MACALISTER ELLIOTT AND PARTNERS LTD.

Public Certification Report

Fishery for Northeast Arctic cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*) by Euronor and Compagnie des Pêches St. Malo

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REPORT SUMMARY

This report is the Public Certification Report for the Marine Stewardship Council (MSC) assessment of the Northeast Arctic cod and haddock fishery by two French fishing companies: Euronor (Boulogne-sur-mer) and Compagnie des Pêches St. Malo. These companies were assessed together because they are members of the same Producer Organisation – FROM Nord, who was the client for the assessment.

The fishery operates in ICES Subareas I and II by bottom trawl with 140-150 mm mesh codend and an 80 mm sorting grid. The catch for each company in 2010 was 2705 tonnes of cod and 581 tonnes of haddock for Cie des Pêches St. Malo and 999 tonnes of cod and 98 tonnes of haddock for Euronor. By-catch is low and only saithe by-catch is significant. Saithe catch is retained as a secondary target species. The saithe caught in this fishery by both companies is already MSC-certified. Discarding is forbidden, and unwanted or damaged fish is in the main landed for fishmeal. No interactions with protected species were identified. Habitats are to some extent protected under Norwegian legislation – particularly under new rules due to come into force on 1 September 2011. There is also an ecosystem management plan for the Barents Sea.

The stocks are managed jointly by Norway and Russia under the auspices of the Joint Norwegian-Russian Fisheries Commission (JNRFC) who take management decisions on the basis of an agreed management plan and reference points. The EU receives a proportion of the TAC by agreement with Norway and Russia. Scientific advice is provided by the ICES Arctic Fisheries Working Group each year, and they have focused a lot of work on ecological modelling of the Barents Sea ecosystem, particularly the trophic interactions of cod, which is a keystone species.

The fishery operates in the Norwegian EEZ and in the Svalbard Fisheries Protection Zone – both under the jurisdiction of Norway. Monitoring, control and surveillance (MCS) is by VMS, radio checks, daily catch reports, logbook submissions (electronic logbooks in use) and checks at sea and at port. MCS is known to be very strict in areas under Norwegian jurisdiction. There are no infractions reported by the Norwegians against any of the vessels in the Unit of Certification.

The fishery was assessed by a team from the Certification Body MacAlister Elliott and Partners (MEP), on 4-6 January 2011 in Boulogne-sur-mer. The team included Dr Jo Gascoigne (MEP - Team Leader, Principle 2), Prof. Jean-Claude Brêthes (Université Québec Rimouski – Principle 1) and Dr Sophie des Cler (independent – Principle 3).

Principle 1 scored an average of 91.9 for cod and 89.4 for haddock. There were no PIs scoring less than 80 for Principle 1. Principle 2 scored an average of 87.7 for both species and companies. Principle 3 scored an average of 89.75 for both species and companies. No PIs scored less than 80 for Principle 3. For Principle 2, one PI scored <80 : habitat outcome. The assessment team were concerned about impacts of trawling on vulnerable habitats (sponges and corals). The fisheries have presented an action plan with the aim of detecting and if necessary reducing these impacts.

The MEP Certification Committee met on the 28th February 2012 to consider the report, peer reviews and stakeholder comments, and concluded that the fishery **should be** certified MSC.

RESUME DU RAPPORT

Ce rapport est le rapport préliminaire à consultation publique qui détaille l'évaluation MSC (Marine Stewardship Council) de la pêcherie de cabillaud et d'églefin dans l'arctique nord-est, par deux armements français : Euronor (Boulogne-sur-Mer) et la Compagnie des Pêches St. Malo. Les armements ont été évalués ensemble dans le cadre de leur organisation producteur : le FROM Nord, client pour l'évaluation.

La pêcherie a lieu dans les sous-zones CIEM I et II, avec des chaluts de fond au maillage de 140-150 mm et une grille d'échappement de 80 mm. Les captures par armement étaient en 2010 : 2705 t (cabillaud) et 581 t (églefin) pour Cie des Pêches St. Malo, et 999 t (cabillaud) et 98 t (églefin) pour Euronor. Les prises accessoires ne sont pas importantes, avec l'exception du lieu noir, une espèce cible secondaire. Les captures de lieu noir par chaque armement ont déjà la certification MSC. Les rejets sont interdits dans la pêcherie, et les poissons abîmés ou non-vendables sont pour la plupart débarqués pour la production de farine. On n'a pas identifié des interactions avec des espèces protégées. Les habitats sont protégés par la législation norvégienne – surtout par des règles qui vont entrer en force le 1er septembre 2011. Il existe aussi un plan de gestion de l'écosystème pour la mer de Barents.

La gestion des stocks est conjointe entre la Norvège et la Russie, dans le cadre du « Joint Norwegian-Russian Fisheries Commission » (JNRFC) ou la commission conjointe des pêcheries Norvège-Russie. La commission prend les décisions de gestion en fonction d'un plan de gestion et des points de référence agréés. L'UE reçoit une partie du TAC par un accord avec la Norvège et la Russie. Le groupe de travail des pêcheries de l'arctique (Arctic Fisheries Working Group) du CIEM propose un avis scientifique annuel pour chaque stock. Beaucoup de travail a été investi par ce groupe dans la modélisation écologique de l'écosystème de la mer de Barents, et en particulier dans les interactions trophiques du cabillaud, qui est une espèce clé.

La pêcherie est réalisée dans la ZEE norvégienne et dans la Zone de Protection de Pêche de Svalbard. Ces deux zones sont sous la juridiction de la Norvège. Le suivi, le contrôle et la surveillance (SCS) sont faits par le VMS (Vessel Monitoring System), les contrôles par radio, les rapports quotidiens de captures, la soumission électronique de logbooks et des contrôles en mer et dans les ports. Le SCS est très strict dans les zones sous juridiction norvégienne et aucune infraction n'a été signalée contre les navires dans l'unité de certification.

La pêcherie a été évaluée par une équipe de l'organisme de certification MEP (MacAlister Elliott & Partner Ltd.), du 4 au 6 Janvier 2011, à Boulogne-sur-Mer. Les membres de l'équipe étaient : Dr Jo Gascoigne (MEP – Chef de l'Equipe, Principe 2),

Prof. Jean-Claude Brêthes (Université Québec Rimouski – Principe 1) et Dr Sophie des Cler (indépendante – Principe 3).

Le Principe 1 était de 91.9 pour le cabillaud et de 89.4 pour l'églefin en moyen. Aucun IP n'a été noté à moins de 80 pour ce Principe. Le Principe 2 était de 88.3 en moyen pour les deux espèces et armements. Le Principe 3 était de 89.75 en moyen pour les deux espèces et armements. Aucun IP n'a été noté à moins de 80 pour le Principe 3. Pour le Principe 2, une IP a été noté à <80 : impacts sur les habitats. L'équipe d'évaluation était concerné par les impacts du chalut sur les habitats vulnérables : les éponges et les corails. Les pêcheries ont présenté un plan d'action avec pour but la détection et si nécessaire réduction de ces impacts.

Le Comité de Certification MEP s'est réuni le 28 février pour considération du rapport, revues externes et commentaires des parties prenantes. Le Comité a conclu que cette pêcherie **devrait être** certifiée MSC.

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1. INTRODUCTION

1.1. GENERAL BACKGROUND

The Marine Stewardship Council (MSC) is a non-profit organisation, which aims to use market mechanisms to support the long-term sustainability of marine fisheries. MSC has developed a standard for well managed and sustainable fisheries, and an associated methodology for assessing individual fisheries against the standard – this collectively is now called the Fisheries Assessment Methodology (FAM) (1). The standard and methodology is periodically updated. This assessment uses version 2 of 31 July 2009 - the current version at the time the assessment was started. Assessments are carried out by private companies (Certification Bodies – CBs) who are accredited to carrying out MSC assessments by the accreditation organisation Accreditation Services International (ASI).

This report is the Public Certification Report for the fisheries for cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*) of the northeast Arctic (NEA) stocks (ICES Subarea I and Divisions IIa and IIb) by two French fishing companies – Euronor and the Compagnie des Pêches St. Malo, which are linked by their membership of the Producer Organisation FROM Nord, who are the overall coordinating body for this assessment. The report has been prepared by an assessment team from the CAB MacAlister Elliott and Partners Ltd. (MEP). The report will be available on the MSC website. For a period of 15 working days after the publication of this report, the MSC system is open for objections to the certification determination.

Full information on the MSC objections procedure is available here: http://www.msc.org/get-certified/fisheries/assessment-process/assessment/objections, or from MEP on request to Chrissie Sieben (chrissie.sieben@macalister-elliott.com).

1.2. THE CLIENT

The client for this assessment is the Producer Organisation FROM Nord, based in Boulogne-sur-mer (France). FROM Nord is representing two of its members, the fishing companies 'Euronor', based in Boulogne s/mer and the 'Compagnie des Pêches St. Malo', based in St. Malo, who are under assessment. Euronor has three vessels in the Unit of Certification, while the Cie des Pêches St. Malo has one – details of vessels and operations are given below.

1.3. UNITS OF CERTIFICATION

The unit of certification defines exactly what is being assessed and certified. It is set out at the beginning of the assessment process (in the Notification Report to MSC).

This report covers four Units of Certification: Euronor cod and haddock and Cie des Pêches St. Malo cod and haddock, in Northeast Arctic (NEA) ICES sub-areas I and II. Details are given below:

Cie des Pêches St. Malo: The Cie des Pêches St. Malo has one vessel that fishes for cod and haddock – the Grande Hermine (details of the vessel given below). The Grande Hermine targets cod and haddock (and to a lesser extent saithe – *Pollachius virens*) in the northeast Arctic (ICES Subareas I and II). The Grande Hermine also targets saithe in the North Sea. The saithe fishery in the Northeast Arctic and the North Sea by Cie des Pêches St. Malo (the Grande Hermine) was certified sustainable on 25 January 2011 (2). Note that any by-catch of cod or haddock by the Grande Hermine from areas other than the NE Arctic is not included in this current assessment.

Euronor: Euronor has three vessels that fish for cod and haddock in the Northeast Arctic (ICES Subareas I and II) – the Cap Nord, the Klondyke and the Nordic II. These vessels also target saithe, and the saithe fishery was certified MSC on 10 March 2010 (3). These vessels also target saithe in the North Sea, along with other Euronor vessels. Note that any by-catch of cod or haddock from areas other than the NE Arctic is not included in this current assessment. Since January 2011, Euronor has been owned by UK Fisheries Ltd., but still operates independently as a French fishing company.

1.4. ASSESSMENT TEAM AND PEER REVIEWERS

The assessment team was made up of three experts, each of whom has competences in fisheries assessment, marine ecology and fisheries management – i.e. in each of the three Principles of the MSC standard. All three experts therefore had equal input on the scoring of each PI in each of the three Principles. For the purpose of drafting the rationales and reporting, each member of the team took responsibility for one of the Principles, and their drafts were then reviewed and revised by the other two team members.

The assessment team was composed of the following individuals:

Prof. Jean-Claude Brêthes: Jean-Claude is professor of fisheries science at the Institut des Sciences de la Mer, Université de Québec à Rimouski and an expert in fisheries analysis and stock assessment. He is involved in several completed or ongoing MSC assessments (Gulf of St. Lawrence northern shrimp, Euronor and Scapêche / Cie des Pêches St. Malo saithe, Normandy-Jersey lobster and Mauritania mullet trial assessment (for information on all these assessments and those listed below, see the MSC website). Jean-Claude was responsible for Principle 1.

Dr. Jo Gascoigne: Jo is the Director for Fisheries Certification at MEP and a former research lecturer in marine biology at Bangor University. She has been involved in several previous assessments (Euronor and Scapêche / Cie des Pêches St. Malo saithe, northern Menai Strait mussel, UK Fisheries / DFFU / Doggerbank saithe, Normandy-Jersey lobster, Tristan da Cunha rock lobster and Mauritania mullet trial assessment), as

well as several ongoing assessments (UK Fisheries / DFFU / Doggerbank cod and haddock, SARPC toothfish, SFSAG saithe and SFSAG *Nephrops*). Jo was responsible for Principle 2, and was the Project Manager for the assessment.

Dr Sophie des Clers: Sophie des Clers is an independent expert in fisheries management and socioeconomics, as well as an affiliated research fellow of University College London. She is involved in several other completed or ongoing MSC assessments (Biscay sardine seine, Normandy-Jersey lobster, UK Fisheries / DFFU / Doggerbank cod and haddock, SFSAG saithe). She was in charge of Principle 3 for this assessment.

The peer reviewers were the following:

Dr. Jan Hiddink: Jan is a senior lecturer at Bangor University, specialising on the ecosystem-level impacts and consequences of fishing. His particular geographical areas of expertise are the North Sea and Irish Sea, but he has also worked in West Africa and elsewhere.

Dr Matthew Cieri: Matt has a PhD from the University of Maine and has worked at Woods Hole and for the State of Maine as a fisheries scientist. He is a member of the Sustainable Fisheries Partnership FishSource team, and a specialist in predator-prey interactions in fish.

CVs for these experts and the peer reviewers are available on the MSC website.

2. BACKGROUND TO THE FISHERY

2.1. TARGET SPECIES

Cod (*Gadus morhua*) is the most iconic fishery species of the north Atlantic, and has such has suffered considerable depletion of several populations. The North Sea and Newfoundland populations are at or close to historic lows, and the Greenland and Iceland populations are also somewhat depleted, as are many coastal populations (4,5,6). The focus of fishing effort on cod has shifted to a large extent to the offshore Norwegian Sea and Barents Sea stock (under consideration here), which is still in good shape (7).

Cod can be found from the surface down to around 600m depth, but is most abundant between 150m and 200m (8). They are generalist demersal carnivores, feeding on any invertebrates or fish of the appropriate size, including capelin, argentine, pout, sand eels and juveniles of other demersal species, including cod.

Haddock (*Melanogrammus aeglefinus*) has a similar geographic range to cod, although perhaps with a slightly more southerly core – it is rare around Greenland and reaches a little further south along the east coast of North America (9). Haddock also tends to be found slightly shallower than cod, preferring a depth range of ~75-200m, although it can also be found down to 600m (10). Nonetheless, its ecology is similar to that of cod, to which it is closely related. Haddock are also generalist demersal carnivores that feed on both invertebrates and fish. They are, however, more likely to feed demersally on benthic invertebrates than cod, which are more strongly piscivorous (11).

Haddock is also a prized commercial fisheries species, particularly in Scotland where it is traditionally preferred to cod. The large wholesale fish auctions in the UK, such as Hull, traditionally grouped fish into three categories: cod, haddock and 'rough' (i.e. everything else). This is of course no longer the case, but it illustrates the iconic status of these two species in northwest European fisheries. Nonetheless, haddock has usually fetched a slightly lower price than cod, and probably as a result stocks are in better shape than cod stocks in most areas (e.g.12).

2.2. VESSELS, GEAR AND FISHING OPERATIONS

2.2.1. EURONOR

Euronor has three freezer trawler vessels participating in the NEA cod and haddock fishery at the moment (Table 1), and seven fishing vessels overall. Each of the three freezer trawlers make one trip per year to the NE Arctic (since Euronor's quota is not sufficient for more than that). The maximum duration of each trip depends on the fuel capacity, which is 38 days for the Nordic II and 55 days for the Klondyke and Cap Nord – however trips may be shorter, depending on quota. The other four trawler vessels are equipped for fresh fish only at present and therefore cannot venture so far from home.

Euronor vessels land their catch exclusively in Boulogne s/mer (France), although they have occasionally used Cuxhaven (Germany) in the past – usually only when vessels are in the area and have a technical problem.

2.2.2. CIE DES PÊCHES ST. MALO

The Cie des Pêches St. Malo has one vessel in the NEA cod and haddock fishery – the Grande Hermine (Table 1). She makes 70-90 day trips, mainly in ICES Subarea I and II (Northeast Arctic) targeting cod and haddock, and to a lesser extent saithe. She also occasionally fishes in Subarea IV (northern North Sea) targeting saithe. Catch is landed in Hammerfest (Norway), St. Malo (France) and occasionally Cuxhaven and Bremerhaven (Germany).

Table 1. Euronor and Cie des Pêches St. Malo vessel details

Company	Vessel	Length (m)	GRT	Type	Gear type
Euronor	Cap Nord	54.55	1492	Freezer	Single otter trawl
Euronor	Klondyke	54.55	1491	Freezer	Single otter trawl
Euronor	Nordic II	54.25	861	Freezer	Single otter trawl
C.Pêche St.Malo	Grande Hermine	61.55	1595	Freezer	Single otter trawl

2.3. DESCRIPTION OF GEAR

The three Euronor vessels in the Unit of Certification use otter boards (trawl doors) of 2300 kg, 3.6m x 2.3m (8.3m^2), with 140mm mesh. The Grande Hermine uses 2000 kg trawl doors of 7.2m^2. The Grande Hermine uses 140mm mesh in winter and 150mm in summer, since in their experience this helps to avoid catching juvenile fish during the summer. The legal minimum mesh size is 130mm.

The trawl must also include a sorting grid, and Euronor and the Grande Hermine use one with an 80mm grill, although regulations require a 50mm grill (Figure 1). This also helps to eliminate small fish without damage. For fishing at Bear Island (the Svalbard Fisheries Protection Zone – see Figure 2 below), an escapement panel of 160-170mm square mesh, measuring 7 squares by 20 squares is also used during the period late June and July, again to eliminate juvenile fish.

Figure 1. The sorting grid used by Euronor vessels in the NE Arctic. The Grande Hermine uses a similar one.

2.4. FISHING AREA AND DEPTH

The management regime is relatively complex in the waters around northern Norway (Figure 2). Euronor and the Cie des Pêches St. Malo fish for cod and haddock in the Norwegian Economic Zone (NEZ) and the fishery protection zone around Svalbard[1] (also called 'Bear Island' – Bear Island (Bjørnøya) being the small island south of Svalbard around which most of the fishing in the Svalbard protection zone takes place). Both these areas are under direct Norwegian control. The 'adjacent area' is managed under an agreement between Russia and Norway. The fishing depth is 120m-350m.

[1] Svalbard is the name of the archipelago of which Spitzbergen (or Spitsbergen) is the largest island.

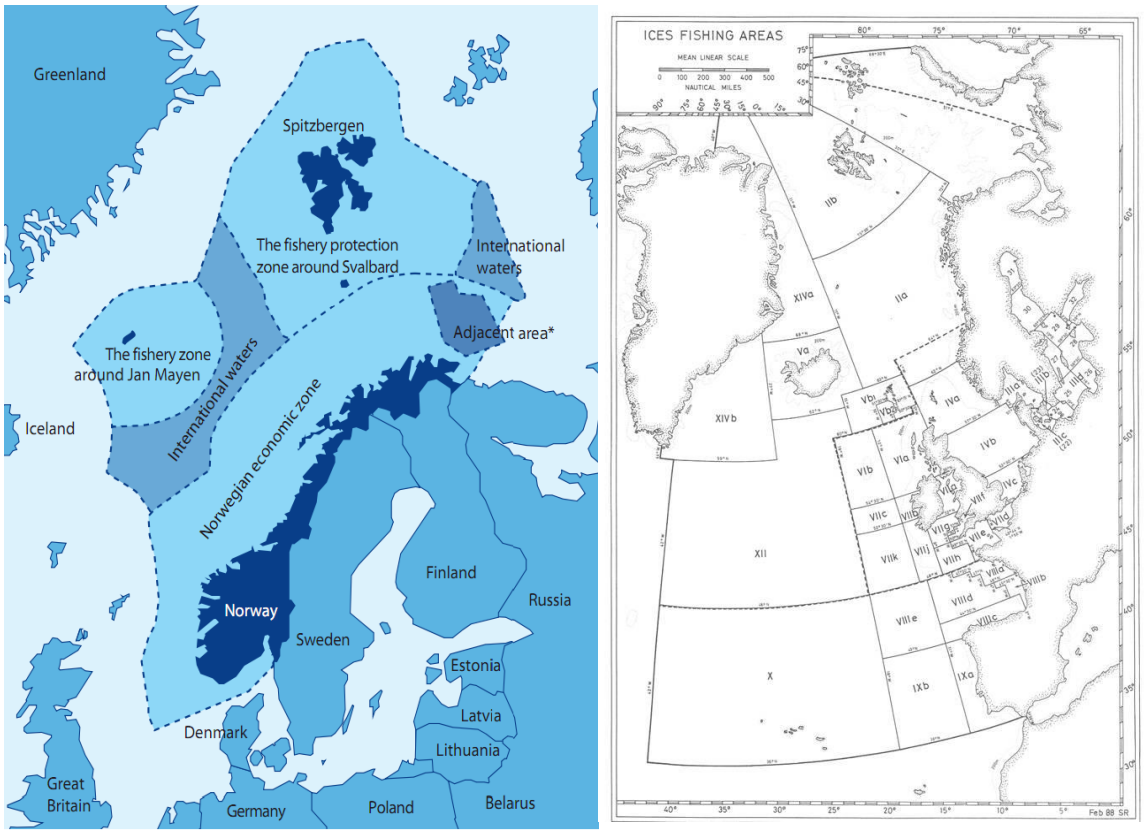

Figure 2. Fisheries jurisdictions in Norwegian waters (left) and ICES management areas (right).

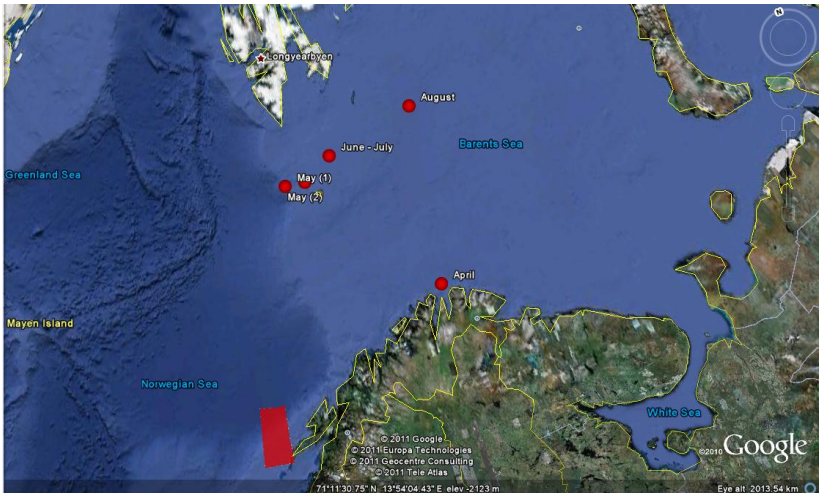

Figure 3. Fishing in the Northeast Arctic by the Grande Hermine in 2010

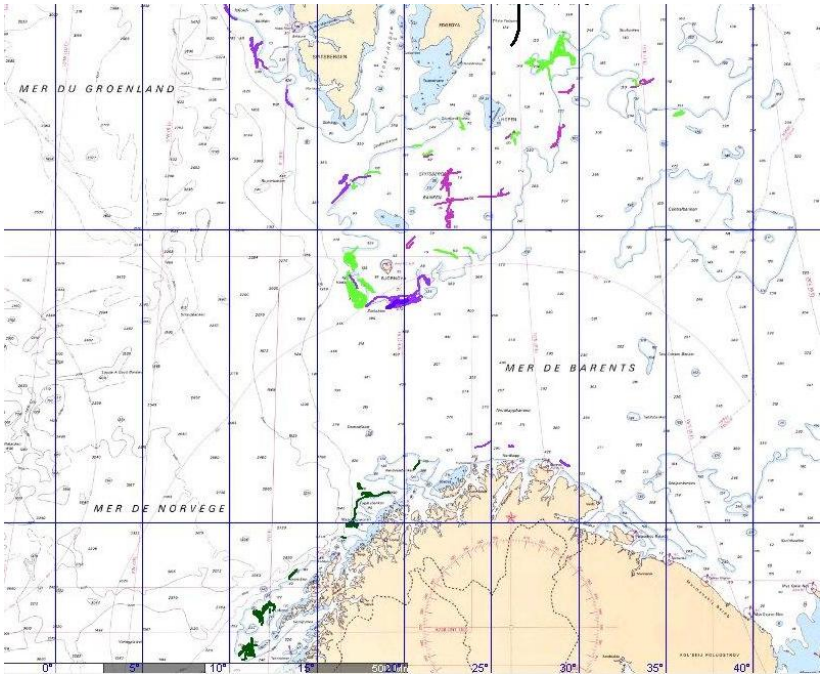

Figure 4. Fishing in the Northeast Arctic by the Cap Nord, Nordic II and Klondyke in 2010

2.5. COD AND HADDOCK CATCH

Catches of cod and haddock from the NEA stock for 2008-2010 for each vessel in the Unit of Certification are given in Table 2.

Table 2. Catches of cod and haddock in tonnes in 2008, 2009 and 2010 for each Unit of Certification, in tonnes live weight. Note that catches of cod and haddock taken as by-catch from the North Sea and West of Scotland saithe fishery (i.e. from ICES Division IIIa and Subareas IV and VI) are not included in the table because they are not part of the Unit of Certification.

Company	Cod 2008	Haddock 2008	Cod 2009	Haddock 2009	Cod 2010	Haddock 2010
Cie des Pêches St. Malo	2143	2143	2584	451	2705	581
Euronor	1112	93	1325	75.9	999	98.3

2.6. RETAINED SPECIES, BY-CATCH AND INTERACTIONS WITH ETP SPECIES

2.6.1. RETAINED SPECIES

The MSC standard distinguishes between retained species and by-catch, with retained species those that are kept and marketed along with the target species, and by-catch those that are discarded (1). This distinction is important because retained species feature in the logbooks and discarded species do not.

Retained species for the fishery under assessment are given in Table 3 and

Table 4, taken from logbook data for 2009 and 2010.

Table 3. Retained species catch by Euronor vessels in the Unit of Certification from the NEA cod and haddock fishery in tonnes live weight. Percentages are calculated on the basis of live weight equivalent. Species are listed in order of size of landings for 2009. Blank squares indicate zero landings, 0.00 indicates landings of <10kg live weight.

species (fr)	species (en)	species (sci.)	catch 2009	catch 2010	% catch 2009	% catch 2010
lieu noir	saithe	*Pollachius virens*	102	25.6	6.72	2.27
sébaste	redfish	*Sebastes* spp.	9.95	0.26	0.66	0.02
loup de l'Atlantique	wolffish or catfish	*Anarhichas lupus*	3.72		0.25	
lingue	ling	*Molva molva*	1.61		0.11	
flétan blanc	Atlantic halibut	*Hippoglossus hippoglossus*	0.417	0.16	0.03	0.01
flétan noir	Greenland halibut	*Reinhardtius hippoglossoides*	0.248		0.02	
lieu jaune	pollack	*Pollachius pollachius*	0.219		0.01	
merlu	hake	*Merluccius merluccius*	0.137		0.01	
baudroie	monkfish	*Lophius piscatorius*	0.085		0.01	
divers*	various*		0.053	2.13	0.00	0.19

*** 'discards' which cannot be discarded under the Norwegian Marine Resources Act 2008 (see below) – made up mainly of non-commercial species and damaged fish.**

Table 4. Catches of other species by the Grande Hermine from logbook data from the northeast Arctic (ICES Subareas I and II), in tonnes live weight. Percentages are calculated on the basis of live weight equivalent. Species are listed in decreasing order of tonnes landed in 2009. As above, blank squares indicate zero landings.

species (fr)	species (en)	species (sci.)	catch 2009	catch 2010	% catch 2009	% catch 2010
lieu noir	saithe	*Pollachius virens*	221	150	6.75	4.33
sébaste	redfish	*Sebastes marinus / mentella*	9.72	12.1	0.30	0.35
loup	wolf fish	*Anarhichas lupus*	3.86	15.0	0.12	0.43
flétan noir	Greenland halibut	*Reinhardtius hippoglossoides*	6.58	2.23	0.20	0.06
lingue	ling	*Molva molva*	1.82		0.06	
flétan de l'Atlantique	Atlantic halibut	*Hippoglossus hippoglossus*		0.53		0.01

2.6.2. DISCARDS

There is no discarding associated with this fishery, since it takes place in Norwegian waters where discarding is forbidden. Previously, discarding of commercial species was forbidden but under the updated Norwegian Marine Resources Act (2008), all discarding is forbidden (13). This includes catch eaten by the crew.

The discard ban means that any vessel catching undersized fish or species for which it has no quota is automatically in an illegal situation. These fish cannot legally be discarded, nor can they legally be retained, even if they are used to feed the crew, for fishmeal etc. Norwegian inspectors will check the details of the fishmeal bin, crew menu and will follow up any evidence of discarded fish. This provides a strong incentive for vessels to use large mesh sizes and ensure that undersized fish are not caught.

In relation to species for which vessels have no quota – in 2010 the rules were updated so that vessels entering the Norwegian zone had to report their quota holdings not only for the target species but also for species considered to be possible by-catch. Lack of quota for any of these species results in the vessel being excluded from the zone.

2.6.3. ENDANGERED, THREATENED AND PROTECTED (ETP) SPECIES

In northeast Atlantic trawl fisheries in general, the key interaction with an ETP species is with the common skate (*Dipturus batis*). The common skate is listed on the IUCN Red List as critically endangered (14) and is protected under EU fisheries legislation (15). The latest ICES advice recommends that target fisheries for this species should not be permitted and measures should be taken to minimize bycatch (16). The common skate,

however, if it overlaps with this fishery at all, it does so only at the very northerly edge of its range (17), and as noted above there is no evidence of any interaction with this fishery.

As regards skates and rays in general, according to Dolgov (18) the vast majority of rays caught by commercial fisheries in the Barents Sea (96% by abundance and 92% by biomass) is the thorny skate or starry ray *Amblyraja radiata*. This species is assessed as 'vulnerable' overall, but of 'least concern' in the northeast Atlantic (19) In this case, since discarding is forbidden and no rays are reported in logbook data, small catches of rays can only occur under 'divers'.

