DNV·GL

SURVEILLANCE NO. 1

Surveillance audit – Report for the Norway Skagerrak and Norwegian Deep cold water prawn fishery

Norges Fiskarlag

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Objective:

The objective of this report is the first surveillance audit of the Norway Skagerrak and Norwegian Deep cold water prawn fishery.

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GLOSSARY

Abbreviations & acronyms

AIS	Automated Identification System
CL	Carapace length
CPUE	Catch per unit effort
EC	European Commission
EEZ	Exclusive Economic Zone
ETP	Endangered, threatened or protected species
EU	European Union
FAM	Fisheries Assessment Methodology
HCR	Harvest Control Rule
ICES	International Council for the Exploration of the Sea
IMR	Institute of Marine Research
LPUE	Landings Per Unit Effort
MSC	Marine Stewardship Council
NAFO	Northwest Atlantic Fisheries Organisation
NIPAG	NAFO/ICES Pandalus Assessment Group
OSPAR	Oslo and Paris Commission for the protection and conservation of the North-East Atlantic and its Resources
PI	Performance Indicator
RTC	Real Time Closure
SG	Scoring Guidepost
SLU	Swedish University of Agricultural Sciences
SSB	Spawning stock biomass
TAC	Total Allowable Catch
VME	Vulnerable Marine Ecosystems
VMS	Vessel Monitoring System
WWF	World Wide Fund for Nature

Stock assessment reference points

B_{lim}	Minimum biomass below which recruitment is expected to be impaired or the stock dynamics are unknown.
B_{msy}	Biomass corresponding to the maximum sustainable yield (biological reference point); the peak value on a domed yield-per-recruit curve.
B_{pa}	Precautionary biomass below which SSB should not be allowed to fall to safeguard it against falling to Blim.

$B_{trigger}$	Value of spawning stock biomass (SSB) that triggers a specific management action.
F	Instantaneous rate of fishing mortality.
F_{lim}	Fishing mortality rate that is expected to be associated with stock 'collapse' if maintained over a longer time (precautionary reference point).
F_{msy}	F giving maximum sustainable yield (biological reference point).
F_{pa}	Precautionary buffer to avoid that true fishing mortality is at Flim when the perceived fishing mortality is at Fpa.
K	Carrying Capacity
MSY	Maximum Sustainable Yield
PA	Precautionary Approach

1 GENERAL INFORMATION

Table 1 General information

<table>
<tr><td>Fishery name</td><td colspan="3">Norway Skagerrak and Norwegian Deep cold water prawn fishery</td></tr>
<tr><td>Unit(s) of Assessment (UoA)</td><td colspan="3">
<table>
<tr><td>Species:</td><td>Northern shrimp, cold water prawn (Pandalus borealis)</td></tr>
<tr><td>Stock:</td><td>Northern shrimp in Skagerrak and Norwegian Deep</td></tr>
<tr><td>Geographical area:</td><td>ICES Divisions IIIa West and IVa East (Skagerrak and Norwegian Deep) in Norwegian and EU waters.</td></tr>
<tr><td>Harvest method:</td><td>Bottom trawl</td></tr>
<tr><td>Management:</td><td>The stock is managed according to EU-Norway agreement, Norwegian national management systems and advised by ICES.</td></tr>
<tr><td>Client group:</td><td>All fishing operators targeting Northern shrimp (Pandalus borealis) in the ICES Divisions IIIa West and IVa East (Skagerrak and Norwegian Deep) using bottom trawl as harvesting method and operating under quota issued by authorities of Norway.</td></tr>
<tr><td>Other eligible fishers:</td><td>No other eligible fishers have been identified</td></tr>
</table>
</td></tr>
<tr><td>Date certified</td><td>14 June 2016</td><td>Date of expiry</td><td>13 June 2021</td></tr>
<tr><td>Surveillance level and type</td><td colspan="3">Surveillance level 6 (surveillance level 2 or more (normal surveillance) according to v. 1.3)

On-site surveillance</td></tr>
<tr><td>Date of surveillance audit</td><td colspan="3"></td></tr>
<tr><td rowspan="5">Surveillance stage</td><td>1st Surveillance</td><td colspan="2">x</td></tr>
<tr><td>2nd Surveillance</td><td colspan="2"></td></tr>
<tr><td>3rd Surveillance</td><td colspan="2"></td></tr>
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<tr><td>Other (expedited etc)</td><td colspan="2"></td></tr>
<tr><td>Surveillance team</td><td colspan="3">Lead assessor: Julian Addison
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This report contains the findings of the first annual MSC Fisheries surveillance audit conducted for the Norway Skagerrak and Norwegian Deep cold water prawn fishery during 3-4 April 2017.

The purpose of this annual Surveillance Report is:

1. To establish and report on any material changes to the circumstances and practices affecting the original complying assessment of the fishery;
2. To monitor the progress made to comply with any Conditions raised and described in the Public Certification Report of 14.06.2016 and in the corresponding Action Plan drawn up by the client;
3. To monitor any actions taken in response to any Recommendations made in the Public Report;
4. To re-score any Performance Indicators (PI) where practice or circumstances have materially changed during the intervening year, focusing on those PIs that form the basis of Conditions raised.

The primary focus of this surveillance report is to review the changes occurred since the previous year. For a complete picture of the fishery, this report should be read in conjunction with the Public Certification Report available for download at www.msc.org.

2 BACKGROUND

2.1 Stock Status

The shrimp fishery in the Norwegian Deep and Skagerrak has been exploited by Norwegian and Swedish vessels since the end of the 19th century and by Danish vessels since the 1930s. The fishery expanded in the 1960s and by 1970 landings had reached 5,000 tonnes. In 1981 landings exceeded 10,000 tonnes after which landings fluctuated but steadily increased to a peak of around 16,000 tonnes in 2004 (Figure 1, Table 2). From 2004 to 2010 landings declined significantly, most likely due to poor recruitment, but are now showing signs of increasing particularly in the light of the 2014 recruitment index which is the highest level of recruitment in the recent time series (NAFO/ICES, 2016). Landings and estimated total catches by Norwegian vessels are shown in Table 2.

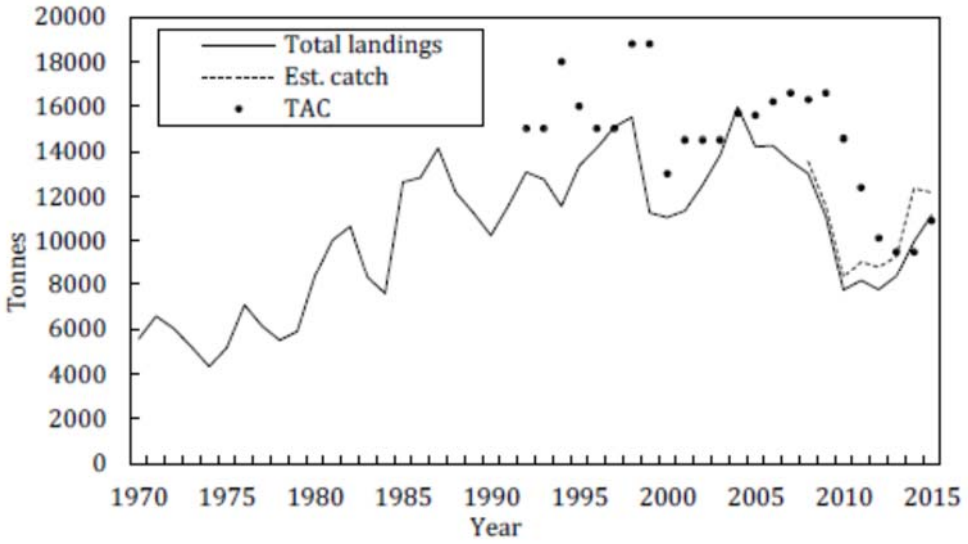

Figure 1. Northern shrimp in Skagerrak and Norwegian Deep: Total landings by all fleets, total catch including discards from 2008 to 2015, and TAC (source: NAFO / ICES, 2016).

Table 2. Northern shrimp in the Skagerrak and Norwegian Deep: TACs, landings and estimated catches in tonnes (source: NAFO / ICES, 2016).

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016[1]
Recommended TAC	13500	14000	15000	15000	13000	8800	*	5800	5400	9800	11869
Agreed TAC	16200	16600	16300	16600	14558	12380	10115	9500	9500	10900	12380
Denmark landings	3111	2422	2274	2224	1301	1601	1454	2026	2432	2709	
Norway landings	8669	8688	8261	6362	4673	4800	4852	5179	6123	6808	
Sweden landings	2488	2445	2479	2483	1781	1768	1521	1191	1397	1644	
Total landings	14268	13553	13013	11071	7755	8168	7771	8379	9953	11161	
Est. Swedish discards			540	337	386	504	671	265	572	325	
Est. Norw. Discards				94	133	247	292	459	1289	476	
Est. Danish discards				36	53	123	88	185	526	204	
Total catch	14268	13552	13554	11539	8327	9044	8822	9288	12341	12166	

[1]Recommended and agreed TACs from October 2015 were changed following a benchmark assessment in March 2016

The Norwegian and Danish shrimp fleets have changed significantly over the last 25 years. In Norway the shrimp fleet has declined by more than 50% from 423 vessels in 1995 to 203 vessels in 2014, with more than half of the large vessels using twin trawls (Søvik and Thangstad, 2014b). Unstandardised catch rates (landings per unit effort, LPUE) from the Norwegian shrimp fishery are significantly higher for twin trawls than single trawls (Søvik and Thangstad, 2014b). In Denmark vessel numbers have decreased from 138 in 1987 to only 10 in recent years (Ulmestrand *et al*., 2014). The Swedish shrimp fleet has decreased from more than 60 vessels in 1995-1997 to 33 vessels in 2014 (Ulmestrand *et al*., 2014).

Shrimp landed in the Skagerrak and Norwegian Deep fishery are separated into high value large shrimp boiled on board and smaller low value shrimp landed raw to the industry for further processing. In 2013 in the Norwegian fleet 43% of the landings were boiled shrimp and 57% raw fresh shrimp (Søvik and Thangstad, 2014b). Shrimp lose weight when boiled, and the fraction of the landings consisting of boiled shrimp is corrected using a conversion factor of 1.13 to obtain an estimate of fresh weight caught (Søvik and Thangstad, 2014b). In the Danish fleet, the majority of landings are of fresh raw shrimp, although the proportion of the landings that are boiled has been increasing in recent years. In comparison the ratio of boiled to raw shrimp in the Swedish fishery has remained at 1:1 over the last few years (Ulmestrand *et al*., 2014).

Discarding of shrimp in the Skagerrak and Norwegian Deep may occur because the shrimp are smaller than the commercial size of 15 mm carapace length (CL) or through high-grading which is the practice of discarding small to medium size low value shrimp and replacing with larger, higher value shrimp. High-grading is most likely to occur in fisheries where the TAC is restricting the activity of the fleet, which has been the case recently in the Swedish fishery. In Norway the landings (corrected for boiling) have varied between 54% and 97% of the Norwegian TAC over the period 2006 to 2013 (Søvik and Thangstad, 2014b) which would suggest that the TAC is not overly-restrictive of the activity of the fleet. However from time to time within-year landings have reached the 4-monthly TAC and the Directorate of Fisheries has had to close the fishery, suggesting that there is potentially some incentive to high-grade in the Norwegian fishery.

Although high-grading may occur within the Norwegian fleet, it is not observed regularly (Modulf Overvik, Directorate of Fisheries, pers. comm.) There are no observer data for the Norwegian fleet, so Norwegian discards in the Skagerrak are estimated by applying the Danish discards to landings ratio to Norwegian landings, and in the Norwegian Deep where no observer data are available, discarded shrimp are assumed to be primarily shrimp under 15 mm CL and are estimated from length distributions of the catch.

