Marine Stewardship Council (MSC) Expedited Assessment Public Certification Report

SFSAG North Sea haddock

On behalf of

Scottish Fisheries Sustainable Accreditation Group (SFSAG)

Prepared by

ME Certification Ltd

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Contents

Glossary

Term / acronym	Definition
CFP	Common Fisheries Policy
CR 1.3	Certification Requirements v1.3 (MSC Scheme Document)
CRP	Cod Recovery Plan
CV	Coefficient of Variation
DCF	Data Collection Framework
DEFRA	Department for Environment, Food & Rural Affairs
DFPO	Danish Fisheries Producer Organisation
EMFF	European Maritime and Fisheries Fund
ETP	Endangered, Threatened and Protected (species)
F	Fishing mortality
FAM	Fishery Assessment Methodology
FCR	Fishery Certification Requirements (MSC Scheme Document)
FISA	Fishing Industry Science Alliance
FMAC	Fisheries Management and Conservation Group
FU	Functional Unit (Nephrops)
HCR	Harvest Control Rule(s)
IBTS	International Beam Trawl Survey
ICES	The International Council for the Exploration of the Sea
LTMP	Long-Term Management Plan
MCRS	Minimum Conservation Reference Sizes
MCS	Monitoring Control and Surveillance
MCZ	Marine Conservation Zones
MEC	ME Certification Ltd
MLS	Minimum Landing Size
MS	Member State(s) (EU)
MSE	Management Strategy Evaluation
MSFD	Marine Strategy Framework Directive
MSS	Marine Scotland Science

Term / acronym	Definition
MSY	Maximum Sustainable Yield
NCMPAs	Nature Conservation Marine Protected Areas
NEAFC	North East Atlantic Fisheries Commission
NSAC	North Sea Advisory Council
NWWAC	North Western Waters Advisory Council
OSPAR	Oslo-Paris Convention
OTT	Twin bottom otter trawls
PA	Precautionary approach
PCDR	Public Comment Draft Report
PCR	Public Certification Report
PETS	Protected, Endangered and Threatened (species)
PI	Performance Indicator
PR	Peer Reviewer
PTB	Bottom pair trawls
RBF	Risk Based Framework
RP	Reference Point
SAC	Special Area of Conservation
SCC	Scottish seines
SSC	Scottish seines
SSN	Danish seine
SAM	State-space Assessment Model
SCCS	Scottish Conservation Credits Scheme
SFF	Scottish Fishermen's Federation
SFPA	Scottish Fisheries Protection Agency
SFSAG	Scottish Fisheries Sustainable Accreditation Group
SI	Scoring Issue
SIDI	Scottish Industry Discard Initiative
SMS	Stochastic Multispecies Model
SPA	Special Protected Area
SSB	Spawning Stock Biomass
SSIs	Scottish Statutory Instruments

Term / acronym	Definition
STEFC	Scientific, Technical and Economic Committee for Fisheries
TAC	Total Allowable Catch
TR1	Mesh size with >= 100 mm cod end mesh
TR2	Mesh size with 70 mm – 99 mm cod end mesh
TSA	Time Series Analysis
UNCLOS	UN Convention on the Law of the Sea
UNFSA	UN Fish Stock Agreement
UoA	Unit of Assessment
VME	Vulnerable Marine Environment
VMS	Vessel Monitoring System
WGNSSK	ICES Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak
WSSD	World Summit for Sustainable Development
XSA	eXtended Survivor Analysis

Executive Summary

This is the Public Certification Report for the expedited assessment of the SFSAG North Sea haddock fishery. The assessment team consisted of Dr Hugh Jones (Team Leader), Dr Robin Cook (Principle 1), Dr Jo Gascoigne (Principle 2) and Dr Geir Hønneland (Principle 3). The site visit for the assessment took place in Aberdeen, Scotland from the 28th February to 2nd March 2017.

The fishery is carried out by vessels covered by membership of the Scottish Fisheries Sustainability Assessment Group (SFSAG) which consists of all the Scottish Producer Organisations, as well as several fishermen associations. The members represent the majority of the Scottish demersal industry operating in the mixed demersal fisheries of the North Sea and West of Scotland. SFSAG membership comprises 232 vessels and represents a mixed fleet, using various gear types to target a range of demersal species. This expedited assessment of the North Sea haddock fishery expands the target species array to include haddock, saithe, plaice, hake and whiting in five separate UoAs and a range extension that include ICES divisions 4, 6a, 3a and 2a (EU waters) depending on species.

For Principle 1: **UoA 1 – haddock** - The current SSB has a probability of 99 % of exceeding biomass reference point limits. Management of haddock seeks to maintain the stock above appropriate biomass trigger points and the stock typically has fluctuated above this level. However, periodically it has fallen below limit reference points through a combination of high fishing mortality and large recruitment variability. New biomass limits and precautionary reference points have been estimated in 2016 based on a precautionary approach for a new combined area. **UoA 2 – saithe** - The current SSB is well above the biomass limit reference point, and although there is no specific target SSB the EU-Norway management plan sets a floor of 200,000 t. Since 1996 the stock has been above this value for 14 out of 22 years. The EU-Norway plan has more conservative limit reference points than the ICES generic HCR. There are no conditions associated with Principle 1 in this UoA. **UoA 3 – plaice** - SSB increased significantly in 2016 and is substantially above SSBs that produced average recruitment. The biomass has been above biomass trigger points since 2011. Current F is slightly below F_{MSY} and would be expected to maintain the stock above biomass trigger points. Managers have moved towards the new MSY HCR that scales F in response to biomass if it falls below $MSYB_{trigger}$. However, while it is expected that a well-defined HCR will be in place, this currently does not exist. Therefore, one condition is raised in Principle 1 in this UoA. **UoA 4 – hake** - SSB has increased significantly in 2017 and has a near 100 % probability of being above the point of recruitment impairment. There is no agreed harvest strategy, but an effective recovery plan has been in operation since 2004. Implementation of the linear reduction in F when biomass falls below biomass trigger points has not been formally adopted by managers and therefore one condition raised in Principle 1 against the harvest control rules in this UoA. **UoA 5 – whiting** - There is a 93 % probability that the biomass is above biomass limit reference points, but the short time period of data analysed limits certainty. ICES advise that further management strategies should be evaluated in view of the uncertainties surrounding the assessment. The current EU-Norway management plan does not reduce fishing mortality when biomass falls below limit reference points. As a result, there are two conditions raised in Principle 1 against the harvest strategy and harvest control rules in this UoA.

For Principle 2, landings data for Scottish vessels, as well as discards and landing estimates for Scottish vessels were analysed by gear type within region (North Sea and West Coast Scotland). This indicated seven main bycatch fish stocks (W. Scotland whiting, N. Sea cod, W. Scotland cod, anglerfish, ling, witch and megrim) and seven *Nephrops* functional units. Two main bycatch stocks are depleted (W. Scotland whiting and W. Scotland cod) with management focused at the Scottish national and EU levels. Two conditions were raised against W. Scotland cod because of stock status and lack of certainty on mortality.

The fishery was found to interact with 14 ETP species of which common skate complex and starry ray had conditions raised against them. Elasmobranchs, classed by Council Regulation (EU) 2017/127 of 20 January 2017 as either forbidden to land or zero-TAC were considered under ETP Species. Vulnerable Marine Ecosystems identified based on survey work were used to identify special areas of conservation under the EU habitats directive, in combination with the occurrence of low or limited mobility species. VMEs potentially overlapping with this fishery were identified as burrowed mud with sea pens / anemones, Inshore deep mud with burrowing heart urchins, Horse mussel beds *Modiolus modiolus*, and Ocean quahog aggregations *Arctica islandica*. A condition was raised against the fishery and its ability to show its impact on tall seapen *Funiculina quadrangularis* communities.

The fishery takes place in EU waters and Norwegian waters and is managed at three levels: the international, EU and national levels, all of which were considered in the Principle 3 analysis. At the international level the fishery is managed under EU - Norwegian Agreements. At EU level, the fishery is managed within the context of the Common Fisheries Policy. At Scottish level, the main legal bases for fisheries management are the 2013 Aquaculture and Fisheries (Scotland) Act and the 2010 Marine Act. Marine Scotland is the implementing body under the Scottish Government, responsible for all components of fisheries management, from science to management and enforcement. Marine Scotland works closely with the POs, which are delegated responsibility for managing fish quotas on behalf of their members. A small proportion of the catch is taken in the Norwegian EEZ. The 2008 Marine Resources Act requires that Norwegian fisheries management be guided by the precautionary approach, in line with international treaties and guidelines and by an ecosystem approach that considers habitats and biodiversity. The same objectives are found in the most relevant policy documents, such as the integrated management plan for the North Sea and Skagerrak.

The main strengths of the client fishery are that it is a well-organised fleet which operates in a well-defined management framework, transparent stakeholder consultation processes and clear mechanisms for dispute resolution. The target stocks each show sufficiently strong SSBs and harvest strategies to pass Principle 1, although conditions were raised against haddock, plaice, hake and whiting with regard to effective management control rules. Management of bycatch species was good overall but further management/data analysis action for West Scotland cod and whiting is required which raises conditions against the haddock, saithe and hake UoAs. With regards to its wider ecosystem impacts, the fishery (all UoAs) need to address its potential impacts on some ETP species, in particular common skate complex and starry ray and these conditions are carried forward from previous assessments. A significant proportion of VMEs are closed to fishing, but structure and function of burrowed mud with seapen habitat could not be assured against fishery damage in subarea 6a and further information and action is required. Therefore a condition is raised against the haddock, saithe and hake UoAs.

Overall, no single performance indicator scored below 60 and the aggregate score for each principle for each UoA was 80 or above, therefore the fishery is therefore recommended for certification.

The overall scores for each UoA are as follows:

Principle	UoA 1 - HAD	UoA 2 - POK	UoA 3 - PLE	UoA 4 -HKE	UoA 5 - WHG
Principle 1 – Target Species	92.4	95.0	93.8	92.5	86.9
Principle 2 – Ecosystem	80.0	80.0	82.0	80.0	82.0
Principle 3 – Management System	94.6	94.6	94.6	96.5	94.6

Eleven PIs scored less than 80 and therefore conditions were raised and summarised below. Three of these conditions were existing conditions brought forward from the existing certification. Note that conditions 1 - 6 required harmonisation with other MSC fisheries.

Condition number	Condition	Performance Indicator	Related to previously raised condition? (Y/N/NA)
1	It needs to be clear that direct effects of the fishery are highly unlikely to create unacceptable impacts on starry ray and common skate.	PI 2.3.1	Y see Section 3.2
2	There should be an objective basis for confidence that the strategy for common skate and starry ray will work, based on information directly about the fishery and/or the species involved.	PI 2.3.2	Y see Section 3.2
3	There needs to be sufficient information available such that the impact of this fishery on common skate can be quantitatively estimated, and hence it can be determined whether the fishery may be a threat to the recovery of the common skate complex. This requires, as a minimum, a fleet-wide estimate of bycatch of common skate, as well as some basis by which population-level trends can be evaluated (noting that ICES considers that existing data are insufficient for this purpose).	PI 2.3.3	Y see Section 3.2
4	**UoA 5 (whiting)** Evaluate and adopt a new harvest strategy that is responsive to the state of the stock and provide evidence that it is achieving its management objectives.	PI 1.2.1	Na
5	**UoA 3 (plaice)** Develop and adopt well-defined harvest control rules that are consistent with the harvest strategy and ensure that exploitation rates are reduced as limit reference points are approached. The HCR	PI 1.2.2	Na

Condition number	Condition	Performance Indicator	Related to previously raised condition? (Y/N/NA)
	should be contained within a new management plan.		
6	**UoA 4 (hake)** Develop and adopt well-defined harvest control rules that are consistent with the harvest strategy and ensure that exploitation rates are reduced as limit reference points are approached. The HCR should be contained within a new management plan.	PI 1.2.2	Na
7	**UoA 5 (whiting)** The fishery must provide evidence indicating that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rule.	PI 1.2.2	Na
8	**UoA 1, 2 and 4 (haddock, saithe and hake)** By year 4 the partial strategy for W. Scotland cod must be demonstrably effective at achieving recovery and rebuilding of the stock to appropriate and realistic rebuilding target levels defined by the relevant stock model.	PI 2.1.1	Na
9	**UoA 1, 2 and 4 (haddock, saithe and hake)** By year 4 there needs to be an objective basis for confidence that the strategy for rebuilding the W. Scotland cod stock will work, based on information about the stock and/or fishery.	PI 2.1.2	Na
10	**UoA 1, 2 and 4 (haddock, saithe and hake)** The fishery should show that it is highly unlikely to reduce structure and function of burrowed mud with seapen habitat on the west coast (as defined by records of the tall seapen *Funiculina quadrangularis*) to a point where there would be serious or irreversible harm. Serious or irreversible harm is defined as a reduction in habitat distribution of 20% or more relative to baseline (currently-defined) levels.	PI 2.4.1	Na
11	**UoA 1, 2 and 4 (haddock, saithe and hake)** The fishery should show that there is an objective basis for confidence that the partial strategy in place for seapens (*Funiculina quadrangularis*) on the W. coast is likely to work, in terms of achieving outcome score 80 or above for 2.4.1.	PI2.4.2	Na

1 Authorship and Peer Reviewers

Dr Hugh Jones (Team Leader): Hugh obtained his PhD in Australia investigating the bioaccumulation of mercury in fisheries and the effects on human health, following a BSc. (Hons) in Marine Biology from Plymouth University.

He has a broad background in marine research including publications and reports on fisheries research, ecotoxicology and environmental risk assessments. Prior to joining MEC he was employed by the University of Tasmania as a fisheries scientist in the development of an empirical harvest strategy for the commercial abalone fisheries and stock assessments of estuarine bivalves. This included work on population metrics (recruitment, growth), harvest dynamics (catch rates, market selectivity), and the use of fine scale geo-spatial techniques as performance measures to assess stock sustainability.

He is a contributing author to the Status of Australian Fish stocks for Tasmanian abalone and shellfish fisheries. Hugh currently works as Fisheries Assessment Manager for MEC.

Dr Robin Cook (Principle 1) Robin Cook studied zoology at Durham University followed by a PhD in population dynamics from Oxford University. He worked for many years at the Marine Laboratory, Aberdeen and was Director there from 2002-2011. He worked mainly in the field of demersal fish stock assessments and assessment methodology. During the 1990s he was chair of the ICES North Sea demersal assessment working group and served on the ICES Advisory Committee on Fishery Management (ACFM) and the EU Scientific, Economic and Technical Committee on Fisheries (STECF). Currently he is a Senior Research Fellow at Strathclyde University, Glasgow, focusing on bio-economic modelling of grey seal predation on demersal fish and the assessment of data-poor stocks. He has published over 80 scientific papers including a number dealing with the status of North Sea cod.

Dr Cook had primary responsibility for the assessment of Principle 1.

Dr Jo Gascoigne (Principle 2): Dr. Gascoigne, an MEC associate, is a former research lecturer in marine biology at Bangor University, Wales. She is an expert on fisheries science and management, with over 15 years' experience as a consultant, working mainly on MSC pre-assessments and full assessments, as well as FIP scoping, planning and implementation. Jo has been involved as expert and lead auditor in a significant number of MEP and MEC's full MSC assessments and pre-assessments covering a range of demersal and pelagic fisheries in the Northeast Atlantic, Mediterranean, Indian Ocean, Southern Ocean and Pacific

For this assessment, Dr. Gascoigne was responsible for Principle 2.

Geir Hønneland (Principle 3) Geir Hønneland is Director of the Fridtjof Nansen Institute and adjunct professor at the University of Tromsø, Norway. He holds a Ph.D. in political science from the University of Oslo and mainly studies fisheries management and international relations in the European North. Among his books are Making Fishery Agreements Work: Post-Agreement Bargaining in the Barents Sea (Edward Elgar, 2012) and Coercive and Discursive Compliance Mechanisms in the Management of Natural Resources: A Case Study from the Barents Sea (Springer, 2000). He has also published extensively in peer reviewed journals. His most important ongoing research project is about the resilience of established international management regimes to spatial shifts in major marine stocks in Polar waters.

Before embarking on his academic career, Geir worked for several years as a fishery inspector for the Norwegian Coast Guard.

Geir has gained a broad experience from evaluations and consultancies in the fisheries sector, e.g. for FAO relating to the FAO Code of Conduct for Responsible Fisheries, and country studies for OECD. He was a member of the team that performed the first MSC assessment of a Russian Barents Sea fishery in 2010 and has subsequently participated in several assessments in the Northeast Atlantic and Southern Ocean, as well as inland fisheries. His experience includes MSC full assessments, re-assessments, pre-assessments, surveillance audits and peer reviews.

Geir Hønneland was responsible primarily for Principle 3.

2 Description of the Fishery

2.1 Unit(s) of Assessment (UoA) and Scope of Certification Sought

2.1.1 UoAs and Proposed Unit of Certifications (UoC)

MEC confirms that the fishery under assessment is within the scope of the MSC Fisheries Standard (7.4 of the MSC Certification Requirements v2.0):

- The target species is not an amphibian, reptile, bird or mammal;
- The fishery does not use poisons or explosives;
- The fishery is not conducted under a controversial unilateral exemption to an international agreement;
- The client or client group does not include an entity that has been successfully prosecuted for a forced labour violation in the last 2 years;
- The fishery has in place a mechanism for resolving disputes, and disputes do not overwhelm the fishery;
- The fishery is not an enhanced fishery as per the MSC FCR 7.4.3; and
- The fishery is not an introduced species-based fishery as per the MSC FCR 7.4.4.
- None of the species under assessment are key Low Trophic Level (LTL) stocks in accordance with FCR v2.0 SA2.2.8.

The UoC and UoA are the same in this assessment as there are no other eligible fishers, the term UoA is henceforth used.

2.1.2 Extension of scope of fishery certificate (expedited assessment).

MEC confirms that the proposed UoAs are part of an expedited assessment of the current SFSAG haddock certification (certificate MEC-F-034), in line with Annex PE of the MSC FCR v2.0. The scope of the haddock certification is being extended to include four stocks (saithe, hake, plaice and whiting) currently assessed under Principle 2 in the existing SFSAG haddock certificate (thereby conforming to requirement 7.22.1.1).

Note saithe is also a P1 species in its own certificate (MEP-F-019). All UoAs under consideration are fished by the same client group, vessels, gear types and have overlapping geographical ranges therefore meeting FCR 7.22.1.2 and 7.22.1.3.

MEC hold the MSC certificates for both the SFSAG saithe and haddock fisheries and are therefore able to meet FCR 7.22.2. Both current certificates are evaluated against scoring version FR 1.3 and therefore to meet FCR 7.22.3 this assessment will use the same assessment tree (FR 1.3) but with process FCR 2.0. The components rescored for each principle are provided in Table 1.

Table 1. Rescoring template for scope extension of this expedited assessment. Areas and subdivisions are ICES statistical areas, area descriptions are drawn from ICES assessment documentation for the relevant species and defined stock area.

Component		UoA 1 (original)	UoA 2	UoA 3	UoA 4	UoA 5
		Haddock (***Melanogrammus aeglefinus***) in Subarea 4, Subdivision 3.a.20 (North Sea, West of Scotland, Skagerrak) Expedited assessment: Division 6.a	Saithe (***Pollachius virens***) in subareas 4 and 6 and Division 3.a (North Sea, Rockall and West of Scotland, Skagerrak and Kattegat).	Plaice (***Pleuronectes platessa***) in Subarea 4 (North Sea) and Subdivision 3.a.20 (Skagerrak)	Hake (***Merluccius merluccius***) in subareas 4, 6, and 7 and divisions 3.a, 8.a–b, and 8.d, Northern stock (Greater North Sea, Celtic Seas, and the northern Bay of Biscay)	Whiting (***Merlangius merlangus***) in Subarea 4 and Division 7.d (North Sea and eastern English Channel)
P1 Outcome		UoA 2 – 4 - These are additional stocks and a full evaluation of the P1 outcome component will be carried out. For UoA 1 the range of the assessment has been extended therefore rescoring is required.				
P1 Harvest strategy		Harvest strategies will differ between stocks and a full evaluation of the P1 harvest strategy component will be carried out on all UoAs.				
P2 Retained species		The removal of saithe, plaice, hake and whiting as P2 retained species will lead to scoring changes. The addition of new fishing areas may equally lead to interactions with previously unassessed retained stocks. This component will be rescored.				
P2 Bycatch species		The addition of new fishing areas may lead to interactions with previously unassessed discarded stocks. This component will be rescored.				
P2 ETP species		The addition of new fishing areas may lead to interactions with previously unassessed ETP species/populations. This component will be rescored.				
P2 habitats		The addition of new fishing areas may lead to interactions with previously unassessed habitats. This component will be rescored.				
P2 ecosystem		The SFSAG North Sea haddock assessment of this component currently focuses on the North Sea ecosystem from a Scottish perspective. The addition of new areas to the scope will require a larger-scale assessment. This component will be rescored.				
	3.1.1	This PI may require rescoring if stock-specific management structure differs from North Sea haddock management. UoA 1 is not required to be scored under this PI.				

<table>
<tr><th colspan="2">Component</th><th>UoA 1 (original)</th><th>UoA 2</th><th>UoA 3</th><th>UoA 4</th><th>UoA 5</th></tr>
<tr><td colspan="2"></td><td>Haddock (Melanogrammus aeglefinus) in Subarea 4, Subdivision 3.a.20 (North Sea, West of Scotland, Skagerrak)
Expedited assessment: Division 6.a</td><td>Saithe (Pollachius virens) in subareas 4 and 6 and Division 3.a (North Sea, Rockall and West of Scotland, Skagerrak and Kattegat).</td><td>Plaice (Pleuronectes platessa) in Subarea 4 (North Sea) and Subdivision 3.a.20 (Skagerrak)</td><td>Hake (Merluccius merluccius) in subareas 4, 6, and 7 and divisions 3.a, 8.a–b, and 8.d, Northern stock (Greater North Sea, Celtic Seas, and the northern Bay of Biscay)</td><td>Whiting (Merlangius merlangus) in Subarea 4 and Division 7.d (North Sea and eastern English Channel)</td></tr>
<tr><td rowspan="3">P3 Governance and policy</td><td>3.1.2</td><td colspan="5">The European, Norweigian and Scottish systems of fisheries management have clearly identified organisations and consultation processes in place regardless the stock under consideration. No re-scoring is proposed, but information updates pertaining to this PI will be considered and evidenced during the assessment.</td></tr>
<tr><td>3.1.3</td><td colspan="5">Re-scoring of this PI is required to take into account long-term stock-specific objectives, which are likely different from those identified for North Sea haddock fishery.</td></tr>
<tr><td>3.1.4</td><td colspan="5">The system of economic and social incentives is unlikely to be influenced by the target stock – no re-scoring proposed, but information updates pertaining to this PI will be considered and evidenced during the assessment.</td></tr>
<tr><td rowspan="5">P3 Fishery-specific management system</td><td>3.2.1</td><td colspan="5">Re-scoring may be required where fishery-specific objectives are thought to be different from North Sea haddock fishery.</td></tr>
<tr><td>3.2.2</td><td colspan="5">Re-scoring may be required where decision-making processes and approach to disputes are thought be different from North Sea haddock fishery.</td></tr>
<tr><td>3.2.3</td><td colspan="5">MCS system and non-compliance will be updated to include new target stocks. This PI will be re-scored.</td></tr>
<tr><td>3.2.4</td><td colspan="5">Scoring on research plan to be updated to take into consideration new target stocks. This PI will be re-scored.</td></tr>
<tr><td>3.2.5</td><td colspan="5">This PI will be updated to take into consideration new target stocks. This PI will be re-scored.</td></tr>
</table>

2.1.3 Final (UoCs) UoAs

The final five UoAs are the same as listed in the expedited assessment announcement and final report and are shown below. All are held under a single certificate of the original UoA of SFSAG North Sea haddock which has a certificate of compliance - MEC-F-034- Valid 17th May 2016 to 12th May 2021.

UoA 1 (original):

Note: The Scottish Fisheries Sustainable Accreditation Group (SFSAG) North Sea haddock fishery is already certified (Certificate of compliance MEC-F-034- Valid 17th May 2016 to 12th May 2021). This assessment is an expedited assessment for UoA 1 incorporating a new area (division 6a).

Species	Haddock (*Melanogrammus aeglefinus*)
Geographical range	Subarea 4, Division 6.a, 2a and Subdivision 3.a.20 (North Sea, West of Scotland, Skagerrak)
Method of capture	Single Nephrops trawl Twin Nephrops trawl Demersal trawl Twin demersal trawl Danish seine Pair seine–trawl Pair trawl
Stock	ICES - Haddock (*Melanogrammus aeglefinus*) in Subarea 4, Division 6.a, and Subdivision 3.a.20 (North Sea, West of Scotland, Skagerrak)
Management Systems	**Legal**: EC Common Fisheries Policy; EU-Norway Agreement; National legislation **Enforcement**: 'Marine Scotland Compliance' & Royal Navy, and 'Norwegian authorities' with 'Norwegian Directorate of Fisheries and Norwegian Coast Guard'. **Science**: Marine Scotland Science/ ICES
Client group	Scottish Fisheries Sustainable Accreditation Group (SFSAG) member vessels
Other eligible fishers	None

UoA 2

Note: The Scottish Fisheries Sustainable Accreditation Group (SFSAG) North Sea saithe fishery is already certified (Certificate of compliance MEC-F-019 Valid 3rd October 2013 to 2nd October 2018).

Species	Saithe (*Pollachius virens*)
Geographical range	Subareas 4 and 6 subdivision 2a and Division 3.a (North Sea, Rockall and West of Scotland, Skagerrak and Kattegat)
Method of capture	Single Nephrops trawl Twin Nephrops trawl Demersal trawl Twin demersal trawl Danish seine Pair seine–trawl Pair trawl
Stock	ICES - Saithe (*Pollachius virens*) in Subareas 4 and 6 and Division 3.a (North Sea, Rockall and West of Scotland, Skagerrak and Kattegat)
Management Systems	**Legal**: EC Common Fisheries Policy; EU-Norway Agreement; National legislation **Enforcement**: 'Marine Scotland Compliance' & Royal Navy, and 'Norwegian authorities' with 'Norwegian Directorate of Fisheries and Norwegian Coast Guard'. **Science**: Marine Scotland Science/ ICES
Client group	Scottish Fisheries Sustainable Accreditation Group (SFSAG) member vessels
Other eligible fishers	None

UoA 3

Species	Plaice (*Pleuronectes platessa*)
Geographical range	Subarea 4 (North Sea) and subdivision 3.a and 2a
Method of capture	Single Nephrops trawl Twin Nephrops trawl Demersal trawl Twin demersal trawl Danish seine Pair seine–trawl Pair trawl
Stock	Subarea 4 (North Sea) and subdivision 3.a.20 (Skagerrak)
Management Systems	**Legal**: EC Common Fisheries Policy; EU-Norway Agreement; National legislation **Enforcement**: 'Marine Scotland Compliance' & Royal Navy, and 'Norwegian authorities' with 'Norwegian Directorate of Fisheries and Norwegian Coast Guard'. **Science**: Marine Scotland Science/ ICES
Client group	Scottish Fisheries Sustainable Accreditation Group (SFSAG) member vessels
Other eligible fishers	None

UoA 4

Species	Hake (*Merluccius merluccius*)
Geographical range	Subareas 4, 6a and subdivisions 2a and 3a.
Method of capture	Single Nephrops trawl Twin Nephrops trawl Demersal trawl Twin demersal trawl Danish seine Pair seine–trawl Pair trawl
Stock	ICES - Hake (*Merluccius merluccius*) in Subareas 4, 6, and 7 and divisions 3.a, 8.a–b, and 8.d, Northern stock (Greater North Sea, Celtic Seas, and the northern Bay of Biscay)
Management Systems	**Legal**: EC Common Fisheries Policy; EU-Norway Agreement; National legislation **Enforcement**: 'Marine Scotland Compliance' & Royal Navy, and 'Norwegian authorities' with 'Norwegian Directorate of Fisheries and Norwegian Coast Guard'. **Science**: Marine Scotland Science/ ICES
Client group	Scottish Fisheries Sustainable Accreditation Group (SFSAG) member vessels
Other eligible fishers	None

UoA 5

Species	Whiting (*Merlangius merlangus*)
Geographical range	Subarea 4 and subdivision 2a
Method of capture	Single Nephrops trawl Twin Nephrops trawl Demersal trawl Twin demersal trawl Danish seine Pair seine–trawl Pair trawl
Stock	ICES - Whiting (*Merlangius merlangus*) in Subarea 4 and Division 7.d (North Sea and eastern English Channel)
Management Systems	**Legal**: EC Common Fisheries Policy; EU-Norway Agreement; National legislation **Enforcement**: 'Marine Scotland Compliance' & Royal Navy, and 'Norwegian authorities' with 'Norwegian Directorate of Fisheries and Norwegian Coast Guard'. **Science**: Marine Scotland Science/ ICES
Client group	Scottish Fisheries Sustainable Accreditation Group (SFSAG) member vessels
Other eligible fishers	None

2.1.4 Total Allowable Catch (TAC) and Catch Data

Landing data for each species is available from the ICES annual advice for that stock with breakdown by country (Table 2 to Table 6). The advice status against agreed TACs is summarised in Table 7.

Table 2. TAC and Catch Data UoA 1 haddock. Source ICES (2017d)**.**

UoA 1 haddock	Year	Weight (t)
TAC	2017	33,643
UoA share of TAC	2017	22,225
Total catch by UoA	2016	28,621
	2015	25,903

Table 3. TAC and Catch Data UoA 2 saithe. Source ICES (2017q)**.**

UoA 2 saithe	Year	Weight (t)
TAC	2017	100,287
UoA share of TAC	2017	11,310
Total catch by UoA	2016	11,185
	2015	12,227

Table 4. TAC and Catch Data UoA 3 plaice. Source ICES (2017m)**.**

UoA 3 plaice	Year	Weight (t)
TAC	2017	129,917
UoA share of TAC	2017	34,388
Total catch by UoA	2016	18,657
	2015	17,392

Table 5. TAC and Catch Data UoA 4 hake. Source ICES (2016h)**.**

UoA 4 hake	Year	Weight (t)
TAC	2017	119,765
UoA share of TAC	2017	12,866
Total catch by UoA	2016	4,978
	2015	2,978

Table 6. TAC and Catch Data UoA 5 whiting. Source ICES (2017r)**.**

UoA 5 whiting	Year	Weight (t)
TAC	2017	16,003
UoA share of TAC	2017	9,838
Total catch by UoA	2016	9,331
	2015	10,012

Table 7. Comparison of ICES catch advice and TAC set by management for each of the stocks under assessment between 2014-2017.

Year	Species	Area	ICES catch advice	TAC	catch	% TAC	Catch value calculation
2014	haddock	4	38,201	38,284	39,000	101.9	ICES total
2015			68,690	40,711	34,335	84.3	ICES total
2016			59,945	61,933	36,024	58.2	ICES total
2017			39,461	33,643		0.0	
2014	haddock	6a	6,432	3,988	4,800	120.4	ICES total
2015			68,690 (4 and 6a)	4,536	5,235	115.4	ICES total
2016			59,945 (4 and 6a)	6,432	5,808	90.3	ICES total
2017			39,461 (4 and 6a)	3,697			
2014	saithe	4, 3a	77,536	77,536	75,196	97.0	ICES landings + discards
2015			72,211	66,006	74,006	112.1	ICES landings + discards
2016			67,995	65,696	70,742	107.7	ICES landings + discards
2017			127,432	100,287		0.0	
2014	saithe	6	8,045	8,045	7,532	93.6	ICES landings + discards
2015			7,492	6,848	7,939	115.9	ICES landings + discards
2016			7,054	6,816	7,793	114.3	ICES landings + discards
2017			13,221	10,404		0.0	
2014	plaice	4	111,631	111,600	122,762	110.0	ICES landings + discards
2015			179,301	128,376	124,395	96.9	ICES landings + discards
2016			216,345	131,714	123,122	93.5	ICES landings + discards

Year	Species	Area	ICES catch advice	TAC	catch	% TAC	Catch value calculation
2017			158,201	129,917		0.0	
2014	hake	Northern stock	81,846	81,846	99,728	121.8	ICES Catch
2015			109,592	90,849	10,5923	116.6	ICES Catch
2016			109,592	108,764	11,8644	109.1	ICES Catch
2017			123,777	119,765		0.0	
2014	whiting	4	16,092	16,092	25,421	158.0	ICES Catch
2015			13,678	13,678	26,130	191.0	ICES Catch
2016			12,373	13,678	27,859	203.7	ICES Catch
2017			9,744	16003		0.0	ICES Catch

2.1.5 Scope of Assessment in Relation to Enhanced Fisheries

The fisheries under assessment are a wild capture fishery and does not meet the criteria for enhanced fisheries (see FCR v2.0 7.4)

2.1.6 Scope of Assessment in Relation to Introduced Species Based Fisheries

The fisheries are not Introduced Species Based Fisheries (see FCR v2.0 7.4).

2.2 Overview of the fishery

The SFSAG North Sea haddock fishery is carried out by vessels covered by membership of the Scottish Fisheries Sustainability Assessment Group (SFSAG) which consists of all the Scottish POs. The members represent the majority of the Scottish demersal industry operating in the mixed demersal fisheries of the North Sea and West of Scotland. The collective members of the group are:

- Scottish White Fish Producers Association
- Aberdeen Fish Producers Organisation
- Anglo-Scottish Fish Producers Organisation
- Fife Fish Producers Organisation
- Fishermen's Mutual Association (Pittenweem)
- North East of Scotland Fishermen's Organisation
- Northern Producers Organisation
- The Fish Producers' Organisation
- Orkney Fish Producers Organisation
- Scottish Fishermen's Organisation
- Shetland Fish Producers Organisation

- Eastern England Fish Producers' Organisation
- Lunar FPO Ltd

Vessels in the UoA are all vessels who are members of any of the above organisations, totalling 232 vessels. Note that the UoAs include some vessels registered in England and Northern Ireland but administered through the above POs. SPSAG current vessel list updated and is provided online at http://scottishfsag.org/wp-content/uploads/2017/02/MSC-Saithe-and-haddock-Master-110217.pdf .

The Board of SFSAG is chaired by Mike Park of Scottish White Fish Producers Association Ltd (SWFPA) and the Secretariat is provided by Seafood Scotland. Marine Scotland Policy and Science also take an active role in the group by assisting with expertise and funding advice.

2.2.1 Gear and operation of the fishery

The SFSAG fleet is a mixed fleet, using various gear types to target a mix of demersal species, including gadoids (cod, haddock, whiting, saithe, hake) but also monkfish and megrim. The SFSAG vessels targeting *Nephrops* also take a significant bycatch of these species which is retained where possible. Under the convention used in the Cod Recovery Plan, gear mesh sizes are described as 'TR1' and 'TR2': TR1 is >100 mm (often 120 mm); TR2 is 80 mm – 99 mm. For squid a mesh size of 70 mm - 80 mm is occasionally used by a few vessels, but this gear is not part of the UoAs.

The fleet is divided as follows:

- Single-rig trawlers targeting mainly whitefish;
- Twin-rig trawlers targeting mainly whitefish;
- Single-rig trawlers targeting Nephrops and whitefish;
- Twin-rig trawlers targeting Nephrops and whitefish;
- Pair trawlers targeting whitefish;
- Trawlers targeting squid (not part of the UoA);
- Scottish, Danish seines targeting whitefish (single and pair)

The gear type percentages used by vessels in the UoA are divided as follows in Table 8.

Table 8. Gear type percentage of the UoAs.

Gear type	Percentage of fleet (%)
Trawl	86
Pair trawls	8
Scottish and Danish seines	6

Gear type	Percentage of fleet (%)
TR1	75
TR2	25

2.2.1.1 Single-rig otter trawl:

In an otter trawl, the mouth of the net is held open by otter boards that are towed in such a way that they create hydrodynamic pressure forcing the otter board outwards, thus creating the opening of the net. The optimum distance between the otter boards (spread) is controlled by the skipper either by measuring the angle between the towing warps or, in the case of larger newer vessels, information relayed to the bridge via remote electronic sensors. The opening of the net is determined by the interaction between the size of otter boards, the length of sweep (or spreaders) between the otter board and the net, and the speed of the vessel. The shape of the net is retained through the use of floats and/or kites. The body of the net is cone-shaped, tapering toward the back of the net where the cod end is situated; this is the area where the fish are held through the duration of the tow. It is the mesh size in the cod end that largely determines the selectivity of the net once fish are captured. As noted above, trawlers are categorised as TR1 vessels when the mesh size is >100 mm and TR2 vessels for mesh size <100 mm, with significant regulatory implications (see below).

Nets can be rigged to travel on rough rocky bottom through the use of large rubber discs called hoppers or rockhoppers or can be rigged for use on soft muddy bottom for *Nephrops* ('scraper nets'). The standard whitefish trawl can stand to a height of around eight metres, while a net designed to catch *Nephrops* may only stand three feet high or less. The efficiency of a net is determined by the size of opening at the front or mouth of the net, although there is some herding effect as a result of the sand cloud created by the otter boards and spreaders.

Demersal finfish trawls are normally towed for around four hours before hauling whereas *Nephrops* vessels may tow for up to seven hours before hauling although the average length of tow is around six hours. The distance between the net and the vessel can vary although the standard length of warp is calculated as two and a half times the depth. The average towing speed is around three knots.

2.2.1.2 Twin-rig otter trawl:

Twin rig is an adaptation of traditional single trawl, the same principles are applied with regard to the use of otter boards; however, a third warp running from the vessel mid-way between those connected to the otter boards allows two nets to be used rather than one. This mid-warp is held down through the use of a weight, or clump, so that it mirrors the behaviour of the otter board without the hydrodynamic characteristics; the weight of the clump is by and large the same weight as that of a single otter board. The mid warp and clump acts as the anchor for the inside spreader of each of the nets, maintaining symmetry is achieved by altering the tension in the middle warp. Twin rig trawls tend to be smaller than single trawls but can be larger in terms of swept area in total, thus giving a higher CPUE. Twin rig is the most popular method in Scotland for vessels targeting *Nephrops* and is also reasonably popular amongst the white fish fleet. The use of more than two nets is prohibited in Scotland (SSI No 602/2006;

this applies to Scottish vessels fishing anywhere and any UK vessels fishing in Scottish waters). Other Member State vessels may tow as many as 12 nets. The majority of the vessels in the UoAs for this fishery are twin-rig TR2 trawlers (*Nephrops* vessels), although these vessels do not account for the majority of the catch.

2.2.1.3 Pair trawl:

Pair trawling uses a similar approach to that of trawling but without otter boards. Instead, the net is towed between two partner vessels, and the distance between the vessels determines the width of opening. Pair trawl nets are usually larger than those used in single trawl. A pair trawl 'team' takes turn-about at shooting, hauling and retaining the fish caught; it is normal for pair teams to carry nets rigged for both sandy and rocky bottom. Modern pair vessels are now very much tailored for this specific method; they use shorter, heavier warps with the benefit that they can use modern electronic net monitoring devices similar to those used by single vessel trawls. The length of warp used is determined by the harshness of the terrain; a pair team may use a combination of wire and wire rope that extends to around 600 m to 800 m. The pair method of fishing is used to target demersal finfish.

2.2.1.4 Scottish seine (Scottish fly dragging):

Scottish seining or fly dragging is a modification of the Danish 'anchor seine' method. In Danish seining, vessels use an anchor for one end of the net, whereas in Scottish fly dragging, vessel engines are used to propel the vessel forward as the winch and rope reels retrieve the warp. The size of the area encircled by the seine largely determines the size of the catch. To be effective, seining must be targeted at known abundances or favoured areas of the sea; more so than trawling. On locating a mark, the vessel drops his marker buoy in a position that will allow the mark to be contained within the triangular perimeter of the vessel's gear. The net, which is located mid-way along the back leg of the triangle, gathers the fish that have been herded to the central point as the side legs of the triangle are drawn-in through a combination of the vessel moving through the water away from the mark, and the vessel's winch which is engaged once the triangle has been completed and the buoy retrieved. The whole operation takes around 2 hours to complete. Seine nets are considered a more eco-friendly method of fishing; the net tends to be lighter and more selective, the absence of both trawl doors and the clump is an added benefit.

It is important to note that vessels may change their strategy depending on markets, quota availability and so on – some may use several of the above methods (although it is difficult for regulatory reasons to switch between TR1 and TR2).

2.2.2 Fishing area and seasons

Fishing by the fleet is technically open all year but fishing opportunities are governed by appropriate weather windows and quota availability. Fishing takes place within UK, Norwegian and European waters of ICES areas 2a, 4, 6a and 3a (Figure 1, Figure 2). Spatial extent of fishing effort, as examined by VMS tracks, across the ICES subdivisions shows the importance of subdivisions 4a and 6a for the Scottish fleet (Figure 2).

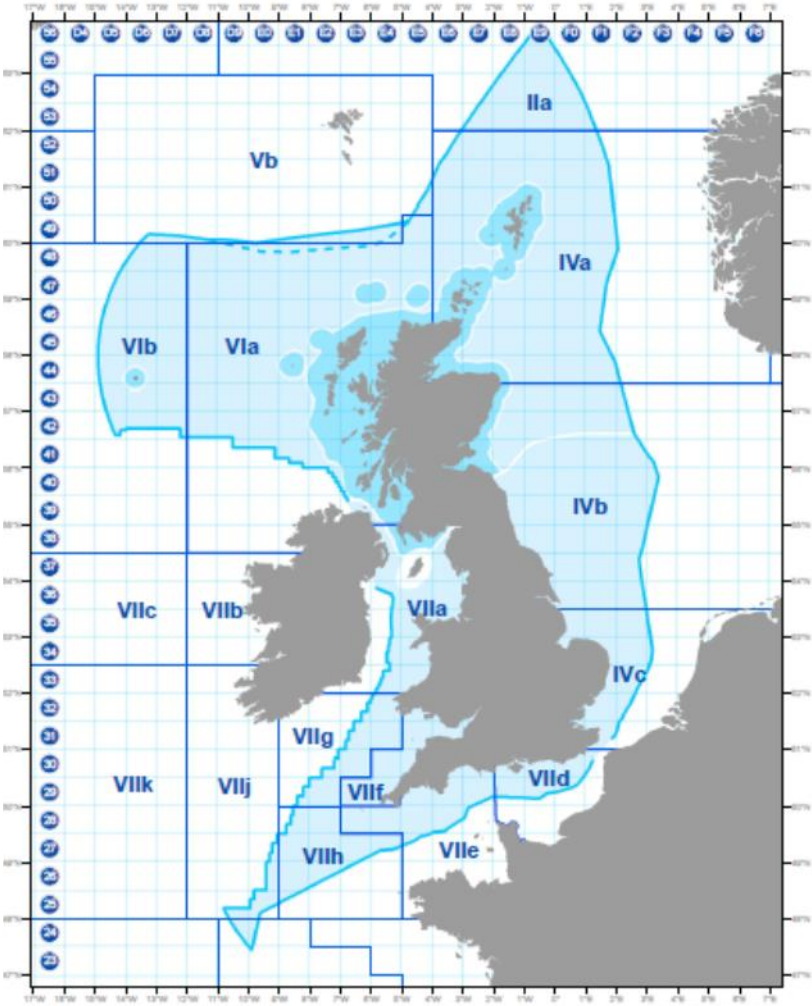

Figure 1. UK Exclusive Economic Zone (EEZ) (blue shading) with ICES divisions overlaid. Source Marine Scotland.

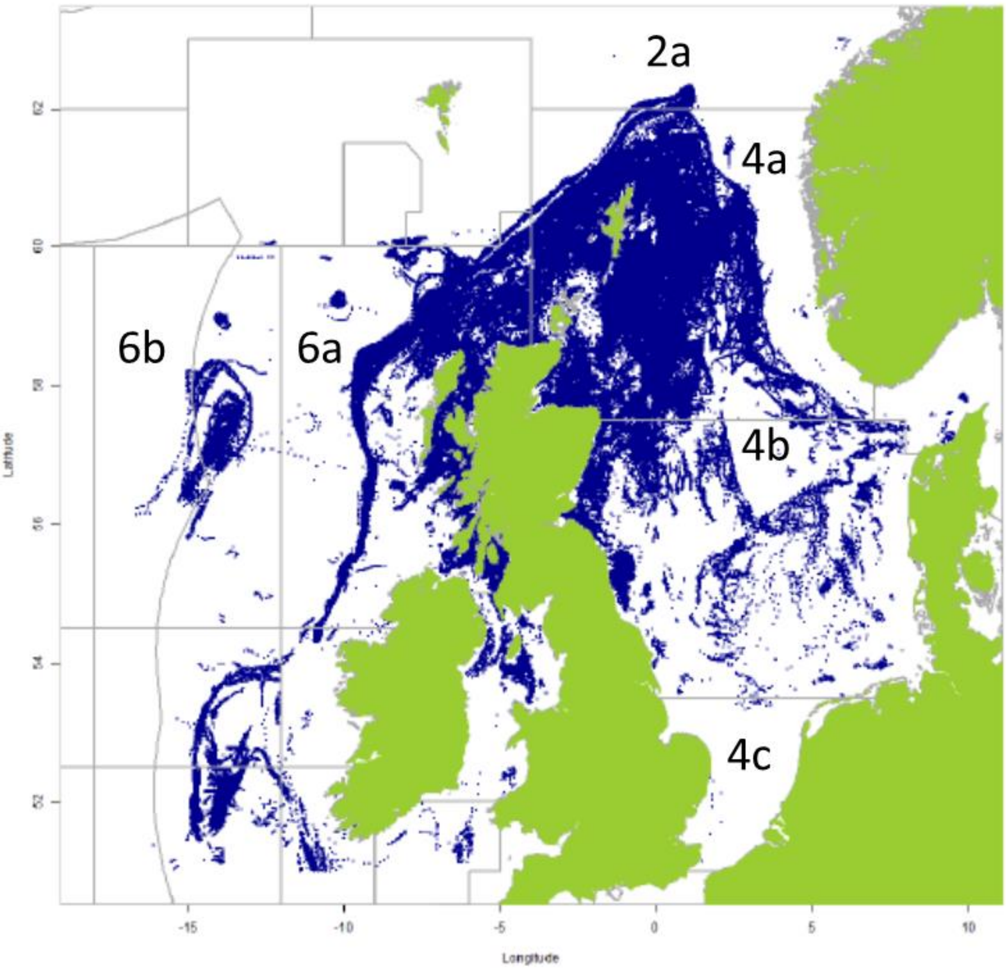

Figure 2. VMS pings (2013) from Marine Scotland Compliance where vessel considered fishing (0.1 knots - 4.5 knots). ICES subdivisions considered in this assessment identified. Source (ICES 2015f)**.**

The fishing area and tonnage for each species is given in terms of ICES statistical rectangle (note this is the entire Scottish fleet, not just the UoA). The spatial extent of the fishery examined in UoAs 1, 2 and 4 (haddock, saithe and hake) is bounded by the borders of ICES subdivision 6a to the West of Scotland to ICES subdivisions 4a, 4b and 3a in the North Sea and Skagerrak and Scottish waters in 2a (Figure 3, Figure 4, Figure 6). For the plaice UoA (UoA 3) the spatial extent of the fishery under assessment includes ICES subdivisions 4, 2a and 3a only (Figure 5). For the whiting UoA (UoA 5) the spatial extent of the fishery under assessment is ICES subdivisions 4 and 2a (Figure 7). Areas closed to fishing across the UoAs are discussed in detail within Principle 2 and 3.

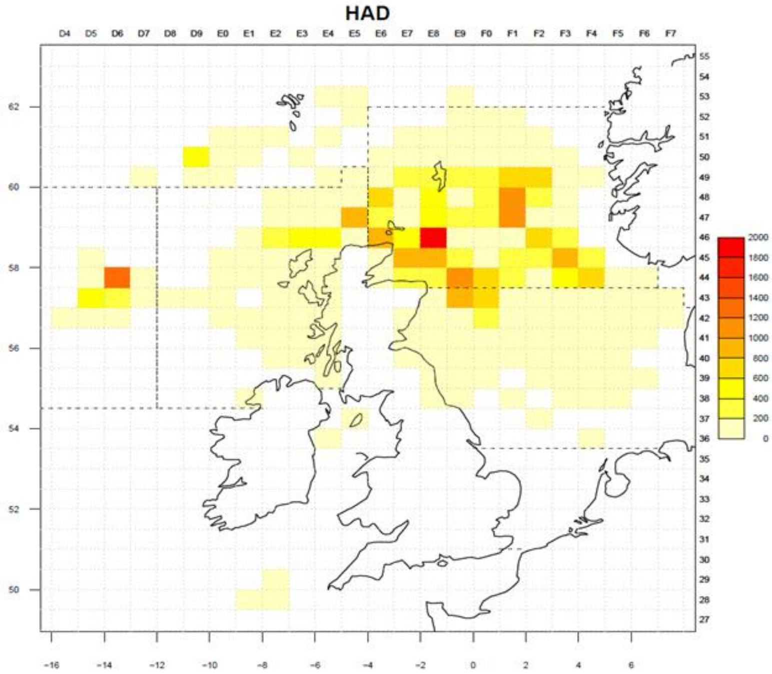

Figure 3. Scottish haddock landed weight (2015) by ICES statistical rectangle in tonnes. Data provided by Marine Scotland Science.

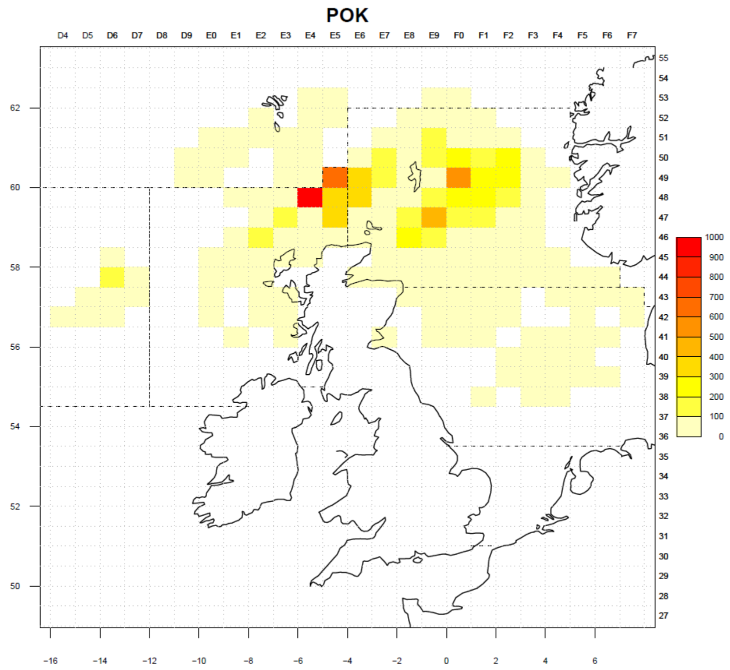

Figure 4. Scottish saithe landed weight (2015) by ICES statistical rectangle in tonnes. Data provided by Marine Scotland Science.

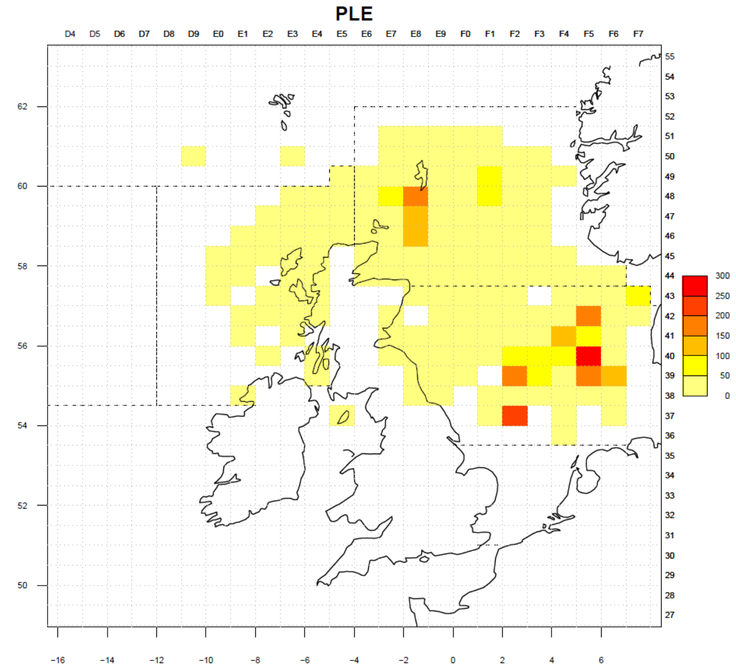

Figure 5. Scottish plaice landed weight (2015) by ICES statistical rectangle in tonnes. Note the UoA for this species is North Sea (ICES 4 and 3a) only. Data provided by Marine Scotland Science.

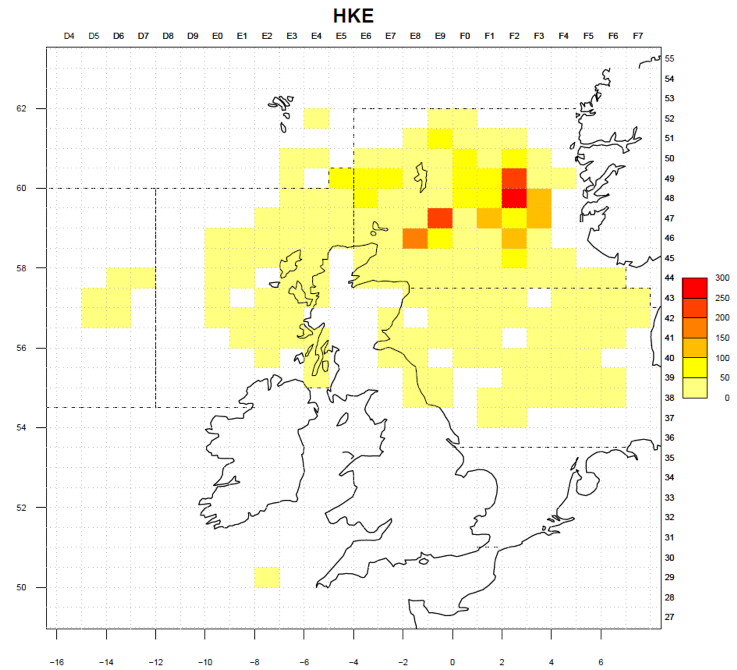

Figure 6. Scottish hake landed weight (2015) by ICES statistical rectangle in tonnes. Data provided by Marine Scotland Science.

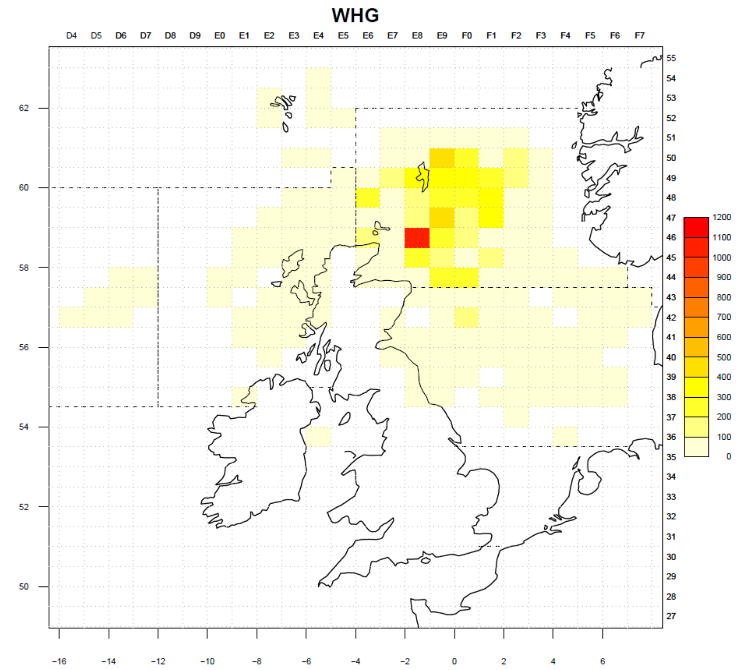

Figure 7. Scottish whiting landed weight (2015) by ICES statistical rectangle in tonnes. Note the UoA for this species is North Sea (ICES subarea 4) only. Data provided by Marine Scotland Science.

2.3 Principle One: Target Species Background

None of the Principle 1 stocks are considered lower trophic level stocks.

2.3.1 Northern Shelf haddock

2.3.1.1 Life History

Haddock (*Melanogrammus aeglefinus*) is a widely distributed roundfish that inhabits temperate northern waters at depths ranging from 10 m to 450 m, but usually between 10 m – 200 m (Muus & Nielsen 1999). In the Northeast Atlantic, haddock are distributed from the Bay of Biscay to Spitzbergen, the Barents Sea to Novaya Zemlya and around Iceland to southern Greenland. They feed mainly on small bottom-living organisms including crustaceans, molluscs, echinoderms, worms and fishes. They are preyed on by other fish, marine mammals and sea birds. Haddock are strongly represented in the diet of cod and whiting and are an important prey species for saithe and other gadoids. 0-group haddock are also strongly represented in the diet of grey gurnards (ICES 2014d).

Northern shelf haddock are distributed mainly north of the Dogger Bank in the North Sea, extending northwards to Shetland, westward along the north coast of Scotland to the Hebrides and shelf edge, and southward to the North Channel. Prior to 2016, Northern shelf haddock were assessed as two separate stocks; one in Division 6a (West of Scotland) and the other in Subarea 4 and Division 3a (North Sea). ICES reviewed stock identity data and concluded that while the exchange of adults between the two areas was likely to be limited, there was a connection in the early life stages to justify combining the areas into a single stock unit (ICES 2014d).

Typically, Northern shelf haddock mature at about 3 years old and reach a maximum length of about 60 cm. Fish may reach an age of 20 years, but most fish in this area are 8 years old or less. Spawning takes place in the spring producing pelagic eggs that hatch into larvae. These metamorphose into juvenile fish that start to appear in demersal habitats in the late summer and autumn. Recruitment is highly variable and thought to be related to the timing of annual secondary production. Large year classes are often followed by below average year classes (Cook & Armstrong 1986).

2.3.1.2 The fishery

The fishery is principally undertaken by the Scottish demersal whitefish fleet. These vessels principally fish haddock in the North Sea (Division 4) and West coast of Scotland (Division 6a) but will sometimes operate in Divisions 6b (Rockall) and 5b (Faroes). These later two divisions, which take place on separate voyages are not covered by this assessment. The demersal fisheries in the Northern Shelf are predominantly conducted by demersal trawlers fishing for cod, haddock, anglerfish and whiting, with bycatches of saithe, megrim, lemon sole, ling and several species of skate. In the North Sea the main fisheries are carried out by demersal trawlers (single, twin, and pair), and (to a lesser extent) by seiners. Haddock are a specific target for some fleets but are also caught as part of a mixed fishery catching cod, whiting, and *Nephrops*. Haddock in Division 6a is caught mainly by Scottish and Irish bottom trawlers, which target mixed demersal fish assemblages. Catches are widely distributed and are concentrated in several areas, e.g. the Butt of Lewis and on the shelf west of the Outer Hebrides (ICES 2014d).

2.3.1.3 Stock assessment

The assessment model is a state-space formulation time series analysis (TSA) based on work by Gudmundsson (1994) that describes the age-specific stock and fishery dynamics by year (ICES 2014d; Fryer 2001). Fishing mortality is modelled as the product of an age effect (selectivity) and a year effect ("effort"). Both these components change over time through a random walk process. Such models perform well when compared to observation error models. It has been subjected to a benchmark review (ICES 2016q) and was deemed the most appropriate model to use given that it allows separate treatment of landings and discards data, the latter an important consideration in this stock. Current SSB and fishing mortality are estimated which are used in the HCR to provide short-term harvest advice.

The TSA model incorporates age-based natural mortality based upon the results of a stochastic multi-species assessment. It estimates recruitment based upon a random walk which is more appropriate than the estimates being constrained by a stock-recruitment relationship. Landings and discards by age are separately estimated, the latter based on age-specific proportions at age which can change over time based upon a random walk.

Data for the assessment include commercial catches (international landings, ages from catch sampling), two survey indices: IBTS Q1, IBTS Q3.

2.3.1.4 Stock trends

Current ICES assessments show stock trends from 1972 onwards although data from the 1960s are available and show very large year classes in 1962 and 1967, a period often referred to as the "gadoid outburst" (Hislop 1996). The consequences of these large year classes can be seen in the large catches in the early 1970s (Figure 8). Discards have been a significant fraction of the total catch especially when a large year class enters the fishery. For many years fishing mortality was very high but reduced substantially from about 2001 onwards and is now close to F_{MSY}. Spawning stock biomass shows no long-term trend and has tended to fluctuate above B_{pa}. Recruitment shows very large variability though there has not been a very large year class since 1999.

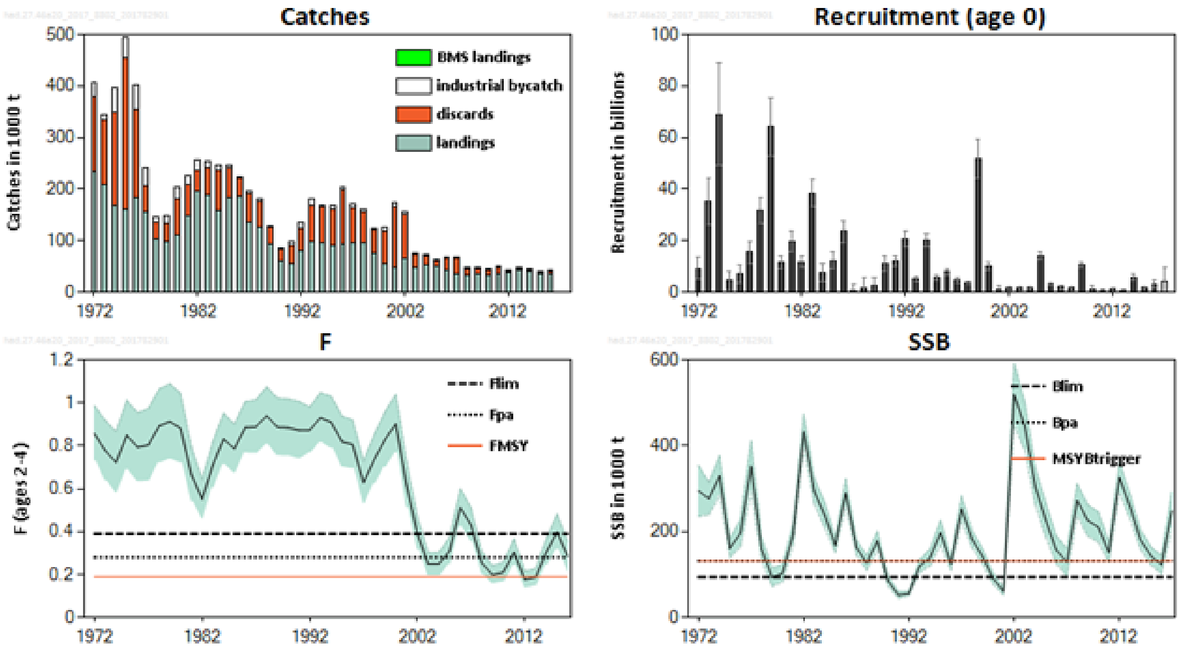

Figure 8. Northern shelf haddock, Stock summary from ICES (2017d)

2.3.1.5 Reference points

ICES re-evaluated reference points for this stock in 2016 (ICES 2016q) in Table 9:

Table 9. ICES reference points for Northern shelf haddock (ICES 2016q)**.**

Framework	Reference point	Value	Technical basis
MSY approach	MSY $B_{trigger}$	132000 t	B_{pa}
	F_{MSY}	0.194	EQsim analysis based on the recruitment period 2000–2015.
Precautionary approach	B_{lim}	94000 t	Lowest estimated SSB that resulted in high recruitment (1979).
	B_{pa}	132000 t	$B_{lim} \times \exp(1.645 \times 0.2) \approx 1.4 \times B_{lim}$
	F_{lim}	0.384	EQsim analysis based on recruitment period 2000–2015
	F_{pa}	0.274	$F_{lim} \times \exp(-1.645 \times 0.2) \approx F_{lim} / 1.4$
Management plan	SSB_{mgt}	100000 t, 140000 t	Former $B_{trigger}$ values B_{lim} and B_{pa}.
	F_{mgt}	0.3	Management strategy evaluation.

The procedure for the estimation of F_{MSY} imposes a constraint that the probability of SSB falling below B_{pa} less than 5 %. In the case of this stock the constraint effectively selects values of F in the lower tail of the F_{MSY} distribution and hence is more conservative than a pure MSY strategy and is less likely to maximise yield.

2.3.1.6 Management

Prior to 1983 and the establishment of the conservation pillar of the CFP, Northern shelf haddock were managed partly by coastal states and by North East Atlantic Fisheries Commission (NEAFC) in international waters. Thereafter management has been undertaken jointly by the EU and Norway. Annual management of the fishery operates through TACs for three discrete areas. The first is Subarea 4 (and EU Waters of 2a). The second is Division 3a (EU waters) and the third is Division 6a.

As well as catch limits there are a number of other technical measures used. Minimum mesh sizes have increased over many years and the current size for the principal demersal fleet is 120 mm. Some haddock are caught in *Nephrops* trawls with a minimum mesh size of 80 mm. Major decommissioning schemes took place in 2002 and 2004 that reduced fleet size and capacity and are believed to have been responsible for the large reduction in fishing mortality at around this time (Fernandes & Cook 2013).

Until recently North Sea haddock (ICES subarea 4) were managed by and EU-Norway management plan. However, the combined stock area has made this plan obsolete. However, TACs are based on the Agreed record of 1 December 2017 for 2018. According to this agreement the ICES MSY HCR has been adopted and the distribution of catches between 6a and subarea 4 is defined in the agreed record

The landing obligation and Norwegian discard rules is discussed further in sections 2.3.6 and 2.4.3.

2.3.2 Saithe, North Sea, Rockall and West of Scotland, Skagerrak and Kattegat.

2.3.2.1 Life history

Saithe (*Pollachius virens*) are widely distributed in the North Atlantic. Adults occur mainly around the 200 m depth contour. In late summer and autumn young saithe are found in large numbers within Scottish and Norwegian coastal waters, usually on grounds which are unsuitable for commercial fishing. The adult stock can occur in dense shoals which move around the water column and are often caught in mid-water.

Saithe reach maturity between the ages of four and six years. A medium sized adult female of around 75 cm can produce about 2.9 million eggs during a spawning season. Spawning takes place in late winter and spring near to the edge of the continental shelf to the north and west of the Outer Hebrides. Initially the young fish live near to the surface but by mid-summer they can be found close inshore, in bays and harbours. In their second year they live along the shoreline before eventually moving to deeper water. This offshore migration usually occurs in springtime. Saithe grow quickly reaching 100 cm by the time they are 11 years old.

Saithe are active predators, feeding on the bottom and in mid-water. By weight, fish prey dominates their diet at all times of the year. Herring, Norway pout and sand eel are the main fish species eaten.

2.3.2.2 The fishery

Saithe are predominantly taken in trawl fisheries by Norway, Germany, and France. German and Norwegian fleets operating mainly along the shelf edge in Subarea 4 and Division 3a, while French fleets fish along the northern shelf and west of Scotland (Subareas 4 and 6). A restructuring of the German fleet began in recent years and, in 2016, two vessels switched from otter trawls to paired trawls. The Scottish fleets that operate in Subareas 4 and 6 are often quota limited resulting in discarding. Discards can also be high in a few Danish and

Swedish fisheries in the Skagerrak because these fleets do not have quota allocations (ICES 2017p). Overall, however, discards represent a small fraction of the total catch.

2.3.2.3 Stock assessment

The assessment model currently used is a state-space assessment model (SAM) (Berg & Neilsen 2016). This is an age structured state-space model that accounts for both observation and process error, treating fishing mortality as a random walk. It provides posterior distributions of critical population metrics such as F and SSB using a Laplace approximation. Input data comprise commercial catches (international landings and discards, age and length frequencies from catch sampling); survey index (IBTS Q3, ages 3–8); combined commercial index scaled to the exploitable biomass (French, German, Norwegian trawler fleets). Maturity-at-age and natural mortality are assumed to be constant.

2.3.2.4 Stock trends

Over the period of the assessment catches peaked in the early 1970s and have generally declined to the present day (Figure 9). Fishing mortality increased from the late 1960s and reach a maximum in the mid-1980s. Since then it has declined and is currently below F_{MSY}. The SSB was very high in the 1970s, declined sharply to the early 1990s and has since shown a gradual recovery and is now above $MSYB_{trigger}$. Recruitment at age 3 has fluctuated with a gradual downward trend over the period of the assessment.

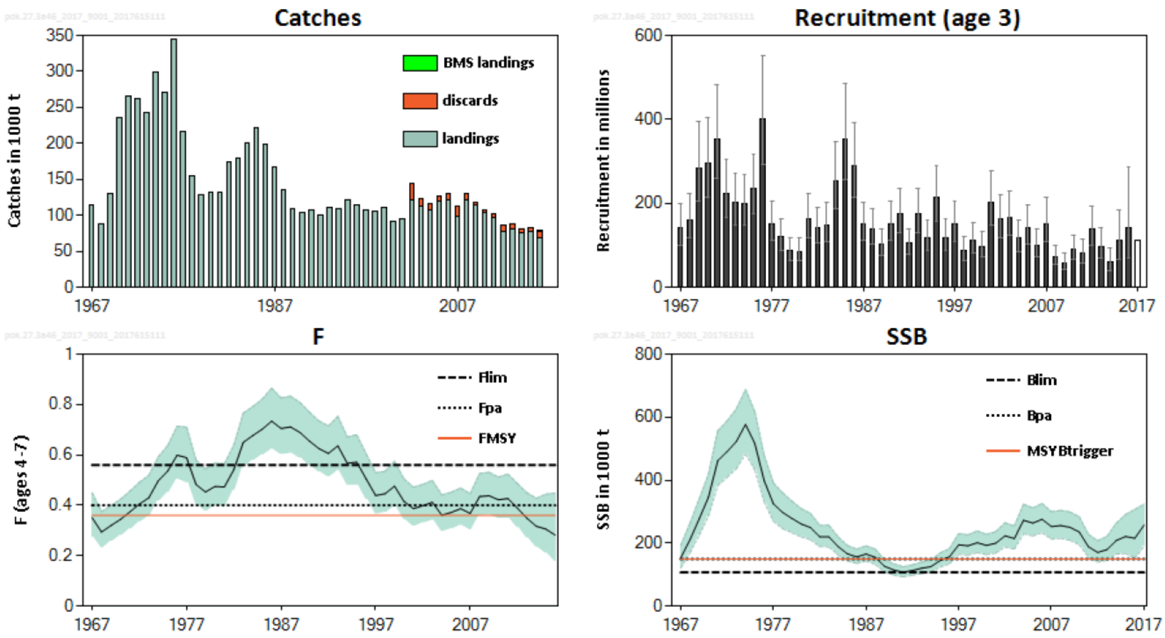

Figure 9. Saithe stock summary ICES (2017q)**.**

2.3.2.5 Reference points

Reference points are shown in Table 10. They are based on an EQsim evaluation that uses a segmented stock recruitment function with B_{loss} as the transition point and a recent period of recruitment. Unlike haddock and whiting, the F_{MSY} value is not heavily constrained by the requirement of a 0.05 probability of falling below B_{lim} and therefore would be expected to maximise yield.

Table 10. North Sea saithe reference points. ICES (2017q).

Framework	Reference point	Value	Technical basis
MSY approach	MSY $B_{trigger}$	150000 t	B_{pa}
	F_{MSY}	0.36	EQsim analysis based on the recruitment period 2003–2015.
Precautionary approach	B_{lim}	107000 t	B_{loss}
	B_{pa}	150000 t	$B_{lim} \times \exp(1.645 \times 0.2) \approx 1.4 \times B_{lim}$
	F_{lim}	0.56	EQsim analysis based on the recruitment period 2003–2015.
	F_{pa}	0.40	$F_{lim} \times \exp(-1.645 \times 0.2) \approx F_{lim} / 1.4$
Management plan	SSB_{mgt}	Not defined	
	F_{mgt}	Not defined	

2.3.2.6 Management

Prior to 1983 and the establishment of the conservation pillar of the CFP, saithe were managed partly by coastal states and by NEAFC in international waters. Thereafter management has been undertaken jointly by the EU and Norway. Catch limits are the principal tool for limiting fishing mortality rate in response to the size of the stock. As well as catch limits there are a number of other technical measures used. Minimum mesh sizes have increased over many years and the current size for the principal demersal fleet is 120 mm.

Changes to the stock assessment and reference points in 2016 imply a need to re-evaluate the EU–Norway management strategy. Until such an evaluation is conducted, the ICES advice is based on the MSY approach.

The landing obligation and Norwegian discard rules is discussed further in sections 2.3.6 and 2.4.3.

2.3.3 North Sea plaice

2.3.3.1 Life history

Plaice (*Pleuronectes platessa*) may be found from the western Mediterranean Sea, along the coast of Europe as far north as the White Sea and Iceland. Occasionally they occur off Greenland. Juveniles are found in shallow coastal waters and outer estuaries. As they grow older they gradually move into deeper water. In the North Sea during summer, juvenile plaice are concentrated in the Southern and German Bights and also occur along the east coast of Britain, and in the Skagerrak and Kattegat. Juveniles are found at lower densities in the central North Sea and are virtually absent from the north-eastern part.

Male plaice become sexually mature at two or three years of age, females mature later when they are four or five years old. Females are larger than males reaching a maximum size of about 40 cm with males approximately 10 cm smaller.

Polychaete worms, tails of *Arenicola* sp. and bivalves are important food groups for plaice. Other important prey includes small crustaceans (e.g. amphipods, mysids and small shrimps), siphons of bivalve molluscs and, in certain areas, brittle stars.

2.3.3.2 The fishery

North Sea plaice is mainly taken in a mixed flatfish fishery for sole and plaice by beam trawls in the southern and central North Sea, the Netherlands being responsible for approximately 42 % of the catch. Directed fisheries are also carried out with Danish seine and gillnet in the central North Sea, and plaice is a by-catch in otter trawl fisheries. After a long-term increase in fishing mortality after World War II, fishing effort of the major fleets exploiting plaice has decreased since the mid-1990s. As the mesh size used in flatfish fisheries is suited to sole, a smaller species, large quantities of discards of small plaice occur.

2.3.3.3 Stock assessment

Until recently the assessment was based on extended survivor analysis (XSA) (Shepherd 1999). Following a benchmark assessment (ICES 2017n) the analytical method used has been changed to a state space model (Aarts & Poos 2009) which models fleet selectivity with splines but otherwise incorporates many of the ideas in current time series models (Berg & Neilsen 2016; Fryer 2001; Gudmundsson 1994). The population dynamics are age structured.

Input data comprise commercial catch, ages and length frequencies from port and observer sampling and six survey indices. Maturity-at-age is assumed constant; natural mortality-at-age is assumed constant at 0.1 year^{-1} (ICES 2017m).

2.3.3.4 Stock trends

Fishing mortality increased steadily from the late 1950s until 1997 but shows a long-term decline thereafter. It has stabilised in the most recent years close to F_{MSY} (ICES 2017m). The decline in F is associated with a strong increase in SSB which is now above $MSYB_{trigger}$ and appears to be on an increasing trajectory. Recruitment shows sporadic large year classes, though none since 1997. Mean recruitment in recent years is higher than the early years. Currently catches are lower than much of the period of the assessment (Figure 10). Discards are a high proportion of the total catch.

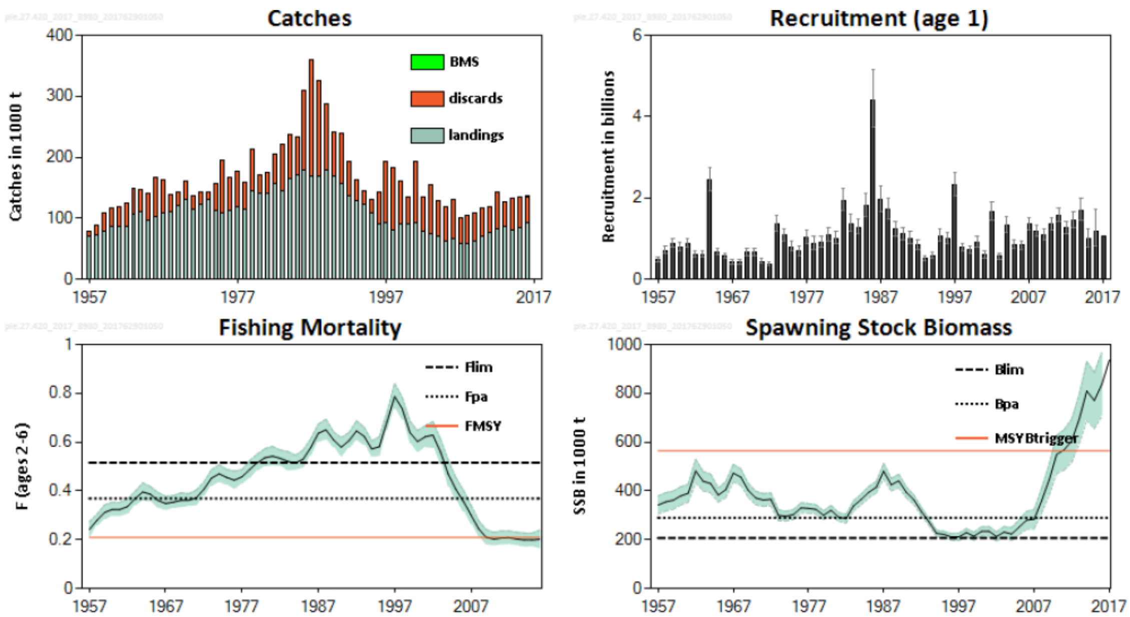

Figure 10. North Sea plaice stock summary (ICES 2017c).

2.3.3.5 Reference points

The reference points have been revised as a result of changes to the assessment and because ICES guidelines require a review when the stock has been at F_{MSY} for more than 5 years. This has meant that $MSYB_{trigger}$ is set to the lower 5th percentile of the recent SSB and is set at a value never seen prior to 2010 despite low fishing mortality rates in the 1950s. F_{MSY} is likely to represent an F that maximises yield as the biomass threshold constraint is unlikely to affect its estimation. The reference points are shown in Table 11.

