Evaluation of OSPAR recommendations for endangered and/or declining species and habitats in the Netherlands

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Wageningen University &

Research report C006/20EN

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Contents

Summary

In 2008, OSPAR has published a list of endangered and / or declining species and habitats in the North-East Atlantic (OSPAR, 2008). In the following years, recommendation documents have been agreed upon for individual species and habitats to better protect them. The recommendations include rules, choices and considerations to implement the recommendations nationally and internationally (paragraphs 3.1 and 3.2 respectively in each recommendation document).

OSPAR Contracting Parties must report every 3 years on the implementation of the OSPAR recommendations. In preparation for this, an overview of the state of implementation of the recommendations has been made in this report. Species and habitats are considered relevant if they are regularly present in the Netherlands. This concerns the following species and habitats:

Invertebrates: Ocean quahog (*Arctica islandica*) and flat oyster (*Ostrea edulis*); Birds: Kittiwake (*Rissa tridactyla*); fish: shad (*Alosa alosa*), eel (*Anguilla anguilla*), houting (*Coregonus lavaretus oxyrinchus*), spotted ray (*Raja montagui*), cod (*Gadus morhua*), long-snouted seahorse (*Hippocampus guttatulus*), short-snouted seahorse (*Hippocampus hippocampus*), thornback ray (*Raja clavata*), salmon (*Salmo salar*), spiny shark (*Squalus acanthias*); marine mammals: harbor porpoise (*Phocoena phocoena*) and habitats (Intertidal mudflats, *Mytilus edulis* beds on mixed and sandy sediments, tidal flats, flat oyster reefs, *Sabellaria spinulosa* reefs, marine and burrowing megafauna communities and Zostera beds.

Research mainly took place on the basis of existing knowledge and policy documents. In addition, some experts were consulted.

For each species or habitat, it is described to what extent the recommendations in the OSPAR recommendation document have been implemented, what the reasons are for whether or not to implement a recommendation, and what opportunities there are. It is also indicated how the Netherlands contributes to joint actions, as described in the "Roadmap for the implementation of collective actions within the Recommendations for the protection and conservation of OSPAR listed Species and Habitats".

We have suggested several levels of implementation, because the recommendations often cover many aspects, which makes it often difficult to answer the question whether they have been fully implemented. In their reporting formats, OSPAR however requires a simple ‘Yes’ or ‘No’. Therefore a ‘translation table’ is given from the categories suggested in this report to categories used by OSPAR. Using these categories, we conclude that most of the approximately 188 OSPAR recommendations relevant for the Netherlands have been implemented.

This is an English translation of the original report in the Dutch language.

1 Introduction

In 2008 OSPAR published a list of endangered and / or declining species and habitats in the north-eastern part of the Atlantic (OSPAR 2008). The list is used by the OSPAR Committee as a guideline for setting priorities for measures for conservation and protection of marine biodiversity according to Annex V of the OSPAR Convention. Knowledge documents and recommendations have been drawn up for most of these species and habitats. In the recommendations for the OSPAR species and habitats (Table 1), actions and measures have been agreed to better protect them. These actions and measures (national) can be found in all OSPAR Recommendation documents under section 3.1, since for each document the division and numbering is the same. The recommendations include regulations, choices and considerations to implement the recommendation.

In addition, OSPAR has mentioned joint actions and measures to be taken jointly by the OSPAR Contracting Parties. These joint actions are listed in section 3.2 of each recommendation. These actions from the various documents have been brought together in "Roadmap for the implementation of collective actions within the Recommendations for the protection and conservation of OSPAR listed Species and Habitats" with associated 48 joint actions, which are published on the OSPAR website: https: //www.ospar.org/work-areas/bdc/species-habitats/implementation-of-species-and-habitat-recommendations.
This report also indicates how the Netherlands can contribute to these joint actions for species and habitats.

OSPAR Contracting Parties must report every three years on the implementation of OSPAR recommendations with regard to this list of endangered and / or declining species and habitats. The next report is planned for 2019. The Dutch Ministry of Agriculture, Nature and Food Quality (LNV) will have to provide this report for the Netherlands. The ministry therefore wants to have an overview in advance, in which the state of affairs of the implementation of the recommendations is evaluated. This ensures transparency by clarifying which considerations have been made and which actions have been carried out and what needs to be done.

The purpose of the report is to analyse to what extent the recommendations for relevant OSPAR species and habitats have been implemented by the Netherlands, what the reasons are for whether or not to implement a recommendation, and what opportunities there are. The research took place on the basis of existing knowledge and policy documents.

This English version is a translation of the original Dutch version of the report.

2 Methods

2.1 Selection of species and habitats

The following criteria have been used to select OSPAR species and habitats (OSPAR, 2008) that are relevant for the Netherlands:

- There is an OSPAR recommendation for the species or habitat
- Species or habitats occur in all OSPAR regions ('all regions') OR in Region II ('Greater North Sea').
- Species or habitats are threatened or decreasing 'all where it occurs' OR only in OSPAR region II
- The species is listed in the Dutch Species Register (www.nederlandsesoorten.nl; Bos et al., 2016).
- The species is common in the Netherlands (and not a vagrant, such as the ivory gull or basking shark).
- Habitats: are present according to an earlier inventory of OSPAR species and habitats in the Netherlands (Bos et al., 2012).
- Area to be considered: Dutch North Sea and Wadden Sea

2.2 Evaluation

2.2.1 National actions (§ 3.1)

For each of the selected species and habitats, a brief explanation is given first after which the OSPAR recommendations are shortly described. Subsequently, the following questions were answered per species / habitat:

- Have the recommendations been implemented in the Netherlands?
- If so, how are they implemented? What has come out?
- If not, what are the reasons for not implementing them?
- What opportunities and opportunities are there for the Netherlands?
- What are the changes with respect to the previous report?