2.7. ECOSYSTEM CONTEXT

Information in this section comes from AFWG report 2010 (11) unless otherwise indicated.

The Barents Sea is on the Arctic continental shelf. It has an average depth of 230m, and a maximum depth of about 500m at the western end of Bear Island Trough. Its topography is characterized by troughs and basins (300 m – 500m deep), separated by shallow bank areas, with depths ranging from 100-200 m. The general pattern of circulation is characterised by an inflow of relatively warm Atlantic water from the southwest and of cold Arctic water from the northeast, with these water masses separated by the Polar Front which is usually around the vicinity of Bear Island. There can be large inter-annual variability in oceanographic conditions related to variable strength in these two inflows and the precise position of the Polar Front.

The Barents Sea, in common with other high latitude marine ecosystems, has extremely high primary production from spring to autumn, but low (more or less zero) primary production in winter due to low light levels and strong wind-induced mixing. This means that the ecosystem supports large populations of secondary producers (zooplankton and small pelagic fish species such as capelin, herring, sand eels etc.) but that the size and growth rate of these populations is very dependent on environmental conditions.

More than 200 fish species are registered during surveys of the Barents Sea, with nearly 100 of them occurring regularly. Commercially important fish species include cod, haddock, saithe, capelin, and spring-spawning herring. Species distributions largely depend on the position of the Polar Front (see 20). The distribution of cod and haddock is largely overlapping. There have been significant variations in abundance and recruitment of many of these fish species due to a combination of fishing pressure and environmental variability (weather, food availability and in some cases predator abundance and distribution). Variation in the recruitment of some important species (cod, haddock and herring) can be linked to changes in the influx of Atlantic waters into the Barents Sea.

Cod, capelin, and herring are considered to be the keystone species in the Barents Sea food web. Capelin are the most important prey species in the Barents Sea: cod prey on capelin, herring, and smaller cod, while herring prey on capelin larvae. Cod is the most important predatory fish species in the Barents Sea in terms of biomass and ecosystem impact, and can feed on a wide range of prey, including larger zooplankton, most fish species and shrimp, although capelin is their preferred prey, followed most likely by euphausiids (krill). Fluctuations of the capelin stock have a strong effect on growth, maturation and fecundity of cod, as well as on cod recruitment. Herring and capelin populations are also linked, with a strong year class of herring leading to poor recruitment of capelin, presumably due to predation pressure. Other important fish species are haddock and saithe, redfish (now less important in the ecosystem due to

heavy overfishing in the 1980s), Greenland halibut, long rough dab and rays (see above). Blue whiting may be present in large numbers in years when Atlantic influence is strong.

About 25 species of marine mammals regularly occur in the Barents Sea, including seven species of pinnipeds (seals and walruses), 12 whales, 5 porpoises and dolphins and polar bear. Some of these species are migratory, and use the Barents Sea as a summer feeding area (e.g. minke whale), while others are resident (e.g. white-beaked dolphin, harbour porpoise). Marine mammals in the Barents Sea may consume up to 1.5 times the amount of fish caught in fisheries – for example, it has been calculated that the minke whale population consumes ~1.8 million tonnes of crustaceans (krill and other similar species), while harp seals consume 3-5 million tonnes of fish; mainly capelin, herring, polar cod (*Boreogadus saida*) and other gadoids.

The Barents Sea is home to ~20 million seabirds (one of the largest concentrations of seabirds in the world), who also harvest ~1.2 million tonnes of biomass from the marine ecosystem. Nearly 40 species are thought to breed regularly in the Norwegian and Barents Seas - particularly auks, gulls and fulmars.

Benthic ecosystems in the area are of course variable, but are generally composed of soft substrata with an infauna dominated by polychaetes and bivalves. Some rocky areas host diverse sponge communities and it is also an important area for deep-water corals (*Lophelia pertusa*), particularly close to the Norwegian coast (although this might be at least partly because they are better mapped in coastal areas. These deep-sea sponge and cold water coral communities are designated by OSPAR as vulnerable habitats (21), and are known to be susceptible to damage by bottom trawls.

2.8. INTERACTIONS WITH OTHER FISHERIES

2.8.1. OTHER LANDINGS OF COD AND HADDOCK

The NEA stocks of cod and haddock are shared between Norway and Russia, and both countries have significant landings, with Norwegian landings dominating the overall catch. The EU also takes a share of the TACs under historic rights, although it plays no significant role in the management of the stock. EU vessels from France, Germany, UK and elsewhere have quota for NEA cod and haddock, as do some vessels from the Faroe Islands. Around three quarters of the catch is taken by trawl, with the remainder taken using other gears (longline, Danish seine, gillnets). Details of TACs for the relevant NEA stocks are given below.

The coastal cod fishery in Norway (ICES Subareas I and II) is currently in a poor state, with recruitment apparently compromised by low spawning stock biomass (6). This appears to be a separate stock to the offshore NEA stock under consideration here – in fact, genetic studies suggest that individual fjords may host separate populations of cod. Certainly the slow recovery of this stock despite the healthy state of offshore population suggests that connectivity between the two stocks is low. It is not, however, always easy

to separate catches from the inshore and offshore stocks in the fisheries statistics. ICES has historically considered catches between 62ºN and 67ºN for the whole year and catches between 67ºN and 69ºN for the second half of the year to be Norwegian coastal cod for assessment purposes.

2.8.2. INTERACTIONS WITH OTHER SPECIES

The cod and haddock fishery also takes saithe (*Pollachius virens*) as a third target species. Total reported landings of saithe from the NEA stock were 185 mt in 2008 and 161 mt in 2009 (22). Again, Norway has most of the quota, with a share going to Russia, the EU and the Faroe Islands. The saithe stock is considered in be in good condition and the saithe catch on this stock by both Euronor and Cie des Pêches St. Malo is MSC certified.

ICES notes (7) that since interspecies interactions are known to be strong in the Barents Sea, the fisheries for cod, haddock and saithe all interact with each other, as well as with other commercially important species. Of these, redfish (*Sebastes marinus* and *S. mentella*) is the most significant, since there is concern about the status of these stocks due to recruitment failure over a decade from 1995-2005 (23). This fishery is now significantly restricted.

3. MANAGEMENT SYSTEM

3.1. LEGISLATIVE CONTEXT

The NEA cod and haddock fisheries take place entirely in Norwegian waters of the Norwegian Economic Zone in the Barents Sea. In Norwegian waters, commercial fisheries are regulated by the Marine Resources Act of 6 June 2008 no. 37 relating to the management of wild living marine resources (13).

Access to Norwegian fisheries is granted to European vessels through the EU - Norway bilateral framework agreement that came in force in 1981 (24). For the NEA cod and haddock stocks, which are not shared with Europe, the arrangements allow for the transfer of fishing possibilities, joint technical measures and issues related to control and enforcement. The EU and the Norwegian Government (Ministry of Fisheries and Coastal Affairs) meet annually to review access and management measures (25). Since 2010 decisions have been delayed by disagreements regarding quota shares and reciprocal access for other stocks in the same framework. In 2011, European vessels, including the vessels considered in this report, had to delay the start of their fishing season in Norwegian waters until an agreement was finally reached.

Both NEA cod and haddock stocks are shared 50:50 between Norway and the Russian federation (26). The Joint Norwegian-Russian Fisheries Commission, established 11 April 1975, meets annually to fix the TACs and their sharing between Norway, Russia and third countries. TACs established by the Commission are based on recommendations given by ICES where both Norwegian and Russian scientists participate (27).

French fishing vessels are under the jurisdiction of their own Ministry of Fisheries - the flag state - and the European Common Fisheries Policy (28), wherever they operate. For matters regarding compliance with the vessels operations and crew, fisheries enforcement at sea and landings in France, the legal framework is provided by the Code rural et de la pêche maritime (29).

3.2. ORGANISATIONS INVOLVED IN MANAGEMENT

A number of organisations are involved in the management of this fishery, and notably:

- ICES, the international advisory body for the fisheries authorities of countries around the North Atlantic, is responsible for assessing the stock.

- The Arctic Fisheries Working Group (AFWG) reports to ICES ACOM that gives scientific advice on management of NEA stocks and recommends appropriate TACs.

- The leading Norwegian fisheries research organisation is the Institute of Marine Research (IMR, 30) based in Bergen with another base in Tromsö and three research stations along the coast.

- TACs and other management regulations are set annually by the Joint Norwegian-Russian Fisheries Commission (JNRFC, see 31) and adopted by the both governments

Fisheries controls (monitoring of VMS, control of landings in Norwegian ports, VHS checks) are run by the Norwegian Directorate of Fisheries (part of the Ministry of Fisheries and Coastal Affairs, 32).

- The Norwegian Coast Guard, part of the Royal Navy, is responsible for controls at sea – over 1800 in 2010 with more than 60% directed at foreign vessels (32).

- The North East Atlantic Fisheries Commission (NEAFC) is the Regional Fisheries Management Organisation co-ordinates Port State Controls (33).

- At local level in France, controls are under the responsibility of the French inter-ministerial offices of the Délégation à la mer et au littoral de Boulogne s/Mer (DML 62) for Euronor, and the DML 35 for Companie des Pêches St. Malo.

- The European Commission DG MARE, Directorate B – International Affairs and Market negotiates access to Norwegian fisheries for European vessels.

- The North Sea RAC is the stakeholder body for EU vessels fishing in the Northeast Arctic fisheries. Questions relating to specific management measures proposed by Norway and to delays linked to negotiations about other fisheries are discussed by its Demersal Working Group (34).

- Euronor and the Compagnie des Pêches St. Malo belong to the Producer Organisation (PO) FROM Nord, the client for this assessment. FROM Nord manages their quota for NEA cod and haddock (and other species) which is allocated based on historic track records and agreement between members of the PO.

3.3. MANAGEMENT PLANS AND OBJECTIVES

The JNRFC has defined a management plan for NEA cod and NEA haddock stocks, with the following objectives in each case (35):

- Maintain conditions for high long-term yield;
- Year-to-year stability in the TACs;
- Full utilisation of all available information on the stock in defining management measures.

Both management plans have been evaluated by ICES and are considered to be in accordance with the precautionary approach (7,36).

3.4. HARVEST STRATEGY

The main management strategy for the stocks, as set out in the management plans, is control of harvest via an annual TAC, which is then divided into quotas by negotiation. The TACs for cod and haddock for these stocks are set, as noted above, by the Joint Norwegian-Russian Fisheries Commission, following scientific advice from ICES.

The ICES advice, the TAC and estimated actual landings for each stock in recent years are given in Figures 5-6 below. Both stocks show clear increasing trends in all three metrics, suggesting that the stocks are both in good condition. However, two issues are immediately clear for both stocks: i) the TAC has over the last decade typically been set somewhat higher than the scientific advice; and ii) actual landings (as estimated by ICES) have typically been somewhat higher than the TAC. It is reassuring that all three of these curves are converging for both stocks, but these issues are nonetheless considered in our evaluation of Principle 1.

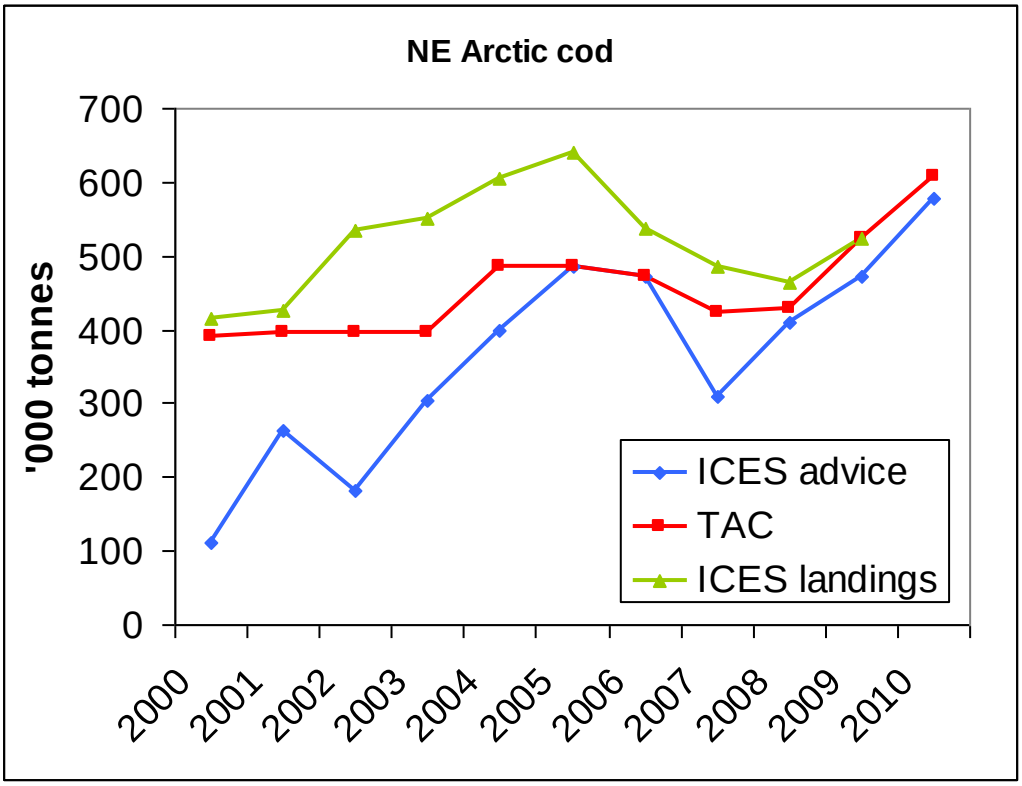

Figure 5. ICES advice on TAC, actual TAC set by joint Norwegian-Russian negotiation, and actual landings (estimated by ICES from data on official landings, illegal fishing and discarding), for the Northeast Arctic cod stock, 2000-2010 (advice and TAC) or 2000-2009 (landings). Data from 7.

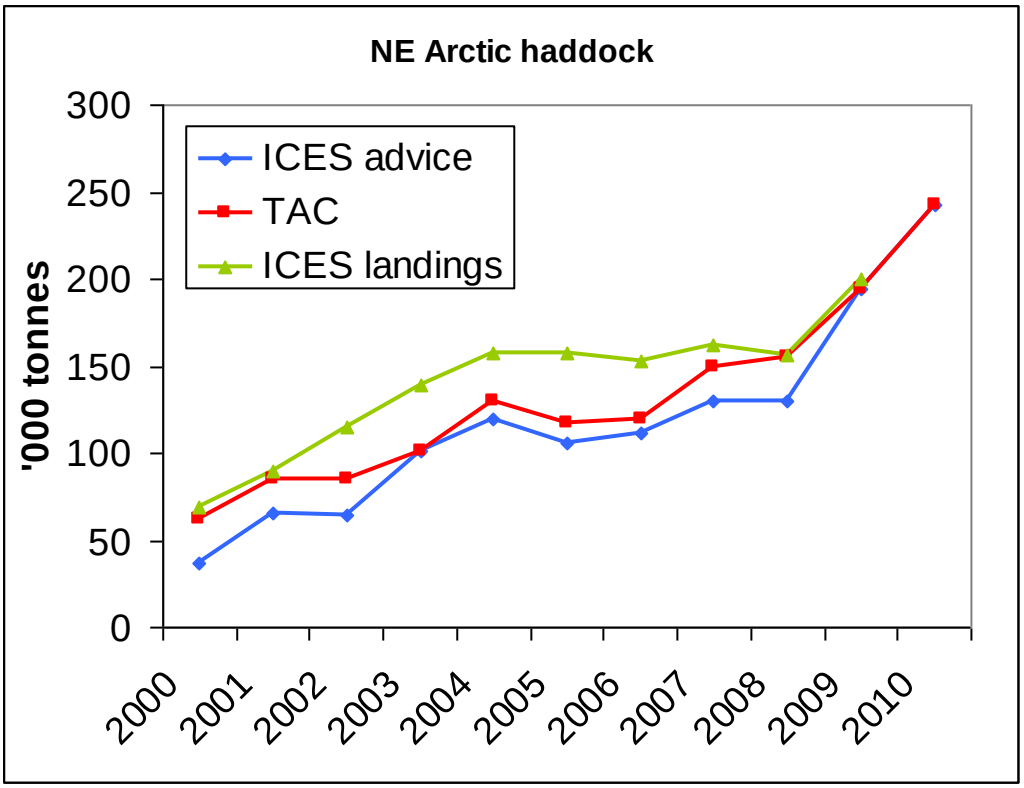

Figure 6. ICES advice on TAC, actual TAC set by joint Norwegian-Russian negotiation, and actual landings (estimated by ICES from data on official landings, illegal fishing and discarding), for the Northeast Arctic haddock stock, 2000-2010 (advice and TAC) or 2009 (landings). Note that in this case the ICES advice is a maximum level (i.e. advice given as '<X tonnes' rather than 'X tonnes' as is the case with cod). Data from 36.

3.5. HARVEST CONTROL RULES AND TOOLS

Rules for setting the TAC for each stock are set out in the management plans as follows (7,36):

Cod: Estimate the average TAC level for the coming three years based on the precautionary fishing mortality reference point F_{pa} (see below for a discussion of reference points). The TAC for the next year will be set to this level as a starting point for the three year period. The following year, the TAC calculation for the next three years is repeated based on updated information – however the TAC should not be changed by more than +/- 10% compared with the previous years. If the TAC then corresponds to a fishing mortality (F) lower than 0.3, the TAC should be increased to a level corresponding to F=0.3. If the spawning stock biomass (B) falls below the precautionary biomass reference point B_{pa}, the TAC should be established based on a fishing mortality than is linearly reduced from F_{pa} at B_{pa} to F=0 at B=0. If B falls below B_{pa} in any of the

operational years (i.e. the three years over which the predictions are made, plus the previous year), the limit in year-to-year variation in the TAC is removed.

Haddock: TAC for the following year is set at a level corresponding to $F=F_{pa}$. TAC should not vary by more than 25% relative to the previous year. If B falls below B_{pa}, the TAC should be established based on reducing F linearly from F_{pa} at B_{pa} to F=0 at B=0. If B is estimated to fall below B_{pa} in the current year or the following year, the limit in year-to-year variation in the TAC is removed.

Other management regulations also apply to both fisheries, as follows (7):

- As noted above, discarding is illegal in both Norway (where this fishery takes place) and Russia. Inevitably, it is not clear whether or not there is 100% compliance with this rule, particularly in the Russian EEZ, but in Norway inspection and control requirements are stringent (see below).

- Minimum size limits are 47cm for cod, 44cm for haddock and 40cm for saithe (N of 64 degrees) (EU waters 35 cod and 30 haddock). Since discarding is forbidden, it is extremely important to fishing companies that fish below these sizes are not caught – hence why all four vessels in this Unit of Certification habitually use trawls with mesh sizes larger than the minimum required by law.

- Mesh size limitations on bottom trawls – in 2011 this was changed to 130 mm across the entire Barents Sea (previously it was 135mm in the Norwegian EEZ and 125mm in the Russian EEZ). Sorting grids are also mandatory (see Figure 1 above).

- Real time closures have been in force since 1984 – fishing is prohibited in areas where the proportion of undersized cod, haddock and saithe in surveys is greater than 15%. The area is closed (to foreign vessels) after 7 days' notice, although vessels are requested by the Norwegian Coast Guard to leave the area before this period is over. The closed area is re-opened when a proportion of juvenile fish <15% is documented by the Norwegian Surveillance Service. ICES reports that this system has been effective in reducing catches of undersized fish.

3.6. REGULATION AND ENFORCEMENT

Management and control over the fishery is maintained by a variety of different methods:

VMS: European vessels of 15 meters or more have to report their positions when they operate in Norwegian waters. All vessels in the two fisheries are tracked by satellite vessel monitoring system (VMS), which provides their position every two hours to the Norwegian authorities. The satellite tracks may be cross-referenced to the logbook data to ensure that logbooks have been completed correctly. It is possible to assess by the track (speed, changes in direction) whether or not a vessel is fishing at any given point.

Logbooks: The main means of keeping track of catches is via vessel logbooks, which all vessels >10m in Norwegian waters are required to complete. The logbooks record all catches of all retained species on a tow-by-tow basis, and are more detailed than the equivalent EU logbooks, which record landings on a daily basis only. EU vessels in Norwegian waters must complete both types of logbook. Starting in 2011, all EU vessels fishing in Norwegian waters must fill in electronic logbooks. For the moment, the French companies keep the paper logbooks as well, and both forms are completed. Catches recorded in the electronic logbooks are reported to the Norwegian authorities daily.

Marine controls: In Norwegian waters, random controls of vessels at sea by the Coast Guard are reported to be frequent and thorough. In 2010, Euronor vessels (all seven) were controlled at sea by the Norwegian authorities 11 times in total, while the Grande Hermine was controlled twice, plus once while discharging at Hammerfest.

VHF controls: Vessels fishing in Norwegian waters are frequently contacted via radio and are requested to transmit information on catches and fishing grounds. Vessels must report to control points when entering or leaving the Norwegian EEZ, and when crossing from the Norwegian to the Svalbard Fisheries Protection Zone. They must report when they start and stop fishing. As noted above, they must also report catches every day by VHS, fax or email. In 2009 the Nordic II was given a written warning for failing to report stopping and re-starting fishing, and for failing to record the previous haul in the logbook before the next haul was brought on board.

Observers: None of the vessels in the unit of certification have had observers on board for this fishery, although they have had observers for their North Sea saithe fishery. The relatively long trips and remote area make it difficult to recruit observers.

Quayside controls: Vessels landing fish in the EU and Norway must submit to controls of the catch during landing. Vessels must land at a designated port and must provide a minimum of 4 hours warning to port authorities so that they can mobilise to check the catch. The Grande Hermine lands catch at St. Malo at the end of each trip, and in the middle of trips may land catch in Hammerfest (Norway). Euronor vessels land their catch in Boulogne.

4. STOCK ASSESSMENT – COD

4.1. DEFINITION OF STOCKS AND MANAGEMENT UNITS

There are several cod populations in the northeast Atlantic. For assessment and management purpose, ICES considers eight units (therefore considered *de facto* to be separated stocks); this excludes several inshore 'stocks' around the UK (such as the Channel, the Irish Sea etc.) as well as the Baltic.

- Northeast Arctic (NEA) cod - ICES Subareas I and II offshore (the stock under consideration here);

- Norwegian coastal cod - ICES Subareas I and II inshore;

- North Sea – ICES Subarea IV, also Division IIIa (Skagerrak) and Division VIId (Eastern Channel) (note: ICES separates this stock from the above two stocks at latitude 62°N, although doubtless exchanges occur between the units).

- Iceland – ICES Division Va;

- Faeroes - ICES Division Vb (divided into Vb1 Faeroes plateau and Vb2 Faeroes bank although these may not be separate stocks);

- West of Scotland – ICES Division VIa;

- Rockall – ICES Division VIb (note: there is no data for this stock, which may or may not be the same stock as in Division VIa);

- West Greenland – ICES Subarea XIV and NAFO Subarea I.

The stock under consideration here is the Northeast Arctic cod stock, which is the only one of these stocks considered by ICES to be in good condition. As noted above (Unit of Certification), both companies also fish in the North Sea, where they may land small amounts of cod (a very small percentage of their overall catch) as a by-catch in the saithe fishery. The North Sea cod bycatch is <u>not</u> included in the Unit of Certification.

4.2. DATA

Catches can come from i) officially reported landings; ii) IUU fishing or iii) discards. Both IUU fishing and discarding have been significant in the past for this fishery (Figure 5, for example, shows a significant gulf between the TAC and ICES estimate of actual landings in the recent past). However, the most recent ICES assessment (11) suggests that official landings and actual landings are now very close (within 1% of each other). Data on discarding is fragmentary (because it is illegal) but discarding rates are believed to be very low. No IUU fishing was detected in this fishery in 2009, according to the Norwegian Directorate of Fisheries (37) (figures for 2010 are not yet available).

Time series of CPUE from both Norwegian and Russian trawl fisheries are used in the assessment. These fleets also provide fairly extensive biological data, as do other fleets, although to a lesser extent (Table 5).

Table 5. Data provided by fishing fleets of each country authorised to fish on this stock (11 Annex 3)

Country	Catch	Catch at age	Weight at age	Proportion mature at age	Length composition of catch
Norway	X	X	X	X	X
Russia	X	X	X	X	X
Germany	X	X	X		X
UK	X				
France	X				
Spain	X				
Portugal	X				X
Poland	X	X	X		
Ireland	X				
Greenland	X				
Faeroes	X				
Iceland	X				

In addition, several fisheries-independent surveys are carried out as follows:

- Joint (Norway-Russia) Barents Sea winter survey (bottom trawl and acoustic);

- Lofoten Islands acoustic survey for spawners;

- Russian autumn survey (November-December - bottom trawl and acoustic);

- Joint ecosystem survey (August-September - bottom trawl)

There has also been joint work on age determination (via otoliths), including re-reading of old otoliths to ensure a reliable time series of length at age and age at maturity.

4.3. STOCK ASSESSMENT

The most recent complete stock assessment for this stock was in 2009 – in 2010 this was updated (11). The stock assessment uses a VPA model called XSA, as is typically used for most ICES assessments, and in this case the assessment has been carried out with few changes to the XSA model settings since 2000. XSA provides an age-based analytical assessment (hence the requirement for good age-related biological data as described above). An alternative model (TISVPA) was also run using the same data.

The assessment assumes a natural mortality rate of 0.2 and takes into account cannibalism using stomach contents data from surveys. The models were tuned using

four of the above data sets (Russian trawl CPUE, joint bottom trawl survey, joint acoustic survey and the Russian bottom trawl survey). The sensitivity of the XSA model to various parameter choices was tested and a retrospective analysis was considered by the ICES Working Group to be 'satisfactory'. The two models (XSA and TISVPA) gave similar trends but resulted in estimates of biomass in 2009 (the terminal year of the analysis) that differed significantly (difference of 20% for total biomass and 6% for spawning stock biomass). For the moment, the more conservative model (XSA) continues to be used, although the TISVPA model appears to have some advantages, for example in terms of dealing with uncertainties in the data.

The 2010 (XSA) stock assessment gives the following results:

- Estimated fishing mortality (*F*) in 2009 was 0.28 – the lowest since 1990. *F* has gradually declined since 2005.

- Spawning stock biomass (*SSB*) in 2010 was estimated to be 2,645,000 tonnes (no significant deviation from long-term time series).

Recruitment cannot be estimated using the XSA model, because survey data for the youngest age classes is not used in the model. Recruitment is estimated using a 'hybrid model' (arithmetic mean of the results from various recruitment models), and using input data from the Russian autumn survey for ages 0-2, the joint winter survey (ages 1-3), the ecosystem survey (age 0), capelin biomass and various environmental parameters (ice cover, temperature and oxygen saturation). The hybrid model estimated the number at age 3 as 384 million for the 2007 year class, 465 million for the 2008 year class and 484 million for the 2009 year class, giving overall a relatively encouraging prognosis for the immediate future.

4.4. REFERENCE POINTS

For the moment, precautionary and limit reference points are defined for this stock. For this stock, reference points were set in 2003 (Table 6).

Table 6. Limit and target reference points for Northeast Arctic cod, as well as some other calculated values and current status according to 2010 stock assessment (11).

Reference point	Definition	Value
B_{lim}	Stock biomass to be maintained above this point in order not to compromise recruitment	220 000 tonnes
F_{lim}	The rate of fishing mortality that is estimated to lead to the stock biomass falling below B_{lim} in the long term	0.74
B_{pa}	A precautionary reference point, from which the spawning stock biomass has only a small risk of dropping below B_{lim}	460 000 tonnes
F_{pa}	The rate of fishing mortality which maintains an	0.40

	equilibrium stock biomass greater than B_{pa}, with a probability of <10% that it will fall below B_{pa}	
$F_{0.1}$	Point at which rate of increase of yield per recruit for a given increase in effort is 10% of the rate of increase starting at zero effort (i.e. the slope of the yield per recruit curve is 10% of the slope at the origin).	0.15
F_{max}	Point of maximum yield per recruit at current stock size and growth parameters	0.28
most recent estimated *SSB*	From 2010 stock assessment (2010)	2 645 000 tonnes
most recent estimated *F*	From 2010 stock assessment (2009)	0.28

Because $F<F_{pa}$ and $SSB>B_{pa}$, the stock is considered by ICES to be at full reproductive capacity and sustainably harvested.

4.5. THE 'MSY' APPROACH

The 'traditional' ICES approach has been to define limit and precautionary reference points based on the probability of stock decline rather than on maintaining stock productivity at a certain level. However, ICES is now working towards an 'MSY' approach, where reference points will be defined based on maintaining stock biomass at a level leading to high productivity. For the Barents Sea, this work is just starting, and the approach is to start with a single-species evaluation of B_{MSY} and F_{MSY} for cod, before moving on to other species and taking inter-species interactions into account (11).

As a first step towards incorporating the MSY approach into the management of this stock, ICES have looked at the long-term yield from the stock using a biological model (11). The outcome of this exercise suggests that the long-term yield is basically stable over a relatively wide range of fishing mortality rates from 0.25 to 0.6. This is because the stock is thought to exhibit strong negative density-dependence in growth rates and in survival (due to cannibalism). ICES note that it is hard to estimate long-term yields from the stock for the lower values of *F*, due to limited data, but that results at high *F* can be considered more reliable.

Overall, this analysis suggests that incorporating an MSY approach into the management of this stock will not make a great deal of difference in terms of the level at which reference points are set, or the rates of fishing mortality. However, it is clear that inter-specific interactions and environmental forcing in the Barents Sea are strong, so we cannot for the moment assume that this will definitely be the case.

4.6. UNCERTAINTIES IN THE ASSESSMENT

The Arctic Fisheries Working Group (11) note the following sources of uncertainty in the stock assessment:

IUU catches have decreased considerably in recent years (as noted above) but the uncertainty in total catch from 2002-2006 still has an impact on the stock assessment.
Recent tests of new models (TISVPA and others) gives results that are notably different from the results of the standard XSA model (that has been used for some years) although trends are mainly the same. ICES recognise the need for a more thorough comparison and evaluation of various assessment methodologies.