Table 11. North Sea plaice reference points (ICES 2017c).

Framework	Reference point	Value	Technical basis
MSY approach	MSY $B_{trigger}$	564599 t	Fifth percentile of current SSB (SSB_{2015}/1.4) as estimated at the benchmark.
	F_{MSY}	0.210	EQsim analysis based on the recruitment period 1958–2012.
Precautionary approach	B_{lim}	207288 t	Break-point of hockey stick stock–recruit relationship, based on the recruitment period 1958–2012.
	B_{pa}	290203 t	$B_{lim} \times \exp(1.645 \times 0.2) \approx 1.4 \times B_{lim}$
	F_{lim}	0.516	EQsim analysis based on the recruitment period 1958–2012.
	F_{pa}	0.369	$F_{lim} \times \exp(-1.645 \times 0.2) \approx F_{lim} / 1.4$
Management plan	SSB_{mgt}	230000 t	Stage one: Article 2
	F_{mgt}	0.30	Management strategy evaluation

2.3.3.6 Management

A multiannual plan for plaice and sole in the North Sea was adopted by the EU Council in 2007 (EU 2007) describing two stages of which the first stage should be deemed a recovery plan and its second stage a management plan. ICES has evaluated the plan as in agreement with the precautionary approach. A subsequent evaluation in 2012 addressed amendments to the plan in the context of moving towards stage two of the plan. However, the assessment unit has changed, and no agreement has been reached between the EU and Norway on a method to split the catch between the North Sea and Skagerrak. As a result, ICES advice is provided based on the MSY approach rather than the management plan.

The landing obligation and Norwegian discard rules are discussed further in sections 2.3.6 and 2.4.3.

2.3.4 Northern hake

2.3.4.1 Life history

Hake (*Merluccius merluccius*) are usually found in depths of 70 m - 400 m. Their distribution in the Eastern Atlantic extends from Norway and Iceland, southward to Mauritania. It also inhabits the Mediterranean Sea and along the southern coast of the Black Sea. Adults feed mainly on fish (small hakes, anchovies, pilchard, herrings, cod fishes, sardines and gadoid species) and squids. The young feed on crustaceans (especially euphausids and amphipods). Hake reach maturity at a length of 20 cm – 70 cm. The maximum size is 140 cm and have been reported to reach 20 years of age

The Northern stock is found in ICES Division 3a, Subareas 4, 6 and 7 and Divisions 8a-b, d. Hake spawn from February through to July along the shelf edge, the principal areas extending from the north of the Bay of Biscay to the south and west of Ireland. After their larval pelagic phase, 0-group hake move to depths of more than 200 m, then moving to shallower water with a muddy seabed (75 m – 120 m) by September. There are two major nursery areas: in the Bay of Biscay and off southern Ireland.

2.3.4.2 The fishery

Spain accounts for the main part of the landings (around 43 %) followed by France (around 29 %).

While hake is an important target species, it is taken in mixed fisheries that include megrim, anglerfish, *Nephrops*, sole, sea bass, ling, blue ling, greater forkbeard, tusk, whiting, blue whiting, *Trachurus* spp., conger, pout, cephalopods (octopus, Loligidae, Ommastrephidae and cuttlefish), and rays. The relative importance of these species in the hake fishery varies largely in relation to the different gears, sea areas, and countries involved.

ICES identifies a number of fleets exploiting hake and these are listed in Table 12 (ICES 2014g). The majority of the catch comes from fleets highlighted in bold and includes longlines, gill nets as well as demersal trawls.

Table 12. Fishing fleets exploiting Northern hake (ICES 2014g)**.**

Unit	Gear	ICES Subarea
FU1	**Long line in medium to deep water**	**VII**
FU2	Long line in shallow water	VII
FU3	**Gillnets**	**VII**
FU4	**Non-Nephrops trawling in medium to deep water**	**VII**
FU5	Non-Nephrops trawling in shallow water	VII
FU6	Beam trawling in shallow water	VII
FU8	Nephrops trawling in medium to deep water	VII
FU9	Nephrops trawling in shallow to medium water	VIII
FU10	Trawling in shallow to medium water	VIII
FU12	Long line in medium to deep water	VIII
FU13	**Gillnets in shallow to medium water**	**VIII**
FU14	**Trawling in medium to deep water**	**VIII**
FU15	Miscellaneous	VII & VIII
FU16	**Outsiders (mixed gears)**	**IIIa, IV, V & VI**

2.3.4.3 Stock assessment

Assessment of the Northern hake uses Stock Synthesis (Methot 2000). This is a likelihood-based approach built around and age structure population dynamics model. Although the underlying population dynamics are age based, the model can fit to length frequency data, as is used for this stock. This is done by modelling growth as a function of age and an assumed dispersion of length at age. The fleet length frequencies are treated as observations so that fleet specific size selectivity functions can be estimated. The assessment also uses four research vessel surveys.

The assessment model is well established in the USA, especially for Pacific coast stocks. It does require, however, considerable skill in configuring the model and the statistical assumptions can be far from clear, particularly in relation to assumptions about observation error in the catches and the weighting given to the multinomial components of the likelihood. Extensive sensitivity testing is required to ensure that results are robust.

2.3.4.4 Stock trends

Following a prolonged period of high exploitation since the 1970s, fishing mortality has reduced substantially from 2007 and is now below F_{MSY}. The reduced rate of exploitation is associated with a rapid increase in SSB over the same period with concomitant increases in landings. SSB is now well above $MSYB_{trigger}$. Recruitment is variable and shows little long-term trend.

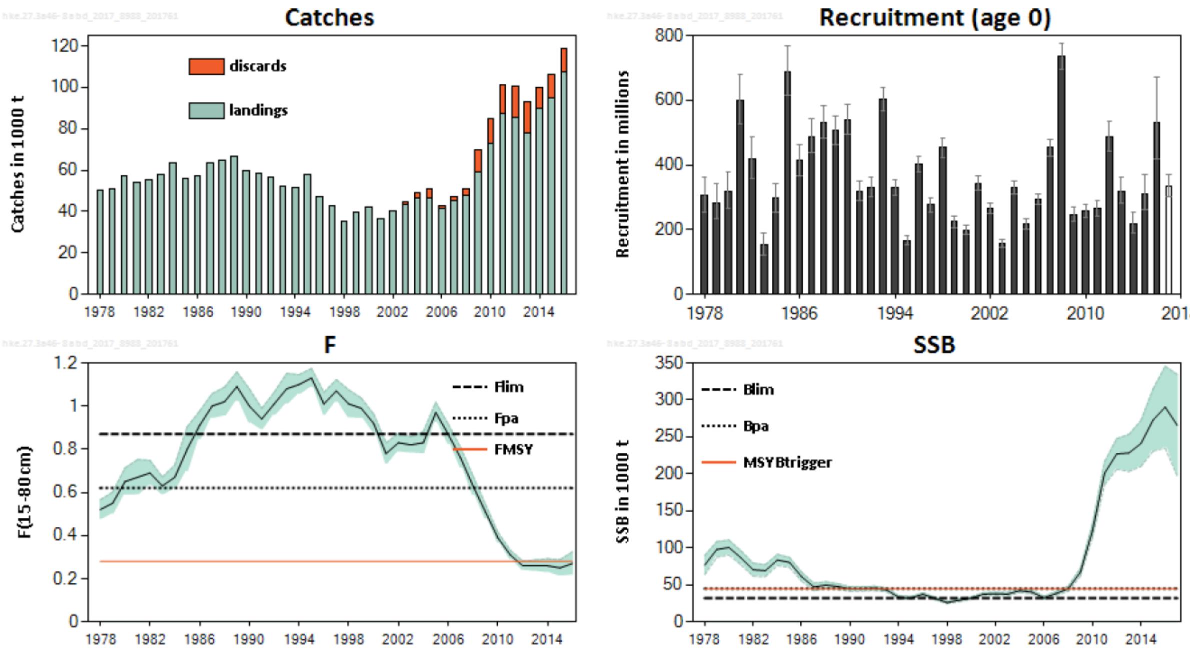

Figure 11. Northern hake stock summary (ICES 2017e)**.**

2.3.4.5 Reference points

Reference points defined by ICES are shown in Table 13. F_{lim} is defined as the fishing mortality that results in a 5 % probability of falling below B_{lim} and is well above F_{MSY}. This means that the constraint applied in the calculation of F_{MSY} will have little effect on its estimation. F_{MSY} will therefore reflect maximising yield.

Table 13. Northern hake reference points.

Framework	Reference point	Value	Technical basis
MSY approach	MSY $B_{trigger}$	45000 t	B_{pa}
	F_{MSY}	0.28	Stochastic simulations on a segmented regression stock–recruitment relationship.
Precautionary approach	B_{lim}	32000 t	A low biomass which was followed by a quick recovery.
	B_{pa}	45000 t	$1.4 \times B_{lim}$
	F_{lim}	0.87	Fishing mortality resulting in a 5% probability of SSB falling below B_{lim}.
	F_{pa}	0.62	$F_{lim}/1.4$
Management plan	SSB_{MGT}	Not defined	

2.3.4.6 Management

The minimum legal sizes for fish caught in Subareas 4, 6, 7 and 8 has been set at 27 cm total length (30 cm in Division 3a) since 1998.

In 2001, an Emergency Plan was implemented by EU for the recovery of the Northern hake stock. In addition, a 100 mm minimum mesh size has been implemented for otter trawlers (>12 m) when hake comprises more than 20 % of the total amount of marine organisms retained onboard. The objective of the recovery plan was to increase the SSB equal to or greater than 140,000 t by limiting fishing mortality to 0.25 and by allowing a maximum change in TAC between years of 15 %. Since the implementation of the recovery plan the reference points have been revised and the stock has clearly recovered. This will require a new management plan. At present management advice is based on the MSY approach.

2.3.5 North Sea whiting

2.3.5.1 Life history

Whiting (*Merlangius merlangus*) are widely distributed throughout the North Sea. Large numbers of immature fish can be found in nursery areas close inshore or in sea lochs whereas the older and larger fish are found in the offshore areas.

There are very large differences between the growth rates of individual fish and a 30 cm fish can be as young as one or as old as six. Although the maximum length may reach 70 cm, a typical large specimen in the North Sea would be 40 cm – 50 cm. At two years old most whiting are mature and able to spawn. The spawning season is prolonged lasting from late January until June. Spawning activity generally peaks in springtime, just as sea temperatures begin to rise.

Young whiting eat mainly crustaceans while adults feed actively on juvenile fish. In the North Sea, whiting are one of the main predators of other commercially important species of fish. Norway pout, sand eel, haddock, cod and even whiting themselves are frequently eaten.

Information on stock identity was reviewed by ICES (ICES 2013a) which concluded that although there was evidence of some sub-structuring of the North Sea population, the assessment should be conducted on the existing unit. There was evidence that the North Sea and West of Scotland assessment units are linked.

2.3.5.2 The fishery

In the northern area, whiting are caught in otter trawl and seine fisheries, with a 120 mm minimum mesh size. These are mixed demersal fisheries targeting mainly cod, haddock and whiting, although there can be important bycatches of other species, notably saithe and anglerfish in the northern and eastern North Sea and Nephrops in the more offshore grounds. Whiting is an important species for the Scottish fleet, with many vessels actively targeting whiting during some fishing trips.

Whiting are a by-catch in some Nephrops fisheries that use a smaller (80 mm) mesh size, although landings are restricted through bycatch regulations. They are also caught in flatfish fisheries that use a smaller mesh size. Fishing for industrial species with small-meshed gear is permitted and these may take a bycatch of whiting but are subject to limits for protected species including whiting. Historically, bycatch of whiting by industrial fisheries for reduction purposes was an important part of the catch, but due to the recent reduced fishery for sand eel and Norway pout the impact of this fishery on the whiting stock is considered much reduced.

2.3.5.3 Stock assessment

This assessment was benchmarked in 2013 (ICES 2013a). New natural mortality values were tested at an interbenchmark in 2016 (ICES 2016r). The assessment uses XSA (Shepherd 1999) which is an age based assessment model. It considers observation error only in the surveys and by modern standards might be considered a somewhat dated approach since the catch data are treated as exact and error free. Input data include commercial catches (international landings, ages from catch sampling by métier), two survey indices (IBTS Q1 & Q3 ages 1 to 5); maturity data assumed fixed through time; time-varying natural mortalities from the stochastic multispecies model (SMS) (ICES 2014b).

Currently ICES censor the data to the period from 1990 onwards. This is partly because discard estimates prior to 1978 are regarded as unreliable and partly because there are conflicting signals between the survey data and the catch data prior to 1990 (Cook 1997). As a result, some of the uncertainty in the stock dynamics are hidden by the selection of a recent time period.

2.3.5.4 Stock trends

Trends from the recent ICES assessment show declining catches with F reducing from 0.7 to values close to 0.2 (ICES 2017r). The SSB declined from 1990 to 2006 but there is some indication of an upward trend in recent years (Figure 12). Recruitment during this period shows no substantial trend but is perhaps lower in recent years. Both F and SSB are a little above their respective MSY limit reference points.

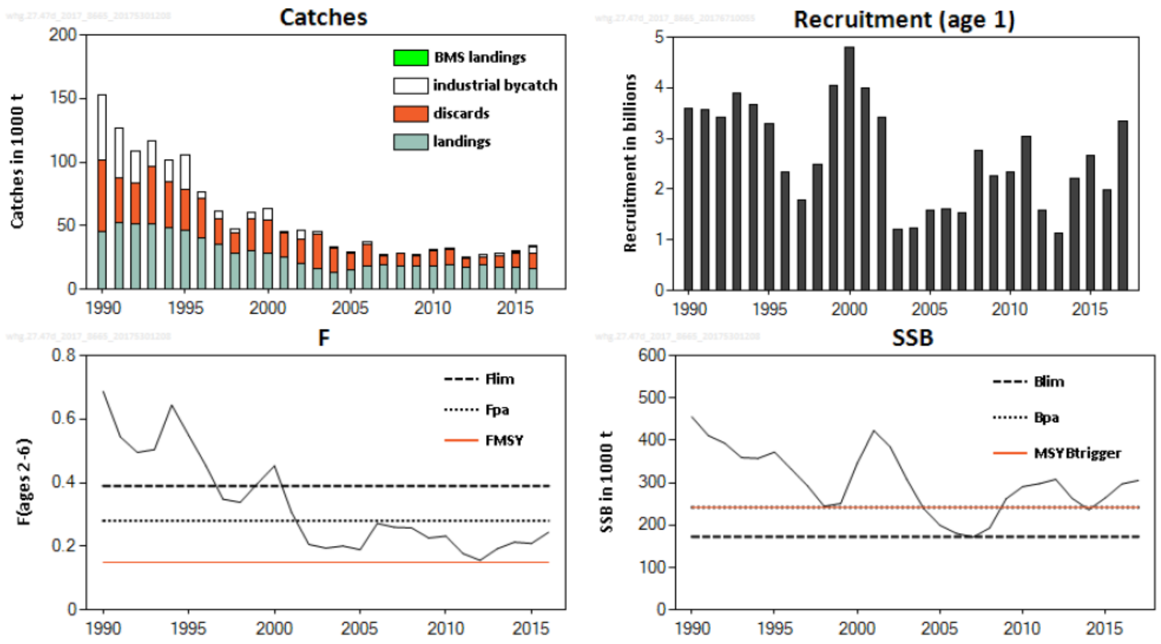

Figure 12. North Sea whiting stock summary (ICES 2017r)**.**

Up to 2001 ICES performed assessments using data from 1960 onwards. When the results of the last complete assessment (ICES 2002) are combined with the most recent ICES assessment (ICES 2017) a more complete picture emerges showing a much larger decline in catches, SSB and recruitment (Figure 13).

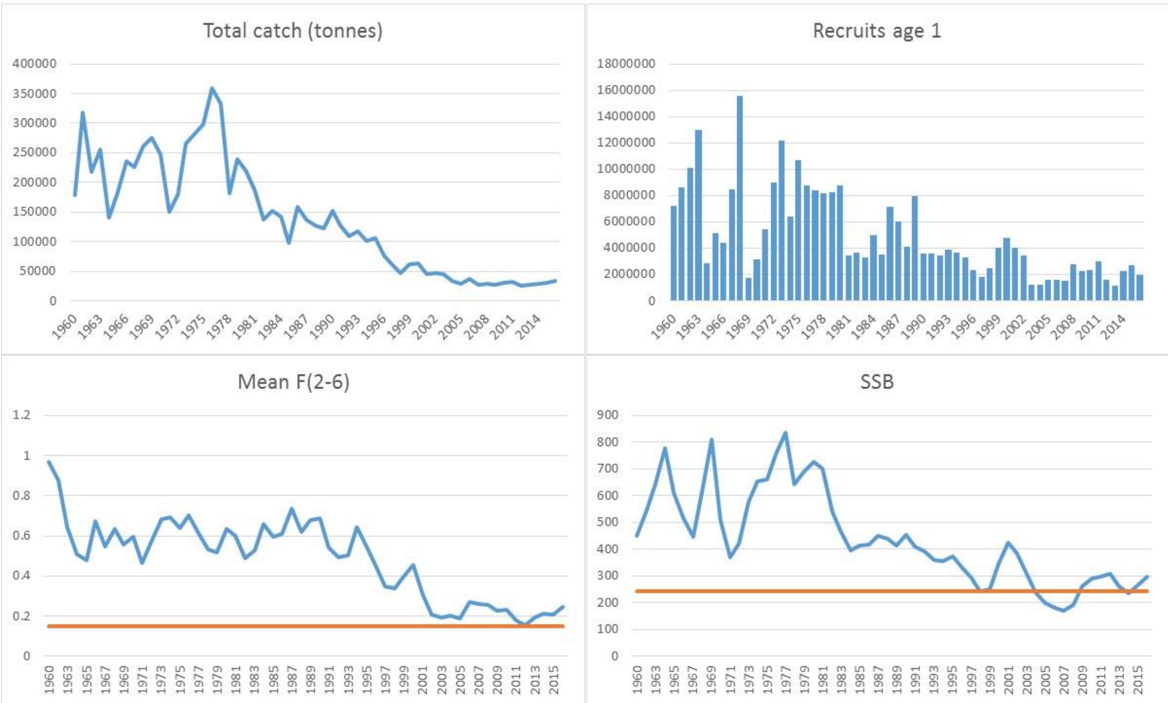

Figure 13. North Sea whiting stock summary. Combined trends from the ICES 2002 and ICES 2017 assessments. The 2002 assessment results are rescaled to account for changes to natural morality values used. Orange lines are equal to MSY reference points in Figure 12.

2.3.5.5 Reference points

The MSY reference points are based on a recent recruitment period and the constraint on the probability of falling below B_{loss}. These reference point essentially express an F that gives a low probability of falling below B_{lim} rather than maximising yield. The values are listed below in Table 14.

Table 14. North Sea whiting reference points (ICES 2017r)**.**

Framework	Reference point	Value	Technical basis
MSY approach	MSY $B_{trigger}$	241 837 t	B_{pa}
	F_{MSY}	0.15	EQsim analysis based on the recruitment period 2003–2014.
Precautionary approach	B_{lim}	172 741 t	B_{loss} (SSB in 2007, as estimated in the 2016 assessment).
	B_{pa}	241 837 t	$B_{lim} \times \exp(1.645 \times 0.2) \approx 1.4 \times B_{lim}$
	F_{lim}	0.39	EQsim analysis based on the recruitment period 2003–2014
	F_{pa}	0.28	$F_{lim} \times \exp(-1.645 \times 0.2) \approx F_{lim} / 1.4$
Management plan	SSB_{MGT}	Not defined	
	F_{MGT}	0.15	F_{MSY}

2.3.5.6 Management

Prior to 1983 and the establishment of the conservation pillar of the CFP, North Sea whiting were managed partly by coastal states and by NEAFC in international waters. Thereafter management has been undertaken jointly by the EU and Norway.

As well as catch limits there are a number of other technical measures used. Minimum mesh sizes have increased over many years and the current size for the principal demersal fleet is >100 mm. Some whiting are caught in Nephrops trawls with a minimum mesh size of 80 mm. Major decommissioning schemes took place in 2002 and 2004 that reduced fleet size and capacity and are believed to have been responsible for the large reduction in fishing mortality at around this time (Fernandes & Cook 2013).

Because of updated natural mortality estimates (ICES 2016r; ICES 2015g), the EU-Norway management strategy (fixed F without $B_{trigger}$ and with TAC constraints; ICES (2013a)) used in previous advice is no longer considered precautionary. Currently, ICES provide advice on the MSY approach (with $B_{trigger}$).

The landing obligation and Norwegian discard rules is discussed further in sections 2.3.6 and 2.4.3.

2.3.6 Landing obligation

The introduction of the Landing Obligation (EU 2015) is intended to eliminate discarding of fish at sea and requires the majority of fish species caught to be landed. At present this regulation is being phased in and affects some fleets currently catching the species and gears in the UoAs under consideration here. At present (2017) hake is only required to be landed from longline vessels not demersal trawls in North Sea and North West Waters (Gov.Scot 2017a). ICES (2017r) has not yet been able to assess the extent to which fish that were previously discarded are being landed. This is of most importance where the TAC is topped up to allow for these additional landings of previously discarded fish. If the TAC is topped up in such a way that landings increase but with no reduction in discard rates, then there is a potential weakening of catch controls. The landing obligation and Norwegian discard rules is discussed further in section 2.4.3.

2.3.7 North Sea Multi Annual Management Plan

Until 2013, several commercial fish stocks in the North Sea were managed by species-specific long-term management plans. These included strict harvest control rules to set fishing opportunities when reference points were reached, and in many cases also effort regimes where days-at-sea were limited. This was the case for cod, hake and plaice (EU 2008a; EU 2004; EU 2009)

In 2016, following the 2013 revision of the CFP, the EC proposed a new multiannual management plan for the North Sea basin for several commercial target species (EU 2016c). The proposal includes a HCR when the stocks are below and above reference points, somewhat following ICES' MSY advisory rule (ICES 2017f), although its specificity is not clear. The proposal considers species: a) that should be managed according to MSY (F_{MSY} by 2020), b) species that may be managed according to the precautionary approach if MSY scientific advice is not available, and c) other species not subject to catch limits to be managed based on the precautionary approach. If stock biomass is below reference points "appropriate remedial measures shall be adopted to ensure rapid return of the stock or functional unit concerned to levels above those capable of producing maximum sustainable yield." Remedial measures include fishing opportunities set at levels consistent with a fishing mortality taking into account the decrease in biomass or abundance, or adequate reduction of fishing opportunities and suspending the targeted fishery.

The EC proposal has been amended and agreed internally by the Council of the EU and the European Parliament (EP) separately, before entering a negotiation process (trialogue) between the two institutions (EU 2016c). Trialogue concluded on the 7th December 2017 when inter alia the following provisions were agreed (CEU 2017)

- The plan is applicable to two groups of species, target and bycatch, to be managed in accordance with the MSY and precautionary approach, respectively;
- F_{MSY} ranges to deal with mixed-fisheries issues;
- Inclusion of recreational catches in some fishing opportunities.

However, to date no agreed text has been disclosed. Therefore, it continues to be unclear which management provisions will apply to many of the Principle 1 species under assessment.

2.4 Principle Two: Ecosystem Background

2.4.1 Main retained and bycatch species in this fishery

Table 15 and Table 16 give landings data for the North Sea (Subarea 4) and the W. Scotland (Subarea 6a) for the Scottish fleet, 2013-15, for all species making up 2 % or more of landings for that gear type. Note that data for Division 3a (Skagerrak) were also provided; however these showed landings of only cod and haddock and are therefore not shown here. The initial list of 'main' retained and bycatch species was derived from this table, based on those making up >5 % of landings from any gear type (including those where landings are >5 % in the FDF (fully-documented fishery) or the non-FDF only, where applicable).

Table 17 gives proportional catch estimates provided by Marine Scotland (i.e. this incorporates discards as well as landings). Note that this is provided for fish species only (i.e. excluding *Nephrops*) and divides gear up only into categories TR1 and TR2. These data have therefore been used to check the analysis of 'main' species taken from the landings data. As most of the non-P1 stocks are shared across both areas (North Sea and West Coast Scotland), the two areas have been analysed as a combined stock, in order to provide an overall impact of the fishery, but for species where there are separate stocks in the North Sea and W. Scotland (i.e. cod and whiting) the team have analysed the two areas independently (Table 18).

The following rules were used to complement the 'main' species derived from the landings data with those identified on the basis of the proportional catch estimates:

- The column percentages in Table 17 total 100 % but the data do not include *Nephrops*; these percentages are therefore proportions of the fish catch not the total catch. For the purpose of evaluating 'main' species for the TR2 gears, it was assumed based on Bergmann et al. (2002) that the split between *Nephrops* and fish in the catch is 40 % / 60 %[1]. Hence the cut-off for distinguishing a 'main' species based on the fish-only catch data for TR2 gears is 8.3 %, rather than 5 %.
- If the catch data show a species as 'main' in two or more of the three years (applying the above rule), it is added to the list, even if not 'main' according to the landings data (this applies to witch for TR2 gears). If it shows a species as main only in one year, and if it is also not main when totalled across the three years, it is not added.
- If a species/stock is considered vulnerable because it is depleted ($B<B_{lim}$), the cut-off applied is 2 % rather than 5 %; or 3.3 % based on the TR2 catch data without *Nephrops* (this applies to W. Scotland cod and whiting).

The complete list of 'main' species for each gear type is given in Table 19 and Table 20. Most main species are identified in the landings data, but the catch data add witch as main species for TR2 gears. The analysis of cod and whiting by stock (North Sea vs. W. Scotland) shows

[1] Bergmann et al. (2002) estimate total catch of *Nephrops* trawls by volume, including invertebrates (starfish etc.), in two areas on the west coast. For the purpose of this exercise we have taken the total *Nephrops* catch relative to the total *Nephrops* plus fish catch, and also made the assumption that catch by volume and catch by weight are approximately equivalent for these groups. The figures from the two areas were 41 % and 74 %; to be precautionary we have taken the lower figure and rounded it down to the nearest 10 %.

that, applying the lower cut-off for W. Scotland stocks, all four stocks are main for TR1 gears, while for TR2 gears all are main except North Sea cod. A list of the relevant stocks, their status and management, is given in Table 21. The relevant *Nephrops* functional units have been determined based on the proportion of Scottish landings coming from these areas (Table 22).

Table 19 shows the discard rates of these species, along with total landings and discards for each area as estimated by Marine Scotland. It shows that there are no 'main' species which are always discarded. Hence all 'main' species qualify as 'retained' rather than 'bycatch' (i.e. they are therefore scored under Component 2.1. rather than Component 2.2). There are some minor bycatch species – i.e. common dab, flounder, tusk, red mullet, grey gurnard and brill, which are bycatch. All species are bycatch in both the North Sea and W. Scotland except brill which is only bycatch in West of Scotland and tusk which is bycatch in the North Sea.

Table 15. North Sea % landings by species for all species making up >2 % of total landings for that gear métier, 2013 - 2015. Note: These data are from Subarea 4 only; data from Division 3a were provided but include only cod and haddock so are not shown here. DS=Danish seine, OTS=single trawl, OTT=twin trawl, OTP=pair trawl, SS=Scottish seine, FDF=fully documented fisheries (for each FDF column the gear is the same as the previous column). The row 'total' is provided so that it is clear how much of the total landings are covered (i.e. 100 %-total is the % of the landings made up of species making up <2 % individually). Data provided by Marine Scotland.

Species	DS TR1	OTS TR1	OTS FDF	OTT TR1	OTT FDF	OTP TR1	OTP FDF	SS TR1	SS FDF	OT TR2	OTT TR2
Cod (*Gadus morhua*)	18.6	13.3	27.3	12.1	30.3	17.7	20.5	15.2	15.5		
Haddock (*Melanogrammus aeglefinus*)	46.5	31.3	26.8	19.6	14.2	48.3	46.3	54	63.7	9.4	11.7
Hake (*Merluccius merluccius*)	3.7	2.1	2.2			5.1	8	2.2	3.8		
Ling (*Molva molva*)	2.4	3.5	2.1	4.4	12.8						
Megrim (*Lepidorhombus whiffiagonis*)	2.7	2.7		4.5							
Saithe (*Pollachius virens*)	3.6	8.8	9.6	7.2	18.2	10.3	11.1	3	3.3		
Whiting (*Merlangius merlangus*)	17.6	10.9	6.6	9.7	6.1	13.3	9.4	19.3	9.7	9.1	10.7
Anglerfish (*Lophius budegassa* and *Lophius piscatorius*)		9.8	8.2	13.5	10.5					5.7	5.8
Nephrops (Nephrops norvegicus)		3.9	6.2	5.9						66.3	63.4
Plaice (*Pleuronectes platessa*)		6.9	3.7	15.3							
Witch (*Glyptocephalus cynoglossus*)										2.3	2.5
Total	**95.1**	**93.2**	**92.7**	**92.2**	**92.1**	**94.7**	**95.3**	**93.7**	**96**	**92.8**	**94.1**

Table 16. W. Scotland (Division 6a) percentage landings by species for all species making up >2 % of total landings for that gear métier, 2013-15. DS=Danish seine, OTS=single trawl, OTT=twin trawl, OTP=pair trawl, SS=Scottish seine, FDF=fully documented fisheries (for each FDF column the gear is the same as the previous column). The row 'total' is provided so that it is clear how much of the total landings are covered (i.e. 100 %-total is the % of the landings made up of species making up <2 % individually). Data provided by Marine Scotland.

Species	DS TR1	OT TR1	OTT TR1	OTP TR1	SS TR1	OT TR2	OTT TR2
Haddock	79.4	28.8	9.6	61.5	91.1		
Hake	4.8	3.6	2	2.3			
Ling	2	6	6				
Megrim	4.1	3.5	7.6				
Saithe	2.4	25.6	29.1	32.8			
Whiting	3.1				2.4		
Anglerfish		10.2	12.6				
Blue ling		3.3					
Nephrops		7.1	26.9			97	93.1
Total	**95.8**	**88.1**	**93.8**	**96.6**	**93.5**	**97**	**93.1**

Table 17. % catch estimates (landings plus discards), for fish only, 2013-15, for North Sea and W. Scotland, gear separated into TR1 vs TR2. Note: 0 = catch estimated to be zero; blank = no data given (the list of species included in this analysis varied over the time period). Data provided by Marine Scotland.

Species	TR1			TR2		
	2013	2014	2015	2013	2014	2015
Anglerfish (*Lophius budegassa* and *Lophius piscatorius*)	4.7	6.5	9.9	11.2	11.3	11.8
Black Scabbardfish (*Aphanopus carbo*)			0			0
Blue ling (*Molva dypterygia*)			0.4			0
Brill (*Scophthalmus rhombus*)		0	0		1.6	4.2
Cod (*Gadus morhua*)	13.8	15.7	16.7	6.1	8	4.4
Common dab (*Limanda limanda*)		0.3	0.3		1.9	3.7
Flounder (*Platichthys flesus*)			0.2			2.1
Grey gurnard (*Eutrigla gurnardus*)		0.5	0.6		3.4	4.6

Species	TR1			TR2		
	2013	2014	2015	2013	2014	2015
Haddock (M. *aeglefinus*)	39	39.2	33.7	26.9	20.2	9.5
Hake (M. *merluccius*)	4		4.4	4.1		6.9
Lemon sole (*Microstomus kitt*)	1.1	1.1	1.2	3.2	4.9	5.6
Ling (*M. molva*)	3.3	3.5	0.9	3.1	2.7	1.2
Megrim (*L. whiffiagonis*)	2.8	2.5	2.3	1.7	4.5	4.6
Plaice (P. *platessa*)	5.2	4.8	5	5	3.9	7.6
Pollack (*Pollachius pollachius*)	0.7	0.6	0.7	0.1	0.1	0.1
Red mullet (*Mullus surmuletus*)			0.1			0.5
Saithe (*P. virens*)	14	13.5	11.9	5.5	6.4	2.9
Sole (*Solea solea*)		0	0		0.2	1.7
Tusk (*Brosme brosme*)			0.1			0.5
Turbot (*Scophthalmus maximus*)	0.1	0.1	0.1	1.5	2.8	3.6
Whiting (*M. merlangus*)	10.6	10.8	10.5	24.5	17.2	13.1
Witch Flounder (*G. cynoglossus*)	0.7	0.9	0.8	7.2	11.1	11.4

Table 18. Percentage catch estimates (landings plus discards), for cod and whiting, separated by area 2013 - 2015 and gear separated into TR1 vs TR2. Note: 0 = catch estimated to be zero; blank = no data given (the list of species included in this analysis varied over the time period). Data provided by Marine Scotland.

Species	TR1			TR2		
	2013	2014	2015	2013	2014	2015
North Sea						
Cod	15.3	17.5	18.9	5.4	4.7	4.3
Whiting	11.8	12.0	12.0	28.3	19.3	14.2
W. Scotland						
Cod	2.7		3.0	8.1	18.5	4.6
Whiting	2.3	2.1		13.8	10.5	11.4

Table 19. Percentage catch estimates (landings plus discards), separated by area data for 2013 – 2015 combined. Species considered discards are highlighted in grey. Data provided by Marine Scotland.

North Sea (NS)					West of Scotland (WS)				Retained / discard
Species	Landed	Discard	Mean discard rate	% catch	Landed	Discard	Mean discard rate	% catch	
Common Dab	0	561	100.0	0.2	0	160	100.0	0.4	Discard
Flounder	0	191	100.0	0.1	0	65	100.0	0.2	Discard
Red mullet	0	120	100.0	0.1	0	0	100.0	0.0	Discard
Tusk	0	120	100.0	0.1	0	0	100.0	0.0	Discard in NS
Grey Gurnard	104	856	87.0	0.4	0	283	100.0	0.8	Discard
Hake	6,145	633	60.4	2.9	772	322	72.2	3.0	Retain
Ling	3,897	575	50.2	1.9	1,925	469	40.0	6.6	Retain
Plaice	11,893	1,006	44.2	5.5	133	560	48.8	1.9	Retain
Saithe	14,374	815	44.2	6.5	5,955	247	37.7	17.2	Retain
Brill	19	118	42.8	0.1	1	163	100.0	0.5	Discard in WS
Sole	12	84	41.7	0.0	5	16	38.7	0.1	Retain
Cod	37,898	1,007	41.1	16.6	414	764	91.4	3.3	Retain
Whiting	28,014	836	30.9	12.3	316	775	69.3	3.0	Retain

North Sea (NS)					West of Scotland (WS)				Retained / discard
Species	**Landed**	**Discard**	**Mean discard rate**	**% catch**	**Landed**	**Discard**	**Mean discard rate**	**% catch**	
Saithe	8,961	349	28.8	4.0	3,474	131	28.1	10.0	Retain
Lemon Sole	2,252	587	28.2	1.2	118	627	43.2	2.1	Retain
Megrim	4,290	829	26.6	2.2	1,412	486	25.9	5.3	Retain
Haddock	86,748	758	21.8	37.4	10,104	489	48.1	29.4	Retain
Witch Flounder	1,120	745	17.3	0.8	115	513	40.3	1.7	Retain
Anglerfish	11,399	395	10.2	5.0	2,505	287	15.3	7.7	Retain
Witch	373	224	8.5	0.3	85	333	39.5	1.2	Retain
Turbot	198	97	6.7	0.1	23	289	17.2	0.9	Retain
Anglerfish	3,545	59	1.7	1.5	1,026	227	25.5	3.5	Retain
Pollack	1,230	324	0.5	0.7	63	18	0.0	0.2	Retain
Total	**222,472**	**11,289**	**31.6**	**100.0**	**28,816**	**7,230**	**43.6**	**100.0**	

Table 20. Main retained stocks as evaluated by landings and catch data (P1 species excluded).

Stocks	Main for which gears?	Note
W. Scotland whiting	all	
N. Sea cod	all TR1	MSC certified
W.Scotland cod	all	
Anglerfish	single and twin trawls TR1 and TR2	
Nephrops	single and twin trawls TR1 and TR2	
Ling	twin trawl TR1	
Megrim	twin trawl TR1	
Witch	all TR2 trawls	

Table 21. Main retained stocks, status and management (excluding P1 stocks)

Stock	Status	Management	Ref.
Whiting 6a	$B<B_{lim}$ but increasing since ~2010; $F<<F_{MSY}$	TAC for 6a+b; but majority of catch is discarded; not part of Landing Obligation (LO) as yet	(ICES 2016x)
Cod 3a20, 4, 7d	$B<MSYB_{trigger}$; $F>F_{MSY}$	EU Norway long-term management plan	ICES (2017b)
Cod 6a	$B<<B_{lim}$, $F>F_{lim}$	EU long-term management plan modified in 2016; zero TAC but bycatch can be landed up to 1.5 % total landings; not part of LO as yet	(ICES 2017a)
Anglerfish 3a, 4, 6	Biomass index increasing since 2011	Precautionary framework for category 3 data limited stocks; change in biomass index over time used to determine change in precautionary TAC	(ICES 2016a)
Nephrops	see Table 22		
Ling NE Atlantic and Arctic	Biomass index increasing since 2001	Precautionary framework for category 3 data limited stocks; change in biomass index over time used to determine change in precautionary TAC	ICES (2017g)
Megrim 4a, 6a	$B>>MSYB_{trigger}$, $F<<F_{MSY}$	MSY approach (target is F_{MSY})	ICES (2017h)
Witch 3a, 4, 7d	B estimated at $\sim=B_{MSY}$; $>MSYB_{trigger}$	Precautionary TAC for 3a and 4 combined with lemon sole; no TAC in 6a; not part of LO as yet	ICES (2017s)

Table 22. Relevant *Nephrops* functional units (FU), status and management.

Stock	Status	Management	Ref.
FU7 – Fladen Ground	$B>MSYB_{trigger}$, $F<<F_{MSY}$ proxy	MSY approach: Proxy F_{MSY} estimated at harvest rate (including discards) of 7.5 %, estimated from UWTV surveys	ICES (2017j)
FU8 – Firth of Forth	$B>>MSYB_{trigger}$, $F<F_{MSY}$ proxy	MSY approach: Proxy F_{MSY} estimated at harvest rate of 16.3 %	ICES (2017k)
FU9 – Moray Firth	$B>MSYB_{trigger}$, $F\sim=F_{MSY}$ proxy	MSY approach: Proxy F_{MSY} estimated at harvest rate of 11.8 %	ICES (2017l)
FU11 – North Minch	$B>MSYB_{trigger}$, $F<F_{MSY}$ proxy	MSY approach: Proxy F_{MSY} estimated at harvest rate of 10.8 %	(ICES 2016k)
FU12 – South Minch	$B>MSYB_{trigger}$, $F<F_{MSY}$ proxy	MSY approach: Proxy F_{MSY} estimated at harvest rate of 11.7 %	(ICES 2016l)
FU13 – Firth of Clyde / Sound of Jura	$B>>MSYB_{trigger}$, F variable, fluctuating around F_{MSY} proxy	MSY approach: Proxy F_{MSY} estimated at harvest rate of 15.1 % (FoC) and 12.0 % (SoJ)	(ICES 2016m)
FU15 – Irish Sea West	$B>MSYB_{trigger}$, $F>F_{MSY}$ proxy	MSY approach: Proxy F_{MSY} estimated at harvest rate of 18.2 %	(ICES 2016n)

2.4.2 Management of depleted stocks

Two “main” stocks are depleted (B<B_{lim}): W. Scotland whiting and W. Scotland cod. For whiting, ICES advice is to minimise catch, and a very small TAC (213 t) is set for Divisions 6a and 6b combined. ~80 % of the catch is discarded, and management at the Scottish level has focused on improving selectivity to reduce discards; with some success according to ICES (ICES 2016x). Management has reduced the fishing mortality to well below F_{MSY}, and since 2010, the spawner biomass has been on an upwards trajectory (Figure 14). For W. Scotland cod, the situation is less positive; although catches have reduced significantly (by a factor of 10) since the 1980s, ICES’ estimates of fishing mortality have remained high and there is no sign of recovery of the spawning biomass (Figure 15).

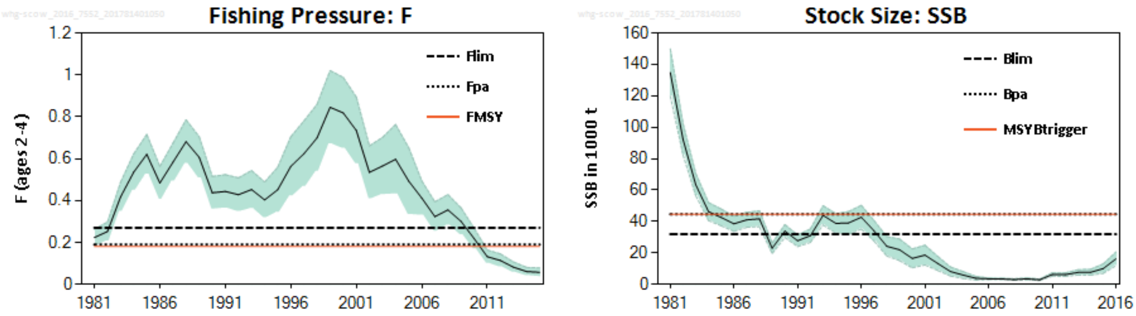

Figure 14. Fishing mortality (left) and spawner biomass (right) for W. Scotland whiting (ICES 2016x)**.**

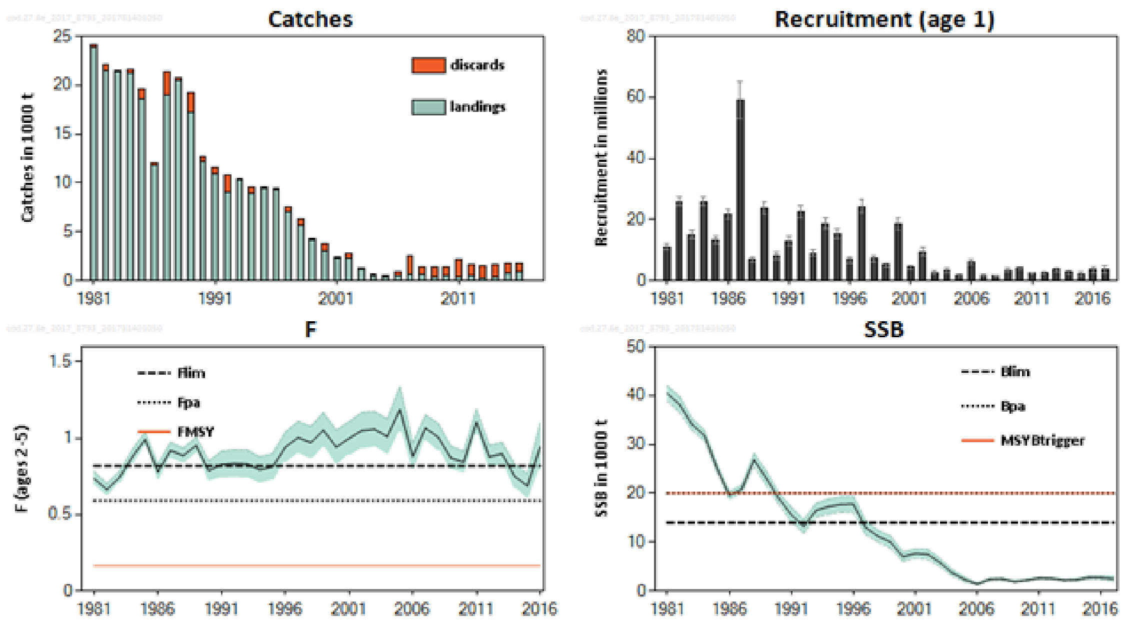

Figure 15. W. Scotland cod: Top left – catch; top right – recruitment; bottom left – fishing mortality; bottom right – spawning biomass; (ICES 2017a)**.**

In order to match the estimated mortality rate of the stock to the catch data, ICES assumed a high rate of area misreporting – the assumption in the assessment includes 28 % of total catch being made up of this ‘misreporting adjustment’ – this is more than the total landings (either official or ICES estimate). Until 2012, ICES used estimates of the quantity misreported data provided by Marine Scotland Compliance. After 2012, estimates of misreporting dropped, but a combination of factors (the switch to eLogbooks resulting in less manual checking, and some staff retirements) led ICES to suppose that they may no longer be accurate. For the interbenchmark (ICES 2015e), ICES developed a method to estimate area misreporting as follows:

- Define a 'high cod area' within 6a (essentially the NE corner where it abuts Subareas 4 and 5 as well as the north coast of Scotland)
- Use VMS data to define trips where there was fishing in this area and either 4 or 5
- Allocate the cod catch for these trips equally to each VMS ping when the vessel was fishing.

This provided a method for ICES to estimate area misreporting independent of the stock assessment model, but it does not have any basis of information about the amount of misreporting – in fact, it assumes it is systematic.

According to Marine Scotland Compliance (email from Gordon Hart, 15/8/17), the figures used by ICES are derived from an unverified provisional analysis of suspected area misreporting, which is intended to identify fishing trips where there is a suspicion or possibility of area misreporting, but not to identify actual misreporting by trip or by tonnage (the purpose being to deploy enforcement resources most effectively). Their experience suggests that real-world cases of misreporting are normally small ('considerably less than 10 t by species'), and they do not accept that ICES' analysis is valid use of this compliance data.

Cook et al. (2015) put forward an alternative theory for the high mortality rate, with the 'missing' mortality coming from grey seal predation. It is known that a predator with a type two functional response can cause depensatory mortality in the prey species; i.e. that the mortality rate from predation increases as the prey population size or density decreases – also called an 'Allee effect' (Gascoigne & Lipcius 2004). Cook et al. (2015) compare three models; i) a base case model without seal predation (corresponding more or less to the ICES stock assessment model; the 'no-seal model'); ii) a model with constant seal 'catchability'; seal remove a fixed proportion of cod, hence applying a mortality rate which is constant across all levels of biomass (the 'constant-seal model'; and iii) a model which incorporates data on seal population size and consumption rates of cod (the 'full-seal model').

The model outputs are summarised in Figure 16 (upper panel). All three models (as well as ICES) agree on the biomass trajectory, but the conclusions regarding fishing mortality are extremely divergent. According to ICES, fishing mortality increased over the time period, the non-seal and constant-seal models suggest a flat trajectory, while the full seal model suggests a consistent decline. This declining trajectory is what would be expected based on changes in effort in the fishery.

This initial model only ran to 2005 (because of availability of seal population and consumption data), but the full-seal model was subsequently updated to 2012 (Cook & Trijoulet 2016) (Figure 16, middle and lower panels); this shows the same pattern, i.e. agreement with ICES in relation to biomass trends, but lower rates of fishing mortality.

Figure 17 (Cook et al. 2015) shows the proportions of total mortality made up of different components (natural mortality, fishing mortality from landings, fishing mortality from the area misreporting adjustment and seal predation) according to ICES and the various models.

It is clear from Figure 17 that observed total mortality is higher than would be expected from (assumed) natural mortality and fishing mortality, and this ‘missing mortality’ is accounted for by seal predation in the full-seal model. Where seal predation is not included (or assumed to be constant – i.e. the ICES, no-seal and constant-seal models) the missing mortality is accounted for by assuming increasing amounts of area misreporting.

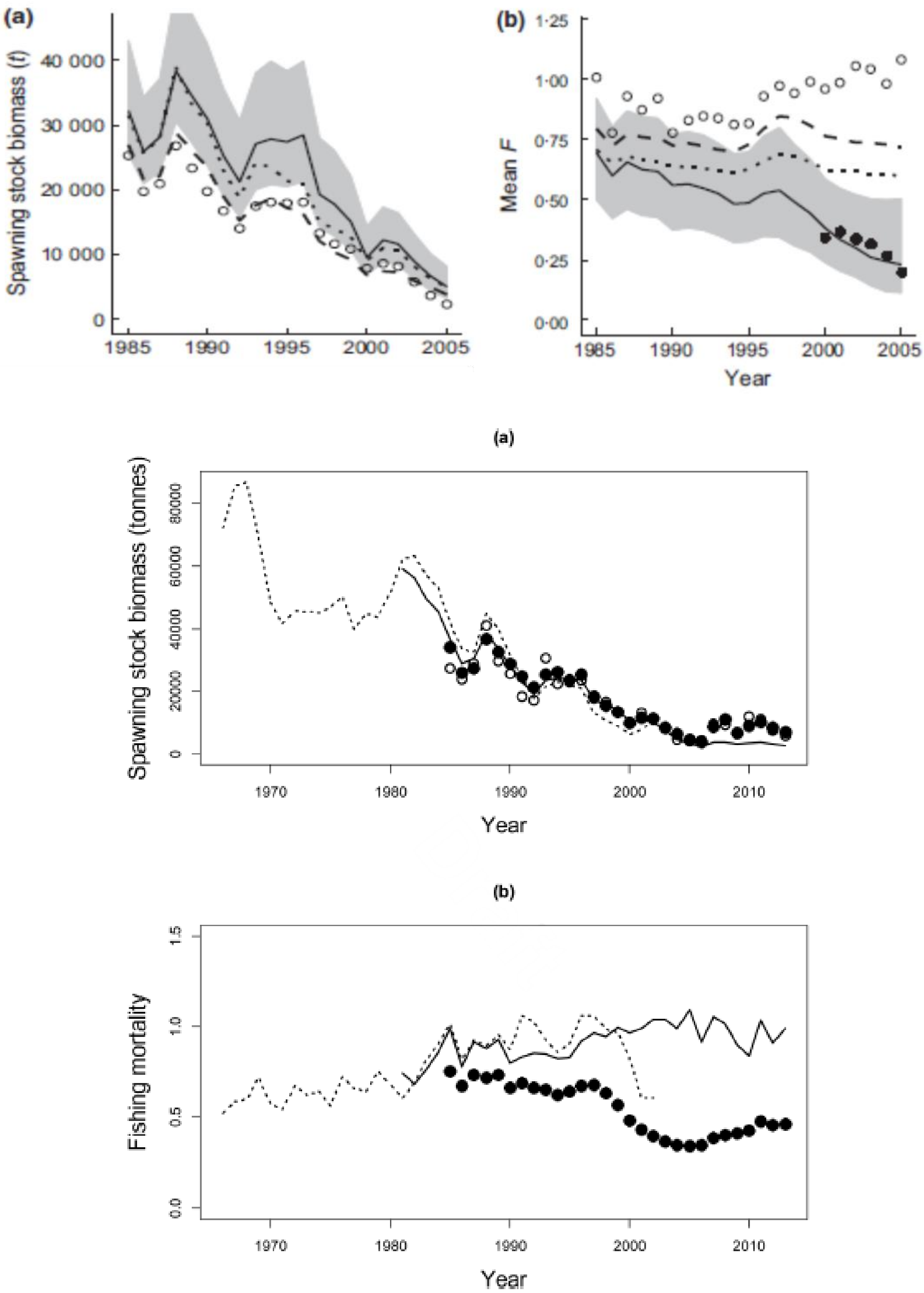

Figure 16. Upper panel: Spawning stock biomass (a) and fishing mortality (mean ages 2-5) (b) as estimated by ICES (open circles), the non-seal model (dashed), the constant-seal model (dotted) and the full-seal model (solid line and grey confidence intervals). Dark circles are scaled fishing effort from Scottish vessels. Figure 2 in Cook et al. (2015)**. Middle panel: As upper panel (a), updated to 2012, for the ICES stock assessment 2002 (dotted), ICES 2014 (solid), full-seal model (black dots); open dots show the cod biomass available to seals as estimated by the full-seal model. Figure 1 in** Cook & Trijoulet (2016)**.**

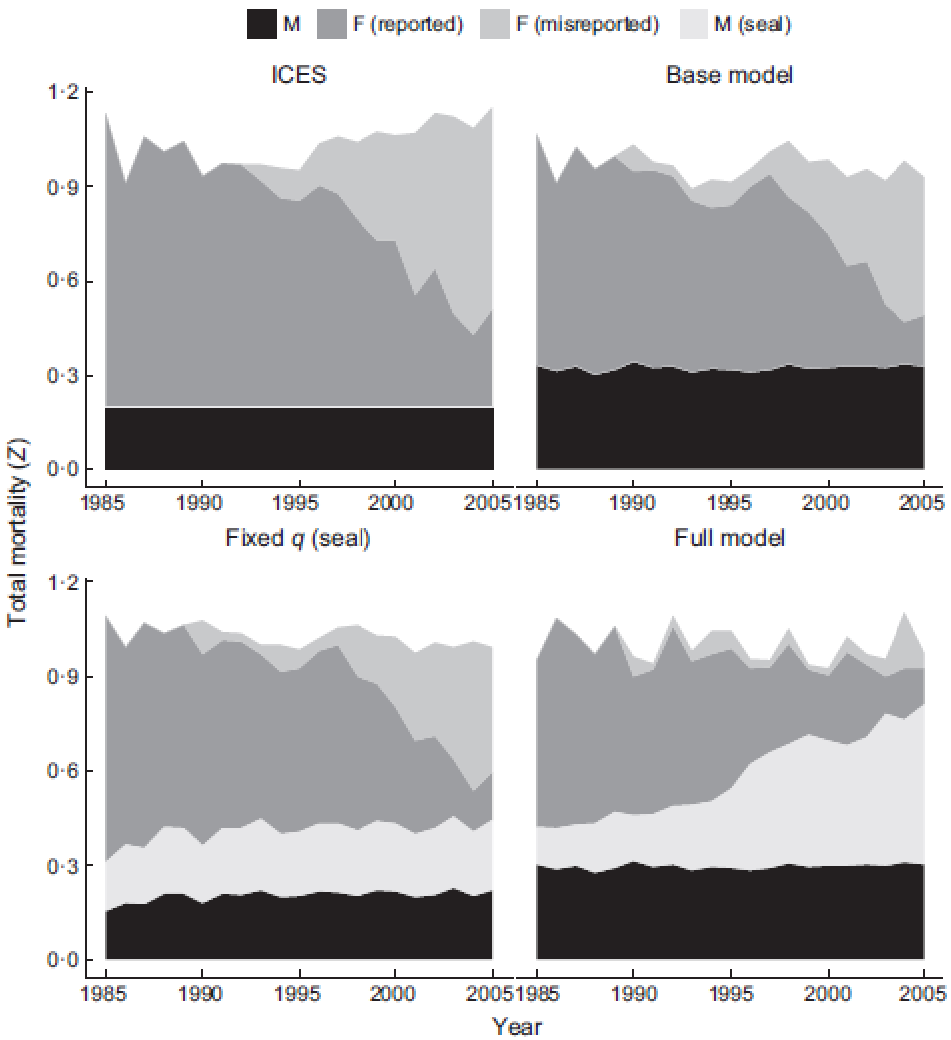

Figure 17. Composition of total mortality under the four models: Top left – ICES; Top right – no-seal; Bottom left – constant-seal; Bottom right – full-seal model. Black=natural mortality (assumed); dark grey=fishing mortality (from reported catches); mid grey= assumed fishing mortality from misreporting; light grey= seal mortality. Figure 7 in (Cook et al. 2015)**.**

Cook & Trijoulet (2016) also evaluate the probability of further decline of the stock biomass in relation to changes in rates of fishing effort and seal predation relative to the recent (2013) situation (Figure 18). It appears that biomass has approximately equally sensitivity to proportional changes in each: the current situation gives a probability of decline of ~16 % over 5 years and ~25 % over 50 years; a change in either fishing effort or the seal population to 1.2 times the 2013 level increases this to ~23 % / 35 %; an increase of this proportion in both increases it to ~30 % / 50 %.

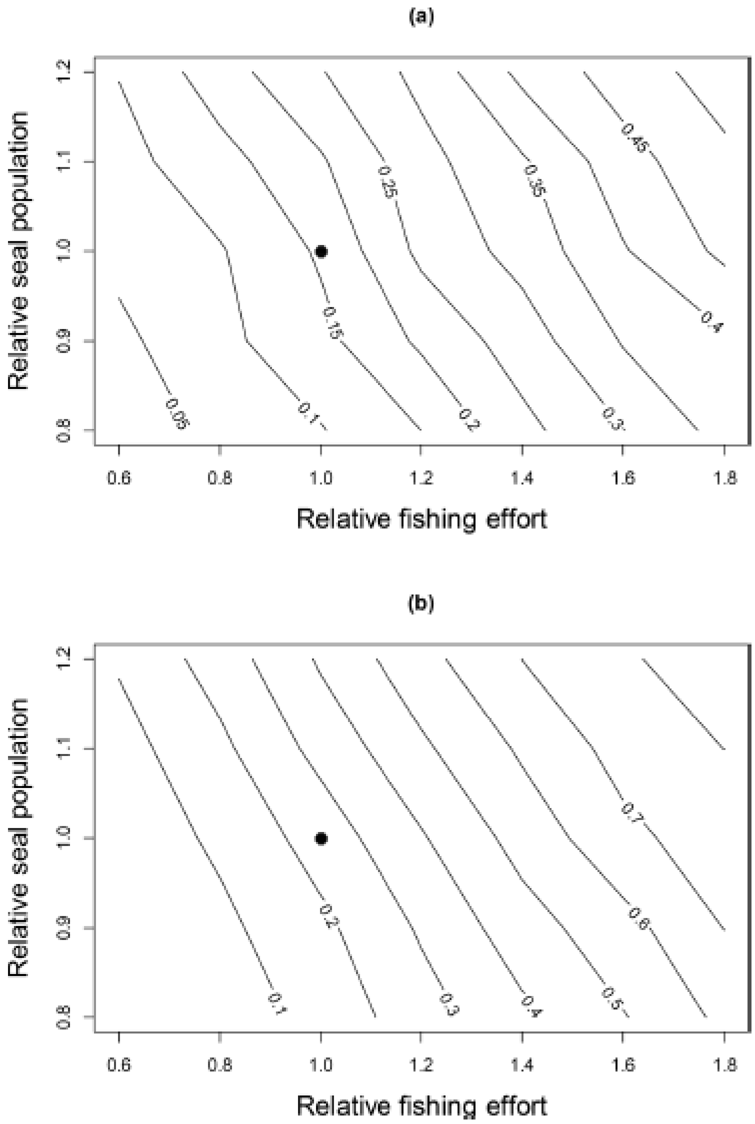

Figure 18. Probability of further decline of Division 6a cod spawner biomass relative to changes in fishing effort (x-axis) and seal population (y-axis), over 5 years (a) and 50 years (b); scaled to the level of each in 2013 (dot at (1,1)). Figure 5 in Cook & Trijoulet (2016)**.**

This analysis questions both ICES' estimates of fishing mortality and the extent to which further management measures on the fishery can be confident in enabling the stock to recover. As can be seen from Figure 17 (bottom right), if the seal hypothesis (based on actual seal population and diet data) is correct, in 2005 (and presumably since then; see Figure 15 and Figure 16) fishing mortality accounts for a relatively small proportion (~20 %) of the total mortality on the stock. The stock may be at a tipping point (a predictable consequence of a depensatory component in the dynamics), such that relatively small changes in mortality rates either from seals or from fishing could push the stock in the direction of recovery or further collapse. Based on the recent situation and the full-seal model, there is a relatively high probability of stock biomass increase (~84 % over the next 5 years). Grey seal populations are reportedly relatively stable on the West coast (see comments in Cook & Trijoulet (2016)) but they do estimate that fishing mortality might be creeping upwards (see Figure 16).

2.4.3 Management of discards

2.4.3.1 Scotland

Some forms of discarding, such as highgrading, have been banned under EU rules for many years, but other aspects of the CFP (notably relative stability for the distribution of quotas and minimum landing sizes) have tended to result in discarding. Since the most recent CFP reform, however, a 'landings obligation' has been progressively brought in for EU countries. Under the landings obligation, minimum landing sizes have become 'minimum conservation reference sizes' (MCRS) (their role in management is a little unclear), and a complete ban on discarding for quota species is being phased in. Full implementation of the discard ban is due for 1 January 2019. There is large uncertainty on what will happen to this and other elements of EU fisheries regulation in Scotland after Brexit. At the time of writing there is only speculation, and this will have to be considered during surveillance audits as (if) it becomes clear. However, it is worth noting that the UK was one of the strongest proponents of the landings obligation within the EU. The present situation is that different species have so far come under the discard ban for different fisheries. For this fishery, the situation is 2017 is as follows:

- For the North Sea: >100 mm mesh-size (TR1) are required to land all saithe (if caught by a saithe-targeting vessel), plaice, haddock, whiting, cod, northern prawn, sole and *Nephrops*; 80 mm – 99 mm mesh-size (TR2) are required to land all *Nephrops*, haddock, sole and northern prawn.
- For W. Scotland: Vessels where 5 % or more of their total landings in 2014 and 2015 were from a combination of cod, haddock, whiting and saithe will have to land haddock, sole, plaice and megrim; vessels where 20 % or more of their landings in 2014 and 2015 were *Nephrops* will have to land all *Nephrops* and haddock.

Additional species will be added in 2018, and will be updated according to Marine Scotland (Gov.Scot 2017a) via their website. Efforts are also being made to improve selectivity and adapt fishing practices to reduce the reasons for discarding (Gov.Scot 2017b).

Enforcement of the landings obligation is still in its early stage, and the focus of Marine Scotland Compliance has been to compare landings profiles with what would be expected given the gear, fishing area etc. In the future it is planned to use fully-documented vessels as a reference fleet to reinforce this approach. At-sea inspections are of course another element of enforcement, and these take place in both Scottish and Norwegian waters.

Despite the increasing focus on trying to improve selectivity to limit discards, there remain some species which are required to be discarded; notably some species of skates in some areas where they are considered to be depleted (see under 2.4.4 Elasmobranchs and ETP species below). In the past, concerns have been raised that this contradicts the Norwegian discard ban which is much more comprehensive than the EU landings obligation in its current state, but this is not in fact the case, as noted further on.

2.4.3.2 Norway

Norway has had a ban on discarding of cod and haddock since 1987. The ban was gradually expanded to new species, and from 2009 an obligation to land all catches was introduced, albeit with certain exemptions, which are not relevant to the UoAs here. The discard ban as of 2014 comprises approximately 55 species (Gullestad et al. 2015). It should be noted that the ban applies to dead or dying fish, however, and it is permitted to discard fish if they are alive and have a reasonable chance of survival. The ban is regulated through the Marine Resources Act (fiskeridepartementet 2018) and enforced through the Norwegian Coast Guard (see enforcement under Principle 3 for further details).

2.4.4 Elasmobranchs and other ETP species

Elasmobranchs may be classified as ETP species if protected by national or international legislation; in this case EU fisheries regulations (EU 2017a) in which they are either classed as forbidden to land or as zero TAC species[2]; (Table 23). In the absence of a protected status, other elasmobranchs are classed as retained or bycatch species. There are elasmobranchs with other sources of protection including the UK basking sharks which are protected under UK law (UK 2008).

Table 23. Elasmobranch species protected by EU fisheries legislation (Regulation 2017/127 of 20 January 2017) and the areas concerned.

Species		Areas in which protected by EU fisheries legislation	ETP N. Sea	ETP W. Scotland
Starry ray	*Amblyraja radiata*	IIa, IIIa, VIId, IV	Y	N
White shark	*Carcharodon carcharias*	All areas	Y	Y
Leafscale gulper shark	*Centrophorus squamosus*	IIa, IV, EU areas of I and XIV	Y	N
Portuguese dogfish	*Centroscymnus coelolepis*	IIa, IV, EU areas of I and XIV	Y	N
Basking shark	*Cetorhinus maximus*	All Waters	Y	Y
Kitefin shark	*Dalatias licha*	IIa, IV, EU areas of I and XIV	Y	N
Birdbeak dogfish	*Deania calcea*	IIa, IV, EU areas of I and XIV	Y	N
Common skate complex	*Dipturus* spp.	IIa, III, IV, VI, VII, VIII, IX, X	Y	Y
Great lanternshark	*Etmopterus princeps*	IIa, IV, EU areas of I and XIV	Y	N
Etmopterus pusillus	*E. pusillus*	EU and international waters of IIa, IV, I, V, VI, VII, VIII, XII, XIV	Y	Y

[2] Note: MSC guidance stipulates that where a zero TAC is put in place specifically to protect the species because of its poor conservation status, that species can be classed as ETP.

Species		Areas in which protected by EU fisheries legislation	ETP N. Sea	ETP W. Scotland
Tope	*Galeorhinus galeus*	EU and international waters of IIa, IV, I, V, VI, VII, VIII, XII, XIV	No – only longline	
Porbeagle	*Lamna nasus*	All areas	Y	Y
Thornback ray	*Raja clavata*	IIIa	Only IIa	N
Norwegian ray	*Raja (Dipturus) nidarosiensis*	VIa, VIb, VIIa-c, e-h and k	N	Y
White ray	*Raja alba*	VI, VII, VIII, IX, X	N	Y
Undulate ray	*Raja undulata*	VI, X	N	Y
Spurdog (picked dogfish)	*Squalus acanthias*	EU waters	Y	Y
Angel shark	*Squatina squatina*	EU waters	Y	Y

Marine Scotland provided data on estimated catch per trip for these species for 2013-15 (Table 24). From these data the key interactions with ETP species by gear and area are with starry ray (North Sea, TR1), common skate (all areas, TR1) and spurdog (all areas, TR1). Note that for simplicity, Table 24 presents data averaged over the three years, but it should be noted that the annual data are quite variable. The stock status of starry ray, common skate, and spurdog are considered separately below.

Table 24. Estimates of mean catch of elasmobranch per trip from observers, by number of individuals, 2013-15 combined (data from Marine Scotland); non-ETP species shaded in grey.* this species is managed as part of the common skate complex under ICES.

Species	North Sea		W. Scotland	
	TR1	TR2	TR1	TR2
Amblyraja radiata	279	6.9	28.4	0.5
*Dipturus batis**	77.4	0	67.3	1.3
*Dipturus flossada**	0.5	0	13.9	0.9
*Dipturus intermedia**	5.1	0.1	91.3	2.2
Dipturus nidarosiensis	0.2	0	0.6	0
Squalus acanthias	25.3	2.3	150.4	0.2

The other source of data on ETP species is the PET (= ETP) observer scheme which collects data on ETP species specifically (including all elasmobranchs). This scheme was initially set up by industry but has since been adopted by Marine Scotland. In 2016 there were 120 trips in the North Sea, 68 in the W. Scotland and 3 combined[3]. In total, the PET species identified were as shown in Table 25. For 2016 the data are separated by métier and region (Table 26).

[3] Or at least, not separated into two trips

Of the 201 trips from 2016, 19 trips accounted for all ETP interactions (<10 %). TR1 gears had more interactions than TR2 with twin bottom otter trawls (OTT) responsible for the highest ETP catches in both regions (common skate complex) (Table 26). Only in W. Scotland did TR2 gears show any ETP interaction. Note that according to Marine Scotland, it is not possible to scale up either of these datasets to fleet level in a quantitative manner (at least, not by 2017), but the data provide a qualitative measure of impact by gear to ETP species. Partly the reason for not scaling to fleet level is the variability of encounters by gear type. For instance, one single OTT TR1 trip accounted for all but one of the common skate complex interactions for that gear in the North Sea for 2016, highlighting firstly the low encounterability of such interactions and secondly the spatiotemporal heterogeneity of the interactions. These data overall are however consistent with the Marine Scotland discard data in identifying common skate complex as the main ETP interaction. Starry ray have apparently not been included since 2015 in the PET data but are observed in each year of the observer data (Table 25).

These data identify non-elasmobranch ETP species as seals (common and grey seals) which are protected under the Marine (Scotland) Act 2010 (they may not be killed except by licence or to relieve suffering) (UK 2010). Bird species identified are gannet, guillemot and starling[4] with gannets and guillemots protected under the EC Birds Directive for migratory species (EU 2009).

[4] Assumed to be a unique event, not considered further.

Table 25. All individuals of each species recorded by observers on the PETS bycatch recording sheets for 2014, covering 47 North Sea trips, TR1 and TR2, for 2015 to September, covering 63 trips and for 2016 for 201 trips. Species ordered by total number dead. * Part of the common skate species complex; all previous classified as *D. batis*. ^ no information on status dead or alive; assumed dead.

Species		2014		2015		2016		Cate-gory	Main?
Common name	Scientific name	Alive	Dead	Alive	Dead	Alive	Dead		
Starry ray	*Amblyraja radiata*	1	67	1	26			ETP	n/a
Cuckoo ray	*Leucoraja naevus*	3	45	16	1			Bycatch	No
Picked dogfish / Spurdog	*Squalus acanthias*	19	38	8				ETP	n/a
Lesser-spotted dogfish	*Scyliorhinus canicula*	12	32		4			Bycatch	No
Flapper skate*	*Dipturus intermedia*	1	15	10	15	5	66^	ETP	n/a
Starry smoothhound	*Mustelus asterias*	7	5	2	10		1	Bycatch	No
Common skate*	*Dipturus batis*	4	1	3	2			ETP	n/a
Blue skate*	*Dipturus flossada*		1	1	1		13^	ETP	n/a
Thornback ray	*Raja clavata*				2			Bycatch	No
Grey seal	*Halichoerus grypus*		1	1			2	ETP	n/a
Shagreen ray	*Raja fullonica*			1	1			Bycatch	No
Rabbit ratfish	*Chimaera monstrosa*		1					Bycatch	No
Blonde ray	*Raja brachyura*				1			Bycatch	No
Six-gilled shark	*Hexanchus griseus*				1			Bycatch	No
Porbeagle	*Lamna nasus*	1				1	2	ETP	n/a
Skates nei	*Rajidae*	1						-	-
Basking Shark	*Cetorhinus maximus*						1	ETP	n/a
Common Guillemot	*Uria aalge*					1		ETP	n/a
Greenland Shark	*Somniosus microcephalus*						1^	ETP	n/a
Common Seal	*Phoca vitulina*						1	ETP	n/a

Species		2014		2015		2016		Cate-gory	Main?
Common name	Scientific name	Alive	Dead	Alive	Dead	Alive	Dead		
Northern Gannet	*Morus bassanus*						2	ETP	n/a
Tope	*Galeorhinus galeus*					2		Bycatch	n/a
Starling	*Sturnus vulgaris*				1			Bycatch	n/a

Table 26. 2016 PET data analysed by gear type within region and showing the total number of observer trips for that gear. A total of 201 trips were completed in this year, gear metier without ETP interactions not shown. Gear types covered by PET data in 2016= OTB / TR2 and TR1, OTT / TR1 and TR2, PTB / TR1, SCC / TR1, SSC / TR1, SSN / TR1.

Region	Gear	TR1/TR2	Species	Total indviduals	No. trips
North Sea	PTB	TR1	Common Guillemot	1	11
North Sea	OTT	TR1	Blue skate	1	36
North Sea	SCC	TR1	Flapper skate	1	2
North Sea	OTT	TR1	Flapper skate	54	36
North Sea	PTB	TR1	Harbour seal/Common seal	1	11
North Sea	PTB	TR1	Northern Gannet	2	11
North Sea	OTT	TR1	Porbeagle	1	36
West Scot.	OTB	TR1	Basking Shark	1	9
West Scot.	OTT	TR1	Porbeagle	2	17
West Scot.	OTT	TR1	Blue skate	12	17
West Scot.	OTB	TR2	Flapper skate	4	22
West Scot.	OTT	TR1	Flapper skate	12	15
West Scot.	OTB	TR1	Greeenland shark	1	6
West Scot.	OTB	TR2	Grey seal	1	22
West Scot.	OTT	TR2	Salmon	1	39

2.4.4.1 Common skate complex

North Sea: This species complex in the North Sea is listed as a category 6 stock under the ICES framework (ICES 2012a), and for these stocks little information on abundance or exploitation is available. Catch rates in the surveys are too low to provide a representative stock size indicator and therefore ICES consider that a precautionary reduction of catches should be implemented unless there is ancillary information clearly indicating that the current level of exploitation is appropriate for the stock. For that reason ICES advises that there should be no targeted fisheries for this stock, no landings permitted and measures should be taken to minimize bycatch (ICES 2015b).

W. Scotland: ICES consider the stock of blue and flapper skate to be part of the larger population in sub areas 6-7, and advise that catch should be zero for 2017 – 2018 (ICES 2016c). Current EU regulations prohibit these species from being fished, retained on board, trans-shipped, or landed. This is the highest protection possible under the EU's Common Fisheries Policy, a long-term conservation strategy that is similar to a long-term management plan for such species. ICES consider the misidentification of members of the *Batis* genus an issue in the data reported. There are currently no robust indicators of stock size (ICES 2016c).

2.4.4.2 Spurdog

This species' stock status is assessed by ICES at a Northeast Atlantic scale where the current stock is well below MSY but the harvest rate has declined substantially from the levels seen prior to 2000 (ICES 2016w). The current advice for 2017 and 2018 suggests no targeted fishing of the stock and annual catches at the recent assumed level (2,468 t) will allow the stock to increase at a rate close to that estimated with zero catches (ICES 2016w). The TACs for spurdog have been set at zero since 2011, but this may have led to increased discarding (ICES 2016w).

2.4.4.3 Starry ray

In the North Sea this species is classed as a category 3 stock by ICES (ICES 2015h). The stock status relative to candidate reference points is unknown and the stock size indicator has shown a continuous decline since 1990. Discarding is known to occur but has not been quantified and discard survival has not been estimated. ICES advise that when the precautionary approach is applied, there should not be a targeted fishery for this stock and measures should be taken to reduce bycatch. This advice is valid for 2016 to 2019.

2.4.5 Habitats

2.4.5.1 Definitions

The MSC FCR v2.0 requires habitats interacting with the fishery to be defined as 'commonly-encountered', 'vulnerable marine environment (VME)' or 'minor', with definitions as given in Table 27. Although this assessment uses version 1.3 scoring, we follow version FCR 2.0 in considering each of these habitat categories explicitly.

Table 27. Habitat definitions as per the MSC Fisheries Certification Requirements v2.0. Although this assessment uses version 1.3 scoring, FCR 2.0 was followed in considering each of these habitat categories explicitly

FCR reference	Definition
SA3.13.3.1	A commonly encountered habitat shall be defined as a habitat that regularly comes into contact with a gear used by the UoA, considering the spatial (geographical) overlap of fishing effort with the habitat's range within the management area(s) covered by the governance body(s) relevant to the UoA.
SA3.13.3.2	A Vulnerable Marine Ecosystem (VME) shall be defined as is done in paragraph 42 subparagraphs (i)-(v) of the FAO Guidelines (definition provided in GSA3.13.3.2). This definition shall be applied both inside and outside EEZs and irrespective of depth.
GSA3.13.3.2	VMEs have one or more of the following characteristic, as defined in paragraph 42 of the FAO Guidelines: **Uniqueness or rarity** – an area or ecosystem that is unique or that contains rare species whose loss could not be compensated for by similar areas or ecosystems **Functional significance of the habitat** – discrete areas or habitats that are necessary for survival, function, spawning/ reproduction, or recovery of fish stocks; for particular life-history stages (e.g., nursery grounds, rearing areas); or for ETP species **Fragility** – an ecosystem that is highly susceptible to degradation by anthropogenic activities **Life-history traits of component species that make recovery difficult** – ecosystems that are characterised by populations or assemblages of species that are slow growing, are slow maturing, have low or unpredictable recruitment, and/or are long lived **Structural complexity** – an ecosystem that is characterised by complex physical structures created by significant concentrations of biotic and abiotic features
N/a	Minor habitats are those that do not meet the above definitions.

Commonly-encountered habitats in Scottish waters can be defined using UK predictive marine habitat mapping by (McBreen et al. 2011) (Figure 19). For the area used by this fishery, they are (in approximate order of spatial extent): sand (most of the northern North Sea); mud of various kinds (Fladen Ground, Minch); coarse sediment (in patches, particularly offshore on the West coast) and rock (offshore from the Western Islands, between Orkney and Shetland). This excludes habitats very close inshore (e.g. infralittoral and estuarine) and very deep-sea habitats (Rockall Trough to the west; off the continental shelf north of Shetland).

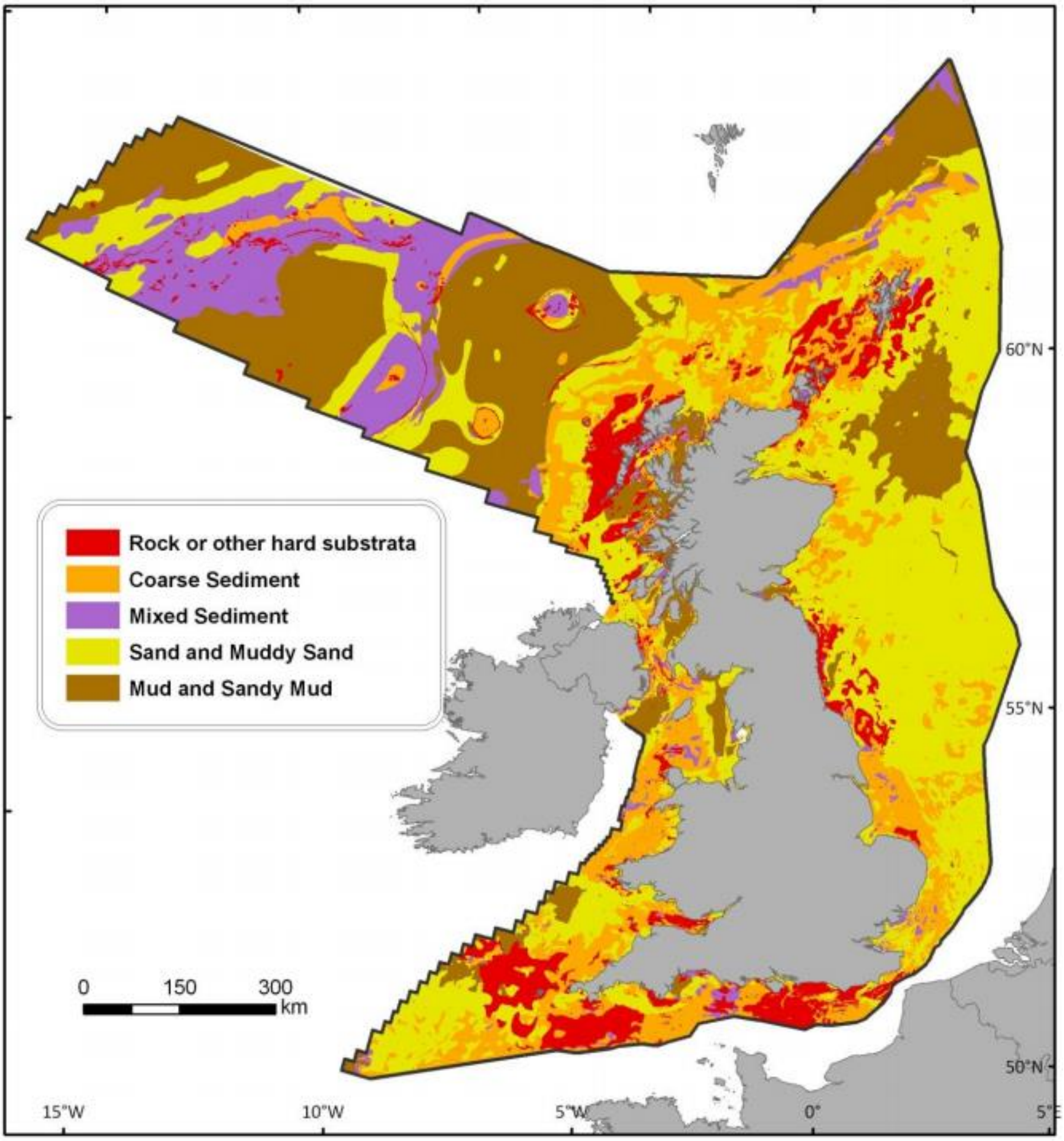

Figure 19. Results of predictive habitat mapping around the UK. Cross referencing fishing spatial effort given in Figure 2; Commonly encountered habitats are: sand and muddy sand, sublittoral mud and sandy mud, Coarse sediments and deepwater mud (source: McBreen et al. (2011)**).**

For the Norwegian part of the northern North Sea, similar maps are available via the MAREANO interactive website (http://www.mareano.no/en/maps/mareano_en.html#maps/188). For the Norwegian North Sea, commonly-encountered habitats are also sedimentary, ranging through the grain-size spectrum from gravelly sand to sand, silt and mud.