2.2.2 Joint Actions (§ 3.2)

Furthermore, a description is given per species or habitat of how the Netherlands can contribute to the implementation of the joint actions of the OSPAR Contracting Parties for species and habitats, which are described online (https://www.ospar.org/work-areas/bdc/species-habitats/implementation-of-species-and-habitat-recommendations) and in Annex 1:

- Implementation of OSPAR joint actions
    - Which actions refer to this species or habitat
    - How can the Netherlands contribute to joint campaigns?

2.2.3 Implementation level

In this report we have described in texts to what level OSPAR recommendations concerning 'National actions (§ 3.1)' have been implemented. Next, we have assessed to what level each recommendation was implemented. For this, we have suggested several levels of implementation, because the recommendations often cover many aspects, which makes it often difficult to answer the question whether they have been fully implemented. In their reporting formats, OSPAR however requires a

simple 'Yes' or 'No'. Therefore a 'translation table' is given in Table 1 from the levels suggested in this report to levels used by OSPAR. In Annex 2 this is indicated per recommendation.

Table 1. Implementation levels used in this report, and their translation to the levels used by OSPAR.

NL Category	Explanation	Corresponding OSPAR implementation level
Not considered	The recommendation is not (yet) considered by government and/or researchers	No
Considered and still pending	The recommendation is considered by government and/or researchers but not implemented nor rejected	No
Partially implemented	The recommendation is addressed by government and/or researchers and some aspects are implemented	Yes
Fully implemented	The recommendation is addressed by government and/or researchers and implemented	Yes
Decided not to implement	The recommendation is considered by government and/or researchers but not implemented	No
Implemented via other mechanisms	The recommendation is considered by government and/or researchers but implemented via alternative way	Yes
Considered and not relevant/conditions do not apply	The recommendation is considered by government and/or researchers but not implemented because it is not relevant for the Netherlands (e.g. conditions do not apply)	No

3 Relevant species and habitats

Table 2 shows which endangered and / or declining species and habitats (OSPAR, 2008) are relevant for the Netherlands, based on the selection criteria as described in the methods (see 2.1). Per species / habitat it is stated:

- in which OSPAR region the species / habitat occurs;
- in which OSPAR region the species / habitat is threatened and / or declining;
- code of the OSPAR recommendation, if published;
- whether the species / habitat is relevant to the Netherlands based on the selection criteria

The corresponding references of the OSPAR recommendations are listed in Table 3.

Table 2. OSPAR list of endangered and / or declining species and habitats, indicating: in which OSPAR region the species / habitat occurs; in which OSPAR region the species / habitat is threatened and / or decreases; whether a recommendation has been made by OSPAR; whether it is relevant for the Netherlands (based on the selection criteria). 1 = yes, 0 = no. NA=not applicable. A species is only selected if there is an OSPAR recommendation, and if the region is "all" or "II", and if the species is present in the Dutch species register (www.nederlandsesoorten.nl). A habitat is only selected if there is an OSPAR recommendation, and if it appears in the OSPAR region "all" or "II".

Scientific name	Name (NL/UK)	OSPAR region	OSPAR region threatened and/or declining	Recommendation	OSPAR region = 'all'	OSPAR region = 'II'	Species present in NL Species Register	Species occurs regularly (not a vagrant)	habitat present (Bos et al., 2012)	in selection
INVERTEBRATES										
Arctica islandica	Noordkromp (Ocean quahog)	I, II, III, IV	II	2013-05	0	1	1	1	NA	1
Megabalanus azoricus	(Azorean barnacle)	V	All where it occurs	NA	0	0	0	0	NA	0
Nucella lapillus	Purperslak (Dog whelk)	All regions	II, III, IV	NA	1	1	1	1	NA	1
Ostrea edulis	Platte oester (Flat oyster)	I, II, III, IV	II	2013-04	0	1	1	1	NA	1
Patella ulyssiponensis aspera	Azorean limpet	V	All where it occurs	2015-02	0	0	0	0	NA	0
BIRDS										
Larus fuscus fuscus	Baltische mantelmeeuw (Lesser black-backed gull)	I	All where it occurs	2011-05	0	0	1	0	NA	0
Pagophila eburnea	Ivoormeeuw (Ivory gull)	I	All where it occurs	2011-02	0	0	1	0	NA	0
Polysticta stelleri	Stellers eider (Steller's eider)	I	All where it occurs	2013-12	0	0	1	0	NA	0
Puffinus assimilis baroli (auct.incert.)	Little shearwater	V	All where it occurs	2011-03	0	0	0	0	NA	0
Puffinus mauretanicus	Vale pijlstormvogel (Balearic shearwater)	II, III, IV, V	All where it occurs	2011-04	0	1	1	0	NA	0
Rissa tridactyla	Drieteenmeeuw (Black-legged kittiwake)	I, II, III, IV, V	I, II	2011-05	0	1	1	1	NA	1
Sterna dougallii	Dougals stern (Roseate tern)	II, III, IV, V	All where it occurs	2011-06	0	1	1	0	NA	0
Uria aalge – Iberian population (synonyms: *Uria aalge albionis, Uria aalge ibericus*)	Iberische zeekoet (Iberian guillemot)	IV	All where it occurs	2014-16	0	0	0	0	NA	0
Uria lomvia	Kortbekzeekoet (Thick-billed murre)	I	All where it occurs	2011-07	0	0	1	0	NA	0
FISH										
Acipenser sturio	Steur (Sturgeon)	II, IV	All where it occurs	2014-01	0	1	1	0	NA	0
Alosa alosa	Elft (Allis shad)	II, III, IV	All where it occurs	2015-04	0	1	1	1	NA	1
Anguilla anguilla	Aal (European eel)	I, II, III, IV	All where it occurs	2014/15	0	1	1	1	NA	1
Centroscymnus coelolepis	Portugese ijshaai (Portuguese dogfish)	All regions	All where it occurs	2014-05	1	1	0	0	NA	0
Centrophorus granulosus	Ruwe zwelghaai (Gulper shark)	IV, V	All where it occurs	2014-03	0	0	0	0	NA	0
Centrophorus squamosus	Schubzwelghaai (Leafscale gulper shark)	All regions	All where it occurs	2014-04	1	1	0	0	NA	0

