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| ECOREGION | North Sea |
| SUBJECT | Proposed fisheries measures for the Cleaver Bank Special Area of Conservation |

Advice summary¹

ICES supports the proposal to close the area dominated with habitat type H1170 to mobile bottom-contacting fishing gear as this will contribute to achieving the conservation objects set for the Cleaver Bank.

ICES does not support the immediate ban on beam trawling in the Botney Cut as the level of beam trawling is very low and not likely to be impeding progress in achieving the conservation objectives. Further studies are needed to establish if fishing with mobile bottom-contacting fishing gear in the Botney Cut affects the adjacent reef habitat.

ICES considers the conclusion of the FIMPAS workshop to not develop site-specific measures for mammal conservation objectives for the Cleaver Bank to be appropriate.

ICES notes that for most benthic species the Cleaver Bank is an open system and recovery processes are likely to be significantly influenced by the broader ecosystem outside of the proposed closed area. Some of the typical reef species will not have commenced or completed re-colonization within the six-year period.

It is imperative that an operational framework be built around the stated conservation objectives. The establishment of a monitoring programme and selection of indicators will require further work. Indicators that are responsive to changes in pressures from the implementation of the fisheries measures and can measure trajectories towards the stated conservation objectives should be selected. It will be necessary to establish the spatial and temporal variance and patchiness of the characteristics being measured by the indicators.

Request

Given the conservation objectives for H1170, ICES is requested to advise on the degree to which the implementation of the proposed fisheries measures² will progress the Cleaver Bank SAC towards the achievement of the Conservation Objectives.

In preparing its response ICES is required to advise on the changes that can be attributed solely or primarily to the implementation of these proposed fisheries measures from the FIMPAS project.

Specifically, for the proposed fisheries measures Cleaver bank SAC, ICES is invited to describe:

- i) the likely progress over a six year period towards achieving the conservation objectives that will occur as a result of implementation of the proposed measures in Cleaver Bank area;*
- ii) the likely long term progress towards achieving the conservation objectives that will occur beyond the six year period as a result of implementation of the proposed measures in Cleaver Bank area;*
- iii) how progress towards achieving the conservation objectives could be measured and when such changes can be expected to be measurable*
- iv) the key aspects that should be contained in an appropriate, cost effective, monitoring programme to measure progress towards achieving the conservation objectives;*
- v) The effort displacement within the SAC attributable to the proposed measures and the expected effects of such displacement on the achievement of the Conservation Objectives, together with any possible measures to mitigate any effects. When considering effort displacement other relevant factors causing*

¹ This ICES advice is in response to specific questions on fisheries measures proposed by the Netherlands. Unless specifically stated, it is not an opinion from ICES on the designation of Natura 2000 sites or the Conservation Objectives set by the Member State. ICES facilitated input and advice in the FIMPAS process by identifying an expert who advised the process. This expert was not involved in any of the ICES review, drafting or advice approving processes. An ACOM Vice-Chair was assigned the task of following and observing the process. Expert reviewers and advice drafters were selected from independent countries as per ACOM procedures. The ICES advice drafting process was managed by the ACOM Vice-Chair; the scientific advice is the work of the independent reviewers and advice drafters.

² The proposed fisheries measures as submitted to ICES by the Netherlands are shown in Annex 1.

- changes in fishing patterns in the Cleaver Bank (e.g. TAC/quotas, fuel cost, other spatial claims etc.) should be taken into account;*
- vi) any shortcomings in the proposed measures and how these might be overcome*
 - vii) any other information ICES considers relevant for the achievement of conservation objectives in the Cleaver Bank SAC for Habitat H1170*
 - viii) Invites ICES to comment whether the presented information on the occurrence and distribution of Habitat type H1170 justifies a change of the Southern and Northern boundaries for the Cleaver Bank proposed SAC, as described in the Cleaver Bank zoning proposal?*
 - ix) Invites ICES to comment on the use of the available data from different sources (fishermen charts, sediment charts, expert reviews) to determine the demarcation of the Habitat type H1170, in the FIMPAS Steering Group Cleaver Bank zoning proposal*

Regarding the Conservation Objectives for Harbour Porpoise, Grey Seal and Harbour Seal

- xi) Invites ICES to comment on the outcome of the FIMPAS workshop not to develop site specific measures for mammal conservation objectives for Cleaver Bank SAC.*

ICES advice

According to the documentation submitted to ICES together with the request, the proposed fisheries measures for the Cleaver Bank attempt

“ to combine the knowledge of the fishing industry with the available scientific knowledge in an ecosystem based approach, incorporating the precautionary principle and using best available technology to develop a more focused and proportional fisheries measure to achieve the Cleaver Banks conservation objectives..... It should result in maintaining an adequate connectivity between areas containing habitat type 1170, while facilitating traditional fishing activities in areas where this habitat type does not appear to exist.”