VMEs in Scottish waters have been identified based on the features used as 'search features' for the creation of the Nature Conservation MPAs (see under 'management' below). The list of search features was developed by Scottish Natural Heritage / JNCC using a composite list of protected or threatened habitats and species provided by EU regulation (Habitat Regulation and others), domestic (UK or Scottish) legislation, Biodiversity Action Plan species and OSPAR threatened or declining habitat (Marine Scotland, 2013a). To identify VMEs which might be relevant to this fishery, the team combined the search features lists of 'habitat features' and 'low or limited mobility species' (see Table 28). The likely impacts of the fishery on these VMEs is evaluated in the rationales for the relevant PIs.

Table 28. Potential VMEs, their vulnerability, likely overlap with this fishery and conclusion as to whether they are identified as VMEs for this assessment, List of potential VMEs taken from Marine Scotland data (MS 2015a)**. Percentage overlap estimates should be taken as semi-quantitative / order of magnitude estimates.**

Potential VME (from search features list)	Vulnerable to mobile demersal gear?	Overlaps with fishery – depth?	Overlaps with fishery – spatial area?	Identified as VME (overlap >= 20%)	References
Blue mussel beds *Mytilus edulis*	Yes	Generally, in lower intertidal and shallow subtidal; can occur deeper in some places, but uncommon; lower depth bound thought to be set usually by predation (crabs, starfish); estimate ~1 %	Generally restricted to very close inshore because of subtidal predation; estimate ~1 %	No	Summary of environmental requirements for mussels (UKSAC 2017)
Burrowed mud with sea pens / anemones	Yes	Wide depth ranges from a few metres to >500 m – potentially 50 %	Habitat for *Nephrops* so overlaps with the fishery by definition – although some areas in sealochs closed to mobile gear (e.g. Loch Sunart, Loch Duich and others) – let's say 75 %	Yes	Summary of *Nephrops* habitat and range (EU 2017b)
Carbonate mounds	Yes	Mainly found 500 m – 1000 m but could have occurred shallower in the past; now 0 %	Closed to mobile gear – 0 %	No	Defra (2008a)
Coral gardens	Yes	Wide depth ranges from a few metres to >500 – potentially 50 %	Only occur in 'Far West' area according to Marine Scotland (i.e. Rockall and around); overlap with this fishery 0 %	No	Lancaster et al. (2014a) Tyler-Walters et al., 2012
Deep-sea sponge aggregations	Yes	Occur >250 m; estimate 20 % max.	Faroe-Shetland Sponge Belt (see below) designated for this habitat; remaining areas around Rockall. Estimate overlap with this fishery ~~50 %	No (50 x 20 %=10 %)	Henry and Roberts, 2014

Potential VME (from search features list)	Vulnerable to mobile demersal gear?	Overlaps with fishery – depth?	Overlaps with fishery – spatial area?	Identified as VME (overlap >= 20%)	References
Flame shell beds *Limaria hians*	Not relevant	Occur in tide-swept areas such as sea loch sills	Most extensive in Loch Sunart and Loch Fyne, but also present in other sea lochs. Several are designated as inshore MPAs for this reason (e.g. Loch Sunart, Loch Fyne/Goil, Loch Carron, Loch Creran, Lochs Duish, Long and Alsh etc.); management is in place for these MPAs.	No; sensitive areas closed to fishing	(SNH 2017a; SNH 2017c; MS 2016b)
Horse mussel beds *Modiolus*	Yes	Mussels can occur to ~250 m, but beds seem to occur in inshore, sheltered areas: voes and sea lochs (Mair et al., 2000)	Extensive in sea lochs and bays on W. coast and Orkney and Shetland; a large bed in NE Caithness; overall potentially >20 %	Yes	Tillin & Tyler-Walters (2015)
Inshore deep mud with burrowing heart urchins	Not relevant	In deep mud mainly in sea lochs	Overlapping habitat to burrowed mud with seapens; considered above	Included with burrowed mud above	De-Bastos & Budd (2015)
Kelp and seaweed on sublittoral sediment	Unlikely to be practical for towed gear	Areas shallow enough for light penetration; estimate 0 %	Inshore / coastal	No	Lancaster et al. (2014d)
Low or variable salinity habitats	Depends	Generally very shallow (estuaries); 0 %	No – not suitable habitat for target species	No	Lancaster et al. (2014e)
Lophelia pertusa	Yes	Yes	Mainly known from 'Far West' but also inshore at East Mingulay SAC; protected in closed area	No	MS (2016c)
Maerl beds	Yes	Photosynthetic so mainly shallow; to 20m max. in some places; say 20%	Most in protected sea lochs (see flame shell beds above; also S. Arran, Loch Laxford) but some not e.g. in Sounds of Arisaig and Barra; say 50 %	No (50 x 20 % = 10 %)	Perry & Tyler-Walters (2016)
Offshore deep-sea muds with bivalves and polychaetes	Depends	Offshore mud at any depth comes under this habitat definition	West and north of Scotland – may overlap with fishery in far NW; estimate maximum 10 %	No	Defra (2008b)

Offshore subtidal sand and gravel		'Commonly-encountered' habitat (Figure 19)			Defra (2008c)
Seagrass beds	Yes	Intertidal and areas shallow enough for light penetration; down to ~5 m; 0 %	Very coastal' 0 %	No	Lancaster et al. (2014b)
Sea loch egg wrack beds	No	Very shallow; 0 %	In sea lochs; 0 %	No	Lancaster et al. (2014h)
Seamount communities	Yes	No – west coast only	Only Scottish records from far offshore west (around Rockall); 0 %	No	MS (2011), Lancaster et al. (2014i)
Tide-swept coarse sand with burrowing bivalves	No, except bivalve dredging	Inshore; 0 %	Orkney and Shetland	No	Lancaster et al. (2014j)
Tide-swept algal communities	Not relevant	Shallow subtidal; 0 %	Narrows or channels with strong tidal currents; probably not recommended for trawling	No	Lancaster et al. (2014k)
Northern feather star aggregations *Leptometra celtica*	Yes	Usually a deep-water species (to at least 1000 m); occurs exceptionally in shallower areas only where sheltered (e.g. sea lochs and voes); say 10 %	Main areas W. Shetland, Minch, Sound of Jura, Rockall	No	(Rowley 2015; Lancaster et al. 2014f)
Fan mussel aggregations *Atrina pectinata*	Yes	Down to 400 m as long as sheltered from water movement	Only known from the Sound of Canna; protected by the Small Isles MPA	No	Lancaster et al. (2014c) and SNH (2017c)
Heart cockle aggregations *Glossus humanus*	Not really; burrowing species	Usually >50 m	Scattered records around west coast	No	SNH (2017b)
Ocean quahog aggregations *Arctica islandica*	Somewhat ('intermediate tolerance'; Lancaster et al., 2014d)	Wide depth range 10m – 300 m or deeper; ~50 %	Many records from central and northern North Sea and Moray Firth; ~50 %	Yes; overlap 20 % or greater	Lancaster et al. (2014g)

2.4.5.2 Management - statutory

Alongside the existing network of Special Areas of Conservation (SACs - under the Habitats Directive), Scotland (and the rest of the UK) is putting in place a system of marine protected areas, aimed at protecting threatened habitats and species listed under OSPAR. In Scottish waters these are called Nature Conservation Marine Protected Areas (NCMPAs). The management measures to be put in place in these MPAs were still under discussion with stakeholders at time of writing. The NCMPAs in Scottish waters are shown in Figure 20; all relevant offshore protected areas (NCMPAs, MCZs, SCIs) are listed in Table 29. Some inshore areas are also potentially tangentially relevant; they are listed as part of the analysis in Table 28 as applicable.

Management for the phase 1 inshore MPAs (including those relevant to potential VMEs (Table 28) and those in Figure 20 is in place – closures relevant to VMEs are set out in Table 28. Management for the offshore MPAs is in the process of being finalised. Marine Scotland has prepared an audited proposal for management measures for the offshore MPAs which sets out the proposed management measures (MS 2016b). An accompanying letter to stakeholders (including other EU member states) sets out a timetable for discussion by stakeholders (via the Scheveningen Group) and potentially the Scientific, Technical and Economic Committee for Fisheries (STECF), followed by implementation via a delegated act from the European Commission. The management proposal, as it relates to demersal fishing, is summarised for each site in Table 29.

There are various protected areas in Norwegian waters to protect cold-water coral reefs, but none of which are in the area relevant to this fishery (HAVFORSKNINGSINSTITUTTET 2017).

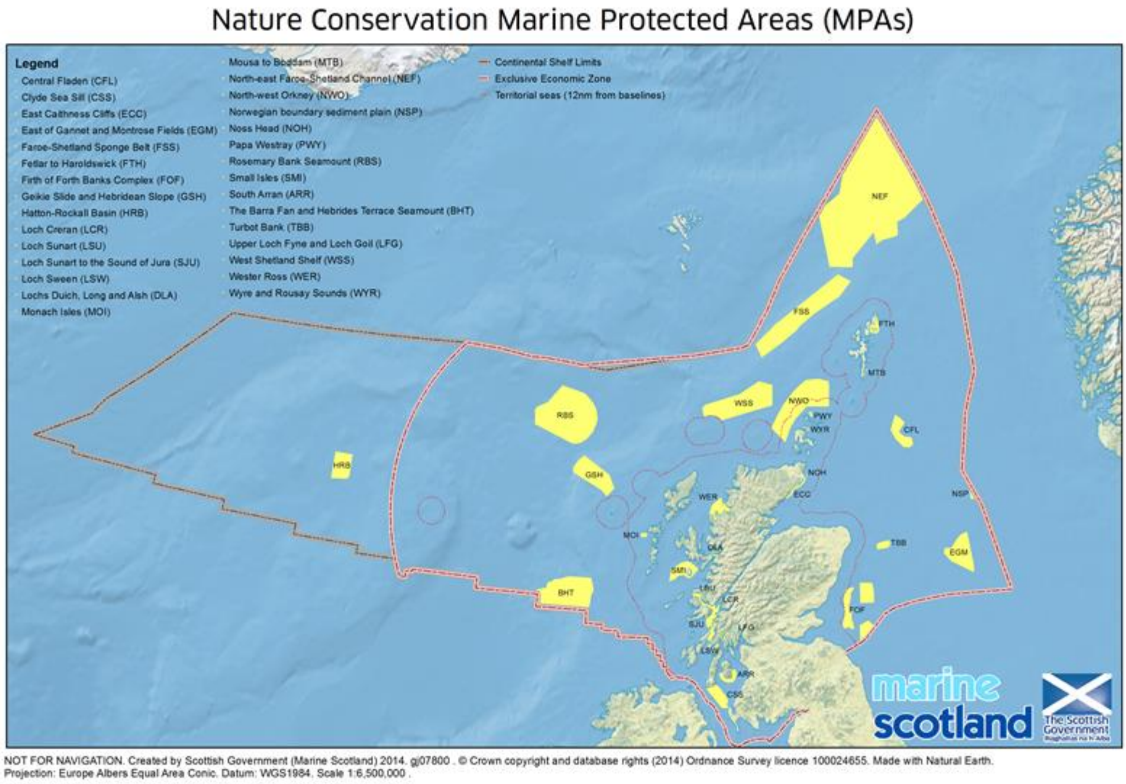

Figure 20. NCMPAs in Scottish waters. Source: JNCC (2017)**.**

Table 29. Designated offshore protected areas relevant to this fishery, their features and proposed management in relation to demersal fishing. Information on NCMPAs available at JNCC (2017) **(follow links for each site to find site description, designation order, management options paper and other information)** (MS 2016b; MS 2017b; MS 2017a)**. Note: Inshore protected areas are considered in Table 28 above where applicable.**

Protected area	Type	Features	Management proposal
Central Fladen (CFL)	MPA	burrowed mud	Three closed areas totalling 40 % of the MPA, including areas with records of *Funiculina quadrangularis*
East of Gannet and Montrose Fields (EGM)	MPA	ocean quahog (*Arctica islandica*) aggregations, offshore subtidal sand and gravel, offshore deep-sea muds	Closed to beam trawling and dredging; ~60 % closed to demersal trawling, including *Arctica* areas; seines and static gears permitted.
Faroe-Shetland Sponge Belt (FSS)	MPA	deep-sea sponges, offshore subtidal sand and gravel, ocean quahog (*Arctica islandica*) aggregations	Area with sponge and *Arctica* records (whole area <500 m plus some deeper) closed to all demersal gears. >~700 m closed to mobile gear.
Firth of Forth Banks Complex (FOF)	MPA	sand and gravel with ocean quahog (*Arctica islandica*) aggregations	Areas with *Arctica* records (in existing sand eel closures) closed to mobile gears except seines.

Protected area	Type	Features	Management proposal
NE Faroe-Shetland Channel (NEF)	MPA	deep-sea sponge aggregations (4 m - 600 m), deep-sea mud, deep-sea gravel	Areas with sponge records closed to all demersal gears; >700 m closed to mobile gears.
Norwegian Boundary Sediment Plains (NSP)	MPA	ocean quahog (*Arctica islandica*) aggregations, offshore subtidal sand and gravel	Closed to all mobile gear except seines; area with *Arctica* records also closed to seines
Braemar Pockmarks	SAC	submarine structures made by leaking gas (methane seeps / carbonate deposits)	Closed to all demersal fishing
Scanner Pockmark	SAC	submarine structures made by leaking gas (methane seeps / carbonate deposits)	Closed to all demersal fishing
Pobie Bank Reef	SAC	reef (bedrock / stony outcrops); also harbour porpoise; grey and common seal	Closed to mobile gear except a few edge areas; 99% of reef habitat covered by closure.
West Shetland Shelf (WSS)	MPA	offshore subtidal sand and gravel	50 % of the area is already under a closure for cod; this closure to be maintained for mobile gear. Whole area closed to beam trawling and dredging.
Geikie Slide and Hebridean Slope (GSH)	MPA	burrowed mud, offshore subtidal sand and gravel, offshore deep-sea mud	Areas <200 m and >800 m closed to mobile gear, also further protected areas ~400 m. 4/7 known burrowed mud sites closed.
Barra Fan and Hebridean Terrace Seamount (BHT)	MPA	deep-sea mud, offshore subtidal sand and gravel, burrowed mud, seamount communities, orange roughy	Seamount closed to mobile and static gear, area >800 m closed to mobile gear including most mud
Solan Bank	SAC	stony and bedrock reef	Three areas closed to mobile gear covering ~95 % of reef habitat
Rosemary Bank Seamount (RBS)	MPA	deep-sea sponge aggregations and seamount communities	Closed to mobile and static gear

2.4.5.3 Management - voluntary

While waiting for the management proposal from Marine Scotland to go through the process of consultation and approval at European level, SFSAG has decided to put in place a voluntary closure to protect all known records of *Funiculina* in the Fladen Ground area. This closure was announced to all vessels in the UoA in May 2017, and is being monitored by Marine Scotland using VMS data (see Appendix 7 Details of SFSAG voluntary closure in the Fladen Ground). The closed area corresponds to one (the southern) of three areas within the Central Fladen Ground MPA which would be closed to demersal towed gear under Marine Scotland's proposal (Figure 21). Marine Scotland note in their proposal (see MS (2017b) – Section B of Annex document) that this southern closed area is aimed at protecting the *Funiculina* seapens, which is clearly the most vulnerable element of this VME, while the other two closed areas are aimed at protecting representative areas of burrowed mud habitat, which are not necessarily vulnerable to demersal towed gear.

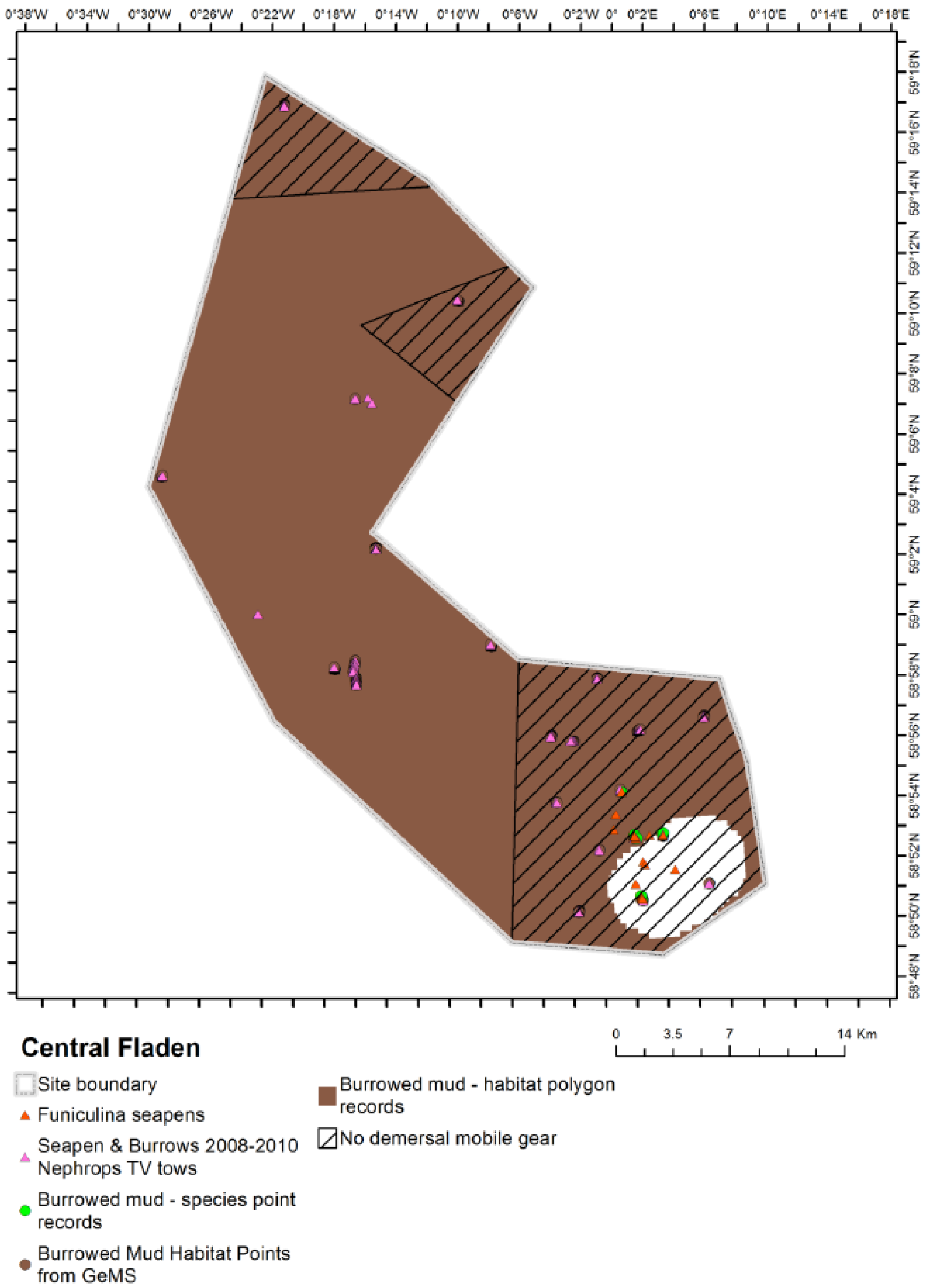

Figure 21. Marine Scotland's proposal for management measures for the Central Fladen Ground MPA: brown = MPA area; hatched = proposed areas closed to demersal towed gears; pink = habitat records of seapens and burrows from *Nephrops* surveys (seapen species other than *Funiculina*, which can retract into the sediment); orange = *Funiculina* records. (The white area is an area which predictive habitat mapping does not designate as 'burrowed mud' but it is included in the MPA and closed area.) Note that the southern hatched area corresponds to SFSAG's voluntary closure from May 2017.

The coordinates of SFSAG's closed area are as follows; this corresponds exactly to the coordinates given by Marine Scotland for their closed area 3 in the Central Fladen Ground MPA (Marine Scotland, 2017a; Section B in Annex, Table B6).

58° 59.248' N 000° 08.373' W

58° 58.226' N 000° 04.475' E

58° 55.440' N 000° 05.816' E

58° 51.311' N 000° 06.539' E

58° 49.143' N 000° 00.170' W

58° 49.819' N 000° 09.843' W

2.4.6 Ecosystem

In 2015, Marine Scotland published Scotland's National Marine Plan (MS 2015b), which includes the development of an ecosystem approach to marine planning and management and a series of objectives around 'good environmental status', as well as a section on fisheries management in this ecosystem context. For the Norwegian waters of the North Sea and Skaggerak, an integrated ecosystem management plan was adopted by the Norwegian government in 2013 (NorwayMinistry 2013).

The evidence suggests that the North Sea ecosystem is mainly influenced by climate-driven bottom-up forces rather than predator-driven top-down forces (e.g. Beaugrand (2004), Beaugrand & Ibanez (2004) and J. Alheit et al. (2005)). Through the running of an Ecopath model with Ecosim, Mackinson and Daskalov (2007) suggest that the removal of cod or haddock from the North Sea ecosystem through fishing mortality would result in a reduction in predation on prey species, but unlikely to cause a trophic cascade that would impact other elements in the North Sea ecosystem; indeed, this is an experiment that has been tried, and impacts do not appear to be irreversible.

The ICES working group ICES (2016e; 2014a) evaluated the status of the North Sea ecosystem via PCA using as input >100 state or pressure variables. For the 2014 analysis of the northern North Sea, PC1 accounted for 29 % of the variability, and including the following key variables: decreasing cod landings, decreasing otter trawl effort, increasing hake biomass, increasing herring biomass and increasing *Calanus heligolandicus* (ICES 2014a). The updated analysis in 2016 divided the North Sea into smaller areas (Orkney - Shetland, Fladen, Utsira and Long Forties are most relevant here); this analysis gives a similar overall pattern but a much more explicit indication that environmental change is significant (1984 - 2013), with a strong signal of increasing temperature at Orkney - Shetland and Fladen and a strong signal of increasing nutrients at Utsira and Long Forties (ICES 2016e).

A similar analysis for the Celtic Seas ecosystem (ICES 2016b) evaluated the key signals with the ecosystem as follows:

- Rise in sea surface temperature, according to long-term data from the Rockall Trough and Malin Shelf; although with a reversal over the last ~decade.

- Changes in the migration, distribution, and onset of spawning of blue whiting, mackerel, horse mackerel and boarfish, thought to be temperature driven.
- Reduction or increasing variability in the recruitment of some gadoids in the Irish Sea, Celtic Sea, and west of Scotland; the Celtic Sea is at the southern/western edge of the geographical range of several of the main gadoid species. As noted above in relation to W. Scotland cod, a more ecosystem-based approach to management for some of these species may imply significant revision of plausible management targets (reference points; Trijoulet et al. (2017)).
- Phytoplankton abundance and the abundance of diatom and dinoflagellate species in shelf and oceanic waters west of the European shelf show long-term declines. There has also been a decline in overall copepod abundance. As in the North Sea, the patterns show the cold-water species (*Calanus finmarchicus, Pseudocalanus*) decreasing and the warm-water species *C. helgolandicus* increasing and spreading northwards.
- Breeding seabirds have generally declined since ~2000 (with some exceptions), but populations of seals have been increasing over at least the past thirty years, though they now seem to be stabilising (SMRU 2017; Russell et al. 2017).
- Fishing pressure on commercial stocks peaked in 1998 and has since decreased. The average F/F_{MSY} ratio for the combined demersal, flatfish, and pelagic stocks is now close to F_{MSY}. Overall biomass of commercial stocks has increased. The average $SSB/B_{trigger}$ ratio for the combined stocks is above $B_{trigger}$.
- The fishing effort of bottom mobile gears decreased by 35 % from 2003 to 2014. This has reduced the spatial fishing footprint and the average number of times the seabed is trawled per year.

Recently published work modelling the West Coast of Scotland ecosystem under various climate scenarios argue the importance of including environmental change in ecosystem approaches to sustainable fisheries management (Serpetti et al. 2017). The study showed that the declined stocks of cod and whiting caused by high fisheries exploitation and strong top-down control by predators (grey seals and saithe) recovered under sustainable management scenarios due to the cumulative effect of reduced fishing and predation mortalities cascading through the food-web under no-climate change scenarios (Serpetti et al. 2017). However, rising temperature scenarios jeopardised boreal stenothermal species: causing severe declines in grey seals, cod, herring and haddock. This in turn had a positive effect for whiting, with declines of its predators such as seals and cod resulting in a strong increase in the whiting stock under rising temperature scenarios.

In summary, the ecosystem around Scotland has been changing over the last 30 years, with trends driven by changes in fish stocks (decline and then recovery), fishing effort (reduction) and in particular environmental change (warming) and its effect on the base of the ecosystem (phytoplankton and zooplankton) and on the distribution and reproduction of some key commercial species (small pelagics and gadoids most notably).

2.5 Principle Three: Management System Background

2.5.1 Jurisdiction

Saithe, plaice and whiting are shared stocks between Norway and the EU, while hake is an exclusive EU stock. The fishery takes place primarily in the EU Exclusive Economic Zone (EEZ), but a small part of the catch is taken in the Norwegian EEZ.

2.5.2 Objectives

The current Common Fisheries Policy (CFP) regulation requires that member states, in accordance with international treaties such as the 1982 Law of the Sea Convention, the 1993 FAO Compliance Agreement and the 1995 Fish Stocks Agreement, apply the precautionary approach to fisheries management, and aim to ensure that exploitation of living marine biological resources restores and maintains populations of harvested species above levels which can produce the maximum sustainable yield. It is specifically mentioned that when targets relating to the maximum sustainable yield cannot be determined, multiannual (management) plans shall provide for measures based on the precautionary approach, ensuring at least a comparable level of protection for the relevant fish stocks. The maximum sustainable yield exploitation rate shall be achieved by 2015 where possible and, on a progressive, incremental basis at the latest by 2020 for all stocks. Precautionary reference points are required by the long-term management plans for stocks under assessment (see reference points for each species under Principle 1 section 1.1).

Further objectives of the CFP include the implementation of the ecosystem-based approach to fisheries management, the collection of scientific data, elimination of discards, provision of conditions for economically viable and competitive fishing industries, adjustment of fishing capacity to the levels of fishing opportunities and contribution to a fair standard of living for those who depend on fishing activities, bearing in mind coastal fisheries and socio-economic aspects.

Since a smaller part of the catch is taken in the Norwegian EEZ, it can be argued that the national fisheries management system forms part of the overarching management framework and should be assessed against some of the PIs, including overarching objectives. The 2008 Marine Resources Act requires that Norwegian fisheries management be guided by the precautionary approach, in line with international treaties and guidelines (§ 7 a)), and by an ecosystem approach that takes into account habitats and biodiversity (§ 7 b)) (fiskeridepartementet 2018). The same objectives are found in the most relevant policy documents, such as the integrated management plan for the North Sea and Skagerrak.

2.5.3 Legal basis and management set-up

The fishery is managed at three levels: the international, EU and national levels. Saithe, plaice and whiting are among the six North Sea stocks that are defined as jointly managed by Norway and the EU, based on the framework agreement between the two parties on fisheries cooperation from 1980 (in force 1981). The agreement provides the legal basis for the setting of TACs for joint stocks, transfers of fishing possibilities, joint technical measures and issues related to control and enforcement. The TACs for the jointly managed North Sea stocks are agreed in annual negotiations between the EU and Norway and split according to fixed distribution formulas, which for saithe is 52 % to Norway and 48 % to the EU, for plaice 93 % to the EU and 7 % to Norway and for whiting 90 % to the EU and 10 % to Norway. Hake is an exclusive EU stock. The EU quota is then divided among member states according to the principle of relative stability. In turn, the major part of the UK quota is given to the Scottish fishing industry. The Production Organizations (POs) manage quota distribution at the regional level.

The fishery is managed within the context of EU's Common Fisheries Policy (CFP), whose provisions are transposed into the Scottish legal system in the form of Scottish Statutory Instruments. The CFP applies to all fishing activities in EU waters, including the exclusive economic zone (EEZ), and to the activities of EU vessels outside the EU's marine jurisdiction. The main legal bases for fisheries management in Scottish territorial waters, as well as management of activities by Scottish registered fishing vessels outside Scottish territorial waters, are the 2013 Aquaculture and Fisheries (Scotland) Act and the 2010 Marine Act, with supplementary legislation at lower levels (secondary or subordinate legislation, such as specific requirements to fishing operations and gear). The regional distribution of responsibilities within UK fisheries management is fixed in an agreement between the Fisheries Administrations of England (Defra – the Department for Environment, Food & Rural Affairs), Northern Ireland (the Department of Agriculture and Rural Development (Northern Ireland)), Scotland (Marine Scotland) and Wales (the Welsh Government) from 2012.

Marine Scotland is the implementing body under the Scottish Government, responsible for all components of fisheries management, from science to management and enforcement. In accordance with the Marine Act, its full special jurisdiction is limited to Scottish territorial waters, but it is also conferred the authority to enforce Scottish fisheries legislation in the EEZ and given flag-state responsibilities towards Scottish registered fishing vessels outside EU waters. Marine Scotland works closely with the Producer Organisations (POs; see PI 3.1.2 b below), which are delegated responsibility for managing fish quotas on behalf of their members. At a UK level, Marine Scotland works with several other bodies of governance, such as Defra and the Marine Management Organisation (MMO). MMO is a Non-Departmental Public Body (NDPB) under Defra, which delivers legal, monitoring and enforcement functions.

A smaller part of the catch is taken in the Norwegian EEZ; hence it can be argued that the national fisheries management system forms part of the overarching management framework. Norway has a well-established system for fisheries management, which has evolved over more than a century and is now codified in the 2008 Marine Resources Act and secondary legislation. The Marine Resources Act is a framework law, which in the main authorizes the Government to issue specific regulations within designated fields (fiskeridepartementet 2018). The most important rules are found in the Regulation on the Execution of Marine Fisheries, which is updated annually (Fiskeridirektoratet 2017). The Regulation contains rules for mesh size, selection and limitations on the use of specific catch gear, seasonal restrictions, bycatch, minimal fish size, discard ban, restrictions on the use of trawl in specific areas and protection of coral reefs, among other things. All Regulations are subject to running modifications and additions through so-called J-orders, which are distributed to the fishing fleet electronically. This includes dedicated and regularly updated annual regulations for the fishery of each species. The executive body at governmental level is the Ministry of Trade, Industry and Fisheries, while the practical regulation of fisheries is delegated to the Directorate of Fisheries.

Enforcement at sea is undertaken by the Coast Guard, which is part of the Royal Norwegian Navy, but performs tasks on behalf of several ministries, including the Ministry of Trade, Industry and Fisheries. Scientific research is performed by the Institute of Marine Research. Fisheries management authorities coordinate their regulatory work with that of other bodies of governance, for instance the Ministry of Climate and Environment and the Norwegian Environmental Agency, which are responsible for the implementation of the integrated management plans for different marine areas.

2.5.4 Stakeholders and consultation processes

Scottish fisheries management includes a sophisticated system for stakeholder consultation. The main mechanisms are:

- Public meetings (regional fishing industry assemblies, quayside conversations and fishing sector focus groups);
- Advisory and working groups (the Inshore Fisheries Groups, the Inshore Fisheries Management and Conservation Group (IFMAC), the Fisheries Management and Conservation Group (FMAC) and the Scottish Discard Steering Group); and
- *Ad hoc* events, such as conferences.

FMAC was set up by the Cabinet Secretary (effectively: Minister) for Rural Affairs and the Environment in 2011, as part of a broader political and management effort to implement the cod recovery plan and increase fishermen – and Scottish – influence in the forthcoming reform of the CFP. It is chaired by Marine Scotland and includes representatives from the fishing industry representative bodies, fish producer organizations, environmental organizations and Marine Scotland Policy and Science. FMAC makes recommendations to Marine Scotland – and, on request, to the Cabinet Secretary for Rural Affairs and the Environment – on matters connected to the development of fisheries legislation and policies, the allocation of fishing opportunities, management mechanisms and objectives for and strategies towards international negotiations. FMAC meets 1-4 times per year, and agendas and minutes from the meetings are available for download on Marine Scotland's website. Marine Scotland aims to circulate documents for discussion no less than four weeks in advance of meetings to allow time for the constituent organizations to consult with their members. Decisions are made through consensus, but objections are recorded in the minutes, on request. Marine Scotland also seeks the opinion of stakeholders on running regulatory issues through occasional consultations papers posted on their website.

Another important interface between the industry and authorities are the POs. These are membership organizations for industry actors whose role, according to EU legislation, is to market the products of their members and implement measures that promote the concentration of supply and stabilize prices. POs are also allocated the vast majority of UK quotas by Fisheries Administrations and are responsible for managing these quotas on behalf of their members. There are currently 10 Scottish POs recognized by Marine Scotland, among them the Scottish Fishermen's Organisation (SFO). Other stakeholder organizations include Seafood Scotland, which was set up in 1999 to increase the value of return to the Scottish seafood sector, and the Scottish White Fish Producers Association (SWFPA), the largest fishing association in Scotland, which protects and promotes its members' interests across a range of national and international political arenas. SWFPA, in turn, is part of the Scottish Fishermen's Federation (SFF), which works to promote the collective interests of Scotland's ten geographically and sectorally defined fishermen's associations. The Federation plays an active role in advancing the interests of Scottish fishermen at national and international levels by lobbying government officials in Edinburgh, London and Brussels. It also plays a key role in helping to inform fisheries science, management of the marine environment; inshore fisheries management, marine spatial planning, marine safety regulations and industry recruitment and training programmes. An example of a more *ad hoc* based interface between different industry actors and authorities is the Gear Innovation and Technology Advisory Group (GITAG), which is hosted by SFF with Marine Scotland participation, established in 2015 to foster flexible working partnerships between fishermen, industry and public bodies, gear technologists and science in the implementation of the landing obligation in 2019.

The situation is similar at the international level, where user groups participate in the bilateral negotiations with Norway and meetings in NEAFC and the North Sea Advisory Council (NSAC); in the latter two, NGOs are also allowed to participate as observers. The Advisory Councils are the main consultation mechanism through which industry engages with management authorities at EU level. They include European industry and NGO representatives ensuring local knowledge is considered within the management system. They actively develop policy advice to the European Commission and are considered as part of the EU's management system. NSAC currently has 24 member organizations: 15 national fishing associations (including SSF and SFO) and 9 NGOs.

2.5.5 Resolution of disputes

At the national level, fishers can take their case to court if they do not accept the rationale behind an infringement accusation by enforcement authorities or the fees levied against them. Verdicts at the lower court levels can be appealed to higher levels. In practice, the vast majority of disputes are resolved within the management system, which incorporates ample formal and informal opportunities for fishers and other stakeholders to interact with the authorities, e.g. to clear out disagreement and conflict among users and between users and authorities.

At the international level, a state can institute proceedings against another state through mechanisms such as the International Court of Justice (ICJ) and the International Tribunal for the Law of the Sea (ITLOS), or bring a dispute before the Permanent Court of Arbitration (PCA). At the regional level, NEAFC in 2004 adopted a recommendation for compulsory dispute settlement. None of these mechanisms have so far been widely used as a means for solving fisheries disputes, but ICJ has over many decades had a number of cases regarding fisheries jurisdiction, and ITLOS has in recent years had cases on the prompt release of detained fishing vessels and the use of provisional measures. PCA was called upon in 2013 to solve certain aspects of the dispute between the EU and Faroe Islands regarding the coastal state management regime of Atlanto-Scandian herring. (The case was terminated a year later as agreement between the parties was reached.) There are no explicit mechanisms for the resolution of disputes in the EU–Norway regime for the North Sea fisheries, but – as is mostly the case also at the national levels – disagreement is sorted out through dialogue, negotiation and compromise.

2.5.6 Enforcement and compliance

Monitoring, control and surveillance (MCS) in the fishery is taken care of by Marine Scotland Compliance, in collaboration with enforcement authorities at UK and EU level (including the European Fisheries Control Agency) and exchange of information with relevant authorities in other states, including the Norwegian Directorate of Fisheries. All these agencies operate on the basis of a risk-based framework, identifying where enforcement resources can be best put to use at any time in order to optimize compliance.

The EU system for fisheries control is laid out in the Control Regulation, which entered into force on 1 January 2010. The Regulation applies to all activities covered by the CFP carried out on the territory of member states or in EU waters, and by EU fishing vessels or nationals of a member state. It requires all member states to adopt appropriate measures, allocate adequate financial, human and technical resources and set up all administrative and technical structures necessary for ensuring control, inspection and enforcement of activities under the CFP. The Regulation contains Titles ('sections' above chapter level) on, among other things, access to waters and resouces (Title III), control of fisheries (Title IV), control of marketing (Title V), surveillance (Title VI), inspections and proceedings (Title VII), enforcement (Title VIII) and common control programmes (Title IX). Among the substantial requirements are that member states operate a vessel monitoring system (VMS) and an automatic identification system (AIS), to be generally applied by vessels above 12 and 15 meters, respectively, and that they make the use of fishing logbooks mandatory for all vessels above 10 meters and electronic logbook for all vessels above 12 meters. The Regulation also introduces an obligation of member states to employ real-time closure of fisheries. Further, member states are obliged to carry out monitoring of fishing activities by inspection vessels or surveillance aircraft and physical inspections of fishing vessels; in addition to national inspectors, a pool of Community inspectors shall also be set up. Procedures are established for situations where infringements are detected, including enhanced follow-up when infringements are serious, such as misrecording of catches of more than 500 kg or 10 % of what is reported in the logbook. Further, provisions are given for proceedings and sanctions.

Marine Scotland Compliance carries out the UK's EU responsibilities for fisheries monitoring, control and surveillance in Scotland. It has 19 offices across the country and operates three surveillance vessels and two aircraft. In accordance with EU legislation, it takes care of information gathering through VMS (through the Marine Monitoring Centre) and electronic logbooks, and carries out all other obligations conferred upon Scotland, according the detailed reporting and control requirements in EU legislation to prevent, deter and eliminate illegal, unreported and unregulated fishing (IUU fishing). A Registration of Buyers and Sellers (RBS) Scheme has been fully operational in Scotland since 2005 and requires all buyers and sellers of first sale fish to be registered, and all auction sites of first sale fish and shellfish to be designated. All relevant regulations and information on enforcement actitities are available on Marine Scotland's website.

A smaller part of the client fishery takes place in the Norwegian EEZ, where MCS is a shared responsibility between the Directorate of Fisheries, the Coast Guard and regional sales organizations. The Directorate of Fisheries keeps track of how much fish is taken of the quotas of different vessels, vessel groups or other states at any given time, based on reports from the fishing fleet. Fishing vessels are required to have VMS and electronic logbooks, and real-time data are forwarded to the Directorate of Fisheries. The self-reported catch data can be checked at sales operations through the sales organizations, which have monopoly on first-hand sale of fish in Norway, and through physical checks performed by the sales organizations and the Directorate of Fisheries in port, and by the Coast Guard at sea. When Scottish vessels land in other European ports, they are subject to the NEAFC port state control scheme, which requires that the port state checks whether the landed fish are covered by legal quota, and physically inspect a certain percentage of the catch. There is also an extensive exchange of information (including inspection and landing data) among the national enforcement authorities around the Northeast Atlantic.

In accordance with the EU Control Regulation, Member States are required to ensure that appropriate measures are systematically taken when violations of fishing regulations are detected, including administrative action or criminal proceedings, in order to provide effective deterrence. For serious infringements, a point system is applied, whereby fishermen are given a specified number of points for different kinds of violations. When a specific number of points is reached, the fishing licence shall be automatically suspended for a period of at least two months, increasing with repeated violations. In addition to the point system, a graduated system of penalties is used at national level in Scotland, ranging from oral advice to an advisory letter, official written warning, various forms of statutory notices (such as revocation and suspension notices), financial administrative penalties (up to £10,000), other material enforcement measures (such as seizure and disposal of fish) and formal prosecution. Fixed penalty levels for different types of offences are publicly available; e.g. the lowest level of infringements leads to a penalty of £250 for a first-time offence and £500 the second time, while the case is referred to prosecution if the violation is repeated a second time.

According to Marine Scotland Compliance, the level of compliance is high in the fishery under assessment. In correspondence with the assessment team, they report that there have been no enforcement issues with Scottish and UK administered fishing vessels the last couple of years concerning the fisheries under assessment specifically. They have given priority to the fishing areas where catches have been highest, and last-haul analysis inspections have regularly been carried out. All prosecuted cases for the last decade are listed on the website of Marine Scotland Compliance. An average of eight cases have been prosecuted each year for the entire Scottish fisheries sector. Few infringements are of a serious nature. The five cases prosecuted in 2015 were related to the failure to comply with e-log requirements (fined £2,000), failure to submit sales notes (fined £350), retention of skate after a closure (admonished), retention of ling after a closure (fined £4,000) and retention of mackerel after a closure (fined £3,000).

As follows from the above, the fishery has in place a comprehensive system for MCS, including physical checks of fishing operations, catch and gear, as well as a fine-meshed sanctioning system. In addition to these coercive compliance mechanism, varioius forms of norm-, legitimacy- and communication-related mechanisms have proved effective to deliver compliance in other fisheries. In the fishery under assessment, there might be a degree of social control in the relatively small Scottish fishing communities, and the high level of user-group involvement may provide regulations with a degree of legitimacy that increases fishermen’s inclination to comply with them. The same applies to the relationship between fishermen and enforcement officers, which is reported to be good. Inspectors are trained to approach the fishermen in as forthcoming a manner as possible – starting from the position that they are in compliance with regulations – and interfering with the fishing activities as little as possible (cf. referenced codes of conduct and enforcement strategies). Importantly, they perceive themselves as having a guidance-providing and not only a policing role towards the fishing fleet.

2.5.7 Review of the management system

The Scottish system for fisheries management is subject to a number of review mechanisms, covering all major parts of the management system. Marine Scotland – which is the overall fisheries management body in Scotland, responsible for all areas of fisheries management at national level, from science to regulation and enforcement – performs annual reviews of its own work, spanning all areas of the organization's responsibility. Annual reviews are also performed within different parts of the organization for scrutiny at higher levels; for example Marine Scotland Science submits annual review reports to the Marine Scotland Board. In 2010, an independent panel appointed by the Cabinet Secretary for Rural Affairs and the Environment evaluated the Scottish fisheries sector, including its system of governance. In 2015–2016, a comprehensive review of the performance and structure of Marine Scotland was conducted by the Scottish Government. The views of staff, customers and major stakeholders were sought, including their experience with Marine Scotland's efforts to communicate effectively with stakeholders. Similarly, at UK level, the Prime Minister in 2003 tasked the Strategy Unit with carrying out a review of options for a sustainable UK fishing industry in the medium to long term, published in 2004. The POs were subject to a comprehensive review by Marine Scotland in 2010–2011. The purposes, functioning and impact of the produr organizations were evaluated, including their management of quotas. All these reviews are publicly available on Marine Scotland's website.

At EU level, the CFP is reviewed in connection with the major revisions of its basic regulations every tenth year. In addition to internal review processes, an independent evaluation was commissioned by the European Commission ahead of the 2013 reform to assess the CFP from both a natural and social sciences point of view. The scientific component of the fishery under assessment is routinely assessed by ICES, as is the management plan for the fishery under assessment. A larger evaluation of the North Sea management plans for demersal fisheries was performed in 2015 by the STECF, set up by the European Commission as a scientc expert body. Biological, economic, environmental and social aspects of the management plans were assessed. NEAFC was subject to a comprehensive evaluation in 2014.

3 Evaluation Procedure

3.1 Harmonised Fishery Assessment

3.1.1 Principle 1

In terms of Principle 1, overlap exists between this fishery and several other fisheries certified by MSC (Table 30). MEC contacted the contributing CABs by email and requested and received P1 scoring rationales and harmonisation details. Note for some stocks however, this assessment is the first to use ICES advice updated in June 2017 and therefore there is some variation in final scores against the other fisheries which hadn't yet been assessed against this new information. Scores were compared to the extent applicable; the differences are shown in Table 31. Different trees were used for a few of the assessments and these are also detailed in Table 31. An expedited audit of the Norway Saithe fishery (now Norway North Sea demersal) was announced in August 2017 and harmonisation will be required for saithe, haddock and hake.

3.1.1.1 Haddock

This fishery is harmonised against the DFPO Denmark North Sea & Skagerrak haddock and the final condition (PI 1.2.2) was closed out by both fisheries at surveillance audits in early 2017. There are minor differences in the overall scoring of some PIs but none of which impact the outcome of the assessments. The DFPO Denmark North Sea & Skagerrak haddock certificate is currently under reassessment by MEC under a new certificate (Joint demersal fisheries in the North Sea and adjacent waters) and the new scores have been communicated between teams.

3.1.1.2 Saithe

This fishery is harmonised against four other certified fisheries and the 2017 saithe advice has resulted in no significant changes in score from previous years. Two of the harmonised fisheries are scored under FCR 2.0. There exist differences in individual PI scores across the five fisheries under certification, but the overall outcome is similar.

3.1.1.3 Plaice

Harmonisation discussions for plaice were initiated in March 2017 and an additional harmonisation call took place between CABs on the 10th April 2017. The discussions resulted in a request from the CABs for interpretation on the subject of 'in-place' and 'explicit' HCRs from the MSC. This was produced in June 2017 via a Principle 1 workshop and in August 2017 published in the MSC interpretation log (Appendix 8 MSC interpretation log, Appendix 9 MSC interpretation workshop). Specifically, for plaice this related to whether ICES MSY rules can be considered an explicit HCR if ICES advice is followed. Further discussions surrounded the introduction of the proposed MAPs for the North Sea which is currently under discussion with co-legislators, the European Council and the European Parliament. Further harmonisation discussions between CABs continued in April 2018 and resulted in the agreement of the current condition on 1.1.2c on exsiting fisheries should be closed and rescored as per this assessment. The scores listed in Table 31 which are not aligned as yet this is the result of differences in the surveillance timings and CABs have agreed to align at the next surveillances (approximately by summer 2018).

3.1.1.4 Hake

For Hake the harmonisation discussions ran parallel to those described for plaice above up to the Autumn of 2017. Further harmonisation meetings were carried out on the 12th Jan 2018 with those fisheries currently in certification required a condition revision following '*constitutional issues that were preventing the development of long-term management plans in the EU*.' This change in circumstance required a redrafting of those fisheries condition milestones and these have been adopted into this assessment.

3.1.2 Principle 3

This fishery will replace the SFSAG North Sea saithe certificate and updates the SFSAG North Sea haddock fishery certificate. Harmonisation against SFSAG cod (noting the difference in default trees) was achieved albeit with different scoring trees (v1.3 and V2.0). Harmonisation activities were carried out in-house as all SFSAG fisheries are managed by MEC, with overlap in team members. A comparison of P3 scores is provided in Table 31. The only variation in score across all UoAs is present in the hake UoA 5 which results from a difference in the management system not requiring international agreement based on the stock area.

Table 30. MSC certified fisheries and fisheries in assessment which were harmonised against this fishery.

Fishery name	Principle	Species	ICES areas	Date certified	Status	CAB
SFSAG saithe	P1, P3	Saithe	4 and 7d	October 2013	Expedited into this assessment	MEC
DFPO Denmark North Sea & Skagerrak haddock	P1	Haddock	4 and 3a	August 2012	Certified	ACOURA
SFSAG cod	P2, P3	Cod	4a and 3a/b	July 2017	Certified	MEC
Joint demersal fisheries in the North Sea and adjacent waters	P1	Plaice, Haddock, Saithe, Whiting, Hake	3, 4 6a and 7d		In assessment	MEC
Scapeche, Euronor and Compagnie des Peches St Malo saithe	P1	Saithe	4 and 7d	Mar 2010	Certified	MEC
UK Fisheries/ DFFU/Doggerbank Group saithe	P1	Saithe	4 and 6a	January 2011	Certified	MEC
DFPO Denmark North Sea & Skagerrak saithe	P1	Saithe	4 and 3a-d	Feburary 2011	Certified	ACOURA
Norway North Sea saithe	P1	Saithe	4	June 2013	Certified	DNV-GL
DFPO Denmark North Sea, Skagerrak and Kattegat hake and plaice	P1	Hake, Plaice	4 and 3a	Oct 2014	Certified	MRAG
DFPO Denmark North Sea plaice	P1	Plaice	4	March 2011	Certified	ACOURA
CVO North Sea plaice and sole	P1	Plaice	4	December 2012	Certified	ACOURA
Cornish Hake gillnet	P1	Hake	4, 6, and 7 and divisions 3.a, 8.a–b, and 8.d	June 2015	Certified	ACOURA

Fishery name	Principle	Species	ICES areas	Date certified	Status	CAB
Ekofish Group-North Sea twin rigged otter trawl plaice	P1	Plaice	4 and 3a	June 2009	Certified	ACOURA
Osprey Trawlers North Sea twin-rigged plaice	P1	Plaice	4 and 3	September 2010	Certified	ACOURA
Germany North Sea saithe trawl	P1	Saithe	4 and 6a	October 2008	Certified	ACOURA

Table 31. Scoring comparison table against MSC certified fisheries. Variation in outcome (pass/fail at SG80) highlighted in red and explained in detail section 3.1.1. * expedited into this assessment. Non-harmonised PIs are blacked out.

Species	Haddock	Saithe	Plaice	Hake	Whiting	Haddock	Saithe*	Saithe	Saithe	Saithe	Saithe	Saithe	Plaice	Plaice	Plaice	Plaice	Plaice	Hake	Hake	Cod
MSC Fishery	This Assessment					DFPO Dk NS & Skag	SFSAG	Scap., Euro. & CDPSM	UK/DFFU/Dog. Group	DFPO Dk NS & Skag	No NS saithe	Germany NS	DFPO Dk NS Skag. & Katt.	DFPO Dk NS	CVO NS	Ekofish NS	Osprey NS	DFPO Dk NS Skag. & Katt.	Cornish gillnet	SFSAG cod
FCR	1.3					1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	2.0
Date (Re)Certified	Na					07/08/12	13/10/13	22/09/16	19/04/16	07/08/12	14/06/13	08/10/13	30/10/14	24/03/11	20/12/12	31/03/16	17/03/16	30/10/14	11/06/15	18/07/17
1.1.1	90	90	100	100	80	90	80	80	80	100	100	100	90	90	90	90	90	90	100	
1.1.2	100	100	90	100	100	80	90	90	90	80	80	80	75	75	80	75	75	90	90	
1.1.3																				
1.2.1	90	100	90	85	70	85	90	100	100	95	100	100	90	95	90	95	95	90	90	
1.2.2	85	100	75	75	65	80	80	90	90	80	90	90	75	75	90	75	75	75	75	

Species	Haddock	Saithe	Plaice	Hake	Whiting	Haddock	Saithe*	Saithe	Saithe	Saithe	Saithe	Saithe	Plaice	Plaice	Plaice	Plaice	Plaice	Hake	Hake	Cod
1.2.3	100	100	100	100	100	90	80	90	90	80	90	90	80	80	80	90	90	80	80	
1.2.4	100	100	100	100	100	95	90	95	95	85	90	90	90	90	95	90	90	90	90	
3.1.1	85	85	85	100	85		100													85
3.1.2	100	100	100	100	100		100													100
3.1.3	100	100	100	100	100		100													100
3.1.4	100	100	100	100	100		100													
3.2.1	90	90	90	90	90		95													90
3.2.2	100	100	100	100	100		90													100
3.2.3	100	100	100	100	100		90													100
3.2.4	100	100	100	100	100		80													
3.2.5	90	90	90	90	90		80													90

3.2 Previous assessments

There are two previous assessments for this fishery which comprise the UoA 1 and UoA 2 of this expedited assessment.

3.2.1 UoA 1

UoA 1 was certified as 'Scottish Fisheries Sustainable Accreditation Group (SFSAG) North Sea haddock' and initially entered assessment on the 17th January 2008. The fishery was certified on the 25th October 2010 by Intertek Fisheries Certification (IFC) with the following fishery performance for each principle.

MSC Principle	score
Principle 1: Sustainability of Exploited Stock	93
Principle 2: Maintenance of Ecosystem	83
Principle 3: Effective Management	95

The Intertek assessment team identified the following key strengths and weaknesses of the fishery management as follows;

Principle 1: The North Sea haddock fishery seems to be well managed by means of the joint EU-Norway Management Plan. The plan appears to be working well and will be reviewed at the end of 2009. The main difficulty with haddock is the large and unpredictable variation in year class strength and recruitment which means that at any one time the fishery can be largely dependent on a single year class. Strict management controls are therefore needed to ensure that good year classes, when they occur, are harvested sustainably.

Principle 2: two (cod and whiting) of the five-main retained by catch species were currently outside biological limits but there are currently effective management strategies to assist their recovery. These two species, as well as the more abundant saithe, grey gurnard and the spotted dogfish may also be discarded. There is no significant interaction with ETP species. Whilst it is recognised bottom trawling is likely to affect benthic habitats, this fishery is unlikely to cause further reduction in the habitat structure and function to a point where there would be serious or irreversible harm.

Principle 3: The SFSAG North Sea haddock fishery is a well-run, tightly managed fishery with a well-established and understood management regime that is clearly understood by all the key players engaged in the fishery, which is itself subject to close surveillance and monitoring ensuring a high level of compliance. There are good lines of two-way communication between the management and catching sectors and the catching sector is fully engaged in the relevant research programmes. All aspects of the fishery, its management and corresponding research are subject to regular and comprehensive review.

Following the initial assessment, the following surveillance audits were also completed.

Year 1 Surveillance Audit: Completed on the 21st October 2011, the first annual surveillance audit found that the conditions raised against 2.1.2 and 2.2.2 had made good progress (were 'on target'). The condition raised against 2.1.3 was closed. Certification was maintained.

Year 2 Surveillance Audit: Completed on the 22nd October 2012, the second annual surveillance audit found that the conditions raised against 2.1.2 and 2.2.2 could now be closed. Certification was maintained.

Year 3 Surveillance Audit: Completed on the 22nd October 2013, the third annual surveillance audit recommended that certification be maintained (All existing conditions had now been closed out).

Year 4 Surveillance Audit: Completed on the 10th November 2014, the fourth annual surveillance audit concluded that a new condition should be raised against PI 1.2.2. (This discussed in more detail in Section 2.3.2). Certification was maintained.

The fishery entered re-assessment on 9th April 2015 and was certified by ME Certification on on 17th May 2016 under certificate number MEC-F-034.

The ME Certification assessment team identified four conditions at the time of re-assessment including one (condition 1) rolled over from the previous assessment.

After the re-assessment, the following audits were completed on the fishery;

Year 1 Surveillance Audit: Completed on the 25th May 2017, the first annual surveillance audit found that the conditions raised against 1.2.2 could be closed and was harmonised against DFPO Denmark North Sea & Skagerrak haddock. Good progress was made on the three other conditions and were considered 'on target'). Certification was maintained.

A summary of all the conditions raised and closed since initial certification are provided in Table 32 (including the justification and year of closure for each).

Table 32. Summary of previous assessment conditions for Scottish Fisheries Sustainable Accreditation Group (SFSAG) North Sea haddock.

Condition	PI	Year closed	Justification
TACs are split among stock subareas to avoid potential local depletion. This has been done for the North Sea + Skagerrak component since implementation of the LTMP. The addition of the West of Scotland component to the management unit in 2014 requires that a portion of the TAC be allocated to this subarea as well. For 2015 and 2016, TACs were split amongst the three stock areas based upon the historical average catch shares outlined in the EU-Norway negotiations (ICES, 2015b). This has added uncertainty to the management of fishing mortality in each area and thus to the overall effectiveness of the HCR. The TAC should be allocated amongst areas based upon the relative fishable biomass in each area, taking into account some estimate of the minimum acceptable biomass in each area. The current allocation process based upon catch opens the possibility of a suboptimal distribution of fishing mortality amongst areas such that the overall stock FMP is not achieved. This effect is likely subtle, given the relative size of the stock components (West of Scotland about 10 % of the total) and current exploitation rates. Further exploration of the appropriate areal split of the TAC in support of a new Northern Shelf haddock management plan is required, which may include estimation of area-specific fishing mortality and biomass. This is to ensure both that the achievement of the plan's overall objectives is not adversely affected by the areal TAC allocation process and that local depletion does not occur. Therefore, until further evidence through these explorations is available, it is not possible to state that the current tools are clearly effective in controlling exploitation levels to achieve objectives. SIc does not meet SG80. Note that this issue was raised in the 2nd surveillance audit by FCI of the DFPO Danish North Sea & Skagerrak Haddock Fishery and the 4th surveillance audit by Intertek of the SFSAG North Sea Haddock Fishery. This resulted in a condition being put in place by the DFPO assessment team which was also adopted by the MEC assessment team. It is determined that this condition is appropriate	1.2.2	2017 (Year 1 Surveillance audit of re-certification)	The reduction in apparent stock status and associated TAC advice from ICES in 2016 is largely a function of changes to ICES model (re-estimate of reference points and correction of errors) rather than a material change in the state or dynamics of the stock. ICES predict that based on a larger 2014 year-class, biomass will be above $B_{trigger}$ in 2017. An EU-Norway agreement has fixed the split between areas, and as noted above, there is no evidence that the division of the TAC between areas will drive local depletion in 6a; in fact, the TAC reduction appears to affect 6a more severely than 3a+4. On this basis, the condition is closed. Note: This is in agreement with the Year 4 audit for the DFPO Danish North Sea haddock fishery (Gaudian et al. 2017) with which this was a harmonised condition.

Condition	PI	Year closed	Justification
and the current team agrees that it will continue under its current form through the new cycle of the certificate. At or within 3 years of setting the condition (approximately October 2017), demonstrate that the fishery meets all the SG80 requirements of this PI. Specifically, this will be through meeting the requirements of PI 1.2.2, SG80, SIc, which requires that: "Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules."			
The client shall ensure that there is a partial strategy in place that is expected to maintain both 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. To achieve this outcome, it is recommended that the SFSAG fleet should continue to collaborate proactively with research and development organisations engaged in seeking gear improvements aimed at reducing unwanted by-catch (both commercial and non-commercial) and other adverse environmental effects. On the basis of this joint research, the client fleet should, in consultation with both statutory and non-statutory organisations, adopt suitably selective gear to reduce discard levels of both whiting and cod. Evidence should be provided by the first annual surveillance there is a partial strategy in place 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. This will include verifiable information on selectivity and gear performance measured against current benchmark levels, which will be formally assessed at the third surveillance audit.	2.1.2	2012 (Year 2 Surveillance Audit)	The client has met the condition at this second surveillance point. The partial strategy is in place and improved selectivity measures have been, and continue to be, adopted. Evidence on improvements in selectivity and gear performance as measured against current benchmark levels will be reported at the third surveillance audit. The requirements of this condition have been met. The score for cod, as indicated in the original assessment is 100, for other scoring components (saithe, monkfish and notably whiting) the score is increased to 80. This PI is now rescored at 85 and the condition is closed.
By the first surveillance audit, evidence must be presented that shows that measures have been developed to provide some accurate quantitative information on total catch (i.e. retained plus discarded catch) of all retained species.	2.1.3	2011 (Year 1 Surveillance Audit)	Information on total catch collated via bespoke paper system, now superseded by on-going collection by e-logbook. Condition closed

Condition	PI	Year closed	Justification
Members of the client group will continue to participate extensively in the development and trial of further selective gears to reduce discards through their participation in initiatives such as the Conservation Credits scheme, a Scottish response to regional management that promotes sustainable fishing practices, and the Scottish Industry Science Partnership (SISP), which helps fishers develop new, environmentally friendly, fishing gears. Furthermore, the group will seek to influence the on-going use and development of innovative net design and configuration of whitefish gear, Seasonal Closures (SC's), and Real Time Closures (RTC's) which together provide substantial protection for juveniles and vulnerable stocks such as cod and whiting The group will use current levels of selectivity and gear design as a benchmark from which to assess the need for further improvements; the group will deliver any necessary changes through their participation, and influence within the various stakeholder groups. It is expected that a formal partial strategy for the adoption of suitably selective gear will be in place within a year of initial certification and that there is evidence that this strategy is being implemented successfully within three years of certification.	2.2.2	2012 (Year 2 Surveillance Audit)	There is a partial strategy in place that would reduce by catch of all species through increased selectivity. By catch of spurdog has been reduced as it is now prohibited to retain or land the species, the fishery operates to avoid known spurdog aggregations and spurdog signals on echo sounders etc... and selectivity of gear has increased. This PI is therefore rescored at 80 and the condition closed.
The bycatch from the fishery should be restrained within a level which can be considered to be 'highly unlikely' to create unacceptable impacts on starry ray and common skate, and is not hindering the recovery of these stocks. This could be achieved with further analysis of the PET data, with actions targeted to reduce bycatch of these species to a minimum or by other appropriate methods.	2.3.1	Open on target	The skate and ray id cards are currently being revised, to make sure that are up-to-date in terms of species identification and names. Once this is finished, they will be available both in hard copy and online. Data is collected on discards of skates and rays both via the general discard sampling programme (which continues to expand to cover a wider range of species) and through the PET forms. The data on discards in this fishery continues to improve year on year.
There needs to be an objective basis for confidence that the strategy for reducing bycatch of starry ray and common skate from the fishery will work to reduce the bycatch to a level which can be considered to be 'highly unlikely' to create unacceptable impacts. This could be on the basis of an assessment of the stock trajectory (by ICES or other)	2.3.2	Open on target	The PET data is improved relative to previous years (208 trips in 2016), and provides useful information e.g. about the sex ratio and fate of discards (alive vs injured vs dead). The reporting of elasmobranchs in the standard discard data set, provides better data on elasmobranch

Condition	PI	Year closed	Justification
or on the basis of an evaluation of trends in bycatch across the fleet, or by some other suitable method.			discards and improves the representativeness of the elasmobranch catch in relation to target stocks. It is important to note that interactions with ETP species are by their nature rare events, and therefore problematic in terms of scaling up to fleet level, without very high (unrealistic) levels of sampling. Nevertheless, the data sets available are sufficient to give a qualitative idea of the level of interactions, which given that the stock assessments for both species are also qualitative, is probably sufficient. Furthermore, the data are sufficient for analyses such as the identification of hotspots in time and space or similar, such as suggested by ICES.
There needs to be sufficient information available such that the impact of this fishery on common skate can be quantitatively estimated, and hence it can be determined whether the fishery may be a threat to the recovery of the common skate complex. This requires, as a minimum, a fleet-wide estimate of bycatch of common skate, as well as some basis by which population-level trends can be evaluated (noting that ICES considers that existing data are insufficient for this purpose).	2.3.3	Open on target	See justifications for 2.3.1 and 2.3.2 above

UoA 2 – 'Scottish Fisheries Sustainable Accreditation Group (SFSAG) saithe' initially entered assessment on the 09th June 2011. The fishery was certified on the 3rd October 2013 by MEC with ten conditions

MSC Principle	Score
Principle 1: Sustainability of Exploited Stock	84.3
Principle 2: Maintenance of Ecosystem	(Subarea 4) 80.7 (Subarea 6) 80.0
Principle 3: Effective Management	93.5

The main concerns about this fishery in relation to the MSC standard raised at the assessment were: i) status of the North Sea saithe stock; ii) bycatch and discards of commercially important species and the status of or knowledge about some of these stocks; iii) bycatch of elasmobranchs (particularly common skate and sandy skate) and iv) habitat impacts in relation to some sensitive habitats (cold water corals). The assessment team noted that the Scottish Government had taken a strong lead in Europe in relation to reducing discards and undesirable catches, notably in its 'conservation credits' scheme. Its efforts to map and protect marine habitats are also well advanced relative to most countries. The institutional structure for the management of Scottish fisheries (Principle 3) is in general very strong.

Year 1 Surveillance Audit: Completed on the 15th January 2015, the first annual surveillance audit found that the conditions raised against 1.1.1 should be closed, the condition on 2.3.3 was ahead of schedule and that overall the fishery was 'on target'. Certification was maintained.

Year 2 Surveillance Audit: Completed on the 10th November 2015, the second annual surveillance audit found that overall the fishery was 'on target'. Certification was maintained.

Year 3 Surveillance Audit: Completed on the 24th May 2017, the third annual surveillance audit found that conditions on PIs 2.1.1, 2.1.2, 2.1.3, 2.2.3 and 2.4.1 were closed based on the provision of new data and management. PI 2.3.1 and 2.3.2 and 2.3.3 were rescored based on the addition of starry ray to these PIs. Conditions remain on PIs 2.3.1, 2.3.2, and 2.3.3 with 2.3.2 and 2.3.3 (common skate) considered behind target due to the lack of analysis of recently collected data. Certification was maintained.

A summary of all the conditions raised and closed are provided in Table 33 (including the justification and year of closure for each).

Table 33. Summary of previous assessment conditions for Scottish Fisheries Sustainable Accreditation Group (SFSAG) saithe

Condition	PI	Year closed	Justification
PI 1.1.1 Because the stock is considered depleted, PI 1.1.3 (rebuilding plan) was scored. This requirement for a rebuilding plan acts as the de facto condition for this PI, therefore no formal condition was required here. The score for PI 1.1.3 was 80. (NB: These scores were agreed during the harmonisation process for all the MSC-certified saithe fisheries during December 2011 and January 2012.)	1.1.1	2015 (1st Surveillance audit)	The reduction in apparent stock status and associated TAC advice from ICES in 2016 is largely a function of changes to ICES model (re-estimate of reference points and correction of errors) rather than a material change in the state or dynamics of the stock. ICES predict that based on a larger 2014 year-class, biomass will be above $B_{trigger}$ in 2017. An EU-Norway agreement has fixed the split between areas, and as noted above, there is no evidence that the division of the TAC between areas will drive local depletion in 6a; in fact, the TAC reduction appears to affect 6a more severely than 3a+4. On this basis, the condition is closed. Note: This is in agreement with the Year 4 audit for the DFPO Danish North Sea haddock fishery (Gaudian et al. 2017) with which this was a harmonised condition.
The fishery should work to ensure that it can demonstrate within 5 years that its impact on the whiting stock in Subarea VI, including via discards, does not put the recovery of the stock at risk.	2.1.1	2017 (3rd Surveillance audit)	The stock is clearly recovering: trajectories of both biomass and recruitment are upwards and F<FMSY even though $B<B_{lim}$. PI 2.1.1a has been rescored for 6a whiting. Since there is now 'evidence of recovery', SG80 is met. This condition is therefore closed.
The fishery should put in place a management plan for the whiting stock in Subarea VI within 5 years, should working with other management agencies if necessary.	2.1.2	2017 (3rd Surveillance audit)	As for 2.1.1
The fishery should carry out a data needs assessment for these stocks within two years, and to support the gathering of the information required to undertake a basic stock assessment – data should be made available for stock assessment within four years, with data collection on-going as required from that point.	2.1.3	2017 (3rd Surveillance audit)	Whiting: Following considerable work by Marine Scotland and industry through the Scottish Industry–Science partnership survey which was initiated in 2013 to provide information on a quarterly basis on the distribution and abundance of cod and other demersal species in Division VIa. This data collection has allowed Marine Scotland to provide catch estimates along with landing values for principal species within this region. Monkfish and Ling: Since the initial certification of this fishery new stock assessment methods for monkfish and ling stock assessments have been published through the ICES framework for category 3 stocks (ICES 2012). The information available for these two species has

Condition	PI	Year closed	Justification
			increased based on dedicated surveys of stock (monkfish) and better use of reference fleets (Ling). Monkfish the catching sector continues to liaise with Aberdeen University and MSS with a focus on delivering more information on spawning females. The stock remains classified as data poor due to the lack of any robust testing for length although improvements to the process continue. The dedicated survey for this stock indicated a strong 2013 year class that will be entering the fishery in 2016. ICES advises that when the precautionary approach is applied, catches in 2016 should be no more than 18,435 tonnes. If discard rates do not change from the average of the last three years (2012–2014), this implies landings of no more than 17,642 tonnes. Genetic and particle-tracking studies have determined that the monkfish caught in the North Sea and those caught to the west of Scotland come from the same biological stock. Since 2014, there has been effort to improve coverage by the Scottish industry/science observer sampling scheme in Subareas IV and VI. In December 2016 at the Council of Ministers meeting in Brussels, the EU Total Allowable Catch for the northern shelf (IV and VI, EC waters of IIa and Vb, and international waters of XII and XIV) monkfish was set at 17,642 tonnes, with the UK quota for 2016 at 11,131 tonnes. Ling: For ling the assessment shows an increasing stock size and stable catch since 2003 and is based on the standardized cpue series from the Norwegian longline reference fleet (ICES 2015b). The advice is based on a comparison of the two latest index values (index A) with the three preceding values (index B), combined with the revised 2012 catch advice. The index is estimated to have increased by more than 20%. An uncertainty cap was applied in estimating the catch advice as the data was not considered sufficiently robust. However, ICES were able to estimate a catch target for 2016 and 2017, with discards considered to be negligible. The landing target of 14,746 tonnes is for subareas VI-IX, XII, and XIV, and in Divisions IIIa and IVa (other areas) (ICES 2015b). For megrim, the condition was closed during the first year audit. For whiting, monkfish, and ling the condition is rescored as part of this surveillance audit and considered closed (see Rescoring PI 2.1.3).

Condition	PI	Year closed	Justification
The fishery should within three years collect sufficient information on sandy ray bycatch to assess the likely impact of the overall fleet, so that it is possible to assess whether or not it is appropriate to consider this species a 'main' bycatch species. If further assessment considers that it should be 'main', the fishery should ensure that its bycatch of this species is not having a population-level impact within five years.	2.2.1	2017 (3rd Surveillance audit)	Confirming the tentative conclusion from 2nd surveillance audit, the team concluded that there is little evidence of any overlap of this fishery with sandy rays, and that mention of sandy rays in the landings data is highly likely to be a result of misidentification. On this basis, sandy rays have been removed from the list of 'main' bycatch species, and the condition is therefore closed. The only other species considered for this PI at time of certification were spurdog and thornback ray which scored SG80. Thus the overall score for this PI is now 80.
This condition relates to the quantitative information available on discards for the UoC. The information provided to the assessment team was not sufficient to make a quantitative or semi-quantitative assessment of total discard rates by the fleet for all, or even main, discard species. The fishery should put in place within 3 years a data collection system such that discard rates can be quantitatively assessed across the fleet.	2.2.3	2017 (3rd Surveillance audit)	SG80b (information is sufficient to estimate outcome status in relation to biologically-based limits) was scored as not met in the initial assessment, for the following reason 'it is difficult to estimate the overall impact of the fishery on the population from the data available (neither total discards nor discard mortality can be estimated)'. Since then, this situation has changed. The two observer programmes (Marine Scotland and SFF) have been merged under a common methodology with common observer training, trip sampling, observer protocols and data handling. MSS provide estimated total discards, discard % and total catches (landings + discards) for all the significant species in the catch, including both finfish and elasmobranchs (see under Condition 5 for details). ICES comments on the improvement in discard sampling in Scotland – for example in relation to 6a whiting. Note that sandy ray has been removed from the list of 'main' bycatch species (see Condition oin PI 2.2.1); main bycatch species are now spurdog and thornback ray. PI 2.2.3 has been rescored and meets SG80. The condition is closed.
This condition relates to possible impacts on common skate in IV and VI and can be addressed jointly with Conditions 8 and 9. The fishery should work with Marine Scotland and other experts as appropriate to	2.3.1	Open on target	There are no milestones on this condition until Year 5. The condition is therefore **on target**. Starry ray has been added to the list of prohibited species in Subarea IV under Council Regulation 2017/127 (see Article 12) as of 2017 (year 3 surveillance audit). This is therefore added to the

Condition	PI	Year closed	Justification
ensure that the bycatch of this species is not hindering the recovery of the stock.			list of ETP species for the North Sea. PIs 2.3.1-2.3.3 have therefore been rescored for starry ray.
The fishery should put in place within three years a strategy for common skate, to ensure that bycatch is not hindering the recovery of the stock.	2.3.2	Open behind target	In years 1 and 2 the Audit Team noted that there was insufficient data to know if a management plan was required. Data is now much improved (see discussion under Condition 6). The audit team noted, however, the progress has not been made by SFSAG in moving from data collection to data analysis and discussion of management needs and options. For example, data are now available which would allow the evaluation of additional management measures such as seasonal/temporal/spatial closures, which may (or may not) reduce fishery impacts on common skate (IV and VI) and starry ray (IV).
This condition also relates to common skate and can be addressed jointly with Conditions 7 and 8. The fishery should within two years collect data on common skate bycatch such that the population-level impacts of the whole fishery on common skate can be assessed.	2.3.3	Open behind target.	As for 2.3.2 above data collection has greatly improved but data analysis (due to start in Year 3) has not started in any significant way.
This condition relates to the <u>possible overlap of the fishery in Subarea VI with the East Mingulay reef area.</u> The fishery should ensure that it does not act either now or in the future to damage this area. Protection should be in place within three years.	2.4.1	2017 (3rd Surveillance audit)	The reef area is now fully protected from towed gear, while a core area with most Lophelia is protected from all except pelagic gear. On this basis, the team concluded that 'The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.'. SG80 is met. The condition is closed.

3.3 Assessment Methodologies

This full assessment was undertaken in accordance with the MSC Fisheries Certification Requirements (FCR) version 2.0 for assessment procedure. Scoring was carried out against Annex CB of the MSC Certification Requirements v1.3. Adjustments to the Default Assessment Tree were not required.

The MSC Full Assessment Reporting Template v2.0 V 1.0 (16th March 2015) was used to produce the report.

The Risk-Based Framework (RBF) was not used in this assessment.

3.4 Evaluation Processes and Techniques

3.4.1 Site Visits and consultations

Stakeholders were informed of the scheduled site visit, its time and location and the proposed audit team on the 26th January 2017. No comments or requests for interviews were received. The visit was held on 28th February through 2nd March 2017 with the attendants listed in Table 34. Marine Scotland Science and Marine Scotland Compliance (Simon Dryden) were also contacted. A full list of stakeholders consulted during and after the site visit is given in Table 34.

Table 34. Stakeholders consulted during the expedited assessment.

Name	Organisation	Type of consultation
Jennifer Mouat	The Aegir Consultancy / SFSAG representative	Provision of information during the site visit
Mike Park	Chief Executive Scottish White Fish Producers' Association / SFSAG representative	Provision of information during the site visit
Gordon Hart	Head of Access and Control, Marine Scotland	Provision of information on compliance via email correspondence
Liz Clarke	Marine Scotland Science. Marine Laboratory	Provision of information on landings and discard data via email correspondence
Elena Balestri	Scottish Fishermans Federation (SFF)	Provision of information on landings and discard data during the site visit and via email correspondence
Nick Bailey	Marine Scotland Science. Marine Laboratory	Provision of information regarding NS cod ICES advice via telephone.

Name	Organisation	Type of consultation
Mandy Gault	Marine Scotland	PET species codes
Robin Cook	MEC	Assessor
Jo Gascoigne	MEC	Assessor
Geir Honneland	MEC	Assessor
Hugh Jones	MEC	Assessment team leader

Information obtained:

- SFSAG: Information about the functioning and management of the fishery (operations, data gathering and analysis, management structures and responsibilities, management plans, regulations, enforcement etc.);
- Marine Scotland Compliance: Information on enforcement, sanctions and non-compliance;
- Marine Scotland Science and SFF: Information on landings and discards data interpretation; observer data

3.4.2 Evaluation Techniques

a) Media announcements: MEC selected the MSC as media outlet. The MSC press release targeted a wide range of stakeholders within the sustainable seafood industry, ensuring that key stakeholders were notified of this fishery's announcement.

b) Methodology for information gathering: Review of data and documentation, interview of stakeholders.

c) Scoring process: Scoring was completed on the second day of the site visit, followed by additional email correspondence afterwards, mainly in relation to Principle 1.

The scores were decided as follows:

How many scoring issues met?	SG60	SG80	SG100
All	60	80	100
Half	FAIL	70	90
Less than half	FAIL	65	85
More than half	FAIL	75	95

Note that where there is only one scoring issue in the SG, the issue can be partially scored – in this case the team used their judgement to determine what proportion of it was met, e.g. at the 100 level, a small part met = 85, about half met = 90, nearly all met = 95.

d) Decision rule for reaching the final recommendation: The decision rule for MSC certification is as follows:

- No PIs scores below 60;
- The aggregate score for each Principle, rounded to the nearest whole number, is 80 or above.

The aggregate score for each Principle is calculated by taking the average score for each Component followed by the average of all the component scores.

e) Scoring elements: The set of scoring elements considered in the assessment are listed in Table 35.

Table 35. Scoring elements. Although not technically individual scoring elements as they are independent UoAs each Principle 1 species is included for reference.