Scientific name	Name (NL/UK)	OSPAR region	OSPAR region threatened and/or declining	Recommendation	OSPAR region = 'all'	OSPAR region = 'II'	Species present in NL Species Register	Species occurs regularly (not a vagrant)	habitat present (Bos et al., 2012)	in selection
Cetorhinus maximus	Reuzenhaai (Basking shark)	All regions	All where it occurs	2010-06	1	1	1	0	NA	0
Coregonus lavaretus oxyrinchus (Linnæus, 1758)	Houting (Houting)	II	All where it occurs	NA	0	1	1	1	NA	0
Dipturus batis (synonym: *Raja batis*)	Vleet (Common Skate)	All regions	All where it occurs	2010-06	1	1	1	0	NA	0
Raja montagui (synonym: *Dipturus montagui*)	Gevlekte rog (Spotted Ray)	II, III, IV, V	All where it occurs	2014/07	0	1	1	1	NA	1
Gadus morhua– populations in the OSPAR regions II and III	Kabeljauw (Cod)	All regions	II, III	2014/14	1	1	1	1	NA	1
Hippocampus guttulatus (synonym: *Hippocampus ramulosus*)	Langsnuitzeepaardje (Long-snouted seahorse)	II, III, IV, V	All where it occurs	2012-02	0	1	1	1	NA	1
Hippocampus hippocampus	Kortsnuitzeepaardje (Short-snouted seahorse)	II, III, IV, V	All where it occurs	2012-03	0	1	1	1	NA	1
Hoplostethus atlanticus	Oranje zaagbuikvis (Orange roughy)	I, V	All where it occurs		0	0	0	0	NA	0
Lamna nasus	Haringhaai (Porbeagle)	All regions	All where it occurs	2014-06	1	1	1	0	NA	0
Petromyzon marinus	Zeeprik (Sea lamprey)	I, II, III, IV	All where it occurs	2015-03	0	1	1	1	NA	1
Raja clavata	Stekelrog (Thornback skate / ray)	I, II, III, IV, V	II	2014-08	0	1	1	1	NA	1
Rostroraja alba	Witte rog (White skate) (check)	II, III, IV	All where it occurs	2010-06	0	1	1	0	NA	0
Salmo salar	Zalm (Salmon)	I, II, III, IV	All where it occurs [3]	2016-03e	0	1	1	1	NA	1
Squalus acanthias	Doornhaai ([Northeast Atlantic] spurdog)	All regions	All where it occurs	2014-02	1	1	1	1	NA	1
Squatina squatina	Zee-engel (Angel shark)	II, III, IV	All where it occurs		0	1	1	0	NA	0
Thunnus thynnus	Blauwvintonijn (Bluefin tuna)	V	All where it occurs [4]		0	0	1	0	NA	0
REPTILES										
Caretta caretta	Onechte karetschildpad (Loggerhead turtle)	IV, V	All where it occurs	2013-07	0	0	1	0	NA	0
Dermochelys coriacea	Lederschildpad (Leatherback turtle)	All regions	All where it occurs	2013-06	1	1	1	0	NA	0
MARINE MAMMALS										
Balaena mysticetus	Groenlandse walvis (Bowhead whale)	I	All where it occurs	2013-08	0	0	1	0	NA	0
Balaenoptera musculus	Blauwe vinvis (Atlantic blue whale)	All regions	All where it occurs	2013-09	1	1	1	0	NA	0
Eubalaena glacialis	Noordkaper (Northern right whale)	All regions	All where it occurs	2013-10	1	1	0	0	NA	0
Phocoena phocoena	Bruinvis (Harbour porpoise)	All regions	II, III	2013-11	1	1	1	1	NA	1
HABITATS										
Carbonate mounds	Carbonaatheuvels	I, V	V[1]		0	0	NA	0	0	0
Coral Gardens	Koraaltuinen	I, II, III, IV, V	All where it occurs	2010-09	0	1	NA	0	0	0
Cymodocea meadows	Zeegras (*Cymodocea*) velden	IV	All where it occurs		0	0	0	0	0	0
Deep-sea sponge aggregations	Diepzeespongaggreaties	I, III, IV, V	All where it occurs	2010-10	0	0	NA	0	0	0

