Marine Stewardship Council fisheries assessments

# Norway sandeel, pout and North Sea sprat

## Expedited Audit report

| | |
|---|---|
| Conformity Assessment Body (CAB) | DNV GL Business Assurance Norway AS |
| Assessment team | Hans Lassen & Sandhya Chaudhury |
| Fishery client | Norges Fiskarlag (Norwegian Fishermen's Association) |
| Assessment Type | Expedited audit |

# Introduction

Following the ICES Advice of 27th February 2020 and consequent harmonisation with the third surveillance audit of the DFPO and DPPO North Sea, Skagerrak and Kattegat sandeel, sprat and Norway pout fishery; PI 1.1.1 for UoC 1 (sandeel area 1r ) of the Norway sandeel, pout and North Sea sprat fishery was rescored at this expedited audit and the corresponding suspension lifted.

# 1 Contents

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# 2 Glossary

## Abbreviations & acronyms

| | |
|---|---|
| BT | Bottom trawl |
| CAB | Conformity Assessment Body |
| CoC | Chain of Custody |
| ETP | Endangered, threatened and protected species |
| EU | European Union |
| FAO | Food and Agriculture Organization |
| FCP | Fisheries Certification Process |
| FCR | Fisheries Certification Requirements |
| HCR | Harvest Control Rule |
| ICES | International Council for the Exploration of the Sea |
| IMR | Marine Research Institute (of Norway) |
| IPI | Inseparable or Practically Inseparable |
| MSC | Marine Stewardship Council |
| NINA | The Norwegian Institute for Nature Research |
| PCR | Public Certification Report |
| PI | Performance indicator |
| PISG | Performance Indicator Scoring Guidepost |
| PS | Purse seine |
| PT | Pelagic trawl |
| SG | Scoring Guidepost |
| TAC | Total allowable catch |
| UoA | Unit of Assessment |
| UoC | Unit of Certification |
| VME | Vulnerable marine ecosystems |
| VMS | Vessel Monitoring System |

## Stock assessment reference points

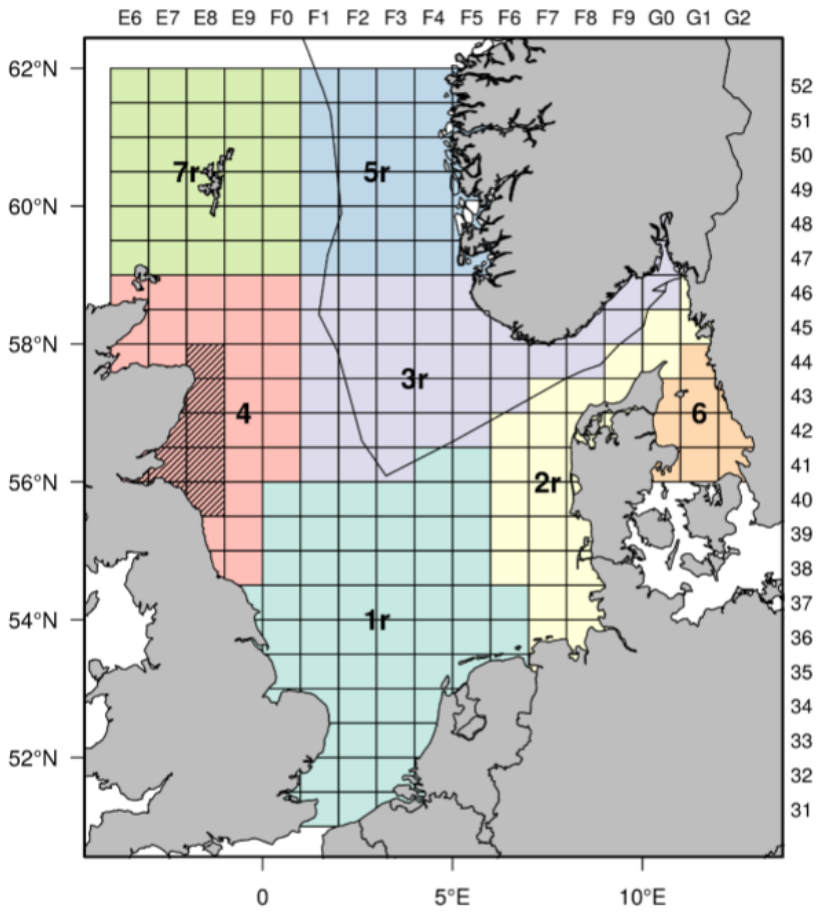
| | |
|---|---|
| $B_0$ | The (spawning) biomass expected if there had been no fishing (assuming recruitment as estimated through stock assessment). |
| $B_{lim}$ | Spawning biomass limit reference point, sometimes used as a trigger within harvest control rules, or defined as the point below which recruitment is expected to be impaired or the stock dynamics are unknown |
| $B_{msy}$ | Spawning Biomass at which the maximum sustainable yield is expected (sometimes expressed as $SB_{msy}$) |
| $B_{targ}$ | Spawning biomass target reference point |
| $F_{lim}$ | Exploitation rate limit reference point, often taken as Fmsy based on UNFSA |
| $F_{msy}$ | Fishing mortality rate associated with the achieving maximum sustainable yield |
| $F_{targ}$ | Fishing mortality target reference point |
| MSY | Maximum Sustainable Yield |
| SSB | Spawning stock biomass |

# 3 Executive summary

The first Surveillance audit of Norway sandeel, pout and North Sea sprat fishery (DNV GL 2019) found that the sandeel stock in North Sea Sandeel area 1r (UoC-1) was depleted and the certificate for UoC1 was consequently suspended. The Norway NEA blue whiting fishery is currently not fishing in sandeel in area 1r stock which is under EU management.

The MRAG certified DFPO and DPPO North Sea, Skagerrak and Kattegat sandeel, sprat and Norway pout fishery announced the 3rd surveillance on 6th February 2020. The ICES stock assessment for sand eel of 27th February 2020 suggested that status of the sand eel stock in area 1r at the beginning of 2020 remained poor while the expected SSB for 2021 (169 kt) is well above Blim (110 kt). Harmonisation was initiated by MRAG and the 2 teams concluded to lift the suspension. Therefore, an expedited audit was initiated for the Norwegian fishery.

This report only addresses revision of the scoring of PI 1.1.1 and PI 1.1.2 for sand eel in North Sea area 1r.
Based on the assessment presented in ICES (2020b) and the conclusions drawn by the Advisory Committee, ICES (2020a) the audit found that the suspension can be lifted. Rescoring of the PI 1.1.1 suggests that PI 1.1.1a is scored at SG60 and therefore a condition has been set.
The scoring for principle 1 was 70 for PI 1.1.1 and 90 for PI 1.1.2 changing the overall score for Principle 1 from 89.2 (original score in PCR of 06.02.2018) to 85.8.
The rescoring is harmonised with the other certificated sandeel fishery DFPO and DPPO North Sea, Skagerrak and Kattegat sandeel, sprat and Norway pout.




Sandeel in divisions 4.b–c, Sandeel Area 1r. Stock areas for the seven sandeel stocks. The border of the Norwegian Exclusive Economic Zone (EEZ) is also shown. The closed part of Sandeel Area 4 is shown with hatched markings.

**Figure 1 Sand eel stock areas of the North Sea**

## 3.1 The Unit of Certification

The MSC Fisheries Certification Process v2.1 defines 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 1 below.

**Table 1 Units of Certification (UoC) Norway sand eel, pout and North Sea sprat fishery – Sand eel**

| UoC 1 - Suspended | Description |
|---|---|
| Species | Sand eel (*Ammodytes marinus*) |
| Stock | North Sea sand eel area 1r |
| Geographical area | **Stock region:** North Sea<br>**Common name of the body of water:** North East Arctic ocean<br>**FAO area** 27<br>**Local fisheries management area:** Sandeel management area 1r, within ICES IVb and IVc. |
| Harvest method / gear | Trawl (bottom and midwater) |
| Management | The fishery is managed under Norwegian and EU jurisdiction and systems for fisheries management. The fisheries management is now codified in the 2008 Marine Resources Act. |
| Client group | Fishing operators are Norwegian vessels fishing under quotas issued by Norwegian fisheries management. |
| Other eligible fishers | The entire Norwegian fleet is included in the Unit of Certification, no other eligible fishers have been identified. |
| **UoC 2** | **Description** |
| Species | Sand eel (*Ammodytes marinus*) |
| Stock | North Sea sand eel |
| Geographical area | **Stock region:** North Sea<br>**Common name of the body of water:** North East Arctic ocean<br>**FAO area** 27<br>**Local fisheries management area:** Sandeel management area 3r, within ICES IIIa, IVa and IVb |
| Harvest method / gear | Trawl (bottom and midwater) |
| Management | The fishery is managed under Norwegian and EU jurisdiction and systems for fisheries management. The fisheries management is now codified in the 2008 Marine Resources Act. |
| Client group | Fishing operators are Norwegian vessels fishing under quotas issued by Norwegian fisheries management. |
| Other eligible fishers | The entire Norwegian fleet is included in the Unit of Certification, no other eligible fishers have been identified. |
| **UoC 3** | **Description** |
| Species | Sand eel (*Ammodytes marinus*) |
| Stock | North Sea sand eel |
| Geographical area | **Stock region:** North Sea<br>**Common name of the body of water:** North East Arctic ocean<br>**FAO area** 27<br>**Local fisheries management area:** Sandeel management area 4, within ICES IVa and IVb. |
| Harvest method / gear | Trawl (bottom and midwater) |
| Management | The fishery is managed under Norwegian and EU jurisdiction and systems for fisheries management. The fisheries management is now codified in the 2008 Marine Resources Act. |
| Client group | Fishing operators are Norwegian vessels fishing under quotas issued by Norwegian fisheries management. |
| Other eligible fishers | The entire Norwegian fleet is included in the Unit of Certification, no other eligible fishers have been identified. |

# 4 Report details

## 4.1 Surveillance information

**Table 2**– General Information

| | | |
|---|---|---|
| 1 | Fishery name | |
| | Norway sandeel, pout and North Sea sprat fishery | |
| 2 | Surveillance level and type | |
| | Expedited audit | |
| 3 | Surveillance number | |
| | 1st Surveillance | |
| | 2nd Surveillance | |
| | 3rd Surveillance | |
| | 4th Surveillance | |
| | Other (expedited etc) | Expedited Audit |
| 4 | Proposed team leader | |
| | **SANDHYA CHAUDHURY Team Leader and Traceability responsible**.<br>• She meets the Fishery team leader qualifications and competency criteria in MSC FCP V2.1 Annex PC Table PC1.<br>• She has a degree in a relevant subject.<br>• Nearly 14 years' experience with the MSC fisheries standard.<br>• Passed MSC's online training for fishery team leader within the last 3 years.<br>• Passed new versions of the compulsory online training modules.<br>• Approved ISO 9001 auditor for 20 years'.<br>• Extensive experience with MSC Fisheries and Chain of Custody schemes.<br>• Considerable experience in applying different types of interviewing and facilitation techniques.<br>• She has undertaken more than 2 MSC fishery assessments/surveillance site visits in the last 5 years.<br>• Knowledge of common language spoken by clients and stakeholders for this fishery which is English<br>• Sandhya is responsible for coordinating the Assessment Team's work and for the completion of the reassessment according to the requirements of FCP v2.1<br>• She is also responsible for Traceability and has considerable first-hand and auditing experience from the MSC Chain of custody as well as other Food safety schemes. She is a qualified MSC Chain of Custody auditor and has passed the MSC Fisheries Traceability module 2.1<br>• She has no conflict of interest in relation to the fishery under assessment. | |
| 5 | Proposed team members | |
| | **HANS LASSEN Principle expert:**<br>• Hans has a degree in a relevant subject.<br>• More than 3 year's fisheries experience.<br>• Passed MSC's online training for fishery team member within the last 3 years.<br>• Passed new versions of the compulsory online training modules. | |

| | |
|---|---|
| | • More than 3 years' experience applying relevant stock assessment techniques being used by the fishery under assessment.<br>• More than 3 years' experience working with the biology and population dynamics of the target or species with similar biology.<br>• More than 3 years' experience in research into, policy analysis for, or management of, fishery impacts on aquatic ecosystems.<br>• Knowledge of common language spoken by clients and stakeholders for this fishery which is English.<br>• Considerable experience in applying different types of interviewing and facilitation techniques.<br>• He has at least two assignments in the country or region in which the fishery under assessment is based in the last 10 years.<br>• Hans has no conflict of interest in relation to the fishery under assessment. |
| 6 | Audit/review time and location |
| | Off-site, desk-top audit week 17 (22.04.2020)- from Team Leader office. |
| 7 | Assessment and review activities |
| | Review of information with emphasis on:<br>1. Stock status<br>2. Scoring of PI 1.1.1 as agreed in harmonisation discussions from 20.03.2020 to 06.04.2020 including Skype meeting of 27th March 2020 so as to ensure the fishery remains harmonised. |

## 4.2 Background

The sand eel stock areas are shown in Figure 1. The Norwegian sand eel fleet did not operate in the EU zone in 2019 and specifically not in area 1r. The Norwegian fleet is not expected to fish the area in 2020.
Bottom trawls remain the gear used in the Norwegian sand eel fishery.
The assessment for sand eel in area 1r is harmonised with the DFPO and DPPO North Sea, Skagerrak and Kattegat sand eel, sprat and Norway pout fishery.

The Norwegian fishery was certified on 23rd February 2018, DNV GL (2018). The fishery in area 1r was suspended at the first surveillance audit DNV GL (2019) based on the failure of PI 1.1.1 (Stock status below Blim) to score >60 because of the very poor year class 2017. Year class 2019 is estimated to be about 40% above the mean value and the projected SSB is about 169 kt.
Therefore PI 1.1.1 is rescored.

## 4.3 Version details

The report shall include a statement on the versions of the fisheries program documents used for this assessment.

