relating to the long-term ecosystem effects of changes in fishing activity and climate. It is not useful for short-term tactical question regarding fisheries management. It is complementary to existing approaches; helping managers and policy makers by giving them a view of the possible surprising and counter-intuitive effects of particular management and policy options".*

Saithe is recognised as an important predator and has a relatively high trophic level of 4.03 for juveniles and 4.36 for adults; compared to juvenile and adult cod trophic levels of 4.43 and 4.83 respectively; large piscivorous sharks at 4.93 and seals at 5.

Saithe do not form major prey for any other predators, but do make up ~5% of the diet of toothed whales, 3% of the diet of seals and 2% of gadoids. Monkfish, horse mackerel and squid are also known to take small amounts of saithe (<1% of their diets).

Juvenile saithe are known to feed mainly on Norway pout (24% of their diet) and sprat (11%), while adults also prey on Norway pout (32% of diet) and herring (19%) as well as smaller quantities of blue whiting and sprat.

Given the proportion of retained species in relation to Danish quotas and TACs for the North Sea and Skagerrak, the level of removal of retained species by each fishery (trawl, seine and set nets) is highly unlikely to disrupt the key elements underlying ecosystem structure and function.

From the above evidence the team assess that the removal of saithe at current proportions is highly unlikely to disrupt the key elements of the underlying ecosystem structure and function to a point where there would be serious or irreversible harm. While evidence does exist it is based on the North Sea ecosystem as a whole and not specific to the Norwegian Trench and Skagerrak area. It is therefore considered that the SG100 issue is not met in full and a score of 85 is awarded.

References

Hiddink J. G., Jennings S. and Kaiser M. J. 2007. Assessing and predicting the relative ecological impacts of disturbance on habitats with different sensitivities. Journal of Applied Ecology 44 , 405–413

ICES (2002) Report of the Working Group on Ecosystem Effects of Fisheries. Advisory Committee on Ecosystems

ICES CM 2009 ACOM Advisory Committee: 20 Report of the Working Group on the Assessment on Ecosystem Effects of Fishing Activities

Mackinson and Daskalov, 2007. An ecosystem model of the North Sea to support an ecosystem approach to fisheries management: description and parameterisation. For CEFAS Science Series Technical Report no.142

Walday M. and Kroglund T. 2002. Europe's biodiversity, biogeographical regions and seas around Europe: The North Sea. For the European Environment Agency. Available at: http://www.eea.europa.eu/publications/report_2002_0524_154909/regional-seas-around-europe/page131.html/#1.1.2

Demersal trawl, Danish seine and set nets				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.5.2	**Management strategy** There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function.	There are measures in place, if necessary, that take into account potential impacts of the fishery on key elements of the ecosystem. The measures are considered likely to work, based on plausible argument (eg. general experience, theory or comparison with similar fisheries/ ecosystems).	There is a partial strategy in place, if necessary, that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance. The partial strategy is considered likely to work, based on plausible argument (eg. general experience, theory or comparison with similar fisheries/ ecosystems). There is some evidence that the measures comprising the partial strategy are being implemented successfully.	There is a strategy that consists of a plan, containing 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. The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved. There is evidence that the measures are being implemented successfully.
Score:	**80**			

Summary: Demersal trawl, Danish seine and set nets

There is a partial strategy that is likely to work and is being implemented to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function.

Justification Demersal trawl, Danish seine and set nets

The reformed Common Fisheries Policy (2003; which is currently being reformed again) contained substantial changes to the way EU fisheries are to be managed, with particular emphasis being placed on fishery managers adopting the precautionary and ecosystem approach to facilitate the long-term sustainability of fish stocks (EC Fisheries 2006). To help co-ordinate the provision of scientific advice on marine ecosystems, and research on the ecosystem effects of exploitation of marine resources in North Western Europe and the eastern Atlantic, ICES formed the Advisory Committee on Ecosystems (ACE) (eg. ICES, 2003).

The wider ecosystem is therefore considered by ICES when undertaking saithe stock assessments and providing advice for appropriate TAC levels.

Furthermore legislation is in place to protect species and habitats under the Habitats and Birds Directives, OSPAR, BONN Convention (including ASCOBANS), BERN Convention and CITES as well as various EC fisheries regulations and Norway-EU agreements.

It is therefore assessed that there are a series of measures in place that constitute a partial strategy to ensure the impacts of the saithe fishery on the ecosystem achieve Ecosystem Outcome SG80.

These partial strategies are likely to work and there is some evidence that the measures are being implemented. The management of the ecosystem component is awarded a score of 80. It is not considered that a plan based on well-understood functional relationships is in place and therefore SG100 is not met.
References
ICES CM 2009 ACOM Advisory Committee: 20 Report of the Working Group on the Assessment on Ecosystem Effects of Fishing Activities ICES. 2002. Report of the Working Group on Ecosystem Effects of Fisheries. Advisory Committee on Ecosystems

Demersal trawl, Danish seine and set nets				
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
2.5.3	**Information / monitoring** There is adequate knowledge of the impacts of the fishery on the ecosystem.	Information is adequate to identify the key elements of the ecosystem (e.g. trophic structure and function, community composition, productivity pattern and biodiversity). Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, but have not been investigated in detail.	Information is adequate to broadly understand the functions of the key elements of the ecosystem. Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, but may not have been investigated in detail. The main functions of the Components (i.e. target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known. Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred. Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Information is adequate to broadly understand the key elements of the ecosystem. Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated. The impacts of the fishery on target, Bycatch, Retained and ETP species and Habitats are identified and the main functions of these Components in the ecosystem are understood. Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred. Information is sufficient to support the development of strategies to manage ecosystem impacts.
Score:	**90**			

Summary: Demersal trawl, Danish seine and set nets

Information is sufficient and detailed enough to understand the key elements of the ecosystem including trophic levels, predator-prey relationships and biodiversity.

Justification: Demersal trawl, Danish seine and set nets

Information is adequate to broadly understand the key elements of the ecosystem. Key elements include the trophic structure of the North Sea and Skagerrak ecosystem such as key prey, predators and competitors; community composition, productivity patterns and characteristics of biodiversity.

Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated. Mackinson (2001) describes the construction and calibration of an ecosystem model of the North Sea using the Ecopath with Ecosim approach. Models of this type readily lend themselves to answering simple, ecosystem wide questions about the dynamics and the response of the ecosystem to anthropogenic changes. Thus, they can help design policies aimed at implementing ecosystem management principles, and can provide testable insights into changes that have occurred in the ecosystem over time.

The main functions of the Components (i.e. target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known. It is known that North Sea and Skagerrak saithe mainly act as a demersal predator species. As for retained species, it is known that North Sea plaice act mainly as an energy sink (Mackinson & Daskalov, 2007), while other retained species are mainly

demersal predator species such as cod, dab and hake. Direct and indirect impacts of the fishery on both ETP species and seabed habitats are known with a reasonable degree of accuracy.

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. Sections 2.1.3, 2.2.3, 2.3.3 and 2.4.3 outline the array of data that are collected in relation to the fishery. The range of data are sufficient to allow the main impacts on these components to be inferred directly.

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). Data is routinely collected on an ongoing basis to allow for the detection of any change or increase in risk level to the main ecosystem components. Key data collected include landings data for all species, spatial data in relation to fishing effort (via EU logbooks and VMS) and data in relation to fishing effort.

All scoring guides at SG80 were met, along with two at SG100. A score of 90 is therefore awarded.

References

FRS: Fisheries Research Services. 2006. Impacts of Climate and Fishing on the North Sea Food Web

Mackinson, S. 2001. Representing trophic interactions in the North Sea in the 1880s, using the Ecopath mass-balance approach. Fisheries Centre Research Report 9:44: 35-98.

Mackinson, S. & G. Daskalov. 2007. An ecosystem model of the North Sea for use in fisheries management and ecological research: description and parameterisation. 195 pp.

Walday M. and Kroglund T. 2002. Europe's biodiversity, biogeographical regions and seas around Europe: The North Sea. For the European Environment Agency. Available at: http://www.eea.europa.eu/publications/report_2002_0524_154909/regional-seas-around-europe/page131.html/#1.1.2

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

3.1	Governance and Policy			
	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
3.1.1	**Legal and/or customary framework** The management system exists within an appropriate and effective legal and/or customary framework which ensures that it: - 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.	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.		
		The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.
		Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.	
		The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

Score:	95

Summary: The management system includes a transparent mechanism at international, EU and national, local (DFPO) levels 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 Danish saithe fishery. The system acts proactively to avoid legal disputes and rapidly implements binding judicial decisions arising from legal challenges. The system has a mechanism to formally commit to the legal rights of people dependent on fishing for food and livelihood. However, the system is not always pro-active and effective in settling international disputes

Justification

The management system is generally consistent with local, national or international laws ……..

At level of international law, Denmark ratified the United Nations Convention on the Law of the Sea (UNCLOS) convention in

2004. The principle legislative instrument for fisheries management in the EU is the Common Fisheries Policy, CFP, which aims at achieving sustainable fisheries management across the EU. This clearly aims to achieve both P1 (stock management) and P2 (wider ecosystem impacts). For example, the regulation states

> The scope of the CFP extends to conservation, management and exploitation of living aquatic resources ……. bearing in mind ……UNCLOS. The objective of the CFP should therefore be to provide for sustainable exploitation of living aquatic resources …….. in the context of sustainable development, taking account of the environmental, economic and social aspects in a balanced manner.

Underneath the umbrella of the EU CFP, there are many binding regulations covering all aspects of fisheries, which are amended and updated as required. For example, some of the key recent pieces of legislation include the regulations on IUU and on control & enforcement. The EU CFP is enacted into Danish law by the Danish Fisheries Act of 2008, which directly reflects the scope and objective of the CFP and as such aims at achieving sustainable fisheries in accordance to MSC P1 and P2.

Specifically, the Danish saithe fishery in the North Sea is managed under the international bilateral agreement between the EU and Norway.

The management system incorporates …. a transparent mechanism for the resolution of legal disputes , considered effective…

The international agreement between the EU and is supported by a transparent mechanism for the resolution of management disputes that has been tried and tested over the long term in the regular annual consultations resulting in the setting of TACs and other regulations pertaining to the exploitation of shared fish stocks including saithe. The subsequent regulations of the fisheries are clearly set out and communicated to the Member States and disputes over compliance (at all levels) is dealt with through the established judicial institutions at EU and national levels.

The *Court of Justice of the European Communities* (CJEC) rules on cases brought before it concerning, amongst others, the application of Community legislation. Although some cases are referred to the Court from national courts, most cases are brought by the Commission because Member States have failed to transpose and/or implement EU legislation. Individuals have very limited ability to bring cases directly to the Court, but must rely instead on complaining to the Commission or bringing cases at the national level. Although the role of the CJEC is less visible, it is far from insignificant in the development of the CFP. For example, the Court has been called to judge on catch quotas, free circulation of capital, and the EC's authority regarding relations with third countries.

The main mechanism for the resolution of legal disputes at the national level is the Danish judicial system. In event of a fisheries infringement the Danish Fisheries Directorate (Fiskeridirektoratet) can administratively fine the offender (when confessed) or hand over the details to the public prosecutor who will then decide on the punishment. Fishermen, or industry representatives can appeal to the full judicial process.

The reason for not achieving the 100 scoring guidepost in relation to the resolution of legal disputes is that the transparency and efficacy of the dispute resolution mechanism is less transparent at the international level – for example at the EU / Norway level. There are recent examples of difficulties in negotiations at this level in other trans-boundary fisheries. Therefore **it cannot be concluded** that *the mechanism has been tested and proven effective*.

The management system or fishery acts proactively to avoid legal disputes.....

It has happened in some occasions that the annual bi-lateral consultations between EU and Norway on TACs, terms of fishing and MCS could not be timely completed because of (legal) disputes. This has in some years prevented the EC to set and communicate quotas and uptake regulations to Member States before the start of the calendar year and prevented EU fishers from entering Norwegian zone and vice-versa.

At the EU and national level it is worth stating that the management authority is not subject to continuing court challenges. There are a number of mechanisms in EU and Danish fisheries management which act proactively to avoid legal disputes, and these are much improved in recent years. Following the review of the CFP in 2002, much increased emphasis was placed on stakeholder engagement in the management process as a means of proactively avoiding disputes. Stakeholder consultation through Regional Advisory Councils (RAC) is now an integral part of the functioning of this system. For the saithe fishery under assessment the North Sea RAC plays an important role in bringing parties together (industry – across all sectors, science, NGO) early on in the management process, thereby reducing the likelihood of management measures which trigger dispute. Additionally in Denmark, both the Ministry and the Directorate act proactively with the industry to discuss management proposals, address industry concerns and inform of up-coming regulations. There are monthly meetings between the industry and the ministry (paragraph 5 & paragraph 6 committee), which have done much to foster proactive dialogue in recent years.

The management system has a mechanism to formally commit to the legal rights .....

The EU CFP 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):

> "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."

How the allocation is divided within member states is then laid out at national level. The recent movement towards an ITQ system in Denmark is based on the principle of historic rights (track record) and also includes a special "coastal fisheries" scheme The Danish National Strategy Plan for fisheries (in accordance with EC reg. no 1198/2006) 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:

- 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

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.

Lov om fiskeri og fiskeopdræt (Fiskeriloven) (Law on fisheries and aquaculture), LBK no. 978 of 26 September 2008

EC 1980. Council Regulation No 2214/80 of 27 June 1980 on the Conclusion of the Agreement on Fisheries between the European Economic Community and the Kingdom of Norway. Official Journal of the European Union L 226, 47-50.

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Ministry of Food Agriculture and Fisheries (2007). National Strategic Plan for development of the Danish Fisheries and Aquaculture Sector 2007-2013.

http://www.nsrac.org/

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
3.1.2	**Consultation, roles and responsibilities** 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.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood. The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	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. The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained. The consultation process provides opportunity for all interested and affected parties to be involved.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction. 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 consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.

Score:	**85**

Summary: Organisations and individuals involved in the CFP management process have been identified. Functions, roles and responsibilities at all levels are explicitly defined and well understood for all areas of responsibility and interaction. The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained. The consultation process provides opportunity for all interested and affected parties to be involved.

Justification

Organisations / individuals in management process .... are explicitly defined and well understood for all areas of responsibility...

Section 5 of this assessment report provides a description of the key roles and responsibility in the fishery management process. Briefly, these include:

- Management / administration: EU DG Mare, Danish Ministry of Food, Agriculture and Fisheries, Danish Fisheries Directorate
- Scientific Advice: ICES, EU's STECF & ACOM, DTU Aqua (Danish Technical University).
- Control & Enforcement: EU Community Fisheries Control Agency (CFCA) , Danish Fisheries Directorate
- Industry Representation: Danish Fishermen's Association ,Danish Aquaculture, the Producer Organisations, The Association of Danish Fish Producers and Exporters, the Association of Employers in the Fish Processing Industry, the Association of Danish Fish Meal and Fish Oil Producers, the Business Council of the Labour Movement, the Association Danish Fish.
- Industry / NGO / Scientific liaison: North Sea RAC
- Denmark / the North Sea RAC also has strong NGO representation, which, over recent years have played an important role in encouraging a more ecosystem-based approach to fisheries management.

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.

The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge and demonstrates consideration of the information obtained.

The best examples of this are, at EU level, the work of the North Sea RAC, and at Danish level, the work of the Fisheries Law Paragraph 5 and Paragraph 6 Ministerial Committees. The RAC is a formalised industry consultation process which has contributed much in recent years to the development of multi-annual plans for a number of fisheries, and there is clear evidence of the work of the RAC being used by the EU. These meetings are regular and provide an effective conduit for local knowledge into the management system. However, both in the case of EU consideration of RAC proposals and the work of the Danish ministerial committees, there is **not** always a clear explanation provided (minuted outputs) of how the information is used or not used.

The consultation process provides opportunity for all interested and affected parties to be involved (and in some cases facilitates their effective engagement).

A good recent example of this has been the consultation process on the reform of the common fisheries policy (which itself closely mirrors the consultation process that preceded the drafting of the reformed CFP in 2002). The 2009 Green paper on the reform of the CFP 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 Danish Government and industry and other interested parties have actively taken up the opportunity to respond, as have the North Sea RAC. Contributions to this consultation process can be viewed at: http://ec.europa.eu/fisheries/reform/consultation/received/index_en.htm

The degree to which the consultation process facilitates engagement for all is less clear. Although there was active facilitation to get industry and key vocal stakeholders to contribute to the reform consultation, it is generally less clear how other maritime and marine organisations are brought into more routine fisheries management consultation. For example the degree to which marine recreation, aquaculture, aggregate extraction and offshore industries are actively facilitated – perhaps as part of an ICZM or marine spatial planning forum is not obvious. The public consultation process, the formation of the RACs and the work of the Danish Ministry have contributed to huge improvements in proactive, facilitated engagement, but due to these slight short-comings (when compared to the theoretical ideal), the final SG is not fully met and therefore not awarded.