Scientific name	Name (NL/UK)	OSPAR region	OSPAR region threatened and/or declining	Recommendation	OSPAR region = 'all'	OSPAR region = 'II'	Species present in NL Species Register	Species occurs regularly (not a vagrant)	habitat present (Bos et al., 2012)	in selection
Intertidal *Mytilus edulis* beds on mixed and sandy sediments	Mosselbanken op gemixt en zandig sediment	II, III	All where it occurs	2015-01	0	1	1	0	1	1
Intertidal mudflats	Wadplaten	I, II, III, IV	All where it occurs	2016/02e	0	1	NA	0	1	1
Littoral chalk communities	Litorale krijtgemeenschappen	II	All where it occurs	2013-01	0	1	NA	0	0	0
Lophelia pertusa reefs	Steenkoraal (*Lophelia pertusa)* riffen	All regions	All where it occurs	2010-08	1	1	0	0	0	0
Maerl beds	Mearlbanken	All regions	III		1	0	0	0	0	0
Modiolus modiolus beds	Paardenmosselbanken	All regions	All where it occurs	2013-03	1	1	1	0	0	0
Oceanic ridges with hydrothermal vents/fields	Oceanische richels met hydrothermale openingen/velden	I, V	V	2014-11	0	0	NA		0	0
Ostrea edulis beds	Platte oesterbanken	II, III, IV	All where it occurs	2013/04e	0	1	1	1	1	1
Sabellaria spinulosa reefs	*Sabellaria spinulosa* riffen	All regions	II, III	2013-02	1	1	1	1	1	1
Seamounts	Zeebergen	I, IV, V	All where it occurs		0	0	NA	0	0	0
Sea-pen and burrowing megafauna communities	Zeeveer en gravende megafauna gemeenschappen	I, II, III, IV	II, III	2010-11	0	1	NA	1	1	1
Zostera beds	Zeegras (*Zostera*) velden	I, II, III, IV	All where it occurs	2012-04	0	1	1	1	1	1

Table 3. References of OSPAR Recommendations of the selected species and habitats from Table 2.

Scientific name	Name (NL/UK)	OSPAR region
INVERTEBRATES		
Arctica islandica	Noordkromp (Ocean quahog)	OSPAR Commission (2013) OSPAR Recommendation 2013/5 on furthering the protection and restoration of the ocean quahog (*Arctica islandica*) in Region II of the OSPAR maritime area (https://www.ospar.org/documents?d=32970).
Ostrea edulis	Platte oester (Flat oyster)	OSPAR Commission (2013) OSPAR Recommendation 2013/4 on furthering the protection and conservation of *Ostrea edulis* in Region II of the OSPAR maritime area and *Ostrea edulis* beds in Regions II, III and IV of the OSPAR maritime area. OSPAR(2) 13/4/1, Annex 7 (https://www.ospar.org/documents?d=32968).
BIRDS		
Rissa tridactyla	Drieteenmeeuw (Black-legged kittiwake)	OSPAR Commission (2011) OSPAR Recommendation 2011/05 on furthering the protection and conservation of the Black-legged kittiwake (*Rissa tridactyla tridactyla*) (http://www.ospar.org/documents/dbase/decrecs/recommendations/11-05e_rec%20kittiwake.doc).
FISH		
Alosa alosa	Elft (Allis shad)	OSPAR Commission (2015) OSPAR Recommendation 2015/04 on furthering the protection and conservation of the Allis shad (*Alosa alosa*) in Regions II, III and IV of the OSPAR maritime area (https://www.ospar.org/documents?d=33054).
Anguilla anguilla	Aal (European eel)	OSPAR Commission (2014) OSPAR Recommendation 2014/15 on furthering the protection and conservation of the European eel (*Anguilla anguilla)* in Regions I, II, III and IV of the OSPAR maritime area (https://www.ospar.org/documents?d=33018).
Raja montagui (synonym: Dipturus montagui)	Gevlekte rog (Spotted Ray)	OSPAR Commission (2014) OSPAR Recommendation 2014/7 on furthering the protection and conservation of the spotted ray (*Raja montagui)* in Regions II, III, IV and V of the OSPAR maritime area (https://www.ospar.org/documents?d=33002).
Gadus morhua– populations in the OSPAR regions II and III[2]	Kabeljauw (Cod)	OSPAR Commission (2014) OSPAR Recommendation 2014/14 on furthering the protection and conservation of cod (*Gadus morhua*) in the OSPAR Maritime Area, Regions II and III.
Hippocampus guttulatus (synonym: Hippocampus ramulosus)	Langsnuit-zeepaardje (Long-snouted seahorse)	OSPAR Commission (2012) OSPAR Recommendation 2012/3 on furthering the protection and conservation of the Long-snouted seahorse (*Hippocampus guttulatus*). (http://www.ospar.org/documents/dbase/decrecs/recommendations/12-03e_long%20snouted%20seahorse.doc).
Hippocampus hippocampus	Kortsnuit-zeepaardje (Short-snouted seahorse)	OSPAR Commission (2012) OSPAR Recommendation 2012/2 on furthering the protection and conservation of Short-snouted seahorse (*Hippocampus hippocampus*) (http://www.ospar.org/documents/dbase/decrecs/recommendations/12-02e_short-snouted%20seahorse.doc).
Petromyzon marinus	Zeeprik (Sea lamprey)	OSPAR Commission (2015) OSPAR Recommendation 2015/03 on furthering the protection and conservation of the sea lamprey (*Petromyzon marinus*) in Regions I, II, III and IV of the OSPAR maritime area.
Raja clavata	Stekelrog (Thornback skate / ray)	OSPAR Commission (2014) OSPAR Recommendation 2014/8 on furthering the protection and conservation of the thornback ray (*Raja clavata)* in the OSPAR maritime area (https://www.ospar.org/documents?d=33004).
Salmo salar	Zalm (Salmon)	OSPAR Commission (2016) OSPAR Recommendation 2016/3 on furthering the protection and conservation of the Atlantic salmon (*Salmo salar*) in Regions I, II, III and IV of the OSPAR maritime area.
Squalus acanthias	Doornhaai ([Northeast Atlantic] spurdog)	OSPAR Commission (2014) OSPAR Recommendation 2014/2 on furthering the protection and conservation of the spurdog (*Squalus acanthias*) in the OSPAR maritime area
MARINE MAMMALS		
Phocoena phocoena	Bruinvis (Harbour porpoise)	OSPAR Commission (2013) OSPAR Recommendation 2013/11 on furthering the protection and restoration of the harbour porpoise (*Phocoena phocoena*) in Regions II and III of the OSPAR maritime area
HABITATS		