Aging is always difficult, and incorporates an element of uncertainty into VPA-type analyses, which rely heavily on information about catch at age.

5. STOCK ASSESSMENT – HADDOCK ICES SUBAREAS I AND II

5.1. DEFINITION OF STOCKS AND MANAGEMENT UNITS

As for cod, there are several haddock populations in the northeast Atlantic. For assessment and management purpose, ICES considers seven units, excluding several inshore 'stocks' around the UK, as well as the Baltic.

- Northeast Arctic haddock - ICES Subareas I and II;

- North Sea – ICES Division IIIa and Subarea IV (note: separated from the above stock at latitude 62°N, although doubtless exchanges occur between the units).

- Iceland – ICES Division Va;

- Faeroes - ICES Division Vb;

- West of Scotland – ICES Division VIa;

- Rockall – ICES Division VIb (note: there is no data for this stock, which may or may not be the same stock as in Division VIa);

- West Greenland – ICES Subarea XIV and NAFO Subarea I.

The stock under consideration here is the Northeast Arctic (NEA) haddock stock. As noted above (Unit of Certification), both companies also fish in the North Sea, where they may land small amounts of haddock as a by-catch in the saithe fishery. North Sea haddock bycatch is not included in the Unit of Certification.

5.2. DATA

Catches can come from officially reported landings, IUU fishing and discards. Officially reported landings were 155,604 tonnes in 2008 and 200,512 tonnes for 2009. Estimates of IUU fishing are incorporated into the stock assessment from 2002 onwards, but in 2009 a joint Russian-Norwegian estimate suggested that IUU in this fishery was close to zero. There is no information on discarding, but it is thought to be low (11).

No fisheries-dependent CPUE data is used in the ICES stock assessment, because it is not considered reliable enough (11). This is likely to be because haddock is essentially fished as a by-catch in the cod fishery, so that effort directed to haddock cannot easily be estimated, and haddock catches per unit of total effort are not likely to be strongly related to haddock biomass.

Instead, the assessment relies on fisheries-independent data from several surveys as follows:

- Joint (Norway-Russia) Barents Sea winter survey (bottom trawl and acoustic);

- Russian autumn survey (November-December - bottom trawl and acoustic);

- Joint ecosystem survey (August-September - bottom trawl)

Nonetheless, the assessment relies on fisheries to supply biological data. As for cod above (see Table 6), ICES receive catch data from all the fleets fishing on the stock. They also receive information on catch at age, weight at age and catch length composition from Norwegian, Russian and German fisheries, and information on age at maturity from Norway and Russia.

5.3. STOCK ASSESSMENT

The 2010 stock assessment for this stock (11) also uses the VPA model XSA. The assessment assumed a natural mortality rate of 0.2, plus estimates of predation by cod, based on cod biomass and stomach contents data. The model was tuned using the joint bottom trawl survey and Norwegian acoustic survey.

The 2010 stock assessment gives the following estimates:

- Estimated fishing mortality (*F*) in 2009 was 0.31. *F* has gradually declined since about 2005.

- Total biomass (*B*) in 2010 was estimated to be 1,118,000 tonnes. Spawning stock biomass (*SSB*) for 2009 was estimated to be 285,000 tonnes – this has been increasing since 2000.

Recruitment is estimated from the surveys. Since a poor year class in 1997, recruitment appears to have been average or above average, with the 2004-6 year classes being particularly strong. The most recently surveyed year class (2009, surveyed in the joint ecosystem survey) appears to be stronger than 2007 or 2008.

5.4. REFERENCE POINTS AND 'MSY' APPROACH

For the moment, precautionary and limit reference points are defined for this stock (

Table 7). As noted above, ICES is moving towards an MSY approach (i.e. taking stock productivity into account as well as risk of stock collapse) but for the moment, this work is confined to cod, although other species, including haddock, will be considered in the future (11, section 11).

Table 7. Limit and target reference points for Northeast Arctic haddock (AFWG).

Reference point	Definition	Value
B_{lim}	Stock biomass to be maintained above this point in order not to compromise recruitment	50 000 tonnes
F_{lim}	The rate of fishing mortality that is estimated to lead to the stock biomass falling below B_{lim} in the long term	0.49
B_{pa}	A precautionary reference point, from which the spawning stock biomass has only a small risk of dropping below B_{lim}	60 000 tonnes
F_{pa}	The rate of fishing mortality which maintains an equilibrium stock biomass greater than B_{pa}, with a probability of <10% that it will fall below B_{pa}	0.35
most recent estimated *SSB*	From 2010 stock assessment (2009)	285 000 tonnes
most recent estimated *F*	From 2010 stock assessment (2009)	0.31

Because $F<F_{pa}$ and $SSB>B_{pa}$, the stock is considered by ICES to be at full reproductive capacity and sustainably harvested.

5.5. UNCERTAINTIES IN THE ASSESSMENT

The Arctic Fisheries Working Group (11) note the following sources of uncertainty in the stock assessment:

- The 2010 assessment gave rather different results for 2008 biomass compared to the 2009 assessment (total biomass estimated around 5% lower and *SSB* around 19% lower). Likewise, *F* in 2008 was estimated to be around 4% higher than the estimate made in 2009. More generally, it appears that the XSA output is rather sensitive to the settings used in a given assessment. It is not clear for the moment why this is.

- There is a systematic difference in the time series of abundance at age observed in the surveys and in that predicted (in retrospective analysis) by the XSA, in that the XSA time series does not predict the amplitude of peaks and troughs seen in the surveys. Again, it is not clear why this is.

- There are gaps in all the surveys for some areas in some years. The survey indices therefore have to be corrected, adding an element of uncertainty.

- There is a problem of correlated error structures, between age groups and also between survey series.

- There may be discarding of undersized fish in the longline fishery, which is not quantified.

- Predation rates by cod on young age groups are very variable from year to year, and hard to estimate with any certainty (although the stock assessment tries to include it).

- Estimates of catch at age may be subject to sampling error.

- In the past, comparative age readings (from otoliths) between Norway and Russia have shown significant discrepancies (up to 20%) – however recent comparisons (2009) show that these have reduced to less than 10%.

6. FISHERY EVALUATION PROCESS

6.1. MSC STANDARD AND METHODOLOGY

This assessment follows the Fisheries Assessment Methodology and Guidance (FAM), version 2, from July 2009 (the most recent version at the time the evaluation was started). The FAM sets out the MSC Standard against which the fishery is assessed, as well as setting out the assessment methodology and providing definitions of key terms (1).

The MSC Standard is composed of three Principles, as follows:

Principle 1: A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery;

Principle 2: Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.

Principle 3: The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

Each Principle is divided into a series of Performance Indicators (PIs). Each PI can be either related to 'outcome' (i.e. the current situation in regard to the element described in the PI), 'management' (i.e. the management objectives, strategy or rules for that element) or 'information' (i.e. the available knowledge about that element). The structure of the FAM and the PIs for each Principle are shown in Table 8.

Table 8. The PIs for each Principle within the FAM (1).

Principle	Component	PI number	PI
1	Outcome	1.1.1 Stock status	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing
		1.1.2 Reference points	Limit and target reference points are appropriate for the stock
		1.1.3 Stock rebuilding*	Where the stock is depleted, there is evidence of stock rebuilding
	Management	1.2.1 Harvest strategy	There is a robust and precautionary harvest strategy in place
		1.2.2 Harvest control rules / tools	There are well defined and effective harvest control rules in place

		1.2.3 Information / monitoring	Relevant information is collected to support the harvest strategy
		1.2.4 Assessment of stock status	There is an adequate assessment of the stock status
2	Retained species	2.1.1 Outcome	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
		2.1.2 Management	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
		2.1.3 Information	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
	By-catch	2.2.1 Outcome	The fishery does not pose a risk of serious or irreversible harm to the by-catch species or species groups and does not hinder recovery of depleted by-catch species or species groups
		2.2.2 Management	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
		2.2.3 Information	Information on the nature and amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch
	ETP species	2.3.1 Outcome	The fishery meets national and international requirements for protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species

		2.3.2 Management	The fishery has in place precautionary management strategies designed to: - meet national and international requirements; - ensure the fishery does not pose a risk of serious or irreversible harm to ETP species; - ensure the fishery does not hinder recovery of ETP species; and - minimise mortality of ETP species
		2.3.3 Information	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
	Habitats	2.4.1 Outcome	The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function
		2.4.2 Management	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
		2.4.3 Information	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
	Ecosystems	2.5.1 Outcome	The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function
		2.5.2 Management	There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function
		2.5.3 Information	There is adequate knowledge of the impacts of the fishery on the ecosystem

3	Governance and policy	3.1.1 Legal / customary framework	The management system exists within an appropriate and effective legal and/or customary framework which ensures that it: - Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; - Observes the legal rights created explicitly or by custom of people dependent on fishing for food or livelihood; and - Incorporates an appropriate dispute resolution framework
		3.1.2 Consultation, roles and responsibilities	The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties.
		3.1.3 Long term objectives	The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach
		3.1.4 Incentives for sustainable fishing	The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing
	Fishery-specific management system	3.2.1 Fishery-specific objectives	The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2
		3.2.2 Decision-making processes	The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives
		3.2.3 Compliance and enforcement	Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with
		3.2.4 Research plan	The fishery has a research plan that addresses the information needs of management

		3.2.5 Management performance evaluation	There is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives. There is effective and timely review of the fishery-specific management system

* Only scored when evidence that stock is depleted – not scored in this case.

For each PI, there are three Scoring Guideposts (SGs). The lowest SG corresponds to a minimum requirement for certification, under the condition that the situation can be improved; the middle SG corresponds to a minimum requirement for certification without conditions, while the highest SG corresponds to an optimal or 'perfect' scenario. These three SGs are assigned scores of 60, 80 and 100. The consequences for each score are set out in Table 9 below.

Table 9. Categories of score for a PI, and the consequences of a given score for the overall outcome of certification (1).

Score	Consequence
< 60	If even one PI scores < 60, certification cannot be awarded
60 – 80	Certification is possible but with conditions: performance under any PI scoring between 60 and 80 must be improved to at least the 80 level within a time period specified by the assessment team
80 – 100	If all PIs score 80 or above, certification will be achieved without any conditions

Note that this assessment methodology (the FAM) differs from the methodology used in assessments prior to mid-2008, because PIs and SGs were previously defined by the CB. They are now set out in the FAM, and cannot be altered except under exceptional circumstances (they have not been altered in this case). There is also now an option to use the 'Risk-Based Framework' for assessing some of the PIs – this option was not used in this case.

The full set of PIs and SGs are set out in the assessment tree for this fishery, with the scores given for each PI and a detailed rationale for each score according to the SGs. The assessment tree is provided in Annex 1 of this report. The scores are also summarised in Section 8.

6.2. ASSESSMENT PROCESS

The steps to follow in the assessment process are set out by MSC in the Fisheries Certification Methodology (most recent Version 6, September 2006). In summary, these steps are as follows:

Pre-assessment

Full assessment step 1: Preparation. This phase forms the start of the formal assessment process, and includes i) the formal notification of the assessment to MSC, stakeholders and public; ii) the selection and approval (including the possibility of stakeholder input) of team of experts and iii) selection of the appropriate assessment methodology (in this case the FAM – the alternative Risk-Based Framework was not used).

Full assessment step 2: Data gathering and evaluation. In this phase the fishery is assessed using data from a variety of sources including: i) published and unpublished scientific data, reports and other similar sources; ii) a site visit by the expert team; and iii) stakeholder consultations via face-to-face interview, phone or email. On the basis of the information gathered, the fishery is scored against the standard (using the FAM). A preliminary assessment report is produced, which is reviewed by the client and by two external peer reviewers. The resulting Public Comment Draft Report and Draft Certification Determination is then made available for stakeholder comment.

Full assessment step 3: Final report and Certification Determination with objections procedure. In this phase, the CAB produces a Final Report, which must present and respond in full to all comments by reviewers and stakeholders. The Final Report is made available on the MSC website, and stakeholders are given the opportunity to object formally to the determination made by the CAB. If such objections are received, the CAB must respond in detail to the objector and to MSC. A final determination decision is then made.

Ongoing review of certification. A certified fishery is audited every year and re-assessed every five years.

6.3. ASSESSMENT OF EURONOR AND CIE DES PÊCHES ST. MALO NEA COD AND HADDOCK FISHERY

Pre-assessment: Generally, any full assessment is preceded by a pre-assessment that highlights strengths and weaknesses in relation to the MSC standard. However, this fishery had been partially assessed by MEP already (for both companies) as part of earlier full assessments of the companies' saithe fisheries (2,3). A formal pre-assessment was not therefore carried out in this case. The intention to proceed with full assessment was announced by MEP on the MSC website on 2 September 2010.

Full assessment: The proposed assessment team was nominated by MEP on the MSC website on 2 September 2010. No comment or objections were received about the

composition of the team, which was confirmed on 5 October 2010. The team concluded that it would be appropriate to use the FAM for this assessment (see above), and this was announced on the MSC website on 5 October 2010. Again, no objections or comments were received. The site visit and scoring meeting took place on 4-6 January 2011, in Boulogne s/Mer, France. The peer reviewers were nominated by MEP on 26 July and approved after 30 days. The Public Comment Draft Report was returned after review by the client on the 25th November 2011. The client action plan was received on the 2nd December 2011. The peer review reports were received in January 2012. The Public Comment Draft Report consultation period was up at the end of the working day on 27 February 2012. The MEP Certification Committee met on the 28th February to make the certification determination.

6.4. STAKEHOLDER CONSULTATIONS

As well as making announcements and documents available via the MSC website, as required by the MSC assessment process, MEP made direct contact with key stakeholders, to ensure that they were aware that the assessment was taking place and that they had the opportunity to comment or object to any part of the process. This process of contact was conducted primarily by email, backed up by telephone or fax when there was difficulty in making contact by email. Contact was made with each relevant stakeholder on 3 September 2010, announcing the start of the assessment, on 9 November 2010 giving details of the site visit and on 24 January 2012 indicating that the Public Comment Draft Report (PCDR) was available for review. Because a period longer than 9 months had elapsed between the site visit and the publication of the PCDR, stakeholders were also invited to submit any new information on the fishery that they may have.

The following stakeholder organisations were contacted in this way:

Stakeholders
ICES - Arctic Fisheries Working Group Chair: Bjarte Bogstad
Ifremer Technopole de Brest-Iroise BP 70, 29280 Plouzané Dr Alain Biseau
French: Mme Sylvie Alexandre Direction Régionale des Affaires Maritimes Nord 92 quai Gambetta 62200 BOULOGNE S/MER
Norwegian: Ministry of Fisheries and Coastal Affairs Grubbegt. 1, P.O.Box. 8118, Dep, NO-0032 Oslo, Norway
RAC Long Distance RAC secretariat

Calle Velazquez Nº 41 , 4º C 28001 Madrid
CNPMEM 134, avenue de Malakoff 75116 PARIS
FROM Nord 16 Rue du Commandant Charcot 62200 Boulogne sur Mer France Directeur : Mr Thierry Missonnier Directeur adjoint : Mr Laurent Nicolle
Union des Armateurs à la Pêche de France 59, rue des Mathurins 75008 Paris France
WWF France 1, Carrefour de Longchamp 75116 PARIS Elise Petre
SABIMA (Cooperation Council for biological diversity) Pb 6784 St. Olavs plass, 0130 Oslo
The Norwegian Institute for Water Research (NIVA) Merete Ulstein (Research Director) Gaustadalléen 21, NO-0349 OSLO
WWF Norway Kathrine Kjelland WWF-Norge, Postboks 6784 St. Olavs Plass, 0130 Oslo
Greenpeace, PO Box 6803 St. Olav Plass 1, 0130 Oslo.
Seas at Risk Rue d'Edimbourg 26 1050 Brussels Belgium Vera Coelho

During the site visit, a series of stakeholders were met and interviewed by the team, as shown in Table 10. No other stakeholders expressed any interest in participating.

Table 10. Stakeholders interviewed during the assessment process.

Name	Organisation	Meeting
M. Bruno Leduc	Euronor	Attended site visit
Mme. Martine Edouard Leborgne	Cie des Pêches St. Malo	Attended site visit
M. Laurent Nicolle	FROM Nord	Attended site visit
M. François Lambert	Délégation à la mer et au littoral	Attended site visit
Hilde Jensen postmottak@fkd.dep.no	Ministry of Fisheries and Coastal Affairs	Corresponded by email

7. SCORING

7.1. SCORING METHODOLOGY

Each PI is scored with reference to the three scoring guideposts (SGs) (see above). Each PI was discussed in the light of information received from the clients and stakeholders before and during the site visit. The score and rationale put forward by each team member was considered and a joint score arrived at.

Scores between 60 and 80 or between 80 and 100 were arrived at by a semi-quantitative method. For example, if the fishery achieves all the elements set out in SG 80, but only some of the elements in SG 100, the fishery would have been scored as shown in Table 11.

Table 11. Example of how the team decided on a score between 80 and 100 (the same principle would apply to a score between 60 and 80, as well as to SG with different numbers of elements).

Number of elements in SG 100 achieved by the fishery, out of four	Score	Number of elements in SG 100 achieved by the fishery, out of five	Score
0	80	0	80
1	85	1	80
2	90	2	85
3	95	3	90
4	100	4	95
		5	100

7.2. DEALING WITH SEPARATE STOCKS AND FISHERIES

This assessment covers two different fishing companies (Euronor and Cie des Pêches St. Malo) which each operate on two different stocks (NEA cod and NEA haddock) leading to four Units of Certification in total.

Principle 1 deals with questions regarding the stock, rather than the fisheries specifically. The fishing companies have therefore been scored together, but separate scores are given for cod and haddock.

Principle 2 and most of Principle 3 deals with the fisheries specifically. The two companies were therefore scored separately for these Principles, except where the discussion deals with the national or EU level, which is the same for each. Since the fishery is in reality a mixed fishery targeting both cod and haddock, there was no need to give separate scores for Principle 2 for the two separate stocks.

In the Assessment Tree (Annex 1), a separate score is given for each fishing company where the analysis and rationale is varies, but a single score is given where the analysis and rationale are the same for each.

7.3. WEIGHTING

The FAM sets out how the score of each PI should be weighted. The weighting ensures that overall scores for each Principle are equally important in the overall score. Within each Principle, each component is weighted equally. Within each component, each PI is weighted equally. The aggregate score for each Principle, and the overall score, is thus a weighted average of the scores for each PI. The overall weighting is shown in Figure 7.

Principle	Weight Level 1	Component	Weight Level 2	PI No.	Performance Indicator	Weight Level 3	Weight in Principle		
						Either		Or	
One	1	Outcome	0.5	1.1.1	Stock Status	0.5	0.25	0.333	0.1667
				1.1.2	Reference Points	0.5	0.25	0.333	0.1667
				1.1.3	Stock Rebuilding	--	--	0.333	0.1667
		Management	0.5	1.2.1	Harvest Strategy	0.25	0.125		
				1.2.2	Harvest Control Rules & Tools	0.25	0.125		
				1.2.3	Information & Monitoring	0.25	0.125		
				1.2.4	Assessment of Stock Status	0.25	0.125		
Two	1	Retained species	0.2	2.1.1	Outcome	0.333	0.0667		
				2.1.2	Management	0.333	0.0667		
				2.1.3	Information	0.333	0.0667		
		Bycatch	0.2	2.2.1	Outcome	0.333	0.0667		
				2.2.2	Management	0.333	0.0667		
				2.2.3	Information	0.333	0.0667		
		ETP species	0.2	2.3.1	Outcome	0.333	0.0667		
				2.3.2	Management	0.333	0.0667		
				2.3.3	Information	0.333	0.0667		
		Habitats	0.2	2.4.1	Outcome	0.333	0.0667		
				2.4.2	Management	0.333	0.0667		
				2.4.3	Information	0.333	0.0667		
		Ecosystem	0.2	2.5.1	Outcome	0.333	0.0667		
				2.5.2	Management	0.333	0.0667		
				2.5.3	Information	0.333	0.0667		
Three	1	Governance and Policy	0.5	3.1.1	Legal/Customary Framework	0.25	0.125		
				3.1.2	Consultation, Roles & Responsibilities	0.25	0.125		
				3.1.3	Long Term Objectives	0.25	0.125		
				3.1.4	Incentives for sustainable fishing	0.25	0.125		
		Fishery Specific Management System	0.5	3.2.1	Fishery Specific Objectives	0.2	0.1		
				3.2.2	Decision Making processes	0.2	0.1		
				3.2.3	Compliance & Enforcement	0.2	0.1		
				3.2.4	Research Plan	0.2	0.1		
				3.2.5	Management Performance Evaluation	0.2	0.1		

Figure 7. Weighting of Principles, components and PIs in the FAM (1). The alternative weightings for Principle 1, Component 1 depend on whether PI 1.1.3 is scored or not – in this case it was not so the first alternative was used.

8. ASSESSMENT RESULTS

This section summarises the results of the assessment of the Euronor and Cie des Pêches St. Malo NEA cod and haddock fisheries. The full assessment tree with scores and rationales for each PI is in Annex 1 of this report.

8.1. OVERALL RESULTS

The scores for each Principle (calculated as described above) for each Unit of Certification are shown in Table 12.

Table 12. Scores for each Principle for each Unit of Certification.

Principle	Cie des Pêches St. Malo		Euronor	
	cod	haddock	cod	haddock
Principle 1	91.9	89.4	91.9	89.4
Principle 2	87.7	87.7	87.7	87.7
Principle 3	89.75	89.75	89.75	89.75

8.2. PRINCIPLE 1

The scores for each PI, and the aggregate score for each component for Principle 1 for each of the two stocks are shown in Table 13.

Table 13. Scores for each PI, and aggregate scores for each component for Principle 1.

Component	PI	cod	haddock
Outcome	*Average outcome*	*92.5*	*87.5*
	Stock status	95	95
	Reference points	90	80
	Stock rebuilding	n/a	n/a
Harvest strategy (management)	*Average management*	*91.25*	*91.25*
	Harvest strategy	90	90
	Harvest control rules and tools	90	90
	Information/monitoring	95	95
	Assessment of stock status	90	90

8.3. PRINCIPLE 2

The scores for each PI, and the aggregate score for each component for Principle 2 for each Unit of Certification are shown in Table 14.

Table 14. Scores for each PI, and aggregate scores for each component for Principle 2.

Component	PI	Cie des Pêches St. Malo	Euronor
Retained species	*Average retained spp.*	*86.7*	*86.7*
	Outcome	80	80
	Management	90	90
	Information	90	90
By-catch	*Average bycatch*	*96.7*	*96.7*
	Outcome	100	100
	Management	100	100
	Information	90	90
ETP species	*Average ETP*	*85*	*85*
	Outcome	90	90
	Management	85	85
	Information	80	80
Habitat	*Average habitat*	*76.7*	*76.7*
	Outcome	70	70
	Management	80	80
	Information	80	80
Ecosystem	*Average ecosystem*	*93.3*	*93.3*
	Outcome	80	80
	Management	100	100
	Information	100	100

8.4. PRINCIPLE 3

The scores for each PI, and the aggregate score for each component for Principle 3 for each Unit of Certification are shown in Table 15.

Table 15. Scores for each PI, and aggregate scores for each component for Principle 3.

Component	PI	Cie des Pêches St. Malo	Euronor
Governance and policy	*Average governance and policy*	*87.5*	*87.5*
	Legal and/or customary framework	90	90

	Consultation, roles and responsibilities	80	80
	Long term objectives	100	100
	Incentives for sustainable fishing	80	80
Fishery-specific management system	*Average fishery management system*	*92*	*92*
	Fishery-specific objectives	90	90
	Decision-making process	90	90
	Compliance and enforcement	100	100
	Research plan	90	90
	Monitoring and management performance evaluation	90	90

8.5. PROPOSED CERTIFICATION RECOMMENDATION

Since the fishery did not receive a score of <60 for any PI, and the average score for each Principle was 80 or above, **the MEP Certification Committee has determined that this fishery should be certified under the MSC standard**.

8.6. CONDITIONS

For both Euronor and Cie des Pêches St. Malo, one PI scored below 80 and is therefore subject to a condition on MSC certification. A condition is proposed for both fishing companies to bring this PI up to the 80 level within 5 years, as set out in Table 16.

Table 16. Condition on PI 2.4.1

PI	PI 2.4.1 – Habitat outcome status The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function.
SG 60	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
SG 80	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
Elements of SG 80 not met	MEP concluded that damage to cold water coral and deep-sea sponge communities from this fishery could be considered 'unlikely' but not 'highly unlikely', mainly because of a lack of direct information about interactions between the fishery and benthos, and because the fishing companies have not been notably proactive in trying to prevent habitat impacts up till now.
Condition	The fishing companies should review recent information on sensitive benthic habitats in their fishing area (notably from the MAREANO project), and also review any evidence that their activities are causing damage to these habitats (benthos attached to the trawl). If this information suggests that activities are damaging to vulnerable communities, as set out in the rationale for PI 2.4.1, then they should take steps to reduce these impacts such that serious or irreversible harm on a bioregional basis is 'highly

	unlikely'.
Timetable	Data collection and review should be completed by the end of Year 2, mitigation measures agreed by the end of Year 3 and implemented during Year 4.

8.7. HARMONISATION WITH OTHER CERTIFIED FISHERIES ON THE SAME STOCKS

Two other fisheries on these stocks have already been certified as sustainable by two other CBs (38,39,87). In order to ensure consistency, MEP reviewed the scores for all three assessments – these are given below (Table 17 to Table 19), with comments on apparent significant inconsistencies between MEP and the others where relevant. Significant inconsistencies are where the MEP score differs by 10 points or more from the other two scores, or where scores fall below and above 80 (except in cases where the MEP scores falls between two widely differing scores, since it is not our intention here to comment on differences between the other assessments).

Table 17. Principle 1 scores for this fishery and the two other fisheries already certified on the same stocks.

Component	PI	Euronor / Cie des Pêches St. M		Russian Barents Sea (38)		Norway NEA offshore (39)	
		cod	had.	cod	had.	cod	had.
Outcome	Stock status	95	95	100	100	95	90
	Reference points	90	80	80	80	95	95
	Stock rebuilding	n/a	n/a	n/a	n/a	n/a	n/a
Harvest strategy (management)	Harvest strategy [1]	90	90	75	80	90	90
	HCR / tools	90	90	80	80	85	80
	Information/monitoring [2]	95	95	70	70	85	85
	Assessment of stock status	90	90	90	85	90	90

Comments:

1. Harvest strategy: The TACs were in the past consistently set higher than the TAC calculated from the agreed harvest control rule (HCR), as noted above in Figures 5 and 6. This was considered by one CB to be inappropriate, while the other placed more emphasis on the fact that the biomass had been maintained well above precautionary reference points. In our case, the TAC appears to have converged with the HCR in the past two years, so we considered the harvest strategy appropriate, although we note that this is an issue for surveillance audits to monitor.

2. Information / monitoring: The issue of IUU was not fully resolved when the other assessments were carried out – however, the most recent assessment of IUU fishing on this stock by ICES is that it is zero.

Table 18. Principle 2 scores for this fishery and the two other fisheries already certified on the same stocks.

Component	PI	Euronor / Cie des Pêches St. M	Russian Barents Sea	Norway NEA offshore
Retained species	Outcome [1]	80	75	75
	Management [1]	90	75	90
	Information	90	90	90
By-catch	Outcome [2]	100	80	95
	Management [2]	100	85	90
	Information [2]	100	80	80
ETP species	Outcome [3]	90	80	80
	Management	85	80	85
	Information [3]	80	80	70
Habitat	Outcome	70	60	75
	Management	80	75	95
	Information	80	80	95
Ecosystem	Outcome	90	90	100
	Management	100	80	95
	Information	100	95	95

Comments:

1. Retained species outcome and management: It appears that these other fisheries include a wider variety of retained species than this fishery, including species such as tusk, redfish and various elasmobranchs, which are depleted, vulnerable or data deficient. These species were not recorded in the logbooks in this fishery, and the team had high confidence that the logbook data was correct. We assume that there are differences between the fisheries in fishing area (perhaps the French vessels are fishing further offshore), fishing strategy or perhaps in the gear or sorting grid mesh size (noting that this fishery uses mesh and sorting grid sizes above the legal minimum). We note that in our experience it is not unusual for apparently similar fisheries to have rather different bycatch composition due to small differences in fishing strategy.

2.Bycatch: Discarding was not completely banned at the time that the other two fisheries were scored – a total ban came in under the revised Marine Resources Act in 2008.

3. ETP species: Because discarding was not completely banned at the time of scoring, rays and skates were habitually discarded, meaning that information was lacking on fisheries impacts on these species.

Table 19. Principle 3 scores for this fishery and the two other fisheries already certified on the same stocks.

Component	PI	Euronor / Cie des Pêches St. M	Russian Barents Sea	Norway NEA offshore
Governance and policy	Legal and/or customary framework	90	95	95
	Consultation, roles and responsibilities [1]	80	75	95
	Long term objectives [1]	100	75	95
	Incentives for sustainable fishing	80	80	95
Fishery-specific management system	Fishery-specific objectives	90	90	90
	Decision-making process	90	80	95
	Compliance and enforcement	100	80	95
	Research plan	90	90	90
	Monitoring and management performance evaluation	90	95	95

Comments:

1. Issues specific to the Russian management system.

9. CHAIN OF CUSTODY

9.1. VESSELS IN THE UNIT OF CERTIFICATION

The vessels included in the Unit of Certification are given in Table 20 below, along with their details. Note that the possibility has been left open for other vessels belonging to the two companies to join the Unit of Certification in the future (in conformance with rules on quotas etc.).This would need to be communicated to MEP for consideration prior to this permission being granted.