The shrimp stock in the Skagerrak and Norwegian Deep area is assessed annually by the joint NAFO/ICES *Pandalus* Assessment Group (NIPAG). There have been major changes in the assessment methodology over the last two years and since the original certification report (DNV GL, 2016). This audit report will therefore describe in detail how the assessment methodology has changed since the original certification and the implications for the subsequent ICES advice on the status of stock.

An ICES benchmark in 2011 and 2013 evaluated two assessment models - a stochastic length-based assessment model (Neilson *et al*., 2015) and a Bayesian surplus production model (Hvingel, 2014). The preferred model was the analytical length-based model but because of various inconsistencies in the fitting of the model, the advice for 2014 and 2015 was based on the surplus production model. The surplus production model was the methodology used at the time of the original certification.

The surplus production model is a stochastic model formulated in a state-space framework and Bayesian methods are used to derive posterior likelihood distributions of the parameters (Hvingel and Kingsley, 2006). The model synthesises information from input priors including initial biomass ratio, carrying capacity and survey catchability, a series of shrimp catches, and four independent series of shrimp biomasses (Hvingel, 2014). Absolute biomass estimates have relatively high variances, and therefore to cancel out the uncertainty of the catchability parameters (which scale biomass indices to real biomass), in the assessment model shrimp biomass (B) is measured relative to the yield that would yield Maximum Sustainable Yield (Bmsy), and the fishing mortality (F) is scaled to the fishing mortality at MSY (Fmsy). In addition the assessment also considers two other reference points that ICES uses within its MSY framework for providing advice: Btrigger, a biomass encountered with low probability if Fmsy is implemented, and Blim (30% of Bmsy), the biomass below which recruitment is expected to be impaired. The assessment also considers Flim (170% of Fmsy), the fishing mortality that would drive the stock to Blim.

The 2015 stock assessment concluded that the time series of relative biomass estimated from the model showed that the stock biomass has been above MSY Btrigger since the early 1990s and the median estimate of fishing mortality has remained below Fmsy since the early 1990s (Figure 2) (ICES, 2015).

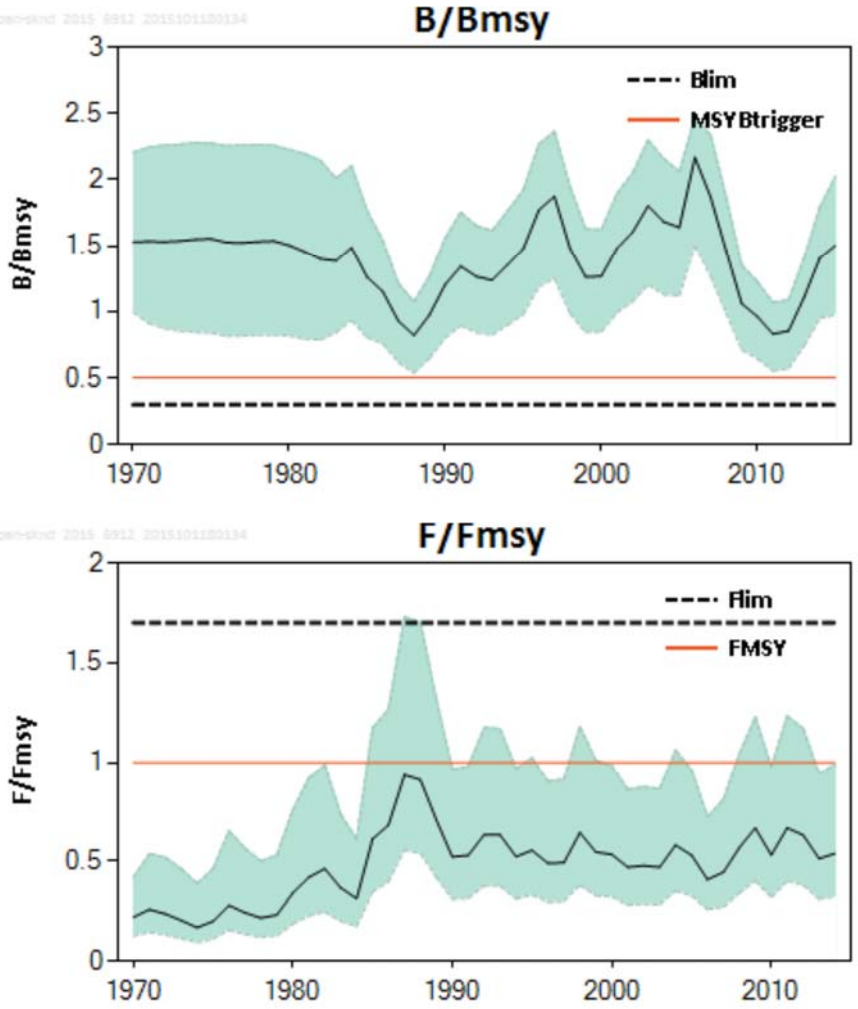

Figure 2. Northern shrimp in Skagerrak and Norwegian Deep: Biomass and fishing mortality relative to Bmsy and Fmsy, respectively, and with 90% probability intervals. (source: ICES, 2015).

The 2015 stock assessment estimated the risk associated with exceeding the various reference points. In 2015, the risk of stock biomass falling below Btrigger and Blim was 0%, and the risk of fishing mortality exceeding Fmsy was 2%. The assessment also provided model predictions of risk associated with a range of catch levels in 2016 from 14,000 to 24,000 tonnes per annum assuming a catch in 2015 of 10,900 tonnes (TAC). For all options, the risk of stock biomass falling below Blim and Btrigger was 0% (Table 3). Based on this table, fishing at Fmsy implied catches of no more than 21,500 tonnes in 2016 (ICES, 2015).

Table 3. Northern shrimp in Skagerrak and Norwegian Deep. Catch options for 2016. (Source: NAFO / ICES, 2015).

	Catch option 2016 (ktons)					
	14	16	18.5	20	21.5	24
Risk of falling below B_{lim} ($0.3B_{msy}$)	0%	0%	0%	0%	0%	0%
Risk of falling below B_{trig} ($0.5B_{msy}$)	0%	0%	0%	0%	0%	0%
Risk of exceeding F_{msy}	12%	19%	28%	41%	50%	63%
Risk of exceeding F_{lim}	1%	2%	5%	7%	12%	17%
Stock size (B/B_{msy}), median	1.42	1.40	1.38	1.33	1.31	1.28
Fishing mortality (F/F_{msy}),	0.60	0.69	0.79	0.91	1.00	1.14
Productivity (% of MSY)	82%	84%	85%	89%	90%	92%

Following the 2015 stock assessment and the consequent ICES advice for 2016 based on that assessment, ICES convened a new benchmark (ICES, 2016a) focused on exploring two alternative length-based models: one of them had already been presented at the previous inter-benchmark process for this stock (see above discussion), whereas the other one, implemented in Stock Synthesis (SS3), was developed for the benchmark. The fits to the data were better for the model implemented in SS3, particularly for the survey length–frequency distributions, which are a very important source of information to determine the strength of the incoming age-1 group. The model developed in SS3 has internally a quarterly time-step and the selection pattern of the fishery is modelled as length-based. This allows the shrimp to be increasingly selected by the fishery as they grow through the year, which is particularly relevant to age-1 shrimp and appears to be a determining factor in achieving good model performance, in comparison with the alternative length-based model. The benchmark agreed to use the length-based model developed in Stock Synthesis for the assessment of this *Pandalus* stock because it provides the better fit to the data (of the two length-based models considered) and, as just noted, this type of model is able to deal with the variable stock dynamics. Retrospective analysis and sensitivities were explored and considered acceptable and strengthened confidence in the approach. The usual precautionary and MSY reference points used for medium-lived stocks (Blim, Bpa, Flim, Fpa, FMSY and MSY Btrigger) were calculated and agreed by the benchmark.

Revised ICES advice was published in March 2016 for this stock based on the application of the new length-based model (ICES, 2016b). The trajectories of biomass and fishing mortality over time estimated by the new model were similar to those from the stock production model (Figure 3) with biomass continuing to increase following the steep decline observed between 2008 and 2012, but reference points had been revised such that the evaluation of stock status in relation to reference points was much less favourable than the stock status evaluated from the stock production model. Biomass was estimated to be well above Blim (6300 tonnes) and above MSY Btrigger (9900 tonnes), but current fishing mortality was around Fmsy (0.62), having previously been estimated to be significantly below Fmsy. Following the new stock assessment, revised ICES advice is that when the MSY approach is applied, catches in 2016 should be no more than 13,721 tonnes, which is a significant reduction on the previous advice issued in October 2015 that catches should be no more than 21,500 tonnes in 2016.

At the NIPAG meeting in September 2016, a new assessment of the stock was undertaken. However following the meeting, it was discovered that there was a serious technical issue with the equipment which resulted in asymmetrical wire length of the trawl gear used in the Norwegian

stock survey on which the assessment is based. ICES concluded that the abundance indicator from the 2016 Norwegian survey was not valid and therefore rejected the new assessment, and in late 2016 the March 2016 advice (ICES, 2016b) remained the latest ICES advice for this stock. A new stock assessment was planned early in 2017 following the 2017 Norwegian stock survey.

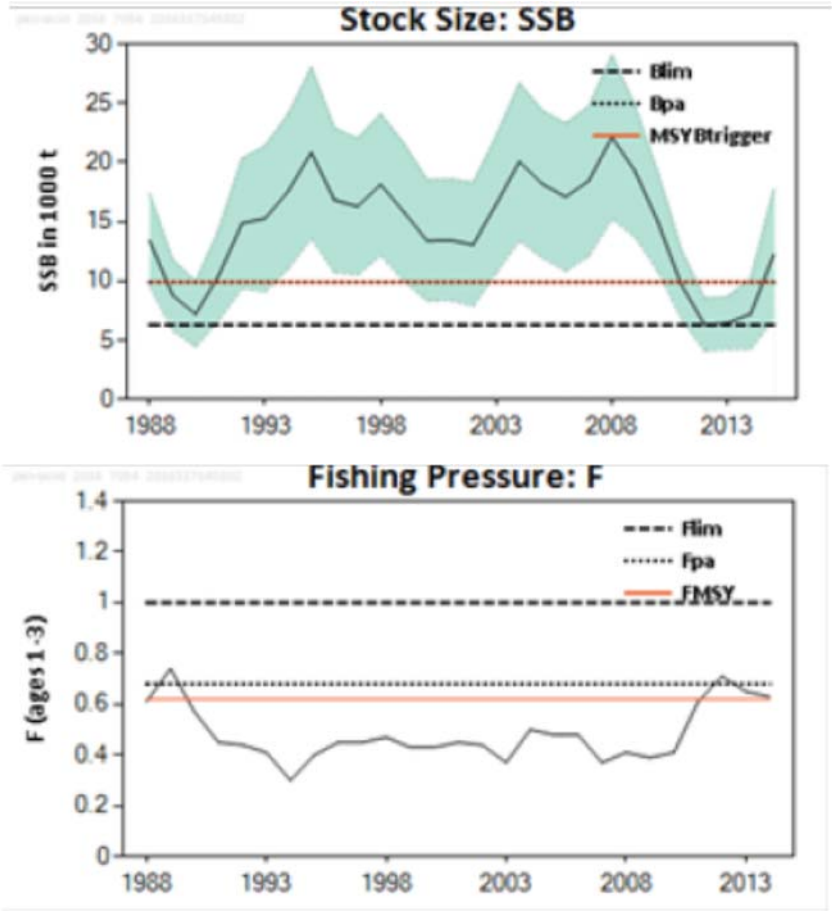

Figure 3. Northern shrimp in Skagerrak and Norwegian Deep. Trends in spawning stock biomass (1988-2016) and fishing mortality (1988-2015). (Source: ICES, 2016b)

The Norwegian stock survey was completed early in 2017 and an updated stock assessment was carried out using the new survey data (NAFO/ICES, 2017). The new estimate of stock biomass is now below MSYBtrigger, and the estimate of fishing mortality (F) is 0.64, which is just above the Fmsy of 0.62 (Figure 4).