**Table 3 Fisheries program documents version**

| Document | Version number |
|---|---|
| MSC Fisheries Certification Process | **Version 2.2** |
| MSC Fisheries Standard | **Version 2.01** |
| MSC General Certification Requirements | **Version 2.4.1** |
| Assessment tree – MSC Fisheries Certification requirements | **Version 2.0** |
| MSC Surveillance Reporting Template | **Version 2.01** |

# 5 Results

## 5.1 Surveillance results overview

### 5.1.1 Stock status

Stock status at the beginning of 2020 is summarised in Figure 2. The stock is 'at risk of reduced reproductive capacity'.
SSSB < Blim (110 kt). SSB (2020) is at 85 kt


Sandeel in divisions 4.b–c, Sandeel Area 1r. Historical development of the stock from the summary of the stock assessment, with 90% confidence intervals. Assumed recruitment values are not shaded.

ICES assesses that the spawning-stock size is below MSY $B_{escapement}$, $B_{pa}$, and $B_{lim}$. No reference points for fishing pressure have been defined for this stock.

Sandeel in divisions 4.b–c, Sandeel Area 1r. State of the stock and fishery relative to reference points.

| | Fishing pressure | | | | Stock size | | | |
|---|---|---|---|---|---|---|---|---|
| | | 2017 | 2018 | 2019 | | 2018 | 2019 | 2020 |
| Maximum sustainable yield | $F_{MSY}$ | ? | ? | ? Undefined | MSY $B_{escapement}$ | ✓ | ✗ | ✗ Below escapement |
| Precautionary approach | $F_{pa}$,$F_{lim}$ | ? | ? | ? Undefined | $B_{pa}$,$B_{lim}$ | ✓ | ✗ | ✗ Reduced reproductive capacity |
| Management plan | $F_{MGT}$ | – | – | – Not applicable | $B_{MGT}$ | – | – | – Not applicable |

**Figure 2 Sand eel in North Sea area 1r. Stock status and trends. Source: ICES (2020a) Figure 1 and Table 1**

The recruitment in 2019 is about 40% above the average recruitment and the therefore ICES advises that a fishery at around 113 kt will still leave an SSB well above Blim. FCR v2.0 GSA 2.2.3 implies that for short-lived species the use of "projected SSB" is relevant. The projected SSB for 2021 is 169 kt with a 2020 fishery of 113 kt, ICES (2020a) Table 3.

The projected spawning stock biomass is constructed of four elements

- SSB = SSB age1 + SSB age2+ SSB age3 + SSB age4

Among these SSB age is dominating.
The 2021 projection is:

- SSB age 1 = 6kt (3%), SSB age 2 = 138 kt (82%), SSB age 3 = 23 kt (13%) and SSB age 4 = 3 kt (3%); in total 169 kt.

As SSB (age) = w(age)*prop(age)*N(age)

where for each age group 'age' w is the stock mean weight, prop the proportion of the stock which is mature and N the population size.
The stock assessment provides an estimate of how well the SSB is estimated, i.e. retrospective when the mortality of the age group is known
These elements are not known in the projection and are therefore considered below.

The accuracy of the population size is judged as follows
**Age 1**: Very little of this age group contributes to the SSB. The stock size is projected based on the geometric mean the standard deviation in logarithmic terms is 0.88.

**Age 2:** This is far the dominating contribute on to the SSB and therefore the analysis is more thorough. The accuracy of the projection is judged based on the relationship
$\log(N2) = \log(q * Dredge\ index0) - Z1 + \ stochastic\ term$
the accuracy (Stochastic term) includes uncertainty from the Dredge survey, from the impact of the fishery as age 1 and of the N2 estimate.

The regression log(N2) vs log (Dredge Index age 0), see below. The regression is applicable for the time series (15 years). The accuracy is an upper estimate of the uncertainty as the ability to project the year-to-year variability of the total mortality is not accounted for. However, there is no projection of the natural mortality which is, according to ICES (2020b), considered to be variable and is dominating the total mortality. The 2019 survey result is well within the regression range and therefore no additional uncertainty is added in the calculations. The regression statistics are given below the Figure.

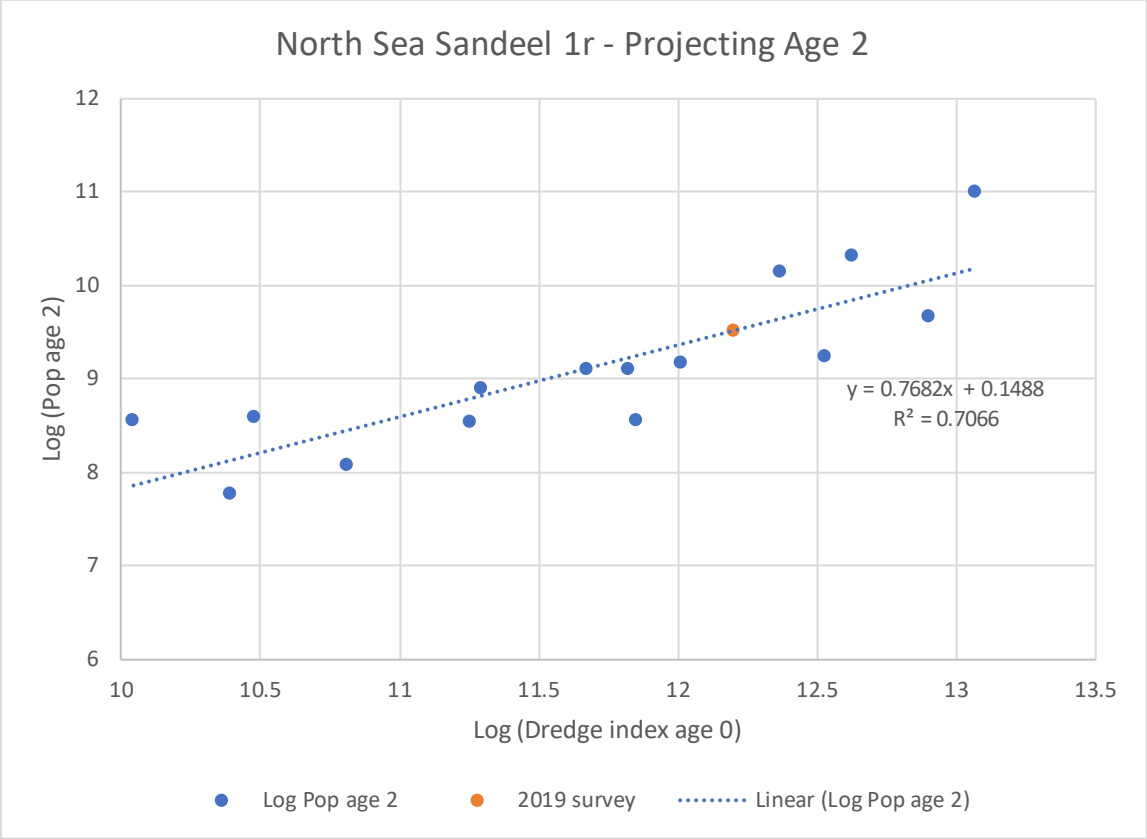



**Figure 3 North Sea Sandeel area 1r. Projection of Age group 2**

| Log(N2) ~log(Dredge age 0) | |
|---|---|
| *Regression Statistics* | |
| Multiple R | 0.840609805 |
| R Square | 0.706624845 |
| Adjusted R Square | 0.684057525 |
| Standard Error | 0.486221707 |

| | |
|---|---|
| Observations | 15 |

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 1 | 7.402486273 | 7.402486 | 31.31186 | 8.6878E-05 |
| Residual | 13 | 3.073350131 | 0.236412 | | |
| Total | 14 | 10.4758364 | | | |

**Age 3 and age 4: Based on estimation of SSB in ICES (2020b)**

Based on data ICES (2020b) and using data for which the dredge survey is covering the stock in area 1r

The results based on data ICES (2020b) and using data for which the dredge survey is covering the stock in area 1r are summarised below

| | **Contribution** |
|---|---|
| Natural Mortality (std dev of the time series 2004-2014 after which time a constant M is applied. For age 2 this is included in the regression shown above | 0.045 |
| Weight (age 2 1st half year) log values time series 2004-2019 | 0.18 |
| Proportion of maturity | Fixed values used |
| Population size age 1 log values Std dev of time series 2004-2019 | 0.88 |
| Population size age 2 log values, see analysis above | 0.486 |
| Population size age 3 and 4 log values, std dev from stock assessment | 0.332 |

Based on simulation[1] of the sum of three lognormal distributed SSBs, (100,000 recurrences) the following percentiles are estimated

| **Percentile** | **5%** | **20%** | **30%** |
|---|---|---|---|
| Confidence limit for projected SSB | 79 kt | 116 kt | 136 kt |
| FCR classification | High degree of certainty | Highly Likely | Likely |
| Conclusion | SG100 not met | Formally SG80 is met however there are uncertainties (proportion of maturity that could not be estimated. Also, the evaluation is based on a projection rather than an estimated stock status. SG 80 is not met | SG60 is met |

### 5.1.2 Stock Management

The stock management is based on the EU CFP and the quota for 2020 has been set at the ICES advised level of 113,987 t, see https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CONSIL:ST_6819_2020_INIT&qid=1587241693183&from=EN

The arrangements with Norway remain unchanged.

[1] The simulations were done in R with the following code:
n<- 100000
ssb1<- rlnorm(n,log(6),1.1)
ssb2<-rlnorm(n,log(138),0.67)
ssb34<-rlnorm(n,log(25),0.55)
ssb<-ssb1+ssb2+ssb34
quantile(ssb, probs=seq(0,1,0.05))

### 5.1.3 Conditions

**Table 4 Summary of Conditions**

| Condition number | Condition | Performance Indicator (PI) | Status | PI original score | PI revised score |
|---|---|---|---|---|---|
| 1 | (All UoC's) The Client should work with relevant authorities and industry colleagues to develop appropriate HCRs and to have these HCRs evaluated (e.g. by ICES) and shown to be precautionary and robust to the main uncertainties. | 1.2.2 | **On target** | **65** | **Not revised** |
| 2 | (UoC 4 & 6) Conservation and management measures for all vulnerable marine habitats in the UoC fishing grounds shall be in place and implemented, such that the UoC does not cause serious or irreversible harm to structure and function of VME habitats. | 2.4.1 | **On target** | **70** | **Not Revised** |
| 3 | (UoC 1,2,3,4 & 6) Conservation and management measures directed to the protection of VME shall be in place and implemented, such that the Habitat Outcome 80 level of performance is achieved. Besides, the client shall present some quantitative evidence of the compliance with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non MSC fisheries, where relevant. | 2.4.2 | **On target** | **75/70** | **Not revised** |
| 4 | The Client must provide evidence that for the *A. marinus* stock in area 1r it is highly likely that SSB is above PRI reference points and fluctuating around target reference points. | 1.1.1 | **NA** | **<60 at 1st Surv.** | **New at this audit** |

### 5.1.4 Total Allowable Catch (TAC) and catch data

**Table 5 Total Allowable Catch (TAC) and catch data**

| | | | |
|---|---|---|---|
| TAC | 2020 | **113,987** | **MT** |
| UoA share of TAC | 2020 | **113,987** | **MT** |
| UoC share of total TAC | 2020 | **0** | **MT** |
| Total green weight catch by UoC | 2019 (most recent) | **0** | **MT** |
| Total green weight catch by UoC | 2018 (second most recent) | **0** | **MT** |

### 5.1.5 Recommendations

| Rec number | Performance indicator (PI) / Recommendation |
|---|---|
| 1 | 2.3.3b The assessment team recommends that systems are put in place to ensure that all interactions with 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. |

| Rec number | Performance indicator (PI) / Recommendation |
|---|---|
| 2 | Following the requirements at MSC FCP v2.01§ PA 1.3.1, the assessment team recommends the client to recognise the need of evaluating some species under MSC Fisheries Standard v 2.01 Principle 1 for the future reassessment. The species include *inter alia* horse mackerel, greater silver smelt and whiting. The Client is urged to promote the establishment of harvest strategy, HCR, data collection and stock assessment of these species to facilitate that these species can be assessed under principle 1 at the reassessment, or to promote the development of techniques to effectively separate catches of currently IPI stocks. |

## 5.2 Conditions

The 3 existing conditions for this fishery have not been evaluated in this expedited audit and their status remains the same as in the 2nd surveillance report of 5th March 2020.

The suspension in 2019 of the sandeel in area 1r was based on the depleted status of the stock (SSB < Blim). Variable recruitment is expected for a short-lived species such as sand eel. The situation was reversed with the 2019 year-class which is well above average strength and consequently PI 1.1.1 and PI 1.1.2 were rescored, see sections 5.1.1 and 5.4.

A new condition 4 was added at this expedited audit.