Component	Scoring elements	Main/Not main	Data-deficient or not
Principle 1 – haddock UoC 1	Haddock in Subarea 4, Division 6.a, and Subdivision 3.a.20 (North Sea, West of Scotland, Skagerrak).	N/A	No
Prinicple 1 – saithe UoC 2	Saithe in Subareas 4 and 6 and Division 3.a (North Sea, Rockall and West of Scotland, Skagerrak and Kattegat)	N/A	No
Principle 1 – plaice UoC 3	Plaice in Subarea 4 (North Sea) and Subdivision 3.a.20 (Skagerrak)	N/A	No
Principle 1 – hake UoC 4	Hake in Subareas 4, 6, and 7 and divisions 3.a, 8.a–b, and 8.d, Northern stock (Greater North Sea, Celtic Seas, and the northern Bay of Biscay)	N/A	No
Principle 1 – whiting UoC 5	Whiting in Subarea 4 and Division 7.d (North Sea and eastern English Channel)	N/A	No
Retained species	W. Scotland whiting N. Sea cod W. Scotland cod Anglerfish *Nephrops* Ling Megrim Witch *Nephrops* FU 7, *Nephrops* FU 8 and *Nephrops* FU 9 (for stock definitions, Table 22; Note: different species apply to different gears)	Main	No
	Megrim, sole	Not main	N/A
Discard species	Flounder Dab Red Mullet Tusk Grey Gurnard Brill	minor	Yes

Component	Scoring elements	Main/Not main	Data-deficient or not
ETP species	Starry ray, *Dipturus* species complex, spurdog, porbeagle, Greenland shark, basking shark, Atlantic salmon, seals, birds (gannet and guillemot)	N/A	No
Habitats	Commonly encountered: sedimentary habitats	N/A	No
	VMEs: burrowed mud, *Arctica islandica* aggregations, *Modiolus* (horse mussel) beds	N/A	No

4 Traceability

4.1 Eligibility Date

The eligibility date has been set as the date of certification 3rd July 2018 for all UoAs. Product caught by SFSAG registered vessels after the date of certification will be eligible to enter further chains of custody.

4.2 Traceability within the Fishery

UoC is the same as UoA for this fishery.

This fishery is governed by the requirements of the European Union and the UK government and as a result, presents a robust traceability system.

The fishing vessels involved in this fishery are required to complete an electronic logbook of all catches that they complete during fishing activities. The vessels are also directly tracked through the use of a Vessel Monitoring System (VMS). The fishery is enforced through the relevant jurisdictions' fishery Monitoring Control and Surveillance systems and authorities (as detailed in Section 2.5.6). This system and the management relating to the fishery are considered to be robust and well maintained. The risk of Illegal, Unregulated and Unreported (IUU) fishing within this fishery is considered relatively low.

Upon gear hauling, fish are brought onboard and graded per length and in accordance to what is required for the destination marketplace. Fish are then placed in open containers in their graded sizes. The catch is then covered with ice to maintain the temperature of the fish. There is no processing or freezing onboard and fish are landed fresh. The boxes are labelled onboard with species, weight and date of capture and are marked as MSC for the species caught within the area of the UoC. As a second check, the date of capture can be linked to the e-logbooks, which gives a high degree of certainty where the vessels have fished (for example, whether they have fished outside the UoC).

Upon landing, the labelled boxes remain separated by fishing area and are either purchased through a direct sales agreement between the fishing company and a processor (e.g. is transferred direct from the vessel to the purchaser's vehicles at the point of landing) or as sales through the auction at the port of landing (sales from fishing company to first buyer). Therefore, traceability to the point of first sale is maintained by the vessel skipper. This is the intended change of ownership and subsequent Chain of Custody certification is required after this transaction. Fish may be landed at ports in the UK or northern Denmark.

EU traceability legislation now dictates that all fish brought to auction must be labelled with the vessel name, type of fishing (e.g. trawl, seine etc…) and ICES catch area prior to the sale so buyers can make informed purchasing decisions prior to and during the auction sale. Once sold, MSC certified stocks are invoiced by the auction under a different MSC-specific code setting out clearly on the invoice the difference between MSC and non-MSC purchases (this code is related directly to the species, gear and ICES area to ensure that only the correct certified stocks can be labelled as MSC on the invoice by the auction).

The combination of The Registration of Fish Buyers and Sellers and Designation of Fish Auction Sites Regulations 2005, EC logbooks and custom and practice provide a series of independent and verifiable mass-balance measures that would enable transgressions to be detected.

The Registered Buyers and Sellers Regulation requires that all transactions at the first point of sale are fully recorded, allowing immediate traceability between the fishery and the first point of the chain of custody whilst the logbook provides a record of the time, location and nature (species and volumes) of the catch. Each vessel in the client group is required to sign terms of membership that stipulate that produce from the Unit of Certification must be both segregated and traceable via logbooks and other mechanisms (e.g. GPS-linked weighing records). Adherence to these terms and conditions would form part of the annual surveillance audit requirements.

Table 36. Traceability Factors within the fishery:

Traceability Factor	Description of risk factor if present. Where applicable, a description of relevant mitigation measures or traceability systems (this can include the role of existing regulatory or fishery management controls)
Potential for non-certified gear/s to be used within the fishery	The UoC for this fishery has specifically included all gears used by the vessels under assessment. The risk of a non-certified gear being used is therefore extremely low.
Potential for vessels from the UoC to fish outside the UoC or in different geographical areas (on the same trips or different trips)	There is a possibility of the vessels from the UoC fishing outside the UoA on the same trip, for instance whiting in 6a are not covered in UoA 5. There is also a possibility of the vessels from the UoA fishing outside the UoC on separate trips e.g. The vessels operate in Faroese waters and at Rockall (6b) these two divisions, take place on separate voyages and are not covered by this assessment. As part of spatially defined quota management systems as fish come onboard, they are graded and placed into open labelled boxes. The boxes are labelled onboard with species, weight, area and date of capture and are marked as MSC for those species caught within the area of the UoC. The date and position of catch will link with the e-log to show where a vessel was fishing; this gives a high degree of security where vessels may fish different management zones in the same fishing trip. Note that any changes in fishing areas are logged. The separate labeled boxes also provide physical separation of catch on their way to port.
Potential for vessels outside of the UoC or client group fishing the same stock	Vessels from outside the UoC are likely to fish for the same stock but will not be covered by this assessment. To avoid the risk of vessels landing certified fish from outside the UoC as MSC (i.e. vessels not associated with this assessment) an up to date list of vessels is maintained by the SFSAG on their website (http://scottishfsag.org/wp-content/uploads/2017/02/MSC-Saithe-and-haddock-Master-110217.pdf) (note: the vessel list is the same as for currently certified cod, haddock and saithe fisheries). This list can then be used by companies with MSC CoC to ensure product is originating from a vessel covered by this assessment.
Risks of mixing between certified and non-certified catch during storage, transport, or handling activities (including transport at	One risk of mixing is between similar species (such as haddock and cod for instance). All vessels maintain catch separately by species (meaning physical identification of species on land is still possible as product has not been filleted (for example). The

Traceability Factor	Description of risk factor if present. Where applicable, a description of relevant mitigation measures or traceability systems (this can include the role of existing regulatory or fishery management controls)
sea and on land, points of landing, and sales at auction)	risk of mixing on-board the vessels during storage or handling is seen as low.
Risks of mixing between certified and non-certified catch during processing activities (at-sea and/or before subsequent Chain of Custody)	As described above, only basic processing (gutting) is completed on board the vessel and all fish are landed 'whole'. The risk of mixing between certified and non-certified product during processing is seen to be low.
Risks of mixing between certified and non-certified catch during transhipment	No transhipment occurs within this fishery and so the risk is seen as minimal.
Any other risks of substitution between fish from the UoC (certified catch) and fish from outside this unit (non-certified catch) before subsequent Chain of Custody is required	No other risks have been identified. Product is landed directly and chain of custody will be required from the first change of ownership (either directly on landing or through the auction system). When product is sold in the auction it is sold by vessel and by species (and is backed up by logbook data). Risk of mixing of certified and non-certified product here is therefore minimal.

4.3 Eligibility to Enter Further Chains of Custody

The assessment team have considered the risks of traceability in the fishery and have determined that product landed by vessels covered by the SFSAG vessel list (found at the following link, http://scottishfsag.org/wp-content/uploads/2017/02/MSC-Saithe-and-haddock-Master-110217.pdf) (note: vessel list is the same as for currently certified haddock and saithe fisheries) and originating from within the UoC covered by this assessment (see Section Previous assessments) shall be eligible to enter into further chains of custody. Product landed from vessels not included on the SFSAG list (as described above) will not be eligible to enter into further chains of custody.

Product is eligible for sale from the auctions listed in Table 37, these are provided along with the landing sites and transport services as required.

Further chain of custody certification will be required for certified product at the first point of sale (through the auction for all ports). Any additional storage of product by the fishing vessel (i.e. storage not on-board the vessel) other than storage organised by an auction, will require separate assessment to determine if chain of custody is required.

Table 37. Landing port, agents, transport and storage services and auction house associated with each landing site used by the UoA.

Landing Site / Port	Agent	Transport Services	Storage Services	fish auction hall, market or place of 1st sale	MSC CoC certifications
Peterhead	no	no	no	Peterhead Fish Market	no
Scalloway	no	no	no	Scalloway Fish Market	no

Landing Site / Port	Agent	Transport Services	Storage Services	fish auction hall, market or place of 1st sale	MSC CoC certifications
Mallaig	no	George Mackay, John McAlister	Mallaig Harbour Authority	Peterhead Fish Market	no
Kinlochbervie	no	no	no	Kinlochbervie Fish Auction	no
Scrabster	no	no	no	Scrabster Fish Market	no
Fraserburgh	no	no	no	Fraserburgh Fish Market	no
Lerwick	no	no	no	Lerwick Fish Market	no
Hanstholm	no	no	no	Hanstholm Fish Market	no
North Shields	no	no	no	North Shields Fish Market	no
Whitby	no	no	no	Whitby Fish Market	no
Lowestoft	no	no	no	Lowestoft Fish Market	no
Scarborough	no	no	no	Scarborough Fish Market	no

4.4 Eligibility of Inseparable or Practicably Inseparable (IPI) stock(s) to Enter Further Chains of Custody

Vessels may cross the boundary between Subarea 4 and 6a on a single trip but in doing so are required to register this movement with the authorities. The two stocks of whiting in Subarea 4 (UoA 5) and Subarea 6a (non-MSC) could be considered IPI. However, as detailed in the traceability section above spatially defined quota management systems require fish to be labelled onboard with species, weight, area and date of capture once landed, this together with VMS and MSS compliance provides a robust measure to allow the North Sea stock to enter further CoC. Plaice is not found in Subarea 6a and therefore there is no risk for this stock.

5 Evaluation Results

5.1 Principle Level Scores

Table 38. Final Principle Scores

Principle	UoA 1 - HAD	UoA 2 - POK	UoA 3 - PLE	UoA 4 -HKE	UoA 5 - WHG
Principle 1 – Target Species	92.4	95.0	93.8	92.5	86.9
Principle 2 – Ecosystem	80.0	80.0	82.0	80.0	82.0
Principle 3 – Management System	94.6	94.6	94.6	96.5	94.6

5.2 Summary of PI Level Scores

Prin-ciple	Component	PI No.	Performance Indicator (PI)	UoA 1 - HAD	UoA 2 - POK	UoA 3 - PLE	UoA 4 - HKE	UoA 5 - WHG
One	Outcome	1.1.1	Stock status	90	90	100	100	90
		1.1.2	Reference points	90	90	90	90	90
		1.1.3	Stock rebuilding					
	Management	1.2.1	Harvest strategy	90	100	95	85	70
		1.2.2	Harvest control rules & tools	85	100	75	75	65
		1.2.3	Information & monitoring	100	100	100	100	100
		1.2.4	Assessment of stock status	100	100	100	100	100
Two	Retained species	2.1.1	Outcome	75	75	80	75	80
		2.1.2	Management	75	75	85	75	85
		2.1.3	Information	80	80	80	80	80
	Bycatch species	2.2.1	Outcome	80	80	80	80	80
		2.2.2	Management	80	80	80	80	80
		2.2.3	Information	80	80	80	80	80
	ETP species	2.3.1	Outcome	75	75	75	75	75
		2.3.2	Management	75	75	75	75	75
		2.3.3	Information	65	65	65	65	65
	Habitats	2.4.1	Outcome	75	75	80	75	80
		2.4.2	Management	75	75	75	75	75
		2.4.3	Information	80	80	80	80	80
	Ecosystem	2.5.1	Outcome	90	90	90	90	90
		2.5.2	Management	100	100	100	100	100

Principle	Component	PI No.	Performance Indicator (PI)	UoA 1 - HAD	UoA 2 - POK	UoA 3 - PLE	UoA 4 - HKE	UoA 5 - WHG
		2.5.3	Information	95	95	95	95	95
Three	Governance and policy	3.1.1	Legal & customary framework	85	85	85	100	85
		3.1.2	Consultation, roles & responsibilities	100	100	100	100	100
		3.1.3	Long term objectives	100	100	100	100	100
		3.1.4	Incentives for sustainable fishing	100	100	100	100	100
	Fishery specific management system	3.2.1	Fishery specific objectives	90	90	90	90	90
		3.2.2	Decision making processes	100	100	100	100	100
		3.2.3	Compliance & enforcement	95	95	95	95	95
		3.2.4	Research plan	90	90	90	90	90
		3.2.5	Management performance evaluation	90	90	90	90	90

5.3 Summary of Conditions

Table 39. Summary of Conditions

Condition number	Condition	Performance Indicator	Related to previously raised condition? (Y/N/NA)
1	It needs to be clear that direct effects of the fishery are highly unlikely to create unacceptable impacts on starry ray and common skate.	PI 2.3.1	Y see Section 3.2
2	There should be an objective basis for confidence that the strategy for common skate and starry ray will work, based on information directly about the fishery and/or the species involved.	PI 2.3.2	Y see Section 3.2
3	There needs to be sufficient information available such that the impact of this fishery on common skate can be quantitatively estimated, and hence it can be determined whether the fishery may be a threat to the recovery of the common skate complex. This requires, as a minimum, a fleet-wide estimate of bycatch of common skate, as well as some basis by which population-level trends can be evaluated (noting that ICES considers that existing data are insufficient for this purpose).	PI 2.3.3	Y see Section 3.2
4	**UoA 5 (whiting)** Evaluate and adopt a new harvest strategy that is responsive to the state of the stock and provide evidence that it is achieving its management objectives.	PI 1.2.1	Na
5	**UoA 3 (plaice)** Develop and adopt well-defined harvest control rules that are consistent with the harvest strategy and ensure that exploitation rates are reduced as limit reference points are approached. The HCR should be contained within a new management plan.	PI 1.2.2	Na
6	**UoA 4 (hake)** Develop and adopt well-defined harvest control rules that are consistent with the harvest strategy and ensure that exploitation rates are reduced as limit reference points are approached. The HCR should be contained within a new management plan.	PI 1.2.2	Na
7	**UoA 5 (whiting)** The fishery must provide evidence indicating that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.	PI 1.2.2	Na
8	**UoA 1, 2 and 4 (haddock, saithe and hake)**By year 4 the partial strategy for W. Scotland cod	PI 2.1.1	Na

Condition number	Condition	Performance Indicator	Related to previously raised condition? (Y/N/NA)
	must be demonstrably effective at achieving recovery and rebuilding of the stock to appropriate and realistic rebuilding target levels defined by the relevant stock model.		
9	**UoA 1, 2 and 4 (haddock, saithe and hake)** By year 4 there needs to be an objective basis for confidence that the strategy for rebuilding the W. Scotland cod stock will work, based on information about the stock and/or fishery.	PI 2.1.2	Na
10	**UoA 1, 2 and 4 (haddock, saithe and hake)** The fishery should show that it is highly unlikely to reduce structure and function of burrowed mud with seapen habitat on the west coast (as defined by records of the tall seapen *Funiculina quadrangularis*) to a point where there would be serious or irreversible harm. Serious or irreversible harm is defined as a reduction in habitat distribution of 20% or more relative to baseline (currently-defined) levels.	PI 2.4.1	Na
11s	**UoA 1, 2 and 4 (haddock, saithe and hake)** The fishery should show that there is an objective basis for confidence that the partial strategy in place for seapens (*Funiculina quadrangularis*) on the W. coast is likely to work, in terms of achieving outcome score 80 or above for 2.4.1.	PI 2.4.2	Na

5.4 Recommendations

None.

5.5 Determination, Formal Conclusion and Agreement

Following consideration of the peer reviewers comments, all stakeholders' inputs and comments to the Public Comment Draft Report (PCDR) and no formal objections being made following the publication of the Final Report (FR) the fishery assessment team concludes that the UoAs assessment in this report should be certified against the MSC standard. The MEC Certification Decision Making entity was informed of the intention to certify the fishery on the 07/06/2018. The final certification decision was made on the 21/06/2018 with the Certification Decision Maker approving the decision to certify the fishery.

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Appendices

Appendix 1 Scoring and Rationales

Principle 1 scoring rationale

Evaluation Table for PI 1.1.1

PI 1.1.1		**The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	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.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.
	Met?	UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: Y UoA 5 - Whiting: Y	UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: Y UoA 5 - Whiting: Y	UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: Y UoA 5 - Whiting: N
	Justification	**UoA 1 – Haddock -** The current SSB (ICES 2017d) is estimated to be 248,592 t which is above B_{lim} (94,000 t), the lowest SSB at which good recruitment was observed (1979). Assuming a CV = 0.3 for the error in the estimate of SSB 2017 implies a probability of 99 % of exceeding B_{lim}, a proxy for the PRI, hence SG100 is met. **UoA 2 – Saithe -** The current SSB is 257,329 t which is well above the B_{pa} value of 150,000 t. It has been above this value since 1996. The stock recruitment plot shows no clear relationship but the largest year classes have occurred at SSB values in the region of 250,000 t (ICES 2017q) which is smaller than the current SSB. The stock is 2.6 times the B_{lim} value that is considered a proxy for the PRI, hence SG100 is met.		

<table>
<tr><td></td><td></td><td colspan="3">UoA 3 – Plaice - Recruitment as estimated over the time period of the assessment shows no long-term trend. SSB fluctuated between 200-500 thousand tonnes from 1957-2011 but has since increased significantly to approximately 940 thousand tonnes in 2016 and is therefore substantially above SSBs that produced average recruitment (ICES 2017m). Stock biomass has never been below B_{lim} and has been increasing since 2004 to be above $MSYB_{trigger}$ since 2011. Biomass in 2016 is >4 times bigger than B_{lim} and 1.5 times above $MSYB_{trigger}$. Since the stock is assessed to be above $MSYB_{trigger}$, a biomass value almost double B_{pa} where there is a 5 % chance of biomass being below B_{lim}, and also with a 95 % CI, then there is a high degree of certainty that the stock is above PRI and SG 100 is met.

UoA 4 – Hake - Recruitment as estimated over the time period of the assessment shows no long-term trend. SSB fluctuated between 25 - 105 thousand tonnes from 1978-2008 but has since increased significantly to approximately 265 thousand tonnes in 2017 and is therefore substantially above SSBs that produced average recruitment (ICES 2017e). If B_{lim} is regarded as the point of recruitment impairment, then the current SSB has a near 100 % probability of being above it. There is therefore a high degree of certainty that the stock is above PRI and meets SG100.

UoA 5 – Whiting - The stock assessment covers the period from 1990 onwards and only provides a limited time series of stock and recruitment values (ICES 2017r). Previously ICES used data from 1963 onwards when recruitment was much higher (Cook & Armstrong 1986). With the current time series there is little or no evidence that recruitment is related to SSB. The current SSB is above B_{lim} and $MSYB_{trigger}$ so SG60 is met. Assuming a CV of 0.3 in the estimate of current SSB, there is a 93 % probability that the biomass is above B_{lim} which may be considered a proxy for the point of recruitment impairment, so SG80 is met. However, there is insufficient information to conclude that the stock is above the point of recruitment impairment which a high degree of certainty given the short time series of observations so SG100 is not met.</td></tr>
<tr><td rowspan="2">b</td><td>Guidepos t</td><td></td><td>The stock is at or fluctuating around its target reference point.</td><td>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.</td></tr>
<tr><td>Met?</td><td></td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td><td>UoA 1 – Haddock: N
UoA 2 – Saithe: N
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td></tr>
</table>

	Justification	**UoA 1 – Haddock -** Management of haddock seeks to maintain the stock above $MSYB_{trigger}$ (132,000 t) and the stock typically has fluctuated above this level. However, periodically it has fallen below B_{pa} through a combination of high fishing mortality and large recruitment variability (ICES 2017d). This pattern continues and although fishing mortality is much lower than the pre-2000 period, average recruitment has also declined offsetting the improvement in exploitation rate. The 2017 estimate of SSB is above B_{pa}. ICES has estimated F_{MSY} to be in the range (0.18-0.30, ICES (2016q)) and the mean value for F during the last 11 years (2 generation times) is 0.27 which falls within this range. Applying average recruitment over this period to the SSB per recruit value at F = 0 gives an estimate of virgin biomass (B_0) as 708,024 t. This implies a B_{MSY} proxy based on $B_{35-40\%}$ (Punt et al. 2014) of 248,000 t -283,000 t. The observed SSB over the same period has fluctuated without trend around this value with a median value of 210,000 t and a range of 123,000 – 327,000 t which is consistent with the B_{MSY} proxy. A full MSY calculation based on a Ricker stock-recruitment function gives a median estimate of B_{MSY} as 144,000t (90% CI = 97,000 t – 280,000 t). A Beverton-Holt or hockey stick recruitment function gives 90%CI Bmsy ranges of 97,000 t – 323,000 t and 109,000 t – 422,000 t with median values of 183,000 t and 191,000 t respectively. The 2017 estimate of the SSB is 249,000 t and is consistent with the stock being close to MSY. There is good reason, therefore, to believe the biomass is fluctuating close to a biomass consistent with B_{MSY} and SG80 is met. There is uncertainty in the estimates of MSY reference points for this stock due to the difficulty of modelling recruitment reliably given the short and variable time series. This combined with F fluctuating at the upper end of the F_{MSY} range means that SG100 is not met. **UoA 2 – Saithe -** There is no specific target SSB but the EU-Norway management plan sets a floor of 200,000 t based on the old B_{pa}. Since 1996 the stock has been above this value for 14 out of 22 years. It has been above the new B_{pa} of 150,000 t continuously since 1996 and is currently increasing. F has been below the estimated F_{MSY} since 2013, hence SG80 is met. Since F has been below F_{MSY} for four years and the generation time for this species is 10 years there is not a high degree of certainty that it is fluctuating around its target value and SG100 is not met. **UoA 3 – Plaice -** $MSYB_{trigger}$ is estimated to be 564,599 t (ICES 2017m) and the biomass has been above this value since 2011 and its 95 % CI since 2014. The estimate for 2016 is 936,773 t, substantially above the reference point (1.5 > $MSYB_{trigger}$). Since $MSYB_{trigger}$ is the lower bound of B_{MSY} and the 95 % CI of the 2015 and 2016 stock biomass is above $MSYB_{trigger}$ then there is a high degree of certainty that the stock is indeed above MSY over recent years. Current F is slighty below F_{MSY} and would be expected to maintain the stock above $MSYB_{trigger.}$ SG100 is met. **UoA 4 – Hake -** $MSYB_{trigger}$ is estimated to be 45,000 t (ICES 2017e) and the biomass since 2008 has been above this value. The estimate for 2017 is 265,666 t, substantially above the reference point. Hence SG100 is met. **UoA 5 – Whiting -** There is no target biomass and $MSYB_{trigger}$ serves as a limit reference point. The stock should achieve B_{MSY} if fished at F_{MSY}. Currently the SSB is above $MSYB_{trigger}$ and has been above this value for most of the period since 1990 (ICES 2017r). F_{MSY} as defined by ICES corresponds to the F that gives a 5 % probability of falling below B_{lim}. The median equilibrium SSB as this value of F = 0.15 is 233,000 t (ICES 2016). All the values of SSB from 2009 onwards are above this value. The generation time for whiting (assuming M~0.6 and maturation at age 2) is 3.7 years so the stock has been above the expected median biomass for more than 2 generations. ICES calculated median equilibrium virgin biomass to be 283,000 t (ICES 2016r) which means that current biomass (ca 300,000 t) is close to unexploited levels. It is therefore fluctuating at a biomass value consistent with MSY and meets SG100.

References		ICES (2016q; 2016v), Punt et al. (2014) ICES (2017q), ICES (2017m), ICES (2016d; 2017e), Cook & Armstrong (1986) and ICES (2017r)		
Stock Status relative to Reference Points				
		Type of reference point	**Value of reference point**	**Current stock status relative to reference point**
UoA 1 HAD	**Target reference point**	F_{MSY}	0.19	$F(2016)/F_{MSY} = 1.89$
	Limit reference point	F_{pa} B_{lim} $MSYB_{trigger}$	0.274 SSB = 94,000 t SSB = 132,000 t	$0.407/F_{pa} = 1.31$ $248592/B_{lim} = 2.64$ $248592/MSYB_{trigger} = 1.88$
UoA 2 POK	**Target reference point**	EU-Norway plan (F_{MGT}) F_{MSY}	0.3 0.36	$0.28/F_{MGT} = 0.93$ $0.28/F_{MSY} = 0.78$
	Limit reference point	B_{lim} B_{pa} $MSYB_{trigger}$ EU-Norway plan ($B_{trigger}$) F_{lim} F_{pa}	107,000 t 150,000 t 150,000 t 200,000 t 0.56 0.4	$257{,}329/B_{lim} = 2.4$ $257{,}329/B_{pa} = 1.84$ $276{,}000/B_{trigger} = 1.38$ $0.28/F_{lim} = 0.5$ $0.28/F_{pa} = 0.7$

UoA 3 PLE	**Target reference point**	F_{MSY}	0.21	$0.2/F_{MSY} = 0.95$
	Limit reference point	$MSYB_{trigger}$ B_{lim} B_{pa} F_{lim}	564,599 t 207,288 t 290,203 t 0.516	$936{,}773/MSYB_{trigger} = 1.66$ $936{,}773/B_{lim} = 4.51$ $936{,}773/B_{pa} = 3.22$ $0.2/F_{lim} = 0.39$
UoA 4 HKE	**Target reference point**	$MSYB_{trigger}$ F_{MSY}	45,000 t 0.28	265,666/45,000 = 5.9 0.27/0.28 = 0.31
	Limit reference point	B_{lim} F_{lim}	32,000 t 0.87	265,666/32,000 = 8.30 0.27/0.87 = 0.96
UoA 5 WHG	**Target reference point**	F_{MSY}	0.15	$0.24/F_{MSY} = 1.6$
	Limit reference point	$MSYB_{trigger}$ (B_{pa}) B_{lim} F_{lim}	242,000 t 173,000 t 0.39	$305{,}405/MSYB_{trigger} = 1.26$ $305{,}405/B_{lim} = 1.76$ $0.24/F_{lim} = 0.61$

UoA 1 – Haddock	**90**
UoA 2 – Saithe	**90**
UoA 3 – Plaice	**100**
UoA 4 – Hake	**100**

UoA 5 - Whiting	**90**
CONDITION NUMBER (if relevant):	**Na**

Evaluation Table for PI 1.1.2

<table>
<tr><td colspan="2">PI 1.1.2</td><td colspan="3">Limit and target reference points are appropriate for the stock</td></tr>
<tr><td colspan="2">Scoring Issue</td><td>SG 60</td><td>SG 80</td><td>SG 100</td></tr>
<tr><td rowspan="3">a</td><td>Guide post</td><td>Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.</td><td>Reference points are appropriate for the stock and can be estimated.</td><td></td></tr>
<tr><td>Met?</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td><td></td></tr>
<tr><td>Justification</td><td colspan="3">UoA 1 – Haddock - The reference points are based on the ICES definition of the Precautionary Approach and their interpretation of MSY. In particular, F_{MSY} is bounded by the probability (0.05) of the stock falling below B_{lim}. The RPs are based on potential impairment to recruitment and take into account uncertainty. New biomass limit and precautionary reference points have been estimated for the Northern Shelf (North Sea, Skagerrak and West of Scotland) stock (ICES 2016q). The reference points can be calculated and are appropriate for the stock.

UoA 2 – Saithe - A long time series of stock biomass, recruitment and fishing mortality estimates are available that provide the basis for reference point calculation. SSB limit reference points are based on the lowest observed biomass (B_{loss}) and F_{lim} is based on the probability of falling below this biomass limit. The reference points can be estimated and are appropriate for the stock. Details of the MSY reference point calculations are given in ICES (2016v).

UoA 3 – Plaice - B_{lim} is set at the breakpoint of a hockey stick stock-recruitment function based on recruitment 1958-2012. $MSYB_{trigger}$ is based on the fifth percentile of SSB in 2015. F_{lim} and F_{MSY} are based on stochastic simulations using EQsim and the recruitment period 1958-2012. The biomass and F reference values have been revised to account for the inclusion of 3a in the revised assessment and are appropriate for the stock, hence SG80 is met.</td></tr>
</table>

		UoA 4 – Hake - B_{lim} is set at a low observed biomass which was followed by a quick recovery. $MSYB_{trigger}$ is based on B_{lim} taking into account uncertainty. F_{lim} is set at a value which gives 5 % or less probability of falling below B_{lim}. F_{MSY} is based in a segmented stock recruitment function using stochastic simulations. These values are appropriate for the stock and are estimated from annual stock assessments performed by ICES. **UoA 5 – Whiting -** The reference points are based on the ICES definition of the Precautionary Approach and their interpretation of MSY. B_{lim} is based on the lowest observed value since 1990 but does not consider data prior to this. It is used as the basis to estimate B_{pa} taking into account uncertainty in B_{lim}. F_{MSY} is calculated using a constraint that the probability of the biomass falling below B_{lim} is less than 0.05. The reference points can be estimated and are appropriate for the stock so SG80 is met		
b	**Guide post**		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 above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues.
	Met?		UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: Y UoA 5 - Whiting: Y	UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: Y UoA 5 - Whiting: Y
	Justification	**UoA 1 – Haddock -** The relationship between stock and recruitment is unclear with little evidence of reduced recruitment at the lowest observed stock sizes. There is sporadic occurrence of strong year-classes which is a characteristic feature of the stock. B_{pa} is in effect the principal biomass limit reference point and takes into account the uncertainty in the estimate of B_{lim}. B_{lim} is based on the lowest biomass which produced a strong year class (the 1979 year class). This meets SG100 **UoA 2 – Saithe -** B_{pa} (the precautionary limit reference point) is based on B_{lim}, the lowest observed biomass, taking into account errors in the estimation of biomass. The value if F_{lim} takes into account the probability of falling below B_{lim}. F_{MSY} is calculated taking into account a range of errors as well as process error in recruitment when using a hockey stick stock-recruitment relationship. There is only weak evidence of lower recruitment at the lowest observed SSB and B_{pa} is in the range where observed recruitment is high. Hence SG100 is met. **UoA 3 – Plaice -** The B_{lim} reference point is set based on the inflection point of the hockey stick stock recruitment function which can be regarded as the PRI. $MSYB_{trigger}$ is based on the lower bound of the estimated 2015 SSB and is more than double B_{lim}, hence SG100 is met.		

<table>
<tr><td></td><td></td><td colspan="2">UoA 4 – Hake - The B_{lim} reference point is set based on the observation of a strong recovery from a low value. $MSY_{Btrigger}$ is used as a limit reference point that triggers a reduction in fishing mortality rate when the stock falls below this value and takes into account uncertainty in the value of B_{lim}, hence SG100 is met.

UoA 5 – Whiting - The relationship between stock and recruitment is unclear with little evidence of reduced recruitment at the lowest observed stock sizes. B_{pa} is in effect the principal biomass limit reference point and takes into account the uncertainty in the estimate of B_{lim}. It is based on the lowest biomass observed since 1990 (in 2007). Recruitment since 2000 has typically been lower than the earlier period but does not show any relationship with SSB. B_{pa} ($MSYB_{trigger}$) takes into account uncertainty in B_{lim} so meets SG100.</td></tr>
<tr><td>c</td><td>Guide post</td><td></td><td>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.</td><td>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.</td></tr>
<tr><td></td><td>Met?</td><td></td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td><td>UoA 1 – Haddock: N
UoA 2 – Saithe: N
UoA 3 – Plaice: N
UoA 4 – Hake: N
UoA 5 - Whiting: N</td></tr>
<tr><td></td><td>Justification</td><td colspan="3">UoA 1 – Haddock - Before the North Sea and West of Scotland stocks were merged, F = 0.3 was the target. F_{MSY} forms the basis of advice which is an upper limit.and followed by managers. It is assumed that fishing at this level will result in the biomass fluctuating around a biomass consistent with MSY. F_{MSY} is calculated within a stochastic simulation using recent recruitment (2000 onward) when it has been lower than previous decades. The calculation takes into account assessment error and advice error. It also excludes F_{MSY} values that result in more than a 5 % probability of falling below B_{lim} (ICES 2016q). The estimated reference point is likely to be very conservative given the precautionary assumption about recruitment and the choice of biomass threshold which limits the F_{MSY} value well below its unconstrained estimate of 0.27. Biomass in the past 11 years has fluctuated around levels consistent with B_{MSY} proxies and parametric estimates of B_{MSY} using a variety of stock-recruitment assumptions. Hence SG80 is met. The ecological role of the stock is not explicitly considered, hence SG100 is not met.

UoA 2 – Saithe - There is no specific target biomass, but the stock is managed to be above the EU-Norway management plan of 200,000 t that represents a floor for the biomass. It is based on the precautionary approach considering the uncertainty in B_{lim}. The upper limit on F is F_{MSY} which is calculated to take into account the probability (0.05) of falling below B_{lim} (ICES 2017q). F_{MSY} calculations consider recruitment uncertainty, assessment error and implementation error. Taken together these limit reference points should ensure that the stock is</td></tr>
</table>

		maintained at a level consistent with B_{MSY} and SG80 is met. However, the ecological role of the stock is not explicitly considered so SG100 is not met. **UoA 3 – Plaice -** There is no specific target biomass but the stock is managed to be above $MSYB_{trigger}$ that represents a floor for the biomass. It is based on the precautionary approach taking into account the uncertainty in the estimate of recent biomass. The upper limit on F is F_{MSY} which is calculated to take into account the probability of falling below B_{lim} (ICES 2014f; ICES 2017m). F_{MSY} calculations take into account recruitment uncertainty, assessment error and implementation error. The current biomass is well above $MSYB_{trigger}$ so there is good reason to expect the stock to be fluctuating at a level consistent with B_{MSY} and SG80 is met. However, the ecological role of the stock is not explicitly considered so SG100 is not met. **UoA 4 – Hake -** There is no specific target biomass, but the stock is managed to be above $MSYB_{trigger}$. It represents a floor for the biomass. It is based on the precautionary approach taking into account the uncertainty in B_{lim}. The upper limit on F is F_{MSY} which takes into account the probability of falling below B_{lim} (ICES 2017e). However, the ecological role of the stock is not explicitly considered so SG100 is not met. **UoA 5 – Whiting -** There is no biomass target reference point used by ICES or managers except that management is intended to avoid B_{lim} with high probability. F_{MSY} is an upper limit on F. It is assumed that fishing at F_{MSY} will result in the biomass fluctuating around a biomass consistent with MSY. F_{MSY} is calculated within a stochastic simulation using a hockey stick recruitment function. The calculation takes into account assessment error and advice error. It also excludes F values that result in more than a 5 % probability of falling below B_{lim} (ICES 2016r). However, the ecological role of the stock is not explicitly considered so SG100 is not met.		
d	**Guide post**		For key low trophic level stocks, the target reference point takes into account the ecological role of the stock.	
	Met?		Not Relevant	
	Justification	None of the stocks are LTL stocks		
References		ICES (2016q) ICES (2017q; 2016u), ICES (2014f; 2017m), ICES (2016d; 2017e), ICES (2016r; 2017r)		

UoA 1 – Haddock	**90**
UoA 2 – Saithe	**90**
UoA 3 – Plaice	**90**
UoA 4 – Hake	**90**
UoA 5 - Whiting	**90**
CONDITION NUMBER (if relevant):	**Na**

Evaluation Table for PI 1.1.3 – not applicable, only scored if PI 1.1.1 60-80

Evaluation Table for PI 1.2.1

PI 1.2.1		**There is a robust and precautionary harvest strategy in place**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	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 is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.
	Met?	UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: Y UoA 5 - Whiting: Y	UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: Y UoA 5 - Whiting: Y	UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: N UoA 5 - Whiting: Y
	Justification	**UoA 1 – Haddock -** The harvest strategy is to harvest the stock at or below F = F_{MSY}. Reference points have been calculated for the stock corresponding to F_{MSY} with a low (5 %) probability of falling below B_{pa}. Annual stock assessments provide an estimate of stock status relative to reference points and advice is given on a catch limit that correspond to the harvest strategy. There is an implicit harvest control rule that reduces fishing mortality when the SSB falls below B_{pa}. The implicit harvest control rule, which is used for advice, takes into account the major sources of uncertainty (ICES 2016q) and is designed to achieve stock management objectives. Hence SG100 is met. **UoA 2 – Saithe -** The harvest strategy aims to keep the SSB above 200,000 t. When the biomass falls below this value F is reduced from its target value of 0.3 and hence is responsive to the state of the stock. ICES has evaluated the strategy to be consistent with the Precautionary Approach (ICES 2017q). An MSY strategy has been evaluated which calculated an F_{MSY} value of 0.36 which is above the management plan value and implies the current plan is consistent with MSY and that the biomass should fluctuate above B_{MSY}. Hence SG100 is met. **UoA 3 – Plaice -** There was an agreed management plan (EU 2007) which has been assessed by ICES to be consistent with the Precautionary Approach (ICES 2016v). The plan has a target F of at least 0.30 (greater than F_{MSY}) but only covers the North Sea		

<table>
<tr><td></td><td></td><td colspan="3">(Subarea 4). It is also linked to the management of sole in the same area. The plan was responsive to the current state of the stock. The change in the ICES unit of assessment in 2016 to include 3a has meant that managers are unable to follow the agreed plan as reference points have changed for the combined area. Managers set catch limits for 2016 below the previous management plan value in an effort to accommodate the new lower F_{MSY} value. F (2017) is below the new F_{MSY} reference point, hence SG80 is met. At present adoption of an MSY harvest strategy has not been formally implemented but the new multiannual plan is being negotiated. There is an agreement on the share of catches in 3a between Norway and the EU (EU-Norway 2017). SG100 is met.

UoA 4 – Hake - There is no agreed harvest strategy, but a recovery plan has been in operation since 2004. The plan has a target F = 0.25 (less than F_{MSY}) and a built in decision rule to increase the SSB (EU 2004) based on the current stock size. The plan is therefore responsive to the current state and meets SG80. At present adoption of an MSY harvest strategy has not been implemented so SG100 is not met.

UoA 5 – Whiting - The harvest strategy is to fish to stock at or below F_{MSY}. Reference points have been calculated for the stock corresponding to F with a low (5 %) probability of falling below B_{lim}. Annual stock assessments provide an estimate of stock status relative to reference points and advice is given on a catch limit that corresponds to the harvest strategy. There is an implicit harvest control rule that reduces fishing mortality when the SSB falls below B_{pa}. The implicit harvest control rule, which is used for advice, takes into account the major sources of uncertainty (ICES 2016r) and is designed to achieve stock management objectives. Hence SG100 is met.</td></tr>
<tr><td rowspan="2">b</td><td>Guidepost</td><td>The harvest strategy is likely to work based on prior experience or plausible argument.</td><td>The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.</td><td>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.</td></tr>
<tr><td>Met?</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: N</td><td>UoA 1 – Haddock: N
UoA 2 – Saithe: Y
UoA 3 – Plaice: N
UoA 4 – Hake: N
UoA 5 - Whiting: N</td></tr>
</table>

<table>
<tr><td></td><td>Justification</td><td colspan="3">UoA 1 – Haddock - The stock was previously assessed as two separate stocks (North Sea and West of Scotland). For the North Sea there was a management plan with a target F of 0.3 and F_{MSY} of 0.37. From 2008 onwards the stock was fished below 0.3 indicating that the strategy was working. In 2015 the two stocks were amalgamated, and new reference points calculated. These were revised subsequently by ICES when an error was found in the stock assessment software used in 2015. This revised F_{MSY} downward to 0.19. As the stock area has been revised the management plan for the combined stock has not been evaluated by ICES. Based on the North Sea area, management was achieving its objectives until 2104 when the assessment unit changed, so SG80 is achieved. However, as the new management plan has not been evaluated and F in 2015 increased above the new F_{MSY} SG 100 is not met.

UoA 2 – Saithe - An MSY strategy has been evaluated which calculated an F_{MSY} value of 0.36 which is above the management plan value of 0.3 and implies the current plan is consistent with MSY and that the biomass should fluctuate above B_{MSY}. Current SSB is above the B_{pa} value of 200,000 t and has been increasing in recent years. Current F is below both the management plan value and F_{MSY}. Hence SG100 is met.

UoA 3 – Plaice - Under the existing plan for the North Sea, the stock has increased well above $MSYB_{trigger}$ and F has fallen slightly below the revised F_{MSY}. The stock has been above $MSYB_{trigger}$ since 2011 demonstrating that the plan has reached its objectives and SG80 is met. As there is no formally agreed harvest strategy and the new MAP for the North Sea has not been tested, SG100 is not met.

UoA 4 – Hake - Following commencement of the recovery plan the stock has increased well above $MSYB_{trigger}$ and F has fallen below F_{MSY}. The stock has been above $MSYB_{trigger}$ since 2008 demonstrating that the plan has reached its objectives and SG80 is met. As there is no formally agreed harvest strategy, SG100 is not met.

UoA 5 – Whiting - The EU-Norway agreement aims to fish the stock at or below F = 0.15. F has reduced from 0.69 in 1990 and fluctuated around 0.2 since 2002 showing that the strategy is likely to work and SG60 is met. ICES revised its estimates of natural mortality and this has changed reference points. ICES evaluated the EU-Norway plan with the revised M values not consistent with the Precautionary Approach unless the plan reduced F when the projected biomass fell below B_{pa} and therefore SG80 is not met. ICES (2016r) advise that further management strategies should be evaluated in view of the uncertainties surrounding the assessment.</td></tr>
<tr><td rowspan="2">c</td><td>Guidepost</td><td>Monitoring is in place that is expected to determine whether the harvest strategy is working.</td><td></td><td></td></tr>
<tr><td>Met?</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td><td></td><td></td></tr>
</table>

	Justification	**UoA 1 – Haddock -** A comprehensive evaluation of the annual stock assessment methodology was investigated in 2016 (ICES 2016g) which resulted in a new configuration of the assessment model. Data on catches and surveys are added each year to the annual assessment which is able to determine stock status in relation to reference points. **UoA 2 – Saithe -** Annual stock assessments are undertaken by ICES that provide estimates of current F and SSB which are used to determine stock status (e.g. ICES (2017q)). **UoA 3 – Plaice -** There is a monitoring scheme in place for the stock and the fisheries. There are several sampling programmes and two fishery independent surveys under the EU Data Collection Framework. There is a port sampling scheme in all countries involved, at-sea observers programme to collect biological information on catches (length, sex, maturity and otoliths). All these data collected are used to inform annual assessments of the stock. This comprehensive catch and survey data that enable stock status determination in relation to MSY reference points (ICES 2017m) so this SG is fully met. **UoA 4 – Hake -** Annual assessments of the stock are carried out using comprehensive catch and survey data that enable stock status determination in relation to MSY reference points, so this SG is fully met. **UoA 5 – Whiting –** A comprehensive evaluation of the annual stock assessment methodology was investigated in 2016 (ICES 2016r) which resulted in a new configuration of the assessment model. Data on catches and surveys are added each year to the annual assessment which is able to determine stock status in relation to reference points.		
d	**Guidepost**			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: Y UoA 5 - Whiting: Y

	Justification	All stocks under assessment here fall under the CFP and the CFP is reviewed periodically every 10 years with improvements made if deemed necessary. The EU Data Collection Framework is also periodically reviewed, as well as each Member States sampling programmes. **UoA 1 – Haddock -** Since 2006, the North Sea haddock strategy has undergone three reviews while that of the W.Scotland has undergone one review. These were undertaken in response to issues raised by the EU and Norway and responded to by ICES using an MSE framework specifically designed to address such requests. In each case, the harvest strategy was improved based upon the review. **UoA 2 – Saithe -** The harvest strategy was reviewed in 2012 following a joint to ICES request from EU-Norway (ICES 2012b). It was decided to keep the existing plan. ICES has recommended that the strategy be reviewed again within 4 years. **UoA 3 – Plaice -** ICES conducted an analysis of MSY ranges in for the stock (ICES 2014f) which uses an MSY harvest strategy and is the proposed basis for advice. Harvest strategies are reviewed at periodic benchmark assessments. **UoA 4 – Hake -** ICES conducted an analysis of MSY ranges in for the stock (ICES 2016d) which uses an MSY harvest strategy and is the proposed basis for advice. A partial review of appropriate harvest rates was conducted at the benchmark assessment (ICES 2014c). **UoA 5 – Whiting –** The harvest strategy was reviewed in 2016 (ICES 2016r). ICES within this report has indicated that a further review should take place to consider alternative strategies.		
e	**Guidepost**	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	None of the target species are sharks. This scoring issue is not relevant.		
References		ICES (2016q) ICES (2017q; 2012a), EU (2007), ICES (2014f; 2017m), EU-Norway (2017) EU (2004), ICES (2016d; 2014c), ICES (2016r)		

UoA 1 – Haddock	**95**
UoA 2 – Saithe	**100**
UoA 3 – Plaice	**95**
UoA 4 – Hake	**85**
UoA 5 - Whiting	**70**
CONDITION NUMBER (if relevant):	**UoA 5 – Whiting = 4**

Evaluation Table for PI 1.2.2

<table>
<tr><td colspan="2">PI 1.2.2</td><td colspan="3">There are well defined and effective harvest control rules in place</td></tr>
<tr><td colspan="2">Scoring Issue</td><td>SG 60</td><td>SG 80</td><td>SG 100</td></tr>
<tr><td rowspan="3">a</td><td>Guide post</td><td>Generally understood harvest 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.</td><td>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.</td><td></td></tr>
<tr><td>Met?</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: N
UoA 4 – Hake: N
UoA 5 - Whiting: N</td><td></td></tr>
<tr><td>Justification</td><td colspan="3">UoA 1 – Haddock - Advice provided by ICES is based on a standard HCR that reduces fishing mortality when the SSB falls below B_{pa}. The rule assumes F_{MSY} is the maximum fishing mortality rate. Hence SG60 is met. The stock area been changed and ICES revised the reference points which has prevented managers from following the agreed EU-Norway management plan for the North Sea. However, TACs are based on the Agreed record of 1 December 2017 for 2018. According to this agreement the ICES MSY HCR has been adopted and the distribution of catches between 6a and subarea 4 is defined in the agreed record, hence SG80 is met.

UoA 2 – Saithe - The EU-Norway agreement sets a maximum F = 0.3 and minimum SSB = 200,000 t. If the biomass falls below 200,000 t F is reduced. ICES has developed a generic HCR for MSY which reduces F linearly when F falls below B_{pa} and has evaluated this for saithe. The EU-Norway plan has more conservative limit reference points and is therefore consistent with the ICES generic HCR. SG80 is met

UoA 3 – Plaice - A multiannual plan (EU 2007) has been in place for some time and has been used to adjust fishing mortality rates in response the size of the stock. The stock is well in excess of $MSYB_{trigger}$ and has fluctuated above it in recent years. Although the stock assessment area has been revised, F is below F_{MSY} for the combined area. ICES advice now follows their conventional HCR based on the</td></tr>
</table>

<table>
<tr><td></td><td></td><td colspan="3">MSY approach. Managers moved towards the new MSY HCR that scales F in response to biomass if it falls below MSY$B_{trigger}$. However, while it is expected that a well-defined HCR will be in place, this currently does not exist, and SG 80 is not met.

UoA 4 – Hake - A recovery plan (EU 2004) has been in place for some time and has been used to set fishing mortality rates in response the size of the stock. The stock has recovered both in terms of SSB and F and therefore meets SG60. The harvest rule now followed by ICES to give advice is based on F_{MSY} as the maximum F. This should be reduced linearly when the biomass falls below MSY$B_{trigger}$ and is zero below B_{lim} (ICES 2016d) however as it has not been formally adopted by managers there is uncertainty about the implementation of the rule so SG80 is not met.

UoA 5 – Whiting - Advice provided by ICES is based on standard HCR that reduces fishing mortality when the SSB falls below B_{pa}. The rule assumes F = 0.15 is the maximum fishing mortality rate. Hence SG60 is met. The EU-Norway management plan uses the same F but does not reduce F when biomass falls below B_{pa} (ICES 2013b). Following a revision of the M values used in the assessment ICES evaluated the plan as not consistent with the Precautionary Approach (ICES 2017r). Hence SG80 is not met.</td></tr>
<tr><td rowspan="3">b</td><td>Guide post</td><td></td><td>The selection of the harvest control rules takes into account the main uncertainties.</td><td>The design of the harvest control rules takes into account a wide range of uncertainties.</td></tr>
<tr><td>Met?</td><td></td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: N
UoA 4 – Hake: N
UoA 5 - Whiting: Y</td></tr>
<tr><td>Justification</td><td colspan="3">UoA 1 – Haddock The HCR is based on a generic rule that reduces F in response to the SSB falling below B_{pa}. B_{pa} is an estimate of the minimum SSB required to produce a good year class taking into account measurement error. F_{MSY} takes into account recruitment variability, assumes low average recruitment and the probability of falling below B_{pa} when accounting for assessment and advice error (ICES 2016q). In addition, the adoption of MSY as a framework for single species management is based on the observation that when fishing at MSY the stock will produce sufficient biomass to sustain the species role in ecological function. Hence a wide range of sources of uncertainty are considered and SG100 is met.

UoA 2 – Saithe - The HCR is based on a generic rule that reduces F in response to the SSB falling below B_{pa}. B_{pa} is an estimate the B_{loss} taking into account measurement error. F_{MSY} takes into account recruitment variability, recruitment and the probability of falling below B_{pa} when accounting for assessment and advice error (ICES 2017q). In addition, the adoption of MSY as a framework for single species</td></tr>
</table>

<table>
<tr><td></td><td></td><td colspan="3">management is based on the observation that when fishing at MSY the stock will produce sufficient biomass to sustain the species role in ecological function. Hence a wide range of sources of uncertainty are considered and SG100 is met.
UoA 3 – Plaice - The previous management plan (EU 2007) and the proposed Multiannual plan for the North Sea (EU 2016c) contain the main elements of an HCR where limit reference points are defined and which identify when management action to reduce fishing mortality in response to the biomass is required. These reference points are incorporated into the ICES advisory HCR and take into account the principal sources of uncertainty. Hence SG80 is met. At present there is no formally agreed HCR which meets SG100
UoA 4 – Hake - As there is a detailed stock assessment using both fishery-dependent and fishery independent data the generally understood HCR is likely to be robust to the main uncertainties and SG80 is met. An HCR has been developed and tested, (ICES 2016d), and is used for advice. It takes into account a wide range of uncertainties including assessment error and implementation error. In addition, the adoption of MSY as a framework for single species management is based on the observation that when fishing at MSY the stock will produce sufficient biomass to sustain the species role in ecological function. As it has not been formally adopted by managers there is uncertainty about the implementation of the rule and SG100 is not met
UoA 5 – Whiting - The HCR used for advice is based on a generic rule that reduces F in response to the SSB falling below B_{pa}. B_{pa} is an estimate the lowest observed SSB taking into account measurement error. F_{MSY} takes into account recruitment variability, and the probability of falling below B_{pa} when accounting for assessment and advice error (ICES 2016r). Hence a wide range of sources of uncertainty are considered and SG100 is met.</td></tr>
<tr><td>c</td><td>Guide post</td><td>There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.</td><td>Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.</td><td>Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.</td></tr>
<tr><td></td><td>Met?</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: N</td><td>UoA 1 – Haddock: N
UoA 2 – Saithe: Y
UoA 3 – Plaice: N
UoA 4 – Hake: N
UoA 5 - Whiting: N</td></tr>
<tr><td></td><td>Justification</td><td colspan="3">UoA 1 – Haddock - The main tools for controlling exploitation are catch limits and restrictions on fleet capacity. In addition there are minimum mesh sizes for the principal fleets (TR1) of 100 mm. During the period when the EU-Norway management plan was in operation the fishing mortality was reduce below the then F_{MSY} value for several years. This shows the tools did work during that period and SG80 is met. In the</td></tr>
</table>

		most recent years the management plan has been made obsolete by the revision of the stock area and reference points so there is insufficient evidence available to consider SG100 as met until further stock assessments have been carried out. **UoA 2 – Saithe -** The principal tool for implementing the HCR is a limit on total catches. In more recent years TACs have been set in line with advice and landings have been close to these limits. SSB has increased since the lowest values in the mid-1990s and has typically been close to or above B_{pa} = 200,000 t. Fishing mortality tended to be higher than the F = 0.3 target value until 2014 but is now at 0.28 following a steady decline from 0.44 in 2009, hence SG100 is met **UoA 3 – Plaice -** The principal annual tool used to implement HCRs is a Total Allowable Catch. The fishery is also managed using closed areas, minimum mesh sizes and fleet capacity limits. This has been effective during the previous management plan and current F and SSB satisfy MSY reference points, hence SG80 is met. However, as no formal HCR has been adopted for the combined area it is not possible to assess the effectiveness of current measures and SG100 is not met. **UoA 4 – Hake -** The principal tool used to implement HCRs is a Total Allowable Catch. This has been effective during the recovery plan and current F and SSB satisfy MSY reference points, hence SG80 is met. Although no formal HCR has been adopted ICES provides using a candidate HCR and is followed by managers to some degree. Recent ICES advice suggests this control of discards may not be effective (ICES 2017e). **UoA 5 – Whiting -** The main tools for controlling exploitation are catch limits and restrictions on fleet capacity. In addition there are minimum mesh sizes for the principal fleets (TR1) of 100 mm. During the period when the EU-Norway management plan was in operation the fishing mortality was reduced from 0.69 to approximately 0.2. This shows the tools had some success during that period. In the most recent years the management plan has been made obsolete by the revision of the natural mortality values and reference points so there is insufficient evidence available to evaluate SG80 or SG100 until further stock assessments have been carried out. For all UoAs, the procedure of topping up the TAC to allow compliance with the Landing Obligation may undermine the control of catches unless there is adequate enforcement of the landing obligation. There is insufficient data at present to evaluate this issue, but currently the quantities involved in top ups are small.
References		ICES (2016q) ICES (2017q; 2016u), EU (2016c; 2007), ICES (2017m) EU (2004) and ICES (2016d), ICES (2016r; 2017r; 2013b)

UoA 1 – Haddock	**85**

UoA 2 – Saithe	**100**
UoA 3 – Plaice	**75**
UoA 4 – Hake	**75**
UoA 5 - Whiting	**65**
CONDITION NUMBER (if relevant):	**UoA 3 – Plaice = 5** **UoA 4 – Hake = 6** **UoA 5 – Whiting = 7**

Evaluation Table for PI 1.2.3

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guide post**	Some relevant information related to stock structure, stock productivity and fleet composition 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.	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 related to the current harvest strategy, is available.
	Met?	UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: Y UoA 5 - Whiting: Y	UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: Y UoA 5 - Whiting: Y	UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: Y UoA 5 - Whiting: Y
	Justification	**UoA 1 – Haddock -** A comprehensive range of information is available for the stock and is reviewed in the 2014 ICES benchmark assessment (ICES 2014e). There is information on stock identity, age composition data by fleet for landings and discards, research vessels surveys and fleet effort data. A range of other scientific surveys are carried out into the hydrography and oceanography of the area by ICES affiliated laboratories. Much of the data from these surveys is held by ICES in Copenhagen. In 1981 and 1991 comprehensive sampling of fish stomach samples was used to estimate predation on haddock (and other principal fish species). Data collected by the Sea Mammal Research Unit at St Andrews University provide periodic estimates of haddock consumed by grey and harbour seals in the North Sea and West of Scotland (Hammond & Wilson 2016) **UoA 2 – Saithe -** The ICES benchmark assessment (ICES 2016p) reviews available data and information. This includes stock identification, CPUE, catch data and research vessel surveys. It also reviews multispecies interactions. Data are collected on over 90% of the catch and some discard data is also available. Environmental information is collected on routine IBTS surveys as well as dedicated oceanographic surveys by regional marine laboratories. Much of the data from these surveys are accessible from the ICES website http://www.ices.dk/marine-data/dataset-collections/Pages/default.aspx . SG100 is therefore met.		

<table>
<tr><td></td><td></td><td colspan="3">UoA 3 – Plaice - Stock identity information was reviewed by Ulrich et al. (2017). A benchmark assessment reviewed biological data relevant to the stock (ICES 2015d; ICES 2017n). Fleet data are collected routinely as part of the assessment process, hence SG80 is met. Surveys provide data on abundance as well as data on bycatch species and some environmental data such as temperature and salinity meeting SG100.
UoA 4 – Hake - Stock identity information was reviewed at the benchmark assessment in 2014 and was sufficient to delimit the Southern and Northern stocks (ICES 2014c). The same benchmark reviewed biological data relevant to the stock. Fleet data are collected routinely as part of the assessment process, hence SG80 is met. Surveys provide data on abundance as well as data on bycatch species and some environmental data meeting SG100.
UoA 5 – Whiting – A comprehensive range of information is available for the stock and is reviewed in the 2013 ICES benchmark assessment. There is information on stock identity, age composition data by fleet for landings and discards, research vessels surveys and fleet effort data. A range of other scientific surveys are carried out into the hydrography and oceanography of the area by ICES affiliated laboratories. Much of the data from these surveys is held by ICES in Copenhagen. In 1981 and 1991 comprehensive sampling of fish stomach samples was used to estimate predation on whiting (and other principal fish species). Data collected by the Sea Mammal Research Unit at St Andrews University provides periodic estimates of whiting consumed by grey and harbour seals in the North Sea and West of Scotland (Hammond & Wilson 2016).</td></tr>
<tr><td rowspan="2">b</td><td>Guide post</td><td>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.</td><td>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.</td><td>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 inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.</td></tr>
<tr><td>Met?</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td></tr>
</table>

<table>
<tr><td></td><td>Justification</td><td colspan="3">UoA 1 – Haddock - Landings are recorded monthly and discards monitored on a quarterly basis. Research vessel surveys monitoring stock abundance are conducted at least twice annually. Both the catch data and survey data are subject to high sampling levels as required by the EU regulations on data collection (EU 2008b). The assessment methodology takes account of the observation errors in the data in an appropriate way (Fryer 2001). The robustness of the assessment was reviewed in 2014 and 2016 (ICES 2016q; ICES 2014e). SG100 is met.
UoA 2 – Saithe - Landings and discards are monitored for the main fleet components. Age composition data from over 90% of the catch are collected annually. CPUE data are available for the three principal fleets in the fishery and are used in the assessment. The annual Q3 IBTS research vessel survey is also used in the assessment. The benchmark assessment (ICES 2016p) reviewed the quality of the data and the performance of the assessment method which provides a good understanding of the uncertainties. Hence SG100 is met.
UoA 3 – Plaice - Landings are monitored routinely for all the main fleet components (ICES 2017m). Discards data are available routinely. Three annual fishery independent surveys provide indices of abundance. Although no formal HCR has been adopted, these data and the assessment provide all the necessary information for a comprehensive HCR and were available for the Multi-annual plan. The benchmark assessment (ICES 2015d) explores the uncertainty in the assessment and is well understood, hence SG100 is met.
UoA 4 – Hake - Landings are monitored routinely for all the main fleet components (ICES 2016s). Discards data have become available recently (1999 onwards, (ICES 2016s)). Four annual fishery independent surveys provide indices of abundance. Although no formal HCR has been adopted, these data and the assessment provide all the necessary information for a comprehensive HCR and were available for the Recovery plan. The assessment WG report explores the uncertainty in the assessment (ICES 2016s) and is well understood, hence SG100 is met.
UoA 5 – Whiting - Landings are recorded monthly and discards monitored on a quarterly basis. Research vessel surveys monitoring stock abundance are conducted at least twice annually. Both the catch data and survey data are subject to high sampling levels as required by the EU regulations on data collection (EU 2008b). The assessment methodology takes account of the observation errors in the survey data in an appropriate way (Shepherd 1999). The robustness of the assessment was reviewed in 2016 (ICES 2016r). SG100 is met.</td></tr>
<tr><td>c</td><td>Guide post</td><td></td><td>There is good information on all other fishery removals from the stock.</td><td></td></tr>
<tr><td></td><td>Met?</td><td></td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td><td></td></tr>
</table>

	Justification	**UoA 1 – Haddock -** Data collected account for the vast majority of the removals by the fishery. Discards are routinely monitored by at-sea observers in both targeted fisheries and fisheries for Nephrops (TR2). Data on industrial bycatch are available. SG80 is met. **UoA 2 – Saithe -** Most of the catch is landed and these are monitored. Discards form a small proportion of the catch but are monitored and take into account in the assessment. Removals by seals are estimated periodically by the Sea Mammal Research Unit (Hammond & Wilson 2016). SG80 is met. **UoA 3 – Plaice -** The monitoring of landings and discards cover the main removals from the fishery (ICES 2016o). SG80 is met. **UoA 4 – Hake -** The monitoring of landings and discards cover the main removals from the fishery (ICES 2016s). SG80 is met. **UoA 5 – Whiting -** Data collected account for the vast majority of the removals by the fishery. Discards are routinely monitored by at-sea observers in both targeted fisheries and fisheries for Nephrops (TR2). Data on industrial bycatch are available. SG80 is met.
References		Fryer (2001), ICES (2016q; 2014e), EU (2008b) ICES (2016p), Hammond & Wilson (2016), Ulrich et al. (2017), ICES (2017q; 2015d; 2017n) ICES (2014c; 2016s), Hammond & Wilson (2016), ICES (2016r; 2013a), Shepherd (1999)

UoA 1 – Haddock	**100**
UoA 2 – Saithe	**100**
UoA 3 – Plaice	**100**
UoA 4 – Hake	**100**
UoA 5 - Whiting	**100**
CONDITION NUMBER (if relevant):	**Na**

Evaluation Table for PI 1.2.4

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guide post**		The assessment is appropriate for the stock and for the harvest control rule.	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.
	Met?		UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: Y UoA 5 - Whiting: Y	UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: Y UoA 5 - Whiting: Y
	Justification	**UoA 1 – Haddock -** The assessment model is a state-space formulation that describes the age-specific stock and fishery dynamics by year (Fryer 2001). These models perform well when compared to observation error models. It has been subjected to a benchmark review (ICES 2016q; ICES 2014e) and was deemed the most appropriate model to use given that it allows separate treatment of landings and discards data, the latter an important consideration in this stock. Current SSB and fishing mortality are estimated which are used in the HCR to provide short-term harvest advice. A key change in the TSA model from the previous two models (North Sea and W. Scotland) is the combination of the data from the two areas based upon a comprehensive review of stock structure information. The TSA model incorporates age-based natural mortality based upon the results of a stochastic multi-species assessment. It estimates recruitment based upon a random walk which is more appropriate than the estimates being constrained by a stock-recruitment relationship. Landings and discards by age are separately estimated, the latter based on age-specific proportions at age which can change over time based upon a random walk. Overall SG 100 is met **UoA 2 – Saithe -** The assessment covers the principal area of distribution of the stock which is mainly along the north-western European shelf edge. It takes into account the age structure of the population and implicitly accounts for growth and recruitment variability. Maturity		

		data allow calculation of SSB from the estimated number at age in the stock. Since F and SSB are estimated annually this directly supports the HCR which is based on the same population dynamics model as the assessment model. SG 100 is met **UoA 3 – Plaice -** Plaice in 4 and 3a is assessed by ICES based on Aarts and Poos model (AAP), a catch-at-age model that has flexible selectivity functions to reconstruct discards data series. The assessment takes into account the spatial distribution and stock identification, age and length composition, growth and natural mortality specific for a severe winter. Therefore major features of the biology of plaice and the nature of UoA are taken into account in the assessment and SG100 is reached. **UoA 4 – Hake -** The assessment is based on length frequencies of landings and discards and uses four survey indices. The method used is Stock Synthesis (Methot & Wetzel 2013) which uses an age structured underlying population model. This provides annual estimates of fishing mortality and SSB with associated confidence intervals. The model takes into account the stock recruitment relationship and the main biological characteristics of the species. Hence SG100 is met. **UoA 5 – Whiting -** The assessment model is a regression approach that describes the age-specific stock and fishery dynamics by year (Shepherd 1999). It considers observation error only in the surveys. It has been subjected to a benchmark review (ICES 2016r; ICES 2013a). Current SSB and fishing mortality are estimated which are used in the HCR to provide short-term harvest advice. The assessment takes into account the relevant components of the fishery with the inclusion of catches by the human consumption fleets, industrial bycatch and discards. The relevant biology is taken into account that includes age of maturity, growth and natural mortality. The latter is estimated from a North Sea multispecies models that estimates predation effects. Overall SG100 is met.		
b	**Guide post**	The assessment estimates stock status relative to reference points.		
	Met?	UoA 1 – Haddock: Y UoA 2 – Saithe: Y UoA 3 – Plaice: Y UoA 4 – Hake: Y UoA 5 - Whiting: Y		
	Justification	**UoA 1 – Haddock -** Current SSB and fishing mortality are estimated on an annual basis relative to SSB and fishing mortality reference points hence SG60 is met. **UoA 2 – Saithe -** The assessment estimates current SSB and F annually which can be compared to the reference points that form the HCR. SG60 is met		

<table>
<tr><td></td><td></td><td colspan="3">UoA 3 – Plaice - Reference points based on the Precautionary Approach and MSY have been calculated for the stock. The assessment provides estimates of current F and SSB in relation to these reference points namely $MSYB_{trigger}$, B_{pa}, B_{lim}, F_{MSY}, F_{pa} (ICES 2016o; ICES 2014f). SG60 is met
UoA 4 – Hake - The assessment provides annual estimates of fishing mortality and SSB with associated confidence intervals. These can be used directly to assess stock status against reference points. SG60 is met
UoA 5 – Whiting - Current SSB and fishing mortality are estimated on an annual basis relative to SSB and fishing mortality reference points hence SG60 is met</td></tr>
<tr><td>c</td><td>Guide post</td><td>The assessment identifies major sources of uncertainty.</td><td>The assessment takes uncertainty into account.</td><td>The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.</td></tr>
<tr><td></td><td>Met?</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td></tr>
<tr><td></td><td>Justification</td><td colspan="3">UoA 1 – Haddock - The observation uncertainties included in the assessment are associated with stock structure, the landings and discard data and the two IBTS indices. The process uncertainties are associated with fishery mortality and how this changes over time, highly variable recruitment with the sporadic appearance of strong year-classes, age-specific natural mortality, and trends in stock and fishery weights at age. The impact of these uncertainties has been evaluated and their implications examined and reported as part of the management advice. Model fits and retrospective analyses do not indicate significant structural issues. The SI is met at SG80.
While the TSA model is able to evaluate SSB and fishing mortality relative to the biological reference points in a probabilistic manner, this is not a routine part of the annual assessment. However, the estimates of F_{MSY} and B_{pa} take into account the uncertainty in the assessment so it can be said that status in relation to reference point is considered in a probabilistic way, so SG 100 is met as the uncertainties are already accounted for in the MSE.
UoA 2 – Saithe - The assessment model currently used is SAM (Berg & Neilsen 2016). This is a state space model that accounts for both observation and process error. It provides posterior distributions of critical population metrics such as F and SSB which can be used in a probabilistic way in relation to reference points. SG100 is met.</td></tr>
</table>

<table>
<tr><td></td><td></td><td colspan="3">UoA 3 – Plaice - The assessment up to 2016 was based on XSA (Shepherd 1999) which takes into account uncertainty in the survey data but not in the catch data. It does not provide precision estimates for fishing mortality. ICES held a benchmark assessment for the stock in February 2017 and has updated the assessment model to include most sources of uncertainty (Aarts & Poos 2009). This meets SG100.
UoA 4 – Hake - The stock synthesis method is a model that can account for both measurement and process error and therefore provides a realistic quantitative estimate of uncertainty (Methot & Wetzel 2013). It provides confidence intervals on SSB and F which can be used in a probabilistic way to evaluate status in relation to reference points, hence SG100 is met.
UoA 5 – Whiting - The observation uncertainties included in the assessment are associated with the two ITBS indices, but the catch data are treated a fixed and error free. Model uncertainty is investigated using retrospective analysis and an alternative model (SURBAR). The impact of these uncertainties has been evaluated and their implications examined and reported as part of the assessment. Model fits and retrospective analyses do not indicate significant structural issues. The SI is met at SG80.
While the XSA model is potentially able to evaluate SSB relative to the biological reference points in a probabilistic manner, this is not a routine part of the annual assessment. However, the estimates of F_{MSY} and B_{pa} take into account the uncertainty in the assessment so it can be said that status in relation to reference point is considered in a probabilistic way, so SG 100 is met as the uncertainties are already accounted for in the MSE.</td></tr>
<tr><td rowspan="3">d</td><td>Guide post</td><td></td><td></td><td>The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.</td></tr>
<tr><td>Met?</td><td></td><td></td><td>UoA 1 – Haddock: Y
UoA 2 – Saithe: Y
UoA 3 – Plaice: Y
UoA 4 – Hake: Y
UoA 5 - Whiting: Y</td></tr>
<tr><td>Justification</td><td colspan="3">UoA 1 – Haddock - The assessment model has been tested with simulated data and shown to be robust to a wide range of uncertainties and indeed there is evidence through self-testing (model applied to data consistent with error assumptions) and cross-testing (model applied to data with different error assumptions) that it performs favourably if not better than observation-error models. Further, residual and retrospective analyses indicate no major issues in model fits. Alternative formulations (e.g. XSA, VPA, SURBA, SAM) are regularly used and indicate consistency in assessment outputs. SG100 is met</td></tr>
</table>

<table>
<tr><td></td><td></td><td colspan="3"> UoA 2 – Saithe - Two principal assessment models have been used, XSA (Shepherd 1999) and the current SAM model. These have been extensively evaluated at benchmark assessments (ICES 2016p).These evaluations consider alternative model configurations and uses of the data within the assessment. SG100 is met. UoA 3 – Plaice - An ICES working group considered a range of alternative assessments for plaice in the North Sea area (ICES 2012c) with particular reference to stock identity and concluded that the North Sea stock and 3a should be combined. A comprehensive evaluation of assessments was carried out by ICES in February 2017 (ICES 2017n) and a new assessment model was implemented. SG100 is met. UoA 4 – Hake - The stock was subject to a benchmark assessment in 2014 where a range of analyses was explored (ICES 2016d) within the Synthesis framework. A full sensitivity analysis was conducted, hence SG100 is met. UoA 5 – Whiting - The assessment was tested at the benchmark assessment (ICES 2013a) where a range of alternative models were explored. These included state-space models and survey only approaches. The model was further tested in ICES (2016r). SG100 is met. </td></tr>
<tr><td rowspan="2">e</td><td>Guide post</td><td></td><td>The assessment of stock status is subject to peer review.</td><td>The assessment has been internally and externally peer reviewed.</td></tr>
<tr><td>Met?</td><td></td><td><table><tr><td>UoA 1 – Haddock</td><td>Y</td></tr><tr><td>UoA 2 – Saithe</td><td>Y</td></tr><tr><td>UoA 3 – Plaice</td><td>Y</td></tr><tr><td>UoA 4 – Hake</td><td>Y</td></tr><tr><td>UoA 5 - Whiting</td><td>Y</td></tr></table></td><td><table><tr><td>UoA 1 – Haddock</td><td>Y</td></tr><tr><td>UoA 2 – Saithe</td><td>Y</td></tr><tr><td>UoA 3 – Plaice</td><td>Y</td></tr><tr><td>UoA 4 – Hake</td><td>Y</td></tr><tr><td>UoA 5 - Whiting</td><td>Y</td></tr></table></td></tr>
</table>

	Justification	**UoA 1 – Haddock -** The WGNSSK reports are subjected to an internal audit process which forms the first level of review. These reports are then reviewed by ACOM who are ultimately responsible for the official ICES advice. This forms the second level of review. Before the advice is implemented in the form of TACs, the EC may ask its own advisory group, STECF to review the ACOM report, which represents the third level of review. Periodically, ICES will organise a benchmark review to consider improvements to the assessment data and model, the latest of which occurred in 2014 and is subject to external review (ICES 2014e). SG100 is met. **UoA 2 – Saithe -** Annual assessments are subject to peer review as part of the ACOM process of advice. External reviewers participate in the benchmark assessments. SG100 is met. **UoA 3 – Plaice -** External peer review took place at the benchmark assessment in 2017. ICES annual assessments are subject to external review as part of the advisory process and SG100 is met. **UoA 4 – Hake -** External peer review took place at the benchmark assessment in 2014. ICES annual assessments are subject to external review as part of the advisory process and SG100 is met. **UoA 5 – Whiting -** The WGNSSK reports are subjected to an internal audit process which forms the first level of review. These reports are then reviewed by ACOM who are ultimately responsible for the official ICES advice. This forms the second level of review. Before the advice is implemented in the form of TACs, the EC may ask its own advisory group, STECF to review the ACOM report, which represents the third level of review. Periodically, ICES will organise a benchmark review to consider improvements to the assessment data and model, the latest of which occurred in 2013 and is subject to external review (ICES 2013a). This review was updated in 2016. SG100 is met.
References		Fryer (2001), ICES (2016q; 2014e) Berg & Neilsen (2016), ICES (2016p; 2011), Aarts & Poos (2009), ICES (2014f; 2017m; 2017n; 2012c), Shepherd (1999) ICES (2016d; 2014c; 2017e), Methot & Wetzel (2013), ICES (2016r; 2013a), Shepherd (1999)

UoA 1 – Haddock	**100**
UoA 2 – Saithe	**100**
UoA 3 – Plaice	**100**
UoA 4 – Hake	**100**

UoA 5 - Whiting	**100**
CONDITION NUMBER (if relevant):	**Na**

Principle 2 scoring rationale

Evaluation Table for PI 2.1.1

<table>
<tr><td colspan="2">PI 2.1.1</td><td colspan="3">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</td></tr>
<tr><td colspan="2">Scoring Issue</td><td>SG 60</td><td>SG 80</td><td>SG 100</td></tr>
<tr><td rowspan="3">a</td><td>Guide post</td><td>Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below).</td><td>Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below).</td><td>There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points.</td></tr>
<tr><td>Met?</td><td>N – W. Scotland cod (go to 2.1.1c)
Y – other stocks</td><td>N – W. Scotland cod and whiting (go to 2.1.1c)
Y – other stocks</td><td>Y – plaice, megrim, hake, Nephrops except FU15
N – other stocks</td></tr>
<tr><td>Justification</td><td colspan="3">Main retained stocks, the relevant gears and their status in relation to biologically-based limits and targets are given below; see also Table 19, Table 20 and Table 21 in Section 2.4.1:
For two stocks, SG80 is not met (i.e. it is not highly likely that the stock is above biologically-based limits; defined here as B_{lim}) – W. Scotland cod and W. Scotland whiting.
For whiting, since the biomass is increasing, we can infer that recruitment is improving; i.e. the stock is ‘likely’ to be above biologically-based limits (SG60 is met) but for cod this is not the case, so SG60 is not met (go to scoring issue c).
Main retained stocks:
<table>
<tr><th>Stocks</th><th>Main for which gears?</th><th>Highly likely to be above biologically-based limits?</th><th>Fluctuating around target ref. points?</th><th>Score</th></tr>
<tr><td>W. Scotland whiting</td><td>all</td><td>No biomass is below B_{LIM} (Section 2.4.2) therefore scoring issue 2.1.1c is required.</td><td>n/a</td><td>go to 2.1.1c</td></tr>
<tr><td>N. Sea cod</td><td>all TR1</td><td>B = $MSYB_{trigger}$; met</td><td>$F>F_{MSY}$; not met</td><td>80</td></tr>
<tr><td>W.Scotland cod</td><td>all</td><td>go to 2.1.1c</td><td>n/a</td><td>go to 2.1.1c</td></tr>
</table></td></tr>
</table>

Anglerfish	single/twin trawls TR1/TR2	Biomass index increasing – met	Stock biomass in 2015 is estimated to be 1.04 times above the estimated B_{MSY}. Met	80
Nephrops	single/twin trawls TR1/TR2	see below		95
Ling	twin trawl TR1	Biomass index increasing since 2001 – met	F_{MSY} approximates M. A proxy based on equilibrium mean length in the population at F_{MSY} is used. This is smaller than current mean length in population. met	80
Megrim	twin trawl TR1		B>>MSY$B_{trigger}$, F<<F_{MSY}; met	100
Witch	all TR2 trawls	B ~=B_{MSY}; >MSY$B_{trigger}$; met	Yes but ref. points and assessment uncertain; not met	80

Nephrops functional units (FU)

FU	Highly likely to be above biologically-based limits?	Fluctuating around target ref. points?	Score
FU7	B>MSY$B_{trigger}$,	B>MSY$B_{trigger}$, F<<F_{MSY} proxy	100
FU8	B>>MSY$B_{trigger}$,	B>>MSY$B_{trigger}$, F<F_{MSY} proxy	100
FU9	B>MSY$B_{trigger}$,	B>MSY$B_{trigger}$, F<F_{MSY} proxy	100
FU11	B>MSY$B_{trigger}$,	B>MSY$B_{trigger}$, F<F_{MSY} proxy	100
FU12	B>MSY$B_{trigger}$,	B>MSY$B_{trigger}$, F<F_{MSY} proxy	100
FU13	B>>MSY$B_{trigger}$,	B>>MSY$B_{trigger}$, F variable, fluctuating around F_{MSY} proxy	100
FU15	B>MSY$B_{trigger}$; met	F>F_{MSY} proxy; not met	80

b	**Guide post**			Target reference points are defined for retained species.