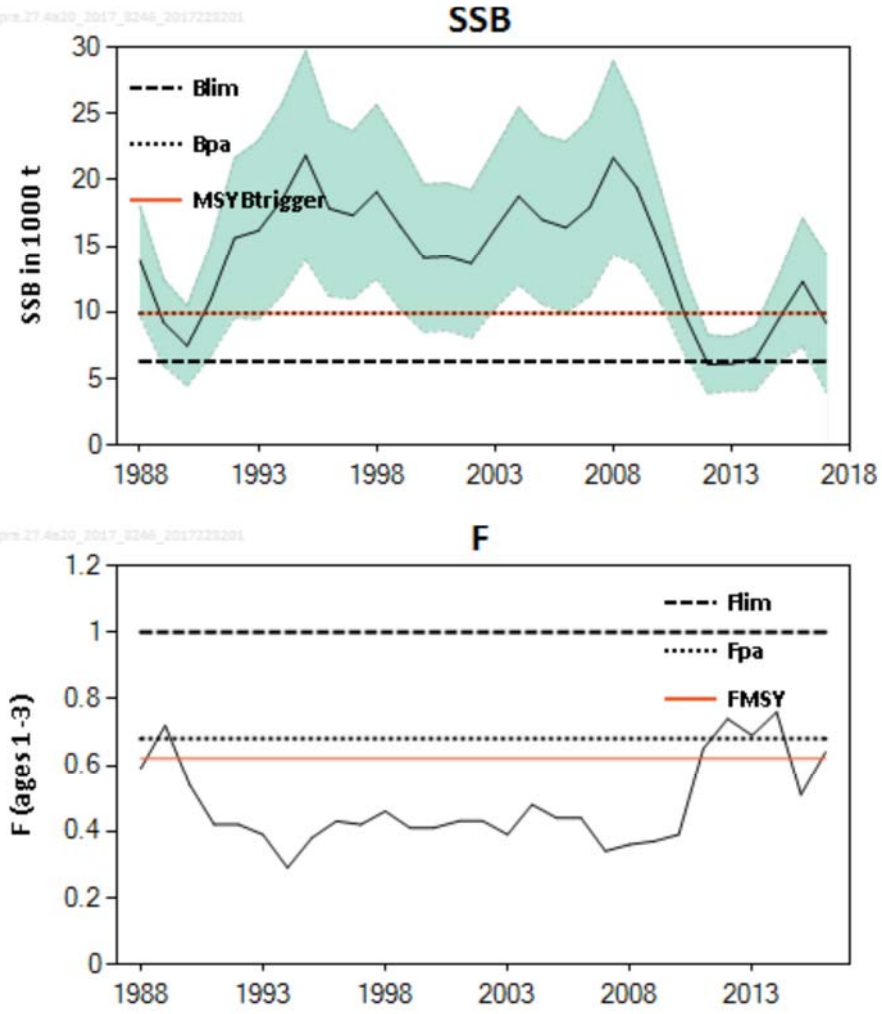

Figure 4. Northern shrimp in Skagerrak and Norwegian Deep. Trends in spawning stock biomass (1988-2017) and fishing mortality (1988-2016). (Source: ICES, 2017)

Following the updating of the stock assessment, ICES published new advice on 27 March 2017. ICES advice is that when the MSY approach is applied, catches in 2017 should be no more than 10,316 tonnes (ICES, 2017).

At this year's surveillance audit in April 2017, the audit team reviewed the most recent stock assessment and ICES advice, and concluded that it was necessary to re-score PI 1.1.1 because the estimated stock biomass had now fallen below MSYBtrigger. The audit team concluded that the stock is not at or fluctuating around its target reference point and therefore the fishery no longer meets the SG80 for scoring issue b. As PI 1.1.1 now scores less than 80, this triggers the scoring of PI 1.1.3 Stock Rebuilding. A full re-evaluation of the fishery against PI 1.1.1 and the scoring of PI 1.1.3 can be found in Appendix 1.

Whilst the SG80 is not met for PI 1.1.1 and the MSC CRv2.0 requires that each performance indicator that receives a score of less than 80 should have its own condition, the MSC Interpretations Page advises that, "*In the case that the stock is depleted, and PI 1.1.1 scoring issue (b) scores less than 80, the CAB may present a rationale that PI 1.1.3 in CRv1.3 fulfils the*

requirements of that condition." The assessment team therefore has not raised a condition as they considered that the scoring of PI 1.1.3 fulfils the need of a condition.

2.2 Impact on the ecosystem

Shrimp trawlers use an otter trawl net, which is held open by trawl doors. An increasing number of Norwegian vessels use twin trawls and in 2011-2014 twin trawls were used by more than half of the trawlers larger than 15m (Søvik and Thangstad, 2014b). Twin trawls use a clump in the middle to keep the net near the bottom. The weight of the doors is between 0.5 and 1.0 tonnes and the weight of the clump is around 1.0 to 2.0 tonnes. The ground rope is prevented from making contact with the sea bottom primarily by plastic bobbins of 20 cm in diameter.

The minimum mesh size in this fishery is 35 mm, although many vessels voluntarily use a 40 to 45 mm mesh size in order to avoid catching very small shrimp. Shrimp fishing occurs throughout the year in depths of 100 to 500 m. Most vessels fish both within and outside the 4nm Norwegian baseline.

The standard trawl may have significant by-catch other than *Pandalus borealis*, and all vessels in the UoC use a Nordmore selective grid incorporated into the standard trawl to target shrimps providing a relatively clean catch of shrimp with very little by-catch. The Nordmore grid has a bar spacing of 19mm which excludes the capture of fish that are approximately 20 mm or more and has been shown to reduce by-catch significantly. Under the EU–Norway agreement, the selective grid is mandatory for all vessels in the Skagerrak, except within 4nm of the Norwegian coastline. In January 2015, the mandatory use of a sorting grid was extended to cover the fishery in the Norwegian Deep, although many Norwegian vessels were already using the grid in this area and inside the 4nm baseline. If vessels have a fish quota, then within the grid trawl they are permitted to use a fish retention device or "tunnel", a 120mm square mesh tunnel at the grid's fish outlet. The tunnel retains larger commercial fish, but may also prevent the escape of non-commercial species.

There are no observer data for the Norwegian fleet, so Norwegian discards in the Skagerrak are estimated by applying the Danish discards to landings ratio to Norwegian landings, and in the Norwegian Deep where no observer data are available, discarded shrimp are assumed to be primarily shrimp under 15 mm CL and are estimated from length distributions of the catch. The overall estimated discard rate by weight for the three fleets combined was 12% in 2012, 10% in 2013, and 19% in 2014 although the proportion of large boiled shrimp in the Norwegian landings is larger than in the Danish landings suggesting that there is some uncertainty surrounding the estimate of discard rate in the Norwegian fleet.

Bottom trawl gears are known to impact on habitat structure and function, and areas with biotic habitats generated by aggregations or colonial growth of single species are particularly vulnerable. Maerl and seagrass beds are also considered to be vulnerable to the effects of trawling gears. The shrimp trawl used in the Swedish fishery is relatively light in comparison with other trawls and is therefore expected to impact significantly less on habitat features. VMS data of the shrimp fleet demonstrates that most of the fishing activity is confined to soft seabed sediments such as mud and sandy mud in the Skagerrak. There are a number of Natura 2000 sites designated in the Skagerrak in particular the Skagens Glen and the Bratten, and the OSPAR Commission lists a number of sensitive habitats that can be found in the Skagerrak. These include coral gardens, deep sea sponge aggregations, Zostera beds, Lophelia pertusa reefs and seapen and burrowing megafauna communities but shrimp trawling is unlikely to occur in the more complex habitats

because the Norwegian shrimp vessels will actively avoid any area where the gear might become entangled. The distribution of fishing activity of Norwegian shrimp vessels as described by VMS data and knowledge of the activity of small coastal vessels confirms that the key Natura 2000 site in which Norwegian shrimp trawling occurs is the Bratten. There is also some fishing activity in the Skagens Gren area, but Norwegian vessels do not fish in the inshore areas of Koster and Varedofjorden and Gullmarsfjorden. VMS data provided by the Directorate of Fisheries for 2016 show that there has been no significant change to fishing grounds in 2016.

Whilst there are a number of measures in place to protect vulnerable habitats from shrimp trawling, the original certification report identified deficiencies in the regulations which resulted in the raising of conditions. Full protection for horn corals and deep sea sponge aggregations is not yet in place in the Bratten, there is a lack of implementation of specific management measures to restrict fishing activity in many of the protected areas, and there is no mechanism for recording interactions between fishing gear and VME habitats.

In September 2016 the European Commission adopted the recommendations developed by the Swedish regional governmental body Västra Götaland, which was later negotiated with Denmark and Germany regarding fishing regulations in the Bratten Natura 2000 site. As a result of this regulation, 27% of the area will be protected and within that area all fishing gears will be prohibited. This will be controlled through mandatory use of AIS which clearly indicates the location of the fishing. These measures (EU-COM delegated regulation (C(2016) 5549 final)) were adopted by the Commission on the 5th of September 2016 and were implemented in early 2017.

2.3 Changes to the management system

The fishery has been managed primarily through a TAC since 1992. The TAC reached 16,600 in 2007-2009, but has since been reduced, and was set at 9,500 for 2013 and 2014 (Figure 1, Table 2). The TAC is shared amongst the three countries based on historical landings with Norway, Denmark and Sweden receiving 58-60%, 26-28% and 14% respectively in 2011-2015. The Norwegian annual quota is then sub-divided into three four-month periods January-April, May-August and September–December with 40%, 30% and 30% respectively of the total annual quota. This allows supply to the market to be controlled and the Norwegian Directorate of Fisheries can close the fishery during any of these 4-monthly periods if the quota is reached. In addition to the overall quota within these 4-monthly periods, in 2014 vessels had an individual quota of 37 tonnes, 28 tonnes and 28 tonnes respectively in the three 4-monthly periods. Initially the TACs were based on catch predictions from a cohort-based analytical assessment, but since that assessment method was discontinued, the TAC has been based on perceived stock development in relation to recent landings (NAFO/ICES, 2015). Whilst there is no formally agreed harvest control rule (HCR) for this fishery, the TAC is implicitly modified therefore in response to the annual stock assessments undertaken by NIPAG.