References

NSRAC (2009). The Common Fisheries Policy After 2012. A paper prepared by the NSRAC for consideration by the Commission before the Green Paper is finalised. Available at http://www.nsrac.org/

COM(2009)163 final. GREEN PAPER. Reform of the Common Fisheries Policy

Ministry of Food, Agriculture and Fisheries Dec. 2008). Rapport om en ny europæisk fiskeripolitik (Report on an new European Fisheries Policy). In Danish

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
3.1.3	**Long term objectives** 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.	Long-term objectives to guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are implicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.

Score:	**100**

Summary: The CFP has 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.

Justification

Clear long-term objectives ..... are explicit within and required by management policy.

At the governance and policy level, clear over-arching long term objectives are set out in the EU common fisheries policy. The reform of the CFP in 2002 heralded the explicit adoption of "a precautionary approach to protect and conserve living aquatic resources, and to minimise the impact of fishing activities on marine eco-systems, and to contribute to efficient fishing activities within an economically viable and competitive fisheries industry, providing a fair standard of living for those who depend on fishing activities .....". These long term objectives are clear and explicitly defined and entirely consistent with MSC P&Cs.

The 2002 reform of the CFP also embraced a more long-term approach to fisheries management, involving the establishment of multi-annual recovery plans for stocks outside safe biological limits and of multi-annual management plans for other stocks. It aimed to progressively implement an eco-system-based approach to fisheries management.

Article 15 of Council Regulation EC 1198/2006 on the European Fisheries Fund, requires that all member states:

> "Shall adopt, following appropriate consultation..... a national strategic plan covering the fisheries sector (which) .....sets out the priorities, objectives, the estimated public financial resources (in accordance with the CFP) .....for:
>
> > (a) ..... adjustment of fishing effort / capacity with regard to the evolution of fisheries resources, promotion of environmentally-friendly fishing methods and sustainable development of fishing activities;
> >
> > (e) the sustainable development of fisheries areas,
> >
> > (g) preserving human resources in the fisheries sector, through upgrading professional skills, securing sustainable employment and enhancing the position and role of women;
> >
> > (h) protection and enhancement of the aquatic environment related to the fisheries sector".

The Danish Ministry of Food Agriculture and Fisheries have complied with the requirements of the above regulation in 'the National Strategic Plan for the development of the Danish Fisheries and aquaculture sector 2007 – 2013'. This clearly sets out national long term objectives under the vision:

> "To create the framework for the maximum possible long-term yield from the Danish fisheries and aquaculture sector, where the resources are utilised taking into account the goal of sustainability and regional development".

The branch objectives, below this vision are fully compliant with both the objectives of the CFP and the MSC P& Cs.

The Danish Law on Fisheries and Aquaculture (the Fisheries Law) adopted in September 2008 has as its purpose (Paragraph 1)

" to establish a management regime that provides protection and recovery of living resources in marine and fresh waters and protection of other fauna and flora, to provide a sustainable basis for commercial fisheries and associated trades and opportunities for recreational fishing". The Law applies to fisheries under Danish jurisdiction in marine and fresh waters, aquaculture, and trade in fish and fish products, and for all areas covered by EU fisheries regulation.

References

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.

Ministry of Food Agriculture and Fisheries (2007). National Strategic Plan for development of the Danish Fisheries and Aquaculture Sector.

COUNCIL REGULATION (EC) No 1198/2006. On the European Fisheries Fund
Lov om fiskeri og fiskeopdræt (Fiskeriloven) (Law on fisheries and aquaculture), LBK no. 978 of 26 September 2008

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
3.1.4	**Incentives for sustainable fishing** The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that negative incentives do not arise.	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices.

Score:	**80**

Summary: The management system at CFP and national levels does provide incentives for fishers/vessel owners that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that negative incentives do not arise.

Justification

The management system provides for incentives ..... and seeks to ensure that negative incentives do not arise.

Since the 2002 revision of the CFP, subsidies that contribute to unsustainable fishing have stopped. There is no support to increase capacity, or to compensate for low catches.

There are some minor forms of subsidy which could be identified for this fishery, however, in the opinion of the assessment team these do not contribute to unsustainable fishing and are consistent with MSC principles 1 and 2. These are:

- 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).

No detrimental subsides, which contribute to unsustainable fishing practices have been identified for this fishery.

At national level, the management system provides economic and social incentives for sustainable fishing. These include:

- Penalties for infringements / non-compliance
- the rights based "Vessel Quota Share" system (in Danish "FKA") adopted in 2007 has increases both certainty and commercial flexibility for industry to plan operations in a profitable and economically efficient manner. The associated (widely used) possibility of "pooling" of vessel quotas works in the same direction and has reduced quota shortage discards (for those Danish vessels in the pool system) previously not uncommon in the mixed demersal fisheries in the North Sea.

The cod recovery plan also includes incentives for those fleet components which have a limited cod bycatch, which include increased days at sea for fisheries which can demonstrate a low cod bycatch, to incentivise more selective fishing. This applies to some vessels covered in this assessment.

However, *the management system does not explicitly consider incentives in a regular review.*

The 2002 Reform of the CFP did not explicitly consider incentives, focussing instead on the priorities of fleet capacity, stakeholder engagement, improved enforcement, removal of subsides and long term planning. By contrast the most recent review of the CFP does address the question of incentives much more explicitly in particular in the form of 'results based management' and increased industry responsibility and even self management. In the consultation process, the Danish industry and ministry are taking a lead role in advocating a more results based approach to management by changing from a system of landing quotas to catch quotas to ensure that all fish caught is counted against the quota – as opposed to just those fish landed. Writing off everything that is caught on the boat against the quota will reduce the motivation to discard small fish and induce an incentive to fish selectively. The Danish Ministry and industry have jointly undertaken a pilot study looking at the potential of 'fully documented fisheries' using CCTV to monitor all catches (and discards) in return for an increased quota. The pilot so far indicates that this incentive is leading to a change in behaviour and the pilot is being extended in 2010.

Although the Danish Ministry is undertaking pioneering work in this area, and the latest CFP reform goes further in addressing

the question of incentives, there is **no** regular review which explicitly addresses incentives. Therefore the 100 scoring guidepost is not fully met and therefore not awarded.
References
COUNCIL REGULATION (EC) No 1198/2006. On the European Fisheries Fund COUNCIL REGULATION (EC) No 1342/2008. Establishing a long-term plan for cod stocks and the fisheries exploiting those stocks and repealing Regulation (EC) No 423/2004. COMMISSION REGULATION (EC) No 498/2007. Laying down detailed rules for the implementation of Council Regulation (EC) No 1198/2006 on the European Fisheries Fund COM(2009)163 final. GREEN PAPER. Reform of the Common Fisheries Policy Dalskov, J & Kindt-Larsen, L. (2009) Final report on Fully Documented Fishery. National Institute for Aquatic Resources Technical University of Denmark. Ministry of Food, Agriculture and Fisheries, Denmark (2009). Paving the way for a New Common Fisheries Policy (including a joint statement by Danish, German and UK Fisheries Ministers).

3.2	Fishery- specific management system

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
3.2.1	**Fishery- specific objectives** The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.	Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system.	Short and long term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.	Well defined and measurable short and long term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.

Score:	**80**

Summary: The long-term management plan for North Sea saithe explicitly includes short and long term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1. Objectives relating to P2 are not well defined or measurable.

Justification

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.

The overall objectives for managing this fishery are set out in the EU Common Fisheries Policy and the bilateral agreement between the EU and Norway for managing the fisheries in the North Sea (1, 3). Fishery-specific management measures for the North Sea saithe stock are established under the CFP. These measures define the annual TAC for the fishery (1, 17).

Harvest controls rules are in place in form of a long-term management plan, which entered into force in 2005 and which is consistent with a precautionary approach and designed to ensure a rational exploitation pattern and provide for stable and high yields. The management plan is updated at the annual EU-Norwegian consultations and will be reviewed before end of 2012 The TAC for 2010 is entirely consistent with the ICES advice and are thus appropriate for the current stock.

Whilst in main the objectives referred to above for target stock management are well defined and measurable, however the objectives relating to P2 (e.g. minimising environmental impact, adoption of an ecosystem based approach) are not well defined or measurable.

References

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 1980. Council Regulation No 2214/80 of 27 June 1980 on the Conclusion of the Agreement on Fisheries between the European Economic Community and the Kingdom of Norway. Official Journal of the European Union L 226, 47-50.

ICES 2009. Advice Book 6, 6.4.12: Saithe in Subarea IV (North Sea), Division IIIa (Skagerrak) and Sub-area VI (West of Scotland and Rockall).

Agreed Record of Conclusions of Fisheries Consultations between the European Union and Norway for 2010 (Annex iii, and Annex XiV)

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
3.2.2	**Decision-making processes** The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives.	There are informal decision-making processes that result in measures and strategies to achieve the fishery-specific objectives. 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.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives. Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions. Decision-making processes use the precautionary approach and are based on best available information. Explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	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. . 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.

Score:	**80**

Summary: Decision-making processes that result in measures and strategies to achieve the objectives for the North Sea saithe resources are well established. The processes do respond to serious and other important issues identified in a transparent, timely and adaptive manner and also take account of the wider implications of the decisions. Decisions are based on a precautionary approach and best available information. Explanations are provided for any actions or lack of action associated with findings and recommendations. However, the system for explanation of decision-making and resulting actions **stops short** of being *'formal reporting to all interested stakeholders'.*

Justification

There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.

The EU-Norway Agreement has established decision making processes that deliver fishery specific objectives such as Long Term Management Plans for shared fish stocks, including saithe in the North Sea and Skagerrak. The process includes scientific advice from ICES.

The European Commission (DG Mare) lies at the heart of the EU internal decision making process and make proposals based on inputs from a wide consultative structure, scientific review from STECF, industry / stakeholder review from ACFA, and direct industry input from the North Sea Regional Advisory council. In addition proposals, are, where relevant viewed by other Commission Directorates, including (of particular relevance to P2 considerations – DG Environment). Above all, the Commission has responsibility to ensure that proposals comply with the objectives laid out in the common fisheries policy. This same decision-making 'machinery' is brought to bear on fishery specific management decisions, such as the setting of TACs, technical measures (MLS, mesh size, closed areas etc) and most importantly, the determination of multi-annual plans (including harvest control rules and reference points). The final arbiter in the decision-making process is the Council of European Union – made up of elected representatives of member states (in the case of fishery decisions this is the fisheries ministers of each member state).

Decision-making processes respond to serious and other important issues .....

The ICES working group structure, and the consultative structure built into the decision-making process (EU-Norway at the international level, STECF / ACFA / RAC / DG MARE working groups/DG environment etc. at the EU-level, and the Ministerial Advisory Committees at the national level) does mean that serious and other important issues are considered. Certainly latest

scientific advice, and industry and social implications play key roles in shaping decisions. However, this perhaps stops short of being all issues. In particular some of the P2 criteria, including habitats and ETP species receive less consideration in a timely, adaptive and transparent manner.

Decision-making processes use the precautionary approach and are based on best available information.

Commission agreements and proposals are always in line with (and guided by) the CFP, which clearly states a commitment to the precautionary approach. By making use of the considerable expertise within ICES, STECF and ACFA the Commission ensures that decisions are based on the best available information. In recent years, considerable additional effort is placed on data recording and monitoring procedures to ensure the information on which decisions are based are accurate.

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 system for transparent explanation of decision-making and resulting actions **stops short** of being *'formal reporting to all interested stakeholders'* in a way which describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. It is possible to see details of ICES working group reports, and recommendations of STECF and ACFA (although these are less 'accessible'). It is also possible to see the outputs of the commissions' deliberations (Agreed Records/Communications / regulations), however it is difficult for all stakeholders to derive clear explanation of the decisions that take place at the commission during the process. There is little 'non technical' reporting to the public or industry – other than generic descriptions of the regulatory bodies and processes.

References

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.

COMMISSION DECISION (2004/864/EC). Amending Commission Decision 1999/478/EC of renewing the Advisory Committee on Fisheries and Aquaculture

COMMISSION DECISION (2005/629/EC). Establishing a Scientific, Technical and Economic Committee for Fisheries

http://ec.europa.eu/fisheries/partners/stecf/index_en.htm

Agreed Record of the Conclusions of Fisheries Consultations between Norway and the European Community for 2010.

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
3.2.3	**Compliance and enforcement** Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with.	Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective. Sanctions to deal with non-compliance exist and there is some evidence that they are applied. 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.	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. Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence. Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery. There is no evidence of systematic non-compliance.	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. Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence. 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. .

Score:	**85**

Summary: A comprehensive monitoring, control and surveillance system is prescribe in the long-term management plan and has been implemented by the Danish and Norwegian authorities. The system has demonstrated its ability to enforce the strategies and measures and sanctions for non-compliance are consistently applied and thought to provide effective deterrence. Evidence demonstrate that Danish fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery. There is no evidence of systematic non-compliance.

Justification

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.

At the international level the EU – Norway Fisheries Agreement for the North Sea also includes MCS. Over the years much effort has been exerted by both parties to ensure the efficiency of the system in place. In Norway the enforcement system involves the Fisheries Directorate staff in inshore waters and on landing. The Coastguard enforces regulations in offshore waters. Sales Organisations also have an enforcement role regarding landings, checking contract notes against vessel quotas.

At EU level it is the responsibility of Member states to enforce rules agreed under the CFP. An EU Community Fisheries Control Agency (CFCA) was established in 2007 to strengthen and coordinate controls across all national enforcement authorities to bring about improved uniformity and effectiveness of enforcement. This is further reinforced by the new EU control regulation which came into force on 1st January 2010, and aims to foster a new culture of compliance (1224/2009).

In Denmark the authority responsible for MCS both at sea and on shore is the "Fiskeridirektoratet" (Directorate of Fisheries) under the Ministry of Food, Agriculture, and Fisheries. Inspections are carried out in accordance with a risk-based strategy, which includes focus areas and campaigns (following the FAO Sampling Strategy). The positive effects of this strategy include a reduction in the number of infringements in recent years and a constructive dialogue with the fishing industry on MCS issues.

The no of infringements was reduced by 21% from 2007 to 2008. This is a continuation of the development observed from 2006 to 2007. Although there remain some infringements in the Danish fishery, across the entire national fleet infringements do appear to be less of a problem than in other EU fleets (3% of Danish vessels in 2006 as opposed to anything up to 37% of vessels in other EU member states), with offences mostly relating to logbook infringements.

There is no evidence of systematic non-compliance.

The enforcement system make strategic and coordinated use of logbooks (increasingly e-logbooks), sales notes, vessels

monitoring systems, designated ports, landing inspections, advance hailing of landing (in particular when landing cod), reporting tolerance limits, inspections throughout the retail and supply chain (as a result of revised buyers and sellers registration requirements in the reformed CFP). Recent improvements including the new EU IUU and Control regulations and the NEAFC Port State control rules also increase comprehensive nature of the system. This can be considered comprehensive and COM(2008) 670 demonstrates that this is consistently effective.

Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.

In cases of non-compliance in Norwegian zone, a range of penalties can be applied by the authorities, with loss of fishing license and heavy economic sanctions as the most severe measures. For minor infringements a series of warnings can be issued. Corrective actions are consistently applied and severe infractions are tried in the courts. Corrective actions are well established, codified, understood and tested. Compliance with regulation in Norwegian zone is reported to be good .

In Denmark, non-compliance is dealt with through the Danish criminal justice systems, and using agreed and tested procedures. In event of an infringement being detected by the Fisheries Directorate, details of the infringement are passed to the public prosecutor, who determines the appropriate fine / sanction. This process also enables the fisher to prepare a defence against the charge and provides full right of appeal. The fisheries Directorate themselves do not therefore have unilateral power to impose sanctions – thereby ensuring the system of deterrent remains transparent, independent and consistently applied.

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.

Although the system appears robust and effective, as detailed above, this **stops short of being** *high confidence* for a number of reasons – the relatively low observer / inspections coverage, the focus of inspections (both at sea and on landing) on cod (as opposed to other species), unclear how the Danish high grading ban is enforced at sea. For example it is notable that the landings size / weight profile of vessels taking part in the Danish pilot study using video cameras onboard suggests that high grading is likely to still occur elsewhere in the fleet. Furthermore it is recognised that there is still a low level of discard sampling. However, it is recognised that the Danish Ministry is actively pushing for a solution in this areas and the DFPO Code of Conduct instruct members holding MSC certificates to avoid high grading and report systematically on observations of importance to the effective management of the fishery.