Scientific name	Name (NL/UK)	OSPAR region
Intertidal *Mytilus edulis* beds on mixed and sandy sediments	Mosselbanken op gemixt en zandig sediment	OSPAR Commission (2015) OSPAR Recommendation 2015/01 on furthering the protection and conservation of intertidal *Mytilus edulis* beds on mixed and sandy sediments in Regions II and III of the OSPAR maritime area. (https://www.ospar.org/documents?d=33048).
Intertidal mudflats	Wadplaten	OSPAR Commission (2016) OSPAR Recommendation 2016/2 on furthering the protection and conservation of intertidal mudflats in Regions I, II, III and IV of the OSPAR maritime area.
Ostrea edulis beds	Platte oesterbanken	See *Ostrea edulis*
Sabellaria spinulosa reefs	*Sabellaria spinulosa* riffen	OSPAR Commission (2013) OSPAR Recommendation 2013/2 on furthering the protection and conservation of *Sabellaria spinulosa* reefs in Regions II and III of the OSPAR maritime area (https://www.ospar.org/documents?d=32964).
Sea-pen and burrowing megafauna communities	Zeeveer en gravende megafauna gemeenschappen	OSPAR Commission (2011) OSPAR Recommendation 2010/11 on furthering the protection and restoration of seapen and burrowing megafauna communities in the OSPAR Maritime Area (http://www.ospar.org/documents/dbase/decrecs/recommendations/10-11e_seapens_burrowing_megafauna.doc).
Zostera beds	Zeegras (*Zostera*) velden	OSPAR Commission (2012) OSPAR Recommendation 2012/04 on furthering the protection and conservation of *Zostera* beds (http://www.ospar.org/documents/dbase/decrecs/recommendations/12-04e_zostera%20recommendation.doc).

4 Evaluation for the Netherlands

4.1 Invertebrates

4.1.1 Ocean quahog (Noordkromp, *Arctica islandica*)

Ocean quahog (Noordkromp, Arctica islandica)

Figure 1. (Dead) ocean quahog Arctica islandica on the Dogger Bank (photo: Oscar Bos, Wageningen Marine Research).

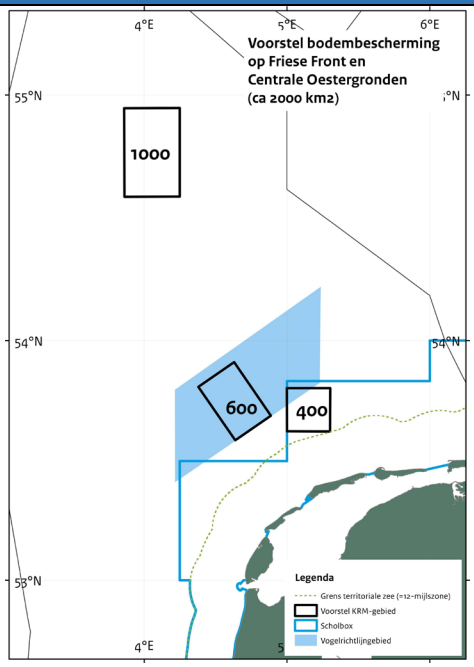

Figure 2. Proposed seafloor protection areas under the MSFD (map: www.noordzeeloket.nl).

➢ **Introduction**

The ocean quahog (*Arctica islandica*) is a bivalve clam that can reach a very high age of well over 100 years. They live in the seafloor at shallow depth and maintain contact with the above water via the siphons so that they are supplied with oxygen and food (Witbaard, 2007; 2009). Fully grown individuals have firm and heavy shells with a low percentage of organic matter in the shell, making them little "flexible" and fragile. The ocean quahog is therefore a physically vulnerable species that suffers a lot from bottom trawling.