In order to put the request and the ICES response into context, the Conservation Objectives for the Cleaver Bank are available in Annex 2.

The main impact on the open-sea reefs of the Cleaver Bank is likely to come from fisheries (beam and otter trawling gear, gillnets), of which trawling has the biggest impact (see Annex 3). The metal shoes, tickler chains, ground rope, and net of the beam trawl dig into or slide along the seafloor, causing physical damage along its way by breaking or dislodging sessile plants and animals. The boards of the otter trawl may also dig into the surface of the seafloor in the case of soft sediments and sand or grind hard surfaces like rocks and stones. The floats and the weighted bobbins attached to the rope running along the lower mouth of the trawl may also slide along the seafloor and abrade the species growing on top of the reef.

The fisheries measures proposed for the Cleaver Bank Special Area of Conservation (SAC) envisage three different fisheries regimes for three zones, as shown in Annex 1. These are: (a) exclusion of beam trawling in the Botney Cut (but with otter trawling permitted); (b) no beam or otter trawling in the two predominately reef habitat areas; and (c) no restrictions in three predominately sandy areas. In responding to the request, ICES provides a separate response for these three different zones where appropriate.

ICES notes that the small size of the area proposed for conservation of open-sea reef habitats on Cleaver Bank suggests that for most of the benthic species it is an open system. Recovery processes that occur within it are therefore likely to be significantly influenced by the broader ecosystem outside of the proposed closed area. Harbour seals and grey seals, along with other marine mammals are transients and are not expected to be affected by the proposed management measures.

Response to Question i) the likely progress over a six-year period

The conservation objective is to improve the quality of the reefs. Good quality is characterized by the presence of sessile biotic communities of long-lived species. If the indicator of good quality is merely the presence of long-lived species on the reefs, these species appear to be present now and will therefore continue to be present over the first six-year period of reduced fishing pressure.

Based on studies undertaken in the early 1990s on the impacts of gravel extraction, recovery of most species is relatively fast, that is within ten years. If fishing has impacted the species on the reef, it is likely that changes will be observed in the impacted areas on similar time scales.

However, with the history of heavy beam trawling in the area dating back to the late 1970s and evidence of moving and chipping of boulders and churning of gravel beds, it is likely that most of the longer-lived species are not present in their natural abundance and population age/size structure. Of the typical animal species known to live on the reefs, the ocean quahog (*Arctica islandica*) is the longest lived with a lifespan in the order of centuries. There is speculation that the horse mussel (*Modiolus modiolus*) may also be present. This species has a long lifespan (50–100 years) with generation times of about six to ten years, and is known to have irregular recruitment and a very long pelagic larval dispersal stage. For a small area such as Cleaver Bank, recruitment of *M. modiolus* will likely depend upon sources from outside of the protected area. The encrusting coralline algae species found on the reefs, *Lithothamnion sonderi* and *Phymatolithon* sp., are slow growing (millimeters per year) and under certain conditions can form maërl. Maërl beds can build up over millennia and it is difficult to know whether or not this type of biogenic habitat could form on Cleaver Bank in the absence of fishing pressure. *L. sonderi* is only known to produce maërl in Scottish waters. These species are not likely to show measurable change over a six-year period and specialized monitoring programmes would be required to determine their status.

Response to Question ii) the likely long-term progress

For the reef habitat it is likely that some of the typical reef species will not have commenced or completed recolonization within the six-year period (see discussion above for long-lived species). Recovery of habitat-forming species of the reef could take a considerable length of time and will continue for decades. A well-designed baseline study and monitoring programme will be needed to measure changes.

As an open system, changes in fish community composition occurring at large spatial scales throughout the North Sea will influence progress towards achieving conservation objectives in the Cleaver Bank. This is because many fish species prey on benthic species at some point in their life cycle and changes to the predation pressure may influence recovery trajectories of the benthos.