References

COUNCIL REGULATION (EC) No 1224/2009. Establishing a Community control system for ensuring compliance with the rules of the common fisheries policy, amending Regulations (EC) No 847/96, (EC) No 2371/2002, (EC) No 811/2004, (EC) No 768/2005, (EC) No 2115/2005, (EC) No 2166/2005, (EC) No 388/2006, (EC) No 509/2007, (EC) No 676/2007, (EC) No 1098/2007, (EC) No 1300/2008, (EC) No 1342/2008 and repealing Regulations (EEC) No 2847/93, (EC) No 1627/94 and (EC) No 1966/2006

COMMISSION REGULATION (EC) No 1010/2009. Laying down detailed rules for the implementation of Council Regulation (EC) No 1005/2008 establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing

COM(2008) 670. COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT. Reports from Member States on behaviours which seriously infringed the rules of the Common Fisheries Policy in 2006

Dalskov, J & Kindt-Larsen, L. (2009) Final report on Fully Documented Fishery. National Institute for Aquatic Resources Technical University of Denmark.

Fiskeridirektoratet. Fiskerikontrol 2008: Inspektioner, Observationer og Kampagner , Overtrædelser (in Danish)

Ministerial Order: ”Bekendtgørelse om regulering af fiskeriet i 2010 og visse vilkår for fiskeriet i følgende år (Reguleringsbekendtgørelsen 2010). Bekendgørelse no. 1443 of 15 December 2009, (in Danish)

FAO Fisheries Technical Paper 454. Safety in sampling - Methodological notes. Rome, 2004. ISBN 92-5-105039-2

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
3.2.4	**Research plan** The fishery has a research plan that addresses the information needs of management.	Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2. Research results are available to interested parties.	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. Research results are disseminated to all interested parties in a timely fashion.	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. Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.

Score:	**80**

Summary: The regular and strategic work undertaken by ICES working groups and national experts on the North Sea saithe stock provides the management system with reliable and timely information sufficient to achieve the objectives of the multi-annual plan. Research results are disseminated to all interested parties in a timely fashion. However, this **stops short of being** widely and publically available, as the results are not presented in an easy accessible form.

Justification

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.

ICES strategically establishes study groups based on information requirements identified by national delegates, including through industrial representations. Members of various ICES Working Groups focused on such elements as climate change, plankton, multi-species fisheries (ecosystem), etc. All review research, identify research requirements and undertake appropriate work. There is good communication between Working Groups (via ACOM), and between researchers through their specialist interests.

Research / investigation is undertaken in relation to specific requirements, which generally come from the recommendations of the Stock Assessment Working Group. Members of the ICES community keep abreast of developments within the scientific community of relevance to the fishery under consideration. This ICES community is wider than Europe and includes relevant research elsewhere. Research contracts are left to other organisations, including Universities, (e.g. through the EC) to supplement scientific understanding relevant to the fishery and related ecosystem. In Denmark, DTU Aqua plays a key role in the work of ICES, and is the formal representative of Denmark on ICES working groups and, as such, contributes significant resources and expertise to relevant research.

For example, a number of key ICES working / study group have particular bearing on the fishery under assessment. These include (but are not limited to):

- WGNSSK - Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak
- WGRED - Working Group for Regional Ecosystem Description
- REGNS - Regional Ecosystem Study Group for the North Sea

Research direction is steered by the money available. Typically it is easier to get national research funding for national projects. As a result many projects are undertaken by national scientific institutes using national fleets. The findings of these studies contribute to ICES findings. Taken in combination it can be concluded there is therefore a strategic approach which delivers reliable and timely information. However, this **stops short of being** considered a coherent and comprehensive research plan.

Research results are disseminated to all interested parties in a timely fashion.

The annual reports of ICES working groups and study groups are publically available on the ICES website. In addition they are disseminated to interested parties in a timely fashion – in particular they are disseminated to decision-makers, in time for annual fishery allocation negotiations. However, this **stops short of being** widely and publically available, as the results are not presented in an accessible form (easy to find), to enable all interested parties (including public / consumers) to quickly interpret the findings – without significant prior knowledge or expertise.

References

http://www.aqua.dtu.dk/english.aspx

Searchable hub for all ICES expert groups: http://www.ices.dk/workinggroups/WorkingGroups.aspx
http://www.fishnet.dk/

	Criteria	60 Guideposts	80 Guideposts	100 Guideposts
3.2.5	**Monitoring and management performance evaluation** There is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives. There is effective and timely review of the fishery-specific management system.	The fishery has in place mechanisms to evaluate some parts of the management system and is subject to occasional internal review.	The fishery has in place mechanisms to evaluate key parts of the management system and is subject to regular internal and occasional external review.	The fishery has in place mechanisms to evaluate all parts of the management system and is subject to regular internal and external review.

Score:	**85**

The long-term management plan for saithe has in place mechanisms to evaluate key parts of the management system and is subject to regular internal review.

Justification

The fishery has in place mechanisms to evaluate key parts of the management system and is subject to regular internal and occasional external review.

There is a comprehensive system of routine **monitoring** of information relevant for management decision-making and stock assessment purposes. The monitoring programme in place principally focuses on landings from the fishery, i.e. quota uptake. Due to the systems described in 3.2.3 this monitoring now forms a substantially more accurate reflection of actual fishing mortality. Additional monitoring is also in place to provide sufficient information to support stock assessment purposes (for example length / weight monitoring).

High quality, well-documented procedures exist to reduce harvest in light of monitoring results. These can be quickly implemented (near real-time recording of catch levels and quota uptake – and annual review of stock status). The CFP system allows the Commission to make a proposal to the Council for an immediate (in-year) reduction in quota. The EU-Norway Agreement from 2009 allows for real-time closures of areas to protect juveniles of saithe and other demersal species.

Additionally there is a well established system of **management evaluations**. For example, there have been a number of directly relevant evaluations of the management system. These include:

- Review of the CFP (2002 & 2008 -)
- Annual Report on Fishing Fleet Capacity – Denmark
- The ICES Working Groups (referred to in 3.2.4) also effectively serve as routine evaluations of management performance, by comparing fishery performance to pre-determined targets.

The majority of the evaluations undertaken are 'internal' either within ICES or the EC and MS. However, ICES work brings together a wide range of national scientists, and in so doing builds external perspectives into the assessments. Additionally this work is periodically externally reviewed. However, this stops short of regular external review.

References

Agreed Record of Conclusions of Fisheries Consultations between Norway and the European Community for 2010. Annex III and XIV.

Appendix 4 – Peer review reports

Peer Reviewer A

General comments

The report on the Danish North Sea Saithe covers the Danish Fishermen´s Producer Organisation (DFPO) vessels using demersal trawl and fly shooting, seine and gill and trammel nets. Because there are three types of gear involved (demersal trawl, seine and set nets) there are three separate Units of Certification being considered. In the case of the demersal trawl (but not for fly shooting), the data presented here shows saithe as the main target species but this is not the case for the other two types of gear seeking certification. Seines are mainly targeting plaice while cod (+ plaice) are being targeted by the set nets. What we have under certification are examples of mixed fisheries which would not be identified as targeting saithe if a métier analysis was carried out. I am not comfortable with the notion of certification done in this way, i.e. when the Unit of Certification will include all vessels (DFPO members) landing saithe even if the species is not the main target (or the second or even third target species) and we are going to certify only part of the fishery.

FCI: All of the gears under assessment operate in mixed fisheries where a number of species are targeted together. In this assessment saithe is considered a primary target species for the demersal otter trawl fleet. While it forms a small, but important, part of the other fisheries under assessment it is not the primary target species which are cod and plaice in both the set net and Danish seine fisheries and haddock in the fly shooting fishery. Despite not being the primary target species in these aforementioned fisheries, saithe is still considered a target species as part of the mixed fisheries.

Data has been analysed to ensure an appropriate representation of the weight of all target species taken when saithe is also landed in these fisheries. The data presented in Tables 4.1-4.4 do not therefore represent the total landings of cod, plaice, haddock etc taken by Danish vessels operating these gears, but shows the associated volume when more than 1 tonne of saithe is landed in any one month.

Note that within this assessment the term 'fishery' is used to describe the species, gear and management unit.

It is important to bear this fact in mind but throughout the text there are sentences that fail to do so such as "*the target species for the fishery under certification is North Sea saithe*",

FCI: This has been changed to read "*the target species for the fishery under certification is North Sea and Skagerrak saithe*"

"*assessment covers a single target species, but assesses three different methods of capture*",

FCI: As described above it is considered accurate to describe saithe as the target species (including when part of a mixed fishery).

"*retained species are those that have been caught and landed while the vessel has been targeting saithe*".

FCI: This is a MSC definition, but has been changed as follows to ensure clarity "*Retained species are those that have been caught and landed together with saithe, the target species under assessment.*"

In particular, this last sentence. The report has, in my opinion, being consistently providing too high a score when evaluating the status of many of the retained/bycatch stocks, considered by ICES as unknown. I do not share the interpretation of the authors that, because there are management measures in place, the score awarded should be 80.

FCI: As described in FAM section 7.1.11 the term biologically based limits refers at a minimum to the point of serious or irreversible harm..... these limits may take many forms depending on the information that is available.... (for example percent of an ecosystem impacted by a fishery). Given the scale of the set net and Danish seine fisheries (and retained species associated with saithe landings) it is considered that they are unlikely to be close to point of serious or irreversible harm. See Tables 4.5 and 4.6 for proportion of TAC represented by retained species in these fisheries under assessment.

As described in FAM section 7.1.23 and 7.1.21, a partial strategy does not have to be specifically designed to manage the component under assessment.

In relation to this, when conditions have been raised due to low scores, these conditions have been formulated in a rather vague and general way and every effort should be directed to provide as clear and as concise as possible instructions to clients if we want the system to have any chance of success.

FCI: The Certification Body works closely with the client to ensure their development of a client Action Plan fits the purpose of the conditions, including specific actions. However, it is not the role of the CB to advice on which the action should be. Instead it is the client who proposes an Action Plan and the CB assess whether the proposed action plan is acceptable and will bring the score to the 80 level.

Because the report is dealing with these 3 Units of Certification, in some sections, information is provided for more than one gear as there is a high degree of overlap. This process has its dangers and for example the text for Condition DS 1 (ETP species) for demersal trawl is exactly the same than the text for Condition DT 1 (also ETP species) for seine (including the mention of demersal trawling twice in the condition for seine). The same applies to the Client Action Plan for these two conditions which presents an identical text even if the gears are different.

FCI: The approach to conditions has been explained in Section 8.2 of the report. The mistake regarding reference to demersal trawl is acknowledged and has been rectified.

The report is otherwise well-structured with a clear overview of the gears under certification, a good background on the biology of the species and a very detailed and comprehensive administrative context. The "status of the stock" section has some areas which are perhaps too detailed and the reader is left confused about the meaning of so many terms. For example in page 24, under the HCR and Tools section (3.5), paragraph two and three could be shortened considerably without losing the important information which is already explained in the 1st sentence "*ICES evaluation of these decision rules determined that they are consistent with the precautionary approach in the short term conditional on the absence of major changes in the productivity and the absence of measurement and implementation error*".

FCI: The extension of the information given in the HCR and Tools section (3.5) relates to the justifications and score given to PI 1.2.2. Therefore it has been decided to leave it unchanged.

I find section 4 the weakest of the report and the reasons for this are explained further below. The choice of figures to illustrate this section is also not always very informative (e.g. Figure 4.10 which shows the threatened habitats - the VMS data should be superimposed to evaluate potential for overlap).

FCI: Overlaid maps of VMS and habitat were not provided to the assessment team. This has been added to habitat condition for demersal trawl.

I will also go into detail into the Scoring sheets but of these, section 3 is the strongest with the authors providing in many cases important information on the fishery which is missing from the main part of the report, e.g. the relatively low coverage of the fleet by observers and inspectors, the

fact that the focus of the inspections is on cod, the fact that it is not clear how the high grading ban is being enforced at sea and the evidence that it is still taking place, and finally the low level of discard sampling.

FCI: Agree. Text in report has been changed to meet this critique.

With regard to the Conditions imposed on the Units of Certification, some of the Suggested Actions are vague and not consistent between gears. For example, Condition DT 1 (ETP species) for the demersal trawl asks for "*Demonstrate a clear commitment to eliminating landings of common skate and spurdog ensuring landings do not exceed those set by the EC Regulations*": now, how can one evaluate what constitutes a "clear commitment"?

FCI: Commitment and actions to meet condition are set out in the Client Action Plan.

Condition DT 2 (Habitats) also for the demersal trawls asks for "*Provide detailed maps and / or seabed community maps for all areas of the North Sea…..where demersal trawling for saithe and other species occur…It is not intended that DFPO should have to produce the maps, as it is likely that significant additional relevant information already exists…… Maintain a record of all potential sources consulted*". What are the DFPO vessels signing for certification exactly being asked to do?

FCI: The client group (DFPO) are being asked to provide up to date habitat data when it is available in order to cross reference sensitive habitats with continuing effort – this links with previous point re overlaying VMS and habitat data.

Another suggested action includes the sentence "*Include strategic provisions relating to protecting vulnerable seabed habitats in the Code of Conduct*" and another "*This could include an undertaking to explore technical measures to reduce unacceptable impacts where identified, such as the use of semi-pelagic otter trawl doors*". As it reads, there is no need for the fishery to do so, it is suggested not required.

FCI: It is not understood how the peer reviewer has come to this conclusion.

Finally, "*Use resulting information in enhance management strategy of the impacts of the fishery to seabed habitats at least to a point where measures combine into a cohesive, reactive and documented strategy that shows an understanding of how the management measures work together to achieve the objectives of minimising impacts to seabed habitats*" is just another example of lack of guidance and concreteness.

FCI: Please refer to the Client Action Plan and note that it is not the intention for conditions to formulate a detailed management plan.

For demersal trawl, an increased observer coverage <u>is suggested</u> as a potential source of data to clarify the impact of the gear on ETP species. For set nets, an independently run observer programme that covers all areas and seasons <u>is required</u> to evaluate the interactions.

FCI: This is due to the level of risk posed by each gear type, which is reflected in the respective scores and wording of the conditions. Also reflects that more data is available in CCTV for trawl gear compared with set nets. Conditions remain unchanged.

The Client does not make a mention of this observer programme in his Action Plan and this should be followed up. In addition, under Condition DT 2 (Habitats) the Client proposes to "*identify indicator catches of vulnerable habitats*". They should explain why they mean by this.

FCI: Agreed. FCI asked the client fishery for clarification on the issue raised above by the peer reviewer. Below it is shown the clarification given by the client fishery:

"Indicator catches of vulnerable habitats primarily means corals and similar structures. The current knowledge of species of corals in Danish waters is rather patchy, but as far as we have been able to

establish they probably include at Hexactinellida, Demospongia and what is known as bubble reefs (not a coral, but tall carbonate structures created by slowly seeping natural gas.) For the first two, we don't have much geographic information, whereas the latter has been found in several (now Natura 2000 designated) areas in the Kattegat. But the recordings (incl. photos) from the PO-logbook may tell us in time what is really out there and where it is"

Also explanation is needed on the "*current CCTV coverage of incidental harbour porpoise bycatch in set net fisheries*" → there is a mention of a study analysing CCTV data later of in the report (Kindt-Larsen & Dalskov, 2010) but it seems to consist on data taken from a single small set net vessel.

FCI: Kindt-Larsen & Dalskov (2010) assess data for one set net vessel. However, this system is currently being rolled out to further set net vessels for monitoring in 2010. The exact details of this (number and size of vessels) are unknown.

The sentence in section 3.5 "*…landings have not exceeded the set TAC. Hence available evidence indicates that the TAC as a management tool is appropriate and effective in achieving the exploitation levels under the HCR*" should be rewritten. TACs will only work as an effective management tool if systems are in place to ensure compliance and issues like bycatch (due to exceeding quotas or for highgrading, note that "*there are not discard estimates for the majority of this fishery*" from page 101) are not happening. Landings below TAC could still hide an overexploitation of the stock. In fact, this (avoid quota-related discarding) is quoted as one of the benefits behind the adoption in 2007 of the Individual Transferable Rights in Denmark (a practice "*not uncommon in the mixed demersal fisheries in the North Sea*", page 179). Incidentally, it is believed that the introduction of this new management system might have resulted in profound changes in the structure of the Danish fisheries (ICES Advice, 2010) but the present report does not take this into account when listing the series of landings or discards by the fisheries under certification.

FCI: It is acknowledged that there exist uncertainty on the effectiveness of the use of TAC as a tool to control exploitation levels and the following has been added to the main text in section 3.5:

"*However, the reported landings have been lower than the set TACs during the past seven years. Information from fishes indicates that this is due to very low prices for saithe combined with high fuel prices. There are also claims that the abundance of saithe has been reduced in most recent years*".

The issue of discards estimates and how the assessment of the stock deals with it is described in section 3.6 and in scoring table/PI 1.2.3 justification (page 107).

In section 3.6, Information and Monitoring, it is stated that the primary abundance index for saithe is the mackerel egg survey, the only one used to fit the population model. This must be an error(!), since on the next page there is a list of the abundance indices used, which include 2 surveys (a Norwegian acoustic survey and the IBTS) and 3 commercial series of catch data.