A substantial part of the Dutch population of the ocean quahog used to occur in the Oyster grounds and the Frisian Front. However, inventories between 2006 and 2008 suggest that this species has virtually disappeared from these areas. Only in a relatively little fished area just south of the Dogger Bank densities of 1 ind. per m2 were still found (Witbaard, 2009).

➢ **OSPAR recommendations**

3.1 Each Contracting Party should consider in Region II:

a. the possibility to introduce legislation to protect the ocean quahog in all its life stages;

b. collaborating on recommended monitoring strategies;

c. facilitating and improving research and collecting trend data on populations and distribution of ocean quahog using suitable sampling methods to obtain quantitative reliable density estimates such as the combination of 'triple-D' dredges and box cores;

d. working towards mapping and assessment of population size of existing ocean quahog distribution;

e. compiling overviews of historical data of the distribution and density of ocean quahog, and strive towards the preparation of maps/models indicating the possible former distribution of this species;
f whether any site justifies selection as a marine protected area (MPA) for the conservation and recovery of the ocean quahog, and whether such areas may become a component of the OSPAR MPA network;
g. the introduction of the ocean quahog as a protected species under regional and international biodiversity conventions;
h. acting for the fulfilment of the purpose of this recommendation within the framework of other competent organisations and bodies.

- **Have the recommendations been implemented in the Netherlands?**

The OSPAR recommendations have partially been implemented.

- **If so, how is it implemented? What has come out?**

a) There is no legislation that protects the ocean quahog (and other benthic animals in the North Sea) at the species level. To protect the ocean quahog and other vulnerable benthic organisms, in addition to the existing N2000 network, three seafloor protection areas have been proposed under the MSFD in the Dutch North Sea: two in the area of the Frisian Front and one in the Oyster Grounds (see map, Figure 2). These can help to protect a part of the habitat of the ocean quahog. However, the protected areas have not yet been implemented and it is not yet known when the European Commission will take a decision (Ministry of I & M and the Ministry of Economic Affairs, 2018). The text box below provides more information about the designation of seafloor protection areas in the Dutch North Sea.

b) The OSPAR background document of the ocean quahog (OSPAR, 2009) states that the Netherlands is the only Member State where annual monitoring of the species took place within the BIOMON program. Within the BIOMON program annual numbers and biomass of macrozoobenthos species at 100 stations in the Dutch North Sea were monitored. The regular benthic sampling techniques that are applied, however, are not well suited for species such as the ocean quahog (Witbaard, 2007). The species could be monitored under the new KMR monitoring program (Ministry of I & M, 2014). However, the first tranche of monitoring does not focus on the rare ocean quahog and biogenic structures. Consideration here is that the formation of substantial populations

Seabed protection

For the seabed integrity of the Dutch North Sea, among other things, a target has been set to improve the quality of the deeper silt-rich parts. Also, 10 to 15% of the seafloor should be free of damaging by human activities (for exact formulation see: Ministry of I & M and the Ministry of Economic Affairs, 2015). Options for seafloor protection in the Frisian Front and Central Oyster Grounds has been studied extensively (Bos et al., 2011; Fey-Hofstede & Witbaard, 2013; Slijkerman et al., 2013; van Oostenbrugge et al., 2013; Jongbloed et al., 2014; Kuhlman & van Oostenbrugge, 2014; Slijkerman et al., 2014; de Vries et al., 2015; Lindeboom et al., 2015; Rijnsdorp, 2015; Slijkerman & Tamis, 2015; van Kooten et al., 2015; van Oostenbrugge et al., 2015). On the basis of long-term monitoring data it was determined that the Frisian Front and the Oyster Grounds are important for the biodiversity of benthic communities (Bos et al., 2011). Next, the Dutch government made decision to close additional areas under the MSFD, in addition to the Natura 2000 network, to protect benthic life. Next, a number of scenario studies have been carried out to determine the exact areas (Slijkerman et al., 2013; 2014), followed by a number of cost-benefit analyses (van Oostenbrugge et al., 2015) and stakeholder workshops. On the basis of this research, closures have been proposed (Figure 2) under the Marine Strategy Framework Directive to protect the seabed and the fauna present. For an area of 2000 km2 of the Frisian Front and Central Oyster Grounds the status 'seabed protection area' has been proposed. The proposal to close parts of the Frisian Front and Oyster Grounds was submitted by Minister (Schultz) to the House of Representatives on 10 June 2016 (Ministry of I & M, 2016), but these area closures have not yet been implemented (2018). It is not yet known when the European Commission will make a decision (Ministry of I & M and the Ministry of Economic Affairs, 2018).