**Table 6 Condition 1 (Harvest strategy and Harvest Control Rule)**

| | |
|---|---|
| Performance Indicator | 1.2.1a and 1.2.2.b<br>1.2.2a (SG80) Well defined HCRs are in place that ensure that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock fluctuating around a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.<br>1.2.2b (SG80) The HCRs are likely to be robust to the main uncertainties. |
| Score | Sand eel UoC 1 and UoC 3: 65<br>Norway pout UoC 4 and UoC 5: 65<br>Sprat: UoC 6,7,8: 65 |
| Justification | There is no multiannual management plan for Norway pout, Sand eel stocks in the EU zone and sprat. There are Generally understood HCRs are in place that are expected to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached. There is no well-defined HCR for the stock mentioned (Norway pout, sprat, and EU sand eel stocks) These plans should be investigated and shown to be robust to the main uncertainties in the input to the Harvest Control Rule. |
| Condition | The Client should work with relevant authorities and industry colleagues to develop appropriate harvest control rules and to have these evaluated (e.g. by ICES) and shown to be precautionary and robust to the main uncertainties. |
| Milestones | **Year 1:** The client should present evidence that he has approached relevant authorities and asked for the required HCRs. Interim score: 65.<br>**Year 2:** The Client should present evidence that such HCRs are under development. Interim score 65.<br>**Year 3:** The Client should present evidence that the HCRs are being developed and are evaluated by competent organisations. The Client should present evidence that the plans are discussed with a view for adoption at the relevant levels. Interim score 65.<br>**Year 4:** The Client should present evidence that the HCRs are being implemented. Interim score: 80 |
| Consultation on condition | None. The relevant party here is primarily the Ministry, secondarily the IMR. |
| Progress on Condition (Year 1 - 2018) | There is a management plan established for the Norwegian sand eel stock in area 3r. Management plan for the joint Norway pout stock is established.<br>There is no progress reported for the North Sea Sprat. |

| | |
|---|---|
| Progress on Condition (Year 2 - 2019) | The stock assessment structure was changed for sprat in 2018 and now subarea 4 and division 3.a are assessed together. The management parties have agreed to work on the future management in 2020, see Anon. 2019 Skagerrak and Kattegat. |
| Status | On target |
| Additional information | The progress of this condition has not been evaluated at this expedited audit. |

**Table 7 Condition 2 Habitat Impact (Outcome)**

| | |
|---|---|
| Performance Indicator | **2.4.1 b)** The UoA is highly unlikely (<30%) to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm. |
| Score | 70 |
| Justification | SG80: The UoA is highly unlikely (<30%) to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.<br>Finding: All Norwegian vessels have a VMS on board regardless the vessel's size. This serves the Directorate of Fisheries to verify that vessels do not enter Marine Protected Areas.<br>The Norway pout fishery takes place in the muddy and sandy grounds of the Fladen Ground, while the sprat fishery mainly takes place in the muddy grounds of the Dogger bank, the Oyster ground and the German bight. According to OSPAR maps, there are seapens (VME) in these fishing grounds which may be affected by the bottom trawl fleet targeting Norway pout or sprat. The Central Fladen Nature Conservation MPA has been designed to protect<br>**Seapens and burrowing megafauna**. The Directorate of Fisheries does not report any infringements regarding the fleet entering MPA.<br>An overlapped map of fishing activities by the bottom trawl UoCs and MPA and OSPAR VME would help the team in scoring this SI.<br>Given the present information is not possible to determine that the UoA is **highly unlikely (<30%)** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm. SG80 is not met. |
| Condition | The SG80 requirements for SIb must be met.<br>By the fourth surveillance audit necessary conservation and management measures for all vulnerable marine habitats in the UoC fishing grounds shall be in place and implemented, such that the UoC does not cause serious or irreversible harm to structure and function of VME habitats (as described by OSPAR).<br>The fishery will also need to provide overlapped maps of bottom trawling activity and OSPAR threatened or declining habitats. |
| Milestones | **Year 1:** There shall be evidence of the Client's plan to evaluate potential damage to seapens, deep-sea sponge aggregations or corals, appropriate to this UoC. There shall be evidence of engagement with research institutions with the goal of evaluating potential damage to all vulnerable habitats by fishing activities of this UoC. If research institutions are unable to provide support for the implementation of the plan, the fishery shall prepare the plan on the basis of other means (e.g. independent consultants or scientists or other means as appropriate). The plan may include an Environmental Impact Assessment or other similar analysis. Score 75.<br>**Year 2:** By the end of Year 2 there shall be evidence of ongoing work towards the implementation of the plan; i.e. developing options for conservation and management measures to all VME habitats affected by the UoC, such that the fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function.<br>These options may be developed with the support of research institutions, or may be developed within the client group, as appropriate. Options may include closed areas, move on thresholds or other actions as appropriate, but should be sufficient to ensure that there serious and irreversible harm to seapens, sponges, and coral gardens is highly unlikely.<br>The client shall provide overlapped maps of VMS records and OSPAR threatened or declining habitats. Score 75 |

| | |
|---|---|
| | **Year 3:** Evaluate the options developed in year 2. Consider suggested modifications if needed and finalise and agree on conservation and management measures for the protection of seapens or other VME species overlapping with the fishery. These measures can be taken either at client group level or at a higher level. Score 75.<br>**Year 4:** Implement the agreed measures necessary to show that the UoA is highly unlikely (<30%) to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.<br>A formal commitment to the agreed upon conservation and management measures shall remain in place for the duration of the certification period. The client shall provide overlapped maps of VMS records and OSPAR threatened or declining habitats, to show avoidance on VME. Score 80. |
| Consultation on condition | None. The conditions involve *approaching* research institutions and the Directorate of Fisheries. It is a well-known fact that the NFA is a major stakeholder for this institution, and that our requests will be given heavy emphasis. However, for both the analysis and potential implementation of measures, third party alternatives are presented in the action plan. NFA has full power to implement meet the condition through these measures, should IMR and the Directorate not be able to provide support. |
| Progress on Condition (Year 1-2018) | The client has been engaging with the Directorate of Fisheries which is currently engaging in a research project to collect more detailed trawl information in certain areas, including benthos bycatch. 500mx500m grid sampling is being planned and rolled out (Per Finne, Directorate of Fisheries, pers.comm). Some data has been mapped and can be seen on Geonorge: https://kartkatalog.geonorge.no/search?text=korall<br>These mapped areas do not necessarily overlap with the areas where the Norway pout and sprat fisheries operate, as can be seen from VMS plots provided by the Directorate of Fisheries.<br>The grid sampling programme is ongoing, and more details will be available by the next audit. |
| Progress on Condition (Year 2-2019) | The Client presented maps with results of ongoing work to locate vulnerable habitats, see Figure 9. These show that there is little overlap. |
| Status | On target |
| Additional information | The progress of this condition has not been evaluated at this expedited audit. |

**Table 8 Condition 3 (Habitat Impact - Management strategy**

| | |
|---|---|
| Performance Indicator | 2.4.2 a) There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. d) There is some quantitative evidence that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant |
| Score | 70 |
| Justification | 2.4.2 a: The Norwegian MAREANO program, which maps depth, topography, sediment composition, contaminants, biotopes and habitats in Norwegian waters, serves as a valuable tool to manage habitat types in Norwegian waters, and has helped to establish no fishing zones in Norwegian waters, which were designed mainly to protect cold corals which are mostly located near the shore line, with the exception of two protected areas in more open waters. The mandatory VMS in place serves to verify that these regulations are followed.<br>As regards fishing grounds which do not fall under the Norwegian jurisdictions, these are studied by the European's Union Natura Directive (http://natura2000.eea.europa.eu/#), the OSPAR Commission (www.ospar.org) and the Mapping European Seabed Habitats portal (www.searchmesh.net). These areas are protected by the Habitats and Nature 2000 Directives in waters which fall under the EU jurisdiction (see Figure 21).<br>Both the Norwegian and the European Union management tools have designated protected areas for the protection of sensitive habitats in their respective waters. Norwegian and EU enforcement systems, along with the mandatory use of VMS in the fishing fleet, serve to assure the accomplishment of these regulations.<br>The research undertaken in the status of benthic habitats along with the establishment of |

| | |
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| | protected areas could serve to support that there is a partial strategy in place (that is expected to achieve the Habitat Outcome 80 level of performance or above) if management and enforcement measures were already implemented. But as mentioned, some of the MPAs in the area (such as the central area of the Fladen Ground and the Dogger Bank) are not yet fully well managed, as there are no site-specific fisheries management measures to protect seapens and burrowing megafauna both in the fishing grounds.<br>SI d:<br>DNV GL – Report No. 2019-028, Rev.0 – www.dnvgl.com 35<br>There is some quantitative evidence that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.<br>There is evidence of the establishment of protected areas to protect vulnerable benthic species both in Norwegian and European waters. There is also evidence on the enforcement systems taking place in both these jurisdictions, through each European nation enforcement system, and on the Norwegian fleet accomplishing management measures in the area. The Norwegian Directorate of Fisheries has been consulted in order to know the range of infractions by the Norwegian fleet entering MPAs, and these resulted in an infraction ratio below 5% for 2016. There are however some concerns about some other vulnerable habitats, such as sea pens, which are not fully protected in certain areas.<br>The Scottish Fisheries Sustainable Accreditation Group (SFSAG) has voluntary closed an area in the Fladen Ground to bottom trawl fishing for its vessels. This measure is taken to protect seapens (Funiculla spp). This closure will apply until approved at European level. The closure was announced to all vessels in the UoA in May 2017, and will be monitored by Marine Scotland using VMS data.<br>The area could potentially be fished by Norsk Fiskerlag Vessels fishing sand eel, Norway pout and sprat, and Norsk Fiskerlag has not provided the required assurance and SG80 is not met by the Norwegian bottom trawl fleet considered in this assessment. Besides, the team has no information on management requirements that other non-MS fisheries may have implemented in the area.<br>The mentioned voluntary closed area corresponds to one (the southern) of three areas within the Central Fladen Ground MPA which would be closed to demersal towed gear under Marine Scotland's proposal. The coordinates of SFSAG's closed area are as follows (this corresponds exactly to the coordinates given by Marine Scotland for their closed area 3 in the Central Fladen Ground MPA. Marine Scotland, 2017a; Section B in Annex, Table B6):<br>· 58° 59.248' N 000° 08.373' W<br>· 58° 58.226' N 000° 04.475' E<br>· 58° 55.440' N 000° 05.816' E<br>· 58° 51.311' N 000° 06.539' E<br>· 58° 49.143' N 000° 00.170' W<br>· 58° 49.819' N 000° 09.843' W<br>The team considers that there isn't sufficient quantitative evidence that the UoA complies with both its management requirements, and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, therefore SG80 is not met by the bottom trawl UoCs. The quantitative evidence given by the lack of infringements in relation to MPA by the bottom trawl fleet serves to justify that the UoC complies with mandatory management requirements to protect VME, therefore SG60 is met for the bottom trawl UoCs. The lack of evidence regarding the impact that the bottom trawl fishery may have on this voluntary closed area prevents these UoCs from achieving SG80. SG80 is not met by the bottom trawl fleet. |
| Condition | The SG80 requirements for PI2.4.2 SIa and SId must be met. There shall be evidence of implemented management measures directed to the different VME which are expected to achieve the Habitat Outcome SG80 level of performance. The client shall present some quantitative evidence of the compliance with protection measures afforded to VMEs by other MSC UoAs/non MSC fisheries, where relevant. |
| Milestones | **Year 1:** There shall be evidence of the Client's plan to evaluate the establishment of potential management measures directed to the protection of identified VME by the relevant authorities (such as seapens, deep-sea sponge aggregations or corals) appropriate to this UoC.<br>There shall be evidence of engagement with research institutions with the goal of evaluating potential measures to avoid such damage by the bottom trawl fleet. If research institutions are unable to provide such support, the fishery shall prepare the potential measures on the |

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| | basis of other means (e.g. independent consultants or scientists or other means as appropriate).<br>There shall be evidence of activities undertaken in order to comply with voluntary protection measures afforded to VMEs by other MSC UoAs/non MSC fisheries, where relevant.<br>Score 70.<br>DNV GL – Report No. 2019-028, Rev.0 – www.dnvgl.com 36<br>**Year 2:** By the end of Year 2 there shall be evidence of ongoing work towards the election and implementation of the most appropriate management measures to protect identified VME by the relevant authorities in the UoC (i.e. developing options for conservation and management measures to all identified (by the relevant authorities) VME habitats affected by the UoC, such that the fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function).<br>These management measures may be developed with the support of research institutions, or may be developed within the client group, as appropriate. The measures shall be sufficient to ensure that serious and irreversible harm to seapens, sponges, and coral gardens is highly unlikely).<br>There shall be evidence of activities undertaken in order to comply with voluntary protection measures afforded to VMEs by other MSC UoAs/non MSC fisheries, where relevant.<br>Score 70.<br>**Year 3:** Evaluate the options developed in year 2. Consider suggested modifications if needed, and finalise and agree on conservation and management measures for the protection of seapens or other identified VME (by the relevant authorities) overlapping with the fishery. These measures can be taken either at client group level or at a higher level.<br>There shall be evidence of activities undertaken in order to comply with voluntary protection measures afforded to VMEs by other MSC UoAs/non MSC fisheries, where relevant. Score 70.<br>**Year 4:** Implement the agreed measures necessary to show that the UoA is highly unlikely (<30%) to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm. A formal commitment to the agreed upon conservation and management measures shall remain in place for the duration of the certification period.<br>There shall be some quantitative evidence of the compliance with protection measures afforded to VMEs by other MSC UoAs/non MSC fisheries, where relevant.<br>By the 4th surveillance audit the client shall provide overlapped maps of VMS records and:<br>- OSPAR threatened or declining habitats overlapping the UoA fishing grounds.<br>- designated MPA overlapping the UoA fishing grounds.<br>Besides, the client shall provide evidence of the accomplishment of voluntary measures undertaken by other MSC UoAs/non-MSC fisheries in the same fishing grounds directed to the protection of VME. Score 80 |
| Consultation on condition | None. The conditions involve approaching the IMR and the Directorate of Fisheries. It is a well-known fact that the NFA is a major stakeholder for these institutions, and that our requests will be given heavy emphasis. However, for both the analysis and potential implementation of measures, third party alternatives are presented in the action plan. NFA has full power to implement meet the condition through these measures, should IMR and the Directorate not be able to provide support. |
| Progress on Condition (Year 1-2018) | The client informed that they will be undertaking a review of relevant MSC certified fisheries (relevant as to gear and location overlap with sprat/ Norway pout/ sand eel), and to note any voluntary closures, including location and reason of these. This was to form part of the work to evaluate measures to mitigate damage to relevant VMEs (see Action 3.1 above). Also, the Client informed that he has engaged consultants to assist with the evaluation of potential measures. However, no information on progress with the evaluation was presented. As these actions were part the client commitments for the Year 1 milestone – it has not yet been met. The Client further informed that discussions with research institutions would be fruitful only based on the evaluations and these therefore has not yet been initiated. The milestones for Year 1 shall be met at Year 2 in addition to the milestones requirements for Year 2. |
| Progress on Condition (Year 2-2019) | The Client has engaged consultants to assist with the evaluation of potential measures but the evaluation has not been completed. The Client has initiated a survey on additional voluntary closures apart from the SFSAG voluntary closure in the Fladen Ground. No such closures were identified. |

| | |
|---|---|
| Status | On target |
| Additional information | The progress of this condition has not been evaluated at this expedited audit. |