Table 20. Vessels in the Unit of Certification.

Company	Vessel	Length (m)	Registration	Call sign	Home port
Euronor	Cap Nord	54.55	BL734690	FNLM	Boulogne
	Klondyke	54.55	BL735220	FHPJ	Boulogne
	Nordic II	54.25	BL341180	FNGU	Boulogne
Cie des Pêches St. Malo	Grande Hermine	60	SM640670	FNGD	St. Malo

9.2. POINTS OF LANDING

The main ports of landing used by these fisheries are Boulogne s/mer and St. Malo (EU – France). The following secondary ports will be utilised on occasion and have been used in the past: Cuxhaven and Bremerhaven (EU – Germany); Hanstholm (EU – Denmark) and Hammerfest (non-EU – Norway).

9.3. PROCESSING ON BOARD

All product is landed frozen. For Cie des Pêches St. Malo, the Grande Hermine carries out some relatively sophisticated processing on board, including the production of skinless fillets and various shrink-wrapped products. The Euronor vessels land product as blocks of frozen fillets.

9.4. CHAIN OF CUSTODY RISK ASSESSMENT

The major risk to the chain of custody as identified by the assessment team relates to the fact that Euronor vessels may land MSC and non-MSC same species product on the same fishing trip. North Sea Cod is currently caught as a by-catch to the North Sea saithe fishery, and this by-catch is not MSC certified. A method for separation of the MSC and non-MSC product would therefore be required in order to maintain traceability of MSC product. As such MEP concludes that product **shall not** be eligible to enter into further chains of custody and a separate chain of custody assessment will be required for the fishery – as is already required for the certified MSC Euronor saithe fishery.

The Grande Hermine does not pose a risk to the chain of custody as she only fishes in the Unit of Certification for cod and haddock. On the occasion the vessel may enter the North Sea, the Grande Hermine does not have any quota for the target species of this report. Although there is the possibility that cod and haddock could be caught as bycatch when fishing for saithe in the North Sea, these would be required to be discarded before entry into port.

10. TARGET ELIGIBILITY DATE

The target eligibility date for these fisheries has been set as **1 January 2012**. This is because the Grande Hermine started a ~90 day fishing trip in mid-January, to ensure that all the product of this trip can be covered by the MSC certification, assuming that other requirements are met.

ANNEX 1 – ASSESSMENT TREE

1. Principle 1

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

1.1. OUTCOME

1.1.1. STOCK STATUS

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

SG 60: It is likely that the stock is above the point where recruitment would be impaired.

SG 80: It is highly likely that the stock is above the point where recruitment would be impaired. The stock is at or fluctuating around its target reference point

SG 100: There is a high degree of certainty that the stock is above the point where recruitment would be impaired. There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.

Scores	Cod	Haddock
Euronor	**95**	**95**
Cie. Pêches St. Malo	**95**	**95**

Rationale

1. Definition of stocks

Euronor and the Cie des Pêches Saint-Malo operate on cod and haddock stocks in Norwegian waters ICES Subareas I and II – the Northeast Arctic stocks. The status, management and monitoring of both these stocks therefore needs to be assessed. Each stock was scored separately. Since we are scoring at the level of the stock, the score for both companies will be the same.

2. Landings

Landings by each company for 2009 and 2010 are given in Tables 1 and 2 below.

Table 1. Cod landings (tonnes live weight) of Euronor and Cie des Pêches Saint-Malo in 2009 and 2010.

Years	Euronor	Cie Pêches Saint-Malo	Total landings (I+II)
2009	1325	3278	523 000
2010	999	3465	610 000

Table 2. Haddock landings (tonnes live weight) of Euronor and Cie des Pêches Saint-Malo in 2009 and 2010.

Years	Euronor	Cie Pêches Saint-Malo	Total landings (I+II)
2009	76	451	200 000
2010	98	581	249 000

3. Assessment in relation to reference points

Information in this and the following sections is from the most recent ICES advice (7,36) and the most recent ICES AFWG report (11) unless otherwise indicated.

The status of both stocks is assessed every year by ICES in relation to reference points (see 1.2.4 below) (1). Reference points have been set for both the spawning stock biomass (*SSB*) and fishing mortality (*F*).

For *SSB* two reference points are defined:
• B_{lim}, (limit reference point) below which the reproductive capacity of the stock is reduced and where the risk of collapse is high (recruitment overfishing);
• B_{pa}, (precautionary reference point) – the stock should remain above this reference point so that the risk of reaching B_{lim} is low, taking uncertainties into consideration.

In the same manner, ICES has set two reference points for *F*:
• F_{lim} is the limit fishing mortality above which the exploitation becomes unsustainable;
• F_{pa} is the precautionary level of mortality that should not be exceeded so that the risk of reaching F_{lim} is low, taking uncertainties into account.

ICES considers that if $SSB>B_{pa}$, the stock is at its full reproductive capacity, and if $F<F_{pa}$, exploitation is sustainable. We note that the precautionary reference points have not been set with explicit reference to reproductive capacity, but rather by an analysis of the risk of decline below the limit reference points. However, we consider this point further in PI

1.1.2, and here consider, following that analysis, that the precautionary reference points are set at an appropriate level to ensure stock productivity.

4. Northeast Arctic cod

For the NEA cod stock, the precautionary reference points were set by ICES in 2003 as per Table 3:

Table 3. Reference point values for the NEA cod stock.

Reference point	Estimated value
B_{lim}	230 mt
B_{pa}	460 mt
F_{lim}	0.74
F_{pa}	0.40

The 2011 agreed TAC for this stock is 703 mt – the level recommended by ICES. Given this level of landings, the projected biomass for 2012 would be around 1 700 mt – i.e. significantly higher than the precautionary reference point. The fishing mortality for 2011 would be 0.30, as agreed in the management plan, and lower than the precautionary limit (0.4). Estimated *SSB* has been above 460 mt (B_{pa}) since 2002, and has been increasing since 2006. *F* has been below F_{lim} since 2001, but below F_{pa} only since 2007. Estimated *F* for 2009 was 0.27. Thus the stock has been considered to be in the "safe zone" of the precautionary approach plot (Figure 1) since 2007.

Spawning stock biomass is at an all-time high since stock estimates started, while the total stock biomass is above the long-term average. As the year classes which have not yet entered the fishery are below average, it is expected that the stock will stabilize at the current level in the next few years (40).

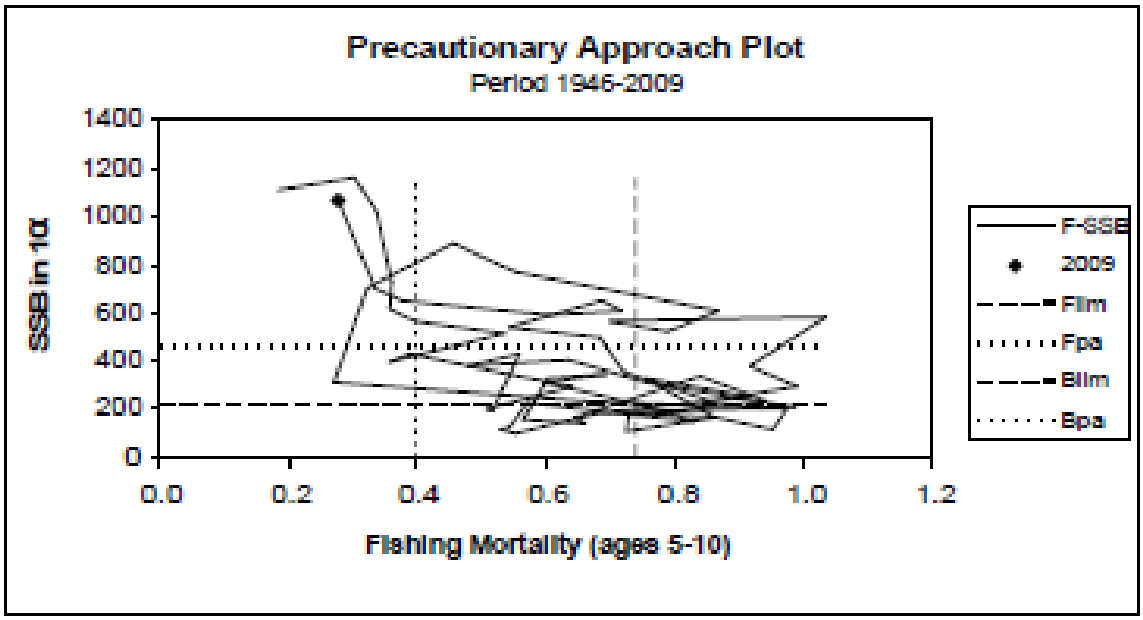

Figure 1. ICES precautionary approach plot for NEA cod stock

The European Commission Scientific, Technical and Economic Committee for Fisheries (STECF; 41) has considered the stock to be healthy for the three past years (Figure 2).

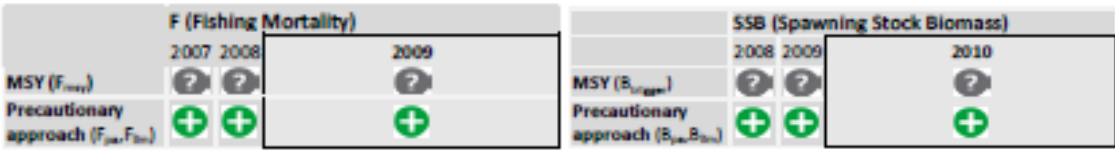

Figure 2. Status of NEA cod stock as defined by STECF (41)

Significant unreported landings have been a significant concern in the past for this stock. These resulted in estimated catches higher than the TAC from the late 1990's recently (

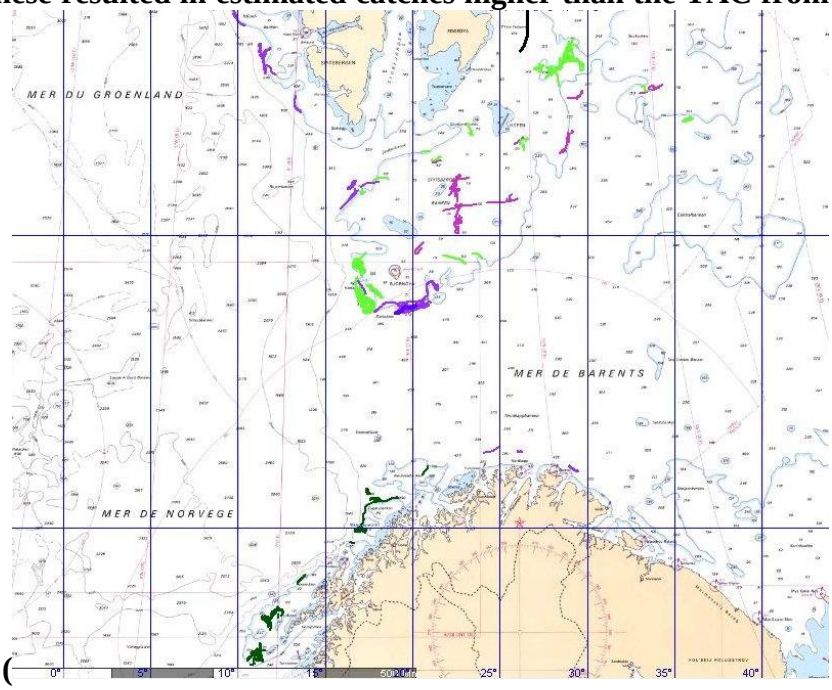

Figure 4. Fishing in the Northeast Arctic by the Cap Nord, Nordic II and Klondyke in 2010

). In addition, the agreed TAC has been until recently higher than the level recommended by ICES (or calculated under the agreed management plan). However, IUU (Illegal, Unreported and Unregulated) catches have decreased in the recent years and were considered by ICES to be close to zero in 2009 (42). In addition, the TAC was agreed at the ICES / management plan level for both 2010 and 2011. We have scored this PI assuming that this policy will continue, and it will be important to monitor this in annual audits.

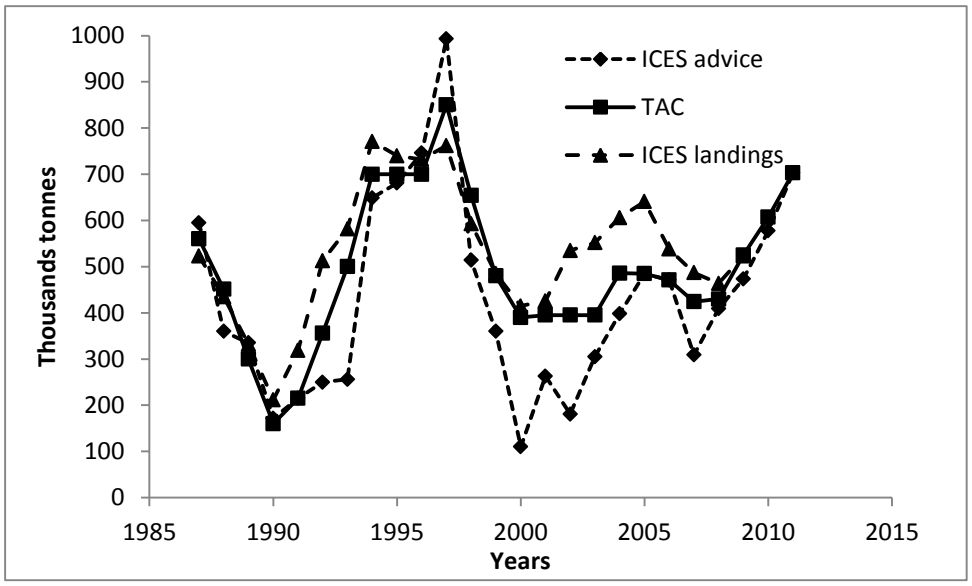

Figure 3. Comparison of ICES recommendation, agreed TAC and actual landings of NEA cod. Redrawn from ICES data (7).

5. NEA haddock

For the NEA haddock stock, reference points are set by ICES as per Table 4:

Table 4. Reference point values for the NEA haddock stock.

Reference point	Estimated value
B_{lim}	50 mt
B_{pa}	80 mt
F_{lim}	0.49
F_{pa}	0.35

The agreed TAC for 2011 is 303 mt (level recommended by ICES). Assuming landings at this level, the projected biomass for 2012 would be around 470 mt; much higher than the precautionary reference point. The resulting fishing mortality would be ~0.31, lower than the precautionary limit (0.35). The estimated spawning stock biomass has been above B_{pa} since 1990, has been increasing in recent years and is at present at its highest value since estimates began. Recruitment at age 3 has been at or above average since 2000. From 1997 to 2007, fishing mortality was generally higher than F_{pa}, but in the range of F_{lim}. Since then it has declined, and was around F_{pa} 2008 and below it in 2009. The stock is now considered to be in the "safe zone" of the precautionary approach plot (**Error! Reference source not found.**).

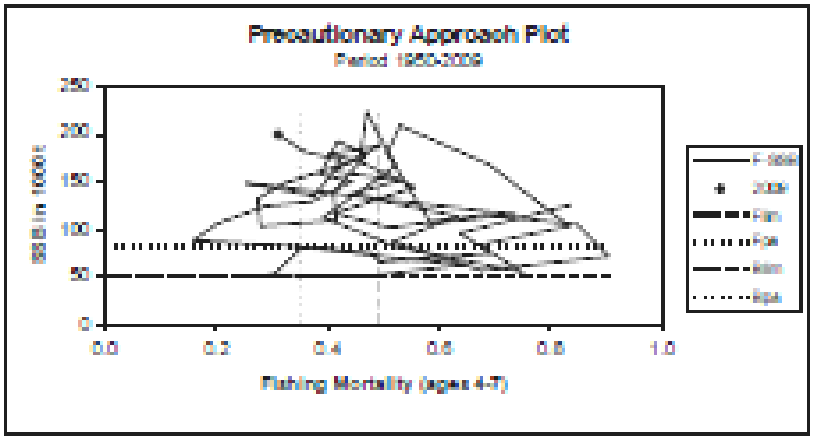

Figure 4. Precautionary approach plot for the NEA haddock stock (36).

The STECF considers the haddock *SSB* to have been healthy since 2007, although the assessment of fishing mortality is less positive for 2007 and 2008, as noted above (Figure 5).

	F (Fishing Mortality)				SSB (Spawning Stock Biomass)			
	2007	2008	2009		2008	2009	2010
MSY (F_{msy})	?	?	?	MSY ($B_{trigger}$)	?	?	?
Precautionary approach (F_{pa},F_{lim})	o	o	+	Precautionary approach (B_{pa},B_{lim})	+	+	+

Figure 5. Status of the NEA haddock stock as defined by the STECF (41). Green = precautionary reference point exceeded, orange = between limit and precautionary reference point, ? = unknown.

As for the cod stock, the main concern in the past has been unreported landings. The Norwegian Institute for Marine Research estimates that those landings varied from 4 - 34 % of the international reported landings. Non-reported landings (IUU) for the period 2002-2008 were estimated ranging from 6 000 t to 40 000 t, but the IUU estimate was 0 for 2009 (42). In addition, the TAC was in the past set somewhat higher than the level implied by the management plan (and recommended by ICES). As a result, as for the cod stock, discrepancies are observed between ICES advice, the agreed TAC and landings, although they are less pronounced (Figure 6).

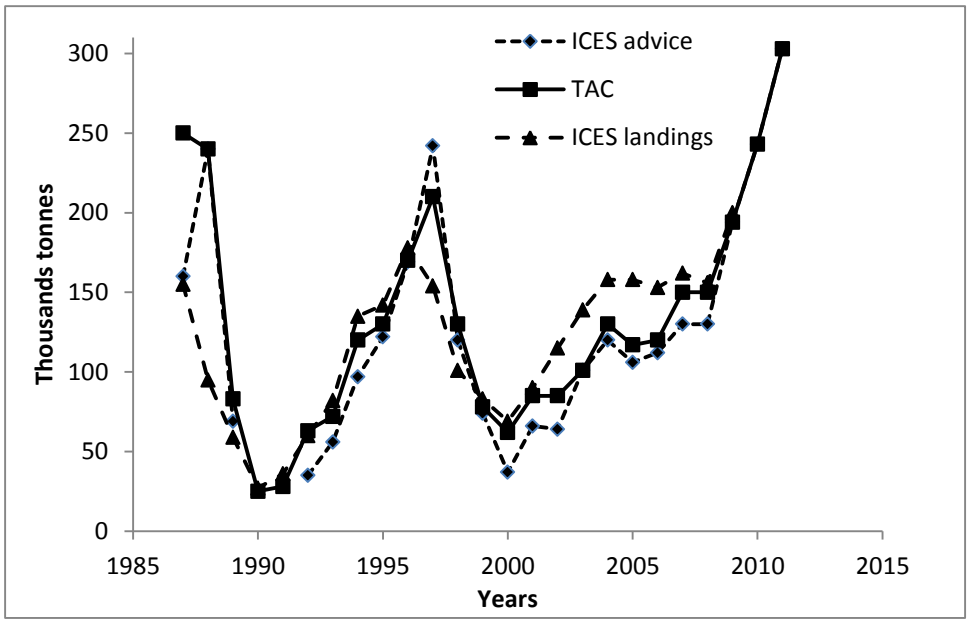

Figure 6. Comparison of ICES recommendation, agreed TAC and actual landings for the NEA haddock stock. Redrawn from ICES data (36).

6. Conclusions

NEA cod

Under SG 80, the team considers that it is highly likely that the stock is above the point where recruitment would be impaired and that the stock is at or fluctuating around its target reference point. Therefore, the two elements are met.

Under 100, both *SSB* and fishing mortality trends, with respect to reference points, indicate that there is a high degree of certainty that the stock is above the point where recruitment would be impaired, so the first element is met. However, uncertainties in the assessment are reported, relating both to catch and survey data (see 1.2.3 and 1.2.4 for more details). These problems have in the main been corrected since 2009, but it is not possible with a high degree of certainty that the stock was above or fluctuating around its target reference point, before this time. We note that up till now there are only three consecutive years where the stock is in the precautionary zone. Thus 'over recent years' is very recent, meaning that the full intent of SG 100 is not met, and resulting in a global score of 95.

NEA haddock

Under SG 80, the team considers that it is highly likely that the stock is above the point where recruitment would be impaired and that this stock is at or fluctuating around its target reference point. Therefore, the two elements are met.

Under 100, both *SSB* and fishing mortality trends, with respect to reference points, indicate that there is a high degree of certainty that the stock is above the point where recruitment would be impaired. The spawning stock biomass has been in the precautionary zone since 1990. The first element is met.
However, again, past uncertainties in the assessment are reported, relating both to catch and survey data (see PIs 1.2.3 and 1.2.4), although these problems have mainly been corrected since 2009. In addition, there is a retrospective pattern of over-estimating stock size and under-estimating fishing mortality in the most recent stock assessments (see PI 1.2.4), and the fishing mortality has been below F_{pa} only since 2009. Thus again it is not possible to say that there is a high degree of certainty except in the most recent years, resulting in a global score of 95.

1.1.2. REFERENCE POINTS

Limit and target reference points are appropriate for the stock.

SG 60: Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.

SG 80: Reference points are appropriate for the stock and can be estimated. The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity. The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome. For low trophic level species, the target reference point takes into account the ecological role of the stock.

SG 100: Reference points are appropriate for the stock and can be estimated. The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues. The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

Scores	Cod	Haddock
Euronor	**90**	**80**
Cie Pêches Saint-Malo	**90**	**80**

Rationale

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1. ICES reference points definitions

Reference points are set following the precautionary approach defined by ICES. Two sets of reference points are defined for both *SSB* and fishing mortality (43) (Table 1).

Table 1. ICES reference point definitions for this stock.

Type of reference point	Biomass reference point	Fishing mortality reference point
Limit reference point	B_{lim}: minimum biomass. Below this value recruitment is expected to be 'impaired' or the stock dynamics are unknown.	F_{lim}: exploitation rate that is expected to be associated with stock 'collapse' if maintained over a given time period.
Precautionary reference points	B_{pa}: precautionary buffer to avoid (or minimise the risk) that the *true SSB* is at B_{lim} when the *perceived SSB* is at B_{pa}.	F_{pa}: precautionary buffer to avoid (or minimise the risk) that the *true F* is at F_{lim} when the *perceived F* is at F_{pa}.

The precautionary reference points are set at a level that should safeguard against natural variability and uncertainty in the assessment.

2. Cod stock

Reference points were defined in 2003 from biological assessment by the ICES Working Groups. The reference point parameter values, including the change-point, were computed using a segmented regression on the 1960-2000 time series of *SSB*-recruitment pairs. For the cod stock, biomass reference points are derived from a recruitment-stock relationship. The corresponding *F* is calculated though long-term simulations.

Reference points are given in Figure 1.

	Type	*Value*	*Technical basis*
MSY Approach	MSY $B_{trigger}$	Not defined	
	F_{MSY}	Not defined	
Precautionary Approach	B_{lim}	220 kt	change point regression
	B_{pa}	460 kt	the lowest SSB estimate having >90% probability of remaining above B_{lim}
	F_{lim}	0.74	F corresponding to an equilibrium stock = B_{lim}
	F_{pa}	0.40	the highest F estimate having >90% probability of remaining below F_{lim}

(unchanged since: 2003)

Figure 1. ICES reference points (7).

Other reference points for *F* are also available. They are derived from a yield per recruit model and are found to be:

$F_{max} = 0.25$
$F_{0.1} = 0.12$
$F_{med} = 0.83$

Where F_{max} is the fishing mortality providing the highest yield per recruit and $F_{0.1}$ is used as a precautionary limit and represents fishing mortality at which the marginal increase in relative yield per recruit is 10% of its value at $F = 0$. F_{med} is the F associated with the median *SSB*, which historically has been able to replace itself; it corresponds to the fishing mortality above which it is likely that fishing at this level will result in stock decline.

An MSY approach is being tried using a stochastic simulation (44). This simulation integrates a relationship between the mean weight at age and total stock size, and mean weight at age in the catch ; maturity at age was modelled as a function of mean weight at age in the stock. Cannibalism was included, and a stochastic segmented regression *SSB*-recruitment relationship was used.

The simulated yields remain fairly constant for F ranging from 0.25 to 0.6 (Figure 2), with the shape of the curve depending on the model used. This range is higher than the range obtained from the yield per recruit analysis. This approach suggests that the sustainable yield is broadly constant over a rather wide range of fishing mortality, probably due to strong density-dependence. It also suggests that F_{pa} (0.40) is well within this range, and in fact F_{lim} is also within the range of all the models except one. Note, however, that this approach is still exploratory and is not yet accepted by the ICES Working Group.

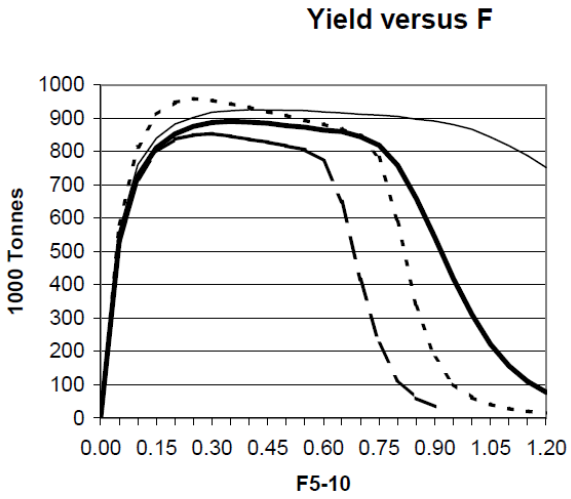

Figure 2. Average equilibrium cod catch (surplus production) as a function of fishing mortality for different exploitation patterns and population models, from a 80 yr long simulation (44).

F_{max} can also be considered a proxy for F_{MSY}. F_{pa} (0.40) is set above F_{max} (0.25), but below F_{med}. It can therefore be seen "reasonable" reference point, particularly since the strategy developed under those reference points has allowed a strong biomass increase in recent years.

Uncertainties remain in the definition of those reference points:

- Unreported catches in the recent past induce a bias in biomass estimates;
- New readings of ages show that matured fishes could be younger. Taking this difference into account would thus have effect on the spawning stock-recruitment relationship and thus on the biological reference points

3. Haddock

The reference points for haddock were set in 2000. The historical time series for this stock was revised in 2006, but the reference points were not revised. It is expected, however, that they will be updated in 2011. For the moment, the reference points are as per Table 1:

Table 1. ICES reference points for NEA haddock

	Type	Value	Technical basis
MSY Approach	$B_{trigger}$	Not defined	
	F_{MSY}	Not defined	
Precautionary Approach	B_{lim}	50 kt	Poor recruitment has resulted from *SSB*s lower than 50 kt; moderate or large year-classes have been produced at higher *SSB*s.
	B_{pa}	80 kt	B_{lim} *1.67
	F_{lim}	0.49	Median value of F_{loss}
	F_{pa}	0.35	F_{med}

For haddock stock, B_{lim} corresponds to B_{loss}, as a proxy for B_{lim}. B_{loss} is the lowest biomass observed in the historical time series which allowed recovery. Under this interpretation, B_{lim} is a boundary after which the stock would enter an area where the stock dynamics are unknown. B_{pa} is calculated from B_{lim} using an empirical function.

Other reference points for F have also been derived from a yield per recruit model as follows:

$F_{0.1} = 0.17$
$F_{med} = 0.39$

The reference point B_{lim} (= B_{loss}) is set by default. Based on historical data, it does not take into account changes of stock productivity over time. Considering the long time series involved, one could imagine that the stock has faced a wide range of conditions – however, some level of uncertainty remains. F_{pa} is set close to F_{med} which should be seen as the maximum acceptable fishing mortality. However, as for the cod stock, we note that

the strategy developed under those reference points has allowed a strong biomass increase.

4. Scoring justification

Cod stock

Under SG80, reference points are estimated. Simulations made on the harvest control rules (see PIs 1.2.2 and 1.2.4) show they are appropriate for the stock. The biomass reference point B_{pa} is set at a level above which there is an appreciable risk of impairing reproductive capacity. B_{MSY} is not calculated but the MSY approach indicates that current measures lead to similar outcome. Therefore, all the elements are met.

Under SG100, relevant precautionary issues are considered in setting reference points – we note that the strategy appears to be very conservative, and even F_{lim} can be argued based on current (preliminary) analysis to be most likely consistent with the MSY approach. However, there cannot be argued to be a 'high degree of certainty' about the ecological role of the species; it is considered in the stock assessment but not incorporated into the definition of reference points. Thus the overall score is 90.

Haddock stock

Under SG80, reference points are estimated, and simulations made on the harvest control rule suggest that they are appropriate for the stock. The biomass reference point B_{lim} (or B_{loss}) appears to be set above the level at which there is an appreciable risk of impairing reproductive capacity. Therefore, all the elements are met.

Under SG100, the use of B_{loss} as a proxy for B_{lim} implies that the setting of reference points does not consider all precautionary issues. There have as yet been no direct attempts to estimated B_{MSY} or F_{MSY} for this stock, although this is on the programme of work for ICES in the future. The ecological role of the species (predation by cod) is taken into account in the stock assessment but not in the definition of reference points directly. None of the elements are met, leading to a score of 80.

1.1.3. STOCK REBUILDING

Where the stock is depleted, there is evidence of stock rebuilding

Stocks not depleted – see 1.1.1. No need to score.

1.2. HARVEST STRATEGY (MANAGEMENT)

1.2.1. HARVEST STRATEGY

There is a robust and precautionary harvest strategy in place

SG 60: The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points. The harvest strategy is likely to work based on prior experience or plausible argument. Monitoring is in place that is expected to determine whether the harvest strategy is working.

SG 80: The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points. The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.

SG 100: The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points. The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels. The harvest strategy is periodically reviewed and improved as necessary.