FCI: Corrected

In this same section, when introducing the system to record landings of saithe and the fact that, for the industrial fishery, bycatch of saithe is not reported and saithe bycatch does take place in other fisheries, we need some information to allow at least a partial quantification of the extent of this bycatch.

FCI: When assessing the PI information/monitoring, the assessment team agreed that all issues at scoring guidepost 80 were met. Since a condition was NOT raised for PI Information/monitoring the assessment team cannot require the quantification of saithe bycatch in industrial fisheries. This outcome is also consistent with the others saithe fisheries certifications assessments (see page 61).

There are several inconsistencies throughout the report. For example in the section on Discarding (4.2) it is stated that there is no data available on set net discards because there is no requirement

to do so and this is based on "historic surveys" that recorded low levels of discards. No references are given to these historic surveys but then the report lists an available discard series of 14 years for gill nets! (Table 4.6).

FCI: Mistake acknowledged and rectified.

Where have these data originated from? Also how have the discard data for the other two gears (trawl and seine) been calculated? The text does not provide enough detail: have discards been calculated for each year of the series and then added up?

FCI: Data originated from observer data for Danish fleet reported by gear type (demersal trawl, Danish seine and set nets) and area (North Sea and Skagerrak). The data is not sorted per fishery i.e. saithe and so provides a summary of the species and respective volumes of discards per gear and area. Figures for trends (per observer trip) from 2004-2008 have been added to the report.

If this is the case, it will be more informative to represent trends in the discarding of the main species to be able to assess how the situation has been evolving over the last few years. It is difficult to compare the landings (provided for only one year, 2008) with the discards (provided for 8 and 14 year periods).

FCI: These data should not be compared since percent coverage of observer data in relation to the saithe fishery is unknown. The discard data presented allows species to be identified and relative proportion (within discard data) to be assessed.

In relation to this, under the Condition DT 1. (page 68) it is stated that the landing statistics from 2009 and the beginning of 2010 show common skate and spurdog continuing to be landed in spite of the prohibition to do so (in the case of common skate) and that "*While it is not possible to determine if these landings are specifically related to the saithe fishery, it is expected to be so*". Why it is not possible to identify the vessels? A similar exercise was carried out to produce Table 4.1.

FCI: Only data from 2008 has been provided by gear type, port of landing, month etc which allowed the detailed analysis of retained species associated with saithe. Data for 2009 and 2010 has been accessed from the Directorate's online database which does not sort by gear or allow species landed in conjunction with the saithe fishery to be determined.

More worryingly, the report presents some glaringly misconceptions. The section on Endangered, threatened and protected species (4.3) gives a free (and wrong) interpretation of the definition of these species: "those that are recognised by national legislation and/or binding international agreement". From this definition, the authors of the report conclude that, unless there is legislation in place to protect a species, automatically they fall out of the ETP category even if they are listed as endangered and/or threatened by International Agreements such as OSPAR. This is wrong, dangerous and completely and utterly against the spirit of sustainability defended by the MSC scheme. I seriously recommend this section is rewritten.

FCI: Do not agree. Definition is clearly described in FAM Section 7.4.1 and 7.4.2. This section has not been rewritten.

In addition to this, is the case of the angel shark (listed by the IUCN as Critically Endangered) that, because it is considered to be locally extinct, the authors of the report do not deem appropriate to include it in the assessment. The same reasoning is used not to include in the assessment the sturgeon. Sadly, it is probably true that neither sturgeons nor angel sharks will be taken by the gears under certification but that should not automatically mean there is no monitoring of possible captures.

FCI: Sturgeon and angel shark will be included within the wheelhouse guide and recording template as per ETP condition.

Following sentence added to ETP conditions: "ETP species listed in Table 4.10 together with protected bird species should be included within this strategy".

For the harbour porpoise, please note that the most updated estimates are those of the SCANS-II survey that are widely available, so quote those figures also. In the text, both SCANS I and II surveys are mentioned but, for the results, the reader is sent to Figure 4.2 which gives areas of high density not actual population numbers. Also, correct legend in Figure 4.2 (SCANS-I took place in 1994), and discuss the trends in population numbers and the shift in distribution apparent from the results of both surveys in this part of the report.

FCI: Details added and figure legend updated.

For the harbour seal, include references and also information on population trends. For example, in the UK, the population is decreasing. This level of detail is given for grey seals further down in the report. From the basking shark onwards, there are no references quoted to support the text. Please include the appropriate references.

FCI: Acknowledged and added.

For birds, on page 45 there is a statement that "*it is therefore clear that interactions between cormorants and fisheries are inevitable*" seemingly based on the fact that the species feeds only on fish (like many marine organisms including plenty more seabirds one would expect) and eats around 500 grams per day. These kind of statements are over simplistic and should be avoided. Detailed information is also needed on management plans in place in Denmark to avoid interactions between this species and the fisheries.

FCI: Changed to "The location and diving range of cormorants together with location and setting procedures for set nets mean that potential for interactions exist".

Management information added as follows:

"A colony of cormorants first established in Denmark in 1938 and from 1970 the Cormorant colonies have gradually become protected in Denmark and Europe. In 1992 the first Danish Cormorant Management Plan was set up. The plan that in use at the moment is from 2002-2008 and is under revision. The management plan aims to prevent unacceptable damage to fisheries and at the same time to protect the cormorant as a common breeding bird in Denmark. While areas of conflict do overlap between cormorants and set nets, the majority of interaction is recorded in coastal pound nets, aquaculture and recreational fisheries. Management tools within the plan include modification to pound nets, scaring of birds, egg oiling and removal of nests to avoid new colonies and to reduce the size of existing colonies and scaring and shooting of birds during smolt migration."

Another such sentence is found under Ecosystem impacts: "*CEFAS has recently published an ecosystem model to support an ecosystem approach to fisheries management in the North Sea*" to support the statement that there is "*considerable knowledge on the habitats and ecosystems of the North Sea and Skagerrak region*". Ecosystem models are tools that can help us understand the effects on the ecosystem of different management measures, for example MPAs. The authors of the model state in their paper that "*The model is best designed to address questions regarding processes that occur over the whole North Sea and on time scales greater than one year. As such the model is designed to help address strategic long-term questions such as those relating to the long-term ecosystem effects of changes in fishing activity and climate. It is not useful for short-term tactical question regarding fisheries management. It is complementary to existing approaches; helping managers and policy makers by giving them a view of the possible surprising and counter-intuitive effects of particular management and policy options".*

FCI: This quotation has been added to the Ecosystem Outcome Status (2.5.1).

In the same section on Ecosystem Impacts, the authors provide a list of Conventions and Agreements guiding the industry and the authorities on "potential habitats and ecosystem impacts" of the fishery (we assume). Including the Convention for ICES is not appropriate since the ICES Convention is not a legislative instrument like the others. ICES is an intergovernmental organisation which promotes and encourages research of the sea.

FCI: ICES has been removed for this list.

Stating that the "*Danish fleet targeting saithe has robust and comprehensive systems in place to minimise any wider ecosystem impacts*" is an overstatement and it is not supported by the evidence provided throughout the report. Otherwise it would have scored higher on criteria 2.5 (Ecosystem).

FCI: Acknowledged and edited.

Section 2.1.1 on the status on retained species presents a mixture of very detailed information, sometimes not exactly relevant to the discussion in hand which is to assess if the retained species are within biological limits with various degrees of certainty or, if this is not the case, if there are measures/strategies in place to avoid the fishery hindering recovery.

FCI: Under FAM Section 7.2.2 it is a requirement to justify in writing why species are included and assessed as retained species.

Pages 104-105 deal with the status of cod. Cod has been classified as suffering from reduced capacity and as being harvested unsustainably as is stated in the report. But not only does SSB remain below Blim even after years of management measures to protect the stock (also mentioned in the text) but there has been an increase in F in 2008 (believed to be due to an increased in discards of cod) and F now is estimated to lie between Flim and Fpa. Because of concerns that the existing cod recovery plan was not working and fishing pressure was not being reduced to allow the recovery of the stock, the EC and Norway adopted a new management plan in December 2008. This new revised plan was evaluated by ICES in 2009 and considered "*to be in accordance with the precautionary approach if <u>it is implemented and enforced adequately</u>* and that higher discards than the ones assumed were going to affect "*the effectiveness of the plan*". ICES has also noted that "*there have been considerable problems with the effectiveness of the cod recovery plans. Despite the objective to reduce fishing mortality and to increase the SSB by combined TAC control and effort management, estimated total catches have been much higher than intended. Fishing mortality has been reduced but has remained well above the implied targets. Discarding contributes about half of the total fishing mortality. Under the present implementation and enforcement approach, large reduction in F and the recovery of the stock are unlikely. It is therefore urgent to pursue and improve the actions towards implementation and enforcement in order to achieve reduction in F by effective control of cod catches*." (ICES Advice 2010 Book 6). Under these conditions, we cannot say that there is "*<u>a partial strategy of demonstrative effective management measures in place</u>*" and as a consequence the score will be lower than 80.

FCI: This issue highlighted here is in relation to whether or not the management plan has been implemented and enforced adequately. There is no evidence to suggest that the Danish saithe fleet are not implementing and complying with these measures.

There is no indication that level of cod landed by vessels landing saithe (target species under assessment) are over TAC. All reasonable steps to comply with cod management plan are undertaken by the saithe fishery. These measures are designed specifically for cod and therefore represent a strategy. The voluntary adoption of the CCTV Fully Documented Fishery by 6 vessels in 2008-2009 and 30 vessels in 2010 is of particular note when scoring this Performance Indicator. This PI focuses on the risk posed by the Danish saithe fishery on retained cod, not implementation and enforcement in other countries targeting this stock. Given the above, it is assessed that these is no reason to give a score lower than 80.

For monkfish (please state that we are talking about two species), it is true that the status of the stock(s) is unknown and that there are no explicit management measures for the stock. ICES advice has been limited to "*no effort increase*" for the last 6 years. Saying that because there has been a reduction in the TAC for saithe automatically we have a reduction of effort is disingenuous: there is no effort data presented to support this, plus we are really talking of a mixed fishery that is targeting other species. In spite of this, because the status of monkfish is poorly known, my reading of the sub-criteria in this section implies that, automatically, the fisheries seeking certification are scored 60 and not more.

FCI: Monkfish are considered a minor retained species and therefore not included within scoring of SG80 issues.

In the case of plaice, there is a need to quote the exact words of the ICES advice. It currently says in the text that "*ICES advice states that the new analysis for the stock in 2008 and 2009 has provided no reason for changing the 2007 advice*". What ICES Advice actually says is "*the new available analysis for the stock in 2008 has provided no reason for changing the 2007 advice*" (ICES Advice 2009, Book 6). It is not correct to say that "*Assessments in 2008 and 2009 have therefore not been undertaken*". It should say, as stated by the WGNSSK report 2009 "*Last analytical assessment accepted by the WG was in 2004*" and the explanations given are the need for large-scale improvement in both commercial and survey sampling design that makes the WG members consider that an analytical assessment would not be appropriate until these are achieved. The text should be revised from here onwards to remove the references to the 2007 analysis and quote the latest ICES advice (2010) "*No reliable assessment can be presented for this stock and therefore, fishing possibilities cannot be projected*" which means that the assessment is only giving us information on trends and that the status of the stock is unknown. Yes, it is true that there is evidence that the stock is in better shape now that it probably was in the 1990s (survey indices indicate "substantially higher" values of abundance and recruitment during the last 6 to 8 years than in the1990s) but again and for the same reasons as for monkfish it should not score above 60. Also please remove the reference to the Seafish Responsible Sourcing Guide stating that the plaice stock appears to be stable. They are using ICES information to produce their guides and in this case, they do not explain how they arrive to that conclusion from the other information they are quoting.

FCI: Comments re quotation of ICES reports acknowledged and changed accordingly. It is considered that the Seafish Responsible Sourcing Guide is applicable and reference to this remains. Score has not changed.

For *Pandalus*, the information given is messy. What the text should say is what ICES states: because there are no reference points defined for the stock, the status of the stock cannot be evaluated with regard to these and it is considered unknown. The only fishery independent information available (from the Norwegian survey) indicates a decrease in both biomass and recruitment since 2007. Information from the fishery does not provide clear trends, with LPUE fluctuating since the mid-1990s. Then the information on the TAC could be given. Then, the next paragraph needs to be removed completely since it is a misinterpretation of the actual text of the ICES Advice. The Advice states that sorting grids should be mandatory in the shrimp fishery in all areas to minimise bycatch of other species (including cod). How from this text, the authors have arrived to "*in relation to non Pandalus targeted fisheries, ICES Advice states that, when sorting grids are not used, retained Pandalus may constitute up to 20% of the landed catch species*" escapes me. And from here the next sentence is using this wrong information to establish happily that *Pandalus make up 8.5% of the saithe catch composition by weight and "therefore meet this criterion*". After this, there is an attempt to wrap up the species with another wild remark: "*the status of the Pandalus stock is uncertain and so for the purpose of this assessment it is considered to be outside biologically based limits*". This is wrong, because the status is uncertain (and you do not have defined reference points)

you do not have the information to assess if the stock is within or outside biologically limits and should therefore give a 60 score ("*if the status is poorly known*…"

FCI: *Pandalus* has been removed from the retained species assessment since it is not landed by the demersal trawl gear under certification. The *Pandalus* fishery is targeted by trawl mesh sizes of 35mm and this fishery can retain saithe, explaining its inclusion within landing statistics in Table 4.1. The saithe landed by demersal trawl gear with 35mm mesh size is not included within the Unit of Certification under assessment.

There is a somewhat incongruous statement in Section 2.1.1 with respect to the seine fishery. *"The Danish seine fishery in the Skagerrak that is landing significant amounts of saithe is therefore primary targeting plaice. ……Nevertheless, with such a high composition, plaice are considered a main retained species*". And for the same reasons as above for the trawl section, I do not agree with the score of 80 for cod and plaice in this section either.

FCI: As described above, disagree and score remains unchanged.

The same applies to the scores for set nets for cod and plaice. They should be awarded less than 80. In addition, in the case of cod, the sentence *"Given the low….cod quota taken by this fishery, together with the fact that the cod is likely to be the target species (with retained saithe), it is considered that the saithe set net fishery has a very low risk to cod"*. The second part of the sentence does not make sense.

FCI: Changed as follows:

"Table 4.6 presents that proportion of cod landed in conjunction with the saithe fishery in relation to the Danish quota and overall TAC. The saithe fishery lands 2% of the Danish quota for cod in the Skagerrak and 1.7% in the North Sea and 1.7% of total TAC in Skaggerak and 0.3% in the North Sea. Given the low proportion of Danish cod quota taken by this fishery it is considered that the saithe set net fishery has a very low risk to cod."

In the case of hake, the information provided could be updated to include the ICES 2010 advice for the stock, which takes into consideration the results of the benchmark assessment carried out in 2010 and defines the "*State of stock is unknown but trends-based assessment indicates an increase in SSB*" since the new assessment method (based on a length based model) is indicative of trends only.

FCI: Acknowledged and added.

In section 2.1.2 there is a quote from the results of Project Survival (incidentally the reference is not included in the reference list) that investigated survival rates of fish in a trawl. Now, the reference is not relevant here (it is not a technical gear restriction) and it does not provide any qualitative details on how the study was carried out (area of study, net size, mesh size or any other details of the experimental design needed to be able to evaluate the results). Was the result of the project really that there is a 95% survival rate for cod and whiting? Under which circumstances?

FCI: Additional details of project have been added as follows:

"The study, called Project Survival was conducted by the Institute of Marine Research, Norway; Fisheries Research Services, and the Scotland and Danish Institute for Fisheries Research, funded by the EU Commission looked at the survivability of various gadoid (cod, haddock, saithe, and whiting) species after escaping the codend, either through an excluder or through the mesh. It was found that the mortality of juveniles that escape the codend is much higher than those of more mature fish, most likely due to the injuries and stress associated with the capture itself. It was also found that fish that escaped at the surface, juvenile or adult and amongst all gadoid species, had a very high mortality rate most likely due to hyperbaric injuries and suffocation at the surface. Of the gadoid species, cod (and saithe in the Barents Sea) appear to be least affected by the trauma of

capture and escape and both cod and whiting were found to have high survival rates after passing through the codend of a trawl."

Note that the 95% rate was quoted in a video about the project, but cannot be found in written scientific evidence and so reference to this figure has been removed.

The score for section 2.1.3 should be 80 not 90: there is not accurate and verifiable information on the catch of ALL retained species. As stated later on in the report, there are retained catches of "*rays + skates*" which are not completely identified to species level since most individuals in this category are landed without head or tail.