**Table 9 – Condition 4 new at this audit.**

| | |
|---|---|
| Performance Indicator | 1.1.1 (sandeel management area 1r)<br>The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing<br>a. Stock status relative to recruitment impairment.<br>SG80: It is highly likely that the stock is above the PRI. |
| Score | 70 |
| Justification | The 30% (70 % probability that the target is met) confidence limit is 136 kt above the PRI limit (110 kt). SG60 is met.<br>The 20% (80 % probability that the target is met) confidence limit is 116 kt above the PRI limit (110 kt). Formally SG80 is met, however, there are uncertainties (proportion of maturity that could not be estimated. However, the fishing mortality for 2019 (0.55) exceeds Fcap (0.49) and the evaluation is based on a projection rather than an estimated stock status. SG 80 is not met<br>The 5% (95 % probability that the target is met) confidence limit is 79 kt below the PRI limit (110 kt). SG100 is not met. |
| Condition | The Client must provide evidence that for the *A. marinus* stock in area 1r it is highly likely that SSB is above PRI reference points and fluctuating around target reference points. |
| Milestones | • At the **third annual surveillance** provide evidence that there is a plan to increase abundance of stocks in area 1r, recognizing that environmental factors may be as or more important than fishing effort in driving abundance and that the abundance has begun to increase.<br>• At the **fourth annual surveillance**, the Client will, subject to environmental conditions for sandeel productivity, provide evidence that for the A. marinus stock in area 1r it is highly likely that SSB is above PRI reference points and fluctuating around target reference points. At this point, the performance indicator will re-score to at least 80. |
| Consultation on condition | The client will consult with IMR to assure that the research institute within its remits of the institute provides support for those responsible for the stock assessment will be fulfilling the condition |
| Status | This condition is ‘new’ at this audit. |
| Additional information | The timeline has been harmonised with the MRAG assessment of Sandeel in area 1r, see MRAG. 2020. 3rd Surveillance Report DFPO, DPPO and SPFPO North Sea, Skagerrak and Kattegat sandeel, sprat and Norway pout fishery Prepared for Danish Fishermen’s Producers Organisation (DFPO), Danish Pelagic Producers Organisation (DPPO), and Swedish Pelagic Federation Producer Organization (SPFPO). Certificate No: MSC-F-31297 MRAG Americas, Inc. April 1, 2020 (updated April 6, 2020).<br>Fulfilling the condition is partly dependent on the productivity of the sandeel stock and this productivity is strongly dependent on environmental factors. It may therefore not be possible to meet the condition within the given timeline in the milestones, based on the development of environmental factors outside the influence of the Client. |

## 5.3 Client Action Plan

The existing Client Action Plan for conditions 1, 2 & 3 have not been evaluated in this expedited audit. The client action plan for the new condition 4 is given in the table below.

| | |
|---|---|
| Condition 1 | Action 1.1<br>NFA (Client) will engage with the 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.<br>Action 1.2<br>In year 2 NFA will provide an evaluation of options for potential HCRs<br>Action 1.3<br>In year four, NFA will cooperate with stakeholders and management authorities and urge them to implement HCRs. |
| Condition 2 | **Action 2.1**<br>NFA will approach the IMR and/or the Directorate of Fisheries in year 1 to propose a comprehensive evaluation of the potential damage to deep-sea sponge aggregations, corals and sea pens with regard to principle 2 of the MSC standard. If the IMR and/or the Directorate of Fisheries is unable or unwilling to perform this analysis, NFA will approach a third party such as independent consultants or scientists.<br>**Action 2.2**<br>By the end of year 2, the analysis, which will include overlapped maps of the UoC VMS activity and VME habitats, should have provided output that allows the NFA to analyse the results, bring them forward to the Directorate of Fisheries and develop management options to mitigate damage if necessary according to the MSC standard. The goal will be to have the measures integrated into official Fisheries management. However, if the authorities are unwilling or unable to do so, voluntary codes of conduct will be considered.<br>**Action 2.3**<br>Potential management measures, if necessary, will be evaluated and implemented in year 4.<br>Updated maps of the UoC VMS activity and VME habitats will be provided, to show avoidance of VME. |
| Condition 3 | **Action 3.1**<br>NFA will engage with IMR and the Directorate of Fisheries to evaluate measures to mitigate bottom damage in the relevant VME areas. Internal discussions will be held to decide how other UoAs voluntary protection of central Fladen or other areas could be protected by a corresponding Norwegian code of conduct if governmental protective measures remain absent.<br>**Action 3.2**<br>NFA will follow up on the results from the consultations under 3.1 and work towards the election and implementation of the most appropriate management measures. Preferably this will be in the form of expected official protective regulation by the EU. In the absence of this, work will be continued to set up voluntary measures afforded to these VMEs by other UoAs.<br>**Action 3.3**<br>Options will be evaluated and NFA will finalize and agree on conservation and management measures and begin their implementation.<br>**Action 3.4**<br>Protective measures will be implemented at governmental or private jurisdiction level to show that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm. The measures will be evaluated with available data, and overlap maps will be provided of VMS records and:<br>-OSPAR threatened or declining habitats overlapping the UoA fishing grounds.<br>-Designated MPA overlapping the UoA fishing grounds. |
| Condition 4 (new) | The Norwegian Fleet is not fishing in the area in 2020. NFA will urge IMR to support the collection and compilation of data that may be available in Norway. Further NFA will urge the Norwegian authorities to consider the sand eel stock in area 1r at fisheries consultations with EU and UK. |

## 5.4 Re-scoring Performance Indicators

### 5.4.1 Principle level scores - updated

**Table 10 Scoring summary**

| Overall weighted Principle-level scores | Original score | Revised Score |
|---|---|---|
| Principle 1 - Target species | **89.2** | **85.8** |
| Principle 2 - Ecosystem | **85.7** | **85.7** |
| Principle 3 - Management | **95.4** | **95.4** |

### 5.4.2 Performance indicators- Principle 1 rescored

**Table 11 Principle 1 rescoring by Performance indicators**

| Principle | Component | | Performance Indicator (PI) | Score |
|---|---|---|---|---|
| **One** | Outcome | 1.1.1 | Stock status | 70 |
| | | 1.1.2 | Stock rebuilding | 90 |
| | Management | 1.2.1 | Harvest strategy | 90 |
| | | 1.2.2 | Harvest control rules & tools | 65 |
| | | 1.2.3 | Information & monitoring | 100 |
| | | 1.2.4 | Assessment of stock status | 100 |

### 5.4.3 Re Scoring P.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 | | | |
|---|---|---|---|---|
| a | Stock status relative to recruitment impairment | | | |
| | | SG 60 | SG 80 | SG100 |
| | Guidepost | It is likely that the stock is above the point where recruitment would be impaired (PRI). | It is highly likely that the stock is above the PRI. | There is a high degree of certainty that the stock is above the PRI |
| | Sandeel NS-1r UoC 1 | **Yes** | **No** | **No** |
| | Justification | The scoring is reviewed based on ICES (2020a) and ICES (2020b).<br>The reference points are unchanged Blim = 110 kt compared to the scoring at DNV GL (2018)<br>The scoring follows the estimation of the 70%, 80% and 95% confidence limits for the projected SSB (2021), see section 5.1.1 for details.<br>The uncertainties of the projected SSB and included in the calculation are accounts of:<br>- Estimated SSB (for ages 3 and 4)<br>- Mean weight by age<br>- Natural mortality as a proxy for the uncertainty of the total mortality in 2020<br>- Population size for age1 1 and 2. The population size of age 2 accounts for about 80% of the projected SSB. | | |

| Percentile | 5% | 20% | 30% |
|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| | | Confidence limit for projected SSB | 79 kt | 116 kt | 136 kt |
| | | FCR classification | High degree of certainty | Highly Likely | Likely |
| | | Conclusion | **SG100 not met** | Formally SG80 is met however there are uncertainties (proportion of maturity that could not be estimated. However, the fishing mortality for 2019 (0.55) exceeds Fcap (0.49) and the evaluation is based on a projection rather than an estimated stock status. **SG 80 is not met** | **SG60 is met** |
| | | The 30% (70 % probability that the target is met) confidence limit is 136 kt above the PRI limit (110 kt). **SG60 is met.**<br>The 20% (80 % probability that the target is met) confidence limit is 116 kt above the PRI limit (110 kt). Formally SG80 is met, however, there are uncertainties (proportion of maturity that could not be estimated. However, the fishing mortality for 2019 (0.55) exceeds Fcap (0.49) and the evaluation is based on a projection rather than an estimated stock status. **SG 80 is not met**<br>The 5% (95 % probability that the target is met) confidence limit is 79 kt below the PRI limit (110 kt). **SG100 is not met.** | | | |
| b | Stock status in relation to achievement of MSY | | | | |
| | Guidepost | | The stock is at or fluctuating around a level consistent with MSY. | There is a high degree of certainty that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years. | |
| | **Sandeel NS-1r UoC 1** | | **Yes** | **No** | |
| | Justification | Unit 1r – the SSB has been fluctuating but generally above the previous $B_{lim}$ and the present $_{MSY}B_{escapement}$ (145 kt) for this unit since 2000. The average SSB (2010-2019 = 160 kt) and is above MSY $B_{lescapement}$ of 145 kt (ICES 2020a Table 10) with half the years above and half the years below. **SG 80 is met**.<br>Because fishing mortality 2017-2019 is above Fcap there is not a high degree of certainty that the stock at present fluctuates around an MSY level. **SG100 is not met**. | | | |
| References | ICES (2020a) Advice on sandeel 1r<br>ICES (2020b) HAWG Chapter 9.2 Sandeel in 1r | | | | |
| **Overall score** | | **70** | | | |
| **Condition** | | **Condition 4** | | | |
| **Stock Status relative to Reference Points** | | | | | |
| | | | | | |
| Target Reference point | MSY B escapement<br>Fcap | 145,000 t<br><br>0.49 | SSB (2020) 84,881t<br>SSB (2021) = 169,415t | | |
| Limit Reference points | Blim | 110,000 t | F(2019) = 0,55 | | |
| | | | | | |

**Evaluation Table for PI 1.1.2 – Stock rebuilding**

| | | | | |
|---|---|---|---|---|
| **PI 1.1.2** | | **Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe** | | |
| **Scoring Issue** | | *SG 60* | *SG 80* | *SG 100* |
| **a** | **Rebuilding timeframes** | | | |
| | **Guidepost** | A rebuilding timeframe is specified for the 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 stock. |
| | **Met?** | *Yes* | | *Yes* |
| | **Justification** | *The generation time of North Sea sandeel is around 2.5-3 years. The Management of the sandeel 1r stock is based on ICES advice which includes a rebuilding time shorter than 1 generation. SG60 is met.*<br>*This is further supported by the finding that the stock has been fluctuating around the MSY level over the most recent 10 years. SG100 is met.* | | |
| **b** | ***Rebuilding evaluation*** | | | |
| | **Guidepost** | Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe. | *There is evidence that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.* | *There is **strong** evidence that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.* |
| | **Met?** | *Yes* | *Yes* | *No* |
| | **Justification** | *The sand eel stock in 1r is monitored annually by the Dredge survey and by indicators from the fishery. There is detailed fisheries statistics available**. SG60 is met.***<br>*The status of the stock fluctuating around MSY over the recent decade provides evidence that the management approach maintains the stock around MSY levels. **SG80 is met.***<br>*The recent observation of the F > Fcal for 2017-2019 suggests that there is not string evidence available that the rebuilding strategies at current fishery – although the 2020 TAC has been set according to ICES advice – are rebuilding the stock.. **SG100 is not met.*** | | |
| **References** | | *ICES (2020a)*<br>*ICES (2020b)* | | |
| **OVERALL PERFORMANCE INDICATOR SCORE:** | | | | **90** |
| **CONDITION NUMBER (if relevant):** | | | | **NA** |

# 6 References

DNV GL. 2018. PUBLIC CERTIFICATION REPORT Initial assessment of the Norway sandeel, pout and North Sea sprat fishery Norges Fiskarlag Report No.: 2017-008, Rev 4.1 Date: February 2nd 2018 Certificate code: F-DNV-251453

DNV GL. 2019. SURVEILLANCE AUDIT NO. 1 Report for the Norway sandeel, pout and North Sea sprat fishery Norges Fiskarlag, Pirsenteret, 7462 TRONDHEIM Report No.: 2019-007, Rev. 0 Date: 2019-05-09 Certificate number: F-DNV-251453

EU 2020 Regulation (EU) 2020/123 as regards certain fishing opportunities for 2020 in Union and non-Union waters with later amends for sandeel

ICES. 2020a. Sandeel (Ammodytes spp.) in divisions 4.b and 4.c, Sandeel Area 1r (central and southern North Sea, Dogger Bank). In Report of the ICES Advisory Committee, 2020. ICES Advice 2020, san.sa.1r, https://doi.org/10.17895/ices.advice.5760.

ICES. 2020b. Sandeel in Division 3.a and Subarea 4. In Herring Assessment Working Group for the Area South of 62°N (HAWG), Section 9.2 (Sandeel in SA 1r) In prep. Section 9 is available separately at the HAWG website. http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/Fisheries%20Resources%20Steering%20Group/2020/HAWG/11%20HAWG%20Report%202020%20-%20Sec%2009%20Sandeel%20in%20Division%203.a%20and%20Subarea%204.pdf

# 7 Appendices

## 7.1 Evaluation processes and techniques

The expedited audit was done as a desk-top offsite audit.