	Met?			N
	Justification	Target reference points are defined for all main retained species, but not for most minor retained species (see Table 15 and Table 16 for list). SG 100 is not met in full.		
c	**Guide post**	If main retained species are 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 main retained species are 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.	
	Met?	Y	Y – WS whiting N – WS cod	
	Justification	This applies to W. Scotland cod and whiting (see SIa) **W. Scotland cod:** This is managed under a long-term management plan (EU 2008a) modified in 2016 (EU 2016c). The TAC is set to zero, there are limits on landing bycatch (maximum 1.5 % live weight of landings) and limits on effort. Most of the catch is discarded, and considerable efforts have been made in recent years to reduce discards by improving selectivity (e.g. under the Conservation Credits Scheme and because of the Landing Obligation). From 2019 all vessels will need to land all catches of all quota species unless an exemption applies in north west waters. The issues around evaluating sources of mortality on this stock are reviewed in detail in Section 2.4.2. Whatever the source of mortality, an analysis by Cook & Trijoulet (2016) suggest that at current (2013) mortality levels, the stock has a reasonable (~85 %) chance of increasing in the next five years (Section 2.4.2, Figure 18), but also that relatively small proportional increases in mortality (from whatever source) increase the chances of further decline. ICES short-term projections of stock status for 2018 suggest ~no change in biomass with F at 2017 levels, while reducing F to F_{MSY} is projected to increase SSB significantly (64 %). Given the tendency of the stock assessment to over-estimate F in the terminal year, which is recognised by ICES this is likely achievable (ICES, 2017b). In WGCSE (2017) (ICES 2017o), Section 5.3.5: Mean F in that year [terminal year – 2016] is estimated at 0.69 which is a significant downward revision compared to the previous year's assessment (0.88). The mean F in 2014 has also been revised downwards. Short-term forecasts of SSB conducted at previous WGs have not shown particularly good consistency with estimates of SSB in assessments conducted in successive years (ICES 2015f). This downward revision of F is evident in the retrospective analysis of F (ICES 2017o):		

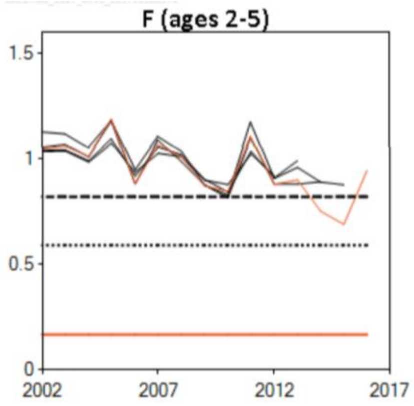


Figure: Cod in Division 6.a. Comparison of mean F (2–5) estimates produced by final run assessments between this year's assessment and previous four assessments. Source (ICES 2017o)**.**

These analyses, clearly show each additional year of assessment has resulted in a revision downwards of the previous year's terminal F and therefore there is uncertainty in the modelled increase in F in the terminal year of the most recent assessment; the more since there is no good external explanation for it in the fishery dynamics.

More generally, it is strange, given that the gadoid fishery in this area is a mixed fishery with management measures that impact across all four main species, that the pattern in F is so different in cod from that seen in haddock (Figure 8Figure 8. Northern shelf haddock, Stock summary from **ICES (2017d)**), whiting (Figure 14) and saithe (Figure 9). For all of these species, F has declined significantly since the introduction of the CRP and related measures. ICES account for the 'missing' mortality by assuming systematic area misreporting (Section 2.4.2), but Marine Scotland Compliance do not consider area misreporting to be a major source of error in the catch figures, and do not accept the way that compliance data which underpins the ICES misreporting have been used by ICES (see Section 2.4.2 and Appendix 10 Marine Scotland Cod misreporting). Conversely, the analysis incorporating seal predation suggests grey seals may be an important source of mortality (ICES 2017a; Cook et al. 2015; Cook & Trijoulet 2016). The declining F is consistent with trends in the other species in the fishery, as well as consistent with the decline in the size of the fleet and the amount of fishing effort. (ICES WGCSE note their intention to evaluate the sensitivity of the model to seal predation data – new data has been provided to them but not in time to include in the 2017 assessment; see WGCSE 2017 Section 5.3.)

In reviewing the above information, the team concluded that fishing mortality is actually likely a lower proportion of total mortality than estimated by ICES but note that there is great importance that fishing mortality on the stock does not increase. Given the EU technical measures in place for this stock (gear size regulations, TAC and minimum conservation reference sizes), coupled with the low but stable SSB and the uncertainty in natural mortality contribution and terminal F values in each stock assessment the team concluded that there was

		sufficient evidence that the measures in place are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species therefore SG60 is met. Management is not, however, so far 'demonstrably effective' – SG80 is not met. **W. Scotland whiting:** This is managed using the MSY approach, with a zero TAC. Unlike the cod stock, there is evidence that this stock is recovering (Figure 14), hence management measures are apparently effective. SG80 is met.		
d	**Guide post**	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.		
	Met?	Y		
	Justification	There are no main stocks where status is poorly known, SG60 is met.		
References		See ICES advice references in Table 20,Table 21 and Table 22 Marine Scotland Gordon Hart (pers. comm.), (ICES 2016t; ICES 2015f; ICES 2015e) (Cook et al. 2015; Cook & Trijoulet 2016)		

UoAs 1, 2 and 4 - haddock, saithe and hake. West Coast Scotland and North Sea

Gear type	Scoring elements	Scores
OT TR1	W. Scotland whiting, N. Sea cod, W. Scotland cod, anglerfish, *Nephrops*, ling, megrim	**75**
OTT TR1	W. Scotland whiting, N. Sea cod, W. Scotland cod, anglerfish, *Nephrops*, ling, megrim	**75**
OTP TR1	W. Scotland whiting, N. Sea cod, W. Scotland cod, anglerfish, *Nephrops*, ling, megrim	**75**

OT TR2	W. Scotland whiting, W. Scotland cod, anglerfish, *Nephrops*, witch.	**75**
OTT TR1	W. Scotland whiting, N. Sea cod, W. Scotland cod, anglerfish, *Nephrops*, ling, megrim	**75**
SS	W. Scotland whiting, N. Sea cod, W. Scotland cod, ling, megrim	**75**
DS	W. Scotland whiting, N. Sea cod, W. Scotland cod, ling, megrim	**75**
UoAs 3 and 5 – plaice and whiting. North Sea only		
Gear type	**Scoring elements**	**Scores**
OT TR1	N. Sea cod, anglerfish, *Nephrops*, ling, megrim	**80**
OTT TR1	N. Sea cod, anglerfish, *Nephrops*, ling, megrim	**80**
OTP TR1	N. Sea cod, anglerfish, *Nephrops*, ling, megrim	**80**
OT TR2	anglerfish, *Nephrops*, witch.	**80**
OTT TR1	N. Sea cod, anglerfish, *Nephrops*, ling, megrim	**80**
SS	N. Sea cod, ling, megrim	**80**
DS	N. Sea cod, ling, megrim	**80**

OVERALL PERFORMANCE INDICATOR SCORE UoAs 1, 2 and 4 - haddock, saithe and hake.:	**75**
OVERALL PERFORMANCE INDICATOR SCORE UoAs 3 and 5 – plaice and whiting.:	**80**
CONDITION NUMBER (if relevant):	**UoA 1, 2 and 4 (haddock, saithe and hake) = 8**

Evaluation Table for PI 2.1.2

PI 2.1.2		**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**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guide post**	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.
	Met?	Y	Y	Y – whiting, WC cod, NS cod, anglerfish, ling N – *Nephrops*, megrim, witch, minor species
	Justification	Useful definitions: “**Measures**” are actions or tools in place that either explicitly manage impacts on the component or indirectly contribute to management of the component under assessment having been designed to manage impacts elsewhere. A “**partial strategy**” represents a cohesive arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and an awareness of the need to change the measures should they cease to be effective. It may not have been designed to manage the impact on that component specifically. A “**strategy**” represents a cohesive and strategic arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome, and which should be designed to manage impact on that component specifically. A strategy needs to be appropriate to the scale, intensity and cultural context of the fishery and should contain mechanisms for the modification of fishing practices in the light of the identification of unacceptable impacts All the main retained species are managed at EU-Norway level via an agreed scientific approach (the MSY approach in most cases; details in Table 21 and Table 22), incorporating reference points, a TAC and quotas allocated via agreed allocation keys at several levels (EU/Norway, within the EU, within the UK, within Scotland). Where data are not sufficient to put in place reference points, the precautionary framework for data-limited stocks is used as the basis for providing advice, which is then used to set TACs. **Scoring elements:** W. Scotland whiting, N. Sea cod, W. Scotland cod, anglerfish, *Nephrops* (7 FUs), ling, megrim, witch		

		W. Scotland whiting: A TAC is set for Divisions 6a+6b with a MCRS of 27cm. Most of the catch is discarded and selectivity measures such as mandatory SMPs for the *Nephrops* fleet aim to reduce unwanted catch. The success or otherwise of the approach is monitored via stock assessment, and the evidence from this suggests that the SSB is recovering (see 2.1.1). The measures constitute a strategy, so SG100 is met. N. Sea cod: A TAC is set for the Skagerrak, North Sea and E. Channel, on the basis of the EU-Norway long-term management plan. The stock has recovered to ~MSY level. SG100 is met. W. Scotland cod: The TAC for 6a is set to zero, with an allowance for landing bycatch up to 1.5 % live weight retained catch per trip; except for fisheries subject to the LO. The MCRS is 35 cm. Advice and management is based on EU Regulation 2016/2094 which amends the previous long-term plan (the Cod Recovery Plan) as a transition to a multi-species plan for the area (although with Brexit this may change). An analysis in relation to the recovery and rebuilding of the stock is provided in Section 2.4.2 and in 2.1.1 above. SG100 is met. Anglerfish: The framework for data-deficient stock is used to provide advice (based on biomass index trends) and a TAC is set on this basis. The biomass index is increasing. SG100 is met. *Nephrops*: Management is by TAC, which is set based on ICES advice for each FU (based on survey trends which can be used to estimate biomass directly). However, the TACs cover several FUs (TAC for the North Sea, TAC for 6 and EU waters of 5b). The biomass in all cases is at or above target levels (see 2.1.1). This constitutes a 'partial strategy' but not a 'strategy' because it is not designed for each FU specifically. SG80 is met but SG100 is not met. Ling: Same as anglerfish; biomass increasing since 2001. SG100 is met. Megrim: Same as anglerfish. ICES also note that 'management measures for other species have constrained the fishery and reduced effort and fishing mortality on megrim' (ICES 2017h). The TAC, however, covers two species of megrim. On this basis, the requirements of a 'partial strategy' are met, but not a 'strategy' because it is not specific to the element (stock). SG80 is met but SG100 is not met. Witch: A precautionary TAC is set for 3a and 4, combined with lemon sole. In 6a, reduction in fishing effort have constrained F on the stocks. On this basis, the requirements of a 'partial strategy' are met, but not a 'strategy' because it is not specific to the element (stock). SG80 is met but SG100 is not met. Minor species (SG100 only): For some minor species, such as grey gurnard, there is no management aside from general measures to constrain effort, and no monitoring. SG100 is not met.		
b	**Guide post**	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.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Y	N – WS cod Y – other species	Y – NS cod

				N – whiting, anglerfish, *Nephrops*, ling, witch, megrim, minor species
	Justification	The stock assessment provides objective evidence of the success or otherwise of the management strategy. 'Testing' could be via short-term projections and/or evaluation of other management and model scenarios and uncertainty. W. Scotland whiting: There is evidence of stock rebuilding, giving an objective basis for confidence that the strategy is working. SG80 is met. There is not, however, 'high confidence'; recruitment remains low (although apparently increasing) and short-term projections suggest a fall in SSB in 2018, even under a zero-fishing scenario (presumably this is a consequence of recruitment estimates). SG100 is not met. N. Sea cod: The stock assessment gives high confidence that the strategy is working, with the SSB at an appropriate level. Stock projections suggest very little biomass change in 2019 based on fishing at the current level or the management target (ICES 2017b). SG100 is met. W. Scotland cod: A detailed analysis of the stock status and projections for WS cod is given in Section 2.4.2, as well as in the rationale for 2.1.1. For W. Scotland cod, the strategy is not working to rebuild the stock, but projections indicate that they have a reasonable probability of doing so given the arguments provided in 2.1.1c. SG60 is met. There is, however, so far, no evidence of rebuilding, and considerable uncertainty remains as to the key sources of mortality on the stock (see Section 2.4.2). Furthermore, Trijoulet et al. (2017) suggests that based on the hypothesis of significant seal predation, MSY reference points will need to be reconsidered, with both F_{MSY} and MSY estimates too high at present (i.e. rebuilding targets may not be realistic based on current seal populations). SG80 is not met. Anglerfish: The biomass index has been increasing since 2011, providing an objective basis for confidence that management is working, however the assessment is empirical; there is no formal stock assessment and no projections. SG80 is met but SG100 is not met. Nephrops: The stock biomass for each relevant FU is at an appropriate level (see Table 22) providing an objective basis for confidence that management is working, however the assessments are empirical; there are no projections. SG80 is met but SG100 is not met. Ling: Biomass increasing since 2001, the assessment is empirical; there is no formal stock assessment and no projections. SG80 is met but SG100 is not met. Megrim: SSB>>$B_{trigger}$ and F<<F_{MSY} (ICES 2017h). Projections evaluate the probability of SB2019<$B_{trigger}$ as <2 % for all scenarios*. SG80 is met. Under SIa, however, it has been concluded that the management measures do not constitute a strategy, so SG100 is not met. Witch: Biomass fluctuating without trend above likely reference levels, the assessment is empirical; there is no formal stock assessment and no projections. SG80 is met but SG100 is not met. Minor species (SG100 only): No strategy – SG100 not met. * There may be typo mistake in the 2017 ICES advice for megrim relating to these projections, because the p B<B_{lim} is higher than the p B<$B_{trigger}$, even though B_{lim}<$B_{trigger}$. Possibly the columns are incorrectly allocated. For the purposes of scoring the team have taken the largest value across both columns.		

c	**Guide post**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	Y – NS cod, anglerfish N – other stocks
	Justification	A series of overlapping changes to the assessment and TACs (changes to many of the ICES assessments in additional to changes in TAC setting as stocks come under the Landing Obligation) plus a mismatch between stock assessment areas and TAC areas make it difficult at present to match ICES advice to TACs directly in many cases. Nevertheless, the stock assessments (summarised in ICES' advice) demonstrate that the stock objectives are being attained (i.e. B > $MSYB_{trigger}$) except for W. Scotland whiting and cod. Each scoring element is considered below. Note that only stocks considered to have a 'strategy' at SIa are eligible to score 100 here (i.e. whiting, cod stocks and anglerfish). W. Scotland whiting: ICES advise no directed fishing, and this is implemented via a very small bycatch TAC (for the whole of Subarea 6). Based on the evaluation provided by ICES, it seems that the TAC (bycatch limit) is successfully implemented. However, most of the catch is discarded. Discards have also reduced considerably over the last two decades (2000-2004 average 3100 t/yr vs. 2011-15 average 700 t/yr). Efforts are ongoing to reduce discards further (e.g. via SMPs for the *Nephrops* fleet, as well as other selectivity initiatives such as via GITAG); it is not clear how much impact these are having according to ICES – discards remain high but this could be expected given that biomass and recruitment are increasing (ICES 2016x). The stock assessment shows an ongoing improvement in stock status since 2010. On this basis, SG80 is met, but SG100 is not met. N. Sea cod: Since the start of the CRP, the strategy has recovered the stock to ~target level. TACs are consistent with advice and landings with TACs; ICES estimate that discards are declining. SG100 is met. W. Scotland cod: Although ICES use area misreporting to account for 'missing' mortality in their analysis, Marine Scotland Compliance do not accept their analysis which is based on their data (see Section 2.4.2 and PI 2.2.1). Other than this issue, the strategy is being implemented, i.e. catch (landings + discards) has reduced dramatically in recent years (ICES 2017a). SG80 is met. Because of various issues (mismatch of TAC and stock assessment areas, questions around misreporting, estimates of discards), SG100 is not met in full. Anglerfish: The biomass index has been increasing; TACs are consistent with advice and landings with TACs; ICES estimate that discards are very low. SG100 is met. *Nephrops*: The overall TAC for each area is consistent with ICES advice in that it does not sum up to more than the total advice, but it does leave scope for overfishing at the FU level. Nevertheless, the biomass of each FU is at or above target level (see Table 22). SG80 is met. Ling: Landings add up to <TAC but more than ICES advice, which is constrained by the precautionary framework (limit on interannual increases); nevertheless, the biomass index has been increasing since 2001, during which time catches have remained fairly constant. SG80 is met. Megrim*: TACs are consistent with advice, landings are lower, discards are very low. SG80 is met.		

		Witch: TACs are for megrim and lemon sole combined, so cannot be compared with advice. However, F has been $F<F_{MSY}$ proxy since 2009, so on that basis we can consider that there is some evidence that the strategy is being implemented appropriately. SG80 is met. Minor species (SG100 only): No strategy – not met. * There may be typo mistake in the 2017 ICES advice for megrim relating to these projections, because the $p(B<B_{lim})$ is higher than the $p(B<B_{trigger})$, even though $B_{lim}<B_{trigger}$. Possibly the columns are incorrectly allocated. For the purposes of scoring we have taken the largest (i.e. most precautionary) value across both columns.		
d	**Guide post**			There is some evidence that the strategy is achieving its overall objective.
	Met?			N – W. Scotland cod Y – all the others
	Justification	For all the stocks except W. Scotland cod and whiting, biomass is at target levels or (where there is no target) increasing – met. For W. Scotland whiting, biomass is rebuilding – met. For W. Scotland cod, not met.		
e	**Guide post**	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Y	Y	Y
	Justification	There is only a very small bycatch of sharks (i.e. a small bycatch of spurdog, porbeagle and tope, all discarded, considered under ETP species scoring). Shark finning is forbidden in EU fisheries (EU Regulation 605/2013 (EU 2013)) and there is no evidence that it happens or has ever happened in Scotland.		
References		See ICES advice references in Table 21 and Table 22 Marine Scotland Gordon Hart (pers. comm.),		

	(ICES 2016x; ICES 2017g; ICES 2016a; ICES 2017h; ICES 2017j; ICES 2016j; ICES 2017k; ICES 2017l; ICES 2017c; ICES 2015f; ICES 2017s; ICES 2016k; ICES 2016l; ICES 2016m; ICES 2016n; ICES 2017a; ICES 2015e; EU 2013; ICES 2017b) (Cook et al. 2015; Cook & Trijoulet 2016; Trijoulet et al. 2017), (ICES 2017o)	
West Scotland Whiting - UoAs 1, 2 and 4 only		**95**
North Sea Cod		**100**
West Scotland Cod - UoAs 1, 2 and 4 only		**75**
Anglerfish		**95**
Nephrops		**85**
Megrim		**85**
Witch		**85**
Ling		**95**
Minor Species		**80**
OVERALL PERFORMANCE INDICATOR SCORE UoAs 1, 2 and 4 - haddock, saithe and hake:		**75**
OVERALL PERFORMANCE INDICATOR SCORE UoAs 3 and 5 – plaice and whiting:		**85**
CONDITION NUMBER (if relevant):		**UoA 1, 2 and 4 (haddock, saithe and hake) = 9**

Evaluation Table for PI 2.1.3

PI 2.1.3		**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**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guide post**	Qualitative information is available on the amount of main retained species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.
	Met?	Y	Y	N
	Justification	Accurate and verifiable information is available on landings (logbook data and landings declarations, cross-checked against buyers and sellers declarations and VMS data); Table 15 and Table 16. For discards, estimates are available for all the main fish species from Marine Scotland and SFF observers (Table 17 and Table 18). Although discard estimates for *Nephrops* were not provided, they are cited in ICES advice for each FU (see list in Table 22). Discard estimates are probably subject to large confidence intervals. Consequences for affected populations are known for all the 'main' species which have stock assessments (either fully quantitative or based on trends), but not necessarily for all species which might be retained (e.g. grey gurnard). SG80 is met but SG100 is not.		
b	**Guide post**	Information is adequate to qualitatively assess outcome status with respect to biologically based limits.	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with a high degree of certainty.
	Met?	Y	Y	N
	Justification	For all the main species, stock status is estimated in relation to reference points (options used include MSY-based, MSY proxies or index based reference points) – see Section 2.4.1; Table 21 and Table 22. Therefore SG80 is met. However, there is not a 'high degree of certainty in all cases; anglerfish, ling and witch use biomass indices rather than having a formal stock assessment (see 2.1.1); nor is there a high degree of certainty for some minor species. SG100 is therefore not met.		

c	**Guide post**	Information is adequate to support measures to manage main retained species.	Information is adequate to support a partial strategy to manage main retained species.	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	Y	N
	Justification	As described in 2.4.1; Table 21 and Table 22 there is a strategy to manage retained species which is applied to all main species and to many minor species. SG80 is met. However, as noted in PI 2.1.2a, there is not a 'high degree of certainty' in all cases as to whether objectives (in terms of stock status) are being met, so SG100 is not met.		
d	**Guide post**		Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy)	Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.
	Met?		Y	N
	Justification	Landings are monitored via logbooks and landing declarations, while discards are monitored by observers. There is sufficient monitoring of landings and discards that total catch can be estimated and risk assessed in all cases. Mortality in the technical sense of fishing mortality cannot always be estimated, but this is generally as a consequence of other issues, e.g. absence of historical data or inability to age the species, rather than as a consequence of ongoing data collection from the fishery. Mortality in the sense of total removals from the stock from this fishery can be estimated for all main retained species, albeit some with wider confidence intervals than others; this is described in 2.4.1; Table 21 and Table 22 for all the relevant stocks. In relation to 6a cod, there is some uncertainty about total mortality for the stock, and queries whether changes in risk level can be identified. The team notes that in scoring P2 the impact of the fishery alone is considered – i.e. F rather than total mortality (although F in relation to total mortality is relevant). Although there are various conflicting theories as to the main sources of mortality (explained in Section 2.4.2 and PI 2.1.1), the team considered that the assessment would still be able to track trends in F and SSB with enough accuracy to detect an increase in F, if not year-on-year than over a few years (see retrospective analyses (ICES 2017o)). SG80 is therefore met for this stock. This is, however, not the case for all retained species, so SG100 is not met.		
References		See ICES advice references in section 2.4.1; Table 21 and Table 22.		

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

Evaluation Table for PI 2.2.1

PI 2.2.1		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guide post**	Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below).	Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below).	There is a high degree of certainty that bycatch species are within biologically based limits.
	Met?	Y	Y	N
	Justification	No main bycatch species have been identified – see Section 2.4.1. SG80 is met by default. There are some minor bycatch species identified in the data provided by Marine Scotland (dab, flounder, red mullet, tusk (North Sea only), grey gurnard, brill (6a only); Table 18, as well as non-ETP species identified in Table 24). ICES produces stock assessments on some of these species in some areas but there is not sufficient coverage of assessment across all species in all areas to consider the minor species to be within biologically based limits with any high degree of certainty (See embedded table).		

Species	North Sea	W. Scotland
Flounder	ICES Cat 3 stock, with F< FMSY	No stock assessment
Dab	ICES Cat 3 stock, with F< FMSY, and above possible B reference points	No stock assessment
Red mullet	ICES cat 3 stock F> FMSY	ICES cat 5 stock status uncertain
Tusk	ICES cat 3 stock with F< FMSY, and above possible B reference points	Not a bycatch species in this area
Grey gurnard	No stock assessment	No stock assessment
Brill	Not a bycatch species in this area	No stock assessment

As well as the species identified in Table 18 and listed above there are non-ETP species in Table 25 and no doubt some others not identified in this work (e.g. invertebrates taken in *Nephrops* trawls – see Bergmann et al. (2002)), which do not have formal assessments. SG100 is not met.

b	Guide post	If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding.	If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.	
	Met?	Y	Y	
	Justification	No main bycatch species have been identified – SG80 is met by default.		
c	Guide post	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery.		
	Met?	Y		
	Justification	No main bycatch species have been identified – SG80 is met by default.		
References		Bergmann et al. (2002), observer data provided by Marine Scotland, references in Table 18 Table 24		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				**Na**

Evaluation Table for PI 2.2.2

<table>
<tr><td colspan="2">PI 2.2.2</td><td colspan="3">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</td></tr>
<tr><td colspan="2">Scoring Issue</td><td>SG 60</td><td>SG 80</td><td>SG 100</td></tr>
<tr><td rowspan="3">a</td><td>Guide post</td><td>There are measures in place, if necessary, that are expected to maintain the main bycatch 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.</td><td>There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch 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.</td><td>There is a strategy in place for managing and minimizing bycatch.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>N</td></tr>
<tr><td>Justification</td><td colspan="3">No main bycatch species have been identified – SG80 is met by default.
Scotland has had for several years a strategy for minimising discards, starting with the Conservation Credits Scheme aimed at reducing cod bycatch as part of the Cod Recovery Plan (described in detail in MEC (2013)). This subsequently broadened to other species – notably haddock and saithe – via e.g. real-time closures (where Scotland was a leader in the EU). It is now general, as part of addressing the Landing Obligation (see Section 2.4.3) (EU 2016b; EU 2016a). However, it is not clear that all the minor bycatch species will enter the LO, nor are there measures in place specifically for these scoring elements (as required for a strategy – see definitions given in 2.1.2). SG80 is met but SG100 is not met.</td></tr>
<tr><td rowspan="3">b</td><td>Guide post</td><td>The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).</td><td>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.</td><td>Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>N</td></tr>
<tr><td>Justification</td><td colspan="3">Since there are no main bycatch species, SG80 is met by default. In relation to SG100, it is hard to evaluate total catch for discarded species, since limited data are available, although MSS do estimate discards using observers. SG100 is not met.</td></tr>
</table>

c	Guide post		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	N
	Justification	Information on how the discard minimisation strategy is being implemented in Scotland is provided by Marine Scotland here: http://www.gov.scot/Topics/marine/Sea-Fisheries/discards/activities; this provides some evidence of implementation. However, there are also concerns around, for example, estimation of total discards and enforcement of the LO, which mean that there is not 'clear evidence'. SG80 is met but SG100 is not met.		
d	Guide post			There is some evidence that the strategy is achieving its overall objective.
	Met?			N
	Justification	As noted above, from the information we have (for retained species) the strategy has had mixed results, with reduction in discards for some stocks but not all. For non-retained species, information is collected by Marine Scotland to estimate discards (Table 19, Table 20), but it is not clear to what extent trends in catch rates (for example) are followed over time. Some of the minor bycatch species have a stock assessment (e.g. NS dab, tusk), but some do not (e.g. WS dab, WS red mullet, grey gurnard). Overall, this is not met.		
References		http://www.gov.scot/Topics/marine/Sea-Fisheries/discards/activities http://www.gov.scot/Topics/marine/Sea-Fisheries/discards EU (2016b; 2016a), MEC (2013)		
OVERALL PERFORMANCE INDICATOR SCORE:				80
CONDITION NUMBER (if relevant):				Na

Evaluation Table for PI 2.2.3

PI 2.2.3		**Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guide post**	Qualitative information is available on the amount of main bycatch species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery.	Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations.
	Met?	Y	Y	N
	Justification	Discard data are collected by Marine Scotland as described in PI 2.1.3 and presented in Table 19– SG80 is met. It may have wide confidence intervals, particularly for non-retained species, where catches are low. Some of the minor bycatch stocks have assessments and some do not; but in most cases the data on the status of affected population cannot be described as ‘accurate and verifiable’. SG80 is met but SG100 is not met.		
b	**Guide post**	Information is adequate to broadly understand outcome status with respect to biologically based limits	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty.
	Met?	Y	Y	N
	Justification	Since there are no ‘main’ bycatch species, SG80 is met by default. SG100 is not met, as is clear from SI 2.2.3a.		
c	**Guide post**	Information is adequate to support measures to manage bycatch.	Information is adequate to support a partial strategy to manage main bycatch species.	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.

	Met?	Y	Y	N
		As noted in PI 2.2.2, there is a strategy to manage discards, and discards are sampled by Marine Scotland. SG80 is met. There is not, however, a high degree of certainty as to discard levels for all species, so SG100 is not met.		
d	**Guide post**		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 effectively of the strategy).	Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.
	Met?		Y	N
	Justification	There are no 'main' bycatch species. SG80 is met. Discards are monitored as described above; significant changes could be identified but for species with low catch rates (i.e. non-retained species) mortalities can only be estimated with relatively wide confidence intervals. SG80 is met but SG100 is met.		
References		http://www.gov.scot/Topics/marine/Sea-Fisheries/discards/activities http://www.gov.scot/Topics/marine/Sea-Fisheries/discards EU (2016b; 2016a), MEC (2013)		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				**Na**

Evaluation Table for PI 2.3.1

PI 2.3.1		**The fishery meets national and international requirements for the protection of ETP species** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guide post**	Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.	The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.	There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species.
	Met?	Y	Y	N
	Justification	ETP species interacting with this fishery have been identified as follows based on PET data and MSS observer data. The data are available for both regions of the fishery (North Sea and W. Scotland): Starry ray (North Sea), common skate complex (inc. blue skate and flapper skate), Norway skate (W. Scotland), spurdog, porbeagle, salmon, seals (common and grey), Greenland shark, basking shark, gannet and guillemot. Elasmobranchs are protected by case EU fisheries regulations (EU 2017a) in which they are either classed as forbidden to land or as zero TAC species; (Table 23). Basking shark is protected by UK law (UK 2008). Seals (common and grey seals) are protected under the Marine (Scotland) Act 2010 (they may not be killed except by licence or to relieve suffering) (UK 2010); Bird species identified (gannets and guillemots) are protected under the EC Birds Directive for migratory species (EU 2009). The regulations state that the species may not be landed (elasmobranchs) or deliberately killed (the other species; except under licence in the case of seals; but this licence has no bearing on the fishery). The team discussed whether this constitutes 'limits' for these species (i.e. limits of zero). Essentially, in this case, the PI is asking whether the fishery is likely to be acting within the requirements of the law as far as these species are concerned. The PET data (Table 25 and Table 26) suggest that interactions with these species are rare (more details given below); training is provided in handling and identification of species to vessels. On this basis, the effects of this fishery were considered to be highly likely to be within the limits of the law. There is not, however, a high degree of certainty (based on small sample size within the PET data).		

b	**Guide post**	Known direct effects are unlikely to create unacceptable impacts to ETP species.	Direct effects are highly unlikely to create unacceptable impacts to ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species.
	Met?	Y	N – starry ray (North Sea), common skate Y – other species	Y – porbeagle, seals, birds, salmon N – other species
	Justification	Starry ray: ICES notes that although the species is widespread in the central and northern North Sea, the survey abundance index has been decreasing continuously since the 1990s (ICES 2015h). ICES advise no targeted fishery and measures to reduce bycatch. In terms of the regulatory requirements, the species is always discarded (according to ICES, recorded landings in total for the whole area of IIa, IIIa and IV are ~300 kg), but according to the PETS data, individuals are usually dead or injured on arrival on board, so it is not clear that the requirement to discard promptly has much effect for this species. Both datasets presented for the fishery suggest that interactions are patchy in space and time. The team concluded that since regulatory requirements are being met following ICES advice, direct impacts could be evaluated (qualitatively) as 'unlikely' to hinder recovery (SG60 met). It is possible, however, that the fishery could do more, perhaps by evaluating the areas or conditions under which large quantities of the species are caught together, and/or the circumstances in which the individuals are brought on board in good or bad condition – i.e. it was possible to do more to avoid fishing or killing these individuals. On this basis, the team considered that SG80 was not fully met. Common skate: ICES evaluates the whole species complex together (*Dipturus batis*, *D. flossada* and *D. intermedia*). For Subarea 4, ICES considers that the species (complex) is depleted, although stock abundance and trends are unknown (survey catch rates are too low to allow an abundance index); advice is the same as for starry ray (ICES 2015b). For Subareas 6 and 7, according to ICES, there are no robust stock size indicators, but the 'stock' is above possible F reference points and below possible B reference points (ICES 2016c). Nevertheless, analyses of Scottish survey data indicate a possible increase in the proportion of survey hauls catching some common-skate-complex species, although confidence intervals are wide. ICES note that further measures to reduce bycatch would be possible, such as spatial closures, but propose that this should be done as part of a rebuilding plan that takes into account the mixed fisheries context. The trend appears to be in the right direction, at least in Subarea 6 which has the majority of interactions (see Table 24). On this basis, the team concluded that it is not likely that the fishery is having major impacts on common skate complex; SG60 is met. There is, however, insufficient information for the moment to say that it is highly likely that this is the case. SG80 is not met. Norway skate (W. Coast Scotland only): Norway skate is a species (or species complex) with a depth range of 200 m - 1000 m and hence a relatively peripheral interaction with fisheries in most areas, although its life history potentially makes it vulnerable (IUCN 2017). Estimated interactions with this fishery in W. Scotland are <1 per trip based on observer data (0.6 in TR1 gear), and the team concluded that this is highly unlikely to create unacceptable impacts. SG80 is met. There is not a 'high degree of confidence', however, so SG100 is not met. Spurdog: Although the stock is still well below $MSYB_{trigger}$, the harvest rate has dropped to well below the proxy MSY level and ICES considers that there are signs of recovery of the biomass in recent years. Since the overall fishing mortality is apparently at an appropriate		

		level, the fishery is highly unlikely to hinder recovery of this stock (ICES 2016w). SG80 is met. There is not, however, a high degree of confidence, since the stock biomass is still low, and recovery has only just started. SG100 is not met. Porbeagle: ICES considers that porbeagle stock status is unknown (ICES 2015c). The advice is the fishing mortality should be minimised and no targeted fisheries permitted. Recent landings are negligible, so discard mortality is the main fishery-related impact. The PETS data record three interactions with porbeagle, one alive and two dead, all from 2016 (Table 26). While the Marine Scotland observer data do not record any. On this basis, the team considered that there is a 'high degree of confidence' that that the fishery is not having significant detrimental effects on porbeagle – SG100 is met for this species. Seals: The PET data record one interaction with a common seal; and four with grey seals over the three years (Table 25). Seals are protected under the Marine (Scotland) Act 2010, and may not be killed, except with a licence or to alleviate suffering. Scientific advice on seal populations in the UK is provided by the Special Committee on Seals, which is hosted by the Sea Mammal Research Unit at St. Andrews University. The most recent population estimates (composite from 2011-15 surveys) for Scotland are 25,399 common seals and 23,353 grey seals. According to previous estimates in 1996-7 (29,514 / 21,602) and 2007-9 (20,430 / 18,968), both populations declined then recovered to approximate previous levels. Since the previous survey, common seals have increased around the west coast but declined in the north and east, while grey seals have increased or remained stable everywhere. The reason for the decline in common seal on the North Sea coast of Scotland is not clear, but fisheries bycatch is not thought to be to blame in Scotland although it might be elsewhere (Duck 2016). The PET figures support this view. On this basis, the team considered that although total mortality for the whole fleet cannot be estimated from the data available, there is a high degree of confidence that it will have no impact on seal populations; SG100 is met. Greenland shark: Greenland shark are one of the largest species of shark and the longest living known vertebrate (~400 years; http://science.sciencemag.org/content/353/6300/702). It has been recorded at >2000 m depth. It was formerly targeted for oil but is now taken only as a bycatch. It is only occasionally encountered in Scottish fisheries (see Table 25). Given the likely low encounter rate, the team considered that impacts from this fishery are highly unlikely, but limited information and the species singular life history preclude a high degree of confidence – SG80 is met but SG100 is not met. Basking shark: The stock is thought to have declined historically following target fisheries. Fishing for basking shark has been forbidden in much of the EU since 2001, and in Norway since 2006. The species has been on the EU Prohibited species list since 2007 and in Uk waters as well under the wildlife act 1981. No new information is available to inform on current stock status (ICES 2015a). Given the low encounter rate, the team considered that impacts from this fishery are highly unlikely, but limited information and the species singular life history preclude a high degree of confidence – SG80 is met but SG100 is not met. Gannet and guillemot: Encounter rates with birds in this fishery are low – 2 gannets and one guillemot in 311 observer trips (see Table 24). On this basis, direct effects on the populations are not likely. Scotland has ~quarter of a million breeding pairs of gannets; 46 % of the world's population and an increase of ~a third since 2003-4 (Murray et al. 2015). Likewise for guillemots (~950,000 pairs), Scotland's population is large and increasing (see http://jncc.defra.gov.uk/page-2898). There is a high degree of confidence of no impacts – SG100 is met.

		Salmon: It is not known whether the salmon (one sole interaction recorded in the PET data) was a wild Atlantic salmon or a fish-farm escapee. Either way, interactions rates are sufficiently low that there is a high degree of confidence of no impacts – SG100 is met.		
c	**Guide post**		Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
	Met?		Y	N
	Justification	The team considered that indirect effects are unlikely (e.g. ghost fishing, noise disturbance etc.). Gear loss is a highly unlikely event given that gears represent huge cost outlay by the owners and vessels avoid foul ground. In addition the fleet use catch control systems on their gear which provide real time feedback to the captain about net position, depth and spread, which can be cross referenced against sonar. The ETP species identified do not include cetaceans which are most likely to be affected by noise and the fishery takes place in the North Sea which has one of the highest volume marine traffic seas in the world. The team considered that SG80 was met. SG100 is not met because there is not a 'high degree of confidence' about indirect effects as this hasn't been researched for this fleet.		
References		http://science.sciencemag.org/content/353/6300/702 http://jncc.defra.gov.uk/page-2898 Murray et al. 2015, (ICES 2015c), (ICES 2015h), (ICES 2015b), Duck (2016)		

Starry Ray (North Sea only)	**75**
Common Skate Complex	**75**
Norway Skate (West Scotland only) - UoAs 1, 2 and 4 only	**80**
Spurdog	**80**
Porbeagle	**85**

Greenland shark	**80**
Basking Shark	**80**
Atlantic salmon	**85**
Seals	**85**
Birds (gannet and guillemot)	**85**
OVERALL PERFORMANCE INDICATOR SCORE:	**75**
CONDITION NUMBER (if relevant):	**1 - existing**

Evaluation Table for PI 2.3.2

<table>
<tr><td colspan="2">PI 2.3.2</td><td colspan="3">The fishery has in place precautionary management strategies designed to:
Meet national and international requirements;
Ensure the fishery does not pose a risk of serious harm to ETP species;
Ensure the fishery does not hinder recovery of ETP species; and
Minimise mortality of ETP species.</td></tr>
<tr><td colspan="2">Scoring Issue</td><td>SG 60</td><td>SG 80</td><td>SG 100</td></tr>
<tr><td rowspan="3">a</td><td>Guide post</td><td>There are measures in place that minimise mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.</td><td>There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.</td><td>There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>N</td></tr>
<tr><td>Justification</td><td colspan="3"> As summarised in PI 3.2.1 above, ICES provide advice on the elasmobranch species (except for Greenland shark), which aims to avoid catching where possible. The requirements, as set out in EU (2017a) are i) not to target, have on board or land; and ii) if brought on board alive to handle following best practice and to discard as soon as possible (or in the case of spurdog, a zero TAC – i.e. do not land). On this basis, the team considered that this constitutes a strategy for managing the impact of fisheries (in general, including this one) on these stocks. They include measures to minimise mortality (no targeting, avoid bycatch, carefully handling if taken alive), and are designed to reduce the fishery impact to the lowest practicable level. Hence SG80 is met. In relation to SG100, the team did not consider that these measures constitute a 'comprehensive strategy' as additional measures are possible and could be explored, at least for the skates and rays. In relation to seals, the Marine (Scotland) Act 2010 bans the killing of seals without a licence, as well as the disturbance of seals at haul-out sites. Interactions with seals in the fishery are reported to be rare and it is clear that the fishery is not having a detrimental impact on the population (see 2.3.1b). The team considered that on this basis, that the Scottish / UK strategy for protecting seals was the most appropriate level at which to have a strategy (rather than in the fishery directly), hence SG80 is met. Since there are no formal measures in the fishery directly, however, SG100 is not met. For the other ETP species (birds, salmon), encounters are very rare, and the fishing technique and/or geographic / depth overlap with the ETP stocks, along with the monitoring (PET and discard data collection) can be considered a strategy which is being successful in avoiding impacts. SG80 is met. This is not, however, a formal 'comprehensive strategy' – SG100 is not met. </td></tr>
</table>

b	**Guide post**	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved.	The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.
	Met?	Y	N – starry ray, common skate Y – others	N
	Justification	For porbeagle sharks, seals, Greenland sharks, basking sharks, birds and salmon, quantitative data (PET data) give an objective basis for confidence that interactions with this fishery are very low. SG80 is met. For spurdog, interactions are more significant, but ICES advice shows that fishing mortality is <<F_{MSY} (proxy), and that biomass is starting to recover (ICES 2016w). There is therefore an objective basis for confidence that the strategy for spurdog is working. SG80 is met. As noted, above, although there is a 'quantitative analysis' as required for SG100, the biomass needs to make more progress towards the trigger reference point before there is 'high confidence' that it is working – SG100 is not met. For Norway skate, low encounter rates provide an objective basis for confidence that fishery impacts are low; SG80 is met. For the common skate complex and starry ray species, since the measures are aligned with ICES advice, they can be considered 'likely to work' (ICES 2015b; ICES 2015h; ICES 2016c). However, the team did not consider, that there is currently an objective basis for confidence that they will work. This is problematic, in as much as a reduction in bycatch rates could be attributed either to the measures working, or to a reduction in the population. For starry ray, however, the survey index suggests that the overall situation with the population remains of concern, and ICES state that the common skate species are depleted (although they do not provide data). On this basis, SG80 is not met for these species.		
c	**Guide post**		There is evidence that the strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	N

	Justification	For the skates and rays, the regulatory requirements are being implemented in this fishery (no targeting, no landings, good handling practices when alive). SFF have reportedly provided ray identification charts and code of conduct which is reviewed independently by 'The Shark Trust' (https://www.sharktrust.org/) and training in handling, although some identification issues appear to remain (e.g. Norway skate is present in Table 24 but missing in Table 25); distinguishing the ray species is not always easy. SG80 is therefore met. For the other species, the 'strategy' in relation to this fishery is the fishing method, which results in interactions being rare – the PET data provide evidence of this, so SG80 is met. SG100 is not met for any of the species because there is only direct information about discard rates and mortality from a subset of trips (those with observers), and for the elasmobranchs, discard mortality is not quantified, although it is assumed to be high.		
d	**Guide post**			There is evidence that the strategy is achieving its objective.
	Met?			N – skates and rays Y – other species
	Justification	For the skates and rays, the team did not have enough data to say yet whether there is a trend in bycatch rates, and even if there were, whether it is attributable to changes in fishing practice or changes in the populations. For the other species, low/negligible encounter rates is a reasonable objective and this is being met.		
References		EU (2017a), Marine (Scotland) Act 2010, SFF identification cards, ICES (2015b; 2015h; 2016w; 2016c), Marine Scotland PET data and Observer data. (ICES 2015a)		

Starry ray (North Sea only)	**75**
Common skate complex	**75**
All others (Spurdog, porbeagle, Greenland shark, basking shark, Atlantic salmon, seals, birds (gannet and guillemot)	**85**
OVERALL PERFORMANCE INDICATOR SCORE:	**75**

CONDITION NUMBER (if relevant):	**2 - existing**

Evaluation Table for PI 2.3.3

<table>
<tr><td colspan="2">PI 2.3.3</td><td colspan="3">Relevant information is collected to support the management of fishery impacts on ETP species, including:
Information for the development of the management strategy;
Information to assess the effectiveness of the management strategy; and
Information to determine the outcome status of ETP species.</td></tr>
<tr><td colspan="2">Scoring Issue</td><td>SG 60</td><td>SG 80</td><td>SG 100</td></tr>
<tr><td rowspan="3">a</td><td>Guide post</td><td>Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.</td><td>Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.</td><td>Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y – others

N – starry ray and common skate complex</td><td>N</td></tr>
<tr><td>Justification</td><td colspan="3">Information about interactions with this fishery comes from observer discard estimates and the PET scheme (see Table 24 and Table 25). Quantitative estimation of impact by gear type (TR1 and TR2 (mean catch per trip)) observer data in Table 24 are provided. Mortality rate information is provided in Table 25 from the PET data, and the PET data for 2016 provides quantitative evidence of impact by gear metier within region by trip quantity. SG60 is met (qualitative estimate of fishery-related mortality from PET and MSS observer data) for all species.

Quantitatively, MSS state that the data cannot be raised to fleet level, this is due to the patchy nature of ETP bycatch meaning the confidence intervals around the ‘raised’ estimates would be unacceptable. However, the low interaction rate of porbeagle sharks, spurdog, seals, Greenland sharks, basking sharks, Norway skate, birds and salmon, give an objective basis for confidence that sufficient information is available to quantitatively assess fishery related mortality and the interactions with this fishery would be very low. SG80 is met.

The lack of raised estimates at fleet level is resultant in part of the patchy nature of the ETP interactions. This can be seen for common skate complex where the majority of captures in one year of observer data was taken in a single observer trip out of a total of 201 (Table 26). For the common skate species and starry ray SG80 is not met because the PET data shows large spatiotemporal variation in catch which would lead to uncertainty in the quantitative estimate when scaled up to the whole fleet.

There is not a high degree of confidence which allow SG100 to be met for any species.</td></tr>
</table>

b	**Guide post**	Information is adequate to broadly understand the impact of the fishery on ETP species.	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.	Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.
	Met?	Y	N – starry ray and common skate complex Y - others	N
	Justification	An analysis as to whether the fishery is a potential threat to protection and recovery of these species is provided in PI 2.3.1b based on stock survey data for all species (except Greenland shark where no stock status is available). The low interaction rate of porbeagle sharks, spurdog, seals, Greenland shark, basking shark, Norway skate, birds and salmon, give an objective basis for confidence that sufficient information is available to suggest that the fishery would not be a threat to the protection and recovery of these species; SG80 is met. SG100 is not met (e.g. no information on post-discard or post-interaction mortality). For common skate in Subarea 4, ICES consider that the species (complex) is depleted and stock abundance and trends are unknown. For Subareas 6 and 7, according to ICES, there are no robust stock size indicators, but the 'stock' is above possible F reference points and below possible B reference points (ICES 2016c). Nevertheless, analyses of Scottish survey data indicate a possible increase in the proportion of survey hauls catching some common-skate-complex species, although confidence intervals are wide. ICES note that further measures to reduce bycatch would be possible, such as spatial closures. There is insufficient information for the moment to say that SG80 is met. For starry ray, survey abundance index has been decreasing continuously since the 1990s and as the data has not been scaled to fleet it is difficult to evaluate the consequences for the population of the fishery impact. SG80 is not met.		
c	**Guide post**	Information is adequate to support measures to manage the impacts on ETP species.	Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.	Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.
	Met?	Y	Y	N

	Justification	As argued in PI 2.3.2 scoring issue a) there is a strategy in place for all the ETP species. The strategy does not particularly rely on gathering information – rather on minimising any fisheries impacts. Trends to manage the fishery for ETP are available can be measured at least qualitatively from the discard and PET data, as well as via population estimates in most cases (greenland shark being the exception). On this basis, SG80 is met. However, there the team are not aware of any recent attempts to raise the ETP to fleet level which could be argued to be a 'comprehensive strategy' for any of the species (see PI 2.3.2a) it cannot be met.
References		EU (2017a), Duck (2016), Marine (Scotland) Act 2010, SFF identification cards, ICES (2015b; 2015h; 2016w; 2016c), Marine Scotland PET data and Observer data.
Starry Ray (North Sea only)		**65**
Common Skate Complex		**65**
All others (Spurdog, Porbeagle, Greenland shark, Basking Shark, Atlantic salmon, Seals, Birds (gannet and guillemot)		**80**
OVERALL PERFORMANCE INDICATOR SCORE:		**65**
CONDITION NUMBER (if relevant):		**3 - existing**

Evaluation Table for PI 2.4.1

PI 2.4.1		The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
	Met?	Y	Y – common habitats, *Modiolus, Arctica* N – West Coast Scotland seapens.	N
	Justification	The fishery takes place in an area which has been trawled consistently for many years, although trawl effort has reduced by approximately a quarter in the last two decades; habitat protection needs to be seen in this context. Commonly-encountered habitats around Scotland are predominantly sedimentary habitats; mainly sand with extensive patches of silt and mud and some smaller patches of coarse (gravelly) sediment, as well as some rocky areas. Burrowed mud typical of TR2 gears targeting *Nephrops* is considered under VMEs below. These commonly encountered types of habitat are not particularly vulnerable to disturbance from demersal fishing gear, although some differences may be apparent between trawled and untrawled areas; the team did not consider, however, that this constitutes 'serious or irreversible harm' for these habitat types. SG80 is met. In relation to SG100, while there is extensive research evidence that demersal fishing causes changes to various different habitat types (reviewed in Kaiser et al. (2001)), the evidence required here would be something specific to the area / habitat in question; it might become available as management is put in place for the new MPAs (see PI 2.4.2 below) and hence adjacent areas can be compared over a gradient of fishing pressure. For the time being, however, SG100 is not met. The team have completed MSC's semi-quantitative analysis of likely impacts on commonly-encountered habitats (Table GSA7, FCRv2.0), which supports the above score:		

	UoA / habitat characteristics	sand	sand-silt	sand-mud	sand-gravel	rock
A	% completely protected in closed areas	Low – assume 0%				

B	Area of habitat subject to fishing	assume 100%	Often unsuitable ~ 50%
C	Level of gear impact	High	
D	Current status of habitats in fished area (% of unimpacted level)	80% based on this habitat's resilience to trawling	50% - epifauna may be lost
E	Current overall status of habitat (A + (B x D))	80%	75%
F	Habitat recovery rate	Fast	Medium
G	Expected future status in fished areas in 20 years if fishing ceases	100%	100%
H	Expected future overall status of habitat in 20 years, compared to unimpacted level (A + (B x G))	100%	100%
1	Likelihood that the UoA is causing serious or irreversible harm (H<80%)	Highly unlikely	Highly unlikely
J	MSC score	80 or higher depending on confidence and evidence	

VMEs have been identified (Table 28) as burrowed mud, *Arctica islandica* (ocean quahog) aggregations, and *Modiolus* (horse mussel) beds.

Burrowed mud: Burrowed mud is typical *Nephrops* habitat, of which the largest areas overlapping this fishery are the *Nephrops* FUs listed in Table 22. The key feature of this habitat potentially at risk from demersal fishing is seapens. The most abundant seapen species in these areas are *Pennatula phosphorea* and *Virgulana mirabilis*, both of which can retract as a response to disturbance and hence are not considered particularly vulnerable to demersal fisheries (MS 2017b), but the rarer tall seapen (*Funiculina quadrangularis*) also occurs – this species cannot retract so is more vulnerable. The team took this species as a proxy for the vulnerable element of this habitat.

The only records from the North Sea are from the Fladen Ground (although it may have been more widespread in the past). The area with *F. quadrangularis* records in the Fladen Ground is proposed by Marine Scotland to be closed to demersal mobile gears (management proposal for Northern North Sea MPAs and SACs; (MS 2017b; MS 2017a) and in the meantime, SFSAG has in place a voluntary closure, monitored by Marine Scotland Compliance (see Appendix 7 Details of SFSAG voluntary closure in the Fladen Ground this has been extracted from MEC (2017)).

The species seems to be relatively extensive in W. Scotland (see figure below).

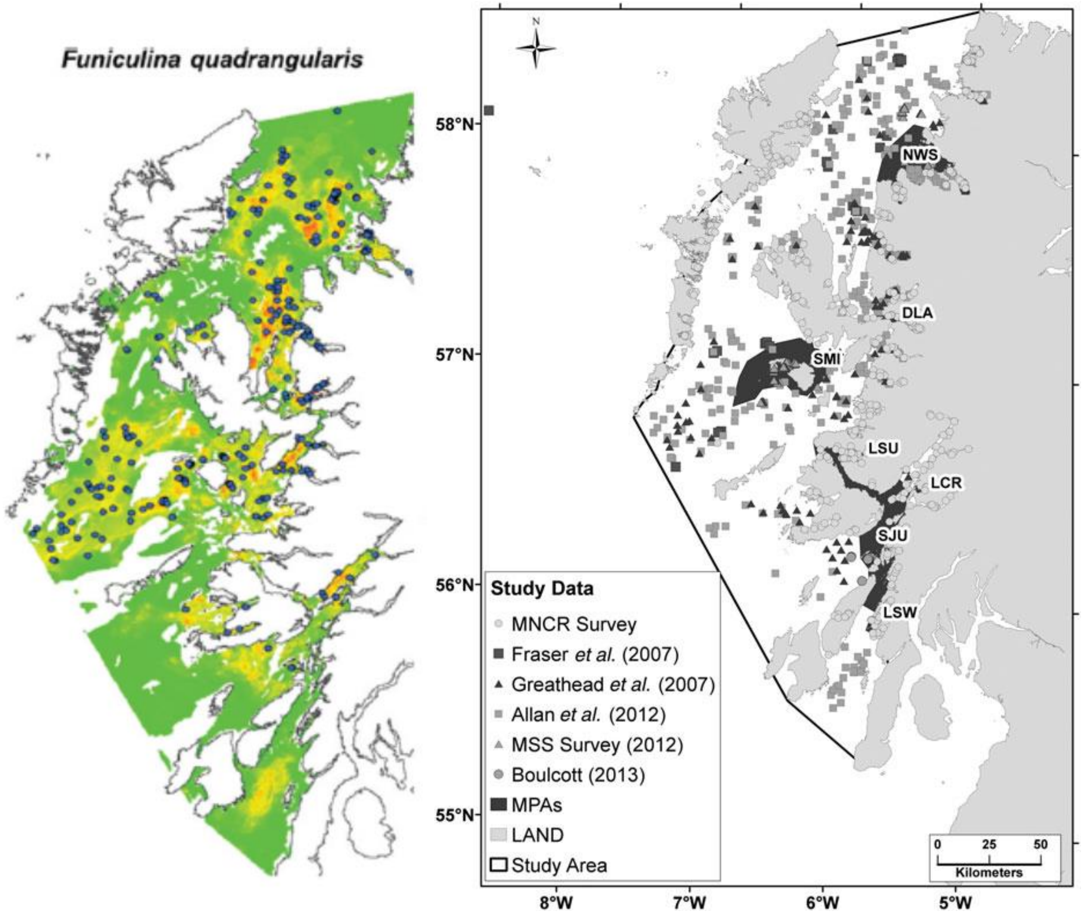
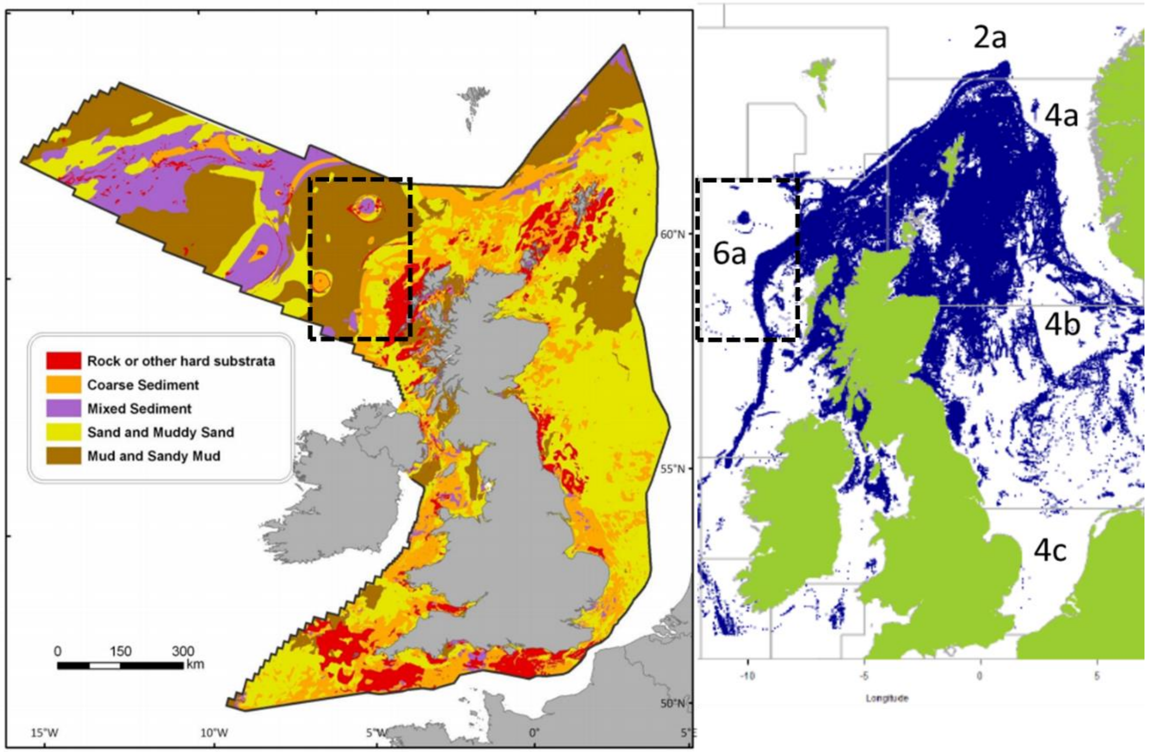


Figure: Left-hand presence of *F. quadrangularis* in W. Scotland from surveys (dots), in relation to modelled habitat suitability (colour coding). Right-hand: MPAs in the area in relation to seapen (all three species) presence. Source Greathead et al. (2015)**.**

		Most records are from with sealochs; it is particularly abundant in Loch Sunart, Loch Teacuis, Loch Duich, Loch A Chairn Bhain and Loch Seaforth; these are not areas where this fishery would operate, and in any case several are closed to demersal mobile gears (e.g. Loch Sunart, Loch Duich and others). There are reportedly 'scattered records' from the Firth of Clyde. Further offshore it is also known from the Hatton Bank, which is not part of the UoA. It is thought to occur down to ~2000 m (Ager 2003); if this is the case its potential distribution range will extent well offshore on the W. Scotland, away from areas which are trawled (maximum trawling depth of this fishery ~~400 m) and away from the current know distribution range in this region (figure below).  **Figure. Left hand - Large deep mud areas (brown) with potential seapen habitat in Subarea 6a (dashed box), with corresponding absence of VMS tracks in right hand figure.** Marine Scotland have an online database cross-referencing the impact of all kinds of activities on all the various habitat features; based apparently on a literature review (see http://www.marine.scotland.gov.uk/FEAST/FeatureReport.aspx#0). In relation to towed demersal

		gear (select 'search by feature' → 'habitats' → burrowed mud → select all types of activities and scroll down to 'surface abrasion'), Marine Scotland state the following with additional MEC comments in square brackets[ ]: 'Damage to seapen species is likely to take place as a result of greater sediment disturbance as a result of towed demersal gear. However, experimental studies have shown that all three species of seapen can re-anchor themselves in the sediment if dislodged by fishing gear (Eno et al. 1996). Eno et al. (1996) found that even if damaged *F. quadrangularis* appeared to remain functional and this could also be true of the other sea pens. However, the apparent absence of *F. quadrangularis* from open-coast *Nephrops* grounds may be a consequence of its susceptibility to trawl damage (D.W. Connor, pers. comm. In Hughes (1998)) [*MEC: it does not specify where these are*]. In long term experimental trawling Tuck et al. (1998) found no effect on *Virgularia mirabilis* populations and Kinnear et al. (1996) found that sea pens were quite resilient to being smothered, dragged or uprooted by creels. Trawling disturbance resulted in reduced species diversity and a disproportionate increase in the abundance of a few dominant species. The short-term effects on epifauna recovered 6 months after trawling fishing ceased. No long-term effects on the total number of species or individuals were detected, but individual species did show effects, notably an increase in the density of *Ophiura* sp. and a decrease in numbers of the fish *Hippoglossoides platessoides* [*MEC: American plaice*] and the whelk *Buccinum undatum*. Other authors have also suggested that increases in echinoderm populations in the North Sea are associated with fishing disturbance (Lindley et al. 1995). Information review on sea pen recovery suggests rapid recovery of *F. quadrangularis* after displacement by fishing gear with 50 % righting themselves after 72 hours. Experimental trawling on a related species in the USA suggested long term survival may be severely impacted with low survival rates >1 year but these experiments have not been recreated for *F. quadrangularis* (Hill & Tyler-Walters 2018). In W. Scotland, a percentage of the populations are in sea lochs; i.e. not in areas typically used by vessels in the UoA; some of them are closed to demersal towed gears in SACs and/or MPAs, while some are not. The population also extends significantly deeper than the maximum depth of trawling, but the size of this deep-water population component is not known. The sealoch populations appear to be healthy (they are reported as 'dense' in many areas), the offshore population is unimpacted, but populations in the Minch and Firth of Clyde may be impacted by fishing. Fishing does not appear to extirpate populations, according to the information above, but presumably causes some damage. Habitat tolerance to abrasion is assessed as low for burrowed mud but recovery is medium according to MS. Estimation of *F. quadrangularis* populations are in untrawled areas (sealochs and closed areas) (figure below) suggested 44 % of *F. quadrangularis* populations were protected. That leaves 56 % of inshore records of *F. quadrangularis* unprotected. Estimation of populations protected in deep mud areas is unknown but given the extent of possible VME habitat available it is estimated to be a third again. That trawling causes ~50 % damage in the short term, this would lead to an overall estimate of damage of the VME ~15 %. Several of the offshore MPAs aim to protect this habitat among others (e.g. NE Faroe-Shetland Channel, Geikie Slide and Hebridean Slope, Barra Fan and Hebridean Terrace Seamount); they are designated and management has been proposed which protects most of the burrowed mud areas from mobile demersal gears (Table 29) but is not yet in place.

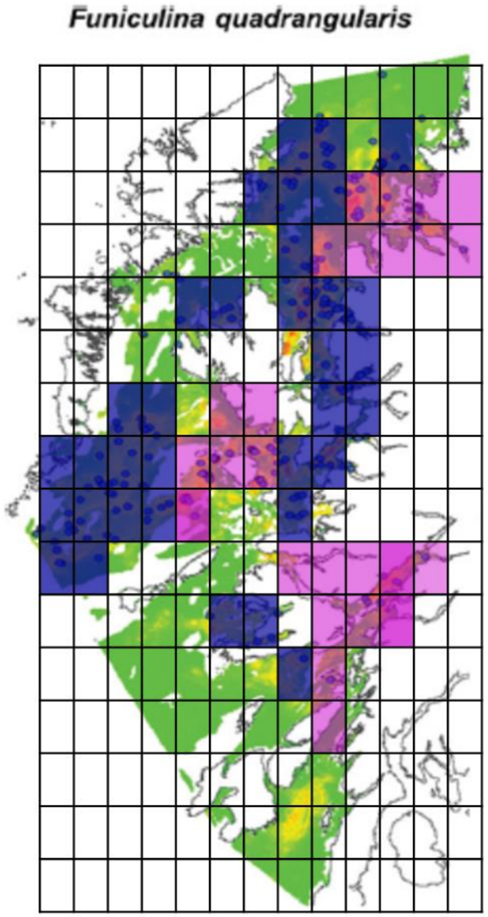


Figure. Estimation of overlap between known records of *F. quadrangularis* (all shaded rectangles) and untrawled areas (sealochs and closed areas) (pink) within W. Scotland. Known areas with records of *F. quadrangularis* open to the UoA in blue shade = 56 %. Base map from Greathead et al. (2015)**.**

		On the basis of the information above the team concluded that it is 'unlikely' that the UoA will reduce the structure and function of this element to the point of serious or irreversible harm (defined as damage of 20 % or greater) but not 'highly unlikely'. SG60 is met. SG80 will be met by the implementation of the proposed management measures in W. Scotland (see Table 29). NOTE only UoAs for haddock, saithe and hake are present in W. Scotland therefore for UoA 3 (plaice) and UoA 5 (whiting) SG80 is met. In the North Sea, the only known records of *F. quadrangularis* (in the Fladen Ground MPA) are covered by a voluntary closure (see Appendix 7 Details of SFSAG voluntary closure in the Fladen Ground this has been extracted from MEC (2017)). *Arctica islandica*: Ocean quahogs live just below the sediment surface with just their syphons protruding. Lancaster et al. (2014g) rate the likely recovery from sediment disturbance / smothering as moderate (since they can survive a period of anoxia and can change their depth within the sediment) but the likely recovery from removal from the sediment as low (due to shell damage or predation), so the type of impact of a given fishing gear on the sediment is crucial. They mention beam trawls and dredges specifically, but neither of these gear types is relevant in this fishery. Witbaard & Bergman (2003) note the likely impact of beam trawling on *Arctica* populations in the southern North Sea, but show that the Fladen population is (or was in 2000 – the most recent data available) much more healthy, with higher biomass and evidence of periodic successful recruitment; the species dominates the biomass in some areas. On this basis, it is not thought likely that the gear used in this fishery (single- or twin otter trawls in this area) is likely to result in wholesale removal of clams from the sediment, particularly since improvements in design have reduced the pressure of trawl doors of a given size on the sediment (with the main aim of reducing fuel consumption). It is worth noting, however, that since the species is long-lived and recruitment is sporadic, a population will take a long time to recover from a mortality event. Four MPAs have *Arctica* aggregations as a designated feature (East of Gannet and Montrose fields, the Faroe-Shetland Sponge Belt, the Firth of Forth Banks Complex and the Norwegian Boundary Sediment Plains; Table 29). Managements proposals would close the areas where *Arctica* is known to occur to towed gear. The team concluded that since the impact of trawling on the population is not apparent, and since management measures have been proposed which would provide protection over and above that recommended by JNCC (i.e. closure of core areas to all towed gear – see Table 29, SG80 is met. SG100 is not met since evidence for the impact of trawling on *Arctica* (or lack of impact) seems to be circumstantial. *Modiolus* beds: *Modiolus* occurs in shallow areas in sealochs, bays, flows and voes on the W. coast, Orkney and Shetland as well as NE Caithness and the inner Moray Firth. As for *Funiculina*, the species occurs nearly all in areas where this fishery does not operate (i.e. inside sea lochs and close in coastal areas). The Moray Firth beds are in a SAC, but are not currently protected from fishing, although the area will be closed to most fishing gear types (including those in this assessment) under the proposed management plan (Kenny Coull, SWFPA, pers. comm.). However, the beds are in shallow inshore areas, and it is reported that no vessels operate there; it would be surprising if they did (a map is given at the end of peer review 1; Appendix 2). The bed in NE Caithness is in a fishery area but is protected by restrictions on towed gear, according to SNH. On this basis SG80 is met but SG100 is not met.
References		Table 29, Ager (2003) http://www.marine.scotland.gov.uk/FEAST/FeatureReport.aspx#0 Eno et al. (1996), Hughes (1998), Kinnear et al. (1996), Lindley et al. (1995) and Tuck et al. (1998), Lancaster et al. (2014g), Greathead et al. (2015)

UoA 1 – Haddock (North Sea and W. Scotland)	**75**
UoA 2 – Saithe (North Sea and W. Scotland)	**75**
UoA 3 – Plaice (North Sea only)	**80**
UoA 4 – Hake (North Sea and W. Scotland)	**75**
UoA 5 – Whiting (North Sea only)	**80**
CONDITION NUMBER (if relevant):	**UoA 1, 2 and 4 = 10**

Evaluation Table for PI 2.4.2

PI 2.4.2		**There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a strategy in place for managing the impact of the fishery on habitat types.
	Met?	Y	Y	N
	Justification	In the context of habitats management, the team considered the process of designating sites as NCMPAs, based on; habitat mapping; OSPAR designations of vulnerable habitats and Natura 2000 list of habitats as key measures for managing the impact of the fishery on habitats throughout Scottish waters. Management measures are in place for the inshore MPAs, and concrete management proposals are in the process of validation and implementation for the offshore area (MS 2016b; MS 2017b; MS 2017a). SFSAG has also put in place a voluntary closure for *Funiculina* seapens in the North Sea, as described in 2.4.1 above (Appendix 7 Details of SFSAG voluntary closure in the Fladen Ground). The fishery also takes place in Norwegian waters of the northern North Sea. Norway has relatively extensive closed areas for cold-water corals, and has set a target to protect 10 % of coastal and marine areas by 2020 (see integrated plan for the Barents Sea (NorwayMinistry 2011)); it is not known as yet, however, whether this will include areas used by the fishery in the North Sea. For commonly-encountered habitats, SG80 is met for Habitat Outcome. The measures listed above were therefore considered sufficient by the team to constitute a partial strategy. SG80 is met. Considering the VMEs individually: <u>*Modiolus*:</u> It is not thought that the fishery is likely to overlap with >20 % of the *Modiolus* beds in the area of the UoA (see Table 28), so to reduce the impact of the fishery to 20 % or less, further measures are not required. There are, however, closures (e.g. in sealochs) and other restrictions on towed gear to avoid impacts on potentially overlapping *Modiolus* beds, according to SNH. On this basis, the team concluded that this in combination with the measures listed above constitutes a partial but not a full strategy – SG80 is met but not SG100. <u>Burrowed mud</u>: The sensitive feature in this habitat type is tall sea pens (*F. quadrangularis*). There is no evidence that move-on rules are an effective management measure for this species, which is most likely to be damaged *in situ* rather than brought up in a trawl although it appears to be somewhat resilient to trawl impacts (see 2.4.1 above). The voluntary closure put in place by SFSAG (Appendix		

		7) protected the whole area with records of *Funiculina* in the North Sea. On the W. Scotland side, part of the *Funiculina* population is protected either in closures, or in areas not fished (i.e. too inshore or too deep) – see 2.4.1 above. On this basis, the team concluded that there is a partial strategy in place for SFSAG which should prevent the UoA from causing significant harm to this VME, hence SG80 is met here. The strategy is not sufficiently complete to meet SG100. *Arctica*: The evidence set out in 2.3.1b suggests that trawl fisheries are not very significant in terms of their impact on *Arctica* aggregations, although significant closures are planned to protect *Arctica* beds. For this VME, the measures listed above were considered by the team as a partial strategy. SG80 is met. Until the proposed management measures for the NCMPAs are fully implemented, however, SG100 is not met.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved.
	Met?	Y	Y – common habitats, *Modiolus, Arctica* N – W. Scotland seapen.	N
	Justification	Habitats are known and mapped, areas have been designated on an objective basis and management options and their consequences have been evaluated. Management measures have recently been proposed by Marine Scotland, along with a timetable for review, agreement and implementation. The management proposal has also been audited by JNCC (e.g. MS (2017a)). There is also a voluntary closure in place by SFSAG which will protect a key VME in the North Sea, to be monitored by Marine Scotland using VMS data. For commonly-encountered habitats, *Modiolus* and *Arctica*, as well as seapens in the North Sea (with the voluntary closure), the team considered this sufficient to provide confidence that the partial strategy will work (i.e. an objective basis for confidence; SG80 is met). Peer reviewer 1, however, raised some concerns about seapens in W. Scotland. It is estimated (Section 2.4.5) that overall ~30 % of the habitat area remains open to fishing. These open areas are near to proposed MPAs and given this distribution of the habitat patches around the MPAs, the potential for the re-population of impacted areas is high as sea pens are fecund and their larvae are likely to be highly dispersive (Greathead et al. 2015). On this basis its plausible that the measures in place are likely to work in preventing serious and irreversible harm and should be considered a partial strategy. However, MSC sets a limit of 20% for ‘serious or irreversible harm’ so if there were heavy impacts in the areas open to fishing, this limit could be exceeded so there is not a clear guarantee (an objective basis for confidence). On this basis, SG60 is met but SG80 is not met. For commonly-encountered habitats, *Modiolus* and *Arctica*, the team considered, however, that ‘high confidence’ was only possible once there has been some experience of implementation of both voluntary and statutory management measures, so SG100 is not met.		

c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	Y
	Justification	It is clear that the partial strategy is being implemented: areas have been evaluated and designated and there is now a clear process ongoing for evaluating management options and their costs (a business impact evaluation), consulting with stakeholders and setting out proposals for the management measures to be put in place for each area; there is also a strategy and timetable for discussion, agreement and implementation of these measures. This process has already been finished for the inshore areas (see Section 2.4.5.2).		
d	**Guidepost**			There is some evidence that the strategy is achieving its objective.
	Met?			N
	Justification	Until management is finalised and implemented, it will not be possible to evaluate whether the partial strategy is achieving its objectives, so SG100 is not met.		
References		For information on NCMPAs: http://jncc.defra.gov.uk/page-5269; follow links for each site to find site description, designation order, management options paper and business impact assessment MS (2016b; 2017b; 2017a), NorwayMinistry (2011)		

UoA 1 – Haddock (North Sea and W. Scotland)	**75**
UoA 2 – Saithe (North Sea and W. Scotland)	**75**
UoA 3 – Plaice (North Sea only)	**85**
UoA 4 – Hake (North Sea and W. Scotland)	**75**
UoA 5 – Whiting (North Sea only)	**85**

CONDITION NUMBER (if relevant):	UoA 1, 2 and 4 = 11

Evaluation Table for PI 2.4.3

PI 2.4.3		**Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There is basic understanding of the types and distribution of main habitats in the area of the fishery.	The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery.	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.
	Met?	Y	Y	N
	Justification	As a basis for the designation of MPAs, and more generally as a basis for Scotland's National Marine Plan (MS 2015b), Marine Scotland published a marine habitat atlas, and OSPAR which includes maps of intertidal, inshore, offshore and deep-sea habitats, as well as the distributions of fish stocks and vulnerable species. The management proposal set out by Marine Scotland for each inshore and offshore MPA includes detailed mapping of the features of conservation interest within each MPA. In Norway, the MAREANO (http://www.mareano.no/en) programme provides good information on marine habitats in some areas, but it does not (as yet) cover the whole coast. On this basis, SG80 is met but SG100 is not met in full.		
b	**Guidepost**	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.	Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.	The physical impacts of the gear on the habitat types have been quantified fully.
	Met?	Y	Y	N
	Justification	The habitats are mainly mapped, as set out for scoring issue PI 2.4.3a. In relation to fishing gear, all vessels >12 m are required to have VMS, which provides Marine Scotland (and the Norwegian Directorate of Fisheries where relevant) with detailed information about the fishery footprint, and is used by Marine Scotland to allocate catches by area, as well as to determine fishery impacts and the consequences of fishery exclusion for each MPA (MS 2016b; MS 2017b; MS 2017a). ICES WGINOSE (ICES 2016e) have also used VMS and logbook information to map surface and subsurface abrasion of sediments by fishing gear (see figure below for surface		

abrasion; the figure for sub-surface abrasion looks similar in spatial extent but less strong. It is not clear from the report how the distinction is made, but presumably it is based on type and size of fishing gear.) The management proposal includes detailed mapping of both the features of conservation interest and the spatial distribution of fishing activity by various relevant gears in relation to these features (from VMS), and uses this information as the basis for defining the management measures (see (MS 2017b)).

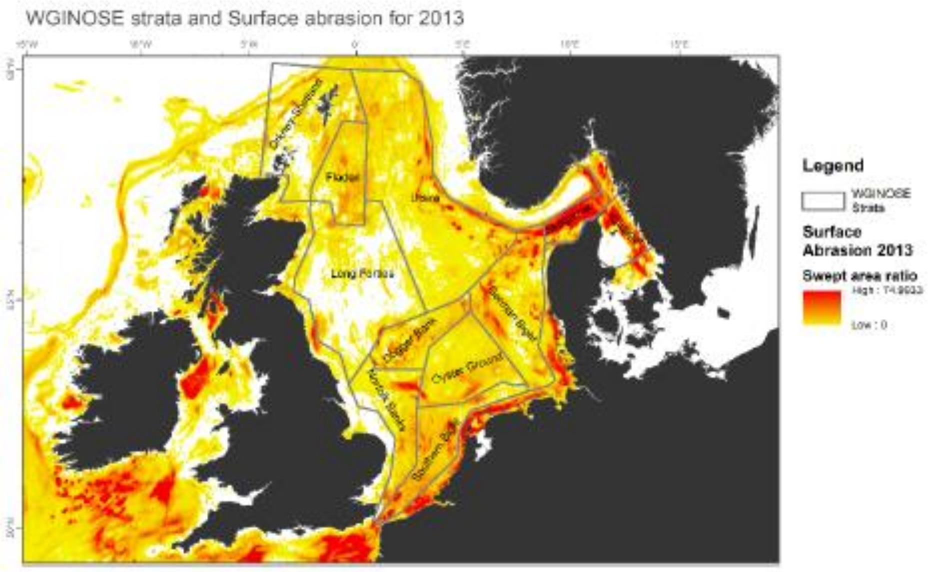


Figure 5.2a. WGINOSE strata and surface abrasion map (ICES, 2015).

Figure 22. Surface abrasion map developed by ICES WGINOSE (ICES 2016e)

SG80 is met. In relation to SG100, while the physical impacts of various types of fishing gear have been studied (see for example review in Kaiser et al. (2001)), this is not the case for all gear/habitat combinations in this fishery, (even if it were possible to quantify gear impacts on habitats 'fully') so SG100 is not met.

c	**Guidepost**		Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Changes in habitat distributions over time are measured.
	Met?		Y	N
	Justification	The footprint of the fishery is continually monitored, because Marine Scotland use VMS data to allocate landings and discards by ICES rectangle on a routine basis (as per Figure 2 to Figure 7), as well as for compliance purposes. The mapping of VMS data on to habitats may not be done routinely, but has been done periodically, for example, in relation to MPA planning – see for example the Fishery Displacement Study which is being used to inform management decision-making for the inshore MPAs; similar work has been done for the offshore MPAs (MS 2016a; MS 2017b). Protected areas are required to be monitored, in order to establish that conservation objectives are being met – hence the risks to key areas of vulnerable habitats will be evaluated on an ongoing basis. SG80 is met. It is not clear, however, what are the plans, if any, to update the maps on an ongoing basis, so SG100 is not met in full.		
References		MS (2016a; 2015b; 2017b), http://www.mareano.no/en, ICES (2016e)		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				**Na**

Evaluation Table for PI 2.5.1

<table>
<tr><td colspan="2">PI 2.5.1</td><td colspan="3">The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function</td></tr>
<tr><td colspan="2">Scoring Issue</td><td>SG 60</td><td>SG 80</td><td>SG 100</td></tr>
<tr><td rowspan="3">a</td><td>Guide post</td><td>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.</td><td>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.</td><td>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.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>P</td></tr>
<tr><td>Justification</td><td colspan="3">This fishery is a mixed fishery, with the species taken in largest quantities is haddock (~one third of the total catch). The P1 and main P2 species together make up ~95% of the catch. W. Scotland cod and whiting are depleted and North Sea cod has recovered from low levels; this has presumably had a variety of knock-on effects on the ecosystem. The other main stocks are in good shape. There is a management strategy in place for all these stocks, which seems to be working (see Principle 1 and 2.1.2). Discard rates are lower than for several years and will presumably reduce further as a consequence of the Landing Obligation (depending on the outcome of Brexit). The gear will have an impact on the benthic ecosystem, but a system of protected areas is in place and is being expanded (see 2.4.1 and 2.4.2).