of ocean quahog and biogenic structures will be minimal as long as there is demersal fishing (Ministry of I & M, 2014). Specific monitoring of the ocean quahog is therefore not currently taking place. For the Dutch implementation of the MSFD, including the monitoring program (MSFD part II), consultation was sought among the countries with which the Netherlands shares the Southern North Sea (Ministry of I & M, 2012). It has been indicated that the monitoring program will, where possible, be set up jointly with the neighbouring countries (synergy, coherence, cost-effectiveness).
c) NIOZ has developed specific equipment (Bergman and Santbrink, 1994) with which suitable density estimates can be made (Witbaard, 2007).
d) an inventory of the north-curvature population in the Dutch part of the NCP, in particular the Frisian Front and the Oyster Grounds, was done by Witbaard (2007).
e) overview of historical data / indication of previous distribution has been described by Witbaard (2007).
f) The ocean quahog is a characteristic species for the Natura 2000 area (SAC) and OSPAR MPA the Dogger Bank (Bos et al., 2008). The ocean quahog has therefore been proposed as a typical species for habitat type 1110C (Bos et al., 2008) but is not enough to qualify; the ocean quahog is found on average in 50% of the years and on 20% of the stations (Troost et al., 2014). Troost et al. (2014) note that this species could possibly be included as a rarer species that may increase in number due to seabed disturbance limiting measures. The species has been added as a candidate typical species for habitat type 1110C which has been designated in the N2000 area the Dogger Bank (Troost et al., 2014). The Dogger Bank is also part of the OSPAR MPA network (see www.mpa.ospar.org). The ocean quahog also occurs in the Birds Directive area, the Frisian Front and in the Central Oyster Grounds. For part of the Frisian Front and Central Oyster Grounds, the status 'seafloor protection area' has been proposed in the context of the MSFD but has not yet been implemented (see above).

g) the species cannot easily be brought under other conventions, but area protection will be achieved. h) government and NGOs consider the protection of the ocean quahog important.

- **If not, what are the reasons for not implementing it?**

a) Species protection is laid down in the Netherlands in the Nature Conservation Act. The Nature Conservation Act protects species that are mentioned in the Habitat or Bird Directive and a number of 'other species'. The ocean quahog is not a species of the Habitats Directive. The Dutch government indicates that for species in the North Sea that are worthy of protection from a nature conservation point of view, but for which the Habitats Directive does not require protection, the OSPAR approach based more on characteristic species and ecotypes of the marine system is more suitable (PBL, 2008). This concerns, for example, long-lived species with a low breeding speed, which suffer from chronic influences such as permanently high fishing pressure, chronic oil pollution or damage caused by seabed fishing such as most sharks and rays, a number of shellfish and structure-forming organisms (PBL, 2008). The ocean quahog falls under this framework.
b) Since the formation of substantial populations of ocean quahog will be minimal as long as there is seafloor disturbance by fishing, the first tranche of MSFD monitoring does not focus on the rare ocean quahog. Specific monitoring of this species is therefore not currently taking place, only via regular benthic fauna monitoring.

- **What opportunities are there for the Netherlands?**

The species will have the chance to recover in the future MSFD-seafloor protection area in Central Oyster Grounds. This concerns a proposed area of 800 km2.

What are the changes with respect to the previous report?
There are no differences with regard to the implementation of the recommendations compared to the reporting in 2016.

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1, 27 (see Appendix 1)

- How can the Netherlands contribute to joint actions?

Action 1: Communication. No new research has been carried out into the Dutch population of the northern cramp since the mid-90s. A literature overview was made in 2007 with species information (Witbaard, 2007).
Action 27: Protection. MSFD areas are being developed within which the species should be protected (Central Oyster Grounds).

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4.1.2 Flat Oyster and *Ostrea edulis* beds (Platte oester en platte oesterriffen)

Flat oyster and Ostrea edulis beds (Platte oester en platte oesterriffen)

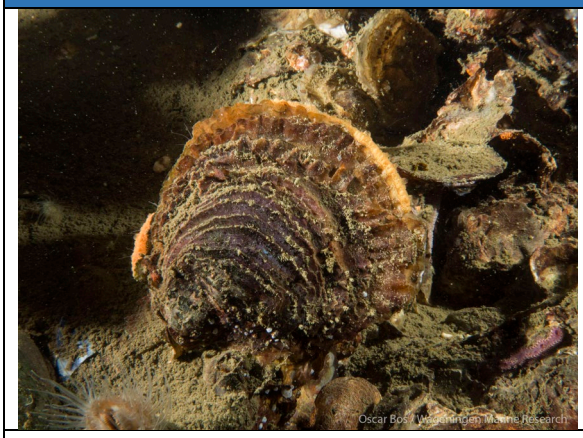

Figure 3. Flat oyster Ostrea edulis in Lake Grevelingen (photo: Oscar Bos, Wageningen Marine Research).

- **Introduction**

The European oyster is a bivalve and an indigenous species in Europe. The flat oyster can grow up to 22 cm but is often smaller. Flat oysters live on the bottom and can form biogenic reefs, and are therefore also called bio engineers (Smaal et al., 2015). With their gills they absorb oxygen and filter out algae from the water as food. Oysters start their lives as male and later on become female in their lives, but can also change gender afterwards again. After fertilization the larvae first remain in the mantle of the mother oyster. Then they swim a few days in the water before settling on the seafloor. Mainly young flat oysters suffer from predation by crabs, starfish and predatory snails such as oyster borers (Smaal et al., 2017).
In the past flat oyster bed formed an important part of the North Sea ecosystem, but in the nowadays the species has virtually disappeared. Overfishing but also natural factors such as diseases have played a role (Smaal et al., 2017). In the Wadden Sea, too, flat oyster beds were numerous in the first half of the 20th century. Through a combination of factors they then disappeared (van der Have et al., 2016).