Scores	Cod	Haddock
Euronor	**90**	**90**
Cie Pêches Saint-Malo	**90**	**90**

Rationale

Both stocks are managed by the JNRFC, who are responsible for deciding on the management plan (harvest control rule HCR) and for setting the level of the annual TAC. Scientific advice and stock assessment is provided by ICES (Arctic Fisheries Working Group). A variety of sources of fisheries-dependent and fisheries-independent (survey) data is available to support the stock assessment and management decision-making. The details of the HCR, data and stock assessment are provided and assessed below (PIs 1.2.2, 1.2.3 and 1.2.4).

The main management tool is the TAC (see 1.2.2 below). The harvest strategy also includes other elements which are designed to maintain both the target stocks and bycatch stocks at precautionary and productive levels. These include:

- Minimum landing size of 47 cm for cod and 44 cm for haddock in the NEZ;

- Total ban on discarding in Norwegian waters;

- A sorting grid has been compulsory since 1997 with a minimum space of 55 mm between bars (the vessels in this fishery use 80 mm spacing);

- The minimum mesh size in the trawl codend is 135 mm (the vessels in this fishery use 140 mm or in the case of the Grande Hermine 150 mm in summer and 160 or 170 mm around Bear Island);

- Norwegian Authorities may implement real time closures to protect small fish - if catches contain more than 15% by numbers of undersized fish the fishing ground is temporarily closed until surveys reveal that the proportion of juveniles in the catch has reduced below this level;

- Five marine protected areas have been established under the fisheries legislation (Iverryggen, Røstrevet, Sularyggen, Tislerrevene and Fjellknausene) to protect vulnerable species and habitats from disturbance; trawling is also forbidden within 12 miles zone of the shore.

The TAC and the other regulations set out above are implemented based on strong monitoring, control and surveillance (see PI 3.2.3), which has achieved an estimated IUU rate of zero for 2009 (the most recent year for which estimates are available).

For both stocks, these elements of the harvest strategy work well together to achieve sustainable management of the stocks. ICES advice is underlain by detailed scientific analysis (11), including analysis of uncertainties. A TAC is proposed by ICES based on this work and on the JNRFC agreed management plan, which has been reviewed by ICES as precautionary. In recent years, JNRFC has agreed the TAC at this level, although this has not always been the case in the past.

We note that improvements to the harvest strategy are proposed for the future: this includes more work on the MSY approach for cod and its eventual extension to other stocks, and the review and revision of the reference points for haddock.

Scoring justification

The harvest strategy is responsive to the state of the stock (for details see PI 1.2.2 below) and the elements of the harvest strategy work together well to maintain the stocks at productive levels – monitoring suggests that this is being achieved since the stock assessment puts both stocks in the ‘safe zone’ and above precautionary reference points (see PI 1.1.1 and 1.1.2). Thus SG 80 is met for both stocks.

For SG 100, we consider that the harvest strategy has been designed to achieve stock management objectives. The strategies are reviewed and updated (e.g. reviews of HCRs and reference points, 11,41). However, we note that it is only in the last few years that the TACs have complied with the HCR, the fishing mortality has come down to reference point levels and the problem of IUU fishing has been eliminated Thus we cannot yet say that the harvest strategy is ‘clearly able to maintain stocks at target levels’ – a longer time series is needed. This leads to an overall score of 90 for both stocks.

1.2.2. HARVEST CONTROL RULES AND TOOLS

There are well defined and effective harvest control rules in place

SG 60: Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached. There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.

SG 80: Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached. The selection of the harvest control rules takes into account the main uncertainties. Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.

SG 100: Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached. The design of the harvest control rules take into account a wide range of uncertainties. Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

Scores	Cod	Haddock
Euronor	**90**	**90**
Cie Pêches Saint-Malo	**90**	**90**

Rationale

1. Cod stock

The HCR was originally defined by the Joint Norwegian-Russian Fisheries Commission (JNRFC) in 2002 and was applied for the first time when setting the TAC for 2004. The rule was slightly amended in 2005. After an ICES evaluation 2007, the HCR was again slightly modified by the JNRFC. The current HCR sets out the decision rules for the TAC as follows (7):

1. Estimate the average TAC level for the coming 3 years based on F_{pa}. TAC for the next year will be set to this level as a starting value for the 3-year period;
2. The year after, the TAC calculation for the next 3 years is repeated based on the updated information about the stock development, however the TAC should not be changed by more than +/- 10% compared with the previous year's TAC;
3. If the TAC, by following such a rule, corresponds to a fishing mortality (F) lower than 0.30 the TAC should be increased to a level corresponding to a fishing mortality of 0.30;

4. If the spawning stock falls below B_{pa} the procedure for establishing TAC should be based on a fishing mortality that is linearly reduced from F_{pa} at B_{pa}, to F= 0 at *SSB* equal to zero. At *SSB* levels below B_{pa} in any of the operational years (current year, a year before and 3 years of prediction) there should be no limitation on the year-to-year variations in TAC.

It is noteworthy that the fishing mortality of 0.30 defined in the HCR is below F_{pa} (0.40). For 2011, applying the 10 % rule would have resulted in $F < 0.30$, and, therefore, as per point 3 of the management plan, the TAC was set for a value of $F = 0.30$, *i.e.* 703 000 t.

The TAC has followed this HCR since 2004. Since 2009, however, the high stock biomass has led to point 3 of the HCR being invoked each year (TAC increase of 22% in 2009, 15% in 2010 and 16% in 2011). We note that point 3 was only formally added to the HCR in 2010, so before this, it is arguable that the JNRFC did not stick to the letter of the HCR, although their logic for such an increase was reasonable.

ICES was requested by JNRFC to evaluate those rules with respect to the precautionary approach. This was done in 2010 by stochastic simulations of stock dynamics based on work done in 2004 and 2005 (45), and taking into account variation in biological parameters such as recruitment, weight-at-age and maturity-at-age, as well as uncertainties in future assessments. Bias in assessments (systematic under- or over-estimation) and implementation error were also modelled explicitly. Two hypotheses on the rate of natural mortality *M* (low or high) were also tested. All simulations with $F= 0.4$ indicate that at this level of fishing mortality the risk of bringing the stock below B_{lim} is very low. ICES concluded that management plan for NEA cod could therefore be characterised as being in accordance with the precautionary approach to fisheries management.

2. Haddock stock

The HCR adopted by the JNRFC (36) takes the same form as the one adopted for the cod stock, but with some differences:

- The TAC for the next year will be set at level corresponding to F_{pa};
- The TAC should not be changed by more than +/- 25% compared with the previous year's TAC;
- If the spawning stock falls below B_{pa}, the procedure for establishing TAC should be based on a fishing mortality that is linearly reduced from F_{pa} at B_{pa} to $F= 0$ at *SSB* equal to zero. At *SSB* levels below B_{pa} in any of the operational years (current year and a year ahead) there should be no limitations on the year-to-year variations in TAC.

Differences are i) a one-year rule instead of a three-year rule; and ii) the HCR permits bigger year-to-year variation in the TAC. Prior to 2007, there was a three-year rule for

haddock as well as cod, but an assessment by ICES in 2006 suggested that this previous rule complied with the precautionary approach only in the absence of implementation errors, which was unlikely due to the problem at the time of unreported catch. The HCR was thus amended in 2007 for a one-year rule, and further assessment by ICES (46) and found the current rule to be in agreement with the precautionary approach. Applying this rule, the 2011 TAC was agreed to be 303 000 t (+25 % from the 2010 TAC).

3. Scoring justification

Those comments are valid for both stocks.

Well defined harvest control rules are in place. They are consistent with the harvest strategy and designed to meet its objectives. The accepted rules are defined to reduce exploitation levels when the biomass falls below B_{pa}. The main uncertainties are included in the definitions of reference points and in the stock assessments (see PI 1.1.2 and PI 1.2.4). The rules have been in place since 2004 (with modifications) and the current stocks status (see 1.1.1) is an indication that those rules are effective in achieving the exploitation levels required under the harvest control rules. All the elements of SG80 are met.

Under SG100, the team considered that the design of the harvest control rules take into account a wide range of uncertainties, even if implicitly (e.g. via B_{pa} or the stock assessment which takes into account, for example, cannibalism for cod and predation for haddock). The team therefore considers that the first point is met. The existing data suggest that the tools in use are effective in controlling exploitation rates, since both stocks are in the "safe" zone and the issue of IUU has been solved. However, all these are recent achievements, and for the moment the time series is too short to assert that we have 'clear evidence'. The last point of SG100 is not met, giving an overall score of 90.

1.2.3. INFORMATION / MONITORING

Relevant information is collected to support the harvest strategy

SG 60: Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy. Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule

SG 80: Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy. Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule. There is good information on all other fishery removals from the stock.

SG 100: A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as

environmental information), including some that may not be directly relevant to the current harvest strategy, is available. All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of the inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.

Score: 95	Cod	Haddock
Euronor	**95**	**95**
Cie Pêches Saint-Malo	**95**	**95**

Rationale

1. Fisheries removal

Boats are clearly identified and recorded through the licensing system. All vessels are followed by a VMS system. ICES' most recent estimate of IUU fishing in these fisheries is zero (for 2009).

On board, catches are recorded in compulsory logbooks. Since February 2011, vessels are required to use an electronic logbook. As the fish is filleted on board, data are collected in live fish weight equivalent, using the official Norwegian correction factor. Since there has not been final agreement on the form that an EU electronic logbook should take, for the moment, the French vessels record their catch both electronically and on paper.

In Norwegian waters, vessels must provide the following reports:

- Catch on entry report (COE), when entering the NEZ or the Svalbard fisheries zone;
- Catch activity reports (DCA): sent daily for each haul; if the electronic logbook fails, a weekly report (CAT) is required;
- Catch on exit report (COX), when leaving the NEZ or the Svalbard zone; total amount of fish on board by species;
- Port reports (POE), when entering a Norwegian port, even if there are no landings.

Controls at sea are frequent and are considered by stakeholders to be very comprehensive (according to the site visit).

On the French side, both VMS and e-log data are centralized at the Centre de surveillance des pêches (Fisheries Monitoring Center, FMC). Copies of the logbooks are sent to FROM-Nord where they are cross-checked with sale slips. A difference of around 8 % between logbooks and sale slips is tolerated; in case of divergence, the highest value is kept on record. Occasional controls on landing and logbook data are also made by the French Gendarmerie Maritime, Affaires Maritimes the service of fraud repression

(Direction Générale de la Concurrence, de la Consommation et de la Répression des Fraudes , DGCCRF) and EU inspectors.

Similar tight controls exist on all fisheries.

2. Fisheries-independent stock data

Aside from CPUE, stock abundance data and biological data are also gathered by annual scientific surveys (ref AFWG 11):

A joint Norwegian-Russian Barents Sea winter survey (bottom trawl and acoustics), takes place in February and March, and the time series starts in 1981;
A Lofoten acoustic survey on spawners, March-April;
A Russian autumn survey (bottom trawl and acoustics), takes place in November and December, and started in 1982;
A joint Norwegian-Russian ecosystem survey in August-September for the period 2004-2009.

3. Biological data

Biological data are available from research surveys. Maturity ogives are regularly calculated and updated. Age structure and weights at age are monitored on a yearly basis. Cod consumption is monitored through stomach contents , and 9,000 cod stomachs from the Barents Sea have been analyzed annually in the period 1984-2009. Extensive work has been done on validating aging from otoliths (11).

4. Scoring justification

The comments are valid for both stocks

The team considers that all the elements of SG80 are met. For SG100, there is a comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, and fishery removals). Information on the environment and on prey species (e.g. capelin) is also available. The first point is thus met. All information required by the harvest control rule is monitored with high frequency, and there is a good understanding of the inherent uncertainties in the information and the robustness of assessment and management to this uncertainty. Due to the past history of both fisheries (IUU), it is, however, not possible to say that the information required by the HCR are gathered with a high degree of certainty, although most of the uncertainties in the data and the assessment are being addressed by ICES. The second element is thus only partly met, which leads to a score of 95.

1.2.4. ASSESSMENT OF STOCK STATUS

There is an adequate assessment of the stock status

SG 60: The assessment estimates stock status relative to reference points. The major sources of uncertainty are identified.

SG 80: The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points. The assessment takes uncertainty into account. The stock assessment is subject to peer review.

SG 100: The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery. The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way. The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored. The assessment has been internally and externally peer reviewed.

Score: 90	Cod	Haddock
Euronor	**90**	**90**
Cie Pêches Saint-Malo	**90**	**90**

Rationale

1. Both stocks

NEA cod and haddock stocks are assessed every year by the Arctic Fisheries Working Group (AFWG) of ICES. Information in this rationale comes from the most recent AFWG report (11), unless otherwise indicated.

Analyses are reviewed by the ICES Advisory Committee (ACOM), which provides scientific advice. That advice is further peer reviewed by a Review Group, the Scientific, Technical and Economic Committee for Fisheries (STECF) of the European Union, composed of external scientists, and by the Joint Norwegian-Russian Fisheries Commission.

The assessments provide a comprehensive vision of the stocks' trends : spawning stock biomass, recruitment-stock relationships, fishing mortality. Data are related to accepted reference points in an analytical way.

2. Cod

The assessment is made with the classical "Extended Survivor Analysis" (XSA), which is a particular formulation of Sequential Population Analysis (SPA). The analysis is based on a time series of commercial catches at ages. The time series starts in 1946.

The assessment also includes: length at age and weight at age (from survey and commercial catches), and maturity at age (both from estimates and direct observations). Cannibalism on younger ages is considered in the assessment, using data derived from stomach content analyses, starting in 1984 – cod themselves are formally included as an "extra fleet" in the SPA and further added to the natural mortality.

The results of the SPA are calibrated with the following fisheries and scientific survey data (Table 1):

Table 1. Data sources for calibrating the SPA model.

Name	Place	Season	Age	Years
Russian trawl CPUE	Total area	All year	9-11	1985-2009
Joint bottom trawl survey	Barents Sea	Feb-Mar	3-8	1981-2010
Joint acoustic survey	Barents Sea + Lofoten	Feb-Mar	3-9	1985-2010
Russian bottom trawl	Total area	Oct-Dec	3-9	1994-2009

The assessment appears to be sensitive both to the length of the tuning period, and the choice of stock size dependant catchability, so comparative runs were made to explore the sensitivity to these choices. These seem to show that the assessment is rather robust to the above changes of model setting.

Other assessment models have also been tried:

- The "TISVPA" (Triple Instantaneous Separable VPA) model belongs to same family as XSA, but extended to try and incorporate interactions between year classes and the activities of different fleets into the estimates of fishing mortality.

- The survey calibration method aims to transform survey data into absolute numbers, using a "calibration" process against the VPA results.

- The biological Gadget model (47) tries to calculate population numbers using various biological traits, such as growth, fecundity and mortality.

Those different approaches give different results in terms of biomass and fishing mortality. They are not directly comparable, but give similar trends.

The main uncertainties in this assessment derive from the biased catch statistics as substantial unreported catches have occurred in the past, even if bias in the catch statistics appears to have decreased in recent years (see 1.2.3). Inconsistencies in the surveys also induce uncertainties in the assessment.

3. Haddock

As for the cod stock, the assessment is made with the classical "Extended Survivor Analysis" (XSA). The analysis is based on a time series of commercial catches at ages, starting in 1950. The assessment also includes: length at age and weight at age (from surveys and commercial catches), and maturity at age. Predation (mainly by cod) is also included in the assessment, and added to the natural mortality, set at $M = 0.2$.

Results are calibrated against the following data sets:

Name	Place	Season	Age	Year
Russian bottom trawl	Barents Sea	Autumn	1–7	1983–2009
Norwegian bottom trawl	Barents Sea	Winter	1–8	1982–2010
Norwegian acoustic	Barents Sea	Winter	1–7	1980–2010

A retrospective pattern is noted in the results, suggesting some systematic bias in the model output. However, the bias tends to overestimate *F* and underestimate *SSB*, which means that the current assessment should provide a conservative view of the stock status.

The 2010 assessment provides a comprehensive list of uncertainties and possible biases:

- Incomplete survey space and stock coverage; even if a correction factor is applied, this incomplete coverage induces uncertainties in this index;
- The level of discarding is not known, but may be a problem in the longline fishery;
- Unreported catches for the period 2002-2008 have been estimated and those estimates are considered uncertain; unreported catches prior to 2002 are considered to be low and IUU has been estimated at close to zero since 2009;
- The survival of young age groups from predation varies from year to year; this leads to uncertainties in predictions which may be important in the context of a three year HCR (hence the ICES review suggesting that a one-year rule would be more precautionary – see 1.2.2 above);
- Sampling errors in the determination of catches at age are not taken into account and may introduce bias in the resulting estimates.

4. Scoring justification

The comments are valid for both stocks

All the elements of SG 80 are met.

Under SG100, the assessment is made according to international standards, and is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery. The

assessment takes uncertainty into account but does not explicitly evaluate the stock in a probabilistic way, although stochastic simulations are extensively used. The assessment has been tested, but it is too early to affirm it is robust, as the solving of IUU issues is too recent. Alternative hypotheses have been explored for cod stock, however not rigorously as yet. The assessment is internally (ACOM/ICES) and externally (STCEF and JNRFC) peer reviewed. Overall, the first and the last elements of SG100 are met, but not the two others, giving a score of 90.

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2. Principle 2

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

2.1. RETAINED SPECIES

2.1.1. OUTCOME STATUS

The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.

SG 60: Main retained species are likely to be within biologically based limits or if outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species. If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.

SG 80: Main retained species are highly likely to be within biologically based limits, or if outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.

SG 100: There is a high degree of certainty that retained species are within biologically based limits. Target reference points are defined and retained species are at or fluctuating around their target reference points.

Score	
Euronor	**80**
Cie Pêches Saint-Malo	**80**

Rationale

1. Principle 2 for cod vs. haddock

The two target species, cod and haddock, are caught as part of a single mixed fishery, so Principle 2 issues are the same for both species.

2. Main retained species

SG 60 and SG 80 refer only to 'main' retained species. These are defined by MSC (in summary) as those making up more than 5% of the landed catch, or those which are considered by the assessment team to be particularly vulnerable to exploitation and/or particularly valuable to the fishing company concerned.

The retained species for Euronor and for the Grande Hermine are given in Table 1 below, along with a rationale for whether they should be considered 'main' or not.

Table 1. Retained species, with their percentage of the catch in 2009 and 2010, ICES advice or other biological information, and the decision of the assessment team as to whether they should be considered 'main' retained species.

species	% 2009	% 2010	ICES advice or other biological information	'main' retained species?	ref
Euronor					
saithe	6.72	2.27	Stock in good condition; fishery MSC certified	yes: >5% of catch in some years	22
redfish	0.66	0.02	Stock depleted; directed fisheries banned.	no: max. catch by Euronor 10 t in 2009 out of 10,000 t total catch of redfish (0.1%); also low % Euronor's catch	23
Wolf fish	0.25	0	No ICES advice; species is vulnerable to exploitation due to slow growth and late maturity.	no: catch too low	48
ling	0.11	0	Data lacking but CPUE increasing	as above	49
Atlantic halibut	0.03	0.01	No ICES advice; species is vulnerable to exploitation due to slow growth and late maturity	as above	50
Greenland halibut	0.03	0.01	Data lacking but stock apparently depleted; directed fisheries banned until 2010 – recent signs of improvement	as above	51
other	small amounts of pollack, hake and monkfish are also caught – these make up <0.01% of the catch and are not detailed here				
Grande Hermine					
saithe	6.75	4.33	Stock in good condition; fishery MSC certified.	yes: >5% of catch in some years	22
redfish	0.3	0.35	Stock depleted; directed fisheries banned.	no: as above – catch of GH 9.7t 2009, 12t 2010 → ~0.1% of total for stock	23
wolffish	0.12	0.43	No ICES advice; species is	no: catch too low	48

			vulnerable to exploitation due to slow growth and late maturity.		
Greenland halibut	0.20	0.06	Data lacking but stock apparently depleted; directed fisheries banned until 2010 – recent signs of improvement	no: GH catch 6.6t 2009, 2.2t 2010 out of TAC of 15,000 t for directed fishery	51
ling	0.06	0	Data lacking but CPUE increasing	no: catch too low	49
Atlantic halibut	0	0.01	No ICES advice; species is vulnerable to exploitation due to slow growth and late maturity	no: catch too low	50

i.e. only one 'main' retained species is considered: saithe.

3. Scoring

SG60 and SG80 only consider the main retained species. In fact, SG100 is met for saithe because the fishery (for both companies) is MSC certified (2,3). SG100 is not, however, met for any of the other retained species, either because of the stock status (redfish, Greenland halibut) or because of lack of information on the stock status (wolffish, ling, Atlantic halibut). Since only one element out of six scores above 80, the overall score is still 80 for both companies.

2.1.2. MANAGEMENT STRATEGY

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

SG 60: There are measures in place 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. The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).

SG 80: 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. 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. There is some evidence that the partial strategy is being implemented successfully

SG 100: There is a strategy in place for managing retained species. The strategy is mainly based on information directly about the fishery and/or species involved, and testing

supports high confidence that the strategy will work. There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its overall objective.

Scores	
Euronor	**90**
Cie Pêches Saint-Malo	**90**

Rationale

1. Strategies

This fishery has a strong general management strategy (of which the key elements are: i) a requirement to demonstrate sufficient quotas for retained as well as target species; ii) a ban on discarding; iii) area closures and iv) strong control and enforcement. This strategy can be expected to impact on the management of retained species, because vessels cannot enter the fishery unless they have sufficient quota and cannot discard any catch that is illegal or undesirable.

It is clear that this strategy is successful, because the proportion of non-target species (i.e. species other than cod, haddock and saithe) in the catch is very small (see Table 1 in PI 2.1.1 above). Russian fisheries in the Barents Sea, where there is no discard ban, have considerably higher catch rates of these species (38).

In addition, there are specific management strategies (or partial strategies) for some of the other retained species, as shown in Table 1 below.

Table 1. Management strategies (or partial strategies) for each retained species

Species	Strategy
saithe	TAC with quota for each company
redfish	Redfish box; limit of 12% total in catch and 15% in any given haul; ban on targeted fisheries
wolffish	none
ling	ICES precautionary TAC with quota for each company
Atlantic halibut	none
Greenland halibut	Limit of 8% total in catch, no directed fishery by these vessels although TAC of 15,000 t for Norwegian and Russian vessels

2. Scoring

SG60 and SG80 refer to 'main' retained species – i.e. saithe only. As noted above, there is a management strategy in place for saithe, which is working well since the stock status is good (above target reference points, fishery MSC certified – 2,3). Thus SG80 is met.

SG100 refers to all retained species. Overall, the team felt that the measures outlined above – particularly the general measures - constituted a 'strategy' for managing retained species, based on the fishery, and that there is good evidence that the strategy is working (low catches of non-target retained species). However, we are lacking population data for some of the retained species (wolffish, Atlantic halibut and ling) to know for certain whether the strategy is working from the point of view of stock status. Thus overall the first two components of SG100 are met out of four, giving a score of 90 for both companies.

2.1.3. INFORMATION / MONITORING

Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species

SG 60: Qualitative information is available on the amount of main retained species taken by the fishery. Information is adequate to qualitatively assess outcome status with respect to biologically based limits. Information is adequate to support measures to manage main retained species

SG 80: Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery. Information is sufficient to estimate outcome status with respect to biologically based limits. Information is adequate to support a partial strategy to manage main retained species. Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).

SG 100: Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations. Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. Information is adequate to support a comprehensive strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective. Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.

Scores	
Euronor	**90**
Cie Pêches Saint-Malo	**90**

Rationale

SG60 and SG80 refer to 'main' retained species – i.e. saithe. This saithe fishery is already MSC certified – so SG80 is met.

There is good quantitative information on catches of all retained species. This is accurate and verifiable because logbooks are cross-referenced with landings on a regular basis, and are also checked by Norwegian authorities. For population status, there is good information on some of the retained species (saithe, redfish) but less good for others (Atlantic halibut, Greenland halibut, ling, wolffish), where population time series are either lacking or are short (22,23,49,51).

Some parts of SG100 is met: i) information on catches; ii) estimate of impact of this fishery on populations; iii) information to support a comprehensive management strategy and iv) monitoring to assess ongoing mortalities by this fishery. Some parts are not met: i) status of affected populations in most cases is not known; and ii) assessment of strategy in terms of stock status (objective of strategy) is also not possible in most cases. The team also noted that since the full discard ban is relatively recent, comprehensive monitoring of all retained species is also quite recent. The overall score is 90.

2.2. BY-CATCH

2.2.1. OUTCOME STATUS

The fishery does not pose a risk of serious or irreversible harm to the by-catch species or species groups and does not hinder recovery of depleted by-catch species or species groups.

SG 60: Main by-catch species are likely to be within biologically based limits, or if outside such limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding. If the status is poorly known there are measures or practices in place that are expected result in the fishery not causing the by-catch species to be biologically based limits or hindering recovery

SG 80: Main by-catch species are highly likely to be within biologically based limits or if outside such limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding

SG 100: There is a high degree of certainty that by-catch species are within biologically based limits

Scores	
Euronor	**100**
Cie Pêches Saint-Malo	**100**

Rationale

Discarding is banned in Norwegian waters (13), and controls are very strict (see rationale for PI 3.2.3).

For Euronor, catches that would normally be discarded (damaged fish of the same species as retained above) are kept frozen in the hold and noted in the logbooks under 'poissons divers' (miscellaneous). This was 53kg in 2009 and 2.1 tonnes in 2010, making up a maximum of 0.19% of the catch in 2010 (all species mixed). This catch is sold to a fishmeal plant in Boulogne. On board the Grande Hermine, the whole catch is processed into fillets, and only guts and other unusable parts are discarded.

Overall, these 'miscellaneous' are a very minor component of the catch of no serious concern. This fishery is effectively discard-free. The score is 100.

2.2.2. MANAGEMENT STRATEGY

There is a strategy in place for managing bycatch that is designed to ensure the fishery

SG 60: There are measures in place, if necessary, which are expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery. The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).

SG 80: There is a partial strategy in place, if necessary, for managing bycatch that is expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery. There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or the species involved. There is some evidence that the partial strategy is being implemented successfully.

SG 100: There is a strategy in place for managing and minimising bycatch. The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports high confidence that the strategy will work. There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective.

Scores	
Euronor	**100**
Cie Pêches Saint-Malo	**100**

Rationale

There is a clear strategy for managing discards in Norwegian waters: discarding is banned. The ban is strictly enforced (see rationale for PI 3.2.3). This result of this ban is that considerable efforts are made to avoid catching small fish – for example, the gear includes a sorting grid and also for the Grande Hermine an escape panel in some areas (around Bear Island). A larger mesh size is also used in the cod-end compared to fisheries outside Norwegian waters further south (see Table 1).

Table 1. Mesh sizes used by the fishery and minimum legal requirement in this fishery

Mesh size (mm)	
Minimum legal mesh	135
Euronor	140
Grande Hermine winter	140
Grande Hermine summer	150

The team decided that all elements of SG 100 are met.

2.2.3. INFORMATION / MONITORING

Information on the nature and amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch

SG 60: Qualitative information is available on the amount of main bycatch species affected by the fishery. Information is adequate to broadly understand outcome status with respect to biologically based limits. Information is adequate to support measures to manage bycatch

SG 80: Qualitative information and some quantitative information are available on the amount of main bycatch species affected by the fishery. Information is sufficient to estimate outcome status with respect to biologically based limits. Information is adequate to support a partial strategy to manage main bycatch species. Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).

SG 100: Accurate and verifiable information is available on the amount of all bycatch and the consequences for the status of affected populations. Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty. Information is adequate to support a comprehensive strategy to manage bycatch, and evaluate with a high degree of certainty whether a strategy is

achieving its objective. Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.

Scores	
Euronor	**90**
Cie Pêches Saint-Malo	**90**

Rationale

Discarding is banned, so in principle there is no requirement for collecting information on discarded species. There are inevitably small catches of species that under other circumstances would be discarded (damaged fish of various species). However, these are very small amounts, and the fishery is very unlikely to have any impact on these stocks (see rationale for retained species above). Specific information is not collected on these catches, however the team did not consider that this was necessary in this context.

Nonetheless, one of the peer reviewers noted that there is little independent observer data on this fishery. While the strict Norwegian inspection regime gave the assessment team confidence in the self-reported data available, they nonetheless agree that the requirement that data be 'verifiable' and 'with a high degree of certainty' is not fully met. The score is 90.

2.3. PROTECTED SPECIES

2.3.1. OUTCOME STATUS

The fishery meets national and international requirements for protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species.

SG 60: Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species. Known direct effects are unlikely to create unacceptable impacts to ETP species

SG 80: The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. Direct effects are highly unlikely to create unacceptable impacts to ETP species. Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts

SG 100: There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species. There is a high degree of confidence that there are no significant detrimental effects (direct and indirect) of the fishery on ETP species

Scores	
Euronor	**90**
Cie Pêches Saint-Malo	**90**

Rationale

The Norwegian Red List (52) includes 24 species of marine mammals and seabirds, both of which are important components of the Barents Sea ecosystem. These species are protected under the Bern Convention (53), but there are no reported interactions with marine mammals or birds by the fishery, although both are seen regularly. The ICES Working Group SGBYC (bycatch of protected species; 54) states that there is no marine mammal bycatch in Norwegian offshore trawl fisheries. Cold water corals (*Lophelia pertusa*) and associated benthic species are considered under habitats (PI 2.4) below.

There are no reported catches of rays, skates or sharks, although small numbers may be included in 'poissons divers' (see 2.2.1 above). A full list of the ray and skate species reported to be present in the area is given in Table 1.

Table 1. Species of rays potentially present in the area of this fishery. For the Red List status CR=critically endangered, NT=near threatened, VU=vulnerable, , LC=least concern, DD=data deficient.