### 7.1.1 Site visits

The Expedited audit for the Norway sand eel, pout and North Sea sprat fishery was done off-site as a desk study. The audit was announced on the MSC website on 14th April 2020 and by stakeholder notification on 15th April 2020.

### 7.1.2 Stakeholder participation

There was no stakeholder participation in this expedited audit.

## 7.2 Stakeholder input

There was no need for stakeholder input in this expedited audit.

## 7.3 Revised surveillance program.

The certificate anniversary is subject to a 6-month extension in accordance with Covid-19 Derogation 27 March 2020 and the new expiry date of the certificate is 23.08.2023.

**Table 12 – Fishery surveillance program**

| Surveillance level | Year 1 | Year 2 | Year 3 | Year 4 |
|---|---|---|---|---|
| Level 6 (Normal surveillance CRv 1.3) | On-site | On-site | On-site | On-site surveillance audit & recertification site visit |

**Table 13 – Timing of surveillance audit**

| Year | Anniversary date of certificate | Proposed date of surveillance audit | Rationale |
|---|---|---|---|
| 3 | 23 August | | The surveillance audits are integrated with assessments of other fisheries for the client NORGES FISKARLAG, each with varying anniversaries. The most viable period for all the relevant fisheries and the client will be the timing of the next audit |

**Table 14 – Surveillance level rationale**

| Year | Surveillance activity | Number of auditors | Rationale |
|---|---|---|---|
| 3 | On-site audit | 2 auditors on-site | |

## 7.4 Harmonised fishery assessments

There is only one fishery that overlaps with the Norway sand eel, pout and North Sea sprat fishery. The PCR of 06 February 2018 states that the assessment team decided not to harmonise with the DFPO and DPPO North Sea, Skagerrak and Kattegat Sand eel, Norway Pout, and Sprat fisheries assessment report due to the following reasons:

- For all Principles: The DFPO and DPPO North Sea, Skagerrak and Kattegat Sand eel, Norway Pout, and Sprat fisheries is assessed under v1.3 of the MSC FCR, while the Norway pout, sand eel and North Sea sprat is certified against the MSC FCR v2.0
- For Principle 1: New ICES advise has been released since the DFPO and DPPO North Sea, Skagerrak and Kattegat Sand eel, Norway Pout, and Sprat fisheries assessment. Moreover, the definition of the areas covered by these advices (specifically for the different sand eel stocks) has been revised by ICES on February 2017.
- For Principle 2: As the DFPO and DPPO North Sea, Skagerrak and Kattegat Sand eel, Norway Pout, and Sprat fisheries certification report falls under MSC CR v1.3, PI related to primary and secondary species were not possible to harmonize. The scoring and rationales for PI 2.3, 2.4 and 2.5 was taken into account during the assessment process.
- For Principle 3: Even though the fisheries take place mainly in the same fishing grounds (North Sea), they fall under different management regimes which cooperate among each other.

However, the stock in sandeel area 1r is managed by EU under the CFP COUNCIL REGULATION (EU) 2019/123. The Norwegian fisheries only have access to this fishery if EU exchanges quota with Norway. The first surveillance audit of this fishery rescored PI1.1.1 tp <60 as the stock in sandeel area 1r was found to be depleted and at reduced reproductive capacity and the UoC 1 was suspended in May 2019. This suspension was harmonised with MRAG's DFPO and DPPO North Sea, Skagerrak and Kattegat Sand eel, Norway Pout, and Sprat fisheries.

During their 3rd surveillance audit MRAG initiated harmonization initially by email of 20.03.2020 and then by a Skype meeting on 27th March 2020 between the MRAG Americas P1 expert, Jake Rice, and the DNV GL P1 expert, Hans Lassen, with team leaders from both MRAG Americas and DNV GL in attendance. It was agreed that both teams would consider expected SSB for sandeel in area 1r based on the 30th percentile of the 2019 recruitment estimate as the relevant figure for assessing PI 1.1.1. Calculations based on the ICES Working Group report were carried out by both teams and a few more email exchanges were needed to arrive at a harmonized agreement on 6th April 2020 to lift the suspension in sandeel area 1r.

Due to mandatory annual holidays in week 15 as a result of COVID-19 measures and subsequent Easter holidays in Norway; MRAG Americas team and Norges Fiskarlag (the client for the Norway sandeel, pout and North Sea sprat fishery) acknowledged a delayed expedited audit and subsequent suspension for the DNV GL Norwegian fishery which does not currently fish in area 1r, – ref. enclosed correspondence in 6.4.1.

**Table 15 Overlapping fisheries**

| Fishery name | Certification status and date | Performance Indicators to harmonise |
|---|---|---|
| DFPO and DPPO North Sea, Skagerrak and Kattegat Sand eel, Norway Pout, and Sprat fisheries. | Certified | PI 1.1.1 |
| Norway sandeel, pout and North Sea sprat fishery | Certified 06.02.2018 | PI 1.1.1 |

**Table 16 Overlapping fisheries**

| Supporting information | |
|---|---|
| Relevant harmonisation emails are at the end of this chapter. | |
| Was either FCP v2.1 Annex PB1.3.3.4 or PB1.3.4.5 applied when harmonising? | **No** |
| Date of harmonisation meeting | **Skype meeting of 27.03.2020 & numerous emails.** |

| If applicable, describe the meeting outcome |
|---|
| As described above. |

**Table 17 Scoring differences**

| Performance Indicators (PIs) | DFPO and DPPO North Sea, Skagerrak and Kattegat Sand eel, Norway Pout, and Sprat fisheries. | Norway sandeel, pout and North Sea sprat fishery |
|---|---|---|
| **PI 1.1.1** | **70** | **70** |

### 7.4.1 Harmonisation communication

**From:** Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>
**Sent:** mandag 20. april 2020 18:08
**To:** Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
**Subject:** RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Hi Sandhya.
Apologies for this mistake. Yes I confirm a 1.1.1 score of 70. Hope you are also keeping well and had a nice break over Easter, etc. Strange times indeed.
Kind regards,
Amanda

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Amanda Stern-Pirlot
Director—Fisheries Certification
MRAG Americas--Seattle

**From:** Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
**Sent:** Monday, April 20, 2020 3:16 AM
**To:** Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>
**Subject:** RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Dear Amanda,

Hope you are doing well in these very strange times.

The DNV GL assessment team is working on the expedited audit report and while harmonising with your report we find that your MRAG report of 6th April 2020 is contradictory - the scoring table for 1r PI 1.1.1 indicates an overall score of 60 while the justification claims that PI 1.1.1b SG80 is met – see below. The DNV GL assessment team has assumed that justification applies and we intend, therefore to score 1.1.1 at 70. Please confirm this.

*Unit 1r – the SSB has been fluctuating but generally above the previous $B_{lim}$ and the present $_{MSY}B_{escapement}$ for this unit since 2000. In the past eight years SSB has been below MSY $B_{lescapement}$ for three years and above it it for five (ICES 2015a Figure 2A) Hence the* ***SG 80 is definite met for the management unit****. However, because of questionable interpretation of MSY $B_{escapement}$ as a target consistent with MSC standards,, and the fact that only a small majority of the SSB estimates of the management unit in recent years have been above that benchmark, SG 100 is not met.*

Thank you.

BR / MVH
For DNV GL Business Assurance Norway AS

Sandhya Chaudhury
Principal Specialist

E-mail sandhya.chaudhury@dnvgl.com
Mobile +47 404 00 404

**From:** Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>
**Sent:** mandag 6. april 2020 16:38
**To:** Chaudhury, Sandhya
**Subject:** RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Thanks Sandhya, Happy Easter to you too, and have a nice break! I will mention in our report the timing aspect of the harmonization from your side, too, so it is explicit that we discussed it and why it didn't happen simultaneously and also why it doesn't matter.
We shall be in touch again soon, no doubt!

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Amanda Stern-Pirlot
Director—Fisheries Certification
MRAG Americas--Seattle
**1631 15th Ave W, Suite 215—NOTE NEW SUITE NUMBER**
Seattle, WA 98119
**Office:** +1 (206) 430 5286
**Cell:** +1 (206) 669-0439
www.mragamericas.com

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**From:** Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
**Sent:** Monday, April 6, 2020 7:24 AM
**To:** Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>
**Subject:** RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Thanks Amanda,
We will have to do an expedited audit. Since DNV GL in Norway are on mandatory holiday (COVID 19 measures) followed by easter holidays we are not back at work before 14th so I will have to lift suspension around the 15th but client has confirmed that they do not fish in 1r so I hope we will not have any problems with ASI.
Hope you and your family are doing well. Have a safe easter.

BR

From: Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>
Date: 06/04/2020 16:15 (GMT+01:00)
To: "Chaudhury, Sandhya" <Sandhya.Chaudhury@dnvgl.com>
Cc: Ken Haste Andersen <kha@aqua.dtu.dk>, Hans Lassen <hans.lassen@lassen.mail.dk>, Michealene Corlett <michealene.corlett@mragamericas.com>, "Rice, Jake" <Jake.Rice@dfo-mpo.gc.ca>
Subject: RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Thank you, Sandhya, for this constructive reply. We will update our report accordingly and lift the 1r suspension today. I'll send you the final version of our surveillance report once we have it updated so it's handy for you when you do yours.
Thanks again to you and Hans and hope you stay well and safe,
Amanda

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Amanda Stern-Pirlot
Director—Fisheries Certification
MRAG Americas--Seattle

**From:** Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
**Sent:** Friday, April 3, 2020 7:12 AM
**To:** Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>
**Cc:** Ken Haste Andersen <kha@aqua.dtu.dk>; Hans Lassen <hans.lassen@lassen.mail.dk>; Michealene Corlett <michealene.corlett@mragamericas.com>; Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>
**Subject:** RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Dear Amanda,

Thank you for the revised justification which is closer to a rationale DNV GL can accept in their report.

1. We are told by ASI on several occasions that we can base our scoring only on the requirements of the MSC Standard, the FCR / FCP, the Interpretation Log and explicit responses to variation requests. Any other guidance, even documented, from MSC is not considered by ASI. We have, therefore requested a reference to the standard. We did not ask for an authority on this issue but on an authority to calculate the standard deviation for the projected SSB., i.e. to provide the 70% percentile of the predicted SSB.
2. Failing the above and to cut this harmonisation short, DNV GL team expert for this fishery, Hans Lasses used this Friday to make the calculations based on data found in the Advisory document (Feb 2020) and in the HAWG (Feb 2020) report. Abundance of the 1-group, which in most years dominates the catches, is estimated on the basis of the 0-group index from the dredge survey in December of the preceding year, (HAWG p. 9). The model estimates a low variance on the survey index for age 0. There are indications of a retrospective pattern in recent years as older fish do not seem to appear in the catches at the expected level. (HAWG p. 9)
3. The key point is the relevant standard deviation for the projected SSB, the main contribution to the predicted SSB is the 2019 year-class, (given as 145982893, Advisory document table 10), uncertainty in this estimate comes from the age 0 dredge survey where the WG report provides this number as 0.39, (HAWG 2020 report p. 39) while solving the equation from the Recruitment Table 10 in the advisory document suggests 0.335. Based on the 0.335 value and ignoring the uncertainty in the older age groups we agree that the predicted 70% level is above Blim (we find 147 kt). Using the 0.39 value the value drops to 143 kt. At the 70% probability level Hans has deduced that the age 2 contributes 11% kt resp. 112 kt. The uncertainty for the older age groups is given as a standard deviation from the dredge survey with a value 0.77. The contribution to the predicted SSB of these older age groups is around 20% and even if these older age groups did not contribute at all, the result would be above Blim (110 kt). We are still not certain that we have made the correct calculations and preferred if an authoritative expert with more knowledge of the intricacies of the sandeel assessment had made these calculations. The uncertainties in the calculations are high and could surely been done differently.
4. The internal consistency, i.e. the ability of the survey to follow cohorts, (Figure 9.2.4) still shows a low correlation between the 0-group and 1-group (i.e. r2 = 0.22 on log scales). This can be a result of highly variable total mortality. If this is so, this will weaken the ability of the dredge survey to predict the incoming year class. This adds to uncertainty.
5. Finally we find that comment on the "b) The 2020 dredge survey estimate contributes almost nothing to the 2021 SSB estimate, because the cohort whose size is largely estimated by that survey will not yet be mature in 2021." Is slightly misleading because the survey will contribute with an age 1 index which will consolidate the January 2021 assessment of the stock size.

In conclusion we have satisfied ourselves that the suspension can be lifted. Even though the formal calculations show that the SG80 bar is probably also reached, we find that the uncertainties around the calculation does not warrant such a strict application of the formal results. We agree that SG80 is therefore not met.

We propose that you review the justification in light of the above comments.

Finally Amanda, the lifting of the suspension should be done simultaneously, but DNV GL will have to do the expedited audit process of announcement-review-report after agreement with client. The earliest I can start this process is on the 14th April 2020 (we are on Easter holiday here from this weekend) but I understand that doing a harmonised timeline for lifting the suspension maybe difficult for your client. Our client has confirmed yesterday, that they have no fishing activities in sandeel area 1r in the near future so a delayed lifting of suspension will not matter, I hope.

Thank you.

BR / MVH
For DNV GL Business Assurance Norway AS

Sandhya Chaudhury

**From:** Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>
**Sent:** torsdag 2. april 2020 22:30
**To:** Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
**Cc:** Ken Haste Andersen <kha@aqua.dtu.dk>; Hans Lassen <hans.lassen@lassen.mail.dk>; Michealene Corlett <michealene.corlett@mragamericas.com>; Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>
**Subject:** RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)
**Importance:** High

Thank you, Sandhya,
We have reformulated our reasoning and tried to address your key concerns more clearly, below. We appreciate your willingness to continue to work toward resolution.

The issue for sandeel: The MSC standard normally requires evaluation of the status of the stock based on the size of the SSB relative to the MSC benchmarks, as it will be when the harvest being certified has been taken.