In recent years TACs have been changed in line with declining stock biomass, but it cannot be concluded that TACs have always been set fully in line with ICES advice in the past. In 2014, ICES advice was that catches of up to 14,800 tonnes in 2015 would ensure that F remained below Fmsy and stock biomass remained above Bmsy, but due to uncertainties within the assessment model and alternative model estimates of stock biomass and fishing mortality, ICES advised that total catches should be no more than 10,900 tonnes. Assuming that discard rates did not change from the average of the last three years, this implied landings of no more than 9,777 tonnes. At the

meeting in December 2014 between the EU and Norway on the regulation of fisheries in the North Sea and the Skagerrak, the Norwegian and EU delegations accepted the ICES advice and set a TAC of 10,900 tonnes for 2015. The TAC represents landings and not total catch, so the TAC was set at a slightly higher level than the ICES advice. Landings in 2015 totalled 11,100 tonnes which were slightly in excess of the TAC of 10,900 tonnes. In October 2015, ICES advice was that catches in 2016 should be no more than 21,500 tonnes implying landings of no more than 18,598 tonnes (ICES, 2015), but the EU-Norway consultations set the 2016 TAC at a lower level than that advised by ICES. However the ICES benchmark on Pandalus in March 2016 (ICES, 2016a) produced an updated assessment of the stock based on a new assessment model, and consequently provided revised advice that catches in 2016 should be no more than 13,721 tonnes, implying landings of no more than 11,869 tonnes (ICES, 2016b). As this revised TAC advice was produced during the fishing season, EU countries and Norway met to discuss the new ICES advice on reduced catch limits, and as the TAC for 2016 had already been set lower than the ICES advice, the EU and Norway consequently reduced the TAC for 2016 by 10%. As discussed above, there were discrepancies identified within the Norwegian stock survey in 2016, and as a result the most recent assessment of the shrimp stock by NIPAG was not accepted by ICES. As at October 2016, the ICES advice from March 2016 (ICES, 2016b) remained the latest stock advice. With no new advice until a new stock assessment could be undertaken following the 2017 stock survey, the EU-Norway consultations agreed to set an interim TAC of 10,000 tonnes for 2017 including 3,000 tonnes for Division IVa. This interim TAC would be applied on a pro-rata basis to cover the first four months of the year in the case of Norway and the first six months of the year in the case of EU countries. The audit team concluded that as far as was possible during this period of uncertain stock status, TACs were being set in line with ICES advice. An updated stock assessment was carried out in early 2017 following the 2017 Norwegian stock survey, following which ICES issued new advice that when the MSY approach is applied, catches in 2017 should be no more than 10,316 tonnes (ICES, 2017). The EU/Norway Commission has set the TAC for 2017 in line with the new ICES advice.

In addition to the TAC, management measures include restricted entry licensing, a minimum mesh size of 35mm (although most vessels voluntarily use a larger mesh size to reduce the catch of undersized shrimp), restrictions in the amount of landed by-catch and the mandatory use of a grid with a maximum bar spacing of 19mm in the fishery in the Skagerrak outside the Norwegian 4nm boundary. In January 2015, the mandatory use of a sorting grid was extended to cover the fishery in the Norwegian Deep, although many vessels were already using the grid in this area. Although the use of a grid is not mandatory within the 4nm zone, around 60% of vessels are now using the grid voluntarily (Client pers. comm.). In Norway there is also a minimum landing size of 6.5 cm total length (recently reduced from 7cm), maximum bycatch limits, and a regulation that requires that any “collisions” between fishing gear and corals and sponges (above specified limits) must be recorded and “move-on” rules apply.

Whilst there is a series of management measures in place for the shrimp fishery in the Norwegian Deep, Skagerrak and Kattegat, there is currently no formal management plan agreed between the nations that participate in the fishery. During the Fisheries Consultations between the EU and Norway on the regulation of fisheries in Skagerrak and Kattegat in 2015 held in Ireland in December 2014, the Delegations agreed to continue developing a management strategy for shrimp during the first quarter of 2015. It is being led by Norway working alongside their EU counterparts in Denmark and Sweden and in conjunction with Norwegian scientists at IMR in Bergen. At a meeting in Lofoten Islands, Norway in May 2015, the EU-Norway consultations considered a proposal by Norway to request ICES advice on various components of a joint management plan

including a TAC determined by an explicit harvest control rule, in-year revisions of the TAC based on the January stock survey, inter-annual quota flexibility, and the sensitivity of TAC calculations to uncertainty about discard rates of both small non-marketable shrimps and medium size shrimps through high-grading. No agreement was reached at the meeting on the request to ICES for advice (Geir Ervik, Norwegian Ministry of Trade, Industry and Fisheries, pers. comm.). However in 2016, with informal agreement from Denmark and Sweden, Norway formally requested ICES advice on the issues described above, in particular on a management strategy which contained the following two elements:

1. The Parties shall set a TAC for Northern shrimp within the range of fishing mortalities that is consistent with fishing at maximum sustainable yield provided that this is forecast to result in a biomass equal to or greater than Bpa at the end of the TAC year.

2. Where fishing at Fmsy would result in a biomass that is forecasted to be less than Bpa, the Parties agree that the lower and upper bounds of the fishing mortality range referred to in paragraph 1 are reduced linearly to zero.

ICES used simulation software to evaluate the proposed harvest control rule (HCR) and advised that the HCR would be precautionary if the target fishing mortality is set at 0.52 or lower, and that F is linearly reduced to zero at stock levels below the MSYBtrigger of 9900 tonnes (ICES, 2016c). These calculations are based on long term average recruitment levels, but lower recruitment levels have been observed from 2008-2014, and if such lower levels of recruitment persist, then a lower target F of 0.32 would be required for the HCR to be precautionary. The evaluation showed that the performance of the HCR was not influenced by including inter-annual quota flexibility. ICES did not however evaluate the effect of in-year revisions of the quota or varying discarding levels.

There have been concerns expressed that discarding of shrimps due to high-grading may occur in this fishery. High-grading generally occurs because the TAC is restricting the activity of the fleet, although in Norway the TAC is not generally restrictive and high-grading is not considered to be a significant problem (Modulf Overvik, Directorate of Fisheries, pers. comm.). New legislation was introduced on 1 April 2017 which prohibits the sorting of the catch on board except for one initial sort which will separate out the largest shrimps to be boiled on board. No sorting of the remaining catch is permitted, so that in theory no discarding can take place. The incentive for high-grading has also been significantly reduced across all national fleets by the development of a market for smaller shrimps. Auctions and processors will now buy even the smallest shrimps, so there is much less wastage of the total catch than previously observed. Gear changes have also reduced the amount of small shrimps being caught. A project at SLU in Sweden has shown increased selectivity when using a mesh size of 47 mm instead of the standard 35 mm, the Norwegian Directorate of Fisheries has been working with Norwegian, Danish and Swedish fishermen to trial more selective gear, IMR has been evaluating trawls with a shortened lead which creates a steeper angle of the trawl, and pilot studies with a new grid that have been developed by Fiskeriföreningen Norden have also shown great promise.

In January 2016, Norway introduced a system of real–time closures (RTCs) in the Pandalus fishery. If the catch consists of more than 15 % undersized shrimp, that area is closed for 14 days and if the catch consists of more than 10 % undersized shrimp the vessel must move to another area. Under this new system, the Norwegian Directorate of Fisheries has closed areas for shrimp fishing four times in 2016 in the Norwegian economic zone south of 62 ° N.

There were a few instances of minor non-compliance in the shrimp fleet in 2016, but these relate primarily to document control or landing site and have no impact on the sustainability of the fishery.

There have been no changes to personnel or responsibilities within the Ministry of Trade, Industry and Fisheries, the Directorate of Fisheries and the Institute of Marine Research which would have a significant influence on the way in which the shrimp fishery is managed.

2.4 CoC considerations

The smart phone app that was introduced in February 2015 for smaller vessels (13-15 m) for recording and reporting catches is in normal operation and the initial technical problems have been solved. However the use of this technology for fishing location tracking is still not implemented, and therefore the statement in the Public Certification Report that the app in addition to species and volumes “also provide fishing location in a similar way to VMS on the larger vessels” is not correct. However this does not influence on the traceability and risk for mixing of certified by non-certified catch by landing since the catch area is noted in the sales note that is filled out when landing. Also these small vessels do not go far and will not go outside the geographical area included in the UoC.

The shrimp catch may contain up to 5% white shrimps. They mainly follow the part that goes to processing and they become sorted out by the processor and goes to meal production together with the shrimp shells(not MSC certified).

There are no changes in landing points from earlier years and the catch that is landed by foreign vessels cannot be mixed with certified catch based on the traceability system described in the Public Certification Report.

The sales organization Skagerakfisk has initiated CoC certification of all landing sites, which is expected to be completed in May 2017.

The systems of tracking and tracing in the fishery are still considered sufficient to make sure all prawn and prawn products identified and sold as certified by the fishery originate from the certified fishery.

Norway Skagerrak cold water prawn products landed by Norwegian vessels, recorded by the Directorate of Fisheries and the sales organizations, and sold through or by approval from the sales organizations, are eligible to enter further Chain of Custody. The scope of the MSC Fishery certification is up to the point of landing and Chain of Custody commences from the point of landing and sale.

Sales organisations:

- Rogaland Fiskesalgslag
- Skagerakfisk

2.5 Catch data

Table 4 TAC and Catch Data

TAC	**Year**	2017	**Amount**	10316 t
UoA share of TAC	**Year**	2017	**Amount**	6126 t
UoC share of TAC	**Year**	2017	**Amount**	6126 t
Total green weight catch by UoC	**Year (most recent)**	2016	**Amount**	8305 t*
	Year (second most recent)	2015	**Amount**	6808 t*

*Landings recorded by ICES – corrected for loss in weight due to boiling

2.6 Summary of Assessment Conditions

Table 5 Summary of Assessment Conditions

Condition number	Performance indicator (PI)	Status	PI original score	PI revised score
1	1.2.2	On target	65	65
2	2.2.3	Behind target	75	75
3	2.4.1	Ahead of target	75	75
4	2.4.2	Ahead of target	75	75
5	2.4.3	Behind target	75	75

3 THE ASSESSMENT PROCESS

3.1 Scope of the assessment

The MSC Fisheries CR and guidance v2.0 define the Unit of Certification (UoC) (i.e., the unit entitled to receive an MSC certificate) as follows:
"The target stock or stocks (= biologically distinct unit/s) combined with the fishing method/gear and practice (including vessel type/s) pursuing that stock and any fleets, groups of vessels, or individual vessels of other fishing operators."
The fisheries covered by this certification are defined as described in Table 6 below.

Table 6 UoC

Fishery name:		Norway Skagerrak and Norwegian Deep cold water prawn fishery
Unit of certification	**Species:**	Northern shrimp, cold water prawn *(Pandalus borealis).*
	Stock:	Northern shrimp in Skagerrak and Norwegian Deep
	Geographical area:	ICES Divisions IIIa West and IVa East (Skagerrak and Norwegian Deep) in Norwegian and EU waters.
	Harvest method:	Bottom trawl.
	Management:	The stock is managed according to EU-Norway agreement, Norwegian national management systems and advised by ICES.
	Client group:	All fishing operators targeting Northern shrimp (*Pandalus borealis*) in the ICES Divisions IIIa West and IVa East (Skagerrak and Norwegian Deep) using bottom trawl as harvesting method and operating under quota issued by authorities of Norway.
	Other eligible fishers:	No other eligible fishers have been identified.

As there are no other eligible fishers the UoC is the same as UoA (Unit of Assessment).

3.2 History of the assessments

3.2.1 Summary of the original assessment

The intent of the Norway Skagerrak and Norwegian Deep cold water prawn fishery to become MSC certified was announced on 26 March 2015, and the fishery received its certification on 1 June 2016. Scope of certification is up to the point of landing and chain of custody commences from point of sale/landing.

The assessment process for the original certification followed the protocols set out in the MSC Fisheries Certification Methodology. The assessment team used the default assessment tree as defined in the MSC Fishery Certification Requirements version 1.3. The initial assessment was carried out by DNV GL project manager Sigrun Bekkevold and Principle Experts Julian Addison (Principle 1&2) and Geir Hønneland (Principle 3). Julian Addison was team leader. Around 95 stakeholders were identified and consulted during the assessment process.

The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any of the individual MSC Criteria. The initial certification scores of the three Principles are provided in Table 7.

Table 7 Principle scores – Original assessment:

Principle	Score
Principle 1 – Target Species	80.6
Principle 2 – Ecosystem	80.3
Principle 3 – Management system	93.3

The fishery achieved a score of below 80 against 5 scoring indicators. The assessment team therefore set 5 conditions for continuing certification that the client is required to address. There were 4 recommendations set. Conditions are presented in full in section 4 of this annual surveillance report.