Species (fr, en, sci)	Distribution / abundance	Vulnerability to fishing	IUCN / Norway redlist status	Conclusion	Refs
raie radiée, thorny skate, starry ray, *Amblyraja* (=*Raja*) *radiata*	Most common ray in Barents Sea.	Stable/increasing in North Sea (IUCN). No evidence of depletion by fishing in Norwegian coastal areas (Williams et al.). Small size at maturity (~44cm).	VU overall, LC in this area / Norway = DD	Probably main ray by-catch species in this fishery, if there is any.	18,19
raie arctique, raie boréale, Arctic skate, blackbelly skate, *A. hyperborea*	Lower continental slopes in sub-Arctic and sub-Antarctic waters (IUCN)	Mainly occurs deeper than commercial fisheries (250-2500m)	LC / DD	Probably little overlap with this fishery due to depth range	18, 55
raie ronde,	Lower shelf	Mainly occurs	LC. Not	Probably	18,

round skate, sandy skate, *Rajella fyllae*	and slope of NW Europe, NE Canada, Greenland, Iceland, Svalbard	deeper than commercial fisheries (170-2000m). Pop. growth rate quite high (IUCN).	on Norway redlist	little overlap due to depth range	56
pocheteau gris, blue skate, common skate, flapper skate, *Dipturus batis*	Reported rare or absent in the Barents Sea. If present then northern extremity of range.	Very vulnerable to fishing. Protected by EU fisheries legislation.	CR / DD	Probably little overlap – more southerly distribution	14, 15, 17, 18
raie voile, sail ray, D. linteus (= Raja lintea)	Distribution poorly known – probably mainly occurs deeper than most fisheries or surveys.	Reported very occasional by-catch in trawl fisheries. Some reports may be illegal landings of *D. batis* (IUCN).	LC / DD	Probably little overlap due to depth range	18, 57
pocheteau noir, long-nosed skate, *D. oxyrinchus*	Reported rare or absent	Vulnerable in general, but this area on extremity or outside range.	NT / DD	Probably little overlap – more southerly distribution	18, 58, 59
raie à queue épineuse, spinytail skate, *Bathyraja spinicauda*	Continental slope species (200-2000m or deeper) in north Atlantic, but apparently more abundant in northwest Atlantic than this area.	Life history unknown, but large body size probably makes it vulnerable. Declines reported in Canadian waters.	NT / DD	Probably little overlap due to depth range	18, 60
raie chardon, shagreen ray, *Leucoraja fullonica*	Reported rare or absent	Large body size probably makes it vulnerable, but this area on extremity or outside range.	NT / DD	Probably little overlap – more southerly distribution	18, 61, 62

If rays are caught, the species is likely to be *Amblyraja radiata*, which is considered as 'least concern' in this area by IUCN, and 'data deficient' by the Norwegian Red List. It is

not a protected species specifically, although it is protected to some extent by the discard ban (13).

The fishery therefore has no direct effects on any protected species, so the first part of SG100 is met. As regards indirect effects such as noise and disturbance, the Barents Sea is an important area for cetaceans, so there is no 'high degree of certainty' that there are no indirect effects. Trophic effects are also possible, although since target fish stocks are in good condition (see P1 and PI 2.1.1), they are not considered likely. Small amounts of bird mortality have been recorded in other trawl fisheries, although they are not reported here. Overall, the second part of SG 100 is not met, giving a score of 90.

2.3.2. MANAGEMENT STRATEGY

The fishery has in place precautionary management strategies designed to: - meet national and international requirements; - ensure the fishery does not pose a risk of serious or irreversible harm to ETP species; - ensure the fishery does not hinder recovery of ETP species; and - minimise mortality of ETP species.

SG 60: There are measures in place that minimise mortality and injury, and are expected to achieve the ETP Outcome PI 80 level of performance or above. The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).

SG 80: There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, that is designed to achieve the ETP Outcome PI 80 level of performance or above. There is an objective basis for confidence that the strategy will work, based on some information directly about the fishery and/or the species involved. There is evidence that the strategy is being implemented successfully.

SG 100: There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, that is designed to achieve above the ETP Outcome PI 80 level of performance. The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work. There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is evidence that the strategy is achieving its objective.

Scores	
Euronor	**85**
Cie Pêches Saint-Malo	**85**

Rationale

There is an integrated management plan for the Barents Sea (63). The reduction of bird and mammal bycatch in fisheries is a key element of this strategy. A report to the Storting (Norwegian Parliament) 2005-6 (64) suggested that there was no evidence of any declines in marine mammal populations related to fishing activity. Concern for by-catch of birds and mammals relates more to gillnets and longline than trawl fisheries in any case.

For elasmobranchs, the discard ban constitutes a strategy for managing impacts, because it has created significant incentives for vessels to avoid catches of unwanted species (see rationale for PI 2.2.2 above). It also leads to much better data on catches of these species, which appear to be negligible.

On this basis, SG80 is met. The first part of SG100 is met (the integrated management plan provides a comprehensive strategy with an outcome PI score >80). There is, however, no formal quantitative analysis of the impact of this strategy on protected species, and as far as we can tell no formal population assessment for most protected species. We also note that the complete discard ban is relatively new (2009), so has not yet provided clear evidence of impacts or lack of impacts. Thus the other parts of SG100 are not met, leading to a score of 85.

2.3.3. INFORMATION / MONITORING

Relevant information is collected to support the management of fishery impacts on ETP species, including: - information for the development of the management strategy; - information to assess the effectiveness of the management strategy; and - information to determine the outcome status of ETP species.

SG 60: Information is adequate to broadly understand the impact of the fishery on ETP species. Information is adequate to support measures to manage the impacts on ETP species. Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.

SG 80: Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a full strategy to manage impacts. Sufficient data are available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.

SG 100: Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives. Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.

Scores	
Euronor	**80**
Cie Pêches Saint-Malo	**80**

Rationale

Data on catches of all species, including protected species, is good. Discarding is not permitted, and components of the catch have to be identified to species in the logbook. Norwegian inspections on board are reported to be strict on the issue of recording all catch – they will check, for example, if crew eat rays or other species which are not marked down in the logbooks.

Data on seabird distribution and population trends is available via the SeaPop programme (65). More general data on the Barents Sea ecosystem, including marine mammals, is available via the joint Norwegian-Russian 'Barents Portal' (66).

For elasmobranchs, both companies have signed up to an 'auto-echantillonage' ('self-sampling') programme run by Ifremer. This records any catches of elasmobranch by tow. An excellent clear and comprehensive identification guide for elasmobranch species is also provided by Ifremer, and is on board all the vessels in this fishery.

This information was considered sufficient to conclude that the fishery is not a threat to any protected species, and to estimated quantitatively the fishing mortality imposed on protected species by this fishery – i.e. SG80 is met.

Information is still lacking, however, on i) indirect impacts (trophic, disturbance) and ii) population level trends (particularly for elasmobranchs but also for some marine mammal and bird species). Overall, the team did not feel that a 'high degree of certainty' was achieved for any protected species, and therefore no part of SG100 was met, giving an overall score of 80.

2.4. HABITAT

2.4.1. OUTCOME STATUS

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

SG 60: The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.

SG 80: The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.

SG 100: 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.

Scores	
Euronor	**70**
Cie Pêches Saint-Malo	**70**

Rationale

1. Gear – impacts on habitats

The gear used by the fishery is a demersal 'rockhopper' otter trawl with large, heavy otter boards (see description of gear in the main report). The gear operates on or near the bottom, and may thus *a priori* be predicted to cause some damage to benthic habitats. The gear used by the fishery is equipped with large 'rockhopper' discs which hold the head rope of the trawl some 10s of cm above the seabed, reducing damage relative to a standard trawl with a tickler chain in contact with the bottom. The contact of the trawl doors with the bottom, however, causes a clear trail which can be seen, for example, using side-scan sonar (67). Rockhopper gear also permits trawling in areas too rough for standard trawls, which would otherwise be protected. Generally speaking, however, the vessels stay within areas that are known to be trawlable, because of the risk of snagging gear on rough ground. This is beneficial to habitats because much of the damage done by trawls is done in the first pass.

Bottom-trawling in the inshore part of the Barents Sea started in the 1930s, expanding offshore in the 1960s by the introduction of factory and wetfish trawlers. By the mid-80s trawling occurred along the continental break and extended further on to the banks on the shelf, expanding further after the development of rockhopper gear. In the early 1990s, concerns about the effects of trawling on cold water coral reefs (*Lophelia pertusa*) in Norway were first raised by longline and gillnet fishermen. Since there are no estimates of the total pristine area occupied by deep-water coral reefs in Norway, it is not easy *post hoc* to estimate the extent of the damage caused by fisheries, but it is roughly estimated that between 30% and 50% of the total coral area has been damaged. In addition, trawls may in some cases 're-engineer' the seabed – by for example flattening out relief – in a way that makes it unsuitable for coral recruitment or re-growth – thus damage may in some areas be irreversible, or reversible only over a long time frame (53).

While cold water corals have been the main focus of concern (and protection), other vulnerable habitats are also present in the area – see below.

2. *Fishing area*

Maps of the fishing area for each company are given in Figure 3 and 4 of the main report.

Note that this fishery is an exclusively offshore – these vessels cannot enter the Norwegian 12 mile zone

3. *Distribution of sensitive habitats in relation to fishing activity*

Information on sensitive habitats in the Northeast Atlantic is available from OSPAR (42) and from the Norwegian MAREANO programme (68). MAREANO provide a variety of habitat-related maps for Norwegian waters, including a map of 'vulnerable habitats' which includes the OSPAR list of 'threatened or declining habitats'. This map is given in Figure 1 below.

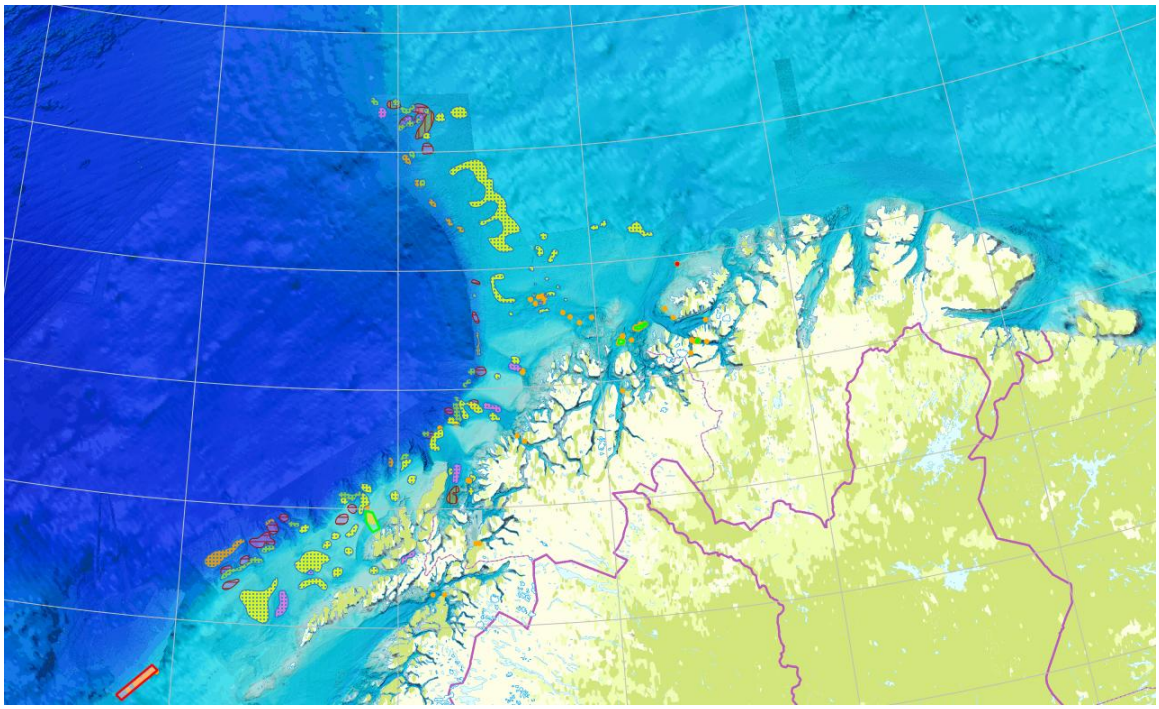

Figure 1. Map of vulnerable habitats from Norwegian MAREANO programme. The largest yellow/green areas = deep sea sponge aggregations; pink with spots = seapens and burrowing megafauna (*Nephrops* grounds); orange with spots = glass sponges; pink with strips = hard bottom coral garden; orange dots = coral reefs; green dots and areas = identified coral areas; areas outlined in pink = protected coral areas (69).

This map does not cover the full area fished by this fishery – however this is because the sensitive habitats are primarily within the areas shown in Figure 1, not because there is no habitat information outside this area (see under 'ecosystems' below for more discussion).

In this assessment we have focused particularly on vulnerable habitats. We note that habitats such as mud and sand habitats can also be affected by trawling, but concluded that in this case 'serious or irreversible harm' is not likely. They are, however, discussed under 'ecosystems' below.

The team reviewed the distribution and depth range of the OSPAR-listed sensitive habitats, including i) carbonate mounds; ii) deep-sea sponges (including glass sponges); iii) *Lophelia pertusa* coral areas; iv) *Modiolus* reefs, v) seamounts and vi) seapens and burrowing megafauna. These habitats are considered in Table 1 below. Habitats with any overlap are discussed in more detail below.

Table 1. OSPAR sensitive habitats in relation to fishing activity. Information from OSPAR (21)

Habitat	Geographic distribution in NE Atlantic	Depth range	Possible overlap with fishery?
carbonate mounds	Off the west coast of Scotland and Ireland	Deeper than 500 m	Not reported in Barents Sea
deep-sea sponges	Norwegian coast, north Norway, Svalbard	250 – 1300 m	Yes
Lophelia pertusa reefs and gardens	West Ireland, west and north Scotland, Norway*	200 – 2000 m	Yes
Modiolus reefs	North Norway, coastal Scotland and Shetland – also occur in the Irish Sea and probably elsewhere	Recorded down to 280 m but usually shallower than 70 m	Yes
seamounts	Offshore North Atlantic and Arctic oceans		No – further offshore / deeper
seapens and burrowing megafauna	Inshore west Scotland and Fladen Ground in North Sea		Not reported in Barents Sea

* NE Atlantic globally significant for this species (70)

Relevant habitats are therefore: i) *Lophelia* reefs; ii) deep-sea sponges; and iii) *Modiolus* reefs.

4. Likely current impacts of the fishery on habitats

Corals: Clearly the greatest concern has been expressed in relation to cold-water coral communities. In fact, from the map above (Figure 1) it is clear that the majority of coral areas are within coastal waters – i.e. in the Norwegian 12 mile zone that is not open to this fishery (see also 38). In addition, several of these areas are protected. Some areas

along the shelf of coral garden are also protected. Overall, on that basis, the team concluded that on a bioregional scale, serious or irreversible harm was 'unlikely' but could not be regarded as 'highly unlikely', giving a score of 60.

Sponges: Sponge communities may be *a priori* more vulnerable to this fishery than corals, because they are probably less well mapped and are certainly less well protected. There are reported to be significant areas of sponges within the fishing area (Figure 1). However, these communities are reported by OSPAR (21) to occur in the depth range 250-1300 m, so this fishery impacts only a small percentage of the total depth range. Given this fact, but bearing in mind the limited knowledge about the 'pristine' distribution of these communities, the team again proposes that serious or irreversible harm can be considered 'unlikely' but not 'highly unlikely', giving a score of 60.

Modiolus reefs: *Modiolus modiolus* (horse mussels) is a very widely distributed species, which is common from the Bay of Biscay, around the coast of the UK and Norway, in the Skagerrak and Kattegat and in the Arctic (e.g. around Spitsbergen and on the north coast of Russia). In some areas it forms 'reefs' – longitudinal structures elevated off the seabed – while in other areas it just a 'normal' component of the benthic fauna. Reefs have been documented in the Celtic and Irish Seas, in Northern Ireland, on the west coast of Scotland, around Shetland and the length of the Norwegian coast, and may well be present undocumented in other areas (21). Modiolus reefs have been damaged by fishing, for example as a result of scallop dredging in Strangford Lough in Northern Ireland, but this form of fishing is significantly more damaging to benthos than trawling. Overall, given the widespread nature of this species and habitat type, as well as the relatively much greater resilience of horse mussels than the other species considered above in terms of life history, serious or irreversible harm was considered by the team to be 'highly unlikely', giving a score of 80.

5. Likely current impacts of the fishery on habitats

The Ministry of Fisheries and Coastal Affairs has issued a regulation that regulates fishing with bottom gear in the Norwegian economic zone, the fisheries zone around Jan Mayen and the fisheries protection zone around Svalbard (71). The new regulation will enter into force from 1 September 2011.

The new regulation consists of the following elements:

- Fishing areas are divided into two categories: existing fishing areas (waters shallower than 1000 meters) and new fishing areas (waters deeper than 1000 meters).
- Regardless of fishing area, vessels shall for each catch estimate the quantity of indicators on vulnerable bottom habitats, such as live corals and sponges. Threshold values are set at 60 kg living corals and 800 kg living sponge. If a catch exceeds these threshold values, vessels are required to submit a special report to the authorities, and to leave the fishing area.

- In existing fishing areas, where fishing has taken place for decades, the perceived impact on the ecosystem is considered tolerable and thus the fishing activity can continue, but with stricter monitoring and reporting requirements.
- There will be stricter requirements for fishing in new fishing areas. In order to commence fishing activities with bottom gear in new fishing areas, vessels must obtain a special permit, which is subject to number of criteria being met. The Directorate of Fisheries may also require that vessels fishing in new fishing areas must have an observer on board.

The new regulation represents a major step forward in addressing both fisheries management and marine biodiversity conservation in an integrated manner. Norway claims to be the first country to implement the FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas in its own waters (72).

6. Conclusions

Three vulnerable habitats were identified, and the fishery scored 60 for two and 80 for one based on current risk of impact. In addition, the team noted:

- The maps of fishing grounds indicate that overlap between fisheries and sensitive habitats is possible;
- Given that these are large vessels towing large trawls, the fishing companies would ideally be proactive in trying to minimise habitat impacts.

Conversely, the new regulation sets a new standard for habitat protection from fisheries. However, it is too soon at the moment to know how it will work in practice.

The team therefore decided that the overall score for this PI should be 70.

7. Condition

A score of <80 requires a condition to be placed on this PI for the fishery to reduce any impacts on vulnerable habitats – in particular, corals and sponge communities.

Condition	The fishing companies should review recent information on sensitive benthic habitats in their fishing area (notably from the MAREANO project), and also review any evidence that their activities are causing damage to these habitats (benthos attached to the trawl). If this information suggests that activities are damaging to vulnerable communities, as set out in the rationale for PI 2.4.1, then they should take steps to reduce these impacts such that serious or irreversible harm on a bioregional basis is 'highly unlikely'.
Timetable	Data collection and review should be completed by the end of Year 2, mitigation measures agreed by the end of Year 3 and implemented during Year 4.

2.4.2. MANAGEMENT STRATEGY

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

SG 60: There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance. The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).

SG 80: There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or habitats involved. There is some evidence that the partial strategy is being implemented successfully.

SG 100: There is a strategy in place for managing the impact of the fishery on habitat types. The strategy is mainly based on information directly about the fishery and/or habitats involved, and testing supports high confidence that the strategy will work. There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective.

Scores	
Euronor	**80**
Cie Pêches Saint-Malo	**80**

Rationale

The management strategy for marine habitat protection from fisheries is defined by the Norwegian government, and has two strands: i) an ecosystem strand – i.e. protected areas plus an ecosystem management plan; and ii) a fisheries strand – i.e. provisions to reduce fisheries impacts on habitat (closed areas, the 'move on' rule for catches of corals and sponges, monitoring via VMS and reporting of coral and sponges catches above the threshold). In the view of the assessment team, these two aspects together comprise a partial strategy which has a reasonably good chance of minimising fisheries habitat impacts – in the context of the important demersal fisheries in this area.

For coral ecosystems in particular there are relatively extensive protected areas which are closed to fishing (see Figure 1, PI 2.4.1 above). More generally, the integrated management plan for the Barents Sea (63, 73), includes a programme of research and mapping of benthic habitats – see for example details of the Norwegian MAREANO programme (68). This programme will contribute to periodic updates of the integrated management plan.

Other fisheries elements include work towards introducing less damaging 'semi-pelagic' trawls, which have already been installed on some vessels as a trial (38). This fishery has also signed up to the French government 'contrat bleu' ('blue contract') which includes requirements on retrieving lost gear, dumping of rubbish and fishing in coastal areas.

The team concluded that while the Habitat Outcome level 80 was not yet met, the ongoing work to improve information and to reduce fishery impacts, as well as the relatively extensive system of protected areas, constituted a 'partial strategy' that was likely to improve the outcome to the 80 level in the long term. VMS and the strict enforcement of all fisheries regulations in Norwegian waters (see PI 3.2.3 below) gave confidence that the strategy was being implemented successfully. Therefore, SG80 was met. However, the team did not consider that the requirement of SG100 for a full strategy with 'high confidence' of success was met, and there are still insufficient data to show directly whether intended changes are occurring. Therefore the overall score is 80.

2.4.3. INFORMATION / MONITORING

Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types.

SG 60: There is a basic understanding of the types and distribution of main habitats in the area of the fishery. Information is adequate to broadly understand the main impacts of gear use on the main habitats, including spatial extent of interaction.

SG 80: The nature, distribution and vulnerability of all main habitat types in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery. Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent, timing and location of use of the fishing gear. Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).

SG 100: The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. Changes in habitat distributions over time are measured. The physical impacts of the gear on the habitat types have been quantified fully.

Scores	
Euronor	**80**
Cie Pêches Saint-Malo	**80**

Rationale

1. Habitat information

The main programme for habitat mapping in the Barents Sea at present is the MAREANO programme, which started in 2005. The programme is a collaboration between a variety of different Norwegian marine, fisheries and geological research institutes (see http://www.mareano.no/english/about_mareano/partners). Benthic mapping and sampling in the Barents Sea is carried out during an annual survey in close collaboration with Russian scientists. Information from MAREANO is the main input into the benthic component of the Barents Sea integrated management plan (53). MAREANO provide a variety of interactive maps on their website, including the map of vulnerable habitats given in Figure 1 for PI 2.4.1 above. The MAREANO programme continues to map habitats across the Barents Sea and NEZ.

Distribution maps for various threatened or sensitive habitats are also given by OSPAR (21) and general information is given at the joint Norwegian-Russian 'Barents Portal' (66) – these are updated periodically from a variety of sources; probably mainly from MAREANO. The Barents Portal gives a historical perspective on benthic abundance, relating it mainly to temperature fluctuations.

In addition, other information on habitats is available. Habitats types around Svalbard and Bjørnøja are known and to a large extent protected (see 73). There is a significant number of regular or periodic benthic surveys in various areas around Svalbard and off the Norwegian coast (see 20 for full details).

2. Fishing gear impacts

The impacts of otter trawls on benthic habitats are well known and studied (67,74). The timing, location and spatial extent of the use of fishing gear are known from VMS and logbook data. Increases in risk to habitat are considered by the team to be unlikely, but could be inferred from changes in fishing operations.

3. Conclusions

There is a rapidly increasing body of evidence on habitat distribution, type and quality in the Barents Sea area, including detailed maps. The distribution of fishing activity is also known in detail because of the requirement for VMS. The impact of trawls on different types of benthos has been well studied. On this basis, the team considered that SG80 was met.

There is, however, no direct information on habitat impacts by this fishery, such as systematic observations of benthos in the catch, because up till now there have been no observers (anecdotal reports by the vessel captains are available but are not particularly useful). There is some historical context to benthic habitat distributions, but not

systematically or over a wide scale. Some areas remain to be mapped, although the MAREANO programme is working to provide more data.

On this basis, the team concluded that SG80 was met, but a higher score could not be justified.

2.5. ECOSYSTEM

2.5.1. OUTCOME STATUS

The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function.

SG 60: 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.

SG 80: 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.

SG 100: 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.

Scores	
Euronor	**80**
Cie Pêches Saint-Malo	**80**

Rationale

The main target species, cod, is a key predator in the Barents Sea ecosystem. The two main prey species of cod - capelin and herring – are also critical keystone species in the ecosystem, and these three populations are closely linked (11 – see ecosystem section). Haddock are not seen as playing such a significant role in the ecosystem (see details below); haddock recruitment is likely to be impacted by cod, but not vice versa. The tight coupling of predators, prey and environment makes an ecosystem approach to management critical. A review of the management system states that management of these three keystone stocks is ‘well-balanced’ (75).

ICES places strong emphasis on the ecosystem approach to stock management for this ecosystem (11). Development of multispecies models to take species interactions in account started in the mid-1980s. The first models developed were MULTSPEC, AGGMULT and SYSTMOD (in Norway) and MSVPA (in Russia). These models include cod, capelin, herring, haddock, polar cod, shrimp, harp seal and minke whale.

These models provided a basis for the current ecosystem models used by ICES: EcoCod, Bifrost, Gadget and STOCOBAR. Details of these models are given below (from 11).

EcoCod – Developed in 2005 as the first output of a joint 10-year Norwegian-Russian programme to estimate of maximum long-term yield of Northeast Arctic cod, taking into account ecosystem factors. EcoCod is a stepwise extension of a single species model for cod (CodSim).

Bifrost – The 'boreal integrated fish resource optimization and simulation tool' is a multispecies model for the Barents Sea with the main emphasis on the cod-capelin dynamics. The prey items for cod are younger cod, capelin and 'other food'. Capelin availability thus partly shields the cod juveniles from cannibalism, and this approach has improved estimates of cod recruitment. Bifrost can also be coupled to the assessment model for herring, to evaluate cod-capelin-herring multispecies harvest control rules.

STOCOBAR - STOCOBAR also focuses on the stock dynamics of cod, taking into account both trophic interactions and environmental influences. It is designed as a tool to explore cod stock dynamics under different harvest strategies and ecosystem scenarios. STOCOBAR considers cod as the main predator on up to eight species: capelin, shrimp, polar cod, herring, krill, haddock, own young and 'other'.

GADGET - Gadget is a multi-species age/length structured model which is being used for modelling the interactions between cod, herring, capelin and minke whale in the Barents Sea. The model focuses on predation interactions, with predator species minke whale, cod and herring and prey species capelin, immature cod, and juvenile herring. Krill is also included as an exogenous food for minke whales. The cod component in this model is the standard single-species ICES model used by the AFWG each year (see under Principle 1).

These multi-species models inform the management of cod and capelin stocks in particular, and this in turn informs the management of other stocks, including haddock (ref AFWG). The basic strategy is to maintain high cod biomass in the ecosystem (i.e. maintain the stock at or above the target reference point), on the basis that this will minimise any trophic impacts of the fishery. Stocks of other target species (haddock, saithe) are also maintained at or above target reference points. A review of fisheries management in this region shows that for all Barents Sea stocks, *SSB* has remained the same or increased, while fishing mortality has remained same or decreased (see 75 – region 1 Barents Sea).

Impacts on other species are minimised as noted in Principle 2, in particular by the discard ban. A series of seasonal and permanent closed areas protect vulnerable fish stocks and vulnerable benthic ecosystems.

The team therefore considered that the fishery was highly unlikely to disrupt ecosystem structure and function – i.e. SG80 is met. SG100 requires evidence, and this is partly

available in the form of the variety of multi-species models that simulate key parts of the ecosystem, as well as providing predictions of the impacts of various scenarios (11). However, this evidence must be regarded as indirect. Information is also lacking on benthic ecosystem impacts – including for example the effect of trawling on soft sediment ecosystems and benthic food supplies for cod and haddock populations – as pointed out by one of the peer reviewers. On this basis, the team felt that SG100 is not met, and the score should be 80.

2.5.2. MANAGEMENT STRATEGY

There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function.

SG 60: There are measures in place, if necessary, that take into account potential impacts of the fishery on key elements of the ecosystem. The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ ecosystems).

SG 80: There is a partial strategy in place, if necessary, that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance. The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ ecosystems). There is some evidence that the measures comprising the partial strategy are being implemented successfully.

SG 100: There is a strategy that consists of a plan, containing measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm. The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved. There is evidence that the measures are being implemented successfully.

Scores	
Euronor	**100**
Cie Pêches Saint-Malo	**100**

Rationale

There is a strategy that consists of a plan: in this case, the plan for Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the

Lofoten Islands (73). The plan addresses fisheries management and fisheries issues on stocks, habitats and the wider ecosystem (trophic impacts), alongside numerous other issues including oil and gas, transport, climate change and conservation. It also considers more indirect impacts of fisheries – such as shipping, bearing in mind that fishing vessels make up two thirds of the shipping in the Barents Sea. The plan is put into practice via a variety of means, as noted above: the ecosystem-based fisheries management approach, the discard ban and associated modifications of gear (sorting grids etc.) and the various closed areas. The plan was prepared in 2005 reviewed and updated in 2010.

The plan and the implementation measures are based on well-understood functional relationships: the main one being cod-capelin-herring as outlined above, but the other target species of the fishery (haddock, saithe) are also included, as are other important species such as krill, minke whales etc. (see rationale for PI 2.5.1). There is also integrated monitoring and presentation of data (MAREANO and Barents Portal – 66,68). The measures implemented under the plan are likely to constraint any ecosystem impacts of the fishery, based on direct information on the ecosystem and fishery (monitoring of both), as well as prior experience (review of plan in 2010 based on experience up to that point). VMS and other monitoring and control ensure that measures are implemented.

The team considered that on this basis, SG100 was fully met.

2.5.3. INFORMATION / MONITORING

There is adequate knowledge of the impacts of the fishery on the ecosystem. Information is adequate to identify the key elements of the ecosystem (e.g. trophic structure and function, community composition, productivity pattern and biodiversity).

SG 60: Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, but have not been investigated in detail.

SG 80: Information is adequate to broadly understand the functions of the key elements of the ecosystem. Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, but may not have been investigated in detail. The main functions of the Components (i.e. target, by-catch, retained and ETP species and habitats) in the ecosystem are known. Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred. Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).