Environmental changes are also expected to be expressed over these longer time periods (including both predictable cycles such as the NAO as well as climate change) and will affect conservation objectives in unknown ways (new species moving in, flood waters inducing changes in water chemistry and pelagic production, etc.). Environmental change will influence rates of changes as well as changes in state. However, in general, the fisheries management measures suggested will contribute to reduce the pressure on the benthic habitat from bottom-contacting fishing gears, although the scale of this effect and consequences to the status of the habitats are not possible to predict.

Response to Question iii) how progress could be measured and changes can be expected to be measurable

It is imperative that an operational framework be built around the stated conservation objectives. This will entail establishment of appropriate indicators, allowing for target setting and evaluation followed by an appropriate monitoring programme (see below). Ongoing work by the ICES expert group on Ecosystem Effects of Fishing Activities (WGECO) has outlined a prioritized list of eighteen criteria that should be considered when selecting indicators (ICES, 2012a). Evaluation of indicators against these criteria considers the quality of the available data, responsiveness of the indicator to the pressure of interest, and links to conceptual and/or theoretical underpinnings. Not all of these criteria are expected to be met by any one indicator and not all may be relevant to the present application. Table 6.3.3.7.1 provides an overview of a preliminary list of generic criteria for indicators along with an evaluation of their priority for any monitoring programme. Indicator redundancy, that is groups of metrics or indicators which co-vary significantly, providing duplicate copies of a single signal rather than reflecting different independent signals, should be avoided.

Table 6.3.3.7.1 Preliminary list of priority for criteria by which the suitability of indicators may be assessed (ICES, 2012a).

| Number | Criterion/Characteristic | Priority |
|--------|---|-----------|
| 1 | Methodological approach to defining the target should be consolidated | Essential |
| 2 | Existing reference conditions | Essential |
| 3 | Relevant spatial domain | Desirable |
| 4 | Environmental fluctuations and climate | Desirable |
| 5 | Related to change in specific pressures | Essential |
| 6 | Uncertainty | Desirable |
| 7 | Relevant to management objectives | Essential |
| 8 | Relevant to management measures | Essential |
| 9 | Comprehensible | Desirable |
| 10 | Established target | Desirable |
| 11 | Pragmatic | Desirable |
| 12 | Theoretically sound | Essential |
| 13 | Early warning | ? |
| 14 | Target suites | Desirable |
| 15 | Compatibility | Desirable |
| 16 | State, impact, pressure, and operational targets | Essential |
| 17 | Relevance to MSFD ecosystem components | Essential |
| 18 | Cross-application | ? |

Consideration of the relative importance of the indicators when assessing overall status may be required and will relate back to relative importance of the conservation objectives.

Response to Question iv) ...an appropriate, cost effective, monitoring programme...

Establishing a comprehensive baseline study is a priority and this should be informed by previous work on the Cleaver Bank. This is a prerequisite to designing a monitoring programme to measure progress or otherwise towards the conservation objectives. Suitable control areas should be selected, outside of the closed area where normal fishing operations are conducted. The spatial and temporal variance and patchiness of the species or ecological elements to be monitored needs to be understood and addressed in the design of a monitoring programme. Standard power curve analyses can be used to determine the precision needed to detect a difference of a given size (say a 25% increase in abundance of a population) with a specified (usually high) probability. To determine the sampling effort needed to achieve the necessary level of precision, it is then necessary to know how variance in the population estimate increases with sampling effort. For the overall objectives of improved environmental status for the communities, improvements in the more common species will contribute most to healthy functioning of ecosystem processes. Such improvements are usually best measured with a representative, spatially stratified random survey design. However, for objectives related to specifically improving the status of rarer species, particularly ones with specialized ecological requirements, targeted sampling will be more efficient. For rarer species, accurate estimates of likelihood of encounter and total range of occurrence are properties that are possible to quantify with sufficient precision to allow evaluation of trends over time.

Use of established protocols for related subjects (e.g., wind farm EIA (environmental impact assessment), or oil-spill monitoring) should be considered. Standards such as EN 16260:2012 (CEN, 2012) on visual seabed surveys and ISO 16665:2005 (ISO, 2005) on sampling marine soft-bottom macrofauna could inform this process.