FCI: This is acknowledged, however EC Regulations 43/2009, which came into force on 16th January 2009, requires the following five species of ray to be recorded separately: Cuckoo ray (*Leucoraja naevus*), Thornback ray (*Raja clavata*), Blonde ray (*Raja brachyura*) Spotted ray (*Raja montagui*) and Starry ray (*Amblyraja radiate*) and is therefore expected to resolve this issue.

While the data have not yet collated in sufficient time series to allow status to be assessed for all species, it is considered that as per EC 43/2009 sufficient information is being collected to species level. The wheelhouse guide (as per ETP condition) will further assist identification and reporting.

For section 2.2.1 (as for section 2.1.1 before), there is a problem with the interpretation of the sub-criteria in my opinion. If the status of a species is poorly known then it should automatically be awarded 60. The authors in the summary of their scores used the same justification throughout the gears "*the main by-catch species……..are assessed as being either highly likely to be within biological based limits and/or having a partial strategy in place*" for awarding a score of 80. There is no allowance for lack of knowledge in the 80 GP, either a species is highly likely to be within the limits or if outside such limits there is a strategy in place. This applies for starry ray, common dab, grey gurnard, long rough dab, roundnose grenadier, whiting which stock status are unknown. It is true that the ICES 2008 advice lists the starry ray stock as stable but this is provided only as a qualitative assessment since the information available for most of the species belonging to this group is solely provided by the surveys (they have been landed and reported generically as "rays and skates" without species-specific information which is essential for stock assessment purposes). Currently there is a EC requirement in place to report landings of the major skate species separately but since this obligation started only in 2008, ICES advice states that until a longer track record (at least 5 years) of data has been gathered it is not possible to advise on species-specific catches. Saying that "*from the available evidence the starry ray is highly likely to be within biological based limits*" is incorrect. From this section the authors should remove the reference to Seafish Responsible Guide (for the reason explained before) and the reference by Vinther and Sparholt (1991). Their biomass estimate of the species is now more than 20 years old!

FCI: Disagree as per previous comments.

For *Nephrops* in the North Sea, I haven´t been able to locate in the ICES Advice 2008 the statement given by the authors that "only part of the Norwegian Seep stock is currently being exploited and there may be potential to expand the fishery to new grounds". For long rough dab, figure 4 in page 124 should be removed, it gives information from a 1996 paper on distribution (average) by size class but again it is very old information.

FCI: ICES Advice 2008, Book 6 6.4.14.4 *Nephrops* in Norwegian Deeps (FU 32)

For the section 2.2.2 on Management strategy, I have two specific questions: can we get an estimate of the percentage of the fleet effort covered by observers? What is the coverage of the observer programmes? Also from the text, my interpretation is that observer data is only available for the trawl and seine fisheries but not for set nets.

FCI: No – set net discard data is available and presented within the report (note that this was provided late during the assessment process, hence some incorrect reference to lack of data). Mistakes have been rectified.

And the second question relates to the 30 Danish vessels which are going to join in 2010 the Fully Documented Fishery scheme, are any of these vessels part of the Units under certification?

FCI: Yes

In this section, there is also an inconsistency in the text between what it says in the summary: "*clear evidence is available to demonstrate that these strategies are being implemented successfully and the intended changes are occurring*" while in the detailed justification it states "*while there is some evidence that the strategies are being implemented successfully, it is not clear that the intended changes are occurring*".

FCI: The latter is correct and text has been changed in the former to reflect this. Score remains unchanged.

Section 2.2.3 on Information / Monitoring is badly justified. First it is supposed to cover the 3 units of certification but there is no mention at all of the measures in place in the set net sector. The justification text only really deals with the trawl fishery ("*for this reason the demersal trawl saithe fishery scores 90 for bycatch information*") → what about the other two units of certification? Because there is no information provided on observer programme coverage it is not possible to assess whether there is an adequate monitoring and information system in place. Saying that "*Through ICES advice, Seafish Responsible Sourcing Guides and scientific papers there is sufficient information to estimate the outcome status with respect to biologically based limits for the main bycatch species*" is simply not true! As I have discussed in the previous sections, for many species there is not sufficient data and ICES advice considers therefore that for many of the listed stocks the status is "unknown". If there are scientific papers dealing with the species under consideration, these papers haven´t been presented in the report (the text makes reference to a couple of studies carried out more than 20 years ago but nothing else is cited in these sections).

FCI: Further text has been added to clarify the above and the score has been changed from 90 to 85.

The section on Interaction with PET species presents the additional problem of mixing between units of certification, pages 135-138 are supposed to deal with trawl and seine but all the information provided is only for demersal trawl. Where are the authors getting the information to state that "*it is recognised that marine mammals mortalities by demersal trawl fisheries are rare*"? Fertl & Leatherwood (1997) discuss that mortalities have been recorded in higher numbers from pelagic trawls than from demersal trawls but not that the latter are rare. All fishing gears have recorded bycatches of marine mammals with some species interacting more with particular gears than others. Vinther (1999) deals with set gillnets while Kindt-Larsen & Dalskov (2010) deal with observations from a single vessel (smaller than many of the set net vessels from the fishery). It will be more useful if the authors elaborate on the results of the various studies available in the North Sea and the Skagerrak and Kattegat areas to support these kind of statements. The same applies to "*consultation during site visits ….confirm that the capture of marine mammals by demersal trawlers is rare*" therefore "*it is not considered appropriate to include them within the demersal trawl ETP assessment*". What about results from scientific studies to support these statements? What about results for seine? The same applies for seabirds and for basking sharks. In all these cases please provide detailed justification.

FCI: Further justification has been added to this performance indicator.

For elasmobranchs, the distinction of skate to species levels as stated in the text means there is no skate in the category "skate & rays" in Table 3 from 2008?

FCI: There is no common skate included in this category.

In addition, the legend inside figure 5 is not legible (in my copy), what are the green squares in the figure?. The same applies to Figures 6-7.

FCI: As explained in the figure title, the green and purple squares indicate the distribution of common skate, spurdog and 'skates and rays' taken in the saithe demersal trawl fishery.

In page 137 the test reads "*Landings of skate are recorded in 2009 and 2010 because catches taken in the Norwegian zone cannot be discarded and must be landed in either Norway or the EU*"… This text would imply that all landings of skate and spurdog in 2009 and 2010 were from the Norwegian zone but this contradicts other sections of the report where it states that "*However, landing statistics from 2009 and Jan-May 2010 reveal that common skate and spurdog continue to be landed from both EU and Norwegian zones*" (page 71, and more).

FCI: Both statements are correct. Landings recorded in early 2010 are likely to be due to a lack of broad awareness of restrictions, which the DFPO have made every effort to resolve, as discussed under management 2.3.2.

The next sentence…. "*For this reason the effect of the saithe demersal trawl fishery is assessed as being highly likely to be within limits of national and international requirements for protection*" is then debatable.

FCI: Consultation with the Fisheries Directorate indicates that no non-compliance has been reported against this regulation. It is assessed that there is at least a 70% probability that this component will be within national and international limits. The score therefore remains unchanged.

Section 2.3.1 for set nets presents another example where I disagree with the scoring system. The summary for the scoring states that since for most of the ETP species assessed the score was 80, except for harbour porpoises (scored 60) you can average scores and end up with a 75 overall score. My understanding of the system was that the overall score for Criteria 2.3.1 would reflect the fact that the fishery was failing to score higher than 60 since in at least for one case it could not provide evidence with a high degree of certainty. What would then be the meaning of a 75 score (a ¾ between "*effects are unlikely*" and "*effects are highly unlikely*"?).

FCI: Scoring has been undertaken as per FAM Section 4.2.6 and 4.2.7.

In this section we are given another conflicting statement "*The most numerous victim of fisheries bycatch is the long-tailed duck……(Zydelis et al., 2009). However the most common species taken as bycatch in Denmark is the cormorant*". The authors need to qualify the first statement by including the information (at present only on the legend of Table 4) that the statement refers to the Baltic Sea and North Sea, and provide information on the gear responsible for the bycatch.

FCI: Acknowledge and added.

Figure 6 presents pooled data from 2003-2009 to illustrate a seasonal pattern of cormorant prevalence. Is this pattern stable through the years? Why not compare solely the seasonal pattern in 2008 with the fishery landings for that year (Figure 7)? Is the seasonal pattern of the fishery also stable over the years? As it is, the statement "*Landings peak from December to May and appear to drop during the peak months for cormorant. It is therefore assessed that the risk of cormorant posed by the set net fisheries is low*" could be considered only circumstantial evidence. Incidentally, what is then the score for cormorant? It is not stated in the text.

FCI: A score of 80 has been awarded to seabirds (including cormorants); this score is (and already was) included in the text.

For seals, please include details of any population estimates available in the area for the 3 species mentioned. In section 4.3 (page 40) most information refers to UK seal populations and it is

restricted to harbour and grey seal. There is no mention of ringed seals. Of the information provided in the scoring tables, please note that Lunneryd et al (2004) is not in the reference list. All studies refer to Sweden and I am not sure of the relevance of findings of seal entanglement in the Northern Baltic and the Gulf of Bothnia for the case in hand.

FCI: Reference has been added to the list.

Population details of 3 seal species have been added to section 4.3

The text "*That is not to say that the larger set net fisheries of cod and plaice (where saithe is taken as a retained species) pose such a low level of risk, but that the scale of the saithe set net fishery must be taken into consideration in assessing the risk to these ETP species*" introduces a further problem. Which is the set net fishery under certification? From the catch information given in Table 4.4. cod is the main retained species, from statements throughout the text (e.g. page 111, "*Cod makes up 50% of the catch composition in the Skagerrak and 56% in the North Sea from trips that record over 1 tonne of saithe landed by set nets. The set net fishery in the North Sea and Skagerrak that are landing significant amounts of saithe are <u>therefore targeting cod</u>*" it will imply that indeed saithe is not the main target so it would not be appropriate to use the term "saithe fishery" or at least to keep implying that it is a different fishery. Statements like "*This latter region is where set net effort for saithe is focused, i.e. where saithe make up > 25% of the set net landings by volume*" further confuses the issue to my mind.

FCI: Please refer to previous description of mixed fishery.

Please provide more details to support the score of 90 given to basking sharks.

FCI: Under this Performance Indicator for set nets elasmobranchs including spurdog and basking shark score 80.

I would suggest rewriting the section on harbour porpoise and removing excess detail from the text. There were two SCANS surveys carried out in the North-east Atlantic. The overall estimate of the harbour porpoise population has not decreased significantly in the 10 year period between both surveys but the results show an apparent shift towards the southern North Sea. Please note that there are more updated bycatch estimates for harbour porpoises in the Danish set net fisheries with data provided up to 2000-01. The results are given by Vinther & Larsen in their 2004 paper on Journal of Cetacean Research and Management 6(1):19-24. Update this section accordingly and the conclusions such as "*it is therefore assessed that the effects of the set net fisheries* are likely to be within limits of national and international requirements" .

FCI: Further text added

I have problems with the scoring system used by the authors in cases when partial fulfillment of a sub-criteria increases the score. For example in page 162, set nets are scored 90 under Status because, based on the available evidence (from VMS data) ,"*it is considered the SG100 is somewhat met and so a score of 90 is appropriate*". My understanding was that a sub-criteria needs to be met fully to be scored. In relation to the evidence provided by the VMS maps, the fact that the number of set net boats fitted with a VMS system is not provided prevents the evaluation of the evidence since we do not have information to assess if the coverage of the fleet is adequate. In my opinion the score for this particular Criterion should be 80. The same rationale applies in page 165.

FCI: Please refer to MSC Policy Advisory 18 (v1), 06 September 2010

In section 2.5.1 Status, the justification needs work: the author arrives at the conclusion that removal of saithe at present levels is "highly unlikely" to disrupt key ecosystem elements. They base the conclusion on results of the ecosystem model by Mackinson & Daskalov and limit the justification to saithe. But the fishery is not only exploiting saithe (in fact, the species is not even the main target for seine and set nets) and the fishery needs to be evaluated in its totality. In addition,

from the ICES WGNSSK REPORT 2009, "*The impact of a large saithe stock on prey species such as Norway pout and herring is unknown. Poor spatial and temporal sampling of stomach data of saithe make the estimation of the saithe diet uncertain* (ICES CM 2006/RMC:02)". Please also check my previous comment on the North Sea ecosystem model.

FCI: Given the proportion of retained species in relation to Danish quotas and TACs for the North Sea and Skagerrak, the level of removal of retained species by each fishery (trawl, seine and set nets) is highly unlikely to disrupt the key elements underlying ecosystem structure and function.

In section 2.5.3 Information and monitoring the authors should greatly expand the justification of their score (at present just a few lines) and revisit this score (see my comments on the previous sections).

FCI: Justification has been expanded.

In the Scoring Sheets there is a change of style in reporting the scoring results between Principle 1, 2 and 3. In the first two cases, the tables include first a summary of how the scores were obtained and then the detailed justification. This is not the case for Principle 3.

FCI: Acknowledged and rectified

There is some work needed on the references. Some references quoted in the main text are missing from the main reference list. The same happens but more frequently once we arrive to the tables of the scores awarded. Here many of the references quoted under individual criteria are not included in the reference list for that particular criterion. In the case of the ICES reports, throughout the main text, references listed with the letters a and b if they share the same year but then are just listed with the year in Appendix 2 (for example ICES 2008a, etc.). Please note that Mackinson and Daskalov should be 2007 and not 2008.

FCI: references amended and corrected as needed

Last and least there are various minor typographical and grammatical errors throughout but in accordance with the instructions I have received I am not listing them here.

Specific comments

Summary:

» 1st paragraph. It states that the assessment process began in August 2009 while September 2009 is given as the start date in section 1.3.

FCI: Corrected

» 5th paragraph. "The Danish North Sea and Skagerrak saithe fishery ……. Fishing is entirely within the North Sea". Slight contradiction here. I suggest changing the sentence as follows "Fishing takes place almost exclusively in European waters of ICES division IV and IIIa (North Sea and Skagerrak)"

FCI: Agreed and changed as suggested.

» Last paragraph. Change "understanding ……the role of plaice in the ecosystem is adequate" to "understanding …the role of plaice in the ecosystem is considered adequate to inform".

FCI: Acknowledged and changed

Section 2: The Fishery:

» Page 10. Please give more information on the type of vessels. For example, it is only in page 156 under 2.4 Habitat scoring table that we find out that under "demersal trawlers" we have standard trawlers, boats using the twin trawling method, pair trawlers, etc. The same applies to the other gears.

FCI: Fishing fleet and fishing method description refers to the operational characteristics of the gear defined in the unit of certification. Description given in scoring tables is more specific in that it is measuring the impact of the different gear types on each of the Principle 2 components (E.g. habitats). Information provided in the background report is meant to be general.

» Page 16, Figure 2.9 is missing the labels

FCI: Corrected

» Page 16, section 2.5.2. Change to "*The main fishing area for saithe for the Danish fleet is the North Sea and Skagerrak (ICES Sub-Areas IV and IIIa), which accounts for some 50% and 45% of all Danish saithe landings, respectively (fig. 2.10-2.13). The remaining small percentage comes from the Kattegat (also ICES Sub-Area IIIa) and the Norwegian Sea (IIa)*".

FCI: Changed as suggested.

» Same page and section. Change to "*98.5% of saithe is landed by demersal trawls, 96.8% of which are 15 or over m in length and most of the remaining are between 10-15 m (Table 2.1)*".

FCI: Changed as suggested

» Figures 2.10-2.13. We need the legend in the maps to be translated to understand what the different colours stand for. They are not referred to in the figure legends.

FCI: Figures 2.10-2.13 are mainly used for showing distribution of fishing effort rather than showing intensity in fishing effort. Therefore the assessment team considered that it was not necessary to obtain the units of each o the colours used in the figures.

» Figure 2.15. Change the legend to "*2008 Landings of saithe by the Danish Registered Fleet by harbour*".

FCI: Changed as suggested

» Page 19, section 2.5.3. Delete last sentence of 2nd paragraph as it is a repetition of last sentence in 1st paragraph.

FCI: Deleted

» Page 19, last paragraph. "*Vessels can pool their quota allocations…..discards related to vessel quota limitation are avoided*" I would expect with this system discards "*are minimised*" more than completely avoided.

FCI: Agreed. The term avoided has been replaced by minimised.

» Page 20, section 3.1, 1st sentence "*There is a high degree of certainty that the stock is, at present, above the point where recruitment would be impaired*".

FCI: by saying "*is*" it is understood "*at present* "

» Same section 2nd sentence "*After failing to a low level in 1992, SSB has ~~therefore~~ increased progressively*"

FCI: Corrected as suggested

» Same section, 4th sentence. "*In 2009, SSB was estimated at 263,377 tonnes, ~~well~~ above B_{pa}, estimated at 200,000 tonnes*".

FCI: Corrected as suggested

» Same section, 2nd sentence, 2nd paragraph "In 2009, fishing mortality (calculated as the average of the mortality in 2006-2008) was estimated at 0.29".