3.2.2 First annual surveillance – 2017

The first surveillance audit was performed as an on-site audit and conducted according to MSC Certification Requirements, version 2.0 dated 01 October 2014. The default assessment tree, set out in the MSC Certification Requirements, version 1.3, was used for this surveillance audit.

The surveillance was announced on the MSC website on 28 February 2017 followed by a supporting notice to stakeholders issued by the MSC on the same date. Direct email notification was also sent to the stakeholders that had previously been identified for this fishery, inviting interested parties to contact the audit team.

The surveillance visit for this fishery was conducted on 3 and 4 April 2017. Member of the original assessment team, Julian Addison, and DNV GL project manager Sigrun Bekkevold gathered input from the Ministry of Trade, Industry and Fisheries, Directorate of Fisheries, Institute of Marine Research, WWF as well as from the fishery client.

List of participants and issues discussed in the surveillance meetings are shown in Table 8.

Table 8. List of participants and issues discussed

Date	Name and affiliation	Key issues
03.04.2017	**Client group** • Tor Bjørklund Larsen, Norges Fiskarlag • Kjell-Arild Tøfte, Skagerakfisk • Jan Bredsand, Skagerakfisk • Tor Edgar Ripman, Norges Råfisklag	1. Review of basic info about the company: • Changes in ownership or organisational structure • Roles and responsibilities in the MSC Fishery certification process • Updated vessel/certificate member list 2. Review of fishing operations: • Changes in fishing season, allocation of fishing days, fishing areas and gear used (specifications) • Changes in recording of catch and effort data 3. Review of impact on ecosystem: • List of all by-catch of fish species (species and quantities 3 preceding years) • List of by-catch of marine mammals, birds, ETP species (species and quantities) • Changes in recording of bycatch of fish

		and shellfish species, marine mammals, ETP species and birds • Changes in discarding practices • Change of protected habitats • Natura 200 sites • Changes in the overlap of the fishery with sensitive habitats and closed areas 4. Compliance with rules and regulations • Change in control, surveillance and monitoring routines • Disputes with national/ international authorities during 2015/2016/2017. • Records of sanctions and penalties (if any) for 2015/2016/2017. 5. Chain of Custody start. Changes in: • Traceability system on board and at landing • Labelling of products/changes in labelling of products • List of landing sites in 2015/2016/2017 • First point of landing • First point of sale • Main products/change in product range • Main markets 6. Review of progress against conditions and recommendations <u>Progress against conditions and recommendations:</u> Condition 1 - Harvest Control Rules Condition 2 – Information on By-catch Condition 3 – Harm to habitat structure Condition 4 – Strategy in place regarding risk of harm to habitat structure Condition 5 - Information to determine the risk posed to habitat types Recommendations 1-4
03.04.2017	**The Norwegian Ministry for Trade, Industry and Fisheries** • Geir Ervik • Tor Bjørklund Larsen, Norges Fiskarlag	• Function, role and responsibility • Changes in harvest strategy for the shrimp fisheries, including regulations limiting fishing effort and harvest control rules • Changes in short-term and long-term management objectives for the shrimp fisheries • Changes in consultation and decision-making process for the stocks of the shrimp fisheries • Changes in mechanisms for resolution of legal disputes • Changes in regulations for the shrimp fisheries in the relevant geographical area • Changes in control, surveillance and monitoring routines/regulations applied to the shrimp fisheries in the relevant

		geographical area • Changes in level of slipping/discards • Changes in strategy for minimising or eliminating ETP by-catch • Changes in strategy and plans for protection of sensitive habitats • Fishermen's compliance with laws and regulations. • Significant discrepancies found at landing control for the shrimp fisheries in the last year • Catch data for the most recent fishing season • Changes in observed fishing pattern (gear used, fishing area, number of boats, fishing season) • Updated VMS data for the shrimp fisheries Changes in research strategy or programmes for the shrimp fishery
03.04.2017	**WWF** • Fredrik Myhre	• Stock status • Impact on the ecosystem o Impact on associated fish stocks o Interaction with ETP species o Impact of fishery on ETP species o Impact of fishery on ecosystem o Impact of fishery on marine habitats • Programmes for protection of ETP species & habitats • Relevant research projects • Engagement of stakeholders
04.04.2017	**Directorate of Fisheries and IMR** • Modulf Overvik (DoF) • Guldborg Søvik (IMR) • Tor Bjørklund Larsen (Norges Fiskarlag)	**Management** • Function, role and responsibility • Changes in harvest strategy for the fisheries, including regulations limiting fishing effort and harvest control rules • Changes in short-term and long-term management objectives for the fisheries • Changes in consultation and decision-making process • Changes in mechanisms for resolution of legal disputes • Changes in regulations for the fisheries in the relevant geographical area • Changes in control, surveillance and monitoring routines/regulations applied to the fisheries in the relevant geographical area • Changes in strategy for minimising or eliminating ETP by-catch • Changes in strategy and plans for protection of sensitive habitats

		• Fishermen's compliance with laws and regulations. • Significant discrepancies found at landing control for the fisheries in the last year • Updated VMS data for the fisheries **Research** • Changes in sampling programmes/level of sampling and surveys including observer programmes • Integration of national data collection programmes and stock assessments with ICES assessments. • Changes in stock status, stock structure and recruitment • Catch data for the most recent fishing season • Changes in monitoring programmes for bycatch, discard, and ETP species • Changes in level of slipping/discards • Changes in impact of the fishery on marine habitats and the ecosystem. • Changes in research strategy or programmes for the fishery

The fishery remains in conformance with the scope criteria relating to unilateral exemption and destructive fishing practices (Certification Requirements v2.0 section 7.4.) The fishery cannot be considered as an enhanced fishery as it does not meet the enhanced fisheries criteria required under the MSC CR 7.4.

The audit team re-scored PI 1.1.1 as the most recent stock assessment showed that stock biomass had fallen below MSY Btrigger and therefore it was concluded that the stock is not at or fluctuating around its target reference point and therefore the fishery no longer meets the SG80 for scoring issue b. As PI 1.1.1 now scores less than 80, this triggers the scoring of PI 1.1.3 Stock Rebuilding. A full re-evaluation of the fishery against PI 1.1.1 and the scoring of PI 1.1.3 can be found in Appendix 1. With a reduction in score for PI 1.1.1 and PI 1.1.3 now being scored, the overall score for Principle 1 has been recalculated, although in fact the original score remains unchanged (Table 9).

Table 9 Principle scores following first surveillance audit:

Principle	Score
Principle 1 – Target Species	80.6
Principle 2 – Ecosystem	80.3
Principle 3 – Management System	93.3

3.3 Harmonisation

The Swedish cold water prawn fishery was the first cold water prawn fishery in the Skagerrak, Kattegat and Norwegian Deep to undergo MSC assessment. Subsequently both the Danish and Norwegian cold water prawn fisheries entered the MSC full-assessment process. All fisheries contracted DNV GL to conduct these assessments which strongly facilitated the harmonisation process. Complementary assessment trees were used, information was shared and conclusions with respect to evaluation, scoring and conditions were consistent as is required under CI3.2.3.2.

4 RESULTS

Table 10 Condition 1

Performance Indicator(s) & Score(s)	**Insert relevant PI number(s)**	**Insert relevant scoring issue / scoring guidepost text**	**Score**
	1.2.2 There are well defined and effective harvest control rules in place	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.	**65**
Condition	By the fourth annual surveillance, well defined harvest control rules (HCRs) shall be implemented for the shrimp stock to ensure that the exploitation rates are reduced as limit reference points are approached. The HCRs should take into account the uncertainties underlying the assessment of stock status and the uncertainties in estimates of discard rates		
Milestones	**Annual surveillance 1**: Show written evidence of consultation with relevant authorities and stakeholder groups in relation to options for HCRs. **Annual surveillance 2:** Provide an evaluation of options considered for potential HCRs **Annual surveillance 3**: Propose HCR to relevant authorities **Annual surveillance 4**: Implementation of HCR through consultation with relevant authorities.		
Client action plan	**Action 1.1** NFA will engage with the IMR and Ministry of Trade, Industry and Fisheries (hereby referred to as "the Ministry") to evaluate the current status and progress towards implementing a HCR in the fishery. **Action 1.2** In year 2 NFA will provide an evaluation of options for potential HCRs **Action 1.3** In year 3 NFA will propose the HCR to relevant authorities. As the Danish and Swedish components of the fishery are also certified under the same condition, NFA will liaise with these counterparts in evaluating and proposing a HCR **Action 1.4** In year four, NFA will cooperate with stakeholders and management authorities and urge them to implement HCRs.		
Progress on Condition [Year 1]	Discussions on a management plan for shrimp in the Skagerrak and Norwegian Deep have been ongoing within the Fisheries Consultations between the EU and Norway on the regulation of fisheries in Skagerrak and Kattegat since 2014. In 2016 Norway requested advice from ICES on a management strategy including a TAC determined by an explicit harvest control rule, in-year revisions of the TAC based on the January stock survey, inter-annual quota flexibility, and the sensitivity of TAC calculations to uncertainty about discard rates of both small non-marketable shrimps and		

	medium size shrimps through high-grading. The management strategy contained the following two elements: 1. The Parties shall set a TAC for Northern shrimp within the range of fishing mortalities that is consistent with fishing at maximum sustainable yield provided that this is forecast to result in a biomass equal to or greater than Bpa at the end of the TAC year. 2. Where fishing at Fmsy would result in a biomass that is forecasted to be less than Bpa, the Parties agree that the lower and upper bounds of the fishing mortality range referred to in paragraph 1 are reduced linearly to zero. ICES used simulation software to evaluate the proposed harvest control rule (HCR) and advised that the HCR would be precautionary if the target fishing mortality is set at 0.52 or lower, and that F is linearly reduced to zero at stock levels below the MSYBtrigger of 9900 tonnes. These calculations are based on long term average recruitment levels, but lower recruitment levels have been observed from 2008-2014, and if such lower levels of recruitment persist, then a lower target F of 0.32 would be required for the HCR to be precautionary. The evaluation showed that the performance of the HCR was not influenced by including inter-annual quota flexibility. ICES did not however evaluate the effect of in-year revisions of the quota or varying discarding levels. The ICES advice was published in October 2016. The audit team concluded that the Client had provided written evidence of consultation with relevant authorities and stakeholder groups in relation to options for HCRs including taking into account uncertainties underlying the assessment of stock status. The Year 1 milestone had therefore been met for this condition.
Status of condition	On target

Table 10 Condition 2

Performance Indicator(s) & Score(s)	**Insert relevant PI number(s)**	**Insert relevant scoring issue / scoring guidepost text**	**Score**
	2.2.3 Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch.	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).	**75**
Condition	By the third annual surveillance, provide evidence of the level of discarding in inshore areas for vessels which do not use a grid, and implement appropriate measures to provide better evidence of the level of discarding.		
Milestones	**Annual surveillance 1**: Provide evidence of the level of discarding in inshore areas for vessels which do not use a grid. **Annual surveillance 2:** Continue to provide evidence of the level of discarding in inshore areas for vessels which do not use a grid. Consider appropriate measures to provide better evidence of the level of discarding. **Annual surveillance 3:** Continue to provide evidence of the level of discarding in inshore areas for vessels which do not use a grid. Implement appropriate measures to provide better evidence of the level of discarding.		