The monitoring requirements of the Marine Strategy Framework Directive and developments within OSPAR will provide opportunities for incorporation of monitoring requirements into a wider monitoring programme. Currently, the ridged structure and focus on fish stock assessment of Data Collection Framework (DCF) surveys means that they could provide only limited data and information for the likely monitoring requirements on the Cleaver Bank. With minimal adjustments, DCF surveys could provide useful data on both commercial species and benthic elements.

It will be appropriate to target monitoring effort in areas which are judged to be controversial and/or sensitive, for example areas where moderate to high fishing effort has occurred prior to the closure, and across the interface between open and closed areas. Cooperation with the fishing industry could bring efficiencies and provide cost-effective access to the sites.

There are a variety of sampling and data collection methods available such as high-frequency ecograms combined with sidescan sonar, underwater video, remotely operated vehicles (ROV), bait-camera systems, grab sampling and dredge sampling, and it is likely that a combination of these and other methods will be required.

Response to Question v) *The effort displacement within the SAC*

Except for otter board trawling in the Botney Cut, fishing activity using moving bottom-contacting gear appears to be limited on the Cleaver Bank. Therefore, based on the current level of fishing effort, effort displacement will not be an issue of concern.

Response to Question vi) *any shortcomings in the proposed measures.....*

Green area – Low impact zone: the Botney Cut, in which beam trawling is banned but otter board trawling is allowed.

Otter trawling in the Botney Cut is evidenced from the report of the FIMPAS Workshop 2. During such fishing activity in the muddy seabed of the Botney Cut it is likely that a mud sediment plume is generated. It is unclear if this plume will result in mud settling on the adjacent reef on either side of the Cut and, if this does occur, the spatial extent of such settling. It is also unclear what effect this would have on the reef.

Information provided in FIMPAS Workshop 2 suggests that there is limited beam trawling in the Botney Cut. Beam trawling in a mud area such as the Botney Cut would produce a greater mud plume than otter trawling and would, as such, result in greater potential pressure to adjacent reef habitats.

Given the higher potential pressure from beam trawling compared to otter trawling on the reefs adjacent to the Botney Cut, ICES understands the inclination to apply the precautionary approach and to ban beam trawling in the Cut. However, as the level of beam trawling effort is very low it is unlikely that a ban on beam trawling, at its current level, will have a significant influence on achieving the conservation objectives set for the Cleaver Bank. Based on concerns with evoking the precautionary approach to ban an activity that currently is not likely to be contributing in any real sense to not achieving the conservation objectives, ICES does not support the immediate ban on beam trawling in the Botney Cut.

With regard to both otter and beam trawling, ICES advises that monitoring, supported by sediment transportation modelling, should be undertaken to verify that fishing with mobile bottom-contacting gear does not cause re-suspended mud settling on and impacting the adjacent reefs. In the event that the risk to the reefs is established from re-suspended mud relating to fisheries activities, mitigation measures should be considered and investigated. These could include seasonal and/or tidal restrictions and closed buffer zones at either side of the Botney Cut to remove or reduce the pressure on the adjacent reef.

Brown area – No mobile bottom-contacting gear fishing zone

This zone contains the reef habitat for which the Cleaver Bank is protected. The documentation provided shows that this part of the Cleaver Bank is bottom trawled throughout the year, but fishing effort is low. ICES has previously advised (ICES, 2009) that typical species of reef habitats are generally more vulnerable to impact from bottom-contacting fishing gear than those of sandbanks. Heavy bottom trawls can destroy the physical structure of reefs.

In 2009 ICES pointed out that:

- the first and second passes of a mobile, bottom-contacting fishing gear exert the most severe effect on benthic structures, communities, and species. It is likely that the reef areas with the highest potential to recover soonest to favourable conservation status are those areas with the lowest historical and current bottom trawling activity. It is also likely that areas that are trawled more than 4–5 times a year do not support self-sustaining populations of some of the characteristic benthic species most vulnerable to mobile, bottom-contacting fishing gears, particularly for reef communities.
- For protected reefs in areas frequently exposed to mobile, bottom-contacting fishing gears, complete closure may be necessary to restore habitats and species to favourable conservation status.

ICES considers these comments to be valid in the case of the Cleaver Bank and supports the proposal to close this area to fishing with mobile bottom-contacting gear.