The MAP plan for fisheries in the North Sea went before European Parliament (EP) in December 2017 (CEU 2017) provisional conclusions were:
• The plan is applicable to two groups of species, target and bycatch, to be managed in accordance with the MSY and precautionary approach, respectively;
• F_{MSY} ranges to deal with mixed-fisheries issues;
• Inclusion of recreational catches in some fishing opportunities.

However, to date no agreed text has been disclosed. Therefore, it continues to be unclear which management provisions will apply to many of the Principle 1 species under assessment.

Currently, mixed species scenarios for the North Sea are presented by ICES each year which detail the limiting TACs from the principle stocks and range scenarios for managing TACs which reduce the gap between the most and least restrictive TACs. For 2018 the most limiting stocks will be haddock and whiting and for TR2 gears Nephrops in FU 6 (ICES 2017i).

The evidence (Section 2.4.6) suggests that the North Sea and Celtic Sea ecosystems are mainly influenced by climate-driven bottom-up forces rather than predator-driven top-down forces (e.g. Beaugrand & Ibanez (2004), Beaugrand (2004) and J. Alheit et al. (2005); ICES (2016b)). Through the running of an Ecopath model with Ecosim, Mackinson & Daskalov (2007) suggest that the removal of cod</td></tr>
</table>

		or haddock from the ecosystem through fishing mortality would result in a reduction in predation on prey species, but unlikely to cause a trophic cascade that would impact other elements of the ecosystem; indeed, this is an experiment that has been tried, and impacts do not appear to be irreversible (except possibly in the case of W. Scotland cod where a combination of seal predation and climate change may possibly mean that rebuilding targets for the fishery defined on the basis of a single-stock analysis are not realistic; see analysis in Section 2.4.2 and 2.1.1). Overall, the team concluded that while the ecosystem is certainly changing, this is being driven by very large-scale drivers such as changes in overall fishing pressure and climate change. Furthermore, fishery-related impacts have tended to reverse direction over the last few decades, as overall demersal fishing pressure has been reduced and trends in associated stocks have started to reverse from decline towards recovery (e.g. North Sea cod, W. Scotland whiting). On this basis, the team considered that the fishery is 'highly unlikely' to disrupt this ecosystem – SG80 is met. In relation to SG100, there is evidence available in the form of studies such as those cited above and others, as well as the output of ecosystem models as noted above. A report on changes in marine ecosystems since 1980 concludes that there has been some change (although spatially very variable), but this can be regarded for the most part as positive (e.g. increased species-richness in the northern North Sea – assumed to be climate-related). For some types of impact, the evidence is more circumstantial – for example, there is evidence from some areas of impacts of trawling on benthic ecosystems even down to nemotodes and nutrient cycling – however, actual changes occurring on the fishing grounds in a given area are usually impossible to assess. (The team noted that the size of the fleet has reduced a lot over the last 30 years, which is likely to have reduced benthic impacts; as inferred by ICES (2016f).) The team considered that SG100 is partially met, and gave an overall score of 90.
References		Beaugrand & Ibanez (2004), Beaugrand (2004), ICES (2016f), J. Alheit et al. (2005) ICES (2016b)and Mackinson & Daskalov (2007)

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

Evaluation Table for PI 2.5.2

PI 2.5.2		**There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guide post**	There are measures in place, if necessary.	There is a partial strategy in place, if necessary.	There is a strategy that consists of a plan, in place.
	Met?	Y	Y	Y
	Justification	Scotland has a National Marine Plan (MS 2015b) which has been developed as part of Scotland's response to the EU's Marine Strategy Framework Directive. The MSFD outlines the legislative framework for an ecosystem-based approach to the management of human activities which supports the sustainable use of marine goods and services, with the overarching goal of achieving 'Good Environmental Status' by 2020 across Europe's marine environment. To do so, a series of detailed criteria and indicators have been produced by the Commission which are used by member states as a blueprint for the implementation of the MSFD. The MSFD requires member states to: • Provide an assessment of the current state of their seas by July 2012 • Provide a set of detailed characteristics of what good environmental status means for their waters, and associated targets and indicators, by July 2012 • Establish a monitoring programme to measure progress by July 2014 • Establish a programme of measures for achieving good environmental status by 2016 Measures regulating fisheries management set out in the CFP must be referenced against the Marine Strategy Framework Directive (MSFD). This means that when setting the sustainable exploitation of fish resources management must ensure the integrity, structure and functioning of ecosystems to be maintained or restored and, where appropriate, in order to safeguard, inter alia, spawning, nursery and feeding grounds (EU 2008b). For the Norwegian waters of the North Sea and Skaggerak, an integrated ecosystem management plan was adopted by the Norwegian government in 2013. The plan evaluates the status of the ecosystem, the main activities, the cumulative impact of these activities on different components of the ecosystem and sets goals for different parts of the ecosystem, as well as measures and monitoring indicators designed to achieve those goals – in other words, the framework and timetable is similar to that set for the EU by the MSFD.		

		Overall, the team considered that the MSFD in itself constitutes an overarching strategy, as implemented by Scotland's National Marine Plan, while for Norway, there is a strategy that consists of a plan along similar lines. SG100 is met.		
b	**Guide post**	The measures take into account potential impacts of the fishery on key elements of the ecosystem.	The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.
	Met?	Y	Y	Y
	Justification	The Scottish National Marine Plan includes specific policy objectives for fisheries, including: • an ecosystem approach, protection of vulnerable species and stocks, protection of the seabed • management of conflicts between fisheries and other activities, including in relation to sustainability of stocks • delivery of international commitments, including the discard ban Measures to deliver these policy objectives include: • Implement the reformed CFP – MSY by 2020 and the landings obligation • Moving towards monitoring total removals rather than landings • Stabilising fishing effort at a sustainable level • Spatial management for inshore areas • Monitoring and adaptation to climate change The plan is based on a strong evidence base, including fisheries data (stock assessments, spatial distribution of fishing effort and landings), as well as other inputs such as the Habitat Atlas. On this basis, the team considered that SG80 is met.		

		In relation to SG100, the UK has now published the Marine Strategy Part 3: UK programme of measures, which provides detailed descriptors and targets for a wide range of marine ecosystem indicators (fish, marine mammals, birds, pelagic and benthic habitats, non-indigenous species, commercially-exploited fish and shellfish, eutrophication, hydrographic conditions, contaminant, marine litter and underwater noise, to be specific). For commercial fish species, these targets are based around F_{MSY} and B_{pa}, as would be expected. For benthic habitats (as an example) descriptors and objectives are around the following: • Overall trends in biodiversity • Conservation of habitats identified as requiring protection from demersal fishing (either nationally or internationally; these are specified) • Distributional pattern and range of habitats • 5% limits on 'unacceptable impacts' from demersal fisheries It also specifies what work has already been done, what is planned, where gaps remain and how they will be filled. On this basis, SG100 is met. The Norwegian Plan for the North Sea / Skaggerak includes the following (relevant) policy objectives for biodiversity and ecosystems and fisheries: • achieve good environmental status, particular vulnerable and/or valuable areas; • protection of habitats and species will ensure i) their continued role in the ecosystem; ii) the maintenance or recovery of threatened and protected species; iii) establishment of a network of representative MPAs; • an ecosystem approach to harvesting of marine organisms, such that ecosystem structure and function is maintained and undesirable bycatch minimised. • avoid the introduction / spread of non-native species • manage fisheries such that they provide high sustainable long-term yield Measures to deliver these in relation to fisheries include (only those relevant here are given): • continue to develop ecosystem-based management • ensure that depleted stocks (e.g. cod) are rebuilt • encourage R&D on selectivity of fishing gear • reinforce at-sea and on-land enforcement • continue system of area closures for juveniles • continue elasmobranch surveys

		• participate in international efforts to ensure overall sustainability of North Sea fisheries and strengthen cooperation with the EU, particularly on the discard ban, selectivity and long-term management plans The plan is based on a strong evidence base, including fisheries data (stock assessments, spatial distribution of fishing effort and landings), as well as other inputs such as habitat maps and the evaluation of cumulative impacts from different sources. On this basis, the team considered that SG80 is met. In relation to the specific effects of this fishery on the ecosystem, although none have been noted particularly (see 2.5.1), the team noted that the plan is also detailed and specific, and concluded that SG100 should be met for the Norwegian North Sea.		
c	**Guide post**	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).	The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.
	Met?	Y	Y	Y
	Justification	The plan incorporates a range of measures, some already in place and some underway, which are in fact the usual measures used to protect species and ecosystems from fisheries impacts: i.e. measures to keep target stocks in good condition (multi-annual plans, precautionary / MSY targets) and measures to protect non-target species and habitats (mapping, MPAs with management including fishery closures – see PI 2.4.1). There are also measures which will help which are not necessarily incorporated into the plan, such as work to improve selectivity under the Landing Obligation (see PI 2.2.1). Information on the fisheries and the ecosystem (see PI 2.5.1) show that impacts on target stocks and non-target species/habitats are declining. SG100 is met.		
d	**Guide post**		There is some evidence that the measures comprising the partial strategy are being implemented successfully.	There is evidence that the measures are being implemented successfully.
	Met?		Y	Y
	Justification	The plan is implemented across a range of domains – fisheries management (e.g. the MSY framework, multi-annual plans) and marine conservation (e.g. the MPA network). The MSFD requires ongoing monitoring – the next round is being evaluation against Good Environmental Status is due in 2018. SG100 is met.		

References	MS (2015b)	
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		**Na**

Evaluation Table for PI 2.5.3

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guide post**	Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity).	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	Y	Y	
	Justification	Information includes stock assessments for most species, including all the P1 and main retained species (P1, 2.1.1), ecosystem evaluations and models (e.g. ICES WGINOSE and WGECO (http://www.ices.dk/community/groups/Pages/WGECO.aspx); see also references for PI 2.5.1), evaluations of interactions between stocks and fisheries (e.g. ICES mixed fisheries advice (ICES 2016i)), mapping of benthos (see PI 2.4.1 and PI 2.4.3) and ongoing work under the ecosystem management plans and the MSFD as discussed in PI 2.5.1 and PI 2.5.2. Other information on key elements of the ecosystem continues to be collected under the Marine Strategy Framework Directive, the VECTORS project, the EC Habitats (e.g. EUNIS) and Birds Directives as well as through independent research (Alexander et al. 2015), (Cook & Trijoulet 2016; Trijoulet et al. 2017) The key elements of the ecosystem are broadly understood.		
b	**Guide post**	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail.	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail.	Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated.
	Met?	Y	Y	Y

	Justification	The main impact of the fishery on the ecosystem is considered to be the removal of demersal fish biomass. Catches and assessments are presented on a yearly basis by ICES in single-species stock assessments and mixed fishery advice. This considers the effect of the fishery on the key relevant stocks (haddock, cod, saithe, whiting, plaice, sole and *Nephrops*) (ICES 2017i). There is no -mixed fishery advice for West Coast Scotland, but there is independent research (Alexander et al. 2015). There has also been investigation into the main interactions between the fishery and ecosystem elements, for example between trawl fisheries and benthic habitats (e.g. MS (2016b; 2017b; 2017a)). ETP species interactions have also been investigated. Ecosystem models (as referenced in PI 2.5.1 and PI 2.5.2) have examined the effects of different fishing activities/methods on commercial species, and estimated the effects of those changes to the populations of their prey species and on their predators. SG100 is therefore met.		
c	**Guide post**		The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known.	The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood.
	Met?		Y	N
	Justification	As discussed in scoring issue a, and in more detail in earlier PIs, the impacts of the fishery on target, bycatch, retained and ETP species and habitats are identified. The impacts of demersal fisheries in the North Sea and Celtic Seas (West of Scotland) are reviewed as part of the ICES ecoregion approach. The function of each of these components in the ecosystem is known, and have been the subject of various kinds of modelling to further elucidate the importance of each component and interactions between these. With ETP data unable to be scaled to fleet level the impacts of the fleet on this section of the ecosystem are not fully understood so SG100 is not met.		
d	**Guide post**		Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.	Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred.
	Met?		Y	Y
	Justification	In general, as set out above, there is a great deal of information available about all aspects of the ecosystem and the fishery, allowing the main consequences for the fishery on the ecosystem to be inferred as done in the rationale for PI 2.5.1. SG100 is met.		

e	**Guide post**		Sufficient data continue to be collected to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).	Information is sufficient to support the development of strategies to manage ecosystem impacts.
	Met?		Y	Y
	Justification	Sufficient data continue to be collected on the fishery (landings, effort, VMS) to detect changes in risk to the ecosystem, based on the main likely impacts of the fishery on the ecosystem (see 2.5.1) meeting SG80. Strategies are in place to manage ecosystem impacts (see PI 2.5.2). SG100 is met.		
References		ICES WGINOSE and WGECO (http://www.ices.dk/community/groups/Pages/WGECO.aspx) ICES (2016i), MS (2016b; 2017b; 2017a)		
OVERALL PERFORMANCE INDICATOR SCORE:				**95**
CONDITION NUMBER (if relevant):				**Na**

Principle 3 scoring rationale

Evaluation Table for PI 3.1.1 – Legal and/or customary framework

PI 3.1.1		**The management system exists within an appropriate legal and/or customary framework which ensures that it:** • **Is capable of delivering sustainability in the UoA(s); and** • **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and** • **Incorporates an appropriate dispute resolution framework.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Compatibility of laws or standards with effective management			
	Guide post	There is an effective national legal system **and a framework for cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and **organised and effective cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **binding procedures governing cooperation with other parties** which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	Y	Y	N for haddock, saithe, plaice and whiting Y for hake
	Justification	The fishery is managed at three levels: the international, EU and national levels. Haddock, saithe, plaice and whiting are among the six North Sea stocks that are defined as jointly managed by Norway and the EU, based on the framework agreement between the two parties on fisheries cooperation from 1980 (in force 1981). The agreement provides the legal basis for the setting of TACs for joint stocks, transfers of fishing possibilities, joint technical measures and issues related to control and enforcement. The TACs for the jointly managed North Sea stocks are agreed in annual negotiations between the EU and Norway and split according to fixed distribution formulas, which for saithe is 52 % to Norway and 48 % to the EU, for plaice 93 % to the EU and 7 % to Norway and for whiting 90 % to the EU and 10 % to Norway. Hake is an exclusive EU stock. The EU quota is then divided among member states according to the principle of relative		

		stability. In turn, the major part of the UK quota is given to the Scottish fishing industry. The Production Organizations (POs) manage quota distribution at the regional level. The fishery is managed within the context of EU's Common Fisheries Policy (CFP), whose provisions are transposed into the Scottish legal system in the form of Scottish Statutory Instruments. CFP applies to all fishing activities in EU waters, including the exclusive economic zone (EEZ), and to the activities of EU vessels outside EU's marine jurisdiction. The main legal bases for fisheries management in Scottish territorial waters, as well as management of activities by Scottish registered fishing vessels outside Scottish territorial waters, are the 2013 Aquaculture and Fisheries (Scotland) Act and the 2010 Marine Act, with supplementary legislation at lower levels (secondary or subordinate legislation, such as specific requirements to fishing operations and gear). The regional distribution of responsibilities within UK fisheries management is fixed in an agreement between the Fisheries Administrations of England (Defra – the Department for Environment, Food & Rural Affairs), Northern Ireland (the Department of Agriculture and Rural Development (Northern Ireland)), Scotland (Marine Scotland) and Wales (the Welsh Government) from 2012. Marine Scotland is the implementing body under the Scottish Government, responsible for all components of fisheries management, from science to management and enforcement. In accordance with the Marine Act, its full special jurisdiction is limited to Scottish territorial waters, but it is also conferred the authority to enforce Scottish fisheries legislation in the EEZ and flag-state responsibilities towards Scottish registered fishing vessels outside EU waters. Marine Scotland works closely with the Producer Organisations (POs; see PI 3.1.2 b below), which are delegated responsibility for managing fish quotas on behalf of their members. At a UK level, Marine Scotland works with a number of other bodies of governance, such as Defra and the Marine Management Organisation (MMO). MMO is a Non-Departmental Public Body (NDPB) under Defra, which delivers legal, monitoring and enforcement functions. A smaller part of the catch is taken in the Norwegian EEZ; hence it can be argued that the national fisheries management system forms part of the overarching management framework. Norway has a well-established system for fisheries management, which has evolved over more than a century and is now codified in the 2008 Marine Resources Act and secondary legislation. The Marine Resources Act is a framework law, which in the main authorizes the Government to issue specific regulations within designated fields. The most important rules are found in the Regulation on the Execution of Marine Fisheries, which is updated annually. The Regulation contains rules for mesh size, selection and limitations on the use of specific catch gear, seasonal restrictions, bycatch, minimal fish size, discard ban, restrictions on the use of trawl in specific areas and protection of coral reefs, among other things. All Regulations are subject to running modifications and additions through so-called J-orders, which are distributed to the fishing fleet electronically. This includes dedicated and regularly updated annual regulations for the fishery of each specific species. The executive body at governmental level is the Ministry of Trade, Industry and Fisheries, while the practical regulation of fisheries is delegated to the Directorate of Fisheries. Enforcement at sea is taken care of by the Coast Guard, which is part of the Royal Norwegian Navy, but performs tasks on behalf of several ministries, including the Ministry of Trade, Industry and Fisheries. Scientific research is performed by the Institute of Marine Research. Fisheries management authorities coordinate their regulatory work with that of other bodies of governance, for instance the Ministry of Climate and Environment and the Norwegian Environmental Agency, which are responsible for the implementation of the integrated management plans for different marine areas.

		At EU and national level, there are effective and binding procedures in place to deliver management outcomes consistent with MSC Principles 1 and 2. At the international level, the 1980 cooperation agreement between Norway and the EU is binding, but it is not very specific; e.g it does not define which stocks are to be jointly managed or how quotas should be divided. In turn, the bilateral cooperation regime for the North Sea fish stocks works effectively, but management decisions made in the annual negotiations between Norway and the EU, including on quota distribution, are not binding. Therefore SG100 is not met for the the jointly managed stocks haddock, saithe, plaice and whiting. It is, however, met for hake, which is an exclusive EU stock.		
b	Resolution of disputes			
	Guide post	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 UoA.	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**.
	Met?	Y	Y	N for haddock, saithe, plaice and whiting Y for hake
	Justifi cation	At the national level in both Scotland/EU and Norway, there are effective, transparent dispute resolution mechanisms in place, as fishers can take their case to court if they do not accept the rationale behind an infringement accusation by enforcement authorities or the fees levied against them. Verdicts at the lower court levels can be appealed to higher levels. In practice, the vast majority of disputes are resolved within the management system, which incorporates ample formal and informal opportunities for fishers and other stakeholders to interact with the authorities (see PI 3.1.2 below), e.g. to clear out disagreement and conflict among users and between users and authorities. At the international level, a state can institute proceedings against another state through mechanisms such as the International Court of Justice (ICJ) and the International Tribunal for the Law of the Sea (ITLOS), or bring a dispute before the Permanent Court of Arbitration (PCA). At the regional level, the North-East Atlantic Fisheries Commission (NEAFC) in 2004 adopted a recommendation for compulsory dispute settlement. None of these mechanisms have so far been widely used as means for solving fisheries disputes, but ICJ has over many decades had a number of cases regarding fisheries jurisdiction, and ITLOS has in recent years had cases on the prompt release of detained fishing vessels and the use of provisional measures. PCA was called upon in 2013 to solve certain aspects of the dispute between the EU and Faroe Islands regarding the coastal state management regime of Atlanto-Scandian herring. (The case was terminated a year later as agreement between the parties was reached.) There are no explicit mechanisms for the resolution of disputes		

		in the EU–Norway regime for the North Sea fisheries, but – as is mostly the case also at the national levels – disagreement is sorted out through dialogue, negotiation and compromise. Furthermore, the above goes to show that there are mechanisms in place within the Law of the Sea, and international law more widely, that the parties can invoke in cases of serious disagreement. However, these mechanisms have not yet been tested and proven to be effective in cases most likely to arise in the context of the fishery under assessment, e.g. disputes on quota allocation or the technical regulation of fisheries. Therefore SG100 is not met for the the jointly managed stocks haddock, saithe, plaice and whiting. It is, however, met for hake, which is an exclusive EU stock.		
c	Respect for rights			
	Guide post	The management system has a mechanism to **generally respect** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **observe** the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to **formally commit** to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	At all levels of the management sysem, fish resources are distributed based on some level of historical usage and attention to the social context within which the fishery takes place. At the bilateral level, the TAC is divided between the EU and Norway based on historical fishing, which is explicitly prescribed by the bilateral framework agreement (Annex 1, which in Art. 1 is defined as an integral part of the agreement), and at least to some extent this also reflects the social and economic importance of the fishery for each country. The parties have also legally obliged themselves to give each others' vessels reciprocal access rights in their respective economic zones (Art. 1), and generally seek a mutually satisfactory balance in their fishing relations (Art. 2 b), Art. 3). At the regional level, the NEAFC Convention states as its objective to ensure the long-term conservation and optimum utilization of the fishery resources in the Convention Area, providing sustainable economic, environmental and social benefits (Art. 2). At EU level, member states are obliged, according to the 2013 CFP, to include social and economic dimensions in their criteria for allocation of quota rights, among them the contribution to the local economy and historic catch levels (Art. 17). Protection of the interests of coastal communities dependent on fisheries is also one of the rationales for the principle of relative stability in fishing rights between the member states (Recital (35)). Among the objectives of the CFP is to foster job creation and economic development in coastal areas (Recital (12)) and to contribute to a fair standard of living for those who depend on fishing activities, bearing in mind coastal fisheries and socio-economic aspects (Art. 2 f)). Marine biological resources in the outermost parts of the Union shall be secured special protection due their importance to the local economy, and certain types of fishing activities shall be limited to fishing vessels registered in the ports of those territories (Recital (21)).		

		The Norwegian system for fisheries management includes various mechanisms that generally respect and observe the rights of the coastal population along the country's northern, western and southern coast. For the most important species, significantly and proportionately larger quota shares are allotted to coastal fisheries than to the ocean going fleet (see, for instance, the Regulation on Participation in Fisheries for an overview), with particular attention to smaller fisheries that are particularly dependent on fishing for livelihood, including the coastal Sami population in the northernmost part of the country. The Sami Parliament, which is a consultative body for the indigenous Sami population on Norwegian territory, is consulted on all management measures, including the distribution of the national quota, related to species of particular historic importance to the Sami. The Government has formally committed to this through the 2005 Royal Decree on Consultations with the Sami Parliament. Hence, mechanisms to formally commit to the rights of people dependent on fishing for food and livelihood are in place in the management system, and SG100 is met.
References		A Subject Specific Concordat between The Department for Environment, Food and Rural Affairs, Marine Scotland, The Welsh Government and The Department of Agriculture and Rural Development (Northern Ireland) ("The Administrations") On Management Arrangements for Fishing Opportunities and Fishing Vessel Licensing In the United Kingdom, 2 May 2012. Agreed Record of Fisheries Consultations between Norway and the European Union for 2017, Bergen, 2 December 2016. Agreement on Fisheries between the European Economic Community and the Kingdom of Norway, signed 27 February 1980, in force 16 June 1981. Aquaculture and Fisheries (Scotland) Act, 2013. Convention on Future Multilateral Cooperation in North-East Atlantic Fisheries, 2006. COUNCIL REGULATION (EU) 2017/127 of 20 January 2017 fixing for 2017 the fishing opportunities for certain fish stocks and groups of fish stocks, applicable in Union waters and, for Union fishing vessels, in certain non-Union waters. J-209-2017: Utøvelsesforskriften (Regulation on the Execution of Marine Fisheries), Norwegian Directorate of Fisheries, 2017. Lov om forvaltning av viltlevande marine ressursar (havressurslova), LOV-2008-06-06-37 (Marine Resources Act), 2018. Interview with Marine Scotland and the fishery client during site visit. Marine (Scotland) Act (2010). NEAFC Dispute Resolution Mechanism, Annex K – Amendment of the Convention on Dispute Settlement, 2004. Regulation (EU) No. 1380/2013 of the European Parliament and of the Council on the Common Fisheries Policy, amending Council Regulations (EC) No. 1954/2003 and (EC) No. 1224/2009 and repealing Council Regulations (EC) No. 2371/2002 and (EC) No. 639/2004 and Council Decision 2004/585/EC. Wakefield, J., Reforming the Common Fisheries Policy, Cheltenham: Edward Elgar, 2016.

	Website of Marine Scotland (http://www.gov.scot/Topics/marine).	
UoA 1, 2, 3 and 5 (haddock, saithe, plaice, whiting)		**85**
UoA 4 (hake)		**100**
CONDITION NUMBER (if relevant):		**N/a**

Evaluation Table for PI 3.1.2 – Consultation, roles and responsibilities

NOTE: scores brought forward from original assessment with new information provided.

PI 3.1.2		**The management system has effective consultation processes that are open to interested and affected parties.** **The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties**		
Scoring Issue		SG 60	SG 80	SG 100
a	Roles and responsibilities			
	Guide post	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **generally understood**.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for key areas** of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for all areas** of responsibility and interaction.
	Met?	Y	Y	Y
	Justification	The functions, roles and responsibilities of all actors in the Scottish system for fisheries management are explicitly defined in the Aquaculture and Fisheries Act, the Marine Act and supporting legislation – all read in the context of relevant EU legislation – and are, according to our interviews during site visit, well understood for all areas of responsibility and interaction. They are also exemplarily described on Marine Scotland's website. As laid out under PI 3.1.1 a) above, governance functions are mainly performed by Marine Scotland, which is a directorate under the Scottish Government. Different user groups are well integrated in the management process; see PI 3.1.2 b). Also at the international level, the roles and responsibilities of the two coastal states are explicitly defined and well understood for all areas of responsibility and action. There is no evidence to the contrary in the team's interviews during site visits or other documentation provided by stakeholders. SG100 is met.		
b	Consultation processes			

	Guide post	The management system includes consultation processes that **obtain relevant information** from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information and **explains how it is used or not used**.
	Met?	Y	Y	Y
	Justification	Scottish fisheries management includes a sophisticated system for stakeholder consultation. The main mechanisms are i) public meetings (regional fishing industry assemblies, quayside conversations and fishing sector focus groups); ii) advisory and working groups (the Inshore Fisheries Groups, the Inshore Fisheries Management and Conservation Group (IFMAC), the Fisheries Management and Conservation Group (FMAC) and the Scottish Discard Steering Group); and iii) *ad hoc* events, such as conferences. FMAC was set up by the Cabinet Secretary (effectively: Minister) for Rural Affairs and the Environment in 2011, as part of a broader political and management effort to implement the cod recovery plan, and increase fishermen – and Scottish – influence in the forthcoming reform of the CFP. It is chaired by Marine Scotland and includes representatives from the fishing industry representative bodies, fish producer organizations, environmental organizations and Marine Scotland Policy and Science. FMAC makes recommendations to Marine Scotland – and, on request, to the Cabinet Secretary for Rural Affairs and the Environment – on matters connected to the development of fisheries legislation and policies, the allocation of fishing opportunities, management mechanisms and objectives for and strategies towards international negotiations. FMAC meets 1-4 times per year, and agendas and minutes from the meetings are available for download on Marine Scotland's website. Marine Scotland aims to circulate documents for discussion no less than four weeks in advance of meetings so as to allow time for the constituent organizations to consult with their members. Decisions are sought made through consensus, but objections are recorded in the minutes, on request. Marine Scotland also seeks the opinion of stakeholders on running regulatory issues through occasional consultations papers posted on their website. Another important interface between the industry and authorities is the POs. The POs are membership organizations for industry actors whose role, according to EU legislation, is to market the products of their members and implement measures that promote the concentration of supply and stabilize prices. POs are also allocated the vast majority of UK quotas by Fisheries Administrations and are responsible for managing these quotas on behalf of their members. There are currently 10 Scottish POs recognized by Marine Scotland, among them the Scottish Fishermen's Organisation (SFO). Other stakeholder organizations include Seafood Scotland, which was set up in 1999 to increase the value of return to the Scottish seafood sector, and the Scottish White Fish Producers Association (SWFPA), the		

		largest fishing association in Scotland, which protects and promotes its members' interests across a range of national and international political arenas. SWFPA, in turn, is part of the Scottish Fishermen's Federation (SFF), which works to promote the collective interests of Scotland's ten geographically and sectorally defined fishermen's associations. The Federation plays an active role in advancing the interests of Scottish fishermen at national and international levels by lobbying government officials in Edinburgh, London and Brussels. It also plays a key role in helping to inform fisheries science, management of the marine environment; inshore fisheries management, marine spatial planning, marine safety regulations and industry recruitment and training programmes. An example of a more *ad hoc* based interface between different industry actors and authorities is the Gear Innovation and Technology Advisory Group (GITAG), which is hosted by SFF with Marine Scotland participation, established in 2015 to foster flexible working partnerships between fishermen, industry and public bodies, gear technologists and science in the implementation of the landing obligation in 2019. The situation is similar at the international level, where user groups participate in the bilateral negotiations with Norway and meetings in NEAFC and the North Sea Advisory Council (NSAC); in the two latter, NGOs are also allowed to participate as observers. The Advisory Councils are the main consultation mechanism through which industry engages with management authorities at EU level. They include European industry and NGO representatives ensuring local knowledge is considered within the management system. They actively develop policy advice to the European Commission and are considered as part of the EU's management system. NSAC currently has 24 member organizations: 15 national fishing associations (including SSF and SFO) and 9 NGOs. Representatives of the client fishery consulted during the site visit report that they concentrate their lobbying activities towards Marine Scotland, Defra and the European Commission. In addition to direct lobbying, of both a formal and an informal nature, they consider FMAC as their most important channel for influence at the national level and NSAC at the international level. They report consultation processes to be inclusive and transparent, with management authorities displaying consideration of the information obtained from stakeholders and explaining how it is used or not used. Such explanations are provided throughout all platforms available for interaction, in both oral and written form. Hence, SG100 is met.		
c	Participation			
	Guide post		The consultation process **provides opportunity** for all interested and affected parties to be involved.	The consultation process provides **opportunity and encouragement** for all interested and affected parties to be involved, and **facilitates** their effective engagement.
	Met?		Y	Y

	Justification	As follows from 3.1.2 b), the consultation processes provide ample opportunity for all interested and affected parties to be involved in discussions about fisheries management in Scotland. Authorities invite relevant stakeholders to meetings and seminars and actively seek their opinion on management measures, in direct meetings and in writing. The level of active encouragement and practical facilitation is considered appropriate to the scope and context of the fishery. SG100 is met.
References		Agreed Record of Fisheries Consultations between Norway and the European Union for 2017, Bergen, 2 December 2016. Aquaculture and Fisheries (Scotland) Act, 2013. Convention on Future Multilateral Cooperation in North-East Atlantic Fisheries, 2006. Fisheries Management and Conservation (FMAC) Group Remit, FMAC/11/02, 2012. FMAC, agendas and minutes from meetings 2013–2015, available at http://www.gov.scot/Topics/marine/Sea-Fisheries/engagement/FMAC/Meetings. Interview with Marine Scotland and the fishery client during site visit. Marine (Scotland) Act 2010. REGULATION (EU) No 1379/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 on the common organisation of the markets in fishery and aquaculture products, amending Council Regulations (EC) No 1184/2006 and (EC) No 1224/2009 and repealing Council Regulation (EC) No 104/2000. Report on Marine Scotland's Programme of Regional Fishing Industry Assemblies in 2014, Marine Scotland, 2015. Websites of FMAC (http://www.gov.scot/Topics/marine/Sea-Fisheries/engagement/FMAC), GITAG (http://www.gov.scot/Topics/marine/Sea-Fisheries/discards/GITAG), Marine Scotland (http://www.gov.scot/Topics/marine), NSAG (http://www.nsrac.org), Producer Organisations (http://www.gov.scot/Topics/marine/Sea-Fisheries/management/17681/producerinterbranch), SFF (http://www.scottishfishermen.co.uk), SFO (http://www.sff.co.uk) and SWFPA (http://www.swfpa.com) .
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		**N/a**

Evaluation Table for PI 3.1.3 – Long term objectives

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC fisheries standard, and incorporates the precautionary approach.		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	Long-term objectives to guide decision-making, consistent with the MSC fisheries standard and the precautionary approach, are **implicit** within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach are **explicit** within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are **explicit** within **and required by** management policy.
	Met?	Y	Y	Y
	Justification	The current CFP regulation requires that member states, in accordance with international treaties such as the 1982 Law of the Sea Convention, the 1993 FAO Compliance Agreement and the 1995 Fish Stocks Agreement, apply the precautionary approach to fisheries management, and aim to ensure that exploitation of living marine biological resources restores and maintains populations of harvested species above levels which can produce the maximum sustainable yield (Recital (6), Art. 2). It is specifically mentioned that when targets relating to the maximum sustainable yield cannot be determined, multiannual (management) plans shall provide for measures based on the precautionary approach, ensuring at least a comparable level of protection for the relevant fish stocks (Art. 9). The maximum sustainable yield exploitation rate shall be achieved by 2015 where possible and, on a progressive, incremental basis at the latest by 2020 for all stocks (Art. 2). Since a smaller part of the catch is taken in the Norwegian EEZ, it can be argued that the national fisheries management system forms part of the overarching management framework and should be assessed against some of the PIs, including overarching objectives. The 2008 Marine Resources Act requires that Norwegian fisheries management be guided by the precautionary approach, in line with international treaties and guidelines (§ 7 a)), and by an ecosystem approach that takes into account habitats and biodiversity (§ 7 b)). The same objectives are found in the most relevant policy documents, such as the integrated management plan for the North Sea and Skagerrak. Since these objectives are both explicit and required by management policy, SG100 is met for both EU and Norway.		
References		Agreed Record of Fisheries Consultations between Norway and the European Union for 2017, Bergen, 2 December 2016. Lov om forvaltning av viltlevande marine ressursar (havressurslova), LOV-2008-06-06-37 (Marine Resources Act), 2018. Meld. St. 37 (2012–2013) Helhetlig forvaltning av det marine miljø i Nordsjøen og Skagerrak (forvaltningsplan), (White Paper on the Integrated Management Plan for the North Sea and Skagerrak), 2013.		

	Regulation (EU) No. 1380/2013 of the European Parliament and of the Council on the Common Fisheries Policy, amending Council Regulations (EC) No. 1954/2003 and (EC) No. 1224/2009 and repealing Council Regulations (EC) No. 2371/2002 and (EC) No. 639/2004 and Council Decision 2004/585/EC.	
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		**N/a**

Evaluation Table for PI 3.1.4 – Incentives and subsidies

NOTE: scores brought forward from original assessment with new information provided.

<table>
<tr><td colspan="2">PI 3.1.4</td><td colspan="3">The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing</td></tr>
<tr><td colspan="2">Scoring Issue</td><td>SG 60</td><td>SG 80</td><td>SG 100</td></tr>
<tr><td rowspan="3">a</td><td>Guide post</td><td>The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.</td><td>The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise.</td><td>The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing practices.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>Justification</td><td colspan="3">The management system provides positive economic and social incentives through a transparent allocation of resources (quota) at a level compatible with sustainable fishery management. Active participation in management provides fishing firms with an improved understanding and sense of fairness, improved legitimacy of management measures. The fishing industry’s active involvement in the CFP reform and in the Operational Programming (OP) of the new European Fisheries Fund (EFF 2007-2013 and EMFF 2014-2020) has helped identify support to help fishing vessels comply with the new landing obligations (on-board cameras, e-logbooks, gear selectivity etc.). Following very low Nephrops catches in 2013, Marine Scotland introduced an Action Plan to support the fleet’s adaptation (TR2 in particular) to discard free operations with a £6 million Fund, including a £3 million immediately accessible hardship fund. In Scotland, the use of public money is submitted to the same checks as for the European Funds. The allocation procedures were fully transparent on the basis of socio-economic information. Incentives provided by EFF / EMFF and associated Scottish public support to the fishing industry are considered explicitly in the annual reviews and formally evaluated (ex-ante, mid-term and ex-post). SG100 is met.</td></tr>
<tr><td colspan="2">References</td><td colspan="3">Fisheries Management and Conservation Group (FMAC) Action Plan, http://www.gov.scot/Resource/0042/00428414.pdf.
EMFF website: http://ec.europa.eu/fisheries/cfp/emff/index_en.htm.
Interview with Marine Scotland and the fishery client during site visit.</td></tr>
</table>

OVERALL PERFORMANCE INDICATOR SCORE:	**100**
CONDITION NUMBER (if relevant):	**N/a**

Evaluation Table for PI 3.2.1 Fishery-specific objectives

PI 3.2.1		**The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	**Objectives**, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery-specific 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-specific 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-specific management system.
	Met?	Y	Y	P
	Justification	Well defined and measurable short and long-term objectives consistent with achieving the outcomes of MSC Principle 1 are explicit in the management plans for the fisheries, such as reference points for stock biomass and fishing mortality, as well as specific timelines for for the achievement of precautionary reference points. Other policy instruments set more specific P2 related objectives, such as the EU MSFD for commercial fishing activities and the protection of marine habitats and biodiversity. Until the MSFD programmes of measures are adopted for the two marine regions (North Sea and West of Scotland), not all P2 related objectives have been quantified. SG100 is only partially met.		
References		EU-Norway (2016) MSFD Scotland see http://blogs.scotland.gov.uk/coastal-monitoring/2014/08/12/update-on-the-marine-strategy-framework-directive-msfd-consultation/ ICES (2017q; 2017d; 2017m; 2017e; 2017r)		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**
CONDITION NUMBER (if relevant):				**N/a**

Evaluation Table for PI 3.2.2 – Decision-making processes

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery.		
Scoring Issue		SG 60	SG 80	SG 100
a	Decision-making processes			
	Guide post	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	Y	Y	
	Justification	Established decision-making procedures in EU and the Scottish national fisheries management system – evolved over several decades and now codified in the 2013 CFP, the Scottish Marine and Fisheries Acts, as well as supporting legislation – ensure that strategies are produced and measures taken to achieve the fishery-specific objectives. This applies to the fisheries under assessment, as it does to EU and Scottish fisheries in general; see PIs 3.1.1 and 3.1.2 above. Measures include, among other things, the establishment of TACs on the basis of scientific advice, regulation of access to the fishery and technical requirements such as gear restrictions; cf. P1 and P2 above. SG80 is met.		
b	Responsiveness of decision-making processes			
	Guide post	Decision-making processes respond to **serious issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to **serious and other important issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.

	Met?	Y	Y	Y
	Justification	According to our interviews during the site visit, as well as ample documentation on Marine Scotland's website, the established decision-making procedures at national level in Scotland respond to all issues identified in research, monitoring, evaluation or by groups with an interest in the fishery. This is ensured through the formal and informal arenas for regular and *ad hoc* consultations between governmental agencies and the industry; cf. PI 3.1.2 above. In addition, there is close contact between authorities and scientific research institutions. User-group representatives claim that the relevant government agencies are open to any kind of input at any time, which is corroborated by information available at Marine Scotland's comprehensive website. Authorities' response to stakeholder input is transparent and timely and the ensuing policy options take adequate account of their advice. SG100 is met.		
c	Use of precautionary approach			
	Guide post		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Y	
	Justification	Decision-making processes are based on relevant scientific research by the Marine Scotland Science, as well as ICES assessments and STECF input. EU and national legislation require the use of the precautionary approach (see PI 3.1.3), and the management plans for each target species have been reviewed by ICES and found to be consistent with the precautionary principle (see P1). SG80 is met. Some of the management plans require updating to incorporate new areas see conditions linked to UoAs in P1.		
d	Accountability and transparency of management system and decision-making process			
	Guide post	Some information on the fishery's performance and management action is generally available on request to stakeholders.	**Information on the fishery's performance and management action is available on request**, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders **provides comprehensive information on the fishery's performance and management actions** and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.

	Met?	Y	Y	Y
	Justification	As follows from PI 3.1.2 above, there are a number of arenas in the Scottish system for fisheries management where the industry and other stakeholders can provide their input to the management process, ranging from formalized platforms such as FMAC to direct consultations like quayside conversations and more informal, direct communication. Marine Scotland's website offers an impressive amount of written response from authorities to stakeholder input, such as minutes from meetings and response to public hearings (e.g. from consultation with stakeholders ahead of the introduction of electronic logbooks in 2008). The information on the official website is supplemented by a blog, where information is disseminated in an even more accessible manner. Furthermore, management performance is reported formally, in annual reports from scientific, regulatory and enforcement authorities, as well as in a range of reviews of the management system, all publicly available and duly distributed (cf. PI 3.2.5 below). This written documentation alone confirms that formal reporting by authorities is in place and in a satisfactory manner explains findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. No indication to the contrary has been provided during interviews at the site visit and other stakeholder input. SG100 is met.		
e	Approach to disputes			
	Guide post	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	Y	Y	Y
	Justification	The national management authority is not subject to continuing court challenges. When occasionally taken to court by fishing companies, the management authority complies with the judicial decision in a timely manner. The management authority works proactively to avoid legal disputes through the tight cooperation with user groups at the regulatory level, ensuring as high legitimacy as possible for regulations and other management decisions, as well as guidance at fisherman level in order to prevent infringements; cf. PI 3.2.3 below. Only the most serious cases go to prosecution by the police and possible transfer to the court system. SG100 is met.		
References		Agreed Record of Fisheries Consultations between Norway and the European Union for 2017, Bergen, 2 December 2016. Aquaculture and Fisheries (Scotland) Act, 2013.		

	Consultation on the Implementation of Detailed Rules on Electronic Recording and Reporting of Fishing Activities and on Means of Remote Sensing in Scotland, Scottish Government Marine Directorate, 2008. COUNCIL REGULATION (EU) 2017/127 of 20 January 2017 fixing for 2017 the fishing opportunities for certain fish stocks and groups of fish stocks, applicable in Union waters and, for Union fishing vessels, in certain non-Union waters. Interview with Marine Scotland and the fishery client during site visit. Marine (Scotland) Act 2010. Regulation (EU) No. 1380/2013 of the European Parliament and of the Council on the Common Fisheries Policy, amending Council Regulations (EC) No. 1954/2003 and (EC) No. 1224/2009 and repealing Council Regulations (EC) No. 2371/2002 and (EC) No. 639/2004 and Council Decision 2004/585/EC. Website of Marine Scotland (http://www.gov.scot/Topics/marine).
OVERALL PERFORMANCE INDICATOR SCORE:	**100**
CONDITION NUMBER (if relevant):	**N/a**

Evaluation Table for PI 3.2.3 – Compliance and enforcement

PI 3.2.3		**Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.**		
Scoring Issue		SG 60	SG 80	SG 100
a	MCS implementation			
	Guide post	Monitoring, control and surveillance **mechanisms** exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A **comprehensive** monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	Y	Y	Y
	Justification	Monitoring, control and surveillance (MCS) in the fishery is taken care of by Marine Scotland Compliance, in collaboration with enforcement authorities at UK and EU level (including the European Fisheries Control Agency) and exchange of information with relevant authorities in other states, including the Norwegian Directorate of Fisheries. All these agencies operate on the basis of a risk-based framework, identifying where enforcement resources can be best put to use at any time in order to optimize compliance. The EU system for fisheries control is laid out in the Control Regulation, which entered into force on 1 January 2010. The Regulation applies to all activities covered by the CFP carried out on the territory of member states or in EU waters, and by EU fishing vessels or nationals of a member state (Art. 2). It requires all member states to adopt appropriate measures, allocate adequate financial, human and technical resources and set up all administrative and technical structures necessary for ensuring control, inspection and enforcement of activities under the CFP (Art. 5). The Regulation contains Titles ('sections' above chapter level) on, among other things, access to waters and resources (Title III), control of fisheries (Title IV), control of marketing (Title V), surveillance (Title VI), inspections and proceedings (Title VII), enforcement (Title VIII) and common control programmes (Title IX). Among the substantial requirements are that member states operate a vessel monitoring system (VMS) and an automatic identification system (AIS), to be generally applied by vessels above 12 and 15 meters, respectively (Art. 9, 10), and that they make the use of fishing logbooks mandatory for all vessels above 10 meters (Art. 14) and electronic logbook for all vessels above 12 meters (Art. 15). The Regulation also introduces an obligation of member states to employ real-time closure of fisheries (Art. 51-54). Further, member states are obliged to carry out monitoring of fishing activities by inspection vessels or surveillance aircraft (Art. 71) and physical inspections of fishing vessels (Art. 74-77); in addition to national inspectors, a pool of Community inspectors shall also be set up (Art. 79). Procedures are established for situations where infringements are detected (Art.		

		82-88), including enhanced follow-up when infringements are serious, such as mis recording of catches of more than 500 kg or 10 % of what is reported in the logbook (Art. 84). Further, provisions are given for proceedings (Art. 85-88) and sanctions (Art. 90-93) (see PI 3.2.3 b) below). Marine Scotland Compliance carries out the UK's EU responsibilities for fisheries monitoring, control and surveillance in Scotland. It has 19 offices across the country and operates three surveillance vessels and two aircraft. In accordance with EU legislation, it takes care of information gathering through VMS (through the Marine Monitoring Centre) and electronic logbooks, and carries out all other obligations conferred upon Scotland, according the detailed reporting and control requirements in EU legislation to prevent, deter and eliminate illegal, unreported and unregulated fishing (IUU fishing). A Registration of Buyers and Sellers (RBS) Scheme has been fully operational in Scotland since 2005 and requires all buyers and sellers of first sale fish to be registered, and all auction sites of first sale fish and shellfish to be designated. All relevant regulations and information on enforcement activities are available on Marine Scotland's website. A landing obligation was introduced in the fishery in 2017. Marine Scotland has a strategy for the use of marine patrol vessel and surveillance aircraft to monitor the discard ban. The enforcement body has also announced that it will initially be pragmatic in its enforcement, recognizing that there needs to be a period of learning and adjustment when the ban takes effect. It is too early to evaluate whether the enforcement system will be comprehensive enough to generally detect violations of the discard ban, and it is the opinion of the assessment team that the fishery cannot be 'penalized' in the form of reduced scoring at this point for any lacking ability in the future to enforce the discard ban. Part of the UoA fishery takes place in the Norwegian EEZ, where MCS is a shared responsibility between the Directorate of Fisheries, the Coast Guard and regional sales organizations. The Directorate of Fisheries keeps track of how much fish is taken of the quotas of different vessels, vessel groups or other states at any given time, based on reports from the fishing fleet. Fishing vessels are required to have VMS and electronic logbooks, and real-time data are forwarded to the Directorate of Fisheries. The self-reported catch data can be checked at sales operations through the sales organizations, which have monopoly on first-hand sale of fish in Norway, and through physical checks performed by the sales organizations and the Directorate of Fisheries in port, and by the Coast Guard at sea. When Scottish vessels land in other European ports, they are subject to the NEAFC port state control scheme, which requires that the port state checks whether the landed fish is covered by a legal quota, and physically inspect a certain percentage of the catch. There is also an extensive exchange of information (including inspection and landing data) among the national enforcement authorities around the Northeast Atlantic. Hence, the fishery has a comprehensive and transparent system for monitoring, control and surveillance, and there are a number of possibilities for enforcement authorities to physically check whether the data provided by fishers through self-reporting are indeed correct. In addition, VMS data enables control of whether area restrictions are observed. SG100 is met.		
b	Sanctions			
	Guide post	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, **are consistently applied** and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and **demonstrably** provide effective deterrence.

	Met?	Y	Y	Y
	Justification	In accordance with the EU Control Regulation, member States are required to ensure that appropriate measures are systematically taken when violations of fishing regulations are detected, including administrative action or criminal proceedings, in order to provide effective deterrence (Art. 89). For serious infringements, a point system is to be applied (Art. 92), whereby fishermen are given a specified number of points for different kinds of violations. When a specific number of points is reached, the fishing licence shall be automatically suspended for a period of at least two months, increasing with repeated violations. In addition to the point system, a graduated system of penalties is used at national level in Scotland, ranging from oral advice to advisory letter, official written warning, various forms of statutory notices (such as revocation and suspension notices), financial administrative penalties (up to £10,000), other material enforcement measures (such as seizure and disposal of fish) and formal prosecution. Fixed penalty levels for different types of offences are publicly available; e.g. the lowest level of infringements leads to a penalty of £250 for a first-time offence and £500 the second time, while the case is referred to prosecution if the violation is repeated a second time. In Norway, statutory authority for the use of sanctions in the event of infringements of fisheries regulations is given in Chapters 11 and 12 of the Marine Resources Act. Intentional or negligent violations are punished with fines or prison up to one year (§§ 60–63), while infringements committed with gross intent or negligence may be punished with prison up to six years. In the judgment of the seriousness of the infringement, the economic gain of the violation, among other things, is to be taken into consideration (§ 64). Alternatively, catch, gear, vessels or other properties can be confiscated (§ 65). The Norwegian enforcement agencies use a graduated sanctioning system, with sanctions ranging from oral warnings, written warnings and administrative fines to formal prosecution. If the fishers do not accept the fines issued by the enforcement or prosecution authority, the case goes to court. The decision of a lower-level court can then be appealed to higher-level courts. The comprehensive enforcement system (see PI 3.2.3 a)) combined with the high level of compliance (see PI 3.2.3 c)) makes it reasonable to conclude that the system provides effective deterrence. SG100 is met.		
c	Compliance			
	Guide post	Fishers are **generally thought** to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	**Some evidence exists** to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a **high degree of confidence** that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	Met?	Y	Y	N

	Justification	According to Marine Scotland Compliance, the level of compliance is high in the fishery under assessment. In correspondence with the assessment team, they report that there were no enforcement issues with Scottish and UK administered fishing vessels the last couple of years concerning the fisheries under assessment specifically. They have given priority to the fishing areas where catches have been highest, and last-haul analysis inspections have regularly been carried out. All prosecuted cases for the last decade are listed on the website of Marine Scotland Compliance. An average of eight cases have been prosecuted each year for the entire Scottish fisheries sector. The total number of inspections in 2016 was 4,588, so the share of inspections resulting in prosecution is miniscule. Few infringements are of a serious nature. The five cases prosecuted in 2015 were related to the failure to comply with e-log requirements (fined £2,000), failure to submit sales notes (fined £350), retention of skate after a closure (admonished), retention of ling after a closure (fined £4,000) and retention of mackerel after a closure (fined £3,000). As mentioned under SI 3.2.3 a) above, a landing obligation was introduced in the fishery in 2017, and Marine Scotland has a strategy for the use of marine patrol vessel and surveillance aircraft to monitor the discard ban. The enforcement body has also announced that it will initially be pragmatic in its enforcement, recognizing that there needs to be a period of learning and adjustment when the ban takes effect. It is too early to evaluate whether the discard ban will generally will complied with, and it is the opinion of the assessment team that the fishery cannot be 'penalized' in the form of reduced scoring at this point for any future reduction in the general level of compliance. The level of compliance is reported to be high also in Norwegian waters. In 2016, the Norwegian Coast Guard carried out 1569 inspections at sea. 74 inspections (4.7 %) resulted in a fine or prosecution. Under the data exchange arrangements with other states, bilaterally and under the NEAFC control and enforcement scheme, Scottish enforcement authorities have not been informed of any violations committed by the UoA fishers in waters outside EU jurisdiction. As follows from PI 3.2.3 a) and b) above, the fishery has in place a comprehensive system for monitoring, control and surveillance, including physical checks of fishing operations, catch and gear, as well as a fine-meshed sanctioning system. In addition to these coercive compliance mechanism, various forms of norm-, legitimacy- and communication-related mechanisms have proved effective to deliver compliance in other fisheries. In the fishery under assessment, there might be a degree of social control in the relatively small Scottish fishing communities, and the high level of user-group involvement (see PI 3.1.2 above) may provide regulations with a degree of legitimacy that increases fishermen's inclination to comply with them. The same applies to the relationship between fishermen and enforcement officers, which is reported to be good. Inspectors are trained to approach the fishermen in as forthcoming a manner as possible – starting from the position that they are in compliance with regulations – and interfering with the fishing activities as little as possible (see codes of conduct and strategies referenced below). Importantly, they perceive themselves as having a guidance-providing and not only a policing role towards the fishing fleet. The MSC Fisheries Standard does not give any specific guidance as to what level of compliance is required to conclude that fishers 'comply with the management system under assessment'. Nor would that be reasonable since the absence of infringements in inspection statistics might as well imply that inspectors are not competent (or willing) enough to detect non-compliance, or that they focus attention on those parts of the fishery where compliance is highest; cf. the note on risk-based control under SI 3.2.3 a). Hence, compliance statistics can only give an indication, and must be seen in relation to other factors, such as the comprehensiveness of the enforcement system, the legitimacy of the management system as such, assumptions on the reliability of data provided by the enforcement authorities and other anecdotal evidence of compliance. It is the qualitative judgment of the assessment team that the requirement that fishers 'comply with the management system' is met in this fishery – this does not imply that infringements never take place (which is probably not the case in any

		fishery), but that most rules are generally respected. The requirement that fishers provide information of importance to the effective management of the fishery is also met. So the question remains whether fishers are 'generally thought to comply' (required for a 60 score), whether 'some evidence exists' that they comply (required for an 80 score), or whether there is 'a high degree of confidence' that they comply (required for a 100 score). Clearly *some evidence exists*, through statements by Marine Scotland Compliance, so SG 80 is met. However, ICES' assumption about misreporting of cod West of Scotland, and seal predation issues mentioned in section 2.4.2 of the report, raises a level of doubt that leads to the conclusion that there is not necessarily *a high degree of confidence* that fishers generally comply, so SG 100 is not met.		
d	Systematic non-compliance			
	Guide post		There is no evidence of systematic non-compliance.	
	Met?		Y	
	Justification	According to Marine Scotland Compliance and the Norwegian Coast Guard, there is no evidence of systematic non-compliance in the fishery. It is worth noting when asked specifically about the potential area misreporting and seal predation issues mentioned under SI 3.2.3 c) above, MS compliance opinion on claims of misreporting are given in Appendix 10 Marine Scotland Cod misreporting.		
References		Code of conduct: Fishing Vessel Inspections at Sea, Marine Management Organisation and Royal Navy. Code of conduct: Fishing Vessel Inspections in Harbour, Marine Management Organisation and Royal Navy. COMMISSION REGULATION (EC) No 1010/2009 of 22 October 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. COUNCIL REGULATION (EC) No 1224/2009 of 20 November 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. Email correspondence with Marine Scotland Compliance and the Norwegian Coast Guard. Financial Administrative Penalties for Fisheries Offences, Marine Management Organisation. Hønneland, G., Making Fishery Agreements Work, Cheltenham: Edward Elgar, 2013.		

	Marine Management Organisation Compliance and Enforcement Strategy. Marine Resources Act of the Kingdom of Norway,), LOV-2008-06-06-37, 2008. NEAFC Scheme of Control and Enforcement, London: NEAFC, updated as per 9 February 2017 (https://www.neafc.org/scheme). REGULATIONS COMMISSION IMPLEMENTING REGULATION (EU) No 404/2011 of 8 April 2011 laying down detailed rules for the implementation of Council Regulation (EC) No 1224/2009 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy. Website of Marine Scotland Compliance (http://www.gov.scot/Topics/marine/Compliance and http://www.gov.scot/Topics/marine/Sea-Fisheries/discards/demersal). Appendix 10 Marine Scotland Cod misreporting email

OVERALL PERFORMANCE INDICATOR SCORE:	**95**
CONDITION NUMBER (if relevant):	**N/a**

Evaluation Table for PI 3.2.4 – Research plan

PI 3.2.4		The fishery has a research plan that addresses the information needs of management		
Scoring Issue		SG 60	SG 80	SG 100
a	Guide post	Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.
	Met?	Y	Y	N
	Justification	The ICES stock assessment process shows that a comprehensive research plan exists with a strategic approach to P1 aspects. ICES explore ecosystem aspects such as changes to migration patterns (WGNSSK, WGRED, REGNS and others). Further research on P2 and P3 does exist at member state level also to address research needs identified by the Advisory Council identifies. Through ICES, the ACs and FMAC P1 and P2 aspects are addressed in a strategic manner in what equates to a research plan. That plan does provide the management system with timely information in order to achieve P1 and 2 objectives. There is research on P3 issues at the national level in Scotland, which is produced to inform decision in a timely manner, although these are not included in a comprehensive plan, SG 100 is not met.		
b	Guide post	Research results are available to interested parties.	Research results are disseminated to all interested parties in a timely_fashion.	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.
	Met?	Y	Y	Y
	Justification	Research plans and results are presented regularly to the Advisory Councils (NSAC and NWWAC) and are publicly available from the ICES website, as conference presentations and in scientific journals. The SIDI project has partnered with Marine Scotland Science to support industry-funded observer and self-sampling programmes to ensure that scientific information and fishermen's expert knowledge are fully compatible. Marine Scotland actively disseminates research plans and results all interested parties, primarily through emailing		

		lists. A large number of research results are also presented for the wider public and freely available from the Scottish government website. SG100 is met.
References		ICES Working Groups: WGNSSK on the Assessment of Demersal Stocks in the North Sea and Skagerrak; WGRED for Regional Ecosystem Description; REGNS - Regional Ecosystem Study Group for the North Sea. Scotland's Marine Atlas, National Marine Plans, SIDI project. Marine Scotland, Economic Assessment of Scottish North Sea TR2 Vessels. An evaluation of declining North Sea *Nephrops* to the TR2 fleet, July 2013. http://www.gov.scot/Resource/0042/00428417.pdf. Seafish, Quay Issues, 2013 Economics of the UK Fishing Fleet, Key Features. L. Cowie and S. Lawrence, Seafish Report No SR680, 2015.
OVERALL PERFORMANCE INDICATOR SCORE:		**90**
CONDITION NUMBER (if relevant):		**Na**

Evaluation Table for PI 3.2.5 – Monitoring and management performance evaluation

PI 3.2.5		**There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives.** **There is effective and timely review of the fishery-specific management system.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Evaluation coverage			
	Guide post	There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **key** parts of the fishery-specific management system	There are mechanisms in place to evaluate **all** parts of the fishery-specific management system.
	Met?	Y	Y	Y
	Justification	The Scottish system for fisheries management is subject to a number of review mechanisms, covering all major parts of the management system. Marine Scotland – which is the overall fisheries management body in Scotland, responsible for all areas of fisheries management at national level, from science to regulation and enforcement – performs annual reviews of its own work, spanning all areas of the organization's responsibility. Annual reviews are also performed within different parts of the organization for scrutiny at higher levels; for example, Marine Scotland Science submits annual review reports to the Marine Scotland Board. In 2010, an independent panel appointed by the Cabinet Secretary for Rural Affairs and the Environment evaluated the Scottish fisheries sector, including its system of governance. In 2015–2016, a comprehensive review of the performance and structure of Marine Scotland was conducted by the Scottish Government. The views of staff, customers and major stakeholders were sought, including their experience with Marine Scotland's efforts to communicate effectively with stakeholders. Similarly, at UK level, the Prime Minister in 2003 tasked the Strategy Unit with carrying out a review of options for a sustainable UK fishing industry in the medium to long term, published in 2004. The POs were subject to a comprehensive review by Marine Scotland in 2010–2011. The purposes, functioning and impact of the producer organizations were evaluated, including their management of quotas. All these reviews of the national Scottish component of the management system are publicly available on Marine Scotland's website. At EU level, the CFP is reviewed in connection with the major revisions of its basic regulations every tenth year. In addition to internal review processes, an independent evaluation was commissioned by the European Commission ahead of the 2013 reform to assess the CFP from both a natural and social sciences point of view. The scientific component of the fishery under assessment is routinely assessed by ICES, as is the management plan for the fishery under assessment. A larger evaluation of the North Sea management plans for demersal fisheries was performed in 2015 by the Scientific, Technical and Economic Committee for Fisheries (STECF), set up by the		

		European Commission as a scientific expert body. Biological, economic, environmental and social aspects of the management plans were assessed. NEAFC was subject to a comprehensive evaluation in 2014. While it is a principal challenge to claim that absolutetly 'all' parts of a management system are subject to a particular mechanism (here: review), it is the opinion of the assessment team that the plethora of relatively comprehensive, frequent and easily accessible reviews of all major parts of the management system at both national and EU level comes closer to the critaria of 'all' than 'key' parts. From an opposite point of view, we cannot see that there are parts of the management system that can reasonably be expected to be subject to review, for which there are no such mechanisms in place for this fishery. We therefore conclude that SG100 is met.		
b	Internal and/or external review			
	Guide post	The fishery-specific management system is subject to **occasional internal** review.	The fishery-specific management system is subject to **regular internal** and **occasional external** review.	The fishery-specific management system is subject to **regular internal** and **external** review.
	Met?	Y	Y	N
	Justification	As follows from 3.2.5 a), all areas of Marine Scotland's work are subject to regular (annual) internal review. The 2010 evaluation of the Scottish fisheries sector, including its system of governance, is indisputably external as it was carried out by an independent panel. The comprehensive evaluation of Marine Scotland's structure, performance and impact carried out by the Scottish Government in 2015–2016 will arguably also count as external as it was not conducted within the management system as such. A country's Government is part of the implementing branch of government, to which the system for fisheries management is subordinate. Hence, a review performed by the Government is admittedly 'less external' than one by an Auditor General, who acts on behalf of a country's legislature, but in this case the governmental evaluation was carried out without participation by Marine Scotland's staff, other than as stakeholders on a par with a range of other actors within the fishery. The fact that two different and relatively comprehensive external evaluations have been carried out in the seven years since Marine Scotland was established counts as evidence that external reviews of the national management system are performed as frequently as might reasonably be expected. In addition come reviews performed of the UK system, such as the 2004 review by the Prime Minister's Strategy Unit. The international part of the management system is also evaluated both internally and externally with some frequency. As follows from 3.2.5 a) above, the European Commission has commissioned independent evaluations in connection with the general reforms of the CFP, and the management plans are regularly reviewed by ICES and STECFT. The fishery is cleary approaching an SG100 score on this SI, but the apparent lack of an overarching review strategy only warrants an SG80 score at this time.		
References		A Review of Marine Scotland, the Scottish Government, 2016. Evaluation of Management Plans: Evaluation of the Multi-Annual Plan for the North Sea Demersal Stocks, STECF 15/04, 2015. Marine Scotland Annual Review 2014.		

	Marine Scotland Review of Scotting Fish Producers' Organisations: Report and Recommendations. Marine Scotland Science: Annual Report to the the Marine Scotland Board, 2015–2016. Net Benefits: A Sustainable and Profitable Future for UK Fishing, Prime Minister's Strategy Unit, 2004. Report on the Performance Review Panel, NEAFC, 2014. Sissenwein, M. & Symes, D., Reflections on the Common Fisheries Policy: Report to the General Directorate for Fisheries and Maritime Affairs of the European Commission, 2007 The Future of Fisheries Management in Scotland: Report of an Independent Panel, the Scottish Government, 2010.

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

Appendix 2 Conditions

Appendix 2.1 - Existing Conditions:

The following three conditions are open from the current SFSAG haddock assessment following the year 1 Surveillance (see section 3.2 - Previous assessments, for breakdown) and are therefore continued into this expedited assessment. In addition the merger of the SFSAG saithe assessment into this certificate requires the transfer of its three open conditions into this assessment. These three conditions are similar to those of the SFSAG haddock assessment and therefore are merged. Conditions 1 - 3 below are also harmonised against the SFSAG cod assessment. Rationales for conditions 1 and 3 are updated for all UoAs in this assessment based on new data. Note that the milestones for the saithe conditions applicable to UoA 2 are three years ahead of the other UoAs, as the conditions have been open for longer. Therefore UoA 2 (saithe) is identified separately from the other UoAs in these conditions. Milestones already completed for conditions 1 and 3 are in grey text.

Table 40. Condition 1.

Performance Indicator	PI 2.3.1: The UoA meets national and international requirements for the protection of ETP species. The UoA does not hinder recovery of ETP species
Score	75
Original Rationale	<u>Scoring Issue b (SG80)</u>: Direct effects are highly unlikely to create unacceptable impacts to ETP species. *Starry ray*: ICES notes that although the species is widespread in the central and northern North Sea, the survey abundance index has been decreasing continuously since the 1990s (ICES 2015h). ICES advise no targeted fishery and measures to reduce bycatch. In terms of the regulatory requirements, the species is always discarded (according to ICES, recorded landings in total for the whole area of IIa, IIIa and IV are ~300 kg), but according to the PETS data, individuals are usually dead or injured on arrival on board, so it is not clear that the requirement to discard promptly has much effect for this species. Both data sets suggest that interactions are patchy in space and time. The team concluded that since regulatory requirements are being met following ICES advice, direct impacts could be evaluated (qualitatively) as ‘unlikely’ to hinder recovery (SG60 met). It is possible, however, that the fishery could do more, perhaps by evaluating the areas or conditions under which large quantities of the species are caught together, and/or the circumstances in which the individuals are brought on board in good or bad condition – i.e. it was possible to do more to avoid fishing or killing these individuals. On this basis, the team considered that SG80 was not fully met. *Common skate*: ICES evaluates the whole species complex together. For Subarea 4, ICES considers that the species (complex) is depleted, although stock abundance and trends are unknown (survey catch rates are too low to allow an abundance index); advice is the same as for starry ray [10]. For Subareas 6 and 7, according to ICES, there are no robust stock size indicators, but the ‘stock’ is above possible F reference points and below possible B reference points [9]. Nevertheless, analyses of Scottish survey data indicate a possible increase in the proportion of survey hauls catching some common-skate-complex species, although confidence intervals are wide. ICES note that further measures to reduce bycatch would be possible, such as spatial closures, but propose that this should be done as part of a rebuilding plan that takes into account the mixed fisheries context. The trend appears to be in the right

Performance Indicator	PI 2.3.1: The UoA meets national and international requirements for the protection of ETP species. The UoA does not hinder recovery of ETP species
	direction, at least in Subarea 6 which has the majority of interactions (see Table 11). On this basis, the team concluded that it is not likely that the fishery is having major impacts on common skate; SG60 is met. There is, however, insufficient information for the moment to say that SG80 is met.
Revised Rationale from this assessment	Starry ray: ICES notes that although the species is widespread in the central and northern North Sea, the survey abundance index has been decreasing continuously since the 1990s (ICES 2015h). ICES advise no targeted fishery and measures to reduce bycatch. In terms of the regulatory requirements, the species is always discarded (according to ICES, recorded landings in total for the whole area of IIa, IIIa and IV are ~300 kg), but according to the PETS data, individuals are usually dead or injured on arrival on board, so it is not clear that the requirement to discard promptly has much effect for this species. Both data sets suggest that interactions are patchy in space and time. The team concluded that since regulatory requirements are being met following ICES advice, direct impacts could be evaluated (qualitatively) as 'unlikely' to hinder recovery (SG60 met). It is possible, however, that the fishery could do more, perhaps by evaluating the areas or conditions under which large quantities of the species are caught together, and/or the circumstances in which the individuals are brought on board in good or bad condition – i.e. it was possible to do more to avoid fishing or killing these individuals. On this basis, the team considered that SG80 was not fully met. Common skate: ICES evaluates the whole species complex together (Dipturus batis, D. flossada and D. intermedia). For Subarea 4, ICES considers that the species (complex) is depleted, although stock abundance and trends are unknown (survey catch rates are too low to allow an abundance index); advice is the same as for starry ray (ICES 2015b). For Subareas 6 and 7, according to ICES, there are no robust stock size indicators, but the 'stock' is above possible F reference points and below possible B reference points (ICES 2016c). Nevertheless, analyses of Scottish survey data indicate a possible increase in the proportion of survey hauls catching some common-skate-complex species, although confidence intervals are wide. ICES note that further measures to reduce bycatch would be possible, such as spatial closures, but propose that this should be done as part of a rebuilding plan that takes into account the mixed fisheries context. The trend appears to be in the right direction, at least in Subarea 6 which has the majority of interactions (see Table 24). On this basis, the team concluded that it is not likely that the fishery is having major impacts on common skate complex; SG60 is met. There is, however, insufficient information for the moment to say that SG80 is met.
Condition	It needs to be clear that direct effects of the fishery are highly unlikely to create unacceptable impacts on starry ray and common skate
Progress against condition	**UoA 1 (haddock):** from SFSAG haddock year 1 surveillance report: *'The skate and ray id cards are currently being revised, to make sure that are up-to-date in terms of species identification and names. Once this is finished, they will be available both in hard copy and online. Data is collected on discards of skates and rays both via the general discard sampling programme (which continues to expand to cover a wider range of species) and through the PET forms. Data for 2016 are given in the report. The data on discards in this fishery continues to improve year on year.'* **UoA 2 (saithe):** from SFSAG saithe year 3 surveillance report: *'Starry ray has been added to the list of prohibited species in Subarea IV under Council Regulation 2017/127 (see Article 12). This is therefore added to the list*

Performance Indicator	PI 2.3.1: The UoA meets national and international requirements for the protection of ETP species. The UoA does not hinder recovery of ETP species
	of ETP species for the North Sea. PIs 2.3.1-2.3.3 have therefore been rescored for starry ray (Rescoring PI 2.3.1).'
Milestones	**UoA 1 (haddock)** and **UoA 3-5** NOTE this assessment is equal to Year 2 of the milestones: Year 1: Ensure that data collection plan (condition 4) is sufficient to provide an objective basis for evaluating whether bycatch in this fishery leads to 'unacceptable' impacts (Score: 75) Year 2: Data collection (Score: 75) Year 3: Review options for management strategy for starry ray and common skate bycatch reduction (noting that it should provide an objective basis for confidence that it will work). (Score: 75) Year 4: Implement management strategy (Score: 75) Years 5: Demonstrate that there is an objective basis for confidence that the strategy for reducing bycatch of starry ray and common skate from the fishery will work to reduce the bycatch to a level which can be considered to be 'highly unlikely' to create unacceptable impacts. (Score: 80) **UoA 2 (saithe)** NOTE this assessment is equal to Year 4 of the milestones set at time of the SFSAG saithe assessment: Initiate discussion with other organisations e.g. Seafish, with a view to identifying the most appropriate project management method. Distribute identification cards and user manuals. Year 2 - Data collection. Year 3 – Data collection and provisional analysis of Year 2 data Year 4 – Data collection and provisional review of fishery impact Year 5 – Final review of impacts, identification and implementation of actions required.
Client action plan	**UoA 1 (haddock)** and **UoA 3-5** NOTE this assessment is equal to Year 2 of the milestones: Ensure data collection requirements are met under current PET observer programme. Also continue distribution of skate and ray identification cards, to member vessels and request interactions with starry ray and common skate to be logged so that the rate of interactions can be adequately assessed. On the basis of the recorded data, the fishery impact on those species will be assessed and appropriate management actions will be reviewed and implemented as required. Year 1: continue distribution of skate and ray identification cards and reporting instructions. Review data collection requirements to assess fishery impacts on common skate and starry ray and put in place additional data collection measures as required. Year 2: Data collection and provisional review of fishery impact Year 3: Data collection and assessment of fishery impact. Review of management options to reduce fishery impact on starry ray and common skate as required. Determine which management options can provide objective basis for confidence that the strategy – if required - will work. Year 4: Data collection and implementation of management strategy. Year 5: Data collection and final review of impacts and effectiveness management strategy.

Performance Indicator	PI 2.3.1: The UoA meets national and international requirements for the protection of ETP species. The UoA does not hinder recovery of ETP species
	UoA 2 (saithe) NOTE this assessment is equal to Year 4 of the milestones set at time of the SFSAG saithe assessment: Initiate discussion with other organisations e.g. Seafish, with a view to identifying the most appropriate project management method. Distribute identification cards and user manuals. Year 2 - Data collection. Year 3 – Data collection and provisional analysis of Year 2 data Year 4 – Data collection and provisional review of fishery impact Year 5 – Final review of impacts, identification and implementation of actions required.
Consultation on condition	None Required

Table 41. Condition 2.

Performance Indicator	**2.3.2 The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**
Score	75
Original Rationale	Scoring Issue b (SG80): There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved. For the common skate complex and starry ray species, since the measures are aligned with ICES advice, they can be considered 'likely to work'. However, the team did not consider, that there is currently an objective basis for confidence that they will work. This is problematic, in as much as a reduction in bycatch rates could be attributed either to the measures working, or to a reduction in the population. For starry ray, however, the survey index suggests that the overall situation with the population remains of concern, and ICES state that the common skate species are depleted (although they do not provide data). On this basis, SG80 is not met for these species.
Updated rationale based on this assessment	For the common skate complex and starry ray species, since the measures are aligned with ICES advice, they can be considered 'likely to work' (ICES 2015b; ICES 2015h; ICES 2016c). However, the team did not consider, that there is currently an objective basis for confidence that they will work. This is problematic, in as much as a reduction in bycatch rates could be attributed either to the measures working, or to a reduction in the population. For starry ray, however, the survey index suggests that the overall situation with the population remains of concern, and ICES state that the common skate species are depleted (although they do not provide data). On this basis, SG80 is not met for these species.
Condition	There should be an objective basis for confidence that the strategy for common skate and starry ray will work, based on information directly about the fishery and/or the species involved.
Progress against condition	**UoA 1 (haddock):** from SFSAG haddock year 1 surveillance report: '*The PET data is improved relative to previous years (208 trips in 2016), and provides useful information e.g. about the sex ratio and fate of discards (alive vs injured vs dead). The reporting of elasmobranchs in the standard discard data set, provides better data on elasmobranch discards and improves the representativeness of the elasmobranch catch in relation to target stocks.* *It is important to note that interactions with ETP species are by their nature rare events, and therefore problematic in terms of scaling up to fleet level, without very high (unrealistic) levels of sampling. Nevertheless, the data sets available are sufficient to give a qualitative idea of the level of interactions, which given that the stock assessments for both species are also qualitative, is probably sufficient. Furthermore, the data are sufficient for analyses such as the identification of hotspots in time and space or similar, such as suggested by ICES.*' **UoA 2 (saithe):** from SFSAG Saithe year 3 surveillance report: '*In years 1 and 2 the Audit Team noted that there was insufficient data to know if a management plan was required. Data is now much improved (see discussion under Condition 6). The audit team noted, however, the progress has not been made*

Performance Indicator	**2.3.2 The fishery has in place precautionary management strategies designed to:** **• Meet national and international requirements;** **• Ensure the fishery does not pose a risk of serious harm to ETP species;** **• Ensure the fishery does not hinder recovery of ETP species; and** **• Minimise mortality of ETP species.**
	by SFSAG in moving from data collection to data analysis and discussion of management needs and options. For example, data are now available which would allow the evaluation of additional management measures such as seasonal/temporal/spatial closures, which may (or may not) reduce fishery impacts on common skate (IV and VI) and starry ray (IV).'
Milestones	**UoA 1 (haddock)** and **UoA 3-5** NOTE this assessment is equal to Year 2 of the milestones: Year 1: Ensure that data collection plan (condition 4) is sufficient to provide an objective basis for evaluating whether bycatch in this fishery leads to 'unacceptable' impacts (Score: 75) Year 2: Data collection (Score: 75) Year 3: Review options for management strategy for starry ray and common skate bycatch reduction (noting that it should provide an objective basis for confidence that it will work). (Score: 75) Year 4: Implement management strategy (Score: 75) Years 5: Demonstrate that there is an objective basis for confidence that the strategy for reducing bycatch of starry ray and common skate from the fishery will work to reduce the bycatch to a level which can be considered to be 'highly unlikely' to create unacceptable impacts. (Score: 80) **UoA 2 (saithe)** NOTE this assessment is equal to Year 4 of the milestones set at time of the SFSAG saithe assessment: Initiate discussion with other organisations e.g. Seafish, with a view to identifying the most appropriate project management method. Distribute identification cards and user manuals. Year 2 - Data collection. Year 3 – Data collection and provisional analysis of Year 2 data Year 4 – Data collection and provisional review of fishery impact Year 5 – Final review of impacts, identification and implementation of actions required.
Client action plan	**UoA 1 (haddock)** and **UoA 3-5** NOTE this assessment is equal to Year 2 of the milestones: Ensure data collection requirements are met under current PET observer programme. Also continue distribution of skate and ray identification cards, to member vessels and request interactions with starry ray and common skate to be logged so that the rate of interactions can be adequately assessed. On the basis of the recorded data, the fishery impact on those species will be assessed and appropriate management actions will be reviewed and implemented as required. Year 1: continue distribution of skate and ray identification cards and reporting instructions. Review data collection requirements to assess fishery impacts on common skate and starry ray and put in place additional data collection measures as required. Year 2: Data collection and provisional review of fishery impact

Performance Indicator	**2.3.2 The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**
	Year 3: Data collection and assessment of fishery impact. Review of management options to reduce fishery impact on starry ray and common skate as required. Determine which management options can provide objective basis for confidence that the strategy – if required - will work. Year 4: Data collection and implementation of management strategy. Year 5: Data collection and final review of impacts and effectiveness management strategy. **UoA 2 (saithe)** NOTE this assessment is equal to Year 4 of the milestones set at time of the SFSAG saithe assessment: Initiate discussion with other organisations e.g. Seafish, with a view to identifying the most appropriate project management method. Distribute identification cards and user manuals. Year 2 - Data collection. Year 3 – Data collection and provisional analysis of Year 2 data Year 4 – Data collection and provisional review of fishery impact Year 5 – Final review of impacts, identification and implementation of actions required.
Consultation on condition	None Required

Table 42. Condition 3.