FCI: Corrected as suggested

» Figure 3.1. Indicate in figure legend the source of the plots.

FCI: Added

» Page 23, section 3.4. 1st sentence, because the Harvest Strategy has not been fully tested I find the statement "*There is an appropriate mechanism to contain harvest and maintain stock size at a precautionary level*" too strong.

FCI: The term appropriate refer to the score of 80 given to issue 1 scoring guidepost 80. At the scoring guidepost of 80 Issue 2 is: "*The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives*". Therefore the term *appropriate* is considered acceptable as PI 1.2.1 scored 80.

Section 3.6. Information and monitoring:

» Page 27. 5th paragraph, "*Norway carried out in years 2006-2008 another acoustic survey*" this will help clarify that we are talking about two separate Norwegian acoustic surveys.

FCI: Text modified as suggested

Section 4. Environmental elements

» Page 30. Tables 4.1 – 4.4 indicate in the legends that data come from 2008 (my understanding from the text in page 29).

FCI: Added

» Page 34. 2nd paragraph, 3rd sentence. "*and a ban on high grading in the EU zone meaning that no fish of marketable size should be landed*" surely this is a mistake!

FCI: Acknowledged and rectified

» Page 36, Table 4.5, legend states that discards are listed for seine fisheries "*in the North Sea and Skagerrak*", data in the table only refers to the Skagerrak.

FCI: Acknowledged and rectified

» Page 40 and following pages. Please give Latin name of the species (it is done for harbour porpoise and both common and grey seals) but not for the remaining ETP species.

FCI: Acknowledged and rectified

» Page 42. Figure 4.5 and text, give information on which fisheries are landing basking sharks.

FCI: It is unknown which gear types are responsible for basking shark landings presented in Figure 4.5.

Section 10. Client Agreement to the Conditions

» Page 74. Client Action Plan. Change to "To ensure that Danish fishermen are aware of the prohibition of landing ~~discard requirement~~".

FCI: Text changed as suggested by peer reviewer B: "...the DFPO has been using all its means of communication to ensure that Danish fishermen are aware of the requirement to **release** skate and spurdog."

Appendix 3. Scoring sheets

» Page 92, the justification is first given to pass the 80 Guidepost and then the same text is used together with some new text for the 100 Guidepost. It will help it the text is streamlined and concentrates of the higher guidepost when the information is repeated.

FCI: It is a requirement of the MSC assessment methodology that justifications are given for each of the issues at each of the scoring guidepost (MSC Policy Advisory 18)

» Page 90. Justification, change throughout the text "*well above*" to "*above*" in relation to the SSB estimates.

FCI: Changed as suggested

» Page 99. Justification, change the sentence "*Information on population age structure is significantly relevant in the assessment of the stock status, as age structure methodology*" as it reads it is unnecessary complicated. A suggestion is "*Catch-at-age data are available for the stock and feed into a Virtual population analysis used to assess the stock*".

FCI: Changed as suggested

» Page 105, delete 3rd and 4th lines ("*The status of cod stocks in the North Sea and Skagerrak is known and is assessed as being outside biological based limits*"). ICES classification of the stock is already given in the first sentence of the paragraph and is "*at risk of being harvested unsustainably*".

FCI: Acknowledged and rectified

» Page 106, line 14, what is the meaning of "*in conjunction with the saithe demersal trawl fishery*", we are in the section on the trawl fishery.

FCI: Acknowledged and rectified

» Page 106, line 35, change "*monkfish*" for "*plaice*".

FCI: Acknowledged and rectified

» Page 106, plaice, include also MLS of 27 cm as a management measure.

FCI: Acknowledged and rectified

» Page 108, References, it should be 6.4.25 for Northern shrimp.

FCI: Acknowledged and rectified

» Page 109, change "*palcie*" for "*plaice*"

FCI: Acknowledged and rectified

» Page 111, justification, end of first paragraph, change to "*could not score above 80*")

FCI: Acknowledged and rectified

» Page 111, the correct Table is 4.4 from Section 4.1.

FCI: Acknowledged and rectified

» Page 115, Table 1 should indicate that landings of spurdog are prohibited.

FCI: Acknowledged and rectified (assume peer reviewer means common skate)

» Page 116, explain meaning of "*consequential limitation*".

FCI: Rewritten as follows "While these restrictions are applicable to Danish vessels, they do not occur across the grounds targeted by the Danish saithe fisheries as shown by the VMS plots in Figures 2.10-2.13 in the main report."

» Page 117, "*voluntary use of square mesh panels by some vessels is known to further improve selectivity*". How many vessels are using this, any of the ones under certification?

FCI: Number of vessels using square mesh panels is unknown. Yes, some of the vessels within the Unit of Certification are using this.

» Page 117, explain what an "*eliminator trawl is*".

FCI: Added "(including BACOMA and T90)"

» Pages 140-141, please include Latin names of the species quoted.

FCI: Acknowledged and rectified

» Page 160: References quoted are mainly dealing with trawls, not seine.

FCI: Acknowledged and rectified

» Page 184-185, Justification, it will help if the justification follows the order of the subcriteria.

FCI: Acknowledged and rectified

Peer Reviewer B

General Comments

Overall, levels of governance, enforcement and reporting are good and efforts have been made to reduce detrimental impacts on ETP species, however the level of capture of harbour porpoise remains high. The evidence presented does not demonstrate beyond doubt that deaths due to set nets are at acceptable levels.

FCI: Further justification has been provided which is detailed under the specific comments section of peer reviewer comments.

Measures in place to protect common skate should (and appear to have been in the last year) be effective. Greater care should be given towards the identification of all skates and rays from all areas so that mistaken retentions of common skate are avoided and data on other species of concern can be collected.

FCI: This will be undertaken through the wheelhouse guide that will include an identification chart and associated recording sheets.

Less precautionary measures required of catches of common skate and spurdog from the Norwegian zone are noted. At a national level, negotiations with the Norwegian authorities should attempt to harmonise measures and enable the release of live common skate back to the sea.

FCI: Following has been added to Condition DT1:

Liaise with Norway in harmonising management measures for common skate to enable the release of live common skate (which is currently illegal in Norway due to ban on discarding).

The review has been hindered to a certain extend by the lack of information concerning numbers of vessels using each gear type.

FCI: As per Section 2.1 an online register of vessels eligible for landing MSC certified saithe will be maintained by the DFPO. A graph indicating estimated number of DFPO members by gear type and vessel size is provided in Figure 2.6.

More detailed comments

1a) Scoring for the removal of target species appears justified however extra caution should be applied to the assessment of **retained species** particularly cod. ICES (advice book 6 2010) reports that "Fishing mortality declined after 2000, and although its most recent trajectory is considered uncertain, it is estimated to be well above the long-term objectives of maximum yield, and likely above Fpa. Recruitment since 2000 is poor." The advice suggests that in order to "cautiously avoid impaired recruitment and achieve other objective(s) of a management plan (e.g., catch stability) the TAC should be 32 240 t.

On this basis I think it would be difficult to say with certainty that "this fishery does not hinder the recovery and rebuilding of the cod stocks."

FCI: Additional information for retained species has been inserted into the report with relation to the proportion of TAC taken by the fisheries under assessment landing saithe.

The TAC and Danish quota for the primary target species in the Danish seine, set net and fly shooting fisheries (that land saithe) i.e. cod, plaice and haddock, are presented in Table 4.4.

The volume of these primary target species landed in association with saithe are presented in Table 4.5. The volume of cod removed by the Danish seine fishery (landing saithe) equates to 2.7% of the Danish quota for the Skaggerak (area IIIaN); the volume removed by the set net fishery equates to 2.2% of Denmark quota in the Skaggerak and 1.8% in the North Sea and EC waters of IIa. The

volume of plaice removed by the Danish seine fishery (landing saithe) equates to 4.5% of the Danish quota for this area and 3.5% of the total TAC. The volume of haddock removed from Skaggerak by the fly shooting and Danish seine fisheries (landing saithe) equates to 2.5 and 2.7% of the Danish quota and 1.8 and 1.9% of the TAC respectively.

In relation to management, ICES advice on cod (2010) reports that "A rights-based regulation (FKA Vessel Quota Share) was put in force in Denmark from the 1st January 2007. ICES has not yet been able to evaluate the consequences of these measures." The same concern also applies to bycatch species 2.2.1 . ICES consider the "Recording of discards through observers good."

FCI: Acknowledged

b) Given that skates and rays are considered as retained species and the fact that there is a real risk of mis-identification, the effect of removal on skates and rays (other than common skate) should perhaps be considered within the scoring of this element of the assessment. "Until recently landings of all skate and ray species have been amalgamated and reported under the category 'skates and rays' making the determination of individual species decline difficult. Furthermore, species identification can be an issue, especially when they are landed with no nose or tail." P48 PRDR

FCI: Misidentification of skates and rays will be covered in the wheelhouse guide which will include ETP species as well as identification charts (with figures) for skates and ray species. Note also regulation 43/2009, which came into force on 16th January 2009, requires five species of ray to be recorded separately: Cuckoo ray (*Leucoraja naevus*), Thornback ray (*Raja clavata*), Blonde ray (*Raja brachyuran*), Spotted ray (*Raja montagui*) and Starry ray (*Amblyraja radiate*). Note that starry ray is assessed under Bycatch (as a discarded species).

Endangered, threatened and protected species (ETP)

2a) "According to the FAM endangered, threatened or protected species (ETP) are those that are recognised by national legislation and/or binding international agreement. Endangered and/or threatened species (such as those listed on OSPAR Appendix II) cannot be included within this category unless they also have some form of protection." PRDR. It is not clear why threatened or endangered species alone cannot be included.

2b) Table 4.6 Protection of species and determination of inclusion within ETP category. The table appears to omit national legislation and species identified within international agreements such as FAO's IPOA on sharks, the EC's Community Action Plan on Sharks.

FCI: Definition of ETP is described in FAM v2 Section 7.4.1 and 7.4.2. International agreements must be binding. With regard to ETP for Denmark national legislation primarily relates to implementation of Habitats Directive via Natura sites (which are discussed within the report).

"The Danish fleet exploiting the saithe resource in the North Sea and Skagerrak does so primarily by fishing within the Norwegian EEZ. (57% of landings in 2009). As such, the fleet is not only required to comply with EU and Danish legislation, but is also required to comply with relevant Norwegian legislation and practices." p59 PRDR. This presumably applies to nature conservation and fisheries legislation.

FCI: The Norway EU agreement is referenced where appropriate within P2 justifications. There are prohibited areas for fishing for sandeel, Norway pout and blue whiting within some areas of Norwegian EEZ, however this is not relevant for the saithe fishery.

Assessors' Conditions

3a) DT1 suggested action "*Demonstrate a clear commitment* to eliminating landings of common skate and spurdog, ensuring landings do not exceed those set by EC Regulations, as described above. This *could* be achieved through the operation of the ETP log on certified vessels, cooperating in

scientific research and increased observer coverage." "Demonstrate data generated and research undertaken is *shaping the development* of a management strategy to mitigate adverse habitat impacts."

Both of these statements are rather vague and therefore difficult to monitor. The same comment applies to the conditions for the Danish Seine net fishery.

FCI: Specific actions and monitoring procedures are provided within client action plan in Section 10.

b) Condition on Set net management strategy for ETPs…. "with information being made fully and freely available to appropriate bodies." This should also be available to the public/consumers.

FCI: Added following statement into condition to ensure transparency for public / consumers: with information being made fully and freely available to appropriate bodies and a summary of the data provided for inclusion within annual surveillance audit reports

PO's own conditions

c) DT1 ETPs "Since the MSC assessment process brought to light the issue of skate and spurdog in EU-waters, the DFPO has been using all its means of communication to ensure that Danish fishermen are aware of the discard requirement. We will continue to do so until landings are zero."

This could indicate extinction. Consider replacing the word 'discard' with 'release' which would give a better indication of the required action. Same applies to the Danish Seine net fishery.

FCI: Agreed and text changed as suggested.

d)DT2, the level of transparency in data provision is very good as are results of evaluation of management and collaboration with external scientists. Further commitment could be demonstrated by an undertaking to implement measures required by Natura 2000 (once they are agreed), without delay.

FCI: Annual surveillance audits will ensure that measures required by Natura 200 are implemented when required.

Appendix 3. The decision tree.

4) The state of the stock and its management is adequately reflected in the scoring system. Uncertainties in the 0-3 age group and in the productivity of the species in the long term have been taken into account. Concerns about levels of discarding and its recording are justified. Caution expressed about the use of commercial CPUE as an indicator of stock abundance is also justified. Concerns about the HCR have also been echoed by ICES. ICES also report that the risk to the stock from fishing is very low. Taking these uncertainties into account, the risk could be classified as low.

FCI: Agreed.

5a) Closed areas, technical gear restrictions, the cod recovery plan and days at sea have been discussed under 2.1.2 for retained species. Although the details are not repeated in this section, these measures are appropriate to bycatch species and have been taken into consideration for scoring. This seems reasonable but should it not apply to species that are retained but also may be discarded as bycatch i.e. undersized cod, so that although the explanation is not repeated in the bycatch section, discarded 'retained species' are also taken into account within the scoring for bycatch?

FCI: As per FAM Section 7.1.2 individual species are only considered within one P2 component to avoid duplication of scores. Cod is predominately a retained species and therefore assessed under this component.

b) The assessment has determined that bycatch management strategies for demersal trawl, Danish seine and set net saithe fisheries meet all of the SG80 performance indicators and the first and third SG100 performance indicators and therefore both score 90. The third performance indicator does not appear to be met.p37

FCI: This was due to a formatting error whereby two issues appeared presented as one continuous issue. This has been resolved. The first and third issues are met, but the second and fourth issues at SG100 are not met. The score remains unchanged.

6a) "In 2009, landed volumes of skate peaked, as a consequence of identification to species level within the statistics, and this equated to approximately 27-44 individuals (based on an average weight of 54-88kg). Given this small number, together with the distinct area targeted by the saithe demersal trawl as shown by VMS data it is unlikely that this fishery will create unacceptable impacts to either skate or spurdog."

One year of data is not sufficient evidence on which to base this conclusion. The issue of mis-identification has not been given sufficient weight in terms of capture from previous years. It would be helpful to describe how the figures for individual animals were arrived at. The geographical range of the species in question and the VMS data seem to coincide very closely.

FCI: Data from 2008, 2009 and 2010 are presented. To current knowledge all possible data sources have been assessed. Data from the Directorates online database have been studied for 2008, 2009 and 2010 (Table 3). Note that this data set cannot be ordered by vessel trip or gear and so landings cannot specifically be attributed to the Danish saithe fishery.

The issue of mis-identification is being addressed as part of the condition set for demersal trawl and Danish seine.

Numbers of individuals have been derived as follows: in 2009 2.4 tonnes of landed common skate were recorded, based on average weight of 54-88kg this equates to approximately 27 (i.e. 2,400/88) to 44 (i.e. 2,400/54) individuals.

For clarification, note that Figure 5 shows the landings distribution of common skate, skates and rays and spurdog that are landed in association with the saithe fishery. They do not represent the geographical range of the species and further figures of distribution have been added.

b) Table 4 p147. Can you include definitions of the suffixes in this table?

FCI: These have been added

Are there anymore up to date figures and/or figures for actual or estimated number of birds caught in the Danish nets? Can any explanation be given as to why none of the other 'Natura' species are taken by the Danish fishery? Is it a seasonality effect for instance?

FCI: In reviewing the status for bird bycatch, the assessment team was provided with very little data upon which to decide an appropriate score. No further information was available other than that presented within the report. Note that a key reference used was Zydelis, R., *et al.*(2009) Bycatch in gillnet fisheries – An overlooked threat to waterbird populations. Biol. Conserv. Given the date of this paper it is expected to contain the most up-to-date information available.

c) Figure 7 p 147. Combined landings, tonnes, of cod, plaice and saithe caught by all Danish vessels deploying set nets in 2008 (from data provided by DTU Aqua, 2010). Given that saithe are landed from a number of mixed fisheries Is there any risk of saithe from an unassessed fishery entering the supply chain of the certified stock? Some clarification about the provenance of the certified stock from the number of fisheries in which is it landed would be helpful. For example "For Norway in 2007, trawls (mainly bycatch in the saithe fishery) and gillnets account for around 60% (by weight) of

cod catches." WGNSSK Stock Annexes 2009. This could also be applicable to comments about retained species and the impact on cod recovery.

FCI: Please refer to Table 2.1 which details landings by gear type and first paragraph of Section 5.1

d) "While interaction between Danish set net fisheries and Harbour seal, grey seal, spurdog, birds (in particular cormorant) and basking shark are recorded, it is considered that due to the scale and location of the saithe set net fishery it does not pose a risk of serious or irreversible harm to these species. That is not to say that the larger set net fisheries of cod and plaice (where saithe is taken as a retained species) pose such a low level of risk, but that the scale of the saithe set net fishery must be taken into consideration in assessing the risk to these ETP species. It is assessed that the effect of the saithe set net fishery on birds, seals, spurdog and basking shark is highly likely to be within national and international limits and that the direct effects are highly unlikely to create unacceptable impacts."