Response to Question vii) *any other information ... relevant for the achievement of conservation objectives....*

Monitoring of relevant, sensitive, and responsive indicators to follow the progress towards the conservation objectives is needed. Some species will be able to recolonize impacted areas quite fast while others need long(er) time. Monitoring the progress (if any) towards the conservation objectives will probably require adjustment and modification of the monitoring programme and possibly even the fisheries measures put in place.

ICES agrees that the proposed fisheries measures will contribute to the reef achieving its conservation objectives as it removes the main anthropogenic pressure acting on the reef and its communities.

Response to Question viii) ...whether the presented information justifies a change of the Southern and Northern boundaries for the Cleaver Bank proposed SAC?

Based on the information provided, ICES considers the change in the southern and northern boundaries to be reasonable as the new boundaries will increase the target habitat to be protected.

Response to Question ix) ...comment on the use of the available data from different sources

ICES notes that the demarcation of the reef habitat type is largely based on the surficial geology of the area. This is a good proxy for inferring benthic community composition. However, baseline biological data is essential in order to characterize the biota and to determine at the six-year review whether the management plan needs to be adjusted.

Response to Question xi)comment on the outcome of the FIMPAS workshop not to develop site specific measures for mammal conservation objectives.....

ICES has previously advised that harbour porpoise are highly mobile on spatial scales much larger than the Natura 2000 sites that have been proposed in the German EEZ (ICES, 2009). Consistent with the 2009 advice, and without effective management outside Natura 2000 sites, the full protection of marine mammals within the boundaries of the Dutch Natura 2000 sites would not ensure a high likelihood of achieving very low bycatch mortality for marine mammals in the southern North Sea.

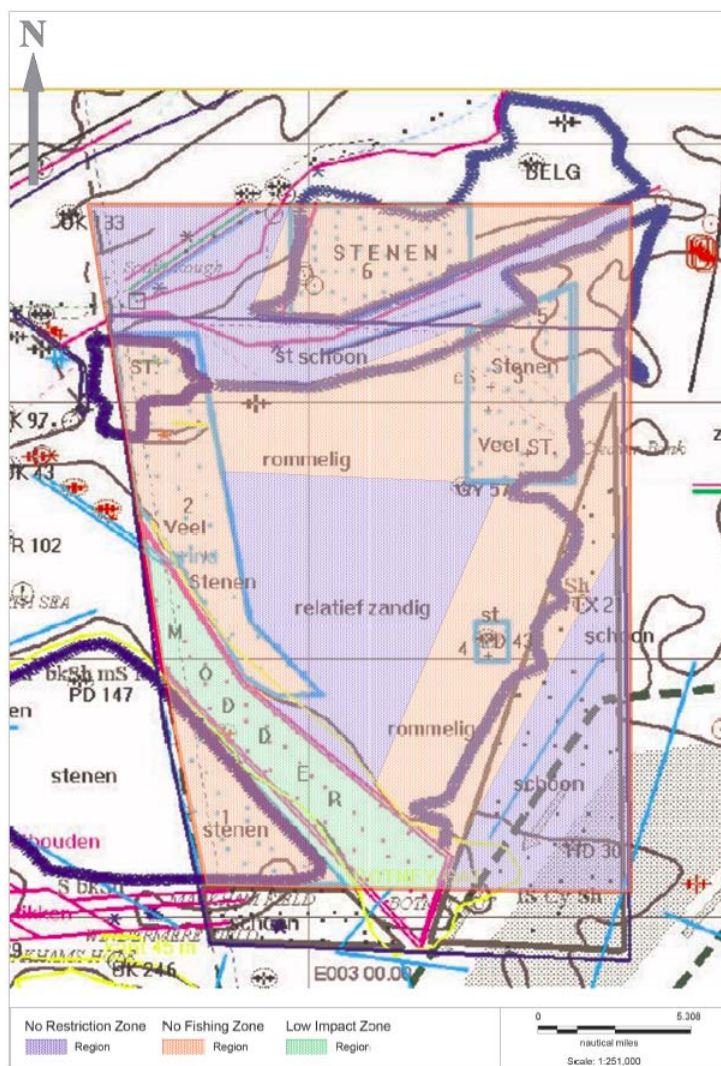
Consequently, ICES considers the conclusion of the FIMPAS workshop to not develop site-specific measures for mammal conservation objectives for Cleaver Bank to be appropriate.