Client action plan	**Action 2.1** NFA will enter dialogue with IMR and the Directorate of Fisheries to summarize the current knowledge basis of discard levels in inshore areas, and determine what can be done to improve the data. **Action 2.2** Depending on the outcome of 2.1, NFA will in SA 2-3 propose taking the identified necessary steps to fill in any knowledge gaps concerning the level of discards for vessels that do not use a grid.
Progress on Condition [Year 1]	There is no observer programme in Norway as in theory discarding is prohibited, but there is undoubtedly some discarding of small shrimp occurring in Norway. ICES estimates Norwegian discards in the Skagerrak by applying the Danish discards to landings ratio to Norwegian landings, and in the Norwegian Deep where no observer data are available, discarded shrimp are assumed to be primarily shrimp under 15 mm CL and are estimated from length distributions of the catch. Norwegian vessels are permitted to fish inside the 4nm baseline using a trawl without a grid, so the catch composition would be expected to be different from those vessels outside 4nm where the use of a grid is mandatory. There are no comparable data from Danish or Swedish vessels from the same area which would provide an estimate of discards in the coastal Norwegian fishery, so a condition was raised to obtain information on the catch composition from this sector of the fleet. At the surveillance audit the Client did not provide any discard data from the coastal fleet, but provided information that the lack of discard data from vessels which are not required to use a grid may not be a problem in the future. On 1 April 2017 new legislation was introduced which prohibits the sorting of the catch on board except for one initial sort which will separate out the largest shrimps to be boiled on board. No sorting of the remaining catch is permitted, so that in theory no discarding can take place, although it is not clear what impact this new legislation will have on non-target species. There have also been a series of multi-agency initiatives to improve the selectivity of the gear aimed at reducing discarding of both small shrimps and non-target species. Most importantly the Client reported that around 60% of all vessels that fish inside the 4nm baseline now use a grid voluntarily, and meetings during the site visit confirmed that there is now support across the management agencies, scientific institutes, fishing industry and WWF for the introduction as soon as possible of mandatory use of the grid within the 4nm baseline.
Status of condition	Whilst there was support from across the range of stakeholders for the mandatory use of the grid within the 4nm baseline which will obviate the need for this condition, the legislation has yet to be introduced. The Client did not provide any data on the level of discarding from vessels fishing inside 4nm without a grid and so the audit team considered that the condition was behind target.

Table 11 Condition 3

Performance Indicator(s) & Score(s)	Insert relevant PI number(s)	Insert relevant scoring issue / scoring guidepost text	Score
	2.4.1 The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	**75**
Condition	By the third annual surveillance, provide evidence that the shrimp fishery is highly unlikely to reduce coral gardens and deep sea sponge aggregations to a point where there would be serious or irreversible harm.		
Milestones	**Annual surveillance 1**: Collate information for the assessment of risk that the shrimp fishery reduces coral gardens and deep sea sponge aggregations to a point where there would be serious or irreversible harm. Show written evidence of consultation with relevant authorities to identify mechanisms for reducing the risk if necessary. **Annual surveillance 2:** Provide evidence if necessary that the risk of impact of the shrimp fishery on coral gardens and deep sea sponge aggregations has been reduced. **Annual surveillance 3**: Provide evidence to demonstrate that the shrimp fishery is highly unlikely to reduce coral gardens and deep sea sponge aggregations to a point where there would be serious or irreversible harm.		
Client action plan	**Action 3.1** NFA will liaise with the Directorate of Fisheries and Institute of Marine Research to assess the current data basis on the extent of potential harm to habitat structure in the area of operations. Through for example VMS analysis, it may be possible to quantify whether serious or irreversible harm is taking place. **Action 3.2** In the event that the evidence shows that serious or irreversible harm is taking place, NFA consult the IMR and the Directorate of Fisheries to determine what management measures can be taken to mitigate this. Cooperation with Swedish and Danish fisheries clients over regulations will also be sought. **Action 3.3** Depending on the outcome of 3.2, NFA will propose these measures, and seek to see them implemented within SA 4.		
Progress on Condition [Year 1]	At the surveillance audit the Client reported that in September 2016 the European Commission adopted the recommendations developed by the Swedish regional governmental body Västra Götaland, which was later negotiated with Denmark and Germany regarding fishing regulations in the Bratten Natura 2000 site. As a result of this regulation, 27% of the area will be protected and within that area all fishing gears will be prohibited. This will be controlled through mandatory use of AIS which clearly indicates the location of the fishing. These measures (EU-COM delegated regulation (C(2016) 5549 final)) were adopted by the Commission on the 5th of September 2016 and were implemented in early 2017. With the adoption by		

	the EU Commission of the restriction on fishing in the Bratten area, the audit team considered that the work conducted had more than met the Year 1 milestone for this condition. However there may be other areas where coral gardens and sponge aggregations are vulnerable to shrimp fishing, and an evaluation of the potential impact of shrimp in those areas and, if necessary, the introduction of appropriate management measures to minimise that impact, will be required before the condition can be closed.
Status of condition	On target.

Table 12 Condition 4

Performance Indicator(s) & Score(s)	**Insert relevant PI number(s)**	**Insert relevant scoring issue / scoring guidepost text**	**Score**
	2.4.2 There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types.	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.	**75**
Condition	By the third annual surveillance, specific management measures which minimize the impact of fishing activities on habitat within all designated protected areas should be implemented if necessary to ensure that the shrimp fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.		
Milestones	**Annual surveillance 1**: Show written evidence of consultation with relevant authorities to consider specific management measures including area closures and move-on rules to restrict fishing activity within all protected areas. **Annual surveillance 2:** Propose specific management measures to restrict fishing activity in all protected areas to relevant authorities. **Annual surveillance 3**: Implementation of specific management measures to minimize the impact of fishing activities on habitat within all designated protected areas through consultation with relevant authorities.		
Client action plan	**Action 4.1** NFA will liaise with the Directorate of Fisheries and Institute of Marine Research to assess the current data basis on the extent of potential harm to habitat structure in the area of operations. Through for example VMS analysis, it may be possible to quantify whether serious or irreversible harm is taking place. **Action 4.2** In the event that the evidence shows that serious or irreversible harm is taking place, NFA consult the IMR and the Directorate of Fisheries to determine what management measures can be taken to mitigate this. Cooperation with Swedish and Danish fisheries clients over regulations will also be sought.		

	Action 4.3 Depending on the outcome of 3.2, NFA will propose these measures, and seek to see them implemented within SA 4.
Progress on Condition [Year 1]	At the surveillance audit the Client reported that in September 2016 the European Commission adopted the recommendations developed by the Swedish regional governmental body Västra Götaland, which was later negotiated with Denmark and Germany regarding fishing regulations in the Bratten Natura 2000 site. As a result of this regulation, 27% of the area will be protected and within that area all fishing gears will be prohibited. This will be controlled through mandatory use of AIS which clearly indicates the location of the fishing. These measures (EU-COM delegated regulation (C(2016) 5549 final)) were adopted by the Commission on the 5th of September 2016 and were implemented in early 2017. With the adoption by the EU Commission of the restriction on fishing in the Bratten area, the audit team considered that the work conducted had more than met the Year 1 milestone for this condition. However there may be other areas where habitat structure is vulnerable to shrimp fishing, and an evaluation of the potential impact of shrimp in those areas and, if necessary, the introduction of appropriate management measures to minimise that impact, will be required before the condition can be closed.
Status of condition	Ahead of target

Table 13 Condition 5

Performance Indicator(s) & Score(s)	**Insert relevant PI number(s)**	**Insert relevant scoring issue / scoring guidepost text**	**Score**
	2.4.3 Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types.	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).	**75**
Condition	By the third annual surveillance, ensure that information on interactions of fishing operations with VME habitats is collected on a continuous basis.		
Milestones	**Annual surveillance 1**: Develop and implement procedures for monitoring and recording all interactions with VME habitats in every fishing haul. Provide an analysis of collected data to determine whether significant impacts are likely. **Annual surveillance 2:** Continue to collect data on interactions between fishing operations and VME habitats and provide an analysis of collected data to determine whether significant impacts are likely. **Annual surveillance 3:** Continue to collect data on interactions between fishing operations and VME habitats, provide an analysis of collected data to determine whether significant impacts are likely, and provide evidence that procedures for monitoring, recording and analysing all interactions with VME		

	habitats in every fishing haul have been fully implemented.
Client action plan	**Action 5.1** NFA will engage with IMR and the Directorate of Fisheries to evaluate practice and relevance of the J-40-2016 move-on rule in the southern component of prawn fisheries, as well as other data collection on habitat impacts. **Action 5.2** In year two, NFA will propose and implement necessary measures to improve data collection on interactions with sensitive habitats. **Action 5.3** In SA 3-4 NFA will provide analysis of collected data and determine whether significant impacts are likely. Potential action arising from this information is interlinked with actions pertaining to PI 2.4.1 and 2.4.2
Progress on Condition [Year 1]	The Client reported that they had met the Directorate of Fisheries to evaluate the move-on rule. Following discussion it was concluded that the move-on rule was largely irrelevant in the Skagerrak and Norwegian Deep fishery as shrimp fishing did not occur in areas where corals and sponges are found, and certainly not where densities are such that the threshold for moving on would be reached. In addition to the move-on rule for interaction of fishing with corals and sponges, there is a requirement to record any interactions with Vulnerable Marine Ecosystems (VMEs) by recording the weight in kilograms of any corals or sponges caught in the shrimp trawls. The Client has discussed the legislation with the Directorate of Fisheries and WWF, but at the surveillance audit there was no clear agreement on the level of compliance with and enforcement of this regulation. No analysis of data on interactions was provided at the surveillance audit. The audit team concluded that discussions had taken place between the Client and relevant stakeholders, but that the first year milestone had not been met.
Status of condition	Behind target

No new conditions were raised following this surveillance audit. PI 1.1.1 was re-scored below 80, and whilst the SG80 is not met for this performance indicator and the MSC CRv2.0 requires that each performance indicator that receives a score of less than 80 should have its own condition, the MSC Interpretations Page advises that, "*In the case that the stock is depleted, and PI 1.1.1 scoring issue (b) scores less than 80, the CAB may present a rationale that PI 1.1.3 in CRv1.3 fulfils the requirements of that condition.*" The assessment team therefore has not raised a condition as they considered that the scoring of PI 1.1.3 fulfils the need of a condition.

Progress in relation to recommendations.

Recommendation 1. The assessment team **recommends** the client to liaise with research scientists and gear technologists in the framework of the NORDEN project. This would better ensure that the project is carried out on a practical basis in a way that fishers could easily implement any desirable technical gear modifications to significantly reduce the capture of small shrimp. The clients could also offer assistance with gear trials on their vessels.

Progress: A multi-stakeholder workshop was held in September 2016 in Fredrikstad on the use of selective fishing gear in the shrimp fishery and the Client liaised with scientists researching gear selectivity. A project at SLU in Sweden has shown increased selectivity when using a mesh size of 47 mm instead of the standard 35 mm, the Norwegian Directorate of Fisheries has been working with Norwegian, Danish and Swedish fishermen to trial more selective gear, IMR has been

evaluating trawls with a shortened lead which creates a steeper angle of the trawl, and pilot studies with a new grid that have been developed by Fiskeriföreningen Norden have also shown great promise. On 1 April 2017 new legislation was introduced which prohibits the sorting of the catch on board except for one initial sort which will separate out the largest shrimps to be boiled on board. No sorting of the remaining catch is permitted, so that in theory no discarding of small shrimps can take place.

Recommendation 2. The assessment team **recommends** that further research is undertaken to resolve the differences in fishing mortality generated by the length-based and surplus production assessment models.

Progress: The ICES benchmark on *Pandalus* held in March 2106 evaluated the performance of the length-based model in comparison with another length-based model, implemented in Stock Synthesis (SS3) and developed especially for the benchmark meeting. The benchmark agreed to use the length-based model developed in Stock Synthesis for the assessment of this *Pandalus* stock because it provides the better fit to the data (of the two length-based models considered) and because this type of model is able to deal with the variable stock dynamics. The previous length-based model will no longer be used in the assessment of the shrimp stock, and this recommendation can therefore be closed.