For long-lived stocks with recruitment showing "typical" variation from year to year, and assessments based on calendar year increments, this approach works well. Detail of when recruitment, fishing mortality and spawning occur don't matter greatly to the evaluation.

For short lived stocks with highly variable recruitment, two problems are presented if spawning occurs before the recruitment event for the calendar year.

- One is that the SSB in that year may be much smaller than the Fishable Biomass, if the recruiting year class contributes to the Fishable Biomass.
- The other is that the Spawning Biomass for that calendar year does NOT reflect how much spawning potential will be left for the stock after the harvest for the year is taken but it reflects how much spawning potential was left after the fishery the previous year. The SSB relevant to how sustainable the fishery in that calendar year is (which is what matters to the annual audit) will be the SSB estimated to be left at the very end of that calendar year. That SSB can only be *projected* at the time of the annual MSC evaluation, using the best information available for how strong the incoming recruitment will be AND how large the fishery will be as the rest of the year unfolds.

In the case of sandeel in both 1r and 2r, the February 2020 assessment documents both that the SSB that the start of 2020 was below the MSC benchmarks, and that an exceptionally strong year-class will enter the stock during the calendar year. Even with risk averse treatment of the estimates of this incoming year-class, the assessment projects two things for the rest of calendar year 2020.

- The stock would be able to support a large harvest, because the incoming yearclass is large enough to be harvested and processed. This is the catch included in the ICES advice
- The incoming yearclass will be largely mature by January 2021 and even with the catch advised by ICES taken from the stock the SSB for the stock will be comfortably above Blim .

MSC has active standards development happening in this area of "yo-yo fisheries" for exactly these reasons, and though the guidance is not yet as clear as it hopefully will be, we can still find some relevant information in the MSC standard to justify the approach we are taking here such as GSA 2.2.3. and 2.2.16.

- MRAG Americas "sense checked" this rationale with Chris Zimmermann, member of the MSC Technical Advisory Board, ICES ACOM member, and Director of the Thünen Institute for Baltic Sea research in Rostock and he said the following: I *agree that current Blim is not a useful measure in this case - but the measure could be of SSBlim or Bescapement can be reached next year as a result of the strong incoming yearclass.*

What we decided/agreed on the harmonization call (I think):

- We agreed that SSB as of Jan 1 2020 is not a good indicator of biomass available to the fishery, because they fish mostly on incoming recruits, starting in April, and, very importantly, spawning by the standing stock (biomass reflected in the 2020 ICES report) has already occurred.
- Because SSB is not a good indicator, it is not appropriate to use this simple metric as the basis for maintaining or lifting the current MSC suspension.
- ICES also recognizes SSB is not the appropriate metric to determine sustainable fishing in 2020, which is why they have advised a rather large TAC for North Sea sandeel for the 2020 season.
- However, ICES estimates 31/12/20 biomass based on the geometric mean value for expected recruitment, while the MSC standard requires at least a 70% certainty that the stock is (or will be, in this case) above Blim.
- To accommodate this discrepancy, as discussed on call, the MRAG team calculated 31/12/20 SSB predicted based on the 30$^{th}$ percentile of expected recruitment (using the 5$^{th}$, 50$^{th}$, and 95$^{th}$ percentile values provided by ICES and confirmation that the distribution is log-normal), and assuming the full fishery is prosecuted in 2020 (i.e. entire allocated TAC is taken; the most conservative possible value). You are correct that there is no 2020 dredge survey result available now.

Furthermore:

- Although this particular calculation and the calculation of resulting lower 31/12/20 SSB was not presented by an "authoritative source" (rather done by the highly qualified MRAG team) the actual calculations are simple mathematics, based on data and other information (the function, and the three data points mentioned above) provided by ICES, and confirmed by the key stock assessment author (and a former chair of ICES WGSAM and Danish delegate to ICES), Anna Rindorf. The explanation of the recruitment estimate calculation is attached to this email and we will put it in our surveillance report as well.

- The method used to calculate the 2021 SSB from this (30$^{th}$ percentile) recruitment estimate, rather than the 50$^{th}$ percentile used in the ICES document, was to reduce the advised estimate of SSB2021 by the ratio of 30$^{th}$ to 50$^{th}$ percentiles, under the assumption that this cohort would be subject to the same natural mortality and fishing mortality as the more successfully recruited one (at 50$^{th}$ percentile) would have been. This was double checked for area 1r by doing this calculation the long way and the values matched. By "do the long way" we mean:

a) go to the full assessment WG report and get the January 1, 2021 numbers at age, weights at age, and maturation at age from the tables

b) take the ratio of Recruitment(2019) from the advisory table 2, to the size of that cohort in the numbers at age 1/1/21 table in the assessment (which should be the survivors of the cohort after natural mortality and fishing mortality during calendar year 2020 as used in the assessment, and alive in the SSB on 1/1/21);

c)multiply that ratio by the 30$^{th}$ percentile of recruitment (from the attached calculation). That should give the survivors in 2021 if the smaller cohort had experience the same fishing and natural mortality as the larger cohort did.

d) substitute the new value for that one cohort into the numbers-at-age vector from step a) but leave everything else the same;

e) do the sum of products of numbers-at-age x weight-at-age x maturity-at-age, and have the SSB.

- Regarding the lack of catch data 2020 and dredge survey data 2020 potentially adding more than recruitment uncertainty to the 2021 SSB estimate currently available, we offer the following:
  a) The above calculation assumes the full TAC from the fishery is taken in 2020; this is the most conservative possible value. The 2020 fishery will affect survivors of all year classes included in the fishable biomass of which the year classes included in the 2020 spawning biomass are a subset.
  b) The 2020 dredge survey estimate contributes almost nothing to the 2021 SSB estimate, because the cohort whose size is largely estimated by that survey will not yet be mature in 2021.

Are there any further points requiring discussion at this stage?

Thanks and looking forward to hearing from you soon,
Amanda

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Amanda Stern-Pirlot
Director—Fisheries Certification
MRAG Americas–Seattle

**From:** Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
**Sent:** Thursday, April 2, 2020 7:05 AM
**To:** Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>; Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>
**Cc:** Ken Haste Andersen <kha@aqua.dtu.dk>; Hans Lassen <hans.lassen@lassen.mail.dk>; Michealene Corlett <michealene.corlett@mragamericas.com>
**Subject:** RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Dear Amanda,

The DNV GL assessment team does not intend to be difficult but we must be in a position to defend our justification to ASI and hope we come to a common, desired outcome to this harmonisation.

Concerning using the confidence limits for the recruitment 2019 as the basis for calculating the confidence limits for the SSB(31/12 2020) we would remark that the Recruitment (2019) is based on inter alia catch data for 2019 and results from the Dredge survey November-December 2019 as explained by Jake. Such data are not yet available for the 2020 (31/12) SSB therefore we expect that the uncertainty for the 31/12 SSB is larger than the Recruitment (2019).

Your comment on the basis for using a projected SSB for scoring is, and we agree, that if the 70% probability is > Blim then we can lift the suspension. In the absence of a direct reference to the standards requirements, we are in the process of determining if any clause or guideline in FCR v2.0 (including GSA 2.2.3 and GSA 2.2.16 as mentioned in your email) can be interpreted to imply the use of “projected SSB” and will have to revert to on this- hopefully tomorrow.

We understand that your authority is Anna Ringdorff (DTU Aqua). Could you please clarify her position? Does she have a mandate from ICES, is she representing DTU Aqua or is she making a statement in a personal capacity? It is not clear from the ICES website that she has an ICES mandate.

Thank you.

BR / MVH
For DNV GL Business Assurance Norway AS

Sandhya Chaudhury

Principal Specialist

From: Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>
Sent: onsdag 1. april 2020 16:41
To: Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>; Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>
Cc: Ken Haste Andersen <kha@aqua.dtu.dk>; Hans Lassen <hans.lassen@lassen.mail.dk>; Michealene Corlett <michealene.corlett@mragamericas.com>
Subject: RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Hi Sandhya,
This is indeed unfortunate but we are not giving up just yet. We are going to publish our surveillance report and lift the suspension on area 2r which does not require harmonization. We will report our rationales on both 1r and 2r in this report, but will also not rescore 1r and note the reason for this is continued lack of harmonization agreement with DNV. We will also report in our harmonization section DNV's latest points of disagreement and MRAG's responses to them (which are also in this email, below). As the Danes are not expected to receive deliveries of sandeel from area 1r for another week or so, we can hopefully continue this discussion and find agreement. Please see below for our immediate response to your latest responses. I know we don't want to carry this on forever, but we do stand by our reasoning and data, and hope you and Hans will continue to keep an open mind in dialogue with us over the coming few days.
Thank you,
Amanda

The predicted SSB for 2020 (1/1 2021) would be demonstrated to be above the 70% percentile. The calculation accounts for the uncertainty for the SSB for 2019. Our point is that the prediction includes a further uncertainty based on the dredge surveys ability to predict the incoming year-class and not alone the assessment uncertainty.
Response from Jake: Generally, It has been a fundamental principle of statistics that successive uncertainties in a chain of information and computations informing a decision are multiplicative. If one takes the 30th percentile of a survey estimate and THEN the 30th percentile of pdf estimated using (among other data perhaps) that survey estimate, then the total risk aversion in the decision option resulting from those computations, relative to the property underlying the survey value, is NOT also the 30th percentile of risk but the 09th percentile (.30th percentile OF the 30th percentile). So with the MSC standard requiring the 30th percentile OVERALL for the harvest, it could be achieved by any product of the risk aversion of the both the survey estimate uncertain AND the assessment uncertainty that together gives .0.3. and we have that. In addition, In all the assessment meetings I ever attended for DFO, for ICES and for NMFS, it didn't matter whether an input data series of importance to the assessment was from a research survey, catch monitoring, questionnaires or any else, the first time that data source was used, there was a rigorous evaluation of the survey design and analytical methods used to produce the numbers that would be used in the assessment. It has been a VERY long time since we met in Copenhagen and then went to the west coast to meet the industry, and did that first review of the analytical methods used in the assessment. Too long ago to remember all the details, but ANY competent assessment takes the uncertainty in the input data into the assessment computations. Moreover, the retrospective analyses that are now standard in assessments and presented for these stocks right in the advice – gives insight into the magnitude of these sources of uncertainty (taking advantage of the fact that each year the assessment has more and more information with which to estimate parameters like this, and just see how good or bad past estimated were. I'm completely satisfied that the retrospective information we see in these assessments validates the decisions made by both the assessment WG and by us as an audit team that the assessment uncertainty treats the largely survey-based estimate appropriately.
2. That this calculation should be presented by an authoritative source e.g. the ICES WG chair/ACOM The authoritative source provided the 10$^{th}$, 50$^{th}$, and 90$^{th}$ percentile values and confirmed a log-normal distribution (Ken did speak with Anna Rindhof about this). Therefore it is trivial mathematics to calculate the 30$^{th}$ percentile. Any of us are capable of it, and certainly any of us with the qualifications required to be an MSC P1 assessment team member. We could do a better job of documenting this in the report, however.
3. That it is demonstrated that the MSC FCR v2.0 allows scoring of the PI 1.1.1a based on projected SSB. See the following from MSC GSA 2.2.3: In requiring that fish stocks are 'likely above the PRI' (SG60 in PI 1.1.1), MSC recognises that fish stocks do not have an exact and constant level below which recruitment will always be impaired. In a Beverton-Holt type stock-recruit relationship, recruitment declines with any reduction in stock size from the unexploited level. The PRI should be interpreted as the point below which there is an increased risk that recruitment may be substantially impaired and fisheries should be managed such that the risk of stocks falling below this level is very low. Where historical estimates of stock size and resulting recruitment are available, the PRI may be identifiable as the point below which reduced recruitment has been observed in the past, and above which recruitment appears to be more related to environmental factors than to stock size. Furthermore 2.2.16: Environmental variability is generally high for fisheries based on key LTL species compared to non-LTL fisheries. In some cases, this makes biomass based reference points meaningless and better justifies the use of F-based management approaches. The highlighted

sentence is key here. We have determined that the risk of having the fishery is sufficiently low to score SG60 but not SG80 based on the calculations we agreed to.
And,
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Amanda Stern-Pirlot
Director—Fisheries Certification
MRAG Americas—Seattle

From: Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
Sent: Wednesday, April 1, 2020 12:41 AM
To: Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>; Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>
Cc: Ken Haste Andersen <kha@aqua.dtu.dk>; Hans Lassen <hans.lassen@lassen.mail.dk>
Subject: RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Dear Amanda,

DNV GL regrets that the text is not fully satisfactory and does not address DNV GL's request, at our Skype meeting of Friday 27.03.2020 and in earlier emails, for all information/calculations to be backed by authoritative source.

We reiterate that to lift the condition for 1r the following three issues need to be addressed, which we do not find in your email below of 31st March 2020:

1. The predicted SSB for 2020 (1/1 2021) would be demonstrated to be above the 70% percentile. The calculation accounts for the uncertainty for the SSB for 2019. Our point is that the prediction includes a further uncertainty based on the dredge surveys ability to predict the incoming year-class and not alone the assessment uncertainty
2. That this calculation should be presented by an authoritative source e.g. the ICES WG chair/ACOM
3. That it is demonstrated that the MSC FCR v2.0 allows scoring of the PI 1.1.1a based on projected SSB.

Thank you.