Sources

- CEN. 2012. Water quality – Visual seabed surveys using remotely operated and/or towed observation gear for collection of environmental data. BS EN 16260:2012.
- ICES. 2009. Report of the EMPAS project (Environmentally Sound Fisheries Management in Protected Areas), 2006–2008, an ICES–BfN project. 123 pp.
- ICES. 2010. Report of the FIMPAS Workshop 2: Fishery Impact and Conflicts with Conservation Objectives, 30 June–2 July 2010, Neufchatel-Hardelot, France. ICES CM 2010/ACOM:53. 45 pp.
- ICES. 2012a. Report of the Working Group on the Ecosystem Effects of Fishing Activities (WGECO), 11–18 April 2012; Copenhagen, Denmark. ICES CM 2012/ACOM:26. 192 pp.
- ICES. 2012b. Material provided to ICES for advice on proposed fisheries measures for Cleaver Bank and the Frisian Front. The FIMPAS project, September 2012. ICES CM 2012/ACOM:76.
- ISO. 2005. Water quality – Guidelines for quantitative sampling and sample processing of marine soft-bottom macrofauna. ISO 16665:2005.

Annex 1

Proposed fisheries measures for the Cleaver Bank. From “*Request for ICES Advice Cleaver Bank and Frisian Front, FINAL VERSION, 4 Sept. 2012*”. The map is from the document “*Industrial proposal on gravel content*”, submitted to ICES as part of the request.



Proposed fisheries measures in the Cleaver Bank:

- (a) Green – Low impact zone: the Botney Cut, in which beam trawling is banned but otter board trawling is allowed;
- (b) Brown – No [mobile bottom-contacting gear]³ fishing zone: a zone with no bottom-contacting gear fisheries allowed. The zone is located in areas with a dominant presence of habitat H1170;
- (c) Purple – No restriction zone: a zone with no restriction on fisheries located on predominantly sandy areas.

³ This is incorrectly labelled on the map – it is *not* a “No Fishing Zone” but rather a “No *mobile bottom-contacting gear* fishing zone”. This was confirmed with the Ministry of Agriculture, Nature and Food Quality, the Netherlands.

Annex 2

Extract from the document "*Conservation Objectives, Jak et al.*", submitted to ICES with the request.

Conservation objectives for the Cleaver Bank

Detailed conservation objectives: Maintain the surface area and improve quality of reefs.

Explanation: Good quality is characterized by the presence of sessile biotic communities of long-lived species. These communities are attached to the hard substrate. An improvement of the quality can be achieved if the disturbance of hard compact substrates and their biotic communities is prevented, i.e. firmly touched or their position changed.

Annex 3

Gear impact matrix developed in the FIMPAS process and supplied to ICES with the request. From “Report of the FIMPAS Workshop 3: Management proposals. 20110328”, page 25

| CONSERVATION OBJECTIVES | Fishing gear | | | | |
|--------------------------------------|------------------------|-------------|---------------------|----------|----------------|
| | Beam trawl | Otter trawl | Demersal seine nets | Gillnets | Midwater trawl |
| Habitats | | | | | |
| Dogger Bank H1110_C Sandbanks | High with disagreement | Medium | Low | Low | Not Relevant |
| Cleaver Bank H1170 Open-sea reefs | High | High | Low | Low | Not Relevant |
| Marine mammals | | | | | |
| Harbour porpoise | Low | Low | Low | Medium | Low |
| Harbour seal | Low | Low | Low | Low | Low |
| Grey seal | Low | Low | Low | Low | Low |
| Seabirds | | | | | |
| Great skua | Low | Low | Low | Low | Low |
| Great black-backed gull | Low | Low | Low | Low | Low |
| Common guillemot | Medium | Medium | Medium | High | Low |
| Lesser black-backed gull | Low | Low | Low | Low | Low |

Gear Impact Matrix FIMPAS WS

High: direct disturbance, the continuity of the habitat/species is in danger.

Medium: the effect is visible and the conservation status will not remain the same without any measures.

Low: the habitat/species is affected, however the conservation status of the habitat/species is supposed to remain.

The judgement based on majority opinions. In most cells particularly for the Dogger Bank area there were a range of opinions; often industry stakeholders rated the impact lower than scientists and NGO's.