Recommendation 3. The assessment team **recommends** that the use of a sorting grid should be mandatory within the 4 nm limit.

Progress: The Client estimates that around 60% of vessels that fish within the 4nm baseline now use a grid voluntarily. Meetings during the site visit confirmed that there is now support across the management agencies, scientific institutes, fishing industry and WWF for the introduction as soon as possible of mandatory use of the grid within the 4nm baseline.

Recommendation 4. The assessment team **recommends** therefore that systems are put in place to ensure that all ETP species are recorded on log books irrespective of whether they are landed or discarded and that the captures of all ETP species are mapped.

Progress: No significant progress was reported on this recommendation.

5 CONCLUSION

The fishery continues to be within the scope of the MSC fisheries standard (MSC FCR v2.0 § 7.4) according to the following determinations (MSC FCR v2.0 § 7.4):

- The target species is a fish (crustacean) and the fishery does not use poisons or explosives;
- The fishery is not conducted under a controversial unilateral exemption to an international agreement;
- The client or client group does not include an entity that has been successfully prosecuted for a forced labour violation in the last 2 years;
- The fishery has mechanisms for resolving disputes and disputes do not overwhelm the fishery;
- The fishery is not enhanced or based on an introduced species.

The audit team concluded that the Norway Skagerrak and Norwegian Deep cold water prawn fishery should remain certified (Table 14).

The main findings by the surveillance team were:

- The most recent stock assessment concluded that stock biomass has declined below MSYBtrigger and fishing mortality has recently exceeded Fmsy: in consequence the fishery no longer meets the SG80 for PI 1.1.1, and consequently PI 1.1.3 Stock Rebuilding has been scored;
- ICES has reviewed a draft management plan which includes a formal harvest control rule (HCR);
- Fishing strategy, fishing gears and fishing grounds are to all practical purposes unchanged compared to previous years. VMS data confirm that there is no significant overlap of shrimp fishing activity with sensitive habitats;
- The key management regulations are unchanged, although additional measures for protection of sensitive habitats have been introduced, and new regulations on sorting at sea have been introduced which should ensure that discarding of small shrimps no longer occurs;
- Control and Enforcement activities and strategies were unchanged;
- CoC conditions are unchanged;
- All conditions remain open at this 1st surveillance audit.

Table 14 Conclusion

Fishery	Status of certification	Comment
Norway Skagerrak and Norwegian Deep Cold Water Prawn	Certified	The assessment team concludes that the MSC Certificate for this fishery shall remain active, subject to the agreed annual surveillance schedule and progress on the remaining conditions.

6 REFERENCES

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Appendix 1. Re-scoring evaluation tables

Table 15. Original Evaluation Table for PI 1.1.1

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.
	Met?	Y	Y	N
	Justification	The surplus production model described in the NAFO/ICES Pandalus Assessment Group (NIPAG) report for 2015 estimated that stock biomass (despite a significant decline from 2006 to 2011) has been significantly above MSY Btrigger and Blim in recent years and that fishing mortality (F) is below Fmsy and well below Flim. It is highly likely therefore that the stock is above the point where recruitment would be impaired. Recruitment indices (estimated abundance of 1 year old shrimp) derived from Norwegian research surveys showed a significant decline from 2007 to 2010, modest increases from 2011 to 2013, but the recruitment index for 2014 was the highest observed in the time series. However the abundance of recruits of age 1 in 2015 returned to levels seen in recent years. The assessment model estimates that stock biomass will be above Btrigger in 2015, with the probability of biomass falling below Blim estimated at 0%. With catches of up to 21,500 tonnes in 2016, F is expected to remain below Fmsy, with stock biomass consequently forecast to be above Bmsy in 2016, so catches of up to 21,500 tonnes are consistent with the MSY approach. With current stock biomass estimates above Bmsy, it would normally be concluded that there is a high degree of certainty that the stock is above the point where recruitment would be impaired. However the ICES benchmark concluded that the length-based model was the preferred model for this stock, and although NIPAG concluded that the length-based model was not yet sufficiently developed for use in providing advice, initial output from the length-based model estimated stock biomass to be lower and fishing mortality higher than the values estimated by the surplus production model. In addition, ICES advice recognises that the surplus production model is not fully sensitive to year-to-year changes. On the basis that further understanding of the performance of the assessment models is required, the assessment team were precautionary in their scoring of this PI and concluded that SG100 is not met.		
b	**Guidepost**		The stock is at or fluctuating around its target reference point.	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.
	Met?		Y	N

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing
	Justification	A specific target reference point has not been defined explicitly for this fishery. However a key output of the assessment of stock status is an estimate of the current level of biomass in relation to Bmsy. NIPAG estimates stock biomass in 2014 and 2015 to be 1.41 x Bmsy and 1.50 x Bmsy respectively. Current fishing mortality (F) is estimated to be below Fmsy, and with a TAC of 21,500 tonnes, the assessment model predicts that F will remain below Fmsy and stock biomass will remain above Bmsy in 2016. It can be concluded that the stock is currently at or fluctuating around its target reference point. The ICES Benchmark concluded that the length-based model was the preferred model for this stock, and although NIPAG concluded that the length-based model was not yet sufficiently developed for use in providing advice, initial output from the length-based model estimated stock biomass to be lower and fishing mortality higher than the values estimated by the surplus production model. In addition, ICES identified some evidence of instability in the stock production model. Based on the need for further understanding of the performance of the assessment models, and that stock biomass has only just recently recovered from a decline from 2006 to 2012, it cannot be concluded with a high degree of certainty that the stock has been fluctuating around its target reference point in recent years and therefore the SG100 is not met.
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Stock Status relative to Reference Points			
	Type of reference point	**Value of reference point**	**Current stock status relative to reference point**
Target reference point	No specific target reference point has been defined explicitly for the fishery, although Bmsy can be considered to be an implicit TRP.	Specific values of the reference points are not provided in the assessment reports. Measures of stock biomass are given as relative (B/Bmsy) rather than as absolute values.	In 2014, B/Bmsy = 1.50
Limit reference point	Fmsy Flim (1.7 x Fmsy) Blim (0.3 x Bmsy) Btrigger (0.5xBmsy)	Specific values of the reference points are not provided in the assessment reports. Measures of stock biomass and fishing mortality are given as relative (B/Bmsy,	In 2014, B/Bmsy = 1.50, i.e. current biomass is higher than Blim and Btrigger. In 2013, F/Fmsy = 0.54, i.e. current F is lower than Fmsy and Flim.

PI 1.1.1	**The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing**		
		F/Fmsy) rather than as absolute values.	
OVERALL PERFORMANCE INDICATOR SCORE:			**80**
CONDITION NUMBER (if relevant):			

Table 16. New Evaluation Table for PI 1.1.1

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.
	Met?	Y	Y	N
	Justification	The new length-based stock assessment model developed in Stock Synthesis (SS3) described in the NAFO/ICES Pandalus Assessment Group (NIPAG) report for 2016 estimated that stock biomass was well above Blim (6300 tonnes) and above MSY Btrigger (9900 tonnes) in 2016, but in 2017 biomass declined to just below MSY Btrigger. Fishing mortality (F) was below Fmsy in 2016, but was just above Fmsy in 2017. Throughout the history of the fishery, F has been below Flim, defined as the fishing mortality that leads to 50% probability that spawning stock biomass is less than Blim. Recruitment indices (abundance of age 0 shrimp estimated from the model and subsequently abundance of 1 year old shrimp derived from Norwegian research surveys) showed a significant decline from 2007 to 2010, modest increases from 2011 to 2012, but the recruitment index of age 0 shrimps for 2013 was the highest observed in the time series. However the abundance of recruits of age 0 in 2014 and 2015 returned to levels seen in recent years, although there was a small increase in 2016. ICES advice is that catches of up to 10,316 tonnes in 2017 are consistent with the MSY approach and will maintain the stock well above Blim and will begin to recover the stock back above MSYBtrigger. The TAC for 2017 has been set at the ICES advice, and as TACs have not been exceeded in recent years, it can be concluded that biomass will remain well above Blim in future years. All evidence suggests therefore that the stock is above the point where recruitment would be impaired. Recent Guidance on the MSC Interpretations Page for scoring stock status for ICES stocks states that the SG80 is met when the stock is estimated above 1/2 of the distance between Blim and Bpa (identical to MSYBtrigger). The SG80 is met therefore. To meet the SG100, MSC requires that a “high degree of certainty” generates only a 5% probability that a stock is less than the point where recruitment would be impaired. ICES states that, at Bpa (MSYBtrigger), there is a very low probability of being below Blim, which can be assumed to be equivalent to the MSC “high degree of certainty”. As stock biomass is currently estimated to be just below Bpa (or MSY Btrigger), the SG100 is not met.		
b	Guidepost		The stock is at or fluctuating around its target reference point.	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.
	Met?		N	N

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing
	Justification	The stock is managed by ICES and the key target reference point is Fmsy. Maintaining fishing mortality (F) at Fmsy should in the long term provide maximum sustainable yield and maintain the stock at Bmsy. A specific biomass target reference point has not been defined explicitly for this fishery. However the NAFO/ICES Pandalus Assessment Group (NIPAG) estimates stock biomass in relation to MSYBtrigger, which is defined as the 5th percentile of the equilibrium distribution of spawning stock biomass when fishing at Fmsy, i.e. MSYBtrigger is a lower bound of the likely value of Bmsy. Maintaining biomass above MSYBtrigger and F at or below Fmsy should maintain biomass at Bmsy. The most recent stock assessment showed that fishing mortality (F) was below Fmsy in 2016, but was just above Fmsy in 2017. Stock biomass was estimated to be above MSY Btrigger (9900 tonnes) in 2016, but in 2017 biomass declined to just below MSY Btrigger. ICES advice is that annual TACs should be set within an MSY framework, and in recent years the TAC has been set in line with the ICES advice. However the most recent assessment shows that F has exceeded Fmsy in most recent years, suggesting that the TAC has been set too high. This can be explained by recent changes in the stock assessment methodology. Previous stock assessments have used a stock-production model which gave a more optimistic outlook on stock status than the newly-implemented length-based model, and TACs were set in line with the best available scientific advice at the time. Although ICES TAC advice is now in line with the new stock assessment methodology, and F should not in future exceed Fmsy, the current biomass estimate is below MSYBtrigger, and therefore it cannot be concluded that the stock is currently at or fluctuating around its target reference point. SG80 is not met therefore.
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Stock Status relative to Reference Points			
	Type of reference	**Value of reference**	**Current stock status**

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
	point	**point**	**relative to reference point**
Target reference point	Fmsy No specific biomass target reference point has been defined for the fishery, although Bmsy can be considered to be an implicit TRP, and MSY Btrigger is the lower bound of the range in which Bmsy lies	Fmsy = 0.62 MSYBtrigger = 9900 tonnes	In 2016 F/Fmsy = 1.03 Biomass 2017/Btrigger = 0.92
Limit reference point	Blim (Bloss = the lowest observed SSB) Flim	Blim = 6300 tonnes Flim = 1.00	Biomass2017/Blim = 1.45 In 2016, F/Flim = 0.64
OVERALL PERFORMANCE INDICATOR SCORE:			**70**
CONDITION NUMBER (if relevant): Whilst the SG80 is not met for this performance indicator and the MSC CRv1.3 requires that each performance indicator that receives a score of less than 80 should have its own condition, the MSC Interpretations Page advises that, "*In the case that the stock is depleted, and PI 1.1.1 scoring issue (b) scores less than 80, the CAB may present a rationale that PI 1.1.3 in CRv1.3 fulfils the requirements of that condition.*" The assessment team therefore has not raised a condition as they considered that the scoring of PI 1.1.3 fulfils the need of a condition.			