BR / MVH
For DNV GL Business Assurance Norway AS

Sandhya Chaudhury
Principal Specialist

From: Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>
Sent: tirsdag 31. mars 2020 20:35
To: Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>; Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>
Cc: Ken Haste Andersen <kha@aqua.dtu.dk>; Hans Lassen <hans.lassen@lassen.mail.dk>
Subject: RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)
Importance: High

Hi Sandhya and Hans,
With thanks again for your time in thinking through the sandeel suspension situation, Jake and Ken have run the numbers according to the telephone discussion, and on this basis have determined we can lift the suspension and rescore sandeel 1.1.1 in 1r (and 2r) above 60 but still below 80. Here's Jake's updated reasoning. Time is of the essence here, thus it would really be great if you could confirm your agreement to this as soon as possible. We are going to publish our surveillance report tomorrow, with the area 2r suspension lifted, and would very much like to be able to do the same for area 1r in the same report at the same time. I realize this gives you almost no time to think, but hopefully at this stage that's ok based on the thinking you did before on this issue!
Thank you both and kind regards,
Amanda

Updated rationale (not yet edited for spelling/grammar etc, please forgive typos):
Sandeel in Management Area 1r
Recruitment for 2019 of $146x10^6$ thousand recruits was nearly 8 times the size of the 2017 year-class, which was the weakest year class in the 35-year time series, and about 2.2 times the size of the 2018 yearclass. This places it 40% larger than the recent geometric mean for the full time series. The strong 2016 year-class that was well represented

in the 2018 and to some extent the 2019 SSB and fishery has almost completely passed through the fishery and the SSB. Moreover the strength of the yearclass recruiting in 2018 was revised downward from the 2019 to the 2020 assessments, from 110x$10^6$ thousand recruits to 67 x$10^6$ thousand recruits, such that the SSB in January 2020 dropped more than was projected in the 2019 assessment.
The estimate of the January 2020 SSB of spawning biomass of 84,881 mt was more than 10% below the 2019 projection of 96,636 mt for the 2020 SSB. This placed it not just well below the Bescapement target for this stock of 145,000, (the value taken as indicative of a very low likelihood of the SSB being reduced to a level when the risk of impaired recruitment may increase), but also only 77% of the Blim of 110,000 mt. The revision to incoming recruitment in 2019 for the 2020 SSB also resulted in a revised estimate of F of 0.55 was slightly above the Fcap of 0.49 used by ICES as a precautionary benchmark (but not active control rule) of fishing mortality for short-lived stocks. The continued fishing mortality at vales above 0.50, combined with the exceptionally weak 2017 yearclass and downward revisions of the 2019 recruitment, has resulted in a substantial decline in the SSB, to well below the escapement benchmark for the stock.
With the estimated SSB in January 2020 now below both the Bescapement and the Blim for this stock, the stock would be below the score of 60 on the appropriate P1 scoring criterion for MSC Certification. However, the very poor 2017 recruitment and weak subsequent recruitments have been attributed to poor oceanographic conditions and not a depleted spawning biomass. The status of the stock at the start of 2019 justified a temporary suspension of of the MSC certificate for that stock, and of the January 2020 SSB estimate was the only consideration, continuation of the suspension would be appropriate. However, spawning annually occurs in January, and the assessment in February 2020 reports a substantially improved recruitment of 146x$10^6$ incoming recruits, that will already start to mature and contribute to the 2021 SSB as well as to 2020 fisheries, if any. Even assuming the geometric mean for the recruitment in 2021, using the median estimate for Recruitment (2019), ICES projects that the much improved recruitment growing and starting to mature in 2020 will result in a January 2021 SSB of 169.415 t , which is well above the Bescapement target and more than 150% of Blim. These projections assume a fishing mortality in 2020 of 0.49, consistent with ICES guidance for short-lived stocks, which would produce a projected catch of 114,000 t. This would mean the stock would start 2021 with an SSB comfortably above the benchmark used for this stock, and a fishing mortality at or below the precautionary benchmark for short lived stocks as well.
However, to score a 60% on the corresponding P1 criteria and benchmarks for SSB , and justify lifting the suspension for the 2020 fishery, there has to be a 70% likelihood of the SSB meeting or exceeding the Blim of 110,000, which can be approximated by the 30$^{th}$ percentile of Recruitment (2019). This percentile was estimated from the 50$^{th}$, 90$^{th}$ and 10$^{th}$ percentiles of recruitment, as reported in Table 10 of the ICES advisory document, and following the ICES assumption that the recruitment estimate follows a log-normal distribution. This provides an estimate of the 30$^{th}$ percentile of Recruitment(2019) (i.e a probability of at least 0.7 that the recruitment is that large or larger) of 1.11541 X $10^{8.}$ If the full advised ICES catch for 2020 were taken, and accounting for natural mortality in 2020, this would result in a January 2021 SSB of at least 129,444 t, which is above the Blim of 110,000t for this stock, but still below the Bescapement of 145,000 t.
Therefore, even if the full ICES advised catch were taken in 2020, the suspension of certification could be lifted, because the stock would be 110% of the Blim for this stock, meeting standard of at least 70% probability of SSB being above the PRI (which in ICES assessments is usually represented by Blim). However the Btarget for this stock would not yet be met. To have at least a 70% likelihood of meeting the target as well as have a 70% likelihood of being above the PRI, the shortfall in SSB of approximately 16,500 t could be compensated for if catches in 2020 were lower than the ICES advice. The unharvested part of the advised catch should be discounted for the expected natural mortality on that age in the second half of 2020. Using the estimate of natural mortality of 0.49 from Table 9.2.8 in the ICES Herring WG Report, a reduction in harvest from the ICES advised 113,987 t by 30,000 t or more to below 83,987 would be necessary for there to be at least an 0.7 probability of SSB being above the Bescapement in January 2021.

This is an awkward situation, with a stock entering 2020 in a condition that would justify retaining the suspension of certification for 2020. However spawning for 2020 has already been completed well before the 2020 fishery would start in the Spring, and incoming strong recruitment could support a moderate fishery and still leave a median 2021 SSB well above the target and 150% of the limit benchmarks for SSB. The stock would also meet the 70% MSC benchmark for being above the Blim (PRI) for the stock, although if the full catch is taken, the January 2021 SSB would no longer also exceed the target Bescapement for this stock with a 70% likelihood. The proper decision about listing or retaining suspension of the MSC certification is depending on whether the decision is based on the January 2020 or the January 2021 SSB, but to a lesser extent also linked with what size fishery will be conducted in 2020.

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Amanda Stern-Pirlot
Director—Fisheries Certification
MRAG Americas--Seattle
1631 15$^{th}$ Ave W, Suite 215—NOTE NEW SUITE NUMBER
Seattle, WA 98119

From: Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>
Sent: torsdag 26. mars 2020 23:47
To: Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>; Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
Cc: Ken Haste Andersen <kha@aqua.dtu.dk>; Hans Lassen <hans.lassen@lassen.mail.dk>
Subject: RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Ok can we try 8:30am Pacific/11:30 Eastern/16:30 Central European? Regular skype is good. My skype is mandyinkiel and Jake's is jake.rice61. Sandhya are you sandhya2106?
Thanks all,
Amanda

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Amanda Stern-Pirlot
Director—Fisheries Certification
MRAG Americas--Seattle

On Mar 26, 2020, at 1:00 PM, Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com> wrote:

Dear Amanda,
7 AM Pacific time / 3PM CET is fine. We can do a Skype call. If Skype business is an option let me know and I will send an invite. If not, please send me the skype addresses and I will call in a meeting at the given time tomorrow
BR

From: Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>
Date: 26/03/2020 19:23 (GMT+01:00)
To: "Chaudhury, Sandhya" <Sandhya.Chaudhury@dnvgl.com>, "Rice, Jake" <Jake.Rice@dfo-mpo.gc.ca>
Cc: Ken Haste Andersen <kha@aqua.dtu.dk>, Hans Lassen <hans.lassen@lassen.mail.dk>
Subject: RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Hi Sandhya and Jake,
Yes let's do a call. At this point I think the discussion has gotten to a level of technical beyond which it is no longer constructive to correspond by email. What is your availability? Time is once again of the essence so if we could do this tomorrow that would be great. I'm on another call from 7-9am Pacific time (GMT-8) but otherwise available. I'm not sure I'm necessary though so you two should find a time that works without worrying about my availability. I think at issue is that the current SSB relative to thresholds based on an October survey does not seem to be an actual indication of the size or sustainability of the stock for the following year's fishery, for this species. A key question to work through is, why would ICES have advised such a large TAC for the 2020 fishery if they did not think such catches would be sustainable? Please let me know if you'd like me to set up a GoToMeeting call or if we should use skype.
Thanks!
Amanda

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Amanda Stern-Pirlot
Director—Fisheries Certification
MRAG Americas--Seattle

From: Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
Sent: Thursday, March 26, 2020 2:07 AM
To: Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>; Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>
Cc: Ken Haste Andersen <kha@aqua.dtu.dk>; Hans Lassen <hans.lassen@lassen.mail.dk>
Subject: RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Dear Amanda and Jake,

Thank you for your input. DNV GL is happy to participate in a harmonisation meeting on whether the suspension should be lifted or not.

We think that the issue is whether a predicted SSB (1/1 2021) is sufficient for this decision. Apparently, there is agreement that the SSB (2020) is below Blim and on that basis the suspension cannot be lifted.

As background to the discussion we note that
1. The predicted SSB (2021) is ~169 kt > Blim (110 kt) based on a catch in 2020 (essentially 1 half year) of ~110 kt
2. The HAWG February 2020 report for sandeel 1r notes "CPUE data from the dredge survey (Table 9.2.4 and Figure 9.2.5) in 2019 show indices of age 0 and 1 just above and below the average, respectively. The internal consistency, i.e. the ability of the survey to follow cohorts, (Figure 9.2.4) still shows a low correlation between the 0-group and 1-group (i.e. r2 = 0.22 on log scales)."
3. Abundance of the 1-group, which in most years dominates the catches, is estimated on the basis of the 0-group index from the dredge survey in December of the preceding year.
4. The SSB 2021 is dominated by the 2 year old (~80%) estimated based on the Dredge survey (0-group in 2019)

Regards

Thank you.

BR / MVH
For DNV GL Business Assurance Norway AS

Sandhya Chaudhury
Principal Specialist

From: Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>
Sent: tirsdag 24. mars 2020 17:27
To: Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>; Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
Cc: Ken Haste Andersen <kha@aqua.dtu.dk>; Hans Lassen <hans.lassen@lassen.mail.dk>
Subject: RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Thanks for this detailed elaboration, Jake. Sandhya/all, perhaps it would be expeditious to arrange a call if there are still disagreements following this latest exchange?
Kind regards,
Amanda

<°)))><  ><(((°>  <°)))><  <°)))><

Amanda Stern-Pirlot
Director—Fisheries Certification
MRAG Americas--Seattle
1631 15th Ave W, Suite 215—NOTE NEW SUITE NUMBER

From: Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>
Sent: Tuesday, March 24, 2020 6:39 AM
To: Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
Cc: Amanda Stern-Pirlot (amanda.stern-pirlot@mragamericas.com) <amanda.stern-pirlot@mragamericas.com>; Ken Haste Andersen <kha@aqua.dtu.dk>; Hans Lassen <hans.lassen@lassen.mail.dk>
Subject: RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

I'm not sure how completely we are communicating. All the information I used in my audit came from the ICES assessment and advice. The key information is all in those two "Table 2" extracts I copies and pasted directly from the 1r and 2r As I noted in yesterday's email, though, communication is made more complicated because for these short lived stocks the conventional use of the term "year-class" (and what it represents) can get mixed up with their use of "Recruitment (calendar

year)" – as the "Recruitment (2019) and Recruitment (2020)" in the Tables form the ICES advice.
In long-lived stocks, the details of which month spawning occurs, which months fishing occurs etc doesn't really matter very much. In those cases it's common to just refer to year year's recruitment as the Yearclass in which the recruits were spawned. For many gadoid, flatfish etc type stocks, each year-class may enter both the Fishable Biomass (FB) and the Spawning Biomass (SB) over a period of several years. with the fastest growing individuals in a cohort entering the FB at perhaps age 3 and the sb at age 4 or even 5. Each subsequent year more of the cohort recruit until the cohort may be considered "fully recruited" as late as age 7 or even more in the case of redfish, for example. In all such stocks, the details of timing *within* a single year are not considered important enough to take into account in the assessment or the management plan. All the assessment computations are done as if everything (fishing mortality, natural mortality, incoming recruitment and spawning) happens instantaneously each year- even though in reality that is never the case. But for long lived stocks the "instantaneous" assumptions end up being only trivially different from analyses that stretch out these processes over the 12 months of the year. Even in special cases where, for example, all fisheries in a calendar year are complete before the annual spawning occurs, it is usual for the assessment scientists to just shift the "assessment year" to be perhaps September 1to August 31 the next year, just so the annual computations correspond to the stock biology. And the way we all normally talk about stock dynamics has these assumptions imbedded in our conversations. It is why the normal MSC P1 standards assume that the SSB in the assessment are the survivors of all year-classes present at the end of the year before (times their percent mature at age) with no adjustment for in-year events –including incoming recruitment that year or fishery removals.