Can the national and international limits for ETP species be defined and some text added as to what is acceptable and unacceptable. If the limits refer to national and international legislation, then in accordance with the legislation, 'reasonable steps' should be taken to avoid capture of these species. A clear description (list) of what steps are actually taken would be useful.

FCI: National legislation for birds and seals are represented by Denmark's implementation of the Habitats and Birds Directives in designating Natura 2000 sites including Special Areas of Conservation and Special Protected Areas (see Figure 4.3). Denmark designated a series of Natura 2000 sites in 2009 and 2010, eight of which have harbour seal as a qualifying feature and 21 of which have grey seal as qualifying feature. The development of management plans for these sites are underway. Only one of these sites lies in the North Sea and Skagerrak area and is out with the effort presented in VMS figures. The development of management plans for all activities in the SACs and SPAs are underway and involve a transparent consultation process. Due to the location of the set nets that are landing saithe, interaction within the existing Natura network is highly unlikely to create unacceptable impacts. It is however, agreed (as per earlier peer reviewer comment) that further commitment could be demonstrated by an undertaking to implement measures required by Natura 2000 (once they are agreed), without delay.

Basking shark is protected under Article 6 of EC No 43/2009 whereby it is prohibited for Community vessels to fish for, to retain on board, to tranship and to land this species. No evidence exists that Danish vessels are in breach of this regulation.

EC No 23/2010 imposes a zero TAC for spurdog with permitted retained by-catches up to 10 % of the 2009 quotas established in Annex Ia to Regulation (EC) No 43/2009 under the following conditions:

» a maximum landing size of 100 cm (total length) is respected, and

» the bycatches comprise less than 10 % of the total weight of marine organisms on board the fishing vessel.

No evidence of set net interactions or retention to this level has been recorded, retention of 0.5% of 2009 Denmark quota was landed in 2009 by the saithe set net fishery.

The use of pingers in the autumn cod fishery is noted but what proportion of the fishery this affects is not known. Greater detail would help provide further justification for this score.

FCI: As per EC 812/ 2004 acoustic deterrents must be used in ICES IV and IIIa for the following fisheries:

(c) Any bottom-set gillnet or entangling net, or combination of these nets, the total length of which does not exceed 400m during the period 1 August to 31st October and
(d) Any bottom-set gillnet or entangling net with mesh sizes ≥ 220m throughout the year.

ICES reports that "Bycatch of harbour porpoises remains a problem in gillnet fisheries in the North Sea." (WGECO 2008)

"ASCOBANS Working Group on harbour porpoises advises that the maximum annual by-catch, assuming no uncertainty in any parameter, is 1.7% of the population size in that year. If uncertainty is considered, such as measurement error in estimating population size, maximum annual by-catch must be less than 1.7% (ASCOBANS, 2000)."

Given the figures presented and the uncertainty as to what would constitute national and international limits I would suggest that it is not possible to say with any degree of certainty that this fishery is operating within the bounds of acceptability. The numbers within the population and the degree of exposure by the Danish nets is confounded by apparent changes in the distribution of these animals. Actual numbers of individuals captured against current population levels would be needed to give the necessary level of certainty that limits are being met. I think the assessment needs to err on the precautionary side given the large numbers of animals involved, the declining status of the harbour porpoise and the current level of protection. Figures for the Skagerrak seem even more uncertain, therefore it might be difficult to conclude from the evidence given that SG 60 in 2.3.1 is met.

FCI: Vinther and Larsen (2004) suggest mean annual bycatch of Harbour porpoise may have been in the region of 5,500 animals per annum in Danish North Sea setnet fisheries between 1987 and 2001. It is estimated that the plaice fishery (one of the primary target species in the Danish set net fishery) accounted for an estimated average incidental capture of 820 Harbour porpoise during this period.

ASCOBANS Working Group on harbour porpoises advises that the maximum annual by-catch, assuming no uncertainty in any parameter, is 1.7% of the population size in that year. If uncertainty is considered, such as measurement error in estimating population size, maximum annual by-catch must be less than 1.7% (ASCOBANS, 2000).

Based on a population size of 231,000, incidental capture of Harbour porpoise (820) would result in a removal of 0.35% of the population.

It is therefore considered that this element meets SG60 issues. However, the overall score has been lowered from 75 to 65 to reflect the importance of Harbour porpoise in this performance indicator.

e) 2.3.2 The assessment awards the fishery a score of 60 in this category. The evidence presented in table 5 shows a good degree of compliance with the requirement to not land common skate. It does not necessarily show that the measures are working in relation to the skate population. There is some evidence that if carefully and quickly replaced, the recovery of some species of captured skates and rays can be quite positive. However, in an actual fishing operation I wonder how practicable this level of care really is, given the time it takes, and how many released animals actually survive. It seems that more of a discussion on this point is needed before a score of 60 can be given. The use of CCTV may help in this regard.

FCI: Addition to Conditions for DT1 and DS1 to ensure level of live release is recorded and procedures to release skate are established and implemented.

Habitats

7a)The assessment concludes that "Given the depth of the saithe demersal trawl fishery it is unlikely to cause serious harm to the sea pens and burrowing mega fauna communities in the area." It is known that these communities occupy a wide range of depths and are located in the areas open to demersal trawling so exposure is possible. Their vulnerability is defined largely by the stability of the deep mud that they normally occupy which could be affected by trawling. After perturbation by trawling it is likely that they would be overtaken by more common species that can withstand high levels of disturbance.

"It is known that demersal trawling has a significant initial effect on muddy-sand and mud habitats, but on the latter these effects have been shown to be short-lived with an apparent long-term, positive, post-trawl, disturbance response (Kaiser et al, 2006). This positive response may represent an increase in the abundance of smaller-bodied fauna, but a possible overall decrease in biomass (Jennings et al. 2001 Duplisea et al. 2002)." This could be taken to mean that, larger (older) animals, often bivalves, are lost, mainly because they are unable to rebury themselves after being brought to the surface. Animals with a delicate structure such as sea pens would also be vulnerable to physical disturbance.

FCI: Acknowledged.

b) "There are a number of measures in place that manage the potential impact of demersal trawling on habitats, including: • TACs and quotas • Days at Sea restrictions"

These measures apply to the management of fish stocks not sensitive habitats and therefore should not be considered here.

FCI: These measures are not specifically designed to manage the habitats component. However they do relate to effort management and the level of effort (and therefore interaction with habitat) throughout the year. This is an example of indirect management and as per FAM 7.1.21 constitutes a measure.

There appears to be no specific management strategy in place to reduce impacts on sensitive habitats and no monitoring to demonstrate that levels of damage are acceptable. The presentation of VMS data on the distribution of fishing effort is beneficial in determining potential levels of impact and should be augmented by regular habitat sampling and monitoring. Once management measures are in place for the Natura qualifying species of interest, habitat monitoring will become more widespread. The fisheries should ensure that they take account of any new information arising from this work.

FCI: A management strategy specifically for the habitat component is required at SG100; a partial strategy is required at SG80. Differentiation between strategy and partial strategy is relevant throughout P2 and definitions are provided in FAM 7.1.22 and 7.1.23.

Ensuring new data from Natura 2000 site monitoring is considered in the development of a cohesive habitat strategy has been added to the condition DT2.

c) 2.4.2, the measures described are not designed to protect habitats and therefore I do not think it correct to say that a partial strategy is in place to protect vulnerable habitats. Measures that reduce the risk of new areas being trawled i.e. areas that have not been disturbed by trawling before, would be helpful but it's difficult to see how this could be achieved under the current regime. Forthcoming provisions within the Natura legislation may help but are likely to be confined to specific areas i.e. designated sites. It's unlikely that all un-trawled areas would be designated, only a representative selection.

FCI: Forthcoming provisions within the Natura legislation will be specific to areas designated due to the presence of vulnerable or sensitive species and therefore appropriate to protection of these vulnerable species.

d) 2.5.1 "the fishery does not cause serious or irreversible harm to the key elements underlying ecosystem and function and there is some level of evidence to support this."

The report only describes the ecosystem impacts of removing volumes of saithe but does not consider the removal of retained species. Nor does it describe the habitat changes which are known to have occurred in heavily trawled areas i.e. the changing composition of benthic habitats and shifts in abundance to species of lower trophic levels. I do not agree that ecosystem effects are unlikely to have occurred, there is some evidence to the contrary. "In the northern North Sea the impact of

otter trawling is less severe […than in other areas], with an estimate of the benthic invertebrate annual mortality due to fishing representing approximately 25% of the standing-crop biomass (Greenstreet *et al*., in press). ICES Advice book 6 2008.

The combined future effects of climate change and fisheries and the resilience of ecosystems affected by fishing, to respond to changes induced by climate change, is not mentioned.

FCI: Given the proportion of retained species in relation to Danish quotas and TACs for the North Sea and Skagerrak, the level of removal of retained species by each fishery (trawl, seine and set nets) is highly unlikely to disrupt the key elements underlying ecosystem structure and function.

8) "No detrimental subsides, which contribute to unsustainable fishing practices have been identified for this fishery."

I have investigated Cappell, R., T. Huntington and G. Macfadyen (2010). 'FIFG 2000-2006 Shadow Evaluation'. Report to the Pew Environment Group, and found that for Denmark "more was spent on scrapping vessels using mobile gear than on constructing or modernising mobile gear vessels." However some funds may have been redirected towards the set gill net fishery which received the greatest proportion of FIFG funds for new builds (across the whole EU).

FCI: Irrespective of what may have been subsidized in the past (FIFG schemes) the guidelines for the Danish EFF programme 2007-2013 specifies that where "support to modernization of fishing vessels and selectivity" is concerned it is conditional that "the project

» reduces the impact of the fishery on non-commercial species, the ecosystem and the seabed

» contributes to reduction of discards

On this background I see no reason to change neither the scoring nor the justification provided.

9 a) the PRDR reports that "The no. of infringements was reduced by 21% from 2007 to 2008. This is a continuation of the development observed from 2006 to 2007. Although there remain some infringements in the Danish fishery, across the entire national fleet infringements do appear to be less of a problem than in other EU fleets (3% of Danish vessels in 2006 as opposed to anything up to 37% of vessels in other EU member states), with offences mostly relating to logbook infringements." Although these appear to be minor infringements it could be argued that as a percentage for certified fisheries, it is rather high. It might be helpful in this regard for targets for 'infringement reduction' to be set by the PO.

FCI: It was determined during the assessment that there is no evidence of systematic non-compliance and all other issues at SG 80 were met. Therefore no condition was raised for this PI. However as noticed above, the position of the PO should always be 0 infringements.

b) Under 3.2.3 Compliance and enforcement, the PRDR reports "Although the system appears robust and effective, as detailed above, this **stops short of being** *high confidence* for a number of reasons – the relatively low observer / inspections coverage, the focus of inspections (both at sea and on landing) on cod (as opposed to other species), unclear how the Danish high grading ban is enforced at sea. For example it is notable that the landings size / weight profile of vessels taking part in the Danish pilot study using video cameras onboard suggests that high grading is likely to still occur elsewhere in the fleet. Furthermore it is recognised that there is still a low level of discard sampling. However, it is recognised that the Danish Ministry is actively pushing for a solution in this areas and the DFPO Code of Conduct instruct members holding MSC certificates to avoid high grading and report systematically on observations of importance to the effective management of the fishery.

These issues need to be addressed for those vessels seeking certification. The PO should ensure that these gaps in enforcement are closed for vessels seeking certification, their measures for doing so

should be evaluated and reported. These gaps should be considered as part of the effective management of the fishery.

FCI: The statement "high degree of confidence" comes from the SG 100. By contrast the SG 80 requires "some evidence". The fishery clearly complies with SG 80. The system has a demonstrated ability to enforce relevant management measures. At national level, the overall inspection strategy is, quite appropriately, based on risk. High risk fisheries (for example some high value pelagic fisheries where high grading makes theoretical economic sense) require a more comprehensive system – ie. 100% inspections of landings, increased inspections at sea, which in turn gives a high degree of confidence (aided also by small fleet size – making inspection easier). This level of inspection is neither appropriate, achievable nor necessary in many other fisheries. The control system for saithe complies with the EU and FOA standard and is therefore deemed appropriate for the fishery. Furthermore, there is no evidence of systematic non-compliance. It is right for assessors to point out why the system does not meet the 100 scoring guideposts, but this does not necessarily require a recommendation.

10) 3.2.4 "Research direction is steered by the money available."

Without duplicating work carried out by national administrations, ICES, OSPAR etc., the PO should develop and implement a research plan particularly for ETP species, to reduce uncertainties and demonstrate the effectiveness of management measures.

FCI: The Code of Conduct implementation strategy meets what can reasonably be asked for from DFPO in terms of ETP species research (provision of primary data).

Appendix 5 – Certificate Sharing Mechanism

Danish Fishermen's PO

Taulov, August 27th, 2009

Certificate-sharing for Danish saithe fisheries

With respect to the proposed MSC certification of the Danish saithe fisheries, we can confirm that all Danish registered and licensed fishing vessels operating in these fisheries will be eligible to be covered by the MSC fisheries certificates awarded.

This commitment is subject to:

A: Either:

- Membership of the Danish Fishermen's PO (DFPO); or
- Membership of a recognised PO which has entered a sharing agreement with the DFPO on the basis of an equitable sharing of all costs incurred by the DFPO before, during and after certification.

B: Compliance with all additional terms imposed by DFPO upon the eligible vessels in relation to the MSC certification.

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Appendix 6 – Stakeholder Comments on Public Comment Draft Report

All FCI comments are provided in red text below. Below we detail responses to the stakeholder submissions

MSC

No.	Type of Finding	Scheme Requirement	Requirement Description	Report Reference	Description and evidence of non-conformity
1	Major	FCM v.6 – Appendix 1: 5.2	Describe known risk factors prior to or after the point of first landing.	N/A	No statement is provided abo ut the traceability provisions on board Kingfisher, which pr oduces saithe fillets.
	FCI Response: There are several statements within section 9 which directly address the assessment of risk factors involved in this fishery, including the following: *'(…traceability can be verified by:…) **A high level of inspection of landings prior to unloading**. Officially calibrated weighing systems of landing. Routine inspection of **entire factory process**.'* This, coupled with specific reference made to Kingfisher's onboard filleting capacity, demonstrates that the team have carefully considered all possible risk factors and concluded that *'…fish products invoiced as such by the fishery originate from within the evaluated fishery and **no specific risk factors have been identified**.'* and that *'Traceability up to the point of first sale 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**.'* So the team have clearly examined the facilities mentioned and concluded that they do not warrant any special consideration outwith that taken for the fishery as a whole.				
2	Major	PA 3	PCDR shall contain all of the conten ts defined in Appendix 1 of the FCM which states the summary shall des cribe the recommendation reached with supporting rationale.	N/A	Recommendation and rationa le missing from summary.
	FCI Response: Paragraph 7 of the Summary is the recommendation for this fishery and the paragraphs that follow constitute a thorough breakdown of the rationale for reaching this conclusion. Headings have been added to the summary for additional clarity.				
3	Major	PA 3	PCDR shall contain all of the conten ts defined in Appendix 1 of the FCM , which states that the names of pe er reviewers should be given in the background of the report.	N/A	Names of peer reviewers not provided in report.
	FCI Response: Now included in the summary to the report				
4	Major	TAB D-029 para 9	PCDR shall include all written submi ssions from stakeholders and a deta iled summary of verbal submissions along with explicit responses from the assessment team to these sub missions.	pp 67-68	Stakeholder comments not pr ovided in report. As stated, t his information shall be inclu ded in a separate section or a ppendix to the PCDR. Also, th ere appears to be some discr epancy in the PCDR's sections 6.3.2 and 6.3.3 regarding wh at types of stakeholder submi ssions were received.