Table 17. Evaluation Table for PI 1.1.3 (not previously scored as the stock was not considered to be depleted)

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Where stocks are depleted rebuilding strategies, which have a reasonable expectation of success, are in place.		Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe.
	Met?	Y		Y
	Justification	The key element of the rebuilding strategy is to maintain fishing mortality (F) at or below Fmsy. This strategy should ensure that stock biomass is rebuilt towards Bmsy and that maximum sustainable yield (defining yield as total catch) is achieved. ICES advice is that annual TACs should be set within an MSY framework, and in recent years the TAC has been set in line with the ICES advice. The SG60 is met therefore. However the most recent assessment shows that F has exceeded Fmsy in most recent years, suggesting that the TAC has been set too high. This can be explained by recent changes in the stock assessment methodology. Previous stock assessments have used a stock-production model which gave a more optimistic outlook on stock status than the newly-implemented length-based model, and TACs were set in line with the best available scientific advice at the time. ICES TAC advice is now in line with the new stock assessment methodology, and F should not in future exceed Fmsy. As noted above, F exceeded Fmsy in 2016, and biomass dropped below MSYBtrigger. The ICES rebuilding strategy under the MSY framework requires that for 2017 the target fishing mortality must be set at a lower level than Fmsy. The TAC has therefore been set in line with a reduced F as follows: F = Fmsy × (SSB2017/ MSY Btrigger) This results in a reduction of fishing mortality to 0.57 from the Fmsy level of 0.64, and the consequent TAC advice is that catches should be no more than 10,316 tonnes in 2017 as opposed to a limit of 10,979 tonnes if fishing mortality remained at Fmsy. The EU/Norway Commission set the TAC for 2017 in line with this new advice. Until the latest stock survey in 2017, the rebuilding strategy had been seen to be continuously re-building the stock since the significant decline observed from 2008 to 2012. As noted above the stock declined in 2017, but this is highly likely to be due to an over-optimistic evaluation of stock status provided by the old assessment model which resulted in setting the TAC at too high a level. The output from the new stock assessment model is now being used to assess current fishing mortality and stock biomass, and although the rebuilding strategy remains the same as in previous years, there is now strong evidence that the rebuilding strategy should work. Modelling shows that this year's level of fishing mortality should return the stock to close to MSYBtrigger, and although it is difficult to estimate exactly when the stock will return to Bmsy because Pandalus is a short-lived species and it is not possible to predict annual recruitment, based on the assumption of annual recruitment being the geometric mean of recent years' recruitments, there is strong evidence from modelling studies and past experience that the stock will be re-built within two generations. The SG100 is met therefore.		

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe		
b	Guidepost	A rebuilding timeframe is specified for the depleted stock that is the shorter of 30 years or 3 times its generation time. For cases where 3 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	A rebuilding timeframe is specified for the depleted stock that is the shorter of 20 years or 2 times its generation time. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the depleted stock.
	Met?	Y	Y	N
	Justification	Generation time for *Pandalus borealis* in the Skagerrak area is around 2-3 years (Guldborg Søvik, IMR, pers. comm.), and therefore the rebuilding strategy of fishing at or below Fmsy should ensure that the stock is re-built within 5 years. The SG80 is met therefore. The ICES advice for 2017 provides a range of management options, some of which will re-build the stock in a shorter time than that proposed within an MSY framework. The SG100 is not met therefore.		
c	Guidepost	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within a specified timeframe.	There is evidence that they are rebuilding stocks, or it is highly likely based on simulation modelling or previous performance that they will be able to rebuild the stock within a specified timeframe.	
	Met?	Y	Y	
	Justification	Monitoring of stock biomass and fishing mortality through annual stock assessments within NIPAG allows determination of whether re-building strategies are effective. Until this year there was evidence that the strategy of maintaining fishing mortality at or below Fmsy was working as the stock had continued to increase from 2013 onwards. The decline in stock biomass observed in 2017 is highly likely to be due to an over-optimistic evaluation of stock status provided by the old assessment model, which resulted in TACs being set too high. The setting of TACs is now based on the new stock assessment model, and modelling shows that it is highly likely that the stock will be rebuilt within two generations. The SG80 is met therefore.		
References		ICES, 2017. Update - Northern shrimp (*Pandalus borealis*) in Division 4.a East and Subdivision 20 (northern North Sea in the Norwegian Deep and Skagerrak). ICES Advice 2017 Book 6. NAFO/ICES 2017. Update assessment of Northern shrimp (*Pandalus borealis*) in Division 4.a East and Subdivision 20 (northern North Sea in the Norwegian Deep and Skagerrak). *In* Report of the Joint NAFO/ICES *Pandalus* Assessment Working Group (NIPAG), 7–14 September 2016, Bergen, Norway. ICES CM 2016/ACOM:15. Annex 6, pages 101–116.		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**
CONDITION NUMBER (if relevant):				

Appendix 2. Stakeholder submissions

No stakeholder submissions were received which had any significant impact on scoring, rationales or conditions.

Appendix 3. Additional detail on conditions / actions / results

N/A

Appendix 4. Revised Surveillance Program (if necessary)

There are no proposed revisions to the surveillance program.

Appendix 5. List of member vessels

Registration no.	Vessel name
H0010O	Bønes
H0017B	Klipton
H0052B	Luna
H0060B	Santos
H0061B	Bølgen
H0085B	Bergblom
H0088B	Havleik
H0098B	Stokkøy
H0145AV	Tor
H0226B	Line
SF0054V	Atina
H0064B	Havøy
SF0001FL	Fjordglans
H0223AV	Amelia
A0002F	Skippy
A0005AS	TRYGG
AA0001G	Smart
AA0002L	Høvågtrål
AA0002T	Borøy
AA0004A	Roughboy
AA0004G	Hovland
AA0005A	TEIS
AA0005G	VÅGAN
AA0006A	Hanne
AA0007A	Farmann
AA0007G	Kvaløy
AA0010A	Emely sør
AA0015R	Luro
AA0015T	Moby Dick
AA0018G	Hebron
AA0018L	Vibeke
AA0022T	Sjøgutt
AA0024G	Sagato
AA0026T	Grepan Junior
AA0032R	Ero
AA0034A	Omega
AA0040A	Omega
AA0050T	Teistholm
AA0055G	Astor
AA0056A	Astrid Ann
AA0059A	Havfruen II

AA0061G	Villfugl
AA0066R	Jano
AA0076A	Frøken Wahlberg
AA0096A	Siri
H0059AV	SKÅR JR
M0008A	TORMO
M0033K	Pauline
O0003O	LUNA
O0004O	Leik
O0005O	Pelikan
O0006O	Fjordgutt
O0029O	SJØFUGLEN
R0007SK	MARTOR
R0008SK	Vestavind
R0033K	Veiflu
SF0277V	Havfluna
TK0002BL	Mostein
TK0005BL	TORNADO
TK0008BL	BUELAND
TK0011K	Risøy
TK0011P	Brusen
TK0014BL	Havlys
TK0015BL	Fjordbuen
TK0019BL	Danholm
TK0030BL	Silje Kristina
TK0031BL	Vibeke
TK0042BL	Nytrål
TK0042K	Skomring
TK0044BL	Skarsund
TK0059BL	Lunik
TK0099BL	Juventus
V0001HS	Vikingen
V0001L	Brenning
V0001N	ÅRØ
V0001T	Sjøglimt
V0001TM	Tristein
V0002L	Sjøgutt
V0002S	Linnea
V0002TM	Mir
V0003S	Stigar
V0004L	Ulsvaag
V0006BR	Hauken
V0006S	Buerøy
V0007N	Orion

V0008L	Zita
V0009S	Sjøbris
V0011S	Cilius
V0015TM	Linnea
V0016S	Veni Activ
V0016TM	Lillegutt
V0020N	Sandøsund
V0020TM	Flo
V0029S	Vesla
V0039L	Ulagutten
V0046L	Oterøy
V0066N	Astor 1
VA0002F	LIPTON BJØRNSON
VA0002S	Hunter
VA0003F	Linn
VA0003K	Musti
VA0004M	VALLØY
VA0004S	Udvaar
VA0007LS	MARIE EMILIE
VA0009S	Neptun
VA0010S	MARINO
VA0011LD	EL MARINO
VA0012LD	Agathe
VA0014F	Merethe
VA0015S	Hellevig
VA0016K	FANCY
VA0017F	Hidraskjær
VA0018F	Daniana
VA0018S	TEMPO
VA0019F	Athena 2
VA0020F	HAVSUND
VA0020S	Lillevig
VA0022K	Sjøvik
VA0024K	Ludvig
VA0026K	Pluto
VA0026M	Ternen
VA0033K	Sigjo
VA0040S	Tomine
VA0041K	Monsun
VA0042K	Setho
VA0044M	Rosenvoll
VA0068S	BRIS
VA0071M	Brattholm
VA0077S	PILOT

VA0083F	Ramona
VA0095K	Piraja
VA0116K	MALENA
VA0135K	Ringskjær Sør
VA0142K	Svåholm
VA0170M	EIGENES
VA0196K	Horisont III
VA0200K	Ann Louise
VA0233S	UDVAAR II
VA0264K	Betzy
VA0269K	Betzy
Ø0001H	Sjøliv
Ø0001S	Camo
Ø0002R	Årviken
Ø0003M	Ringskjær
Ø0007H	Eli R
Ø0008H	Victhor
Ø0010F	Baluba
Ø0010H	Eli R
Ø0014F	Vigdis
Ø0019F	SVANESUND
Ø0019H	Henriette
Ø0019R	Aqualon
Ø0022F	ELLEN
Ø0022H	Stangholm
Ø0023H	Veronika
Ø0024H	Helene
Ø0028F	Villand
Ø0028H	Strandgutt
Ø0030H	Spjærøy
Ø0036H	Hera
Ø0039H	Luro
Ø0044H	Kikki
Ø0045H	Odden
Ø0047H	Asmalø
Ø0048H	Tennskjær
Ø0050H	Sonbas Senior
Ø0072H	Nikita
Ø0082H	Bodil
Ø0086H	Øyskjær
Ø0088H	Mikki
Ø0235H	Topsy
Ø0264H	Torglimt
H0183AV	Eikholmen

H0322AV	Mersey
HM0424	Westbank
M0028G	Myntevik
M0042A	Klondyke
N0009H	Spitsbergen
N0060H	Vestskjær
N0065VV	Spitsbergen
R0001RB	Havsol
R0003ES	Guldringnes
R0004K	BUØY
R0004S	B.vassøy
R0005ES	Fiskebøen
R0005K	Holm
R0005S	Sangis
R0009SK	Teodor
R0009U	Guldringnes
R0011K	Fjordtrål
R0012B	Jarstein
R0013ES	Caprice
R0014ES	Suderøy
R0014K	Athena
R0014SK	Hastverk
R0015H	Boffen
R0018K	Ikato
R0018SO	Optimist
R0020B	Vågholm
R0020K	Molinergutt
R0020ST	Teis
R0022SK	Mersey
R0023SK	Elin
R0024B	Vågan
R0030S	Vassøybuen
R0041K	Veafisk
R0049K	Waarøy
R0050B	Varholm
R0050K	Quo Vadis
R0059ES	Øyestein
R0059K	Fjordtrål
R0060ST	Trio
R0062ES	Tråsavik
R0066K	Elvira
R0076K	Lom
R0077ES	Skårholm
R0077K	Skårholm

R0077SK	Vestavind
R0082ES	Tråsavik
R0087K	Skårholm
R0110K	Fløsund
R0111K	Rima
R0132K	Erly
R0168K	Strand
R0183K	Norli
R0233K	Sæviktrål
R0258K	Myntevik
R0344K	Toya
R0784K	Silvervåg

About DNV GL

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil and gas, and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our 16,000 professionals are dedicated to helping our customers make the world safer, smarter and greener.