Performance Indicator	**2.3.3 Relevant information is collected to support the management of fishery impacts on ETP species, including:** • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**
Score	75
Original Rationale	SIa(80): Sufficient information is available to allow fishery-related mortality and the impact of fishing to be quantitatively estimated for ETP species. Information about interactions with this fishery come from the PET scheme, which covered 47 trips in 2014, and 63 trips in 2015 to September. It is not clear that it is possible to scale these data up to provide estimates for the entire fleet, so estimates of mortality of PET species remain qualitative rather than quantitative. In terms of evaluating stock status for these species, porbeagle has a quantitative stock assessment, grey seal an annual survey, starry ray a survey abundance index and the common skate species nothing. Overall, SG60 is met (qualitative estimate of fishery-related mortality from PET data). SG80 is met for porbeagle, grey seal and starry ray since the overall status or trend in stock status can be evaluated quantitatively, but not for the common skate species. SG100 is not met for any species, because the PET data cannot be scaled up to the whole fleet. Sib (80): Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species. Although the PET data cannot be quantitatively scaled up to the fleet level, it gives an understanding in broad (semi-quantitative) terms of the impact of the fishery on these species, so SG60 is met. For porbeagle, grey seal and starry ray, the population size is tracked directly either via surveys or via a stock assessment, so the status and recovery of these species can be directly evaluated. Therefore SG80 is met for these species. For common skate, however, population trends cannot be measured, and hence it is difficult to evaluate the consequences for the population of the fishery impact. SG80 is not met for the common skate species.
Updated rationale from this assessment	Information about interactions with this fishery comes from observer discard estimates and the PET scheme (see Table 24 and Table 25). Quantitative estimation of impact by gear type (TR1 and TR2 (mean catch per trip) observer data in Table 24 are provided.. Mortality rate information is provided in Table 25 from the PET data, and the PET data for 2016 provides quantitative evidence of impact by gear metier within region by trip quantity. SG60 is met (qualitative estimate of fishery-related mortality from PET and MSS observer data) for all species. For the common skate species and starry ray SG80 is not met because the PET data shows large spatiotemporal variation in catch which would lead to uncertainty in the quantitative estimate when scaled up to the whole fleet. There is not a high degree of confidence which allow SG100 to be met for any species.
Condition	There needs to be sufficient information available such that the impact of this fishery on common skate can be quantitatively estimated, and hence it can be determined whether the fishery may be a threat to the recovery of the common skate complex. This requires, as a minimum, a fleet-wide estimate of bycatch of common skate, as well as some basis by which population-level trends can

Performance Indicator	**2.3.3 Relevant information is collected to support the management of fishery impacts on ETP species, including:** **• Information for the development of the management strategy;** **• Information to assess the effectiveness of the management strategy; and** **• Information to determine the outcome status of ETP species.**
	be evaluated (noting that ICES considers that existing data are insufficient for this purpose).
Progress against condition	**UoA 1 (haddock):** from SFSAG haddock year 1 surveillance report: '*The PET data is improved relative to previous years (208 trips in 2016), and provides useful information e.g. about the sex ratio and fate of discards (alive vs injured vs dead). The reporting of elasmobranchs in the standard discard data set, provides better data on elasmobranch discards and improves the representativeness of the elasmobranch catch in relation to target stocks.* *It is important to note that interactions with ETP species are by their nature rare events, and therefore problematic in terms of scaling up to fleet level, without very high (unrealistic) levels of sampling. Nevertheless, the data sets available are sufficient to give a qualitative idea of the level of interactions, which given that the stock assessments for both species are also qualitative, is probably sufficient. Furthermore, the data are sufficient for analyses such as the identification of hotspots in time and space or similar, such as suggested by ICES.*' **UoA 2 (saithe):** from SFSAG Saithe year 3 surveillance report: '*In years 1 and 2 the Audit Team noted that there was insufficient data to know if a management plan was required. Data is now much improved (see discussion under Condition 6). The audit team noted, however, the progress has not been made by SFSAG in moving from data collection to data analysis and discussion of management needs and options. For example, data are now available which would allow the evaluation of additional management measures such as seasonal/temporal/spatial closures, which may (or may not) reduce fishery impacts on common skate (IV and VI) and starry ray (IV).*'
Milestones	**UoA 1 (haddock)** and **UoA 3-5** NOTE this assessment is equal to Year 2 of the milestones and was harmonised against the condition on SFSAG saithe therefore only has three years of milestones: To be implemented alongside conditions on 2.3.1 and 2.3.2 Year 1 and 2: data collection (Score: 75) Year 3: Analysis of bycatch data demonstrates that the fishery does not pose a threat to the recovery of the common skate complex (Score: 80) **UoA 2 (saithe)** NOTE this assessment is equal to Year 4 of the milestones set at time of the SFSAG saithe assessment: To be implemented alongside conditions on 2.3.1 and 2.3.2 Year 1 – Assessment of data gaps, data collection strategy Year 2 – Start of data collection Years 3 and on – Ongoing data collection, data analysis
Client action plan	**UoA 1 (haddock)** and **UoA 3-5** NOTE this assessment is equal to Year 2 of the milestones: Action plan for conditions 1, 2 and 3: Ensure data collection requirements are met under current PET observer programme. Also continue distribution of

Performance Indicator	**2.3.3 Relevant information is collected to support the management of fishery impacts on ETP species, including:** **• Information for the development of the management strategy;** **• Information to assess the effectiveness of the management strategy; and** **• Information to determine the outcome status of ETP species.**
	skate and ray identification cards, to member vessels and request interactions with starry ray and common skate to be logged so that the rate of interactions can be adequately assessed. On the basis of the recorded data, the fishery impact on those species will be assessed and appropriate management actions will be reviewed and implemented as required. Year 1: continue distribution of skate and ray identification cards and reporting instructions. Review data collection requirements to assess fishery impacts on common skate and starry ray and put in place additional data collection measures as required. Year 2: Data collection and provisional review of fishery impact Year 3: Data collection and assessment of fishery impact. Review of management options to reduce fishery impact on starry ray and common skate as required. Determine which management options can provide objective basis for confidence that the strategy – if required - will work. Year 4: Data collection and implementation of management strategy. Year 5: Data collection and final review of impacts and effectiveness management strategy. **UoA 2 (saithe)** NOTE this assessment is equal to Year 4 of the milestones set at time of the SFSAG saithe assessment: Initiate discussion with other organizations e.g. Seafish, with a view to identifying the most appropriate project management method. Distribute identification cards and user manuals. Year 2 - Data collection. Year 3 – Data collection and provisional analysis of Year 2 data Year 4 – Data collection and provisional review of fishery impact Year 5 – Final review of impacts, identification and implementation of actions required.
Consultation on condition	None Required

Appendix 2.2 - New Conditions

Table 43. Condition 4. UoA 5 (whiting)

Performance Indicator	PI 1.2.1 There is a robust and precautionary harvest strategy in place
Score	70
Rationale	Scoring issue 1.2.1b (SG80) The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives. **UoA 5 (whiting)** The EU-Norway agreement aims to fish the stock at or below F=0.15. F has reduced from 0.69 in 1990 and fluctuated around 0.2 since 2002 showing that the strategy is likely to work and SG60 is met. ICES revised its estimates of natural mortality and this has changed reference points. ICES evaluated the EU-Norway plan with the revised M values as not consistent with the Precautionary Approach unless the plan reduced F when the projected biomass fell below Bpa and therefore SG80 is not met. ICES (2016) advise that further management strategies should be evaluated in view of the uncertainties surrounding the assessment.
Condition	Evaluate and adopt a new harvest strategy that is responsive to the state of the stock and provide evidence that it is achieving its management objectives.
Milestones	Meeting this condition will require the client to encourage the EU and Norway to obtain advice from ICES on an appropriate harvest strategy and control rule for the revised reference points. Managers will need to agree a management plan based on this advice. The anticipated milestones are set out below: Year 1: Evidence that the client is working with ICES, the UK authorities, and the EU to obtain relevant scientific advice on which to base a management plan. Score: 70 Year 2: Evidence that a new management plan has been developed and tested. Score: 70 Year 3: Evidence that the plan has been implemented. Likely resulting PI score SG 80.
Client action plan	Year 1: SFSAG will work through the Scottish / UK authorities to influence ICES and the EU to obtain relevant scientific advice on which to base a management plan. • The Plan will be based on the North Sea Multi Annual Management Plan for the North Sea and Adjacent waters. • In Year 1 the client will work through the Scottish Government to review progress of the plan through the EU Parliamentary process. It is expected that the Plan should be approved by Spring 2018. Year 2: The client group will review the actions from Year one and will reassess the actions required in subsequent years. This will be influenced by any management changes. • SFSAG will work with Scottish / Uk Authorities to influence the development of a management plan and test that it is fit for purpose. • The Multi Annual Plan progress will be a key dependency for this action.

Performance Indicator	PI 1.2.1 There is a robust and precautionary harvest strategy in place
	• The client will review the regulations which result from the approved Multi Annual Plan. Year 3: The client group will review the actions from Year two and will reassess the actions required in subsequent years. This will be influenced by any management changes. SFSAG will work with others to implement the Multi Annual Plan and associated regulations bearing in mind the flux within the political landscape (Brexit).
Consultation on condition	See Appendix 2.3 – Marine Scotland letter of support

Table 44. Condition 5. UoA 3 (plaice)

Performance Indicator	PI 1.2.2 The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing
Score	75
Rationale	Scoring issue 1.2.2a (SG80) 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. **UoA 3 (plaice)** A multiannual plan (EU 2007) has been in place for some time and has been used to adjust fishing mortality rates in response the size of the stock. The stock is well in excess of $MSYB_{trigger}$ and has fluctuated above it for many years. Although the stock assessment area has been revised, F is below F_{MSY} for the combined area. ICES advice now follows their conventional HCR based on the MSY approach. Managers moved towards the new MSY HCR that scales F in response to biomass if it falls below MSYBtrigger. However, while it is expected that a well defined HCR will be in place, this currently does not exist and SG 80 is not met.
Condition	Develop and adopt well-defined harvest control rules that are consistent with the harvest strategy and ensure that exploitation rates are reduced as limit reference points are approached. The HCR should be contained within a new management plan.
Milestones	Meeting this condition will require the client to encourage the EU and Norway to obtain advice from ICES on an appropriate harvest strategy and control rule for the expanded assessment area. Managers will need to agree a management plan based on this advice. The anticipated milestones are set out below: Year 1: Evidence that the client is working with ICES, the UK authorities, and the EU to obtain relevant scientific advice on which to base a management plan. Score: 75 Year 2: Evidence that a new management plan has been developed and tested. Score: 75 Year 3: Evidence that the plan has been implemented. Likely resulting PI score SG 80.
Client action plan	Year 1: SFSAG will work through the Scottish / UK authorities to influence ICES and the EU to obtain relevant scientific advice on which to base a management plan. • The Plan will be based on the North Sea Multi Annual Management Plan for the North Sea and Adjacent waters. • In Year 1 the client will work through the Scottish Government to review progress of the plan through the EU Parliamentary process. It is expected that the Plan should be approved by Spring 2018. Year 2: The client group will review the actions from Year one and will reassess the actions required in subsequent years. This will be influenced by any management changes. • SFSAG will work with Scottish / Uk Authorities to influence the development of a management plan and test that it is fit for purpose. • The Multi Annual Plan progress will be a key dependency for this action.

Performance Indicator	PI 1.2.2 The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing
	• The client will review the regulations which result from the approved Multi Annual Plan. Year 3: The client group will review the actions from Year two and will reassess the actions required in subsequent years. This will be influenced by any management changes. SFSAG will work with others to implement the Multi Annual Plan and associated regulations bearing in mind the flux within the political landscape (Brexit).
Consultation on condition	See Appendix 2.3 – Marine Scotland letter of support

Table 45. Condition 6 – UoA 4 (hake)

Performance Indicator	PI 1.2.2 The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing
Score	75
Rationale	Scoring issue 1.2.2a (SG80) 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. **UoA 4 (hake)** A recovery plan (EU 2004) has been in place for some time and has been used to set fishing mortality rates in response the size of the stock. The stock has recovered both in terms of SSB and F and therefore meets SG60. The harvest rule now followed by ICES to give advice is based on F_{MSY} as the maximum F. This should be reduced linearly when the biomass falls below $MSYB_{trigger}$ and is zero below B_{lim} (ICES 2016d) however as it has not been formally adopted by managers there is uncertainty about the implementation of the rule so SG80 is not met.
Condition	Support work to develop and adopt well-defined harvest control rules that are consistent with the harvest strategy and ensure that exploitation rates are reduced as limit reference points are approached. The HCR should be contained within a long-term management plan.
Milestones	Years 1-2: Support the adoption of well-defined harvest control rules which are consistent with the harvest strategy and ensure that the exploitation rates are reduced as limit reference points are approached. Resulting score: 75 Year 3: Evidence shall be presented that a harvest control rule is being implemented that is consistent with the harvest strategy (i.e. the objective of attaining MSY specified in the EU Common Fisheries Policy or equivalent international agreements) and that would ensure that the exploitation rate is reduced as limit reference points are approached. Resulting score: 80
Client action plan	Years 1-3: SFSAG will work to support the adoption of well-defined harvest control rules which are consistent with the harvest strategy and ensure that the exploitation rates are reduced as limit reference points are approached. • ICES has just received a request form the EU to assess the current distribution of the stock which is viewed to have changed over time. Any movements will depend on the detail and result of this response. Resulting score: 75 Year 4: The client will review the outputs from the previous year and review the actions following on from this/ • SFSAG will work to implement a new management plan which contains well defined harvest control rules that are consistent with the harvest strategy and ensure that the exploitation rates is reduced as limit reference points are approached. This will be dependent on the work being carried out by ICES in year 1-3 Resulting score: 80

Performance Indicator	PI 1.2.2 The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing
	Years 5: No further action required Resulting score: 80
Consultation on condition	See Appendix 2.3 – Marine Scotland letter of support

Table 46. Condition 7 - UoA 5 (Whiting)

Performance Indicator	**PI 1.2.2 The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing**
Score	65
Rationale	Scoring issue 1.2.2c (SG80) Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules. **UoA 5 (Whiting)** The main tools for controlling exploitation are catch limits and restrictions on fleet capacity. In addition there are minimum mesh sizes for the principal fleets (TR1) of 120mm. During the period when the EU-Norway management plan was in operation the fishing mortality was reduced from 0.69 to approximately 0.2. This shows the tools had some success during that period. In the most recent years the management plan has been made obsolete by the revision of the natural mortality values and reference points so there is insufficient evidence available to evaluate SG80 or SG100 until further stock assessments have been carried out.
Condition	The fishery must provide evidence indicating that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rule.
Milestones	Meeting this condition will require that Condition 3 is achieved and that there is progress towards reducing F towards this strategy. The anticipated milestones are set out below: Year 3: Evidence that the plan in Condition 3 has been implemented. Likely resulting PI score: 65 . Year 4: Evidence from stock assessment that F is at or below the F_{MSY} reference point. Likely resulting PI score: 80
Client action plan	Meeting this condition will require that Condition 3 is achieved and that there is progress towards reducing F towards this strategy. The anticipated milestones are set out below: Year 3: Refer to condition 3 to show that a plan has been implemented. Year 4: Refer to stock assessment that F is at or below the F_{MSY} reference point.
Consultation on condition	See Appendix 2.3 – Marine Scotland letter of support

Table 47. Condition 8. UoAs 1, 2 and 4 (haddock, saithe and hake)

Performance Indicator	PI 2.1.1. 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
Score	75
Rationale	Scoring Issue c (SG80): If main retained species are 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. For *W. Scotland cod*: W. Scotland cod: This is managed under a long-term management plan (EU 2008a) modified in 2016 (EU 2016c). The TAC is set to zero, there are limits on landing bycatch (maximum 1.5% live weight of landings) and limits on effort. Most of the catch is discarded, and considerable efforts have been made in recent years to reduce discards by improving selectivity (e.g. under the Conservation Credits Scheme and subsequently as a consequence of the Landing Obligation). The issues around evaluating sources of mortality on this stock are reviewed in detail in Section 3.4.2. Whatever the source of mortality, an analysis by Cook & Trijoulet (2016) suggest that at current (2013) mortality levels, the stock has a reasonable (~85%) chance of increasing in the next five years (Section 3.4.2, Figure 12), but also that relatively small proportional increases in mortality (from whatever source) increase the chances of further decline. ICES, unfortunately, has not attempted any short-term projections of stock status in recent years (ICES 2016w; ICES 2015g; ICES 2015f). Grey seals may be an important source of mortality (ICES 2017a; Cook et al. 2015; Cook & Trijoulet 2016) but grey seal biomass on the W. coast appears to be relatively stable (see 3.4.2). It is therefore important that fishing mortality on the stock does not increase. ICES estimate that it is high but stable or declining (Figure 9), while Cook and Trijoulet (2015) estimate that it is lower (seals providing the 'missing' mortality) but potentially increasing (Figure 11). ICES account for the 'missing' mortality by assuming systematic area misreporting (Section 3.4.2), but Marine Scotland Compliance do not consider area misreporting to be a major source of error in the catch figures, and do not accept the way that compliance data have been used by ICES (Section 3.4.2). The team found the Marine Scotland Compliance argument persuasive that fishing mortality is actually a lower proportion of total mortality than estimated by ICES. Given the EU technical measures in place for this stock (gear size regulations, TAC and minimum conservation reference sizes), coupled with the low but stable SSB and the uncertainty in natural mortality contribution the team concluded that there was sufficient evidence that the measures in place are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species therefore SG60 is met. Management is not, however, so far 'demonstrably effective' – SG80 is not met.
Condition	By year 4 the partial strategy for W. Scotland cod must be demonstrably effective at achieving recovery and rebuilding of the stock to appropriate and realistic rebuilding target levels defined by the relevant stock model.
Milestones	Year 1 – Work with Marine Scotland to re-evaluate appropriate reference points and fishing mortality rates for W. Scotland cod, as required. Score 75 Year 2 – Evaluate fishing mortality in relation to levels required to meet targets; if required, set out options for reduction. Score 75 Year 3 – Review and agree options for reduction of fishing mortality if required. Score 75

Performance Indicator	**PI 2.1.1. 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**
	Year 4 – Implement reductions in fishing mortality; fishing mortality at appropriate levels to allow rebuilding of the stock to agreed target levels. Score 80
Client action plan	Year 1 West of Scotland Cod is included in the North Sea Mutli annual plan and Adjacent seas. • The Plan is currently progressing though the EU Parliamantary process and it is expected to be adopted by Spring 2018. Year 2 There will be a review of the previous year taking account of any changes as a result of the current political situation. In years 3-4 the client will work with the relevant authorites to review the regulation coming out from the Multi Annual Plan and work with the Scottish Government in the implementation and reach agreement to reduce fishing mortality inline with required targets.
Consultation on condition	See Appendix 2.3 – Marine Scotland letter of support

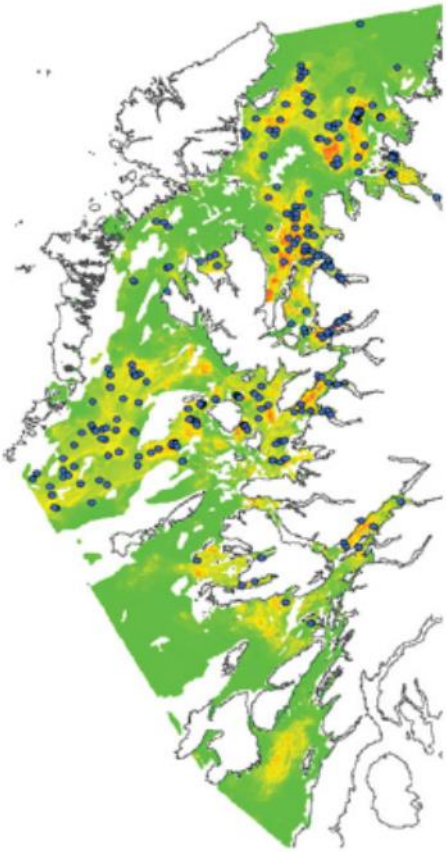
Table 48. Condition 9. UoAs 1, 2 and 4 (haddock, saithe and hake)

Performance Indicator	2.1.2 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
Score	75
Rationale	Scoring Issue b (SG80): 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. W. Scotland cod: A detailed analysis of the stock status and projections for WS cod is given in Section 2.4.2, as well as in the rationale for 2.1.1. Further comments are given in the response to peer reviewer 1. There is evidence of stock rebuilding, giving an objective basis for confidence that the strategy is working. For W. Scotland cod, the strategy is not working to rebuild the stock, but projections indicate that they have a reasonable probability of doing so; see 2.1.1c. SG60 is met. There is, however, so far no evidence of rebuilding, and considerable uncertainties remain as to the key sources of mortality on the stock (see Section 2.4.2). Furthermore, Trijoulet et al. (2017) suggests that based on the hypothesis of significant seal predation, MSY reference points will need to be reconsidered, with both F_{MSY} and MSY estimates too high at present (i.e. rebuilding targets may not be realistic based on current seal populations). SG80 is not met.
Condition	By year 4 there needs to be an objective basis for confidence that the strategy for rebuilding the W. Scotland cod stock will work, based on information about the stock and/or fishery.
Milestones	Year 1 – Work with Marine Scotland to re-evaluate appropriate reference points and fishing mortality rates for W. Scotland cod, as required. Score 75 Year 2 – Evaluate fishing mortality in relation to levels required to meet targets; if required, set out options for reduction. Score 75 Year 3 – Review and agree options for reduction of fishing mortality if required. Score 75 Year 4 – Implement reductions in fishing mortality; levels of fishing mortality provide an objective basis for concluding that the strategy will allow the stock to recover. Score 80
Client action plan	Year 1 – SFSAG will work with Marine Scotland to re-evaluate appropriate reference points and fishing mortality rates for W. Scotland cod, as required. This will be the result of the Multi Annual Plan for the North Sea and Adjacent waters in which West of Scotland Cod is included. It is expected that the Plan will be adopted in Spring 2018. Year 2 – The client group will review the actions from Year 1 and will reassess the actions required in subsequent years. This will be influenced by any management changes. SFSAG will work with Marine Scotland to evaluate fishing mortality in relation to levels required to meet targets; if required, set out options for reduction. This will be dependent on the adoption of the Multi Annual Plan and resultant regulations.

Performance Indicator	2.1.2 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
	Year 3 – The client group will review the actions from Year 2 and will reassess the actions required in subsequent years. This will be influenced by any management changes Based on the outputs of the previous two years the client will work with Marine Scotland to review and agree options for reduction of fishing mortality. Year 4 – The client group will review the actions from year 3 and will reassess the actions required in subsequent years. This will be influenced by any management changes SFSAG will work with Marine Scotland to implement reductions in fishing mortality; levels of fishing mortality and provide an objective basis for concluding that the strategy will allow the stock to recover.
Consultation on condition	See Appendix 2.3 – Marine Scotland letter of support

Table 49. Condition 10. UoA 1, 2 and 4 (haddock, saithe and hake)

Performance Indicator	PI 2.4.1a The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function
Score	75
Rationale	Scoring Issue a (SG80): The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. **ALL UoA** Burrowed mud: Burrowed mud is typical *Nephrops* habitat, of which the largest areas overlapping this fishery are the *Nephrops* FUs listed in Table 22. The key feature of this habitat potentially at risk from demersal fishing is seapens. The most abundant seapen species in these areas are *Pennatula phosphorea* and *Virgulana mirabilis*, both of which can retract as a response to disturbance and hence are not considered particularly vulnerable to demersal fisheries (MS 2017b), but the rare tall seapen (*Funiculina quadrangularis*) also occurs – this species cannot retract so is more vulnerable. We take this species as a proxy for the vulnerable element of this habitat. The only records from the North Sea are from the Fladen Ground (although it may have been more widespread in the past). The area with *F. quadrangularis* records in the Fladen Ground is proposed by Marine Scotland to be closed to demersal mobile gears (management proposal for Northern North Sea MPAs and SACs; (MS 2017b; MS 2017a) and in the meantime, SFSAG has in place a voluntary closure, monitored by Marine Scotland Compliance (see Appendix 7 Details of SFSAG voluntary closure in the Fladen Ground this has been extracted from MEC (2017)). The species seems to be relatively extensive on the west coast (see figure below). From the west coast, It is particularly extensive most records are from in sealochs; it is abundant in particularly Loch Sunart, Loch Teacuis, Loch Duich, Loch A Chairn Bhain and Loch Seaforth; these are not areas where this fishery would operate, and in any case several are closed to demersal mobile gears (e.g. Loch Sunart, Loch Duich and others). There are reportedly 'scattered records' from the Firth of Clyde. Further oOffshore it is also known from the Hatton Bank, which is not part of the UoA. It is thought to occur down to ~2000m (Ager 2003); if this is the case its distribution would presumably extent well offshore on the west coast, away from areas which are trawled (maximum trawling depth ~~800m, max. depth of this fishery ~~400m).

Performance Indicator	PI 2.4.1a The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function
	Funiculina quadrangularis  **Presence of F. quadrangularis on the west coast from surveys (dots), in relation to modelled habitat suitability (colour coding). Source** Greathead et al. (2015)**.** *Direct information about any impacts on seapens from the UoA is limited. Marine Scotland have an online database cross-referencing the impact of all kinds of activities on all the various habitat features; based apparently on a literature review (see* http://www.marine.scotland.gov.uk/FEAST/FeatureReport.aspx#0). *In relation to towed demersal gear (select 'search by feature' → 'habitats' → burrowed mud → select all types of activities and scroll down to 'surface abrasion'), Marine Scotland state the following [MEC comments in square brackets]:Damage to seapen species is likely to take place as a result of greater sediment disturbance as a result of towed demersal gear. However, experimental studies have shown that all three species of seapen can re-anchor themselves in the sediment if dislodged by fishing gear* (Eno et al. 1996). *Eno et al. (1996) found that even if damaged* Funiculina quadrangularis *appeared to remain functional and this could also be true of the other sea pens. However, the apparent absence of* Funiculina *from open-coast* Nephrops *grounds may be a consequence of its susceptibility to trawl damage (D.W. Connor, pers. comm. In* Hughes (1998)*)* [it does not specify where these are]. *In long term experimental trawling* Tuck et al. (1998) *found no effect on* Virgularia mirabilis *populations and* Kinnear et al. (1996) *found that sea pens were quite resilient to being smothered, dragged or uprooted by creels. Trawling disturbance*

Performance Indicator	PI 2.4.1a The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function
	resulted in reduced species diversity and a disproportionate increase in the abundance of a few dominant species. The short term effects on epifauna recovered 6 months after trawling fishing ceased. No long-term effects on the total number of species or individuals were detected, but individual species did show effects, notably an increase in the density of Ophiura *sp. and a decrease in numbers of the fish* Hippoglossoides platessoides [American plaice] *and the whelk* Buccinum undatum*. Other authors have also suggested that increases in echinoderm populations in the North Sea are associated with fishing disturbance* (Lindley et al. 1995). On the west coast, a percentage of the populations are in sea lochs; i.e. not in areas typically used by vessels in the UoA; some of them are closed to demersal towed gears in SACs and/or MPAs, while some are not (although the team has not investigated areas closed to towed gears in arrangements for allowing potting and creeling). The population also extends significantly deeper than the maximum depth of trawling, but the size of this deep-water population component is not known. The sealoch populations appear to be healthy (they are reported as 'dense' in many areas), the offshore population is unimpacted, but populations in the Minch and Firth of Clyde may be impacted by fishing. Fishing does not appear to extirpate populations, according to the information above, but presumably causes some damage. Estimating that one third of *F. quadrangularis* populations are in untrawled areas (sealochs and closed areas), one third are deep and one third are vulnerable to trawling, and that trawling causes ~20% damage in the short term and 50% in the long term, this would lead to an overall estimate of damage of ~~7% in the short term and 17% in the long term. Several of the offshore MPAs aim to protect this habitat among others (e.g. NE Faroe-Shetland Channel, Geikie Slide and Hebridean Slope, Barra Fan and Hebridean Terrace Seamount); they are designated and management has been proposed which protects most of the burrowed mud areas from mobile demersal gears (Table 29) but is not yet in place. In the North Sea, the only known records of *Funiculina* (in the Fladen Ground MPA) are covered by a voluntary closure (see Appendix 7 Details of SFSAG voluntary closure in the Fladen Ground this has been extracted from MEC (2017)). On this basis then the team concluded that it is 'unlikely' that the UoA will reduce the structure and function of this element to the point of serious or irreversible harm (defined as damage of 20% or greater) but not 'highly unlikely'. SG60 is met. SG80 will be met by the implementation of the proposed management measures on the W. coast (see Table 29).
Condition	The fishery should show that it is highly unlikely to reduce structure and function of burrowed mud with seapen habitat on the west coast (as defined by records of the tall seapen *Funiculina quadrangularis*) to a point where there would be serious or irreversible harm. Serious or irreversible harm is defined as a reduction in habitat distribution of 20 % or more relative to baseline (currently-defined) levels.
Milestones	Year 1 – Collaborate with the relevant authority for the development of the western waters MPAs management plan. Year 2 – Finalise and agree management measures for western waters MPAs, or evaluate options for other protected measures for tall seapens. Score 80 Year 3 – Implement management of MPAs, or other management options. Score 80

Performance Indicator	PI 2.4.1a The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function
Client action plan	Year 1 - 3 – SFSAG will work with Marine Scotland, SNH and JNCC to finalise and agree management measures for western waters MPAs or evaluate options for other protected measures for tall seapens. Noting that the timetable for the former is driven by the relevant authorities. Thirty Marine Protected Areas (MPAs) were designated in Scotland's seas on 24 July 2014; 17 of these MPAs fall under the Marine (Scotland) Act 2010 in inshore waters. In line with EU legislation, suitable management measures must be implemented at each site to conserve the protected features. The 17 inshore MPAs and 22 Special Areas of Conservation (SACs) were split into two groups to allow for phased implementation of management measures. Following consultation and further opportunities for representations, the areas from Phase 1 now have additional management in the form of either a Marine Conservation Order or an Inshore Fisheries Order. The process by which these Orders have been laid is available here; http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/MPAMGT/protectedareasmgt For all of the areas consulted on in Phase 1, Fisheries Management measures are in place. For the Small Isles Area, further consultation is ongoing with local communities and a final decision on fisheries management measures is expected very soon. Marine Scotland are actively developing a Monitoring Strategy for the MPA Network, details of which were published on 20 June 2017 and are available at; http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/MPAmonitoring Year 2 -3 - Phase 2 of the consultation is well underway with proposals for fisheries management measures having been developed through extensive stakeholder discussion. The outcomes of these deliberations are to be subject to a Public Consultation, expected to commence early 2018. However, none of the designated areas have been identified for protection of burrowed mud or tall seapen. Offshore MPAs Proposals have been developed for Offshore MPAs in Scottish Waters and process of putting fisheries management measures in place is well advanced, although subject to agreement from the European Commission. Only two of these areas have Deep Burrowed Mud or Offshore Deep Sea Mud as protected features. The process and state of play is outlined at: http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/SACmanagement Details of the fisheries management proposals are outlined at; http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/SACmanagement/Offshore2017 Year 4 – SFSAG will work with the relevant stakeholders to implement management of MPAs. Score 80.

Performance Indicator	PI 2.4.1a The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function
Consultation on condition	See Appendix 2.3 – Marine Scotland letter of support

Table 50. Condition 11. UoA 1, 2 and 4 (haddock, saithe and hake)

Performance Indicator	PI 2.4.2. There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types
Score	75
Rationale	<u>Scoring Issue b SG80</u>: There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved. It is estimated that overall ~30 % of the seapen habitat area remains open to fishing. These open areas are near to proposed MPAs and given this distribution of the habitat patches around the MPAs, the potential for the re-population of impacted areas is high as sea pens are fecund and their larvae are likely to be highly dispersive (Greathead et al. 2015). On this basis its plausible that the measures in place likely to work in preventing serious and irreversible harm and should be considered a partial strategy. However, MSC sets a limit of 20% for 'serious or irreversible harm' so if there were heavy impacts in the areas open to fishing, this limit could be exceeded so there is not a clear guarantee (an objective basis for confidence). On this basis, SG60 is met but SG80 is not met.
Condition	The fishery should show that there is an objective basis for confidence that the partial strategy in place for seapens (*Funiculina quadrangularis*) on the W. coast is likely to work, in terms of achieving outcome score 80 or above for 2.4.1.
Milestones	Year 1 – Collaborate with the relevant authority for the development of the western waters MPAs management plan. Year 2 – Finalise and agree management measures for western waters MPAs, or evaluate options for other protected measures for tall seapens. Score 80 Year 3 – Implement management of MPAs, or other management options. Score 80
Client action plan	Year 1 - 3 – SFSAG will work with Marine Scotland, SNH and JNCC to finalise and agree management measures for western waters MPAs or evaluate options for other protected measures for tall seapens. Noting that the timetable for the former is driven by the relevant authorities. Thirty Marine Protected Areas (MPAs) were designated in Scotland's seas on 24 July 2014; 17 of these MPAs fall under the Marine (Scotland) Act 2010 in inshore waters. In line with EU legislation, suitable management measures must be implemented at each site to conserve the protected features. The 17 inshore MPAs and 22 Special Areas of Conservation (SACs) were split into two groups to allow for phased implementation of management measures. Following consultation and further opportunities for representations, the areas from Phase 1 now have additional management in the form of either a Marine

Performance Indicator	**PI 2.4.2. There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types**
	Conservation Order or an Inshore Fisheries Order. The process by which these Orders have been laid is available here; http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/MPAMGT/protectedareasmgt For all of the areas consulted on in Phase 1, Fisheries Management measures are in place. For the Small Isles Area, further consultation is ongoing with local communities and a final decision on fisheries management measures is expected very soon. Marine Scotland are actively developing a Monitoring Strategy for the MPA Network, details of which were published on 20 June 2017 and are available at; http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/MPAmonitoring Year 2 -3 - Phase 2 of the consultation is well underway with proposals for fisheries management measures having been developed through extensive stakeholder discussion. The outcomes of these deliberations are to be subject to a Public Consultation, expected to commence early 2018. However, none of the designated areas have been identified for protection of burrowed mud or tall seapen. Offshore MPAs Proposals have been developed for Offshore MPAs in Scottish Waters and process of putting fisheries management measures in place is well advanced, although subject to agreement from the European Commission. Only two of these areas have Deep Burrowed Mud or Offshore Deep Sea Mud as protected features. The process and state of play is outlined at: http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/SACmanagement Details of the fisheries management proposals are outlined at; http://www.gov.scot/Topics/marine/marine-environment/mpanetwork/SACmanagement/Offshore2017 Year 4 – SFSAG will work with the relevant stakeholders to implement management of MPAs. Score 80.
Consultation on condition	See Appendix 2.3 – Marine Scotland letter of support

Appendix 2.3 – Marine Scotland letter of support

marine scotland

Scottish Government
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E: Allan.gibb@gov.scot

Mike Park
Scottish Fisheries Sustainable Accrediatation Group
(SFSAG)
mike@swfpa.com

20 November 2017

Dear Mike,

The Scottish Government encourages eco-labelling schemes and recognises that these have a valuable role to play in the promotion of sustainable fisheries and fish consumption. We therefore welcome the work of SFSAG in facilitating a number of key Scottish fisheries in becoming MSC certified, including your current work on North Sea haddock and associated fisheries.

I am aware that the assessment for this fishery has a number of conditions attached. Marine Scotland will of course, when appropriate and the outcome is deliverable, endeavour to assist SFSAG with these.

I believe there are a number of approaches that will facilitate this, including; ensuring that relevant data is collected thought the continued joint work of Marine Scotland, SFSAG and Scottish Fishermen's Federation under the independent on-board observer scheme.

At the earliest convenience Marine Scotland will liaise with relevant parties, through the various forums, to seek development of appropriate management plans or the re-evaluation of lapsed plans, for each individual stock.

As we move closer to 2019 and the full implementation of the landing obligation, Marine Scotland will continue to support industry and work towards reducing discards, alleviate choke species risks and ensure the sustainable and rationale utilisation of fish stocks. For example, in the conditions specific mention is given to West of Scotland cod. This is one of Scotland's most significant choke challenges under the landing obligation. Going forward Marine Scotland will continue to work with industry and other relevant parties to ensure plans

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are in place that aid stock recovery, using simple and manageable solutions which enable fishing to continue but control fishing mortality.

The Marine Environment team will continue to work on Scotland's Marine Protected Areas, liaising with stakeholders as appropriate. The protection of endangered, threatened and protected species is of great importance to the Scottish Government. We are committed to continual assessment of the need for unilateral measures by our fleet in the waters that they operate if that is deemed necessary and appropriate to secure and enhance our sustainable and responsible fishing footprint.

Regards

Appendix 3 Peer Review Reports

Peer Review 1

Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**CAB Response**
Justification**:** Overall, yes, but I have some concerns about some information included and a few of the scorings.		The concerns outlined here have been addressed by the assessment team under the individual PIs.

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? ***[Reference: FCR 7.11.1 and sub-clauses]***	**Yes**	**CAB Response**
Justification: Yes		No response required

Do you think the client action plan is sufficient to close the conditions raised? ***[Reference FCR 7.11.2-7.11.3 and sub-clauses]***	**Yes**	**CAB Response**
Justification: Mostly yes, but I have concerns about a few of them, and some of them mostly require action from policy makers, which may be hard influence.		The client represents the entire Scottish demersal fleet and have strong lobbying capacity with the UK authorities.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.1.1	Yes	Yes	NA		No response required
1.1.2	Yes	Yes	NA		No response required
1.2.1	Yes	Yes	Yes, it could work but it is ambitious to expect to influence EU wide decisions.		No response required
1.2.2	Yes	Yes	Yes, it could work but it is ambitious to expect to influence EU wide decisions.		No response required
1.2.3	Yes	Yes	NA		No response required
1.2.4	Yes	Yes	NA		No response required

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.1.1	Yes	Yes	Yes		No response required
2.1.2	Yes	Yes	Yes, although 'Implement reductions in fishing mortality' sounds a lot easier that it will be.		No response required
2.1.3	Yes	Yes	NA		No response required
2.2.1	Yes	Yes	NA		No response required
2.2.2	Yes	Yes	NA		No response required
2.2.3	Yes	Yes	NA		No response required

2.3.1	No, here and rest of 2.3	Yes	No. The plan will achieve a better estimate of the numbers caught, but not necessarily a better estimate of the impact, for which an estimate of F is needed.	Basking shark is not included here as an ETP species, and I do not understand why not. It is similar to Greenland sharks in many aspects, and has also been recorded caught once just like the Greenland shark, and I see no reason why not to include it here.	Basking shark's omission from the scoring rationale has been noted as an oversight on the team's part and this has been revised with Basking Shark added as a scoring element through 2.3 PI's. Given the single incident of capture the scoring is not revised. The CAP set out by the client seeks to reduce bycatch of the fleet by development of a comprehensive management strategy. This management strategy will also include the estimate of fleet effects on numbers of skate caught including discard survival. The PI does not ask for the impact in relation to F. In order to reach SG80 for this PI the effects of the fishery must be known and highly likely to be within limits. Highly likely is set at 80th percentile by MSC (table SA9 of FCR 2.0). More comprehensive information provided through the management strategy should increase confidence that the fishery is not having a significant effect. Furthermore, the fleet wise estimation of catch may be used by MSS and ICES to further develop stock size indicators.
2.3.2	Yes	Yes	No. The plan will achieve a better estimate of the numbers caught, but not necessarily a better estimate of the impact, for which an estimate of F is needed.		No comments required for Justification. See comment in 2.3.1 above for CAP appropriateness.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.3.3	No	Yes	NA		No response required
2.4.1	No	No	It could work but the UoC has relatively little influence on what is achieved and on what time-scales. They could implement a series of voluntary closed area in the mean time like on the Fladen Ground.	I am not convinced by the way VMEs are defined in the main report. If a VME occurs in the fished area and the target species occurs in that habitat, it should be classified as a VME. Evaluating the impact and overlap with the fishery is a separate step. I do not understand where the 20% overlap criteria comes from, and why it would make sense. Even if a VME occurs widely outside the fished area and the UoA, if it occurs in the fished area it is still a VME, while in the reasoning of the report it somehow stops to be a VME if is occurs widely elsewhere (e.g. deep sea sponges). I therefore do no agree with the exclusion of deep sea sponges, maerl, flame shells, Offshore deep-sea muds with bivalves and polychaetes and Heart cockle aggregations. They occur in the fished area and should therefore be	Your point is taken, but the problem is that for every VME that is identified, in 2.4.2 MSC requires a minimum level of management to be in place for a pass at SG60. It is therefore extremely difficult to score VMEs that are present in the general area of the fishery (i.e. around Scotland) but overlap with the fishing activity negligibly or not at all; there is a requirement in the standard for management measures which are i) not likely to be in place and ii) not really contributing to the sustainability of the fishery anyway. Hence, pragmatically speaking, it is better to first define a list of VMEs where there is a genuine overlap and hence a clear management requirement. The 20% overlap criteria comes from GSA 3.14.2.1.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	**CAB Response**
				evaluated as a VME. The conclusion when evaluated may well be that there is little overlap with the fishery. The definition of deep burrowed muds uses the presence of *Funiculina* to define these habitats, but not the other species of seapens that occur here (*Virgularia* and *Pennatula*). I do not agree with this definition, it underestimates the extent of this habitat. The evidence to support a lack of vulnerability of the other seapen species is not strong enough to build such conclusions on, and they should be included in the assessment. The Eno et al. study is a report about traps, not trawls, and I cannot access it, but it is hardly the type of source to base such a strong conclusion on. The effect of a trawl vs. a pot is likely to be very different.	The approach follows the one taken by Marine Scotland, in consultation with JNCC (see management proposal, detailed annexes and audit document, citations 'MS 2017x' in rationale); they provide a fairly extensive rationale for this approach, if you follow the chain of documents from initial habitat identification through proposals for designation, consultations etc. In the 2017 MS audit document, it is acknowledged that the approach will not eliminate risk to the habitat; but MSC are not asking for zero risk; they are asking for a risk of 'highly unlikely' (quantified by them as 20 % probability or less) of 'serious or irreversible harm, which is very different.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	**CAB Response**
				The evidence for a lack of an effect of otter trawls on *Artica* populations is weak, it is a 17 year old paper that did not attempt to evaluate the effect of trawling. Plausible argument would justify concluding that otter trawls will kill a fraction of *Arctica* (6% for otter trawls for benthos in general in Hiddink et al 2017, PNAS), and that killing even a very small fracitons of animals that routinely live to >100 yrs is going to severely affect their population size. Even very low mortality rates, for example by the doors, can extirpate organisms that live as long as *Arctica*. This needs a much more rigorous and at least semi-quantitative	The Eno report features only as part of a direct quotation from the Marine Scotland document; it can be accessed here https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/1309r03b94076.pdf It is included in the reference list for completeness. We did as you suggested and looked at the stock assessment for US commercial fisheries of Arctica, aka ocean quahogs (see NEFSC, 2017). The assessment uses SS3 and is based on commercial CPUE and a NOAA trawl survey. Their approach in terms of incidental mortality is to include it independent of discards (which are assumed to be zero). (The source of the incidental mortality is not specified, but presumably it is those damaged but left in situ, i.e. what concerns us here.) They estimate it by adding a supplementary 5 % to landings, which

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	**CAB Response**
				analysis. It wouldn't be called a VME if it was not vulnerable. More robust evidence might be obtained by evaluating the targeted fisheries for *Arctica* of the NE USA.	is presumably somewhat arbitrary, but does not suggest that they consider it to be a major issue. Bear in mind also that this is a fishery that targets quahogs – in fact from the picture on the website below, it looks like a dredge fishery not a trawl, from which would you expect incidental mortality to be higher than in this fishery in Scotland. Their estimated F from this directed fishery currently (2016 last year of assessment time series) is 0.005 (Fthreshold (Fpa) = 0.019). I haven't worked out quantitatively what this would imply in terms of F for 5% of this level of removals (i.e. incidental only), but it's not much. Furthermore, the time series for SSB and F seems stable, despite the fact that the fishing area for quahogs (Georges Bank to Southern VA with the centre off Long Islang, 40-100m) is also extensively trawled for groundfish and other species. So in other words, the team is encouraged by this review to think that the current analysis is appropriate. The rationale has

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				Modiolus: does the fishery operate in the SAC or not? This is ambiguous and important.	been expanded to consider the information above. https://www.fishwatch.gov/profiles/ocean-quahog (NEFSC 2017) This is an excellent point which we should not have assumed. The answer, as it turns out, is that there is no management in place to stop them from doing so, at present; but the proposed management plan would close the area to a whole suite of gears, including those in this assessment (Kenny Coull, SWFPA, pers. comm.). The *Modiolus* beds, however, turn out to be very close inshore (see Figure 23 at the end of this review; the *Modiolus* are the red squares and red circles). There are no commercial vessels operating in this area as you would expect given the bathymetry. The rationale has been changed accordingly.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.4.2	Yes	No	NA	30% of Funiculina habitats is open to fishing W of Scotland and no strategy is in place to reduce this impact. These are among the most intensily fished areas in NW Europe. I do not consider this an effective strategy that is likely to work. There is a plan for this under the condition for 2.4.1 that should work. All Arctica habitat is open to fishing, otter trawling is likely to have an effect, with no strategy in place to reduce this impact. I do not consider this an affective strategy that is likely to work.	The rationales and scoring have been expanded and changed (partial strategy but insufficient; score reduced to 75). This PI has had a condition added, which is the same as the condition for 2.4.1 as the reviewer notes.
2.4.3	Yes	No	NA	My comments above indicate that I think the inferences about the impact of the fishery on Arctica and sea pens in not sufficient, as I think the assessment is overly optimisitic. This gap means that the data is not sufficient, and should not be scored at SG80.	See response to 2.4.1; the basis for these analyses is now been signifcantly improved.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.5.1	Yes	Yes	NA		No response required
2.5.2	Yes	Yes	NA		No response required
2.5.3	Yes	Yes	NA		No response required
3.1.1	No	Yes		What about the haddock UoA, this is not mentioned in the justification? Surely it has to.	Haddock is not rescored on this PI as part of the expedited audit as detailed in Table 1. There are no changes from the last certification cycle therefore none required (MEC 2016).
3.1.2	Yes	Yes	NA		No response required
3.1.3	Yes	Yes	NA		No response required
3.1.4	Yes	Yes	NA		No response required
3.2.1	Yes	Yes	NA		No response required

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.2.2	No	Yes	NA	I would like to see a table comparing TACs with ICES recommendations. This would make it much easier to assess how well the decision making is at achieving P1 objectives and therefore judge P3.	This data table has been added to the report (Table 7) and clearly shows that TACs have been set in line with ICES advice for the stocks since 2014.
3.2.3	No	No	NA	The report mentions that ICES has assumed considerable misreporting of cod W of Scotland, and although MS disputes this, it does raise a reasonable doubt. SG100 is not satisfied in my opinion.	The discussion on the misreporting issue of West Scotland cod has been greatly expanded and explained in the report to provide the reader with a clearer image of the issue. MSS compliance have informed the team that they consider the ICES use of their data (the source of the misreporting) inappropriate a copy of this is provided in Appendix 10 Marine Scotland Cod misreporting. The team are content that the original score holds.
3.2.4	Yes	Yes	NA		No response required
3.2.5	Yes	Yes	NA		No response required

General Comments from Peer Reviewer 1:

Overall, this is a well prepared and detailed report, and I am happy with its overall conclusions, even though I have several reservations as specified above.

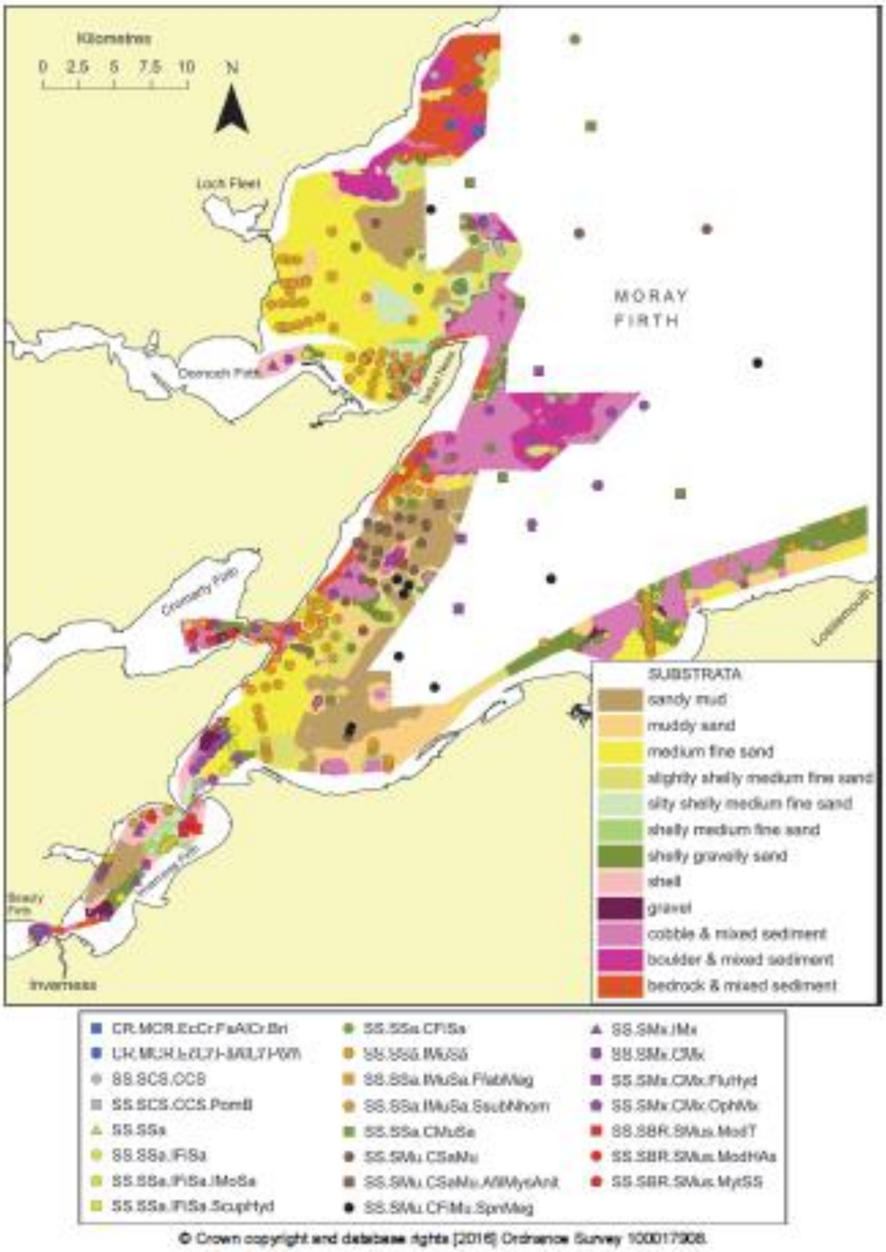


Figure 23. Biotope survey records for the Dornoch Firth and Morrich More SAC and the Moray Firth SAC; Modiolus habitats are the red squares and the red circles. Figure 8 in Moore, C.G. 2016. Biological analysis of underwater video and infaunal data from surveys of the Moray Firth SAC. *Scottish Natural Heritage Commissioned Report No. 940.*

Peer Review 2

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**No**	**CAB Response**
<u>Justification:</u> I do not consider that the assessment team has reached an appropriate conclusion. For Principle 1, the conclusions seem appropriate, pending some amendments to the report. The situation is similar for Principle 3. For Principle 2, however, the information presented in the report is generally cursory and the conclusions drawn are inappropriate (and in many cases contradictory). A case is partially made for MSC certification of the UoAs for the North Sea area. The information presented in the report is deficient in many respects, but sufficient information is available about the stocks impacted and the métiers concerned to justify certification of these UoAs. On the basis of the evidence presented, the UoAs that extend to the West of Scotland do not meet the MSC standard. The main issue of concern is the status of the cod stock to the West of Scotland. An argument is presented in support of a "pass" score (in the range 60-80) for West Scotland cod (considered to be a main retained species). This argument is not convincing. The key reasons for this are set out in my comments on the relevant PIs and summarised below:- a) The west of Scotland cod stock is correctly scored as being outside biologically based limits. It is argued that the management strategy in place (the cod recovery plan implemented in 2008) is likely to work, despite the fact that there is no evidence of stock recovery in the intervening 9 years. b) No convincing argument is presented in the scoring of the relevant outcome, management or information PIs for West of Scotland cod to justify this element attaining a score of 60 or more. This cod stock is caught by all métiers, and the UoA métiers account for the vast majority of the removals of this stock, so this is a significant issue. A further issue throughout Principle 2 is the complete absence of information about the different impacts of different fishing métiers on different P2 components. While all of the métiers used are mobile fishing gear, there is a considerable difference between the likely impact of (for instance) a Nephrops trawl and a Danish seine on different P2 components. Equally, the catch composition of a "demersal trawl" used to catch plaice in UoA3 when compared to a vessel (or even the same vessel) targeting		The concerns outlined here by the PR have been addressed by the assessment team under the individual PIs. The PR has considerable concerns over the west coast cod stock and the assessment team have expanded the dialogue in the body of the assessment and in the scoring tables to further the justification of the stock meeting SG60. These are available under the retained PIs and additional commentary in the CAB response to the PR below. The assessment team reject the assertion of the lack of differentiation of the impacts different métiers on non-target species. Table 15 to Table 18 provide a breakdown of catch by different métiers and the scoring tables where applicable have been expanded to provide individual scores by gear type (see PI 2.1.1). This clearly deals with the PR's concern regarding the different catch composition between gear types. The minor issues with P1 Harvest Control Rules & Tools being not well defined (PI1.2.2) are dealt with below and under that PI and clarity has been provided in the scoring rationales to explain the scoring levels. The PRs comments regarding multispecies management consideration are considered irrelevant as current management does not take multispecies considerations into account. Although this may change into the future. The information is provided by ICES in the form of 'mixed fisheries advice' by region but there are no management associated with this at present. Similarly the PRs reference to the North Sea Multi-Annual Plan (MAP) is not relevant to the scoring of the UoA as it is not current management. Again this may change and the latest development of the MAP through the EU trilogue in late 2017 is noted in the text. The discussion of the latest developments of the MAP is given in section 2.3.7.

saithe in UoA2. No consideration is given at all to these possibilities. There are some minor issues concerning the scoring of Principle 1. The key issue is that for stocks where the Harvest Control Rules & Tools are not well defined (PI1.2.2) there is, by and large, a corresponding lack of clarity in the limit and / or target reference points, when these are considered in the context of MSC Certification Requirements set out in CRv1.3 at CB2.3.2.1. Given that this is an assessment of several species, it is very strange that the report makes no mention of multi-species management considerations. ICES have commented on this for several years (see the most recent comments in ICES 2017). Very briefly, ICES recognise that fishing at Fmsy for predatory species (cod, saithe) will result in larger populations of these species that will depress the abundance of other species; and that if each fleet in the North Sea were to utilise its entire catch share, then this will result in "…*overfishing of the single-stock advice possibilities of most stocks*". Related to this point, an elaboration of ICES approach to the implementation of the Landing Obligation (i.e. "wanted" and "unwanted" catches and discard estimates), along with some consideration of the EU proposals for a North Sea Multi-Annual Plan (European Commission 2016a, 2016b) are notable omissions from the overall Principle 1 consideration. Within Principle 3 (and throughout the report) there is an inconsistent approach to the Norwegian component of the fishery. Good information is presented about the work of the Norwegian Coastguard in PI3.2.3. No mention is made of Norwegian national fishery management anywhere else in the Principle 3 scoring despite the fact that the UoAs extend in to the Norwegian EEZ. This is a significant omission (though not, given the excellent fisheries management regime in Norway one that is likely to detrimentally affect the assessment outcome).	For Principle 3 – The inclusion of Norwegian management has been added to PIs where the national legislation of Norway is relevant to the fishery. A full dialogue is given under PI 3.1.1. As the PR noted the excellent system in place within Norwegian has not impacted the scoring.

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? ***[Reference: FCR 7.11.1 and sub-clauses]***	**Yes/No**	**CAB Response**
<u>Justification:</u> There are 10 conditions associated with the fishery assessment. Two of these were from the original assessment. The remaining 8 are new conditions. They are considered in turn below. **Overall** The MSC require that conditions shall follow the narrative and metric form of the PISGs used in the final tree (FCR at 7.11.1.2). This is generally not the case for the new conditions. The MSC also require that the milestones should spell out the outcome and score that shall be achieved at any interim milestones. Again, this has been done for the original conditions, but is not the case for the new conditions 3, 4, 5 & 10. With suitable revisions (identified below) the conditions should be appropriate. Please note that in my view the fishery does not actually meet the SG60 level of performance for some PISGs. The comments on the condition have no bearing on my comments on the relevant PISGs in this review. **Condition 1:** This seems appropriate. **Condition 2:** This seems appropriate. **Condition 3:** This condition should be associated with PI1.2.2 rather than 1.2.1 (it is really about harvest control rules rather than harvest strategy). The wording of the condition does not match the narrative and metric form of the relevant PISG. The milestones should be re-phrased to match the narrative and metric form of the PISG. The condition does not consider how the whiting stock will be managed under the North Sea MAP proposals (European Commission 2016a, 2016b). The client action plan does, fortunately, rectify this.		**NOTE: on review the team have added two additional conditions (3 and 12) the following peer review (PR) report therefore all comments from the PR in this edition of the report are now one step out. E.g. condition 3 is now condition 4. The team have made this clear by providing the new condition number in brackets throughout this PR review.** Across all new conditions 4-11 the narrative of the condition has been amended to meet the scoring issue criteria. **Condition 3 (now 4):** The assessment team disagree with the PR assertion that the condition is based on the HCR rather than the HS. The HCR is part of the harvest strategy. The UoA fails SI 1.2.1b because when "tested" (see guidepost wording) the strategy failed ICES analysis as F did not respond to the state of the biomass. The condition points directly to the factors that need to be rectified to pass this test. The North Sea MAP proposals provide a framework (basically MSY) whereas the condition is specific about what needs to be done to meet the SG. **Condition 4 and 5 (now 5 and 6):** The conditions are directly related to the problem that the current management plans is obsolete due to a change in the stock area. While managers are following the ICES default HCR it is unclear how this will be handled in future. The North Sea MAP proposals provide a framework (basically MSY) whereas the condition is specific about what needs to be done to meet the SG. **Condition 7 (now 8):**

The condition should be revised to better follow the narrative and metric form of the PISGs and to better integrate the milestones with the MAP proposals. **Condition 4:** The wording of the condition does not match the narrative and metric form of the relevant PISG. The milestones should be re-phrased to match the narrative form of the PISG. The condition does not consider how the revised extent of the haddock stock will be addressed in the context of the North Sea MAP proposals (European Commission 2016a, 2016b), which are limited to "ICES zones IIa, IIIa and IV" (i.e. excluding VIa to the west of Scotland). The condition should be revised to address these issues. **Condition 5:** The comments made under condition 4 apply in equal measure here, *mutatis mutandis*. **Condition 6:** I should declare an interest here – I have worked on this condition as part of the harmonisation process. It would be inappropriate for me to comment. **Condition 7:** The wording of the condition does not follow the narrative and metric form of the relevant PISG (the condition refers to the harvest strategy; the PISG refers to the harvest control rules). The wording of the relevant SG provides support for my view that condition 3 should really have been raised under PI1.2.2 (harvest control rules). **Condition 8:** The condition states that: *By year 4 the partial strategy for W. Scotland cod must be demonstrably effective at achieving recovery and rebuilding of the stock to appropriate and realistic rebuilding target levels defined by ICES and/or Marine Scotland*. It is not appropriate for the condition to refer to rebuilding target levels "*…defined by ICES and/or Marine Scotland.*" This creates uncertainty. The text should be revised to remove the reference to Marine Scotland. ICES is the most appropriate organisation to determine the rebuilding target levels for this stock.	This condition refers to 1.2.2a and addresses the fact that the HCR has not yet reduced F to the desired level, although it is approaching it. Given the fact that ICES evaluation of the management plan suggested was not consistent with the PA, more evidence is required to pass SG80. **Condition 8 (now 9):** The team have removed the reference to MSS. The PRs comments re SG60 not being met are noted and the teams additions to the text now make it clear that SG60 is met and the condition stands. **Condition 9 (now 10):** Given that this is an expedited audit (within Yr 2 of the current cycle) the condition here will likely progress through this cycle into the next certification cycle where FCR 2.0 (or later) will be required, hence the future proofing the PR notes. The tem have removed the sentence the PR was unhappy with.

Please note that in my view the fishery does not actually meet the SG60 level of performance for this PISG and that no condition is therefore required. The comments on the condition above have no bearing on my comments on the relevant PISG below. **Condition 9:** The wording of the condition is appropriate. Please note that in my view the fishery does not actually meet the SG60 level of performance for this PISG and that no condition is therefore required. The comments on the condition above have no bearing on my comments on the relevant PISG below. **Condition 10:** The condition is framed in the context of the requirement of MSC FCR v2.0 performance indicators, and not v1.3; it does not therefore follow the correct narrative and metric form. However, it is sensible for the team to future-proof the fishery, so if some suitable caveat /explanation is provided, this would be appropriate. The condition concludes with the sentence: *This can be achieved by implementing management of the offshore MPAs as proposed by Marine Scotland or by other means as appropriate.* This sentence adds some ambiguity. It is also not appropriate for the condition to specify the remedial action required; it should identify the outcome required. It would be appropriate to delete this sentence.	

If included:

Do you think the client action plan is sufficient to close the conditions raised? ***[Reference FCR 7.11.2-7.11.3 and sub-clauses]***	**Yes/No**	**CAB Response**
Justification: Marine Scotland has registered its commitment to "*…when appropriate and the outcome is deliverable, endeavour to assist SFSAG with these.*" I note that closure of some of the conditions will require action by the client, Marine Scotland and other relevant entities including the Scottish and UK Governments, European Commission, European Council, Norwegian Government, and other EU Member States. Closure of the conditions is therefore dependent on political and geopolitical issues that are beyond		None required

the direct control of any individual institution or indeed any individual national Government. Under the current regime of uncertainty associated with Brexit, it is hard to anticipate whether the action plan is sufficient, nor indeed who the "relevant entities" will be in 4 years' time. Taken these considerations into account, the client action plan and the support they have garnered are as good as could be expected, and just as likely to close the conditions as any other approach. Providing that the client and CAB keep the conditions and client action plan under review to ensure that all relevant entities are engaged, the proposed client action plan should be considered acceptable.	

PI	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	**CAB Response**
1.1.1	*Yes*	*Yes*	*NA*	*The scoring is appropriate for all of the UoAs.* *SIb* ***UoA 1- Haddock:*** *there is a redundant (and slightly confusing) paragraph at the end of the rationale. I would suggest deleting this text or integrating the information in the preceding part of the rationale.*	**SIb. UoA 1- Haddock:** The assessment team agree. Paragraph deleted as suggested
1.1.2	*Yes*	*No*	*NA*	*All of the UoAs should attain at least an SG60 score here as there is some kind of reference point available for each of them.* *The MSC CRv1.3 requires at CB2.3.2.1 that:-* *"For the purposes of PI 1.1.2 or pre default tree PI equivalents the team shall interpret reference points as reference points used for managing the fishery—i.e. explicit or implicit points used by management as part of management procedures, management strategies or decision rules to trigger management action. "*	The MSC CRv1.3 defines a target reference point as "The point which corresponds to a state of a fishery and/or resource which is considered desirable and which management is trying to achieve." All stocks under assessment here have explicit reference points that are used by ICES to give advice and are followed by managers. **UoA 1 Haddock;** the rationale points out that managers are following ICES advice that uses F_{MSY} as a reference point. It explains the derivation of F_{MSY} to show that it conforms both

				The key point is therefore not that reference points have been estimated, but that they are <u>used for managing the fishery</u>. *For UoA 1 Haddock, it is stated in the rationale for SIc that "There is no target reference point currently used by ICES or managers." On this basis it is not possible that SG80 can be met for this UoA for this SI.* *For UoA 5 Whiting, it is stated in the rationale for SIc that "There is no target reference point currently used by ICES or managers." On this basis it is not possible that SG80 can be met for this UoA for this SI.* *Awarding a score of less than 80 for these two UoAs for this PI would also make the assessment more consistent for these UoAs between the scoring of this PI and PI1.2.2.*	to Precautionary criteria and MSY. Since managers have followed advice based on this reference point the target reference point definition is met. Hence SG 80 is met. **UoA 5 Whiting.** The same rationale applies as for UoA 1 Haddock. Advice based on F_{MSY} is followed by managers and this meets the MSC v 1.3 target reference point definition. The issue here is the definition of "target" reference point. ICES defines only limit reference points, but they are often used as targets by managers in the sense of keeping the stock above a biomass threshold and below an F threshold. The MSC CRv1.3 operational definition is therefore met as it is considered a desirable state. The team has made minor amendments to the text in the scoring in order to provide further clarity on this.
1.1.3	*NA*	*NA*	*NA*	*None of the stocks are depleted; no rebuilding strategy is needed.*	No comment required
1.2.1	*No*	*No*	*No*	*The team seems to have blurred the distinction between "harvest strategy" and "harvest control rules".* *For most of the UoAs, the team have described the harvest control rule (i.e. to keep the SSB above a certain biomass) rather than the harvest strategy. There is no description or elucidation of the harvest strategy that applies in the UK EEZ, under the EU CFP or as part of the EU-Norway*	The MSC CRv1.3 defines the Harvest Strategy as: "The combination of monitoring, stock assessment, harvest control rules and management actions, which may include an MP or an MP (implicit) and be tested by MSE." It is therefore necessary to include mention of these in the rationale where they apply. Since these elements relate to the whole stock, differentiation between EEZs is not really relevant. In the specific case of fisheries there

				agreement. *These observations apply to all of the UoAs for SIa and SIb.* *SIc is fine.* *At SId it is appropriate to refer to both the decadal review of the CFP. The ad-hoc revisions to individual harvest control rules for each UoA should really be moved to support the scoring of PI1.2.2 SIc, as justification that the relevant harvest control rules are effective. As already noted, harvest control rules are different from harvest strategies.*	is at present no distinct UK EEZ as the resources are considered a common pool. For each UoA the opening sentence directly addresses the management objectives where these exist and applies to all jurisdictions. The decadal CFP review is already included in the rationale. For each UoA revisions to the HCR are relevant as these form part of the Harvest Strategy (see definition above) and are arguably the most explicit expression of the strategy. In the case of haddock, an explicit MSE evaluation was performed. For each stock, the rationale refers to evaluations of long term management plans that implicity contain a harvest strategy.
1.2.2	*No*	*No*	*NA*	*There are some minor issues in the rationale that require attention. These include:-* *SIc* *UoA 1 – Haddock &* *UoA 5 – Whiting* *The scoring comments do for these UoAs state that:-* *The main tools for controlling exploitation are catch limits and restrictions on fleet capacity. In addition there are minimum mesh sizes for the principal fleets (TR1) of 120 mm.* *This comment overlooks the fact that the métiers in UoA1 include TR2 gear (80-99mm) and also squid trawls with a smaller mesh. If scoring at*	The rationale is correct in identifying TR1 as the principal fleet. This fleet uses a mesh size of at least 100 mm for the UoAs under consideration and this is now corrected. The TR2 fleet targets Nephrops and is a minor component of the fish catch (see Tables 7, 14 and 15.). The squid trawl is not part of any of the UoAs and therefore the comment on this is irrelevent. UoAs 1,2,3,5 Yes, this is true. A generic comment has been added to the rationale applying to all UoAs.

				SG80 is dependent on the assumption that haddock are caught in TR1 gear (which in fact is >100mm, not >120mm), than the scoring should be reviewed. *UoAs 1,2,3,5* *The scoring comments for UoA 4 (hake) state that:-* *However, the procedure of topping up the TAC to allow compliance with the Landing Obligation may undermine the control of catches unless there is adequate enforcement of the discard ban.* *This comment applies in equal measure to all of the UoAs that are subject to the Landing Obligation. If the observation affects hake, than it also affects all of these other UoAs, which should therefore be re-evaluated to consider the significance of this issue.*	
1.2.3	*Yes*	*Yes*	*NA*	*The scoring is appropriate.* *I note that for UoA 2 in SIc the text neglects to mention that fishery removals are monitored, and some text about this should be added to fully justify the scoring.*	Additional text has been added to the rationale to justify the monitoring of the fishery removals.
1.2.4	*Yes*	*Yes*	*NA*	*The scoring is appropriate.*	No comment required
2.1.1	*No*	*No*	*NA*	*I have several concerns about the scoring and justification here.* *1. Procedural error.* *There is a procedural error here and throughout*	**Procedural error** The peer reviewer is mistaken regarding the need for P1 species to be considered in separate UoAs in P2 under an expedited

				the retained and discarded species PIs. Because the P1 species are being assessed as separate UoAs (and not as P1 elements in a single UoA), then each P1 species become a P2 species for all UoAs other than the UoA for which it is the P1 species. So, for example, in UoA1 (haddock) the P2 species list should include saithe, plaice, hake and whiting. For UoA2 (saithe) the P2 species include haddock, plaice, hake and whiting. And so on. *2. Species status* *The team has done a good job of distilling a great deal of information and squeezing it into the scoring justification.* *3. North Sea* *The scoring outcome for the North Sea UoAs (3 & 5) seems broadly appropriate.* *4. West of Scotland* *For UoAs 1,2 & 4 the scoring outcome does not seem at all appropriate.* *The key issue here is the West of Scotland cod stock. For this species:-* *SIa – I agree that SG60 is not met. This triggers SIc.* *SIb – I agree that SG100 is not met overall (though reference points have been defined for the West of Scotland cod).* *SIc – I do not agree at all with the scoring rationale supporting the SG60 score for WoS cod.*	assessment see GPE2.2.3 Considerations for rescoring of P2 species: *'In cases where there are a number of stocks identified as 'main primary' in a certified fishery, assessing one or more of these against Principle 1 instead will mean that they are removed as 'scoring elements' from Principle 2 'primary species'.* **2. Species status** No comment required **3. North sea** No comment required **4. West Coast Scotland** UoAs 1,2 & 4 – no comments required West of Scotland cod stock SIa and SIb no comment required **West Coast Scotland Cod** **SIc - a)** The team agree with the PR regarding F and its track record in reponse to the CRP and this is made clear in the report. We do note that F is estimated by ICES to have dipped below F_{lim} for the first time in 2014-15 but increased again in 2016 (this upturn in F is addressed below). B has remained below B_{lim}. The key question is why this is? The assessment team have significantly expanded the discussion for the scoring meeting SG60 both in the report Section 2.4.2 within the scoring. Furthermore we have addressed it here to specifically answer the PRs comments.