	FCI Response: TAB 29 clearly states that only the following stakeholder comments must be included in the PCDR: *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 FAM and use of the RBF* - none were 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 assessment regarding the specific assessment (Issues material to the outcome of the assessment include 1) information that could influence a PI score such that if falls below 60, 2) information that could influence a PI score such that if falls below 80, and 3) information that could influence PI scores within any Principle such that the aggregate score at the Principle level falls below 80).* - none were received *c. Explicit responses from the assessment team to submissions described in a. and b. above* - not applicable Therefore no Appendix was required and a statement to this effect is included in the body of the report: *'All relevant stakeholders were able to attend meetings during the site visit or at other scheduled times. A record of the meeting is held in file by the certification body. No stakeholders chose to make written submissions instead of attending a meeting with the assessment team. The assessment team was therefore able to get a full understanding of the range of stakeholder views and draw upon relevant expertise or additional sources of material. The scope of views and the identified sources have, where relevant, been used in the scoring of the fishery and are referenced accordingly in the assessment tree. There are therefore no additional written submissions from stakeholders, nor issues of concern, over and above normal scoring practice, which require additional mention over and above normal reporting.'* Regarding sections 6.3.2 and 6.3.3 – 6.3.3 has been re-worded to avoid any confusion in interpretation of this section.				
5	Major	FCMv6 section 3.4.2	"Where the fishery achieves a score of less than 80, but of at least 60 for any individual Performance Indicator, the certification body shall set one or more conditions for continuing certification."	pp 74-77	Conditions DT1 and DS1 given for 2.3.3 even though score for this PI was 80.
	FCI Response: 2.3.3 should not have been included in this condition and has been removed				
6	Major	FCMv6 section 3.4.8	As outlined in PA 17, "evidence must be provided that the CB has consulted all relevant entities when setting conditions, if those conditions require action or funding from these entities in order to achieve the condition (FCM 3.4.8)."	pp 80-82	There is no mention of consultation on the conditions. Also, PA 17 provides examples to illustrate how conformance to this requirement can be achieved.
	FCI Response: Section 10 of the report fully details the consultation on the conditions, including an explicit statement to the effect that the relevant entities (in this case, solely the client) have been consulted in that they have agreed to and signed the Client Action Plan.				
7	Major	FCMv6 section 3.4.5	"The certification body shall specify conditions that closely follow the narrative or metric form of the performance indicators and scoring guideposts used in the assessment tree …"	pp 80-82	The conditions are not framed to follow the narrative or metric form of the Pis and SGs from the assessment tree. Again, PA 17 provides examples to illustrate how conformance to this requirement can be achieved.
	FCI Response: To more closely follow the metric and narrative of the scoring tables, we have added the text of PIs used and given the corresponding score for each.				
8	Guidance	PA 3	PCDR shall contain all of the contents defined in Appendix 1 of the FCM	N/A	Summary does not include an explanation of the events tha

			, which states the summary shall in clude a brief explanation of the eve nts that occurred and describe who the assessors were.		t occurred or the names of th e assessment team members.
	FCI Response: FCI would argue that the Summary **is** the 'brief explanation of the events that occurred'. A decription of the team members has been added to the summary to the report.				
9	Guidance	TAB D-015 v2: 2.4	Where a fishery assessment overla ps with a certified fishery, "the asse ssment team shall base their assess ment on the rationale and scores d etailed for the previously scored fis hery. Any difference in the scores s hall be clearly detailed and justified in the scoring rationale for all relev ant performance indicators."	p 69	Stating that harmonisation " was not required by the asses sment findings" is unclear. Is this to say that harmonisation was not necessary because t he team found the scores and conditions of other fisheries to be similar to their findings for this fishery, or does it mea n that the team did not parta ke in the harmonisation proc ess? If the former, the state ment should be clarified. If t he latter, harmonisation is re quired (D-15 2.4).
	FCI Response: A more thorough statement will be added to the effect that harmonisation meetings were not necessary because the findings were similar in nature				
10	Guidance			p 72	Replace "x" in Table 7.1 title with appropriate description.
	FCI Response: This has been replaced				
11	Guidance	FAMv2 section 4.2.7	The assessment team must use its j udgment in coming up with a final s core, but it shall do so logically and be able to fully document and expla in its reasoning.	p 104	1.2.2: At the end of the score summary, the PCDR says "a sc ore of 85 was awarded due to the repeated guidepost." Thi s appears to be an error beca use there isn't a repeated gui depost for the PI.
	FCI Response: This was an editing error – the sentence about the repeated guidepost has now been removed				

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Scotland, IV3 8GY

December 11 2010

Public comment draft report for the Danish North Sea saithe fishery

Dear Melissa McFadden

The World Wide Fund for Nature (WWF) is working for fisheries to become more sustainable, and is therefore highly interested in the Marine Stewardship Council (MSC) certification of the Danish Saithe fishery. It is important for WWF that the principles, criteria and indicators, as defined by MSC, are applied strictly. This is crucial not only in stimulating fisheries to become truly sustainable, but also for the credibility of the MSC certificate.

We have read the draft assessment report for the certification of the Danish saithe fishery and are impressed with the work so far, but feel that the principles, criteria and indicators were not always applied strictly.

We would particularly highlight our concern, that since the assessment involves a trawl fishery in protected areas and sensitive benthic habitats, a meticulous analysis is essential and all relevant information (and non-information) must be taken into account. We would also like to request more data on catch composistion, by-catch and discards.

Please find our detailed comments below. We sincerely hope that you will take our input into consideration, and that you will provide an answer to our concerns.

Kind regards,

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Programme Officer

WWF Denmark

Principle 1: Stock status and harvest control rules

The performance indicators under Principle 1 have generally scored high, scoring 80 or above since the stock is considered to be in a good condition. However, attention must be paid to the fact that assessment for the saithe stock has not been carried out for 2010, due to insufficient data. The advice is therefore based on the 2009 assessment. As ICES (2010a) states:

"An update assessment could not be run in 2010 due to missing and incomplete indices for 2009. The assessment of the 2009 working group meeting has been used as a basis for the forecast run that has been extended to 4 years. SSB is estimated to have been above Bpa from 2001-2008."

"Abundance indices for two of the fleets previously used in the assessment were not available for 2009. The French cpue data were not available in time for the working group, and the Norwegian acoustic survey was not conducted in 2009. In addition, doubts were raised about the reliability of the IBTS Q3 time series for this stock due to lack of Norwegian data in 2009. Therefore, only a trial update assessment was made and the projections are based on last year s assessment. With no update assessment, the uncertainty in the projections has increased. Prerequisite to an assessment for this stock in future is the continuation of national data collection for the relevant surveys, with full area coverage."

The fact that no reliable assessment currently can be carried out for this stock, presents a problem in terms of assessing the sustainability of a fishery with a high dregree of uncertainty. The assessment of the stock (particularly relevant for performance indicator 1.2.4) is already influenced by some uncertainties, namely the lack of information on year-class strength for ages 1-3, and the necessity of using commercial CPUE as abundance index as the survey series only contain usable information for ages 3-6. These uncertainties are increased as there is no clear stock assessment.

WWF finds it crucial that a reliable assessment can be performed in 2011. The certification should furthermore take into consideration the resulting increased uncertainties (e.g. recruitment) within the assessment.

For the different performance indicators, WWF would like to conclude and recommend the following:

Conclusion and recommendations on scoring for 1.1.1. Due to the lack of a stock assessment in 2010, there is not sufficient evidence to determine with a high degree of certainty that the stock is above the point where recruitment would be impaired. However, there is a historically good status for the stock and fishery within the TAC, and there is a high degree of certainty that the stock has been fluctuating around/has been above its target reference point over recent years.

Conclusion and recommendations on scoring for 1.2.1. The indicator can not attain a score of 95. The harvest strategy is dependent on annual information (e.g. fishing mortality and SSB) by the stock assessment, which could not be carried out for 2010 due to insufficient data, and the outlook for 2011 in regards of making a new stock assessment is unknown.

Conclusion and recommendations on scoring for 1.2.4. No stock assessment could be carried out for 2010. There are further uncertainties about recruitment indices for this stock.

Suggested Actions:

» Collaboration and communication with scientists and managers to ensure a stock assessment can be carried out for 2011

» In terms of the uncertainties for recruitment indices, the impacts of these uncertainties on the assessment should be examined, and alternative assumptions and model structures should be explored. It is acknowledged that this may require extensive resource allocation.

Alternatively (and acknowledging the potential technical and resource difficulties in resolving the above issues) annual TAC setting should explicitly incorporate an appropriate degree of precaution.

FCI: Information used during the MSC full assessment to assess the saithe stock status was based on ICES 2009 advice. However ICES 2010 advice should be taken into account if there are any relevant changes in the score of any Performance Indicatoras a result of new information. As pointed out by WWF Denmark an updated assessment could not be run in 2010 due to missing and incomplete abundance indices for 2009.

In particular, as ICES (2010) states" the French demersal trawl CPUE data was not provided for its use in the assessment of the stock. Also, the IBTS Q3 was provided, but Norway did not participate in the cruise in 2009, normally this party covers large part of the distribution area of the larger saithe. It was not possible to adapt the remaining cruise plans to fully cover up for the missing Norwegian stations".

The assessment team consider that a condition needs to be placed due to the incomplete abundance indices and the impossibility of updating the assessment of the stock in 2010. PI 1.2.3 (Informaiton/monitoring) issue 2/SG 80 is not met:"...Abundance indices are NOT available and monitored with sufficient frequency to support the harvest control rule.". (see Condition for PI 1.2.3). The condition requires the DFPO to work with relevant stakeholders to ensure that abundance indices are available and monitored with sufficient frequency to support the harvest control rule.

Regarding the conclusion and recommendation on PI 1.1.1 the assessment team belive that there is a high degree of certainty that the stock is above the point at which there is risk of recruitment failure. This is based on the SSB level in relation to Bpa. SSB is projected to be above Bpa for 2011 and 2012.

Regarding the conclusions and recommendations on PI 1.2.1 the assessment team considers a score of 95 as appropioate as most of Issues at SG 100 are met. The fishery has been penalized in PI 1.2.3 due to the insufficient data. However if the assessment of the stock is not updated in 2011 the harvest strategy score would fall below 80 as issue 1/SG 80 would not be met: "*.. the elements of the harvest strategy are working together*". Any needed updates in the score will be assessed during the first surveillance audit.

Regarding the conclusions and recommendations on PI 1.2.4 the assessment team considers that a score of 85 is appropriate. The assessment methodology is appropriate to assess the stock status, takes uncertainty into account and is subject to peer review. The assessment team understand that the problem resides in the quality of the data ruther than the methodology used to assess the stock, therefore in acknowledgement of the concern highlighted by WWF a condition has been introduced for PI 1.2.3.

Principle 2: Ecosystem Impacts

2.1 Retained species

Conclusion 2.1.1: North Sea cod was considered to meet SG 80, because while the stock is outside biologically based limits, there is a management strategy in place. However, it is too early to tell if this has actually been effective. Should the advice from ICES change, the UoC must review their practices accordingly. Data on actual catch composition and not only landings should also be provided (see further below)

FCI: A recommendation has been added for retained species as follows: It is recognised that it is too early to evaluate whether the management plan in place for cod has been and/or continues to be

effective. It is therefore recommended that future surveillance audits review ICES advice for cod carefully and ensure the fishery continues to operate within TAC and quotas for this species and where necessary reviews practices accordingly.

2.2 Bycatch and discards

Conclusion and recommendations on scoring for 2.2.1 & 2.2.3:

The data presented for performance indicators 2.2.1 & 2.2.3 are not sufficient to attain the scores of 80 or 85. The draft assessment report gives no qualitative or quantitative information on catch composition of the UoC, which will fully enable the impact on the cod and other stocks The data presented (p. 35-42) is based on sampling of the Danish fleet (trawl, Danish seine and set net) and not the UoC specifically. These data are needed to assess the nature and extent of by-catch and discards of the UoC, and its potential impact on other stocks.

FCI: In order to meet SG80 it is required that qualitative information and some quantitative information is available on the amount of main bycatch species. Discard data has been provided for the entire Danish demersal trawl fleet operating in the North Sea and Skagerrak. These data were incorrectly interpreted from data provided by DTU Aqua and the Final Report has been edited to present updated, accurate tables. These data are based on actual observer trip discard percentages which are averaged over a running 4 year period and then multiplied with the total landings of all species for the demersal trawl fleet for the full year.

Discard data specific to the saithe fishery has not been available to the assessment team. While this would be beneficial to the assessment, it is considered that a good understanding has been achievable through the discard data already provided for the entire demersal trawl fleet. A recommendation has, however, been added to the report in relation to this, as detailed below.

A representative list of the average catch composition, (including bycatch and discard numbers) should be provided over the course of at least one fishing season, which could be attained through a sampling programme of the UoC. The UoC is furthermore encouraged to participate in the Danish trials on the fully documented fishery, as these have proved efficient in documenting catches and reducing bycatch and discards.

Some of the vessels currently participating in the Fully Documented Fishery are included in the UoC. Of note one Danish demersal trawl vessel that is responsible for 10% of Danish saithe landings has been and continues to be part of this scheme. At the time of assessment data specific to the landings under the Fully Documented Fishery scheme were not available; the reporting was specific to how successful the CCTV system was for documenting catches (rather than the catch composition). A recommendation has been added to the report as follows: The work undertaken by the Danish industry to trial and implement catch quotas through the Fully Documented Fishery scheme is commendable. However no data has been made available from these trials, other than reporting related to successful use of CCTV systems. It is therefore recommended that catch composition data is collated where possible from vessels within the UoC that are part of the Fully Documented Fishery scheme and that these data be presented at future surveillance audits.

2.4. Habitats

Conclusions 2.4.1 Trawl:

Considering that habitat mapping is not complete, (and since spatial patterns of the entire UoC is still not known to a satisfactory degree) we would like to emphasize that there is not sufficient data to conclude that “the fishery is unlikely to reduce habitat structure to a point where there would be serious or irreversible harm” as it stated in the scoring for 2.4.1 for Trawl. The fishery may not qualify for a score of 60.

Special attention should be paid to findings of deep sea sponge and soft coral communities in the Skagerrak area, in spatial conflict with the saithe fishery. Trawling can cause serious or irreversible harm to such communities.

Special attention should be paid to the effects of fishery on Natura2000 sand banks, such as Skagen, and other habitat types. A score of 60 or more can **only** be justified if the fishery has taken measures in line with the N2000 objectives. This would probably imply a stop of bottom trawling activity in these areas.

FCI: The form of evidence required to assess whether a SG60 "unlikely" can be achevied includes "plausible argument, across a range of viewpoints and hypotheses. Based on analogy from similar situations with limited direct observations from the fishery (e.g. qualitative or general observations). Substantially relies on qualitative assessment and expert judgement." The evidence available to the team is considered sufficient to allow scoring at SG60 level. The incomplete habitat mapping has been recognised within the condition. Further text has been added to strengthen the condition in relation to sensitive habitats in Skagerrak and to ensure due regard to Natura 2000 sites, while plans for management of activities within these sites are being drafted.

Conclusions 2.4.1 Danish Seine.

For fishery with Danish seine the habitat impact is less than gear such as trawl, but the act of hauling the drag lines and net can have significant impacts if sensitive habitats are present. Since habitat mapping is still incomplete, it remains inconclusive whether there will be spatial conflict with sensitive habitat. The fishery may not qualify for a score of 80.

FCI: As correctly stated the impact of this gear is less than demersal trawling, what is also important is the scale of this fishery in relation to the UoC. Danish seine lands approximately 0.4% of saithe under assessment; moreover of total Danish seine landings saithe makes up ~0.43% by volume (compared to plaice 64%). The level of risk posed by this UoC is therefore appropriate to consider in this assessment. All available evidence (including landings statistics and VMS data) show no significant effort across sensitive habitats, for this UoC. A score of 80 is considered justified.

Conclusions 2.4.3

This indicator has scored 80 for all gear types. However, habitat mapping is still incomplete and some of the existing knowledge, for example the knowledge and references presented above about mapping of the Skagerrak area, e.g. Sköld et al 2007, has not been sufficiently included in the report. Also, spatial patterns of the entire UoC is not completely known. Therefore the information PI should not score 80, and a score of 60 is suggested.

FCI: The level of information is considered adequate to determine the risk poses to Habitat Outcome Status and Management PIs. The condition set for these performance indicators will undoubtedly act to improve the score of 2.4.3. However, given the knowledge of habitat distribution throughout the North Sea and Skagerrak, including sensitive areas where data is sufficient to determine location of Natura sites and WWF proposed MPAs, together with the detailed (fishery specific) VMS data, it is considered that all of the SG80 issues are met and a score of 80 is justified.

Conclusions on Condition 2

A spatial plan for the fishery that includes avoidance and area closures of sensitive habitat types must be developed at the first audit. Based on data on the spatial patterns of the whole UoC, and data on habitat distribution provided through projects like EUSeaMap and other sources, a spatial plan must be developed.

Fishermen are encouraged to participate in the collecting information about benthos and benthic features.

There should be special attention to management measures within Natura2000 sites to protect and maintain the biodiversity of these sites. Member states are currently drafting plans for management of activities within these sites, although they will not be implemented until 2015. A fishery certified under MSC should take particular precaution in relation to protected areas under the spatial plan.

The impact of bottom trawling on benthic habitats is well documented and varies depending on habitat structure and biotype. Some projects under ICES (e.g. EMPAS and the working group report by WG ECO in 2007) investigated the effects of various types of fishing gear on benthic habitats, and WWF encourages the use of such findings and recommendations.

FCI: the Habitat condition has been strengthened on this basis and as outlined in text above.