These de facto assumptions of instantaneous annual stock dynamics events become very problematic in short-lived stocks – a point acknowledged in the MSC special provisions for short-lived stocks. I want to stress again that the expected substantial increase in the SSB in January 2021 (to far above Bescaptment – not just Blim) and the projected large available *sustainable* harvest in the spring and summer of 2020 are in no way whatsoever dependent on either the 2020 *year-class* (whose size is never referred to in either the ICES assessments or the audit text form us), and is also not caused by the values in those two Table 2 extracts that are labeled "Recruitment (2020) and whose strengths are, as both you and I have noted, assumed to be the geometric mean recruitment for the stock, It is the strength of the incoming recruitment called "Recruitment (2019)" in both Table 2 (and the 2018 year-class in typical stock assessment parlance, that is producing the increase in SSB and potential sustainable catch. The strength of this incoming recruitment is well documented by data collected through calendar year 2019 and available for use in the February 2020 assessment of sand eel. This cohort CALLED "Recruitment (2019) in both the February 2019 and the 2020 assessments, was first SEEN in the stock in 2019 (which is why there was ability to collect the information

on how strong it is), but its size had not been estimated in last year's assessment because in February 2019 none of the necessary data existed, and its size a year ago was also assumed to be geometic mean.
Now that "Recruitment (2019) " year-class contributed very little to the SSB estimate for January 2020 from the assessment in February 2020 – because the percent mature for that age is only 3%. Consequently th January 2020 SSB is indeed below all conservation benchmarks for P1. However, spawning for calendar year 2020 IS ALREADY COMPLETED. It was concern about how small the January 2020 SSB was likely to be, given what we knew of the population size and age composition in LAST YEAR'S assessment, that led our audit to the suspensions were justified. And we (and the assessmnnet) were proved correct in our evaluations. Even without a commercial fishery, the January 2020 SSBs were below all the conservations benchmarks. But that is all HISTORY. It is NOT RELEVANT to evaluating how large the SSB at the END of 2020 – or more biologically correctly .the beginning of 2021 will be. The February 2020 assessment took the now well documented strength of the "Recruitment (2019)", used it to project the size of the SSB that would be available spawn the very next time spawning will occur after the period we are auditing, and concluded that even with a substantial fishery the SSB would be well above the benchmarks used for a healthy stock. This is the point we are trying to keep in focus. The fishery whose sustainability and compliance with MSC standards we are auditing THIS YEAR is the possible fisheries in spring or summer of 2020 whose consequences will be the SSB in January 2021. It was LAST YEAR'S audit that evaluated the consequences of any fishery in 2019 for the SSB that was observed two months ago in January 2020.

I hope this helps clarify our differences in view on these stock status and dynamics

Jake

From: Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
Sent: Tuesday, March 24, 2020 5:44 AM
To: Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>
Cc: Amanda Stern-Pirlot (amanda.stern-pirlot@mragamericas.com) <amanda.stern-pirlot@mragamericas.com>; Ken Haste Andersen <kha@aqua.dtu.dk>; Hans Lassen <hans.lassen@lassen.mail.dk>
Subject: RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Dear Jake

Thank you for the comments.

Your basis for the estimate of the 2020 year-class seems to stem from information DNV GL are not privy to and we would be grateful if you could point us to where this information is published. We cannot find it in the ICES advice backing that the geometric mean assumption is based on e.g. the Danish Dredge survey from late autumn 2019. Furthermore, there remains that ICES maintains "ICES assesses that the spawning-stock size is below MSY Bescapement, Bpa, and Blim." This is qualified by "Stock size at the beginning of 2020 is estimated to be below Blim; however, the 2019 year class is large enough to contribute both to an increase in SSB and to the advised catch for 2020.". Hence, lifting the suspension seems based on a projection of the stock development rather than an observed change of the stock status.

Regards

Thank you.

BR / MVH
For DNV GL Business Assurance Norway AS

Sandhya Chaudhury
Principal Specialist

From: Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>
Sent: mandag 23. mars 2020 17:01
To: Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
Cc: Amanda Stern-Pirlot (amanda.stern-pirlot@mragamericas.com) <amanda.stern-pirlot@mragamericas.com>; Ken Haste Andersen <kha@aqua.dtu.dk>
Subject: FW: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Dear Sandhya

This sandeel 1r and 2r situation is complex from several perspectives. However i wanted to clarify one important point in the draft audit document you saw.
Copying and pasting directly out of the associated pdfs fomr the ICES advice we can see:

| Table 2 Sandeel in divisions 4.b–c, Sandeel Area 1r. The basis for the catch scenarios. Variable | Value | Notes |
|---|---|---|
| F (2019) | 0.55 | From the assessment |
| Recruitment (2019) | 145 982 893 | From the assessment; in thousands |
| Recruitment (2020) | 104 153 964 | Geometric mean 1983–2018; in thousands |
| SSB (2020) | 84 881 | In tonnes |

| Table 2 Sandeel in divisions 4.b–c and Subdivision 20, Sandeel Area 2r. The basis for the catch scenarios. Variable | Value | Notes |
|---|---|---|
| F (2019) | 0.056 | From the assessment |
| Recruitment (2019) | 95 725 952 | From the assessment; in thousands |
| Recruitment (2020) | 20 825 766 | Geometric mean 2009–2018; in thousands |
| SSB (2020) | 47 240 | In tonnes |

Using this information, it is explicit that for both 1r and 2r the growth of the SSB (and fishable biomass) through calendar year 2020 and the size of the SSB on January 1, 2021 is based primarily on the recruitment value labeled “recruitment 2019” plus survivors from older ages. Often in fisheries assessments this would be called the 2018 *year class* but for these short lived stocks even ICES assessments fairly often refer to recruitments as the year they appear in the stock assessment and SSB and not the year in which they were spawned.

The estimates of the sizes of the year-classes that appeared in 1r and in 2r in 2019, and were influential in the February 2020 assessment calculations were NOT based on the geometric mean. Rather they were based on surveys and the small “monitoring fisheries” conducted through 2019 when the year classes were

considered to have first arrived in the population structure, but few of which were mature in January 2020. There is quite high confidence that they are well above the geometric mean. Consequently the projected growth of the stock through 2020 is *evidence based* and not *assumption based.* The contribution of the year-class spawned in 2019 as assumed to be the geometric mean will be strongly apparent in the assessment *next* year (Feb 2021), but not this year, and by next year there will be enough evidence to have that year-class strength based on similar evidence and not on an assumed geometric mean.

Now this does not make the choice you face easy. It is certainly the case that when the sandeel spawning in January 2020, the SSB for both 1r and 2r were below the Blims for the stock. Hence if one is narrowly looking at a decision based on the calendar year, there is justification to retain the suspension. However, the status of the SSB in January 2020 is primarily relevant in that it validates the decision to suspend certification for any fisheries in 2019, because they would have reduced the January 2020 SSB even further, But the 2020 spawning is past history already, and fisheries in 2020 cannot retroactively make it larger or smaller. What they effect is the size of the SSB htat will be available to spawn in 2021 . And in that context, the ICES advice is to ensure that in January 2021 there would be a high likelihood of an SSB well above Bescapement. With the *evidence-based* estimate of the strong year-classes, labeled “recruitment (2019)” in both tables , our audit concluded that as long as the harvest in spring and summer of 2020 does not exceed the science advice, the SSB for 1r and 2r will be well above their respective Bescapements. So for a biological year of a) entering recruitment and growth of carry-over adults, then b) a fishery and other natural mortality, and then c) spawning of the SSB left after a) and b) - which might be closer to a year from March 1 year X to Feb 28 Year X+1. Our audit concluded that the stock would be consistent with all the P1 criteria in the biological year that fully includes the expected fishery this spring and summer.

Happy to correspond or communicate further , if you consider it useful.

Jake Rice

Jake

From: Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
Sent: Monday, March 23, 2020 7:36 AM
To: Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>
Cc: Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>; Michealene Corlett <michealene.corlett@mragamericas.com>; Hans Lassen <hans.lassen@lassen.mail.dk>
Subject: RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Dear Amanda,

The DNV GL assessment team does not agree to lifting the suspension at this stage.

The ICES advice from 22 February 2020 places the stock as ‘reduced reproduction capacity’ which is also reflected in your text. ICES says: “ICES assesses that the spawning stock size is below MSY Bescapement and below Bpa and

Blim. ". SSB < Blim which is the main reason why the fishery failed PI 1.1.1a requires for SG60: It is likely that the stock is above the point where serious ecosystem impacts could occur.

There is an estimate for the 2018 year-class while the estimate for the 2019 year-class is a projection based on a geometric mean, i.e. hope rather than knowledge. F(2018) is above Fcap.

The stock is short-lived and with high variability in recruitment. ICES says: "The large change in the advice from year to year can be explained by the marked interannual variability of biomass and recruitment as well as the early maturation, both of which are typical for a short-living species."

Thank you.

BR / MVH
For DNV GL Business Assurance Norway AS

Sandhya Chaudhury
Principal Specialist

**From:** Bostrom, Jodi <Jodi.Bostrom@dnvgl.com>
**Sent:** Friday, March 20, 2020 11:36 AM
**To:** Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>; Stefan.Midteide@dnvgl.com; Kiseleva, Anna <Anna.Kiseleva@dnvgl.com>; Chaudhury, Sandhya <Sandhya.Chaudhury@dnvgl.com>
**Cc:** Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>; Michealene Corlett <michealene.corlett@mragamericas.com>
**Subject:** RE: Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)

Hi Amanda,
I'm including Sandhya on this email as I believe she is working on that fishery.

Regards,
Jodi

**From:** Amanda Stern-Pirlot <amanda.stern-pirlot@mragamericas.com>
**Sent:** Friday, March 20, 2020 11:24 AM
**To:** Stefan.Midteide@dnvgl.com; Kiseleva, Anna <Anna.Kiseleva@dnvgl.com>; Bostrom, Jodi <Jodi.Bostrom@dnvgl.com>
**Cc:** Rice, Jake <Jake.Rice@dfo-mpo.gc.ca>; Michealene Corlett <michealene.corlett@mragamericas.com>
**Subject:** Sandeel ICES area 1r harmonization-urgent (MragRef:US2023 Danish FM)
**Importance:** High

Hi Stefan, Anna and Jodi,
Hope you are all well in your respective self isolation! I'm writing because we are currently completing our 3rd surveillance audit for the DFPO/DPPO/SPFPO sandeel sprat and pout fishery, and as part of this, we are recommending lifting the suspension for sandeel area 1r which is shared with Norway. Though the ICES advice still shows the SSB to be below the limit, the rationale below explains why we feel lifting the suspension is warranted. Jake Rice, our P1 expert for this assessment, is in copy here, in case you'd like to schedule a call to discuss or exchange emails. Since no one is going anywhere, we are all generally very available for calls. Time is of the essence because the sandeel fishery opens 1 April and it would be great if we could get this process done and the suspension lifted (if you agree) before that day. Thank you in advance for your prompt attention to this!
Kind regards,
Amanda

**Rationale here:**
Sandeel in Management Area 1r
Recruitment (age 0) for 2019 of $146 \times 10^6$ thousand recruits was nearly 8.5 times the size of the 2017 year-class, which was the weakest year class in the 35-year time series, and about 2.2 times the size of of the 2018 yearclass. This

places it 40% larger than the recent geometric mean for the full time series. The strong 2016 year-class that was well represented in the 2018 and to some extent the 2019 SSB and fishery has almost completely passed through the fishery and the SSB. Moreover, the strength of the yearclass recruiting in 2018 was revised downward from the 2019 to the 2020 assessments, from $110x10^6$ thousand recruits to 67 $x10^6$ thousand recruits, such that the SSB in January 2020 dropped more than was projected in the 2019 assessment. The estimate of the January 2020 SSB of spawning biomass of 84,881 mt was more than 10% below the 2019 projection of 96,636 mt for the 2020 SSB. This placed it not just well below the Bescapement target for this stock of 145,000, (the value taken as indicative of a very low likelihood of the SSB being reduced to a level when the risk of impaired recruitment may increase), but also only 77% of the Blim of 110,000 mt. the revision to incoming recruitment in 2019 for the 2020 SSB also resulted in a revised estimate of F of 0.55 was slightly above thee Fcap of 0.49 used by ICES as a precautionary benchmark (but not active control rule) of fishing mortality for short-lived stocks. The continued fishing mortality at values above 0.50, combined with the exceptionally weak 2017 yearclass and downward revisions of the 2019 recruitment, has resulted in a substantial decline in the SSB, to well below the escapement benchmark for the stock.
With the estimated SSB in January 2020 now below both the Bescapement and the Blim for this stock, the stock would be below the score of 60 on the appropriate P1 scoring criterion for MSC Certification. However, the very poor 2017 recruitment and weak subsequent recruitments have been attributed to poor oceanographic conditions and not a depleted spawning biomass. The status of the stock at the start of 2019 justified a temporary suspension of of the MSC certificate for that stock, and of the January 2020 SSB estimate was the only consideration, continuation of the suspension would be appropriate. However, spawning annually occurs in January, and the assessment in February 2020 reports a substantially improved recruitment of $146x10^6$ incoming recruits, that will already start to mature and contribute to the 2021 SSB as well as to 2020 fisheries, if any. Even assuming the geometric mean for the recruitment in 2021, ICES projects that the much improved recruitment growing and starting to mature in 2020 will result in a January 2021 SSB of 169.415 t , which is well above the Bescapement target and more than 150% of Blim. These projections assume a fishing mortality in 2020 of 0.49, consistent with ICES guidance for short-lived stocks, which would produce a projected catch of 114,000 t. This would mean the stock would start 2021 with an SSB comfortably above the benchmark used for this stock, and a fishing mortality at or below the precautionary benchmark for short lived stocks as well. Consequently, such a stock would score at least 80% on the corresponding criteria and benchmarks, and justify lifting the suspension for the 2020 fishery. This is an awkward situation, with a stock entering 2020 in a condition that would definitely retaining the suspension of certification for 2020/ However spawning for 2020 has already been completed well before the 2020 fishery would start in the Spring, and incoming strong recruitment could support a moderate fishery and still leave a 2021 SSB well above the target and 150% of the limit benchmarks for SSB. These anomalous conditions are expected occasionally with short-lived stocks that have high interannual variability in recruitment. The circumstances mean that a fishery consistent with the ICES advice for 2020 would be fully sustainable and leave a stock on January 1 of 2021 that meets all the P1 standards for MSC certification, apparently justifying lifting the suspension.

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Amanda Stern-Pirlot
Director—Fisheries Certification
MRAG Americas--Seattle

# 8 Template information and copyright

This document was drafted using the 'MSC Surveillance Reporting Template v2.01'.



**Template version control**

| Version | Date of publication | Description of amendment |
|---|---|---|
| 1.0 | 08 October 2014 | Date of issue |
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A controlled document list of MSC program documents is available on the MSC website (msc.org)

Senior Policy Manager
Marine Stewardship Council
Marine House
1 Snow Hill
London EC1A 2DH
United Kingdom

Phone: + 44 (0) 20 7246 8900
Fax: + 44 (0) 20 7246 8901
Email: standards@msc.org

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