				I do not consider that this stock attains the SG60 level for the following reasons:- *a) The cod recovery plan has been in place since 2008. This plan represents the "measures in place" to ensure that fishing does not hinder recovery & rebuilding. The stock has not responded noticeably to this plan: after 9 years the SSB is basically unchanged (see Figure 16 of the report from the most recent ICES advice. F has been above Fpa and Fmsy throughout this period and consistently above Flim for most of the time (Figure 16, again).* *b) It is stated that on the basis of some modelling of fishing mortality and seal mortality that "….the stock has a reasonable (~85%) chance of increasing in the next 5 years." This is mis-representation of what that study said, and what the Figure 18 in the report (taken from the publication cited) shows. What the paper said is that if current fishing mortality is maintained, there is a (roughly) 16% chance of further decline. Given that at current levels of F there has been no stock increase for the past 11 years, it is not at all clear (nor logical) to presume that a 16% chance of further decline equates to an 84% (or 85%) probability of an increase.* *c) The assessors omit to cite the ecosystem modelling work (Alexander et al. 2014) which concluded that "Results suggest that the rise*	**SIc – b)** The team disagree with the argument the reviewer is presenting that a probability of decline of 0.16 does not equate to a probability of increase of 0.84. This is untrue. The model in question estimates the projected SSB relative to the current SSB. If 16% of the stochastic runs resulted in a decrease in SSB, then by definition (as probabilities sum to 1), 84 % must have been greater than current SSB (leaving aside the negligible proportion where the projected and current SSBs are identical). This has also been confirmed by the lead author of the paper in question. **SIc – c)** The team does not at any point argue that fishing was not the driver of the decline in W. coast gadoid stocks. One only has to look at the catch data presented in Figure 16 of the report (as well as Figures 9 and 15 for haddock and whiting – bearing in mind that this is a mixed fishery) to see that this is likely. With regard to Alexander et al. (2014) this paper is not trying to predict the future (i.e. the likely impact of current management measures on the stock) as we are; they are evaluating what would have happened in the past under different fishing/seal scenarios – they do not try to project the stock beyond current levels. It does not therefore provide useful information for us with regard to the expected recovery and rebuilding of the depleted species. Furthermore, there is also a problem with the analysis in Alexander et al. (2014). The data used to fit the EcoSim model to cod biomass

				in the grey seal population over recent years has not led to the decline in gadoid stocks; there is insufficient bycatch by the Nephrops fleet to have a large impact on gadoid stocks; however, fishing, as a key driver of the west of Scotland shelf ecosystem, has impacted stocks and by decreasing fishing levels to maximum sustainable yield cod biomass may increase slightly though not returning to previous levels." *d) It is stated that "ICES, unfortunately, has not attempted any short-term projections of stock status in recent years."* *This is untrue.* *The ICES stock Annex for 2016 sets out the basis for short-term projections which are presented in the advice for 2015 and in the June 2017 advice. This most recent advice shows that if F remains at F2017, the SSB in 2019 is projected to be just 1.77% larger than at present (which, given the confidence intervals means essentially no change). By contrast, if F is reduced to Fmsy, then a 64% increase in SSB by 2019 is predicted.* *e) The team's basis for confidence that the measures in place are expected to work are based heavily on Marine Scotland Compliance's assurance that the area misreporting used by ICES to account for the unexplained mortality in this cod stock is not*	estimates are taken from the single species stock assessments – and these assume constant M (including predation). The conclusions of the analysis (that seal predation does not have a significant impact on gadoid biomass) is therefore somehow in-built into the model assumptions, because the input data implicitly assumes no impact (because it assumes constant M). For these reasons, we have opted not to include this paper in our analysis. **SIc – d)** This omission has now been rectified (2017 advice –biennial advice is now accounted for). These projections have been added to the rationale. They did not result in a change the scoring. **SIc – e)** The assessment team dispute that the team's communication with MS compliance 'misses the point'. The basis and use of this 'area misreporting' analysis is clearly explained in Section 2.4.2. We discussed the analysis with Marine Scotland Compliance and they were not happy about the use to which their data had been put by ICES and intended to communicate that with the scientists. For avoidance of doubt, I quote the full text of the email in Appendix 10 Marine Scotland Cod misreporting. The team are unclear as to why the reviewer would not want us to trust Marine Scotland Compliance in this regard. Marine Scotland Compliance are not the client. Marine Scotland Compliance are the enforcement agency. Marine Scotland Compliance has (as far as we

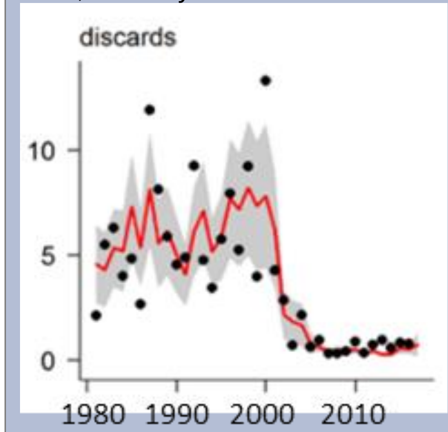
				taking place. This observation rather misses the point and shows a lack of understanding of how the stock assessment has been conducted. *A final observation, mentioned earlier in the assessment report, is that the UoAs account for nearly all of the demersal fishing effort in the waters to the west of Scotland. There is no argument that the UoAs (either individually or collectively) represent a trivial contribution to WoS cod mortality. The reality is that the UoAs account for the vast majority of WoS cod mortality (as shown in Figure 16 of the report).* *On the available evidence (both that presented in the report and the available information that has been omitted), it is clear that SG60 is not met for West of Scotland cod for both PI2.1.1 SIa and SIc. Consequently UoAs 1, 2, & 4 should not be certified. (Or alternatively the UoA extent should be altered to exclude the West of Scotland).*	can see) no interest in having a fishery with significant compliance problems MSC-certified – one would imagine it would only make their life harder. Furthermore, the standard approach in assessments in relation to evaluating compliance issues (e.g. as per PI 3.2.3) is to ask the relevant compliance authority for their comments. This is no different to that. **f)** Reviewer's final observation The UoAs combined represent most of the fishing mortality on the stock; nowhere have we tried to argue differently (as the reviewer observes). The stock assessment for 6a cod – some further observations: The scoring for 6a cod is made more difficult by the fact that ICES themselves acknowledge that the assessment is problematic. For example, in relation to estimates of F, it is clearly evident that the assessment has a consistent problem in estimating F in the terminal year. These issues have been incorpoarted into the scoring rationale for 2.1.1c It is difficult to incorporate into an MSC assessment these concerns about the stock assessment, since they appear self-serving, and since MSC assessments have tended to take stock assessments at face value, at least in relation to P2 species, on the basis that the assessment scientists are likely to know better than the (MSC) assessment team. Hence we have not incorporated them into our rationale and scoring for this stock directly. Our concerns

					are likely, however, to have informed our approach to questioning some assumptions (such as the area misreporting) and in evaluating the weight to given to different analyses (seal vs non-seal); this is what an 'expert' team should do, in our view. We hope that this elaboration addresses the main concerns of the reviewer in relation to this stock.
2.1.2	*No*	*No*		*a. Many of the comments made for SIa above apply in equal measure here, particularly the need to consider each P1 species as a P2 species for the UoAs where it is not the P1 species (e.g. North Sea Whiting should be considered as a P2 species in UoAs 1-4).* *b. For each scoring element it is also important to make the distinction between ICES having determined a basis for advice and that there are measures in place for the stock concerned.* *The cursory approach adopted to the scoring of the multiple different scoring elements for the SIs within this PI is not appropriate. Each scoring element has its own characteristics and the generic text set out in the SIs at present results in some vital issues being glossed over.* *c. I would recommend that this PI is re-scored with a full rationale presented for each scoring element to justify the scores given.* *Finally, why is there no mention of management measures in place for the Norwegian part of the*	**a. Procedural error** see previous comment in relation to this under 2.1.1 – and GPE2.2.3 Considerations for rescoring of P2 species. **b.** The assessment team have made a series of amendments to avoid confusion on this area and provide distinction between advice and measures in place. **c.** The scoring for each scoring element has been separated out, as the reviewer suggests. This resulted in some stocks scoring higher. **Norwegian stocks -** Where there are shared stocks, the management is agreed between the EU and Norway. This is noted in the rationale. **1. SIa** - The assessment team have made a series of amendments to avoid confusion on this area and provide distinction between advice and measures in place. The scoring for each scoring element has been separated out, as the reviewer suggests. **a. West of Scotland Nephrops:**

				UoAs? *Some more detailed comment are given below.* *1. SIa:* *The assessment rationale is cursory and full justification is not provided for each scoring element within the scoring table.* *Some examples of oversights that result from this approach are given below. This should not be taken as an exhaustive list of issues that have been missed, it is merely an indication that a more thorough job is required here.* *a) West of Scotland Nephrops* *There is no consideration of the management issues in Subarea 6, routinely raised by ICES (including in the most recent advice):-* *A single TAC covers the entire ICES Subarea 6. Management should be implemented at the functional unit level to ensure that fishing opportunities are in line with the scale of the resource for each of the stocks and the corresponding MSY approach. The two subareas in FU 13 imply that additional controls should be implemented to ensure landings taken in each subarea are in line with the advice.* *A score of 80 does not therefore seem appropriate for this element.* *b) West of Scotland Cod* *Given the comments for PI 2.1.1 above, it should*	the following text has been added to the rationale: The management meets the requirements of a 'partial strategy' given that the biomass of all the FUs (in both areas) is at or above the target level, and given that a partial strategy does not have to have been designed to manage that element specifically (see FCR 2.0 Table SA8 - 'A "**partial strategy**" represents a cohesive arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and an awareness of the need to change the measures should they cease to be effective. **It may not have been designed to manage the impact on that component specifically**).' **b. West of Scotland Cod** The extensive response provided in 2.1.1 above, provides the rationale of why the team believe the fishery meets SG60. The analysis for cod provided in the rationale has been expanded to evaluate some of these issues in more detail, although we try to avoid repetition between the main text and the rationales as far as possible; we are not always as efficient as we should be, however, at cross-referencing the two. (Cross-refs have also been added.) **c.West of Scotland Whiting** More detail has been provided to clarify the team's assertion, although not about the LO which does not yet apply; information on discards has been added. The PRs comment on whiting as a future choke species cannot be accounted for in this PI and is only presented by

				be clear that the West of Scotland cod stock does not meet the SG60 requirements. In brief, it is clear from ICES advice and from peer-reviewed scientific that UoA-related fishing mortality (coupled with high natural mortality) is preventing this stock from recovering. *ICES advice on the management measures in place for this stock states that [with emphasis added]:-* *Management measures taken thus far <u>have not recovered the stock</u>. The zero TAC for this area and 1.5% bycatch by live weight limit implemented since 2012 applies to the retained part of the catches; <u>neither of these measures constrains catches</u>. The proportion of the total catch that is discarded has increased since 2005, and discards now account for over 60% (average 2014–2016) of the total catch. It is necessary to reduce all sources of fishing mortality to recover the stock above Bpa as quickly as possible.* *The evidence available from ICES and in the literature provides evidence that the measures in place are not working. SG60 is not met for this species.* *c) West of Scotland whiting* *This is a depleted stock. The management measures in place are predicted to result in a further decline in stock status. 80% of the catch is discarded, 77% of which results from one of the UoA métiers (Nephrops trawls), and ICES recognise that this will become a "choke" species in the Nephrops fishery when the Landing*	ICES as 'could' meaning there is uncertainty to whether it will be. Furthermore, if whiting did become a choke species in this sub-area, this could result in reduced F across the suite of species considered under P2 and aid stock recovery. Overall, the scoring has not changed, however, for reasons which are now presented in the rationale in detail. The team notes the PR is incorrect regarding discards by *Nephrops* fleet according to WGCSE 57% of discards came from the fleet targeting Nephrops in 2016 not the 77% the reviewer states (WGCSE 2017 Section 38.1). **2. SIb** The rationale is presented by element as requested by the peer reviewer. **a. West of Scotland whiting** The team disagree with the PR there is no evidence of stock rebuilding and have maintained the score given to this PI. The evidence of stock recovery comes from ICES advice (ICES 2016x) (and see also the 2017 advice) that the biomass has been increasing consistently since 2006 and F has been below F_{MSY} since 2010, and is now ~ 25 % of F_{MSY} (see Figure 14). There has also been an upturn in recruitment since 2013 which is encouraging. In relation to retrospective bias, the retrospective analyses from WGCSE do not suggest an issue with estimates of overall trends in F (although it was under-estimated in the past – this issue seems to have been fixed

				Obligation is implemented. These points are simply not mentioned in the narrative text or scoring comments, and they are grave omissions. *SG60 is not met for this scoring element.* *2. SIb* *Again, the information presented is cursory. A full scoring rationale should be presented for each element.* *I have considered in detail the status of the two depleted stocks (West of Scotland whiting and cod) with regard to the scoring comments. I find that there is a significant mismatch between the scoring comments and the ICES advice. I do not feel that the scores awarded are therefore justified.* *I have not repeated this process for the other scoring elements, but on the basis of this analysis it clearly should be done.* *a) West of Scotland whiting* *The text states that:-* *In relation to W. Scotland whiting, there is evidence of stock rebuilding, giving an objective basis for confidence that the strategy is working.* *Where is this evidence? The most recent ICES advice shows an upturn in the SSB estimate in 2016, but it remains less than 60% of Blim. ICES' projections of catch options for 2017 all result in a fall of SSB in 2018. There is a retrospective bias in the assessment which means that F has been*	in the most recent assessments), nor in SSB or R. ICES notes that the inclusion of the two new Scottish survey time-series increased the precision of the assessment of this stock for 2016. Copy of the retrospective analysis are provided in Appendix 11 – Whiting in division 6a. It is true that all the management options predict a decline in biomass for 2018, but this includes the option with zero fishing – e.g the unfished stock is also predicted to decline. It is not quite clear to us why this should be but since the last year for which recruitment is estimated by the model (2015) suggests a good year class relative to recent levels, it may be a function of the 2016 recruitment which is input as an average of x previous years' recruitment? (where x is a figure in the range 3-5 which I cannot find right now). This means it is lower than 2015 recruitment by definion, because recruitment has been on an upwards trend. This may provide at least part of the explanation. **a. West of Scotland cod** The reviewer is wrong that a probability of decline of 0.16 does not equate to a probability of increase of 0.84, as previously explained in response to the PR comments in 2.1.1. We have therefore maintained the score previously given. **3. SIc** the team is not clear why it should be a particularly controversial statement and the statement was qualified in the following

				underestimated, and SSB and recruitment overestimated in past years. All in all, there is no evidence of stock rebuilding at all. There is ample evidence that the UoAs are hindering rebuilding (UoA vessels account for most of the whiting caught in this area). SG60 is not met. *b) West of Scotland Cod* *The text states that:-* *"For W. Scotland cod, the strategy is not working to rebuild the stock, but projections indicate that they have a reasonable probability of doing so"* *As already noted in the comments for 2.1.1 SIc above, this is not what is said in the source cited. The relevant information (Figure 18 of the assessment report) shows the probability of further <u>decline</u> of the stock, and not the probability of <u>recovery</u>. The assessor has made the (unjustified) assumption that if the stock has a 16% probability of further decline at current levels of F and M, then it consequently has an 84% probability of recovery under this scenario.* *Given the available evidence that the stock is stable at a very low level in spite of the measures that are cited in the report (Figure 15), it is clear that SG60 is not met for SIb for West of Scotland cod.* *3. SIc* *Again, the assessment approach is cursory.* *Further to this, the opening sentence would*	sentence; '*Nevertheless, the stock assessments (summarised in ICES' advice) demonstrate that the stock objectives are being attained (i.e. B > MSYBtrigger) except for W. Scotland whiting and cod.'* The rationale has been redrafted by scoring element; hopefully it is now less 'cursory'. **a. West of Scotland whiting** The model estimates of discards (red, CIs in grey) and data (black dots) for 6a whiting, from WGCSE 2017 (Figure 38.14) are provided below. The assessment team strongly disagree with the reviewers statement regarding 'fallen discards' and the 2007-2009 period acting as a reference period against which the current management regime could be assessed. There is always fluctuation from year to year, and no doubt if you want to pick out selected patches of 2-3 years, you can make any argument you want, should you have a mind to. 

				suggest that it is not possible to adequately assess this SI for <u>any</u> of the scoring elements:- *A series of overlapping changes to the assessment and TACs (changes to many of the ICES assessments in additional to changes in TAC setting as stocks come under the Landing Obligation) plus a mismatch between stock assessment areas and TAC areas make it difficult at present to match ICES advice to TACs directly.* *This statement requires some qualification.* *Again, I have briefly looked at the two depleted species (West of Scotland whiting and cod) and feel that the scoring is inappropriate. On this basis I feel that the justification for each scoring element (not just cod and whiting) should be fully articulated here.* *a) West of Scotland whiting* *The report states that discard levels have fallen.* *This view rather depends on the frame of reference. While discards exceeded 3,000t pa until 2000, they were less than half of the current (2015) level in the period 2007-09; so does this mean that discard levels have in fact increased under the current management regime?* *The most recent ICES advice indicates that 80% of the whiting catch was discarded in 2015 and that fishing at the level of the 2016 TAC would cause a 12% fall in SSB for a stock that is currently estimated to have a biomass that is less than 60% of Blim.*	Figure reproduced from WGCSE 2017, Figure 38.14. In relation to ICES 2018 projections – see response to comment above. We don't disagree that the majority of the catch is discarded (this is made clear in Section 2.4.2 which includes exactly this figure). The scoring has not been changed, for the reasons set out at length throughout this discussion. **b. West of Scotland cod** Here the team refer to the extensive additional information outlined above and included in the scoring. No score change has been given. **4. SId** In the context of this PI, 'a high degree of certainty' is 90 % probability (see Table SA9). The team agrees that we have at least this level of confidence that shark finning is not taking place, based on the collective knowledge of Scottish fisheries, and it illegal nature in the EU. The team reject the PR's assertion here and maintain the score at SG100.

				Overall I can see no basis for awarding an SG80 score of this scoring element here. *b) West of Scotland cod* *As noted in the comments on SIb above, ICES consider that the management strategy is not working and that the management measures do not constrain catches for this stock.* *There is no justification for awarding an SG80 score.* *4. SId* *Whilst accepting that there is only a very small bycatch of shark species and that shark finning is illegal in the EU, this does not give a "high degree of certainty" that shark finning is not taking place.* *To justify the SG100 score I would expect to see evidence from observers and enforcement officers that provides the "high degree of certainty" that shark finning is not taking place. I am sure that this probably exists, and should be presented in the report.*	
2.1.3	*No*	*No*	*NA*	*SIa: the score seems appropriate.* *SIb: the score seems appropriate. Better cross-referencing to the relevant narrative sections of the report would be helpful and would support the rationale.* *SIc: the score seems appropriate for all species*	**SIa: No comment required** **SIb:** The relevant information was in tables which were referenced, however, the section which includes the tables has also been added as a reference. **SIc:** cross referencing has been added.

				apart from West of Scotland whiting. *Better cross-referencing to the relevant narrative sections of the report would be helpful and would support the rationale.* *For West of Scotland whiting, ICES note that:-* *The assessment indicates an increasing mismatch between the survey and the fishery catchabilities. This is most likely linked to changes in fishery selectivity due to changes in effort for different métiers and the introduction of various technical measures in 6.a. These are not explicitly taken into account in the assessment model. The majority of catches have been discarded in recent years. Discard information is imprecise compared to landings data due to low sampling levels. The mean weights-at-age in the catch have been quite variable in recent years because of low and patchy sampling. This implies that the catch information of recent years in the assessment is less certain.* *These deficiencies in information are significant. A score of 60 would seem more appropriate for this species.* *SId: In line with earlier comments, the information presented is cursory. Better justification is required for each scoring element.* *For West of Scotland cod and whiting, the score of SG100 does not seem appropriate. Again, I have considered these species below but have not looked at the other scoring elements, and feel*	**West of Scotland whiting**: The team note the SGs for this PI are as follows: SG60: Information is adequate to support measures to manage main retained species SG80: Information is adequate to support a partial strategy to manage main retained species The reviewer believes that a score of 60 would be 'more appropriate'; but we are not scoring based on our 'feeling' about information and its deficiencies, we are scoring here about whether information is available to support 'measures' vs a 'partial strategy'. To provide some definitions (see Table SA8): *"**Measures**" are actions or tools in place that either explicitly manage impacts on the component or indirectly contribute to management of the component under assessment having been designed to manage impacts elsewhere.* *A "**partial strategy**" represents a cohesive arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and an awareness of the need to change the measures should they cease to be effective. It may not have been designed to manage the impact on that component specifically.* It is hard to argue that there is not at least a 'partial strategy' in place for this stock (and others in the area), whatever you may think about its effectiveness, so the question is

				that this should be done. *a. West of Scotland Cod* *The ICES advice highlights that there is considerable uncertainty about the total mortality for this stock. ICES consider that the unaccounted mortality is a result of misreporting; the assessment team contend that (in scoring comments for PI2.1.1) that it is due to seal predation. Whichever is the case, it is clear that sufficient data are not presently being collected to detect an increase in risk level to this stock. SG80 is not met.* *b. West of Scotland whiting* *The ICES advice quoted for this species under SIc above highlights that there is insufficient data presently available to detect "any increase" in risk level as required at SG80.*	whether the implementation or analysis of the strategy is impacted by the deficiencies identified by ICES. Mismatch between data inputs such as surveys vs fisheries - CPUE is a common problem in stock assessment models, but should be included (explicitly or implicitly as here) in the gamut of analyses of uncertainty in the model (i.e. sensitivity runs, retrospective analyses, confidence intervals and so on). Retrospective analyses for whiting are given in Appendix 11 – Whiting in division 6a; CIs are given in Figure 14 etc. Likewise for imprecise estimates of discards; CIs on catch, landings and discards are given in Appendix 11; they have widened slightly the last few years, but it is hard to see how it would have an impact on the strategy for managing this stock, which in relation to discards is based around a reducing in fishing effort and work to improve selectivity. Discards are estimated to be ~80 % of catch (or a little below – see stock annex Figure 38.1) – if they were estimated to be 90 % or 60 %, would this impact this strategy? The answer is no. On the basis of this no scoring change has been implemented. **SId:** The data collection framework is the same for all these stocks, so the team do not see the benefit in restating it for each scoring element. Some additional cross-refs have been added to provide clarity through the text The reviewer is correct, however, that scoring this SI at 100 was optimistic– the score has been reduced to 80.

					a. cod The assessment team has not set itself up as an alternative to ICES, please note. We have tried to review all the evidence from different sources (ICES, the published scientific literature, Marine Scotland Compliance etc.) and come to a view – anyway, all this is covered by the response to 2.1.1, as the reviewer says. Here, the question is whether the problem is one of information: we suggest that it is not – landings and discards are monitored and there is a stock assessment which estimates F (albeit with some problems, as the reviewer notes) as well as SSB and recruitment – with fewer problems for these parameters, if you look at the analyses in WGCSE 2017. SSB is also tracked directly via a survey, which is also used by WGCSE as a model input. On this basis, the data available for this stock is as good as most other Scottish commercial stocks. So this issue is not a question of data, it's a question of the model and model interpretation, in our view. The rationale has been clarified. **b. West of Scotland whiting**: The team disagree with the PRs statement that there is insufficient data presently available to detect "any increase" in risk, for the reasons outlined above. ICES draw attention to the main uncertainties, as they are required to do.
2.2.1	*No*	*No*	*NA*	*The scoring is not justified.* *Discarding rates are not identified in any of the*	The team note the procedural error in using FCR version 2.0, which divides bycatch species into primary vs secondary rather than retained

				tables presented in section 2.4.1 of the report. *The only tables to mention discards are Tables 16 & 17.* *The reality is that there must be some discarded whiting in the West of Scotland UoA, which are considered to be a "main" non-target species (Table 18), and 80% of which are discarded (ICES 2016).* *As before, the scoring comments are cursory and further justification is required.*	vs discarded. Apologies for this mistake. This section has been redrafted. A table has been added (new Table 18) which gives discard rates for the species in Table 16. This analysis confirms that there are no 'main' bycatch species, although it identifies some minor species (dab, flounder, tusk, red mullet grey gurnard in 6a). Whiting are still considered under retained species, so are not relevant here. Although the majority of the catch is discarded, the approach is to consider species as 'retained' if any part of the catch is retained. The new analysis shows that there are no 'main' species, so SG80 is automatically met for all SIs. None of the SIs relating to minor secondary species are met. on this basis, we are not clear what more information is required in the rationales, although we have included information on the minor species including stock status where available, just to be thorough. We have, also added a cross-reference to Section 2.4.1 in the rationales – this make things clearer.
2.2.2	*No*	*No*	*NA*	*The scoring is unjustified, as evidence is not presented in the report to identify which species are discarded and to what extent.* *The scoring comments at SIb demonstrate this point:-* *….it is hard to evaluate discard rates for non-commercial (i.e. non-retained) species, since limited data are available.*	The team note the same error in 2.2.1 has led to the lack of evidence for discards. This section has been redrafted and a new table added (new Table 18) giving discard rates. The rationale has been revised, further to the error of category made as noted above. The reviewer is right that SG100 is a stretch for SIa and SIc, and the scores have been reduced to

				The only reference that the scoring rationale makes to the EU Landing Obligation is an oblique comment in SIc and the insertion of two hyperlinks. *This is particularly puzzling because there is a reasonable summary of the Landing Obligation in section 2.4.3.1 of the report. It is as if the author had forgotten all about this.* *A key point with the landing obligation (which is relevant to the scoring here) is that the extent and pace of implementation differs between UoAs and geographic areas, which should be reflected in the scoring for each SI rather than ignored.* *Finally – why is there no mention of the Norwegian management regime for discards?* *1. SIa* *Meeting the SG100 requirements would require there to be a strategy in place for minimising <u>all</u> bycatch (there is no "main" qualifier here).* *As already noted above, the comments at SIb state that there is limited data available on the discard rates of all species caught, so SG100 simply cannot be met.* *The assessors have misdirected themselves by citing the cod recovery plan here as justification for minimising bycatch if the species concerned (cod) are not a "bycatch" (i.e. discarded) species. Since cod are considered to be a retained species, this scoring rationale is irrelevant.*	80, with reference to the minor bycatch species. The quote given left has also been revised. The team note that the LO does not apply as yet to any of the species in the bycatch category and so is not relevant here; and it is not clear that it ever will, not only because of Brexit but also because the intent to apply the LO to non-commercial species, which includes some of the species identified here has not yet been clarified. The PIs are scored on the current management requirements and practices in place for the stocks identified based on available data. The actions in place at Scottish level which aim to address the future implementation of the LO (i.e. the work to improve selectivity) is current, and therefore relevant. The Norwegian discard ban applies to these vessels in Norwegian waters, but there is nothing to stop them discarding when they get back to Scottish waters – in fact, for some species (such as the rays which are required to be discarded under EU regulation), this is what they have to do. **SIa** The logic behind this scoring is that the strategy is general (i.e. to improve selectivity) rather than species-specific. We note that SG100 does not say anything about discard information. Nevertheless, we agree that the scoring was on the generous side, and has been reduced to 80, following the reviewer's suggestion.

				In any case, the scoring comments here are very hard indeed to reconcile with the ICES assessment of the West of Scotland cod stock which states that:- *Management measures taken thus far have not recovered the stock. The zero TAC for this area and 1.5% bycatch by live weight limit implemented since 2012 applies to the retained part of the catches; neither of these measures constrains catches. The proportion of the total catch that is discarded has increased since 2005, and discards now account for over 60% (average 2014–2016) of the total catch. It is necessary to reduce all sources of fishing mortality to recover the stock above Bpa as quickly as possible.* *ICES consider that most of the West Scotland cod that are caught are discarded. If the cod stock is to be considered at all under this PI, it fails to attain the SG60 requirements.* *Whilst the work by the client fleet and Marine Scotland on real-time closures was excellent, the initiative was suspended in 2016, so cannot influence scoring of the fishery at present. do not as far as I am aware apply to <u>all</u> species caught in <u>all</u> métiers for <u>all</u> of the UoA target species, so would not meet the SG100 requirements.* *2. SIb* *If there are no main discarded species, the scoring is appropriate. As previously noted, the evidence for this is not presented in the report.*	Yes we have misdirected ourselves, by scoring following version 2.0 instead of 1.3. 6a cod is not relevant here as the reviewer notes, it is listed and considered under retained. Although a large proportion of the catch is discarded, the approach (in v1.3) to consider species as 'retained' if any part of the catch is retained is employed here. Therefore the further comments on cod by the PR are not considered further for this PI. However, the role of the CRP is relevant to this PI as it is one element that has reduced overall effort (e.g. via days at sea limits leading to a reduction in the fleet size). In any case, the rationale has been rewritten as noted above, based on the reviewer suggestions and now scores 80. **SIb** The mysterious text is probably a consequence of the version confusion (FCR2.0 scoring rather than V1.3) noted above; the rationale has been redrafted. **SIc** The team included the list as bullet points as it is a list of bullet provided by Marine Scotland to explain how they are dealing with issues around reducing discards, which addresses the question in the SGs quite well (i.e. how is Marine Scotland implementing the 'partial strategy' for bycatch species?) As noted above, the LO for now only applies to species which are considered under 'retained' (2.1) – counter-intuitive as that may be. The work that Marine Scotland is doing, however

				The rationale contains the rather mysterious text:- *Based on retained species, the strategy has had mixed results; selectivity is only one factor in discarding.* *This comment is strangely disconnected from the scoring rationale in SIa which cites the pioneering work carried out in Scotland including real-time closures as part of a strategy.* *3. SIc* *The scoring at SG100 is not justified by the casual reference to a hyperlink which is essentially a list of bullet points.* *This is the first reference to the Landing Obligation in this PI or in any of the PI text about discards.* *I am at a loss to understand why there is no reference to the Landing Obligation and a precis of the summary in section 2.4.3.1 with an allocation of scores to different UoAs based on that summary.*	(see the casual bullet points), is relevant and is mentioned. Have said that, the rationale has been revised and the score reduced to 80 following the reviewer's suggestion.
2.2.3	*No*	*No*	*NA*	*The score of 80 is not justified, particularly given that no information is presented in the report to demonstrate that the discard rates for any species are known.* *Confidence in the scoring of this PI is rather undermined by the comment at PI2.2.2 SId:-*	The assessment team's amendments to the discard section including the addition of Table 18, provide sufficient rationale to ensure that SG80 can be justified. The main point here is that there are no 'main' bycatch species, so SG80 is met by default for all SIs. This has been made clearer.

				For non-retained species, information is collected by Marine Scotland which would allow an analysis but as far as we can tell it is not all analysed. *Given this comment and the quality of the information on discards presented in the report it is not at all clear how the SG80 level is met for any of the SIs in this PI.* *It is not at all clear why the assessment team has not use the data made available under the EU data collection framework to inform the assessment.*	For additional information, the data from the EU data collection framework too which the PR refers is not new data, it is data provided to STECF by Marine Scotland – i.e. the same data that we have used throughout the P2 section, therefore the comment is irrelevant.
2.3.1	*No*	*No*	*NA*	*a. As for PI2.1.1, the team has done a remarkably good job of collating and summarising information relating to the identity and status of ETP species in the fishery.* *b. However it is clear that there is a paucity of information about ETP catches in the UoAs and by métier. The only data presented in the report are Table 22 (mean catch of elasmobranchs per trip) and Table 23 (species recorded on observer trips). A brief review of the status of the ETP species that may be impacted by the fishery is provided in SIb.* *c. The problem with the information in Table 22 is that no units are given for the data; there is no indication of the catch on the trips monitored (and hence no indication of the proportion of ETP species in the catch); and as a consequence these data cannot be raised to the fleet level.*	**a.** no comment required. **b and c. Table 22** – The PRs comments on Table 22 are contradictory regarding the lack of units. In Paragraph 2 they state ' *Table 22 (mean catch of elasmobranchs per trip)'* while in paragraoh 3 critisizes ' *…no units are given for the data'.* The data in Table 22 (which is now Table 23) is mean individuals per trip as the PR states and this is in the legend, the team therefore reject the PRs comment here. Associated data for catch for these trips is not available. This is, however, not the reason why the data cannot be raised to fleet level – MSS have all these data and could do it if they wanted to, but they do not consider that it is appropriate, because the low sample size and patchy nature of bycatch means that the confidence intervals around the 'raised'

				Further to this the data are for TR1 and TR2 gear in broad geographic areas only; there is no consideration of the possibility that the ETP species catch may vary between métier (independent of mesh size) or between UoA as a function of the target species on a particular trip. *d. Table 23 provided information for 47 observer trips in the North Sea. Again, it is for TR1 and TR2 gear, with no distinction made for different métiers, target species, or geographic areas. No information is presented from observer trips to the West of Scotland.* *e. Finally, Marine Scotland have issued a caveat that the data cannot be raised to the fleet level (see statement to this effect in section 2.4.4.). The team seem to have ignored this because the conclusions drawn are very heavily (though not entirely) based on the assumption that these data are representative of the fleet for each UoA.* *It is therefore not at all clear how the scoring for this PI is justified, in particular for the West of Scotland where there is no evidence that there are any observer data to support the comments in SIb.* *f. The list of ETP species presented in the report is limited in Table 21 to those listed in the 2017 TAC regulation. There is no mention of other EU legislation (the Habitats Directive and Birds Directive in particular) nor to domestic (UK) legislation that establishes further protection for additional ETP species. (Though I note that the team has referred to domestic legislation when*	estimates would be unacceptable. Evidence of the patchy nature of the ETP interactions is evidenced in the text with regard to the capture of the common skate complex where the majority of capture in one year of observer data is taken in a single trip out of 201 (Table 26). As the reviewer notes, the data are not sufficient to score by metier or by target species for the trip; the point of the condition, therefore, is to get a better analysis of these data, such that the occurance of interactions according to these various criteria (as well as in space and time) can be evaluated, and more targeted avoidance strategies developed. **d.** In order to meet the the PRs comments the team have provided additional information in regard to the métier interaction (Table 26) which shows NS and west coast broken down by gear. The additional information clarifies the teams position on scoring. **e.** The team are able to clarify the PRs comments on the observer data. Data are available for both areas as evidenced by the estimates of discards in both areas as these come from observer data. The PET observer data is a different and additional scheme from the standard MSS observer trips (this was started by the SFF although now taken over by MSS). The PET observer data does represent far fewer trips than the 'standard' MSS observer trips partially because the PET data was intially only available for the North Sea but now includes the West Coast of Scotland.

				considering the status of seals in SIb). *g. Looking at Tables 22 and 23 in the report there seems to be a significant catch of flapper skate (Dipturus intermedia) and blue skate (D. flossada). D. intermedia was more abundant in catch estimates to the West of Scotland than D. batis (Table 22); and both species were observed in greater quantities than D. batis (Table 23). However neither species is considered here as an ETP species. This omission is not explained.* *h. Finally, there is no information presented about ETP species legislation and protection in the Norwegian part of the UoAs, nor any report of monitoring of ETP interactions in this geographic area.* *i. With respect to the individual SIs I have a few observations (not an exhaustive list):-* *1. SIa* *As noted above, the list of ETP species presented is restricted to those that have been recorded in some very limited data sets. There are omissions that should be included (notably flapper skate and blue skate, see above).* *Marine Scotland has specifically indicated that these data cannot be raised to the fleet level, yet that is what the team has done to reach its conclusions.* *It is stated that the PET data suggest that interactions with these species are rare. These data only relate to the North Sea, so this scoring*	Additional text and analysis has been provided in the body of the report to highlight this under '*Elasmobranchs and other ETP species*'. Regarding MSS caveat of not being able to raise data to fleet level the reasoning is dealt with above under point c.) MSS job is to provide scientific estimates of discards / impacts etc. to inform management. The assessments team's job is to use the information available to score the fishery against the MSC PISGs. These are not the same. The point is taken, however, about representativeness of the data across gears and particularly in Subarea 4 vs 6. The rationales have been expanded to consider this question. In practice, however, the scoring does not rely solely on the PET data, and did not change as a result, although some clarifications have been added. **f.** Table 21 (now table 22) is only supposed to be about elasmobranchs, hence why it only addresses EU fisheries legislation. UK legislation (such as the Wildlife and Countryside Act) and the Habitats and Birds Directives do not include protection for any relevant species of elasmobranchs. Non-elasmobranch ETP species are considered further down in the same paragraph – see text immediately above Table 24. **g. Skates:** The three species of skate have been considered together as the 'common

				rationale cannot apply to the West of Scotland area. Further information is required to support the scoring for the area to the West of Scotland, and / or the score of 80 for this area should be reduced. *Overall, the SG80 score may be reasonable (with further justification) for the North Sea, but not for the West of Scotland.* *2. SIb* *For all of the species listed, the use of observer data to support the scoring cannot extend to the West of Scotland area because there are no observer records from this area.* *Because of this the scoring for species such as common skate and porbeagle (as well as others) cannot be justified for the West of Scotland area.* *All of the scoring should be reviewed to make the distinction between the score that is appropriate for the North Sea UoAs (where there are some observer data) and the score for the same species off the West of Scotland (where observer data is not reported).* *For common skate it is stated that:-* *The trend appears to be in the right direction, at least in Subarea 6 which has the majority of interactions (see Table 24). On this basis, the team concluded that it is not likely that the fishery is having major impacts on common skate; SG60 is met.*	skate complex' – and ICES and management regulations consider them together (ICES 2016c). This has been made more clear in the rationale. **h. Norwegian** See response to comment about Norwegian management of discards above – it is not clear to us that it is relevant. The Norwegian discard ban applies to these vessels in Norwegian waters, but there is nothing to stop them discarding when they get back to Scottish waters – in fact, for some species (such as the rays which are required to be discarded under EU regulation), this is what they have to do. In terms of monitoring, the North Sea observer trips may going into Norwegian waters; there is no difference in monitoring between the two areas. **i.** 1. **SIa –** The comments regarding this PI have been answered above as they relate to the neture of the PET data and the spatial extent of the infomration. Flapper skate and blue skate are already included under 'common skate complex' – as explained above regarding the EU management and advice structure for this species complex. Additional explanation has been added in the rationale text since this was unclear. MS specify that the data cannot be raised quantitatively to fleet level, but the team view the data as sufficient to use the data in a qualitative manner, supported by the MSS assertion that interactions are rare.

				However for PI2.3.2 at SId it is stated that:- *For the skates and rays, we do not have enough data to say yet whether there is a trend in bycatch rates, and even if there were, whether it is attributable to changes in fishing practice or changes in the populations.* *Both of these statements cannot be true. On the basis of the information presented in the report, I would agree that there is very limited information available on trends as stated in PI2.3.2 and thus the argument set out for common skate in PI2.3.1 SIb is not valid. Certainly, the data presented in the relevant table (Table 23 in my version of the report) is not adequate to show a trend in catch numbers.* *I would, however, agree with the team that the independent data available for common and grey seals supports a high score for these species.* *3. SIc* *The scoring rationale presents no evidence; it is simply a dismissal of the possibility of indirect interactions. Why does the team consider that indirect effects on ETP species are unlikely?* *The rationale should be revised so that some evidence is provided to support the assertion.*	The rationales have been reviewed with this issue in mind; but the scoring does not rely on these data. **2. SIb** – Clarity on the provision of obsever data for the West Coast of Scotland has been provided above under comments c. and e. This additional information makes the distinction between the W. Scotland and North Sea UoAs unnecessary, although the rationales have been reviewed with this mind. As noted above, there is observer data for 6a so the data in Table 23 for elasmobranchs (which represents more trips than the PET trips) is available and valid for both areas. The scoring for common skate and porbeagle is based on these observer data, which covers both areas. The team agree that the comments between 2.3.1 and 2.3.2 don't sound very consistent – these comments have been reviewed and clarified in 2.3.2, which is a generalisation about all skates and rays. **3. SIc** Indirect effects such as gear loss / ghost fishing and noise disturbance on ETP were considered by the team but are unlikely to affect the species identified. The ETP species identified form observer data do not include cetaceans which are most likely to be affected by noise and the fishery takes place in the North Sea which has a high volume of non-fisheries marine traffic. As for gear loss the client reports that gear loss is extremely rare

					as gears represent huge cost outlay by the owners. Therefore the team conclude that the score should remain. Additional text has been added to bolster the rationale.
2.3.2	*No*	*No*	*NA*	*Overall the key issue here for the appraisal of the effectiveness (or otherwise) of the management measures / strategy in place for ETP species is compromised by the clear statement from Marine Scotland that the information that they have provided about ETP species interactions cannot be raised to the fleet level.* *A secondary issue is that the coverage of the observer data provided by Marine Scotland is limited to the North Sea, so cannot be used to infer anything about the extent of ETP interactions with the fishery in this area.* *1. SIa* *For the species that are listed as prohibited in the annual TAC regulation, that regulation provides a strategy for management; it would certainly meet the SG80 requirements.* *For seals, the provisions of domestic legislation should also meet the SG80 requirements.* *No evidence is presented in the report to describe any strategy in place for managing the fishery's impacts on any other ETP species (i.e. birds or salmon). On this basis the SG80 requirements are not met.* *Further evidence is therefore needed to justify the SG80 score for all ETP species.*	Please see the extensive response provide by the team for 2.3.1 in relation to this. **1. SIa** Evidence is presented for managing impacts on birds and salmon in the final paragraph of the rationale. The behaviour of the fishery can be considered a 'strategy', as long as it is monitored and there is a reasonable expectation that it would be changed if impacts were detected. Otherwise we are in a position of requiring fisheries to put in place strategies for ETP species where there is zero impact (as here) – which is nonsensical. **2. SIb** The team disagree with the PRs assertion here. The reviewer is confusing quantitative raising to provide fleet-wide numerical estimates (which is what MSS is declining to do) with qualitative inference about levels of confidence, which is what the SGs are asking about. The reasons for the lack of quantitative raising is described in the body of the report and under the responses to this PR above for 2.3.1. An 'objective basis for confidence' does not have to rely on a quantitative estimate, necessarily.

				2. SIb *As noted previously, the conclusions drawn here rely on the invalid assumption that the data provided by Marine Scotland can be raised to the fleet level; something that Marine Scotland have clearly stated is not the case. This observation along would constrain all of the scores (except for seals and spurdog where there is reliable information on stock abundance) to no more than SG60.* *In order to attain the SG100 score for this SI, there needs to be evidence that "a quantitative analysis supports high confidence that the strategy will work." This requirement is more onerous than simply having some observer records of the number of individuals caught: it requires that there has been some assessment of the consequences of the interactions (as is the case, for instance, for spurdog).* *It is not at all clear that any species apart from spurdog or seals (and probably birds, if the team get around to presenting the information) would meet the SG100 requirements.* *It is certainly the case that Greenland shark and porbeagle shark do not meet the SG100 requirements. I have considered each of these species below.* *a) Greenland shark* *The team states that:-* *For porbeagle sharks, seals, Greenland sharks,*	Nevertheless, the point is take in relation to SG100. The score has been reduced to 80 for Greenland shark, Basking shark (added on PR 1's review), birds and salmon.

				birds and salmon, quantitative data (PET data) give a high degree of confidence that interactions with this fishery are very low. SG100 is met. *However, earlier in the report at PI2.3.1 SIb, the team stated that for Greenland shark:-* *Given the likely low encounter rate, the team considered that impacts from this fishery are highly unlikely, but limited information and the species singular life history preclude a high degree of confidence – SG80 is met but SG100 is not met.* *Whilst the PIs are slightly different in each case, further justification of awarding a score of 100 for Greenland shark on the basis of very limited observer data (which does not extend to the West of Scotland).* *SG100 required that there has been a quantitative analysis to support the high confidence that the strategy will work. A limited number of observer records do not represent a "quantitative analysis", particularly when the organisation providing these data has clearly stated that they cannot be raised to the fleet level.* *A score of 80 for this species in the North Sea might just about be justified, but in the absence of observer data, SG80 is not justified for the West of Scotland.* *The scoring concludes with the remark that:-* *For the other ETP species, encounters are very*	

				rare, and the fishing technique and/or geographic / depth overlap with the ETP stocks, along with the monitoring (PET and discard data collection) can be considered a strategy which is being successful in avoiding impacts. SG80 is met. *This evidence does not support the view that there is a strategy in place for these "other" ETP species (unspecified). The rationale is a vague description of fishing practices, which may be regarded as measures (SG60). PET and discard data collection do not represent a strategy for managing the impacts of the fishery as required at SG80; these are initiatives for monitoring impacts. The vagueness of this text is inadequate to support the SG60 level for these species, though with further justification this may be an appropriate score; there is no evidence here or elsewhere in the report that a higher score is warranted.* *b) Porbeagle shark* *While agreeing that the level of interaction with porbeagles is low, the team has already noted under PI2.3.1 at SIb that:-* *ICES consider that porbeagle stock status is unknown.* *If stock status is unknown, and all that is known is the level of interaction on some vessels from limited observer coverage, then it cannot be possible for the SG100 requirements to be met.* *Indeed, in the absence of any information about stock status and on the basis of the limited*	

				information available in the report it is hard to justify the SG80 requirements other than by reference to the known habits of porbeagle sharks relative to the fishing métiers under consideration. *As repeatedly mentioned, the observer data available can be used to support the scoring for the North Sea (to some extent, given the caveats from Marine Scotland), but is not relevant to the scoring for the West of Scotland.* *With further justification a score of 80 for the North Sea and 60 for the West of Scotland for this species would seem appropriate.* *c) SIc* *The scoring is contradictory. It states that:-* *For the skates and rays, we do not have enough data to say yet whether there is a trend in bycatch rates, and even if there were, whether it is attributable to changes in fishing practice or changes in the populations. For the other species, low/negligible encounter rates is a reasonable objective and this is being met.* *This is absurd. It is equally true that for all of the other species (with the exception of spurdogs and seals) that there is insufficient information available to measure trends; and the counter argument is also true - there is evidence of a low / negligible catch of skates and rays, just as there is for other species.* *In my view, the score is inappropriate for all species apart from seals and spurdog (where*	

				there is some evidence that the objectives of the conservation measures / strategy are being achieved). *To recap briefly, the only evidence available for all of the other species is from catch records and observer data that are extremely limited, and which Marine Scotland have said cannot be raised to the fleet level (which is the only way that the team can justify their conclusion). For some of these species (such as Greenland shark and Porbeagle shark as examples) there is uncertainty about stock status as well as uncertainty about the actual level of interactions, which means that there is no way to determine whether or not the strategy in place is in fact achieving its objective.* *The scoring should be revised.*	
2.3.3	*No*	*No*	*NA*	*The comments made for PIs 2.3.1 & 2.3.2 apply, mutatis mutandis, here.* *Specific observations are:-* *1. SIa* *The team state that:-* *Discard estimates have been scaled up to the entire fleet and are therefore quantitative* *This point is irrelevant to the PI. The discard levels referred to are for non-ETP species.* *Marine Scotland has stated that the ETP data (which is the data that is relevant to the UoAs) cannot be raised to the fleet level (see section*	Please see the extensive response provide by the team for 2.3.1 in relation to this. **1. SIa** The team agree with the reviewer and the rationale for this PI have been completely revised and scoring revised based on the PRs previous comments on data availability and the provision of PET data by metier. **2. SIb** Please see the extensive response provide by the team for 2.3.1 and 2.3.2 in relation to the difference between quantitative scaling and qualitative assessment.

				2.4.4 of the report). On this basis there is no "quantitative estimate of fishery related mortality and the impact of fishing", as required at SG80. Only qualitative data seem to be available, and this is only (in the case of the observer data) available for the West of Scotland. *The team has stated in the scoring rationale that:-* *For the other fish species, interactions rates are presumably too low for them to feature in the discard data, but information from the PET data is sufficient to infer with reasonable confidence that the impact of the fishery is negligible; likewise for the non-fish species. SG80 is met for all species.* *This statement does not meet the SG80 requirements; it is little more than guesswork (a presumption about one set of data and an unjustified and inappropriate inference about another set of data).* *The assertion that porbeagle shark should attain the SG100 score is absurd. As already noted, the team has stated under PI2.3.1 SIb that the status of this species is not known. It would therefore be impossible to "quantitatively estimate outcome status" as required at SG100, let alone with a high degree of certainty.* *On the basis of the information presented in the report is not possible to see how the SG80 requirements for this SI are met for any ETP species apart from spurdog and seals, for which there do seem to be some quantitative data.*	Impacts by metier are now provided (Table 26) and mortality rates are available in Table 25. All those marked 'injured' in the PET data have been classified as dead. We have made no further assumptions about discard mortality; the reviewers suggestion are plausible but basically speculation. It is precautionary to assume zero survival in all cases. The team agree with the reviewer in part and the rationale for this PI have been completely revised and scoring revised based on the PRs previous comments. **3. SIc** There is not an 'absence of information'; there is information sufficient to infer impacts. Different types of strategy require different levels of information. The data being collected by the MSS observer data and PET data can measure trends (e.g. catch per trip for skates and rays), but in referring to Table 24 to Table 26, there are only three years' worth of data, which is not enough to measure trends as of this time which could form a comprehensive strategy.

				These are my main concerns about this SI; I could go on but you get the idea. *2. SIb* *Many of the previous comments apply, and the case is not made to justify an SG80 score here, which required that <u>both</u> fishery related mortality and the impact of fishing are known (not either/or).* *In brief the key points are:-* • *The team have been told by Marine Scotland that the data they provided about ETP catches and observer records of ETP interactions should not be raised to the fleet level; hence fishery related mortality cannot be inferred from these data.* • *The status of some ETP species is unknown (for instance porbeagle & Greenland shark). For such species, the impact of the fishery cannot therefore be quantitatively estimated.* • *The observer data available from Marine Scotland is limited in its coverage to the North Sea.* *A further point, which has surface here but should have been considered previously is that there is no information available on post-discard mortality. This is likely to vary considerably between métier (contrast the tow times & characteristics of a Danish seine and a Nephrops trawler for instance); and it is also likely to differ between*	

				UoA for similar reasons. *Overall SG80 does not seem to be met for any species other than spurdog, seals and probably birds (though additional information needs to be presented in the report to justify this).* *It is not at all clear that SG60 would be met for the West of Scotland UoAs; further evidence and justification is needed for this.* *3. SIc* *The scoring rationale states that:-* *As argued in PI 2.3.2 scoring issue a) there is a strategy in place for all the ETP species. The strategy does not particularly rely on gathering information – rather on minimising any fisheries impacts* *This view is quite incredible. It is not at all clear to me how a strategy for managing impacts can be implemented in the absence of information; indeed that is the whole point of this SI.* *The text goes on to say:-* *however, trends can be measured at least qualitatively from the discard and PET data, as well as via population estimates in some cases. On this basis, SG80 is met.* *This text contradicts earlier text stating that trends in skate and ray bycatch cannot be determined (PI2.3.2 SId) and other text which indicates that the population status of some ETP species is*	

				unknown (see PI2.3.1 SIb for porbeagle and Greenland shark). *On the basis of the information presented elsewhere in the report this scoring justification is clearly incorrect. A score of SG80 is not warranted for all ETP species; it is perhaps attainable for some species but would require a thorough re-appraisal of the information available and re-scoring of this SI.*	
2.4.1	*No*	*No*	*NA*	a. *The team has misdirected itself and has committed a procedural error.* *This fishery is being assessed using the process requirements of FCR v2.0 and the v1.3.* *The scoring rationale presented here and the narrative text set out in the report considers "commonly encountered habitats" and "vulnerable marine ecosystems".* *Neither commonly encountered habitats nor vulnerable marine ecosystems form any part of the Performance Indicators in CR v1.3; these scoring elements are part of FCR v2.0.* *b. The report presents a "one size fits all" view of habitat impacts. No consideration of the different habitat impacts of different métiers is presented in the report. For instance, the text about impacts on seapens is highly relevant to the Nephrops trawl fishery on the west coast of Scotland (and probably in the North Sea); it has much less*	**a.** The team took the scoring element approach for this fishery on the basis of FCR 2.0 as this was being followed for procedures and in being more precautionary for habitats than FR1.3. Following the FCR 2.0 scoring element scenario also allows the fishery to be harmonized with SFSAG cod assessment for the North Sea component of the fishery. Therefore the team have maintained their approach. **b.** The PR has wrongly viewed the assessment approach here as 'one size fits all' rather the approach is consider the metiers which most severely impact habitats and use them as a baseline for the entire fleet. This approach is taken as there is insufficient information on the impacts of all the different types of metiers on all the different habitats (unlikely any demersal fishery worldwide have this information). Therefore in this case the team have taken the precautionary approach of assuming the worst-

				relevance to the saithe trawl fishery conducted in the eastern North Sea, and also little relevance to Danish seining in all locations. These different habitat interactions are a consequence of the characteristics of the different fishing methods and target species, which result in different métiers impacting different habitats in different ways and to different extents. *The team are clearly aware of this issue: the scoring for PI2.4.3 SIb states that:-* *In relation to SG100, while the physical impacts of various types of fishing gear have been studied (see for example review in (ICES 2017) (2001)), this is not the case for all gear/habitat combinations in this fishery* *This is a significant oversight which calls the scoring into question and should be addressed.* *If the procedural mistake is explained in the report, and providing that some consideration is given to the different impacts of different métiers on different habitats, I would agree with the scoring awarded here.*	case scenario for the scoring in all cases. With that in mind the rationales remain unchanged.
2.4.2	*Yes*	*Yes*	*NA*	*The scoring is appropriate. It even considers what is happening in Norwegian waters. Well done.*	No comments required
2.4.3	*Yes*	*Yes*	*NA*	*The scoring is appropriate.*	No comments required

2.5.1	*No*	*Yes*	*NA*	*The main omission here is an absence of any reference to ICES consideration of multi-species management (ICES 2017). This consideration is specific to the North Sea, and the team should consider similar work for the West of Scotland.* *If this information is taken into account the scoring is probably appropriate.*	The mixed species advice from ICES in 2017 has been added to the rationale. The assessment team have added text related to the MAP plan for the North Sea but note that as this is not current management its influence is currently negligible. The scoring has not been changed.
2.5.2	*No*	*Yes*	*NA*	*A significant omission here is the linkage between the CFP and the MSFD, and also the ecosystem-related objectives of the CFP (see Article 2(3) et seq).* *The score is, however, appropriate.*	Some discussion of the CFP and MSFD has been added but the scores have not changed.
2.5.3	*No*	*No*	*NA*	*The justification presented drastically over-states the information available for the fishery.* *1. SIa* *It is stated that:-* *This fishery is information rich in all areas* *On the basis of the information presented in the report, particularly for ETP species, this is plainly not the case.* *To justify an SG80 score the team should list the key elements of the ecosystem and briefly describe them.* *2. SIb* *The key difference between the SG80 and SG100 score is that SG80 "some" interactions have been investigated in detail; at SG100 this distinction is*	**1. SIa –** the addition of significant added information on the spatial extent of ETP (west Scotland) added to this report provides sufficient information to justify the comments made by the assessment team. Ecosystem elements have been added. **2. SIb** But both rationales relate to the 'main' interactions of the fishery with the ecosystem – SG100 does not therefore require investigation of all interactions. The team is of the view that a case has been made that the 'main' interactions have been investigated, although details such as the relative habitat impacts of different metiers have not (oddly, only SG80 requires investigation 'in detail'). The issue of metier impact on ETP has been dealt with under ETP see Table 26, while the assessments team approach to considering the most -severe gear

				removed; all main interactions must be investigated in detail. *On the basis of the information presented in the report (for instance the absence of any information about métier-by-métier interactions with marine habitats – see PI2.4.3 SIb; and other issues such as uncertainty about the actual extent of ETP interactions), the SG100 requirements are not met, and a score of 80 would seem to be the highest attainable.* *3. SIc* *The scoring rationale states that:* *the impacts of the fishery on target, bycatch, retained and ETP species and habitats are identified.* *This is clearly not the case, for reasons stated time and again before (notably limited understanding of ETP species interactions and the nature of métier-specific habitat impacts).* *The (lack of) information in the report demonstrates that the impacts of the fishery on the components are not fully understood. SG100 cannot possibly be attained.* *A score of SG80 would seem appropriate.* *4. SId* *The comments for SIc apply in equal measure here. SG80 is the highest score attainable.* *5. SIe*	impact to habitats provides a precautionary approach. **3. SIc** The reviewer is confusing 'identified' with 'quantified' or indeed 'fully understood'. SG100 requires that impacts of the fishery are 'identified' while the main functions of the element in the ecosystem are understood. The rationale has been expanded to add some detail and make this distinction clearer, but with the lack of impact of fishing for ETP at fleet level the team have reduced the score to SG80. **4. SId** in contrast to SIc SG100 can be attained here as impacts can be inferred from the fleet from all data sources including ETP. **5. SIe** In relation to observer data, see comments above. Here we are talking about ecosystem impacts, not ETP species impacts – scoring the ecosystem PIs is not a rehashing of the other P2 elements. So the question is, is the limited data on ETP interactions having an impact on MS's ability to monitor the ecosystem and the role of the fishery within it? The team considered that it was not – the rationale has been expanded to make this point.

				The scoring is not justified. *A key issue here is the very limited understanding of the interactions between the fishery and ETP species. The data gathered is very limited indeed, and Marine Scotland have indicated that it cannot be raised to the fleet level. In addition to this there is no observer information available to the west of Scotland. This limited information means that there could be a considerable and undetected change in fishery impacts on ETP species.* *For this reason alone, SG80 is not met here.*	
3.1.1	*No*	*No*	*NA*	*The key issue here is the omission of the Norwegian legal system; and also the overlooking of haddock.* *The score nevertheless seems appropriate.* *1. SIa* *The SI asks if there is an effective national legal system.* *The rationale presents an account of the international, EU and Scottish/UK legal system* *There is no mention of the Norwegian legal system.* *The distinction is made between the SG80 score for saithe, plaice and whiting, and the SG100 for hake. What about haddock?*	According to GSA4.1.1, the assessment team shall determine which jurisdiction levels apply to the UoA. Focus is on which international levels shall be included in the assessment addition to the national level, not on whether different national levels shall be assessed. According to assessment practice, only the national management system of the UoA vessels is included, in addition to any relevant international management regime, with the exception of the enforcement system (cf. PI 3.2.3) of other states in whose waters the UoA vessels fish or in whose ports they land the fish. Not least is this the case in previous assessments of North Sea fisheries, and this is the approach chosen by the team in the current fishery. Nevertheless, the team has chosen to accommodate the views of this peer reviewer to

				2. *SIb* *Some amendment to the scoring rationale is required to mention the dispute resolution mechanisms in place in Norway.* 3. *SIc* *The scoring seems appropriate.*	the extent possible. It can be argued that the national Norwegian management framework (PI 3.1.1) and the objectives underlying Norwegian fisheries management (PI 3.1.3) have some relevance for the UoA fishery since they take a small part of their catches in Norwegian waters – but only through their indirect influence on the working of the MCS system (PI 3.2.3), which the team in any event has assessed. But other PIs, covering, for instance, the consultation mechanisms available for Norwegian fishers (PI 3.1.2) can hardly be said to be of relevance for the UoA fishery. Hence, the team has decided to assess the two former PIs, but not the others for the national Norwegian management system. No change in score is necessary or has been applied. We emphasize that doing this we go considerably farther than what is usual in similar fisheries in the North Sea, and probably in MSC assessed fisheries in general. For instance, in the extensive tuna fisheries, not every single national management system is systematically covered in the assessments of individual national tuna fisheries. The team welcomes clarification on this issue in the next version of the MSC standard. Haddock was not originally rescored on this PI as there are no changes from the last certification cycle (MEC 2016). However, the team have now included it based on Peer Reviewer 2 requesting the inclusion of the Norweigian management system for this PI,

					which changes the rationale from the last certification cycle.
3.1.2	*No*	*No*	*NA*	*Again, the missing piece of the jigsaw is the organisations and management system in Norway.* *If this omission is corrected the score will be appropriately justified.*	See comment under PI 3.1.1 above. The team has not included Norwegian management for this PI as the consultation mechanisms available for Norwegian fishers (PI 3.1.2) can hardly be said to be of relevance for the UoA fishery.
3.1.3	*No*	*No*	*NA*	*Norway is missing again; the issue raised in PI3.1.1 about the absence of clear rules for determining the quota allocation under the EU-Norway agreement is perhaps relevant. As a consequence it is not clear whether the score of 100 is justified for all UoAs.*	See comment under PI 3.1.1 above. Information about the Norwegian management system has been added. No change is score is necessary.
3.2.1	*No*	*No*	*NA*	*The text is all about the EU CFP and EFF/EMFF, and actions take to provide incentives in Scotland.* *Norway is missing again.* *If this omission is corrected the score will be appropriately justified.*	See comment under PI 3.1.1 above for the overall relevent inclusion of Norwegian management of this fishery. No change has been made to this PI.
3.2.2	*No*	*No*	*NA*	*Norway is missing again.* *If this omission is corrected the score will be appropriately justified.*	See comment under PI 3.1.1 above for the overall relevent inclusion of Norwegian management of this fishery. No change has been made to this PI.
3.2.3	*No*	*No*	*NA*	*Great, Norway is mentioned.* *However in SIc, the assessors refer to the Scottish Cod real time closure scheme. This was suspended on 20th November 2016, so is no*	See comment under PI 3.1.1 above. Reference to the real-time closure scheme has been removed from the text. However, this does

				longer relevant to the scoring. *Despite this, the overall score seems appropriate.*	not change the overall conclusion and score of this SI.
3.2.4	*Yes*	*Yes*	*NA*	*The scoring is appropriate.*	No comment required
3.2.5	*No*	*No*	*NA*	*Norway is missing again.* *If this omission is corrected the score will be appropriately justified.*	See comment under PI 3.1.1 above for the overall relevent inclusion of Norwegian management of this fishery. No change has been made to this PI.

Appendix 4 Stakeholder submissions

No stakeholder submissions were presented at the time of the publication of the PCDR (26th April 2018). O

nly Technical oversights raised by the MSC were presented to the CAB during the public comment period which closed 26th May 2018 at 5pm GMT (Table 51).

Table 51. MSC technical oversight.

SubID	Page	Grade	Requirement Version	Oversight Description	CAB Comment
28768	p.108-9	Guidance	FCR_7.12.1.5.a v2.0	Section 4.2 & Table 36: As UoC is the same as UoA for this fishery, it may be useful to mention this again within the Traceability section, and all references of 'UoA' in Section 4 of the report can instead be 'UoC' for clarity.	This has been addressed and all references to UoA changed to UoC.
28769	P. 109	Guidance	FCR - 7.19.4.2c v2.0	Section 4.3: Auction is mentioned in Section 4.2 where they facilitate sale and raise invoice upon sale along with an assigned unique MSC specific code. Please clarify the list of auction house(s) involved, and if CoC is not required at auction the reasons behind.	In order to address this the assessment team has added a new table (Table 37). Which shows the port, transport, storage and auction site of each landing place.

Appendix 5 Surveillance Frequency

The surveillance for this fishery has been set as default (Level 6), requiring four on-site surveillance audits as per the level set at the re-certifiaction. There are two further surveillanace in the current certification cycle.

Deviations from the standard surveillance schedule (i.e. annually, by the anniversary date of the certificate) are currently not foreseen.

The fishery surveillance programme is shown below.

Table 52. Surveillance level rationale

Year	Surveillance activity	Number of auditors	Rationale
2019	On-site surveillance	2 minimum on-site	There are conditions raised across Principle 1 and 2 which will require at a minimum two assesors to attend an on-site visit to assess progess against the conditions.

Table 53. Fishery Surveillance Program

Surveillance Level	Year 3 (2019)	Year 4 (2020)
Level 6	On-site surveillance audit	On-site surveillance audit

Appendix 6 Objections Process

No objections received

Appendix 7 Details of SFSAG voluntary closure in the Fladen Ground

Announcement to fleet by SFSAG of closure

All

You will be aware that the Scottish Fisheries Sustainable Accreditation Group (SFSAG) entered North Sea Cod into the MSC certification programme last year. It has proceeded well and now reached the penultimate stage with the final report about to be released. It will be certified immediately after.

Before this can happen we have an issue which we need to resolve regarding the protection of tall sea pens.

The area of sea pens falls within a designated offshore MPA at the Fladens although it will be the early part of next year before the management measures are finalised and introduced. This leaves the sea pens vulnerable to damage during the early part of our certification, which under the applied scoring system would deliver a fail.

As a solution to the problem SFSAG have agreed to introduce a self-imposed restriction for the interim period between the granting of full certification and the introduction of the MPA. We are fortunate that little fishing takes place within the area, which means that very little disruption to fishing should occur.

This approach has the support of Marine Scotland who has agreed to monitor the area and report any fishing activity to the group.

We ask for you cooperation in this matter and request that you refrain from fishing in the area contained within the following coordinates.

58° 59.248' N 000° 08.373' W

58° 58.226' N 000° 04.475' E

58° 55.440' N 000° 05.816' E

58° 51.311' N 000° 06.539' E

58° 49.143' N 000° 00.170' W

58° 49.819' N 000° 09.843' W

Best Regards

Mike Park

Chair

SFSAG

Confirmation of monitoring by Marine Scotland

Request from SFSAG to Marine Scotland

From: Mike Park [mailto:mike@swfpa.com]
Sent: 18 May 2017 11:37
To: Gibb AG (Allan)
Subject: North Sea Cod Certification

Allan
You will be aware that SFSAG - Scottish Fisheries Sustainable Accreditation Group - is currently in the process of certifying North Sea cod through the gold standard of MSC (Version 2.3).
The process has gone smoothly and we are now in the final stages. One outstanding issue is the protection of Tall seapens (Funiculina quadrangularis) in the area of the central fladen.
The area in question has been designated as an MPA on the basis that it makes a contribution to the OSPAR network for the seapens and burrowing megafauna Threatened and/or Declining habitat in OSPAR region II. It is our understanding that the MPA will not be in place until early 2018.
In terms of MSC requirements MPAs are a very good initiative and will, once in place, serve our purpose well. However, with regard to our certification which is imminent we require protection of the area pretty much immediately.
SFSAG has concluded that in the absence of an MPA the best way forward is to notify all the vessels covered by our certification that they should avoid fishing within the area. This would cover gear types - dredge, beam trawl, bottom trawl, and seines.
Our request to Marine Scotland centres around some assistance in the monitoring of the area concerned, the coordinates of which are set out below.
In the absence of any obvious alternative would Marine Scotland agree to monitor the area and notify SFSAG if any of the vessels covered by the certification operate within it. You would not be required to take any additional action.
I look forward to your response.
58° 59.248' N 000° 08.373' W
58° 58.226' N 000° 04.475' E
58° 55.440' N 000° 05.816' E
58° 51.311' N 000° 06.539' E
58° 49.143' N 000° 00.170' W
58° 49.819' N 000° 09.843' W

Best Regards

Mike

Chief Executive

Scottish White Fish Producers Association Limited
Fraserburgh Business Centre
South Harbour Road

Fraserburgh
AB43 9TN
Email: mike@swfpa.com

Tel: 07710504773

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Response from Marine Scotland

From: <Allan.Gibb@gov.scot>
Date: 19 May 2017 at 15:51:02 CEST
To: <mike@swfpa.com>
Subject: RE: North Sea Cod Certification

Mike

A very positive development.

I can confirm that Marine Scotland would be willing to monitor this area and notify the SFSAG of the names of any vessels that appear to be in there and operating at a fishing speed. You will be required to provide us with a full list of the vessels to which this will apply.

Regards

Allan Gibb
Head of Sea Fisheries Division

marine scotland: Fisheries Policy

Scottish Government 1B (South) Mail Point 2

Victoria Quay. Edinburgh, EH6 6QQ

Tel : 0044 (0)131 244 4981
Fax: 0044 (0)131 244 6474
Mobile: 0044 (0)7920477514
Email : Allan.Gibb@gov.scot

Appendix 8 MSC interpretation log

What are the MSC requirements on Harvest Control Rules (HCRs), including 'generally understood' and 'available'? (multiple questions)

1 Answer

Since releasing FCR v2.0 in October 2014, MSC has received requests from stakeholders for clarifications on the requirements in the default assessment tree relating to Harvest Control Rules (HCRs), PI 1.2.2. This 'interpretation' document aims to clarify MSC's intent regarding the scoring of HCRs PI, and reduce the risk of inconsistent application between Conformity Assessment Bodies (CABs) and other stakeholders.

MSC does not regard the interpretations provided in this document as changing the existing standard, but also recognises that not all stakeholders or CABs have held the same interpretations given here, due to the original guidance not being sufficiently comprehensive or clear. MSC expects the interpretations in this document to be read as supplementary to the guidance of FCR v2.0 and to CR v1.3 where applicable (i.e. those parts of the guidance sections that do not refer to the 'available' HCRs option).

This interpretation was released to a targeted consultation with fisheries CABs, ASI, and selected fishery clients and other stakeholders who had previously engaged with MSC on this topic. The consultation feedback was reviewed by the MSC's Technical Advisory Board (TAB) in December 2015 and this final version approved for use by CABs.

Table of Contents

Interpretation Question and Answers in Detail

1 – Are pre-agreed rules and/or management actions a critical component of a HCR without which a score of 60 could not be achieved? What is meant by 'generally understood' and 'in place' HCR?

There is a difference between 'generally understood' HCRs as applied at SG60 and "well defined" HCRs as applied at SG80. The Certification Requirements Table SA5 are explicit and definitive in this regard. The definition of HCRs currently given in the MSC vocabulary applies at the SG80 level, not at the SG60 level.

As explained in critical guidance, 'generally understood' HCRs do not need to be well defined (e.g. with an explicit hockey stick rule) or explicitly agreed (Guidance to V2.0, section GSA2.5: HCRs should be regarded as only 'generally understood' as required to achieve a 60 score in cases where they can be shown to have been applied in some way in the past, but have not been explicitly defined or agreed), but there should be at least some implicit agreement supported by past management actions from which to understand that 'generally understood' rules exist, and there should be no reason to expect that management will not continue to follow such generally understood rules in future and act to be responsive to changes in indicators of stock status with respect to explicit or implicit reference points.

When determining whether there is a 'generally understood' HCR in place in the fishery under assessment, assessors need to determine whether the fishery will in future take appropriate management action in line with what they perceive as the 'generally understood' rule. Evidence that positive action has been taken in the past should be considered to be evidence that there is a generally understood rule in place.

2 – What sort of evidence must be provided that HCRs are 'generally understood', 'in place' and 'effective' in either the target fishery or the other fishery where HCRs are 'available'?

CABs should apply a precautionary approach to scoring when there is uncertainty over whether a HCR meets the requirements of 'generally understood' and whether there is sufficient evidence to support this. Where there is uncertainty, CABS should follow the precautionary approach (Box GSA1) and award a lower score.

Indefinite promises such as "we agree to implement an HCR sometime" should not be considered 'in place'. Clear reference should be provided to documents or other evidence that actions have been taken on specific previous dates. Promises of vague future action should also not be interpreted as indicating that HCRs are either 'in place' or 'available'. General regulations, such as convention texts or references to the Fish Stocks Agreement do not constitute 'in place' or 'available' HCRs although binding commitments (such as in national law) may do so if supported by evidence of management action. Scientific recommendations on HCRs or reference points that have not yet been adopted by the actual management agency should not yet be regarded as 'in place'. However, teams should also not expect that 'in place' arrangements require formal indefinite binding agreement. Conservation and Management Measures (CMMs) approved by RFMO Commissions and for example regarded as 'active' resolutions, may thus be accepted asin place even if they might still be overturned at some point in the future.

Evidence and examples of the positive actions taken in response to generally understood HCRs should be provided for the target stock in the case that generally understood HCRs are 'in place' or for other stocks in the case that they are 'available'.

There may be both positive and negative examples of management action in the target stock or in associated stocks. Such negative examples need not be exhaustively investigated by the CAB, but clear and recent cases should be considered by the team alongside positive examples. In the case of 'available' HCRs, where there are some negative examples (such as evidence that actions have not been taken previously in other stocks), these should not be assumed to overrule positive evidence from the other species that HCRs are 'available', but this will ultimately be the judgement of the CAB and in cases of uncertainty and doubt, CABs should apply a precautionary judgement.

3 – For HCRs to be 'available' as defined in SA2.5.3, must the HCRs used in other stocks by the same management agency be 'well defined' or can they be 'generally understood'?

The CR language given in Table SA5 is clear in requiring that at SG60 'available' HCRs must be at least "generally understood" in nature. If the HCRs are 'well-defined' in the other stock, there would be more confidence that they are available to the fishery in assessment.

CABs should note that the references to 'other UoAs' in SA2.5.3a and 'other named UoAs' in SA2.5.5a is not meant to imply that such UoAs are necessarily in assessment or certified as MSC fisheries. Although this may sometimes be the case, they may also just be other species or stocks which are also managed by the same management body and considered as part of the assessment.

4 – Under clause 2.5.3.b does there need to be an explicit link between the commitment to implement an HCR and stock status, or is a time-bound commitment that is demonstrated to become due before the stock is projected to drop to BMSY sufficient?

Any commitment that will clearly deliver a HCR before the stock declines below BMSY is sufficient.

However, lack of evidence is not acceptable (for example, "there is no evidence that the stock will be below BMSY at this point") – positive evidence is required, or the precautionary approach applies.

5 – If under the 'available' language the existence of a HCR in another fishery under the same management jurisdiction is presented in scoring issue (a), must this fishery also be used to score the 'available' language in scoring issue (c)?

Yes. At the SG60 level, if generally understood rules are regarded as 'in place' in the fishery in assessment, the evidence presented in scoring issue (c) should also relate to the application of such rules by their associated tools in the same fishery under assessment. If generally understood rules are regarded as 'available' to the fishery in assessment, on the basis of their use in another fishery (SA2.5.3a), evidence should be presented here of their effectiveness in that other fishery.

Due to the scoring rules, if HCRs are only regarded as 'available' in scoring issue (a), it is not possible to score more than 60 for issue (c) since the SG80 refers to the tools 'in use' in the fishery in assessment, not the tools 'in use or available'.

If the fishery in assessment has defined HCRs and meets SIa at SG60, but has not yet defined exactly which tools would be used to apply the HCRs, it is possible for SIc to be scored on the basis of the tools used in other fisheries managed by the same agency. In this case SA2.5.5a should still be applied.

6 – Can evidence that F<FMSY be used on its own to justify there being an HCR in place?

No. Evidence that F<FMSY should not be the sole evidence used for the existence of an effective HCR in the absence of any 'generally understood' or 'well defined' rules. F could, for example, be lower than FMSY just because effort is currently low, even though there has been no management commitment or attempts to actually control effort at a level that would constrain F to FMSY. However, in some circumstances – where F has been constrained at F<FMSY by controls on effort or catches, then this could be given as part of the evidence that the 'generally understood' HCRs are being effective. Evidence for the effectiveness of an HCR should in fact require the consistent achievement of the target exploitation level, which may be well below FMSY if stocks are currently below BMSY. If under scoring issue (a) the 'available' language is used, the fact that F<FMSY in the other fishery is, again, not sufficient evidence on its own that HCRs and tools are effective in that other fishery. Additional explanation is needed of how F<FMSY has been achieved. Particular care should be given in assessing the effectiveness of capacity limitation measures in fisheries, as opposed for example to well monitored effort controls and catch limits, in terms of their likely ability to meet management goals and target exploitation levels.

Your Answer

Click here to be notified of followup answers via e-mail

Category: C Team: Fisheries Requirement: FCR v2.0: Annex SA: Principle 1 Clause: PI 1.2.2 Keywords: Harvest Control Rules HCRs

Date: 18/12/2015 ID: 2186

1 Answer

Since releasing FCR v2.0 in October 2014, MSC has received requests from stakeholders for clarifications on the requirements in the default assessment tree relating to Harvest Control Rules (HCRs), PI 1.2.2. This 'interpretation' document aims to clarify MSC's intent regarding the scoring of HCRs PI, and reduce the risk of inconsistent application between Conformity Assessment Bodies (CABs) and other stakeholders.

MSC does not regard the interpretations provided in this document as changing the existing standard, but also recognises that not all stakeholders or CABs have held the same interpretations given here, due to the original guidance not being sufficiently comprehensive or clear. MSC expects the interpretations in this document to be read as supplementary to the guidance of FCR v2.0 and to CR v1.3 where applicable (i.e. those parts of the guidance sections that do not refer to the 'available' HCRs option).

This interpretation was released to a targeted consultation with fisheries CABs, ASI, and selected fishery clients and other stakeholders who had previously engaged with MSC on this topic. The consultation feedback was reviewed by the MSC's Technical Advisory Board (TAB) in December 2015 and this final version approved for use by CABs.

Table of Contents

For HCRs to be 'available' as defined in SA2.5.3, must the HCRs used in other stocks by the same management agency be 'well defined' or can they be 'generally understood'?

Under clause 2.5.3.b does there need to be an explicit link between the commitment to implement an HCR and stock status, or is a time-bound commitment that is demonstrated to become due before the stock is projected to drop to BMSY sufficient?

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Interpretation Question and Answers in Detail

1 – Are pre-agreed rules and/or management actions a critical component of a HCR without which a score of 60 could not be achieved? What is meant by 'generally understood' and 'in place' HCR?

There is a difference between 'generally understood' HCRs as applied at SG60 and "well defined" HCRs as applied at SG80. The Certification Requirements Table SA5 are explicit and definitive in this regard. The definition of HCRs currently given in the MSC vocabulary applies at the SG80 level, not at the SG60 level.

As explained in critical guidance, 'generally understood' HCRs do not need to be well defined (e.g. with an explicit hockey stick rule) or explicitly agreed (Guidance to V2.0, section GSA2.5: HCRs should be regarded as only 'generally understood' as required to achieve a 60 score in cases where they can be shown to have been applied in some way in the past, but have not been explicitly defined or agreed), but there should be at least some implicit agreement supported by past management actions from which to understand that 'generally understood' rules exist, and there should be no reason to expect that management will not continue to follow such generally understood rules in future and act to be responsive to changes in indicators of stock status with respect to explicit or implicit reference points.

When determining whether there is a 'generally understood' HCR in place in the fishery under assessment, assessors need to determine whether the fishery will in future take appropriate management action in line with what they perceive as the 'generally understood' rule. Evidence that positive action has been taken in the past should be considered to be evidence that there is a generally understood rule in place.

2 – What sort of evidence must be provided that HCRs are 'generally understood', 'in place' and 'effective' in either the target fishery or the other fishery where HCRs are 'available'?

CABs should apply a precautionary approach to scoring when there is uncertainty over whether a HCR meets the requirements of 'generally understood' and whether there is sufficient evidence to support this. Where there is uncertainty, CABS should follow the precautionary approach (Box GSA1) and award a lower score.

Indefinite promises such as "we agree to implement an HCR sometime" should not be considered 'in place'. Clear reference should be provided to documents or other evidence that actions have been taken on specific previous dates. Promises of vague future action should also not be interpreted as indicating that HCRs are either 'in place' or 'available'. General regulations, such as convention texts or references to the Fish Stocks Agreement do not constitute 'in place' or 'available' HCRs although binding commitments (such as in national law) may do so if supported by evidence of management action. Scientific recommendations on HCRs or reference points that have not yet been adopted by the actual management agency should not yet be regarded as 'in place'. However, teams should also not expect that 'in place' arrangements require formal indefinite binding agreement. Conservation and Management Measures (CMMs) approved by RFMO Commissions and for example regarded as 'active' resolutions, may thus be accepted asin place even if they might still be overturned at some point in the future.

Evidence and examples of the positive actions taken in response to generally understood HCRs should be provided for the target stock in the case that generally understood HCRs are 'in place' or for other stocks in the case that they are 'available'.

There may be both positive and negative examples of management action in the target stock or in associated stocks. Such negative examples need not be exhaustively investigated by the CAB, but clear and recent cases should be considered by the team alongside positive examples. In the case of 'available' HCRs, where there are some negative examples (such as evidence that actions have not been taken previously in other stocks), these should not be assumed to overrule positive evidence from the other species that HCRs are 'available', but this will ultimately be the judgement of the CAB and in cases of uncertainty and doubt, CABs should apply a precautionary judgement.

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Appendix 9 MSC interpretation workshop

P1 ICES Calibration Meeting Minutes

15 June 2017, London, UK

In attendance: Simon Jennings (MSC TAB), Christopher Zimmerman, (MSC TAB), Hans Lassen (P1

Assessor), Mike Pawson (P1 Assessor), Jean-Claude Brêthes (P1 Assessor), Lisa Borges (P1 Assessor), Paul Medley (P1 Assessor), Robert O'Boyle (P1 Assessor), Giuseppe Scarcella (P1 Assessor), Jake Rice (MSC Peer Review College), Hugh Jones (MEC), Rob Blyth-Skyrme (Team Leader), Sergio Cansado (ASI), Jason Combes (ACOURA).

Staff observers: David Agnew (Science and Standards Director), Rohan Currey (Fisheries Standard Director, Megan Atcheson (Senior Fisheries Assessment Manager), Graham Bruford (Training and Assurance Manager), Jean-Charles Gordon (Fisheries Assessment Manager), Vivien Kudelka (Fisheries and Stakeholder Engagement Manager), Margaux Favret (Fisheries Outreach Manager), Joanna Jones (Science and Standards Liaison Support Officer).

1515 – HCRs; Multiannual plants and well-defined [Note taker: JCG]

1.2.2 Harmonisation Comment: EU MAP are not well defined because they don't clearly state the actions that will be taken. Response: TAC is a clear action ICES interpretation on MSY and TAC are actions. I wouldn't look only at legislation; I would also look at other agreements and the overall management approach. Chris Zimmerman: ICES MSY rule is the basis for the plan but the plan doesn't explicitly state ICES MSY rule. Comment: Implemented/enacted is missing from the "in place" interpretation Response: CBD has clear guidance on management plans. Fisheries are part of countries that are signatories to the Aichi targets. CBD states that plans must be in plan to achieve Bmsy targets.

Actions: 1 – Add implemented/enacted in the "in place" interpretation. HCRs can be in place in legislation but not implemented e.g. followed to set a TAC. 2 – HCR effectiveness should be able to be simulated in a management strategy evaluation (MSE). If HCRs have sufficient information and specificity, then assessors should consider MSEs for evaluating the effectiveness of HCRs. This could be considered in the "well defined" interpretation but could also apply to HCR evaluation SI c as well as the harvest strategy PI 1.2.1.

1545 – Wrap up session

Comment: Some parts of the world you don't have a top down management system. Bottom up management can be applicable in some areas for HCRs. Comment: Well defined should be subject to a management strategy evaluation.

1600 – End of meeting.

Appendix 10 Marine Scotland Cod misreporting

Subject: RE: cod area misreporting
Date: Tue, 15 Aug 2017 08:53:31 +0000
From: Gordon.Hart@gov.scot
To: jo.gascoigne@cantab.net
CC: hugh.jones@me-cert.com

Hi Jo

Thank you for your e-mail. Your query has required a little detective work because the figures shown in the stock assessment papers do not accord with any official figures that we hold, and we are not aware of any held by any other Member State.

After some investigation however I've been able to establish that the estimated figures in question originate from provisional Compliance analysis on suspected area misreporting by Scottish demersal vessels operating in Areas VI and IV.

Monitoring of VMS and e-log systems has allowed MS Compliance to identify fishing trips where there is suspicion that misreporting has occurred. This does not prove or show that actual misreporting has taken place, nor does it produce an actual tonnage count but merely provides an indicator as to where compliance resources might be best deployed to maximise effective enforcement activity. These figures are produced for internal purposes and have not been reported to science by either policy managers or Compliance officers, and we would regard them as unverified. We also suspect that they may contain an element of double counting. We understand that the calculated estimates may have been added to VIa catches, but not deducted from IV catches. In the circumstances, the estimated data appears to have been used for a purpose for which it was never intended.

In terms of the actual real world problem, we do monitor the activity of Scottish vessels active in VIa and IV in the same trip, and analysis is undertaken to detect and deter risks of misreporting. Where this is suspected, arrangements are in place to vary the licences of relevant vessels to prohibit them from taking catches in more than one ICES area for a set period. This approach has had some notable success in deterring potential misreporting, but the position is monitored as a matter of routine.

Our experience in real world cases is of demersal tonnages potentially misreported that are normally considerably less than 10 tonnes by species, and often much less, in the cases that have warranted review.

In any case thank you for bringing this to our intention. We may well raise with scientific colleagues.

Best

Gordon

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Appendix 11 – Whiting in division 6a

Source: (ICES 2017o)

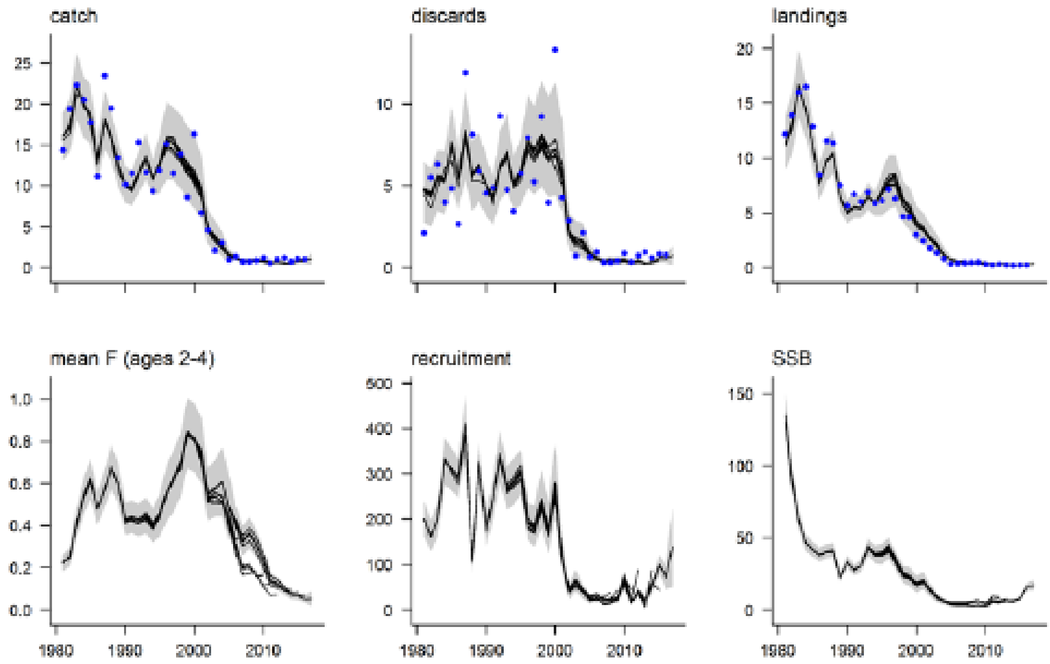

Figure 38.15. Whiting in Division 27.6.a. Retrospective plots of TSA run (the retro analysis for 2007–2016). Catch, landings, discards and SSB in tonnes, recruitment in thousands. Blue points show observed values, black lines show estimates in the respective years, grey bands show confidence intervals for the last estimate.