- **OSPAR recommendations**

3.1 Each Contracting Party should consider in Regions, II, III and IV:
a. the possibility to introduce legislation to protect the *Ostrea edulis* and *Ostrea edulis* beds;
b. investigating the occurrence of the *Ostrea edulis*, the species distribution and population dynamics, and assessing the extent and quality of the *Ostrea edulis* beds, by means of monitoring and seabed habitat surveys, in order to complete the knowledge base and provide indicators for the state and recovery of the species and habitat;
c. whenever applicable, seeking ways and means to broaden the knowledge base on the occurrence of and threats to the *Ostrea edulis* and *Ostrea edulis* beds by gathering additional knowledge from sources such as national planning authorities, environmental impact assessments and post development monitoring, research institutes, fisheries research, local sea fisheries committees, commercial and recreational fisheries, Non-governmental organisations (NGOs) and the general public;
d. reporting any existing and new data on the distribution, quality and extent of the *Ostrea edulis* beds to the OSPAR Commission;

e. whether any site justifies selection as a marine protected area for the conservation and recovery of the *Ostrea edulis* and *Ostrea edulis* beds and whether such areas may become a component of the OSPAR MPA network;
f. addressing and minimising adverse impacts on the *Ostrea edulis* and *Ostrea edulis* beds arising from human activities in waters under its national jurisdiction;
g. in areas where pressures have caused the decline/disappearance of the *Ostrea edulis*, and that are now adequately managed, exploring, where practicable, restoration through seeding or translocation of adult *Ostrea edulis* to promote recovery or re-establishment of the habitat;
h. ensuring that populations used as donors for seeding (as mentioned in §3.1.g. above) are pathogen and parasite free;
i. reporting the management measures taken specifically for the protection of the *Ostrea edulis* and *Ostrea edulis* beds to the OSPAR Commission and assessing whether these are effective and determining whether further measures are needed to address the key threats;
j. raising awareness of the importance of the *Ostrea edulis* and *Ostrea edulis* beds among relevant management authorities, relevant industries and the general public;
k. acting for the fulfillment of the purpose of this Recommendation within the framework of other competent organisations and bodies;
l. consider individually addressing any of the actions outlined in §3.2 below;

- **Have the recommendations been implemented?**

Yes, partially implemented.

- **If so, how is it implemented? What has come out?**

a) The species could be classified under N2000 habitat type H1170 (reefs). In the Netherlands, the definition of H1170 should be adjusted for this. To date, the line has been followed that no additional legislation is needed in the Netherlands, see section "reasons for not implementing".
b) In the context of recovery opportunities for the flat oyster in the North Sea, the current occurrence of the flat oyster in coastal and offshore waters of the Netherlands has also been studied (Smaal et al., 2015). Recently a reef with flat oysters in the Dutch North Sea has been investigated for habitat conditions, potential for increasing biodiversity and the role of the substrate offered by other shellfish species such as the invasive species of Pacific oyster (*Crassostrea gigas*) (Christianen et al., 2018).
c) Knowledge about flat oyster (beds) is collected from different frameworks, such as: reintroduction (Smaal et al., 2015, Sas et al., 2016, 2018, 2019, van der Have & van der Zee, 2016, Didderen et al., 2019a,b); multifunctional use of wind farms (Smaal et al., 2016); and national and EU regulations regarding shellfish and crustacean diseases (Engelsma & Haenen, 2007; 2008).
d) In the latest OSPAR overviews (OSPAR, 2009; 2014) it is stated that the flat oyster (beds) in the Netherlands do not (or no longer) occur. The very recent description of a flat oyster reef is reported by Christianen et al.(2018).
e, f) At the level of the Central Oyster Grounds extensive flat oyster reefs were present until the end of the 19th / beginning of the 20th century (Lindeboom et al., 2008, Wijnhoven & Bos, 2017, van Duren et al., 2016). For a part of the Central Oyster Grounds, a seafloor protection areas has been proposed (see Ocean quahog).
g) A desk study has been conducted for the Ministry of Economic Affairs and the Ministry of Infrastructure and the Environment on the feasibility of reintroducing the flat oyster in the Dutch North Sea (Smaal et al., 2015). Such a study was also carried out for the Wadden Sea for the Program Towards a Rich Wadden Sea (van der Have & van der Zee, 2016). Two follow-up studies for Economic Affairs focused on the possibilities that wind farms can offer in the recovery of flat oyster populations in the North Sea (Smaal et al., 2016, Kamermans et al. 2018a,b). In the development of offshore wind farms, the operators are asked to actively restore natural biodiversity, through regulations in the licensing process. A manual is available for this (Lengkeek et al., 2017) in which the flat oyster plays an important role. There appears to be a perspective for the establishment of the flat oyster in the Dutch North Sea (Smaal et al., 2015 & 2016, Christianen et al., 2018). In March 2016, a trial was started in the Voordelta (Sas et al., 2016). In the Wadden Sea reintroduction has also been investigated (Van der Have et al., 2016). A large part of the

channels and deeper parts of the western Wadden Sea are suitable for flat oysters. It is recommended to set up search areas for the first pilot experiments (van der Have et al., 2016).
(h) compliance with national and EU legislation on shellfish and crustacean diseases (eg Engelsma & Haenen, 2007; 2008);
i) i) Protection measures have not yet been taken. A marine protection area