SG 100: Information is adequate to broadly understand the key elements of the ecosystem. Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated. The impacts of the fishery on target, by-catch, retained, ETP and habitats are identified and the main functions of these Components in the ecosystem are understood. Sufficient information is available on the impacts of the fishery on the Components and elements to allow the

main consequences for the ecosystem to be inferred. Information is sufficient to support the development of strategies to manage ecosystem impacts.

Scores	
Euronor	**100**
Cie Pêches Saint-Malo	**100**

Rationale

As noted above, there is good information on food web dynamics for both cod and haddock (and saithe) for the Barents Sea, with good quantitative information from stomach content analysis being used to parameterise ecosystem models. These models in turn underpin the fisheries management system, including the annual stock management advice, and as well as the Barents Sea ecosystem management plan (see PI 2.5.2 above).

The team scored information for habitats (PI 2.4.3 above) <80, but this is because of a lack of direct information from this fishery specifically – in general, habitat impacts are understood and investigated (see for example the MAREANO project). The information on which the integrated management plan is based (see PI 2.5.2 above) is set out in the management plan and is sufficient to support a detailed strategy to ensure that the Barents Sea ecosystem remains as healthy as possible.

Overall, the team considered that i) the role of key elements of the ecosystem, and their interaction with the fishery, is understood in detail; ii) the impacts of the fishery on target and retained species (cod, haddock, saithe), ETP species, habitats and the ecosystem are understood, as is their wider role in the ecosystem. The ecosystem consequences of the fishery for the ecosystem can thus be inferred – and in fact modelled in some quantitative detail. This information has supported clear management strategies both at the fisheries management and at the wider ecosystem scale. Some uncertainties certainly remain – the future impact of climate change and associated changes in ocean productivity and sea ice cover being a key one – but overall, the team considered that all parts of SG 100 are met.

3. Principle 3

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

3.1. GOVERNANCE AND POLICY

3.1.1. LEGAL AND/OR CUSTOMARY FRAMEWORK

The management system exists within an appropriate and effective legal and/or customary framework which ensures that it: - Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; - Observes the legal rights created explicitly or by custom of people dependent on fishing for food or livelihood; and - Incorporates an appropriate dispute resolution framework.

SG 60: The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2. The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system. 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 generally recognises and respects the legal rights created explicitly or by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

SG 80: The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2. The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery. The management system or fishery is attempting to comply in a timely fashion with binding judicial decisions arising from any legal challenges. The management system observes the legal rights created explicitly or by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

SG 100: The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2. The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective. The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges. The management

system is formally committed to the legal rights created explicitly or by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

Scores	
Euronor	**90**
Cie Pêches Saint-Malo	**90**

Rationale

The governance framework is the same for both cod and haddock fisheries, so the Units of Assessment are scored together for this PI.

Fishing activities in Norwegian waters by vessels of any nationality are managed through the Norwegian Marine Resources Act 2008 (13) and relevant secondary legislation. The two fishing companies in the certification units receive copy of all relevant legal texts communicated by the Government of Norway to the EU through their European association (76). The companies forward the texts (their English translations) with covering explanatory notes in French to all vessel captains fishing in Norwegian waters.

The Act aims to facilitate the development of a precautionary and ecosystem-based management system for all wild living marine resources and requires a "sound basis" for all harvesting (Preamble §1 and 2 and section 7, 76). Its objectives are clearly aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2. The Norwegian Marine Resource Act puts sustainable use at the heart of its management of living marine resources, in accordance with international requirements as set out in agreements including the 1982 UN Law of the Sea Convention (77), the 1995 UN Agreement on the Conservation and Management of Straddling Fish Stocks (78) and the 1995 FAO Code of Conduct for Responsible Fisheries (79). Access for European vessels to the fishery is managed through an international agreement between the EU and Norway (80). France, and the European Union have also ratified the UN conventions and FAO Code.

Annual fishing opportunities in Norwegian waters for European vessels have been determined on the basis of a bilateral agreement between the EC and Norway under a framework agreement signed in 1980. Quota and access conditions for French vessels in waters falling within the fisheries jurisdiction of Norway and the fishing zone around Jan Mayen, are subject to the conditions set out in Regulation (EC) No 1006/2008 (81) and its implementing provisions. Quota details by Member State are set annually in a European Council Regulation (see 15 for 2011 season). In its respect of historical use, the system acts proactively to avoid legal disputes.

TACs set for the coming year are apportioned on the bases of historical allocations between resources users grouped by vessel sizes and gear type, including recreational

users and foreign vessels. The Norwegian Marine Resources Act applies to foreign natural and legal persons in areas outside the jurisdiction of any state if this follows from an international agreement (**Error! Bookmark not defined.**, section 5). The management system incorporates a transparent mechanism for the resolution of legal disputes if the fishing authorization of a vessel is suspended or withdrawn by the Norwegian authority following a fisheries regulation infringement. Under the bilateral EC – Norway agreement, administrative or judicial proceedings may be brought up by the Member State and inspection and surveillance reports drawn up by Commission inspectors, Community inspectors, inspectors of Member States or Norwegian inspectors, constitute admissible evidence (24 art. 16).

The Norwegian Marine Resource Act formally commits the management system to the legal rights created explicitly or by custom on the people of Norway dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2 (**Error! Bookmark not defined.**: section 2). This ensures that the fisheries are well managed from a domestic point of view, but it does not formally commit to permanent rights to foreign vessels. Only SG90 is met.

3.1.2. CONSULTATION, ROLES AND RESPONSIBILITIES

The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties.

SG 60: Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood. The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.

SG 80: Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction. The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained. The consultation process provides opportunity for all interested and affected parties to be involved.

SG 100: Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction. The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used. The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.

Scores	
Euronor	**80**
Cie Pêches Saint-Malo	**80**

Rationale

The governance framework is the same for both cod and haddock fisheries, so the Units of Assessment are scored together for this PI.

The fishery is well managed with an inclusive governance system and adaptive policy through the Joint Norwegian Russian Commission and by both governments. Organisations and individuals involved in the management process are well known and include fishermen's associations, the fishing industries, trade unions, the Sami Parliament, local authorities, environmental organisations and other stakeholders; consultation processes are in place, with clear roles and responsibilities for the coastal states fisheries business operators and other stakeholders in Norway.

The particular case of owners and operators of foreign vessels is different. The Norwegian organisations involved are well known to them and explicitly defined. Vessels are individually authorised, and their key areas of responsibility are well understood by the fishing companies who are regularly briefed by the Norwegian authorities and vessel operators receive copies of any regulatory changes promptly. Vessels have to report all activities and any operational problem, including local knowledge. The management system seeks relevant information including local knowledge through daily contacts and frequent vessel inspections at sea. The management system provides opportunities for foreign vessel operators and their national scientists to be involved through the ICES WG, and thus all aspects of SG80 are met.

However, apart from contacts at sea or if landing in a Norwegian port, there is no direct effective engagement of the French vessel owners. Their catch shares represent a very small part of the fisheries' TACs and they are not directly involved in key assessment or management decisions. Negotiations with Norway twice a year are through the bilateral European Agreement with Norway, which includes a number of other fisheries used as bargaining chips in the negotiations. From the point of view of the vessels in the unit of certification, the list of consultative and participative bodies given in Table shows that the French organisations, companies and individuals are not directly represented in discussions with Norway. Only, DG Mare is directly involved in access negotiations. SG100 is not met.

Table 1. Organisations involved in Fishery governance

Organisation	MSC Principles	Representation (Yes / No)	
		French	EU
ICES Arctic Fisheries Working Group (AFWG)	P1, P2	No	-
Joint Norway-Russia Fisheries Commission (JNRFC)	P1, P2	No	-
Norway government departments and agencies	P1, P2, P3	-	-
EC DG Mare - access negotiations with Norway	P3	No	Yes
EC ACFA and NS RAC representation	P1, P2, P3	UAPF	Yes
FR - Conseil National Pêches Maritimes CNPM	P1, P2, P3	UAFP	-
FR - PO federation ANOP	P1, P3	FROM Nord	-
FR - DPMA Quota monitoring Commission	P1, P3	ANOP, CNPM	-

3.1.3. LONG TERM OBJECTIVES

The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach

SG 60: Long-term objectives to guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are implicit within management policy.

SG 80: Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy.

SG 100: Clear long-term objectives that guide *decision*-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy

Scores	
Euronor	**100**
Cie Pêches Saint-Malo	**100**

Rationale

The governance framework is the same for both cod and haddock fisheries, so the Units of Assessment are scored together for this PI.

The management system for both NEA cod and haddock fisheries in the Barents Sea is shared between Norway and the Russian Federation through the Joint Norwegian-Russian

Commission established in 1976 (26). Access to the fisheries is via an international agreement between the EU and Norway (24).

Norway has developed integrated management plans for the Barents Sea and areas off the Lofoten Islands (2006) and the Norwegian Sea (2009) where the French vessels operate (73). The plans, adopted by the Norwegian Parliament, aim to establish an ecosystem-based management and sustainable use of all activities in the areas, including oil and gas and fishing and their possible impacts on the marine environment. The integrated plans are reviewed regularly.

The plans have clear long-term objectives with respect to biodiversity, valuable and vulnerable habitats and species management. They are part of ecosystem management programmes that ensure resource monitoring and provide management advice on fish stocks. A management plan for the NEA cod and haddock has guided decision-making since 2004, consistent with MSC Principles and Criteria and the precautionary approach. It aims - among others - to maintain high long-term yield and year-to-year stability (see 11).

The team holds the view that long-term objectives and the precautionary approach are explicit within the management policy and are required by it. SG 100 is met.

3.1.4. INCENTIVES FOR SUSTAINABLE FISHING

The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing

SG 60: The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.

SG 80: The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that negative incentives do not arise

SG 100: The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices.

Scores	
Euronor	**80**
Cie Pêches Saint-Malo	**80**

Rationale

The governance framework is the same for both cod and haddock fisheries, so the Units of Assessment are scored together for this PI.

The Norwegian management system consists of a number of clear and stringent rules to frame commercial fishing activities that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2. The discard ban, mandatory use of sorting grids, limited quota and excluded areas to protect habitats are a few examples (see rationales for P1 and P2 above).

The management system also seeks to ensure that negative incentives do not arise, but it does not explicitly consider incentives in a regular review of management policy or procedures to determine their possible effects on sustainable use. For example, Norwegian fishing vessels are exempt from the Norwegian basic tax and CO_2 tax and are therefore subsidised in that sense (82). The same is true of French vessels refuelling in France. Only SG80 is met.

3.2. FISHERY-SPECIFIC MANAGEMENT SYSTEM

3.2.1. FISHERY-SPECIFIC OBJECTIVES

The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.

SG 60: Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system.

SG 80: Short and long term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.

SG 100: Well defined and measurable short and long term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system

Scores	
Euronor	**90**
Cie Pêches Saint-Malo	**90**

Rationale

The fisheries management framework is the same for both cod and haddock fisheries, so the Units of Assessment are scored together for this PI.

The Norwegian Fisheries policy has short-term and long-term management objectives based on the principles of sustainable harvest of the marine living resources. The Fisheries policy is imbedded in an ecosystem-management system supported by extensive monitoring and research programmes for the Norwegian Sea and in collaboration with the Russian Federation through the JNRFC for the Barents Sea for both Northeast Cod and haddock fisheries.

The NEA cod and haddock management plans (see 11, sections 3.4.1 and 3.4.3) have well defined and measurable the objectives to maintain high long-term yield, year-to-year stability. Based on evaluations made in 2006 and 2007, ICES considers the management plans to be in accordance with the precautionary approach (see 7,11,36). The management objectives are demonstrably consistent with achieving the outcomes expressed by MSC's Principle 1. SG100 is met.

However, although some P2 objectives are included in the ecosystem management plans (Barents Sea and Norwegian Sea) that aim to strengthen all fisheries management plans - notably regarding retained and bycatch species - these are not currently well defined and measurable in the fisheries management plans. For Principle 2 only SG 80 is met, giving SG90 for this PI overall.

3.2.2. DECISION-MAKING PROCESSES

The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives

SG 60: There are informal decision-making processes that result in measures and strategies to achieve the fishery-specific objectives. Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider *implications* of decisions

SG 80: There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives. Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions. Decision-making processes use the precautionary approach and are based on best available information. Explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity

SG 100: There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives. 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. Decision-making processes use the precautionary approach and are based on best available information. Formal reporting to all interested stakeholders describes how

the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity

Scores	
Euronor	**90**
Cie Pêches Saint-Malo	**90**

Rationale

The fisheries management framework is the same for both NEA cod and haddock fisheries, so the Units of Assessment are scored together for this PI.

The NEA cod and haddock stocks are shared 50-50 between Norway and the Russian Federation. Decision-making procedures and collaborative research programmes are well established at both international and national levels. Within the JNRFC collaborative decisions have resulted in measures and strategies to achieve the fishery-specific objectives since 1976.

Norwegian and Russian scientists (mainly) on the ICES Arctic Fisheries Working Group (AFWG) provide fisheries assessment and scientific advice. The AFWG follows a precautionary approach and its recommendations are based on the best available information. On this basis, the JRNFC decides on the total annual catch (TAC), on the TAC allocation to Russia and Norway and on catch quotas to third parties (non-coastal states).

For the fisheries in Norwegian waters, the management system consists of a comprehensive cycle of data collection, analysis, research, management and consultation (the "regulatory chain", 83) and responds 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 regarding the fisheries.

Explanations are provided for any actions or lack of action through the regulatory chain at Norwegian level, and to the general public through the research institute (IMR) website for each stock.

According to Hønneland (2007, 31), collaboration between the two countries in the JNRFC generally worked well but was "plagued by disparity between scientific recommendations and established quotas, and Norwegian claims of Russian overfishing" when Russian catches overshot the recommended TAC from 1999 and 2005. However, the most recent ICES report shows that IUU (Illegal, Unreported and Unregulated) catches decreased sharply from 2006 and were close to zero for NEA cod and haddock in 2009 (see above). This is still very recent, however, so only SG90 is met.

3.2.3. COMPLIANCE AND ENFORCEMENT

Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with.

SG 60: Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective. Sanctions to deal with non-compliance exist and there is some evidence that they are applied. Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery

SG 80: A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules. Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence. Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery. There is no evidence of systematic non-compliance

SG 100: A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules. Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence. There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery. There is no evidence of systematic non-compliance.

Scores	
Euronor	**100**
Cie Pêches Saint-Malo	**100**

Rationale

In Norwegian waters, the fisheries management framework is the same for both NEA cod and haddock fisheries, so the Units of Assessment are scored together for this PI.

For French vessels fishing in Norwegian waters under the Norway-EU bilateral agreement, there are three Monitoring, Control and Surveillance (MCS) systems – the Norwegian, the European and the French.

1. Norwegian system

The Norwegian MCS system is extremely stringent, and particularly for foreign vessels (see 32). Norway's Fisheries Monitoring Centre (FMC) is at the Directorate of Fisheries in Bergen. The FMC receives position and daily electronic catch and activity data reports. Electronic data are handled automatically, and exchanged via a secure data line with the foreign country's FMC.

When in the Norwegian fishing zone, vessels keep both European and Norwegian logbooks. The Norwegian logbook is much more detailed with haul-by-haul records for all species caught (and kept on board as no discards are permitted). Norwegian offshore vessels have been using electronic logbooks since 2010 (84), but European vessels have been delayed by compatibility problems between the EU and Norwegian e-logbooks software and hardware requirements.

Vessels operating in Norwegian fisheries have to use designated report and beside activity and catches, vessels have to report - and make all attempts to retrieve - lost gear,

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.

2. European system

The European Community Fisheries Control Agency (CFCA, 85) established in 2005 organises operational coordination of fisheries control and inspection activities by the Member States to ensure an effective and uniform application of the Common EU Fisheries Policy rules. The CFCA is seated in Vigo, Galicia - Spain.

However, Member States are responsible for applying the rules i) on their own territory, ii) in waters under their sovereignty and jurisdiction, and iii) on fishing vessels flying their flag, wherever their activity is carried out.

3. French system

In France a number of different agencies come together to deliver MCS. The national marine fisheries MCS (Surveillance et police des pêches maritimes - SURPÊCHE) for the CFP is coordinated by the Centre régional opérationnel de surveillance et de sauvetage (CROSS) located in Étel in South-Brittany.

Compliance and enforcement matters are coordinated by the pôle PAM - Pôle pêches et activités maritimes of the inter-ministerial Délégation à la mer et au littoral (PAM – DML of the DDTM). It has a dual role of collecting data in support of regulations and controlling fishing activities and landings and has police powers at sea and on land. The DML's powers to enforce maritime and fisheries regulations are exercised locally by ULAM's vessels and fisheries enforcement agents (ULAM - Unité Littorale des Affaires Maritimes, based in Boulogne-sur-mer (62-Pas de Calais) and StMalo (35-Manche)

respectively, in collaboration with the Gendarmerie Maritime, Customs, Gendarmerie départementale and the French Navy (Marine Nationale).

In European ports controls ashore are done by Customs officers in a first instance, where fish caught in Norwegian waters are treated as imported products (caught in non-EU waters). This applies to all the catch, whether frozen onboard vessels returning from a campaign or landed abroad and transported by road as sealed frozen consignments.
The PAM - DML - DDTM organises MCS activities for distant fleet vessels through two main channels:

a. Collection, analysis and crosscheck of commercial fishing declarations, as daily effort by area, gear used, catch by species in European logbooks.
b. Collection, analysis and crosscheck of market sales slips ("notes de ventes") mandatory for all commercial fish sales and fish buyers.

The catch arrives in France frozen and processed, thus the French research institute Ifremer does not collect data.

Overall therefore, there is a comprehensive monitoring, control and surveillance system for the NEA cod and haddock fisheries.

The Norwegian system has demonstrated a consistent ability to enforce all relevant management measures, strategies and rules. The MCS is believed to be effective very effective for all vessels concerned.

Sanctions to deal with non-compliance exist for the fishery and are consistently applied. For foreign vessels, any apparent non-compliance results in intense scrutiny at sea and the vessel may be escorted to the nearest port. Infringement would result in a loss of access. Potential sanctions provide effective deterrence for fishing companies and their fleet managers demonstrate an in-depth knowledge and painstaking effort to adapt their compliance strategies with the most detailed regulatory requirements.

The Norwegian enforcement authorities report no infringement by the vessels considered here. Evidence exists therefore to demonstrate that fishers comply with the management system under assessment. They also, when required, provide information of importance to the effective management of the fishery. SG100 is met.

3.2.4. RESEARCH PLAN

The fishery has a research plan that addresses the information needs of management

SG 60: Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2. Research results are available to interested parties.

SG 80: A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives

consistent with MSC's Principles 1 and 2. Research results are disseminated to all interested parties in a timely fashion.

SG 100: A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2. Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.

Scores	
Euronor	**90**
Cie Pêches Saint-Malo	**90**

Rationale

The fisheries management framework is the same for both NEA cod and haddock fisheries, so the Units of Assessment are scored together for this PI.

Norway has an extensive research programme on the fisheries and on the ecosystems of the Norwegian Sea and the Barents Sea (see Principle 1 and 2 for details above). Research for NEA cod and haddock across their entire distribution range is coordinated through the JNRFC, the ICES AFWG and for the Barents Sea the Joint Russian-Norwegian commission on environmental cooperation (JRNCEC, see 66). Considered together, they amount to a comprehensive research plan. Ecosystem considerations such as regarding the effect of climate change, abundance of capelin and other trophic changes on cod and haddock recruitment and mortality (see 11) inform the management system annually. A coherent and strategic approach to research is evident across P1 and P2, providing reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2. Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available through the Norwegian research institute (IMR), ICES and Barents Sea portals.

From the point of view of foreign vessels operating in NEA cod and haddock fisheries in Norwegian waters, there is no strategic or coherent research across P3. In particular, the possibility of a stable multi-annual access regime, independent of other unrelated fisheries presently included in the Norway-EU agreement, has not been researched. Only SG90 is met.

3.2.5. MONITORING AND MANAGEMENT PERFORMANCE EVALUATION

There is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives. There is effective and timely review of the fishery-specific management system.

SG 60: The fishery has in place mechanisms to evaluate some parts of the management system and is subject to occasional internal review.

SG 80: The fishery has in place mechanisms to evaluate key parts of the management system and is subject to regular internal and occasional external review.

SG 100: The fishery has in place mechanisms to evaluate all parts of the management system and is subject to regular internal and external review.

Scores	
Euronor	**90**
Cie Pêches Saint-Malo	**90**

Rationale

The fisheries management framework is the same for NEA cod and haddock fisheries, so the Units of Assessment are scored together for this PI.

The fisheries and ecosystems management systems for the NEA cod and haddock fisheries reviews are reviewed in Norway and internationally. The fisheries management plans are discussed by the Norwegian and Russian research institutes, and by ICES AFWG, which provides an annual external review. The objectives are clear, monitored closely against measurable indicators, leading to annual TAC recommendations that are discussed openly, at ICES and by the JNRFC. ICES AFWG recommendations are peer reviewed.

Unreported catches, in particular from Russian transhipping at sea, were a problem, but these are considered to have decreased to nil in 2009. A 2007 European Court of Auditors report (86) mentioned reporting problems with French vessels, but this does not happen in Norwegian waters where a discard ban has been enforced and after careful evaluation has been extended to all species for 2011. Catch and activity records are also crosschecked between the French and Norwegian authorities and communicated to the European CFCA.

The ecosystem management plans are also subject to internal and external reviews scheduled every five years. Following from the Joint Norwegian-Russian Barents Sea Ecosystem environmental status 2008 report, the 2006 Barents Sea -Lofoten Ecosystem Management was reviewed in April 2010.

The fisheries have mechanisms in place to evaluate key parts of the management system, which are subject to regular internal and external review. SG90 is met.

ANNEX 2 - STAKEHOLDER COMMENTS

1. Summary of comments from site visit and consultation phase

MEP did not receive any unsolicited stakeholder comments during the site visit. The team requested meetings in order to gather information about the fishery. Aside from purely imparting information, no particular comments were noted, except a general emphasis on the strict controls under which this fishery operates, particularly under Norwegian jurisdiction. There were also concerns noted about the EU-Norway quota negotiations – particularly in reference to political conflicts about the mackerel and blue whiting stocks. These conflicts represent a political risk to this fishery in the future, but had no particular bearing on this MSC assessment.

2. Stakeholder comments on Public Comment Draft Report

The only comments received by MEP on the PCDR were from MSC and one stakeholder, Mr. Bjarte Bogstad of the Norwegian Institute of Marine Research. These comments are summarised below, with responses from MEP in green.

1. The site visit took place on 4-6 January 2011, after which more than nine months elapsed with no submission of the PCDR. None of the steps thus required by CR 24.2.3.1-24.2.3.3 have, however, been undertaken. Since a further 30 days has passed since the nine months deadline, the CR requires that any new information be invited from stakeholders before the PCDR is finalised.

MEP wrote to all identified stakeholders inviting them to submit any new information they may have, as well as to submit any comments on the report or any aspect of the fishery. No information or comments were received.

2. The report does not consider harmonisation with the Norway NEA haddock fishery.

This has been added to Table 17 (it was already included in Tables 18 and 19). No significant discrepancies were observed and no changes were made to any scores.

3. The peer reviewers' names do not appear in the report (they should be included though unassociated with their reviews). Even though this assessment is not subject to the full reporting template requirement, it should include items required within it that were previously required by the FCM (Appendix 1).

The names and a brief biography have been added alongside the details on the assessment team.

4. The fishery name given in the PCDR does not match that on record with the MSC (i.e., the one given in the notification report and on the website - Comapêche and Euronor cod

and haddock). If the name has changed, it is preferred if an announcement is sent to the MSC so the name can be corrected on the website.
Actually, the fishery name given in the Notification Report was: Euronor and Compagnie de Peche de St. Malo cod and haddock fishery. It is not clear why MSC changed it to go on the website. Cie des Pêches St. Malo prefers not to be known as 'Comapêche' and this title has been avoided in all MEP's public reporting for this assessment.

5. The text in "Table 1" (page 61) is cut off and should be renumbered in sequence.

Table redrawn (sorry)

6. P3 scores are not given to the nearest one decimal place.

We use the convention here that 0.25 and 0.75 are 'to the nearest quarter'.

7. The rationale for the target eligibility date is not clearly stated

The TED was changed during the PCDR comment period (announcement submitted to MSC) because of the date of sailing of the Grande Hermine for a long trip. This is explained in this report.

8. The report does not clarify whether the "secondary ports which are occasionally used, or have been used in the past" will be also be used to land MSC products (in addition to the primary ports identified).

They will be. This is clarified in the CoC Section.

9. Bjarte Bogstad: The fishery management section is incorrect: "The fishery is managed under the Common Fisheries Policy. ICES is the scientific authority. Decisions are taken by EU Fisheries Council and the Norwegian government." I suggest replacing this by something like: "The fishery is managed by Norway and Russia through the Joint Norwegian-Russian Fisheries Commission, which determines the TAC for cod in ICES sub-areas I and II. ICES is the scientific authority. (Quotas for EU countries – which I assume Comapeche and Euronor refers to, are agreed through subsequent negotiations between EU and Norway.)"".

This comment was received on the 31st January and Mr. Bogstad was responded to on the same day, stating that the error would be rectified.

ANNEX 3 – PEER REVIEWER REPORTS

Peer review 1

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**Conformity Assessment Body Response**
Justification: Generally yes, I think this fishery can be certified as it is much better and much more sustainably managed than some other fisheries that have already been certified. I have some reservations about some of the scores though.		*See detailed comments on his reservations*

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**Yes**	**Conformity Assessment Body Response**
Justification: The set condition is fine.		

If included:

Do you think the client action plan is sufficient to close the conditions raised?	**No**	**Conformity Assessment Body Response**
Justification: I do not think that enough information is collected and acted upon. I think the ships should also: - collect information on catches of invertebrates, and not fish areas that have **any** catches of vulnerable species - avoid fishing in new areas where they have not fished before unless they can be certain that vulnerable habitats do not occur there. - avoid effects on soft-sediment communities by not		*The conclusion of the assessment team (from experience of one member) is that i) the type of trawl used in this fishery is not actually very likely to bring up corals and sponges in the trawl – this is because it is equipped with very large rockhopper discs that hold the head rope some 10s of cm above the bottom. This conclusion is also supported by the captain of the Grande Hermine, who reported that this rarely if ever happens. Therefore, the team did not consider it worthwhile to ask the fisheries to collect this data – noting that they are obliged to conform to the new Norwegian regulations on invertebrate catches. As regards fishing in new, untrawled areas, this is also not usually done, because of the risk of snagging*

extending their fishing operations into areas that have not previously been trawled.	*gear on rough ground. The conclusion of the assessment team was therefore that these requirements would be onerous on the fishing vessels in terms of data collection and monitoring (e.g. in order to be able to show in an auditable way where they had fished in relation to other time periods or vessels), while not generating much benefit in terms of habitat protection.*

For reports using the Risk-Based Framework please follow the link.

For reports assessing enhanced fisheries please follow the link.

General Comments on the Assessment Report (optional)
MEP responses in green

This fishery is one of the more sustainable and better managed fisheries I have come across, and an impressive amount of data is available for this assessment. In general, the report is well considered, available information is used in a good way. As such, I am quite happy that this fishery can be certified by the MSC. I do however have a number of comments on the assessment, and because my expertise lies mostly in P1 and P2, my comments focus there.

In the introductory text we need to see some clarifications:

Firstly, IUU fishing has decreased to near zero, but no information is given on how IUU fishing is monitored and why it has come down so much over the past years. Without this information the reliability of the information is hard to assess.

The Norwegian authorities are very much present in the area, and fishing vessels can be inspected at sea (by helicopter or vessel) at any time (the details of Norwegian monitoring, control and surveillance are given in the report). This has certainly become stricter over recent years. The assessment team did, however, to some extent take the word of the Norwegian authorities, the JRNFC and ICES that IUU fishing is estimated to be zero.

Secondly, it is not clear from the text what the implications of the discard ban are for the quota of the fisheries. I.e. if the fishery catches a few tons of undersized cod, and sell them for fish meal, is this catch deducted from their cod quota? Similarly, fish species for which the vessels have no quota at all still cannot be discarded. How does landing these species affect the quota? This is a very important point because it indicates to what extent there are incentives for illegal discarding and avoiding the catch of unwanted species. I.e. if they can sell the undersized and no quota species without implications for their quota, there is very little incentive to avoid these by-catches. If on the other hand there are implications for their quota, there are strong incentives to illegally discard by-catch.

Good points. 1. If a vessel catches any undersized cod they are likely to be in big trouble with the Norwegian authorities if caught. They are *de facto* in an illegal situation as soon as the fish comes up in the net – whether they discard it, declare it, eat it or whatever. This is why there is a strong incentive to use large mesh sizes. Any cod sold as fish meal are more likely to be fish that are legal but have got a bit mangled – this should certainly be reported in the logbook and deducted from the quota. During 2011, the Grande Hermine was arrested by the Norwegian authorities because they found 15kg of cod in the fishmeal bin that could not be accounted for in the logbook – thus they are very strict with this. 2. As of recently (2010?) vessels must have quota not only for the target species but for all species considered likely to be caught as by-catch. They must report their quota when entering Norwegian waters. These points have been clarified in the main body of the report (Section 2.6.2 – Discards).

The depth range at which the fishery operates needs to be defined, as it is referred to many times in the report.

120 – 350 m. Section 2.4 now titled 'Fishing area and depth'

I don't understand the explanation of $F_{0.1}$ (page 24).

No, I don't blame you, it wasn't very clear. Clarified – we hope. It's not a straightforward concept.

The report would benefit from some editorial scrutiny, and I have listed some of the mistakes below.
Report summary: Explain MCS at first use
Page 4: 'fueld' = fuel
The figures and tables need proper numbering, figure 1 appears many times. The numbering is restarted at the start of Annex 1 and for each rationale. There are other ways of doing it,but it seems clear enough which Figure is indicated in each case.
Figure 2 on page 7 needs to indicate the extent of ICES area I and II. Added
Figure 4, page 8, needs a legend to indicate which vessel is which colour. The resolution of the image is also very low. It is however commendable that such a figure is included as it is essential for assessing P2. The team did not think that indicating which vessel was which was relevant to the assessment. This information is sensitive.
Page 11: 'As regards'
Cite the sources of the figure and table on pager 54. The resolution of the table is also low and needs a legend to explain what it means. Added. We couldn't do anything about the resolution.
Page 55. A figure appears that should not be there. ???
Correct 'Error! Reference source…' several times over. Corrected.
Table 1 on page 60 is not fully readable. Corrected
Figure 2 on page 61 needs a legend for the different curves. It's from various different assumptions and model formulations, the details of which are not easy to summarise in a figure legend and not really relevant to the outcome of the assessment.
Page 82, 2.2.2. Part of the description is missing This has been revised as per the comments below.

Page 94. Figure XX. Corrected.

Performance Indicator Review

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

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Yes	Yes	NA	The stock seems to be healthy and improving.	
1.1.2	Yes	Yes	NA	Although MSY is not used as the target, in practice this is the outcome. The reported uncertainties (unreported catches and overestimates of the age of fish) both make the assessment conservative and therefore more likely to be sustainable.	
1.1.3	NA	NA	NA		
1.2.1	Yes	Yes	NA	No problems	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.2	Yes	Yes	NA	No problems	
1.2.3	Yes	Yes	NA	No problems	
1.2.4	Yes	Yes	NA	This is probably one of the most data rich stocks in the world.	
2.1.1	Yes	Yes	NA	Redfish catches are an issue and warrant limiting the score of 80	
2.1.2	Yes	Yes	NA	No problems	
2.1.3	Yes	Yes	NA	No problems	
2.2.1	Yes	No	NA	I find it hard to believe that the Grand Hermine processes every single fish caught, and that only	Various issues are relevant here: 1. The Grande Hermine (and the Euronor vessels), have quite a

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				53kg of by-catch was recorded by Euronor in 2009. The lack of independent observer data and reliance of self-reporting is a weak point. Given that we do not know what the by-catch species are, I think it is unjustified to say that there is a high degree of certainty that they are within biologically based limits. Whether or not there exists a discarding ban in Norway is of no relevance to this point. A severe mismatch seems to exist for this criterion between the definition (no serious harm) and the criteria (within biologically based limits). I am convinced that there is no serious	sophisticated factory on board, and the objective is to make use of everything caught, including fish that are damaged, and including where possible heads, skin and other offcuts – for example, the vessels make 'farce' (minced fish) from offcuts. 2. The discard ban is relevant, for two reasons: i) it provides a strong incentive for vessels not to catch anything that they cannot land (as described above) –penalties are severe if caught; and ii) it provides an incentive to find a way of selling bycatch species that might otherwise be discarded – i.e. they then become 'retained' species rather than 'bycatch' and are no

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				harm because of the small volumes of the catches, but cannot agree that by-catch species are within limits as we do not even know what the species and limits are. As such, even a score of 60 would not be justified. I think the problem here lies in the definition of the criteria rather than in the fishery so I would support a score of >80, but think that the criteria need redefining here.	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
					longer relevant to this PI! For these reasons, as well because of the very stringent Norwegian enforcement regime, the assessment team felt able to accept the data provided by the clients despite the lack of external verification (except for Norwegian inspections at sea). 3. We take your point about the mismatch between the definition and the SGs – this is not up to us, however.
2.2.2	Yes	Yes	NA	No problems, very well managed	
2.2.3	Yes	No	NA	The lack of independent observer data and reliance of self-reporting is a weak point. For example, table 4 reports no 'various' category for the Grand Hermine and only 53kg for Euronor, which suggest that they	This is a fair point. However, the assessment team was inclined to be less sceptical than the reviewer for the following reasons: 1. the ecosystem is not particularly species-rich compared to (for example) the North Sea – the fishery is very clean (see for example the ICES AFWG reports);

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				never and hardly ever catch any other species, which is extremely unlikely. This supports the assumption that self-reporting is rarely fully credible. The lack of independent observer data is justified in the report but this does not solve this problem. I do not think this situation justified a score of 100 ('accurate and verifiable information') as the presented information is neither of those. I think 'sufficient data' is available and a score of 80 would be more appropriate.	2. perhaps more importantly, the Norwegian inspection regime is extremely strict, and in our view constitutes a significant check on the bycatch data provided (as per the arrest of the Grande Hermine for 15kg cod). Nonetheless, the assessment concluded that a score of 90 was more appropriate than the original score of 100, to account for the lack of observer data.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.3.1	Yes	No	NA	I am happy with the majority of information given here, except for this discussion on trophic effects ('are considered unlikely'). This is probably an issue that has more to do with the lack of biological realism in the criteria than the assessment of this specific fishery. A fishery that is exploited at MSY will reduced fish biomass by about 50% from pristine levels. This is a very significant reduction and it is very unlikely that this has no have effects on the food availability for marine mammals. However, such effects are unavoidable in any form of exploitation, and a such should not be a problem for certification.	True – but for example with marine mammals and birds, most are eating commercial fish species at well below the size at which they are fished. The issue then becomes not the proportional reduction in fishable or spawning stock biomass per se, but rather the impact that this has on recruitment. Since stock-recruit relationships are usually imperceptable at levels of biomass around or above MSY, it is arguable that there is very little trophic impact even though the proportional reduction in the prey SSB from virgin biomass to MSY is quite large.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.3.2	Yes	Yes	NA	No problems	
2.3.3	Yes	Yes	NA	No problems	
2.4.1	No	Yes	No	The text proposes a score of 70 while the summary table at the start shows a score of 60. The supplied maps show that a significant overlap exists between the fisheries and the sensitive habitats and a such serious harm can be expected to take place. It would be informative to include the 12nm limit on Figure 1 on page 90. In addition to this the map of sensitive habitats does not seem to cover the whole area that is exploited in this fishery which means that a data deficiency exists and this	Oh dear. We revised this score due to the new Norwegian legislation for habitat protection, but the rest of the report evidently did not keep pace. Our apologies. 70 was the score we intended. Unfortunately, the map comes off the MAREANO website and adding the 12 mile limit does not seem to be an option, although we agree it would be nice … The assessment team discussed these comments at some length, and concluded the following: • The trawl has large rockhopper discs which insure that the footrope does not touch the bottom. While the doors will impact the bottom in places, overall this type of trawl is

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				means that is is not 'unlikely' that serious and irreversible harm occurs. In addition to this, the lack of any observer data on by-catches of invertebrates, and even a lack of self-reporting on this, also means that we cannot know if sponges and corals are affected and to what extent. I feel that following the limits set by the new regulation (move on after 60 kg of coral and 800 kg of sponges) do not lead to avoiding impacts on vulnerable habitats.	relatively benign, particularly considering its size;
				Currently the discussion in the assessment only focused on vulnerable	• Most of the area of the fishery has been mapped – the maps show areas of vulnerable habitat,

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				habitats, otter trawling is know to cause significant reductions in the biodiversity and functioning of soft-sediment invertebrates. These effects are serious and are not discussed. In turn, these reductions in the production of benthic invertebrates can lead to a lower food availability for the stages of cod and haddock that feed on benthic invertebrates. Effects of trawling are most serious in areas that have not been trawled before and these areas therefore need to be avoided. I could agree with a score of 60 for 2.4.1, but only if the condition was made much more stringent. I	rather than all known habitats (for example, see ref. 73 p.33 for a description of the kelp-dominated habitats around Bjørnøya • Anecdotal information from the captain is that invertebrates rarely if ever come up in the trawl – we take the point again that lack of observer data is an issue with this fishery, but this has been scored elsewhere; • Many areas are de facto closed to trawling because they are too rocky to be trawled; • The assessment team had more faith in the Norwegian regulation to deliver habitat protection, giving the emphasis put on strict management of fishery by the Norwegian system;

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				think the ships should also: - collect information on catches of invertebrates, and not fish areas that have any catches of vulnerable species - avoid fishing in new areas where they have not fished before unless they can be certain that vulnerable habitats do not occur there because they have been surveyed. - avoid effects on soft-sediment communities by not extending their fishing operations into areas that have not previously been trawled.	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
					• The assessment team also takes the point about soft sediment communities, but considering the relatively low density of trawling in this area, did not consider that these effects were 'serious or irreversible' as required by the MSC standard. They have, however, been considered further under 'ecosystems' – see below; • In the main, fishing (by all trawlers together) takes place over a subset of the whole area – in areas that are known to be safe to trawl. According to the captain of the Grande Hermine, it is a risk to trawl in areas where no trawler is known to have gone, because of the probability of hitting rough ground and losing gear. This type of risk is perhaps worth taking in areas which are heavily fished, but this is not the case in the Barents Sea.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
					Overall, the assessment team decided to retain the score of 70 but to revise the rationale to reflect the above discussion better. Comments on the client action plan are given above.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.4.2	Yes	No	NA	VMS monitoring is required to assess the damage done to habitats but is not in itself a monitoring strategy. I do not see the relevance of reporting lost gear here. Exploring a move to semi-pelagic trawls would be good but is hardly a management strategy. In my mind these management measures could lead to fewer habitat effects but it is not that likely. I think this criterion can therefore not score 80 and needs the same conditions as listed under 2.4.1	The management strategy is defined by the Norwegian government, and we would argue has two strands: i) the protected areas and ecosystem management plan; and ii) the provisions to reduce fisheries impacts on habitat (protected areas again, plus the coral and sponge 'move on' rule, plus montoring via VMS and reporting of coral and sponges catches above the threshold). In the view of the team, these two aspects together comprise a partial strategy which has a reasonably good chance of minimising fisheries habitat impacts – while dealing with the reality that this is an important fisheries area. This rationale was rather poorly drafted, and has been re-written.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.4.3	Yes	No	NA	I am not convinced the distribution of vulnerable habitats is known in relevant detail as the maps do not seem to be complete. Therefore I think a score of 80 is too high.	These maps are not the only source of information on benthic ecosystems in the area – see for example the Barents Portal information on various annual benthic surveys. Again, the rationale was not well drafted and has been expanded to give more details.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.5.1	No	No	NA	As mentioned before, otter trawling is known to cause wide-spread and significant reductions in the biodiversity and functioning of soft-sediment invertebrates. These effects are serious and are not discussed. In turn, these reductions in the production of benthic invertebrates can lead to a lower food availability for the stages of cod and haddock that feed on benthic invertebrates. Effects of trawling are most serious in areas that have not been trawled before and these areas therefore need to be avoided.	Based on these comments the assessment team agreed that the score should be reduced to 80.
2.5.2	Yes	Yes	NA	Information seems to be missing ('plan … in this case').	Just a typo - corrected.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.5.3	Yes	Yes	NA		
3.1.1	Yes	Yes	NA		
3.1.2	Yes	Yes	NA		
3.1.3	Yes	Yes	NA		
3.1.4	Yes	Yes	NA		
3.2.1	Yes	Yes	NA		
3.2.2	Yes	Yes	NA		
3.2.3	Yes	Yes	NA		
3.2.4	Yes	Yes	NA		

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

Any Other Comments

Comments	Conformity Assessment Body Response

For reports using the Risk-Based Framework:

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

For reports assessing enhanced fisheries:

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

Peer review 2

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes/No** Yes	**Conformity Assessment Body Response**
Justification: Given the information presented the scoring of this application is appropriate. There are some concerns about compounding effects of uncertainty with can only be resolved through increased monitoring, and frankly, time.		*See detailed comments below*

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**Yes/No** **Yes**	**Conformity Assessment Body Response**
Justification: If followed the conditions set in the review should allow a score greater than 80 for those criteria. I would also suggest additional at-sea observers be installed to monitor this progress and to gather the required data for the next report.		*The other reviewer also noted the absence of at-sea observers for this fishery. MEP are sympathetic to the clients' point that it is extremely difficult for them to recruit observers for long (2-3 month) trips to the Arctic. They continue to try.*

If included:

Do you think the client action plan is sufficient to close the conditions raised?	**Yes/No** **Yes**	**Conformity Assessment Body Response**
Justification: The plan, as laid out, should close the issue particularly with regards to habitat. Further action may be required to completely resolve the concerns expressed here; including the		*MEP notes that the Action Plan was reviewed and strengthened as a result of the other peer review.*

use of at-sea observers. Some of the concerns however may not be met, and this is due to the amount of time involved to collect the data needed, rather than something omitted by the applicant.	

For reports using the Risk-Based Framework please follow the link.

For reports assessing enhanced fisheries please follow the link.

General Comments on the Assessment Report (optional)

Performance Indicator Review

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

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Yes	Yes	NA	Both stock appear to be in good shape and at high levels of abundace as shown in the stock assesment report.	
1.1.2	Yes	Yes	NA	For Haddock, while the use of B_{lim}=B_{loss} is appropriate, one questions the validity of that assumption in all cases.	Indeed. Blim is a management reference point rather than a biological reference point – i.e. it does not have a specific

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				Environmental conditions and recruitment success do change. So an appropriate B_{loss} under one environmental régime may be completely inappropriate under another environmental régime.	biological definition. One of the crucial aspects of management is to find an appropriate biological point on which to hang the management reference points. We agree with the reviewer that this has been done appropriately in this case, although not in every case.
1.1.3	NA	NA	NA	NA: Stock is not in rebuilding	
1.2.1	Yes	Yes	NA	For haddock and Cod, only recently have the TACs been followed. It remains to be seen if managers and harvesters follow the scientific advice and if the harvest control rules now in place are effective. There is some concern, however with the level of haddock TAC. While scientifically justified using the current assessment model, the TAC	This is true – and obviously part of the review process will be to check that the TAC continues to be respected. The comment on the increases in the TAC are also true (2001 – 303,000 t vs. 155,000 t in 2008). A management rule put in place after the site visit for this fishery may be relevant here – EU vessels in the Svalbard zone now only have a 15% bycatch quota of

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				in 2011 is nearly double the 2008 value. This represents a substantial increase in exploitation as well as effort, and could exasperate any assessment uncertainties should these catches become realized.	haddock (i.e. 15% of their cod quota), rather than a direct proportion of the TAC for direct exploitation. There are some questions as to whether or not this should be allowed under the treaty governing Svalbard, but the effect is likely to be to reduce haddock catches considerably by these vessels – although Norwegian and Russian vessels have no such limits. It remains to be seen in future audits and re-assessments how this all pans out.
1.2.2	Yes	Yes	NA	There are adequate control rules in place with the formulation and appropriate use of TACs. Howver, the following of those TACs is relatively recent and so there is some uncertainty if the measures currently in place an effective reduce effort when if TACs are declining.	Yes – see above

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.3	Yes	Yes	NA	Information is currently adequate to support the harvest strategies. However data collection is a fairly recent event, and the full effects will not been see for a few years to come.	
1.2.4	Yes	Yes	NA	There are effective assessments for both Haddock and Cod. It is noted that there are retrospective patterns in the assessments. As such managers should take explicit precautionary approaches to address those uncertainties, particularly as they patterns tend to overestimate biomass and underestimate F. While the recent ICES documentations with sensitivity analysis, adequately justifies the current scoring; This pattern	This point is noted. Actually, annual surveillance audits may not enter into the details of the ICES stock assessment – relying instead on the ICES advice. MEP notes that it would be a good idea to keep an eye on these issues between re-assessments.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				in the assessments will need to be monitored in the future.	
2.1.1	Yes	Yes	NA	For main retained species, fishery poses low or minimal risk. In this case only saithe was included as it's the only species retained at a greater the 5% level. That stock is under MSC certification and is in good shape.	
2.1.2	Yes	Yes	NA	From the document; 1. a requirement to demonstrate sufficient quotas for retained as well as target species; 2. a ban on discarding; 3. area closures and 4. strong control and enforcement suggests that an adequate management regime is in place.	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.3	Yes	Yes	NA	It should be noted that the prohibition on discarding at sea is very recent, as well as the monitoring system in place. A comprehensive look at the effect of this prohibition should be conducted over the next few years. The lack of at-sea observations, to confirm low discard rates and comparisons with retained data, should be explored	Yes – the other reviewer also noted that the lack of observer reports in this fishery is a significant problem. The reasons are logistical and do no reflect any unwillingness on the part of the clients.
2.2.1	Yes	Yes	NA	While discarding is banned in Norwegian waters, this ban is very recent. As such while there is no dispute with the score, monitoring of this strategy and compliance with it should be examined closely.	Good point.
2.2.2	Yes	Yes	NA	There is an effective	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				management strategy in place for bycatch as there is for most fisheries in this region.	
2.2.3	Yes	Yes	NA	While discarding is banned in Norwegian waters, this ban is very recent. As such while there is no dispute with the score, monitoring of this strategy and compliance with it should be examined closely. Comparisons of retained incidental catch prior to and after the ban should be conducted.	This is a good idea – the problem is that the incidental catch is small and tends to be filed under 'various' in the fishmeal bin, making comparisons difficult.
2.3.1	Yes	Yes	NA	There is not a "high degree of certainty" that the fishery doesn't have indirect effects on PET species, though it seems highly unlikely. both the information available and the rational seem appropriate. However some question if a "high degree of	In this case the fishery scored 90 – as the reviewer rightly says, because there is almost never a 'high degree of certainty' about indirect effects. They are, however, theoretically possible – e.g. in a fishery on foot or by sail power or similar.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				certainty" is needed particularly for indirect effects is needed to attain a score of 100. It's uncertain if any fishery could achieve a score of 100 given the wording.	
2.3.2	Yes	Yes	NA	A management straegy is in place for dealing with PET stocks should interactions be found.	
2.3.3	Yes	Yes	NA	Both the information available and the rational seem appropriate. However some question if a "high degree of certainty" is needed particularly for indirect effects is needed to attain a score of 100. It's uncertain if any fishery could achieve a score of 100 given the wording.	see above

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.4.1	Yes	Yes	Yes	Given the gear type used, the scoring is appropriate. Information and data collection are important in measuring impacts on sensitive hard bottom communities. Therefore the conditions as laid out are also appropriate. However, at-sea observation could also be helpful here and is suggested to directly monitor the interactions.	The other reviewer made the same point – see responses to his comments for details.
2.4.2	Yes	Yes	NA	On-going gear work, monitoring, and the generalized management regime in place (including a system of closed fishing areas) justify the score given. It is also expected to increase 2.4.1 with the additional conditions laid out in the document	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.4.3	Yes	Yes	NA	The lack of information and lack of at-sea observer coverage justifies this score.	
2.5.1	Yes	Yes	NA	While this fishery doesn't impact the ecosystem per se, indirect effects cannot be fully understood without an MSVPA-type approach or assessment. Some analyisis is availible and has been used. As such the scoring and information used are appropriate.	
2.5.2	Yes	Yes	NA	The Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands is what managers use and therein lies the management strategy. As such both a strategy and mechanism to	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				counter ecosystem effects are in place, should they arise (unlikely)	
2.5.3	Yes	Yes	NA	Food web dynamics are well understood and an analytical model frame-work is available to quantify the effects (if any)on the forage base. However some uncertainties particularly with habitat interactions are still present. Overall both the amount of available information and the rational used in scoring are appropriate. However, a score somewhat less than assigned could be argued for, given the uncertainties expressed above.	The other reviewer made a similar point about benthic food web interactions due to habitat damage. See detailed response to his comments.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.1.1	Yes	Yes	NA	Appropriate legal and monitoring systems are in effect for quota setting and to observe (somewhat) the rights of those dependent on the fishery.	
3.1.2	Yes	Yes	NA	While Norwegian vessels enjoy a high degree of interaction with the management body, the French vessels that participate only lightly do not. Given that lack of representation of French vessels in the current fishery management regime, the current scoring is appropriate.	
3.1.3	Yes	Yes	NA	There are very clear long-term objectives for management decision making. Further these are well in line with MSC	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				principles. Precautionary management and sustainable catches are an integral part of the management for these stocks	
3.1.4	Yes	Yes	NA	While subsidies are not used, both Norwegian and French vessels are immune from certain taxes, unlike other industries. However, the use of quotas, closed areas, and sorting grates ensure compliance with MSC sustainability Principles	The fishing vessels buy fuel under the same tax regime as for agriculture. The rights and wrongs of this system have been extensively debated, but it is not (for the moment) considered a subsidy under the MSC standard.
3.2.1	Yes	Yes	NA	The fishery has clear and specific objectives to meet most of MSC P-1 and P-2. However there isn't a over-all strategy and frame work for dealing with issues of bycatch and ecosystem	

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				issues across fisheries under management.	
3.2.2	Yes	Yes	NA	Management decision making is based on a precautionary and sustainable approach to removals, at least in the most recent timeframe. The lack of manager compliance with TAC advice suggests a lower score, however recent changes have been made to improve this criteria.	As noted above, this is an issue to keep an eye on.
3.2.3	Yes	Yes	NA	Management measures are well enforced and monitoring is strictly adhered too given the three systems in place	
3.2.4	Yes	Yes	NA	A research plan is in place and there are clear objectives to this research. Some improvement is	Currently, of course, it is extremely difficult to unpick the impacts of environmental fluctuations, environmental long-

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				warranted in gauging decadal oscillations and other environmental factors, particularly with regards to reference points.	term oscillations and anthropogenic environmental change. Clearly, this is a massive issue in the Arctic, and is the driver for a great deal of research (see for instance http://www.arcus.org/search/index.php, http://www.arcticchange.org/ and many others).
3.2.5	Yes	Yes	NA	Management plan currently in place allows for regular monitoring of fishery performance with regards to objectives. Both the objectives and methods for measuring progress (stock status) are regularly peer reviewed. Further the management goals and actions are open for public participation/and review.	

Any Other Comments

Comments	Conformity Assessment Body Response
A word about uncertainty and the current management/TAC setting is appropriate. While the scores given this fishery are in line with MSC principles and the findings of the team, some caution should be noted. Uncertainties can be additive and can result in unforeseen difficulties. For example, doubling the quota in recent years, coupled with a retrospective pattern, and the use of B_{loss}, can quickly get a fishery well over a sustainable catch if not monitored closely. Likewise, increasing quota and effort can exasperate habitat and bycatch issues as harvesters increase activity in response to increase quota. Many of these issues are complex, and it's difficult to examine these compounding effects in a comprehensive way. Given these issues monitoring is going to be very important, and a more gradual increase in exploitation maybe warranted.	MEP notes this point, and the need to emphasise the review of uncertainty in the stock assessment during annual audits, as well as during re-assessment. The recent change to the distribution of the haddock quota may go some way to addressing this issue for haddock specifically (the stock for which the increase in exploitation rate has been most acute over the last 5-10 years).

For reports using the Risk-Based Framework:

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

2.5.1	NA	NA		

For reports assessing enhanced fisheries:

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

ANNEX 4 – CLIENT ACTION PLAN

CLIENT ACTION PLAN FOR COMPAGNIE DES PÊCHES ST MALO AND EURONOR

Condition	The fishing companies should review recent information on sensitive benthic habitats in their fishing area (notably from the MAREANO project), and also review any evidence that their activities are causing damage to these habitats (benthos attached to the trawl). If this information suggests that activities are damaging to vulnerable communities, as set out in the rationale for PI 2.4.1, then they should take steps to reduce these impacts such that serious or irreversible harm on a bioregional basis is 'highly unlikely'. The team notes that following the requirements of the new regulation may be enough to meet this condition.
Timetable	Data collection and review should be completed by the end of Year 2, mitigation measures agreed by the end of Year 3 and implemented during Year 4. The new regulation may, however, require a faster implementation timetable.

Joint response from the Compagnie de Pêche de St. Malo and Euronor (for translation see below)

Le plan prévu visant à éviter les interactions des vaisseaux avec les habitats sensibles est le suivant :

A noter : Il est important de noter que le planning précis des interventions dépend surtout du planning des marées de pêche en arctique. Pour le moment, il est prévu comme suivant, à condition que des facteurs externes ne viennent pas perturber les plans de pêche :

Euronor : Svalbard et NEZ le dernier trimestre 2012.

Cie des Pêches St. Malo : NEZ - mars à mai; Svalbard - juillet à aout

- Année 1 (2012)

Janvier - Juin 2012 : Identification des sources d'information existantes sur les habitats sensibles (MAREANO notamment), à consulter régulièrement pour confirmer leur localisation et l'évolution possible de celles-ci.

Mars – Aout 2012 : Pêche (Cie. Pêche St. M.)

Juin – Octobre 2012 : Identification des plus récentes délimitations des habitats sensibles.

Octobre – Décembre 2012 : Pêche (Euronor)

Fin 2012 : Vérification avec les capitaines après les marées de pêche en arctique des interactions éventuelles de la pêche de cabillaud et églefin avec les habitats sensibles.

- Année 2 (2013)

1er semestre : Mise en place d'une stratégie de limitation des impacts éventuels, inscrite dans les instructions au capitaine pour chaque campagne de pêche en arctique.

Fin 2013 : Bilan des actions de pêche en 2013, en ce qui concerne les interactions éventuelles de la pêche avec les habitats sensibles. Fixation d'objectifs et de moyens pour réduire ces interactions éventuelles.

- Année 3 (2014)

Inscription dans les instructions au capitaine pour chaque campagne de pêche des objectifs et des moyens définis à la marée précédente pour réduire les interactions éventuelles.

- Année 4 et continu

Vérification des résultats après chaque marée. Bilan du plan d'action concernant les habitats sensibles.

Response from the Compagnie de Pêche de St. Malo and Euronor (English translation)

The following plan has been developed to avoid interactions of the fishing activities with sensitive habitats:

NB : It is important to note that the exact timing of activities depends on how the fishing trips to the Arctic are planned. For the moment the companies' timetables are sas set out below, but external factors can always cause these to change:

Euronor : Svalbard and NEZ the last three months of 2012.

Cie des Pêches St. Malo : NEZ – March to May; Svalbard – July to August

- Year 1 (2012)

January – June 2012 : Identify existing sources of information on sensitive habitats (notably MAREANO), and consult regularly to confirm the positions of sensitive areas, which possible changes over time.

March – August 2012 : Fishing (Cie. Pêche St. M.)

June – October 2012 : Identify the most recent positions of sensitive habitat areas

October – December 2012 : Fishing (Euronor)

End 2012 : Discuss with the fishing skippers after each trip in the Arctic, any possible interactions with sensitive habitats during cod and haddock fishing

- Year 2 (2013)

First 6 months : Strategy put in place to limit possible impacts, written into the skippers' instructions for each fishing campaign in the Arctic.

End 2013 : Review of fishing activities in 2013 in relation to possible habitat impacts. Definition of objectives and maens to reduce these impacts as necessary.

- Year 3 (2014)

Objectives and means defined above written into skippers' instructions for each Arctic fishing campaign.

- Year 4 and ongoing

Results checked after each trip. Review of action plan for sensitive habitats.

ANNEX 5 - REFERENCES

1 MSC 2008. Fisheries Assessment Methodology and Guidance, version 1, 12 June 2008

2 Scapeche and Compagnie des Pêches St. Malo saithe fishery – MSC Final Report – MacAlister Elliott and Partners. See http://www.msc.org/track-a-fishery/certified/north-east-atlantic/Scapeche-and-CoPSM-saithe

3 Euronor saithe fishery – MSC Final Report – MacAlister Elliott and Partners. See http://www.msc.org/track-a-fishery/certified/north-east-atlantic/euronor-saithe

4 ICES advice 2010, section 6.4.2; Cod in IV (North Sea), VIId (Eastern Channel) and IIIa West (Skaggerak). See http://www.ices.dk/committe/acom/comwork/report/2010/2010/cod-347.pdf

5 ICES advice 2010, section 2.4.2; Cod in Division Va (Icelandic cod). See http://www.ices.dk/committe/acom/comwork/report/2010/2010/cod-iceg.pdf

6 ICES advice 2010, section 3.4.2; Cod in Subareas I and II (Norwegian coastal cod). See http://www.ices.dk/committe/acom/comwork/report/2010/2010/cod-coas.pdf

7 ICES advice 2010, section 3.4.1; Cod in Subareas I and II (northeast Arctic cod). See http://www.ices.dk/committe/acom/comwork/report/2010/2010/cod-coas.pdf

8 FishBase entry for cod – see http://www.fishbase.org/Summary/speciesSummary.php?ID=69&genusname=Gadus&speciesname=morhua&AT=Gadus+morhua&lang=English

9 FishBase entry for haddock – see http://www.fishbase.org/Summary/SpeciesSummary.php?ID=1381&AT=haddock

10 Hedger R., McKenzie E., Heath M., Wright P., Scott B., Gallego A. and Andrews J. 2004. Analysis of the spatial distributions of mature cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*) abundance in the North Sea (1980–1999) using generalised additive models. Fisheries Research 70, 17-25.

11 ICES 2010. Arctic Fisheries Working Group report. See http://www.ices.dk/reports/ACOM/2010/AFWG/AFWG%202010.pdf

12 ICES advice 2010, section 6.4.3; Haddock in Subarea IV (North Sea) and Division IIIa West (Skaggerak). See http://www.ices.dk/committe/acom/comwork/report/2010/2010/had-34.pdf

13 Marine Resources Act of 6 June 2008 No. 37 relating to the management of wild living marine resources. English translation, 17pp.

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15 Council Regulation (EU) No 57/2011 of 18 January 2011 fixing for 2011 the fishing opportunities for certain fish stocks and groups of fish stocks, applicable in EU waters and, for EU vessels, in certain non-EU waters, 125p. (quotas in Norwegian waters I and II Cod: page 71; Haddock: page 74 and maximum numbers of fishing authorisations amongst Member States and vessels present at any time in Annex III: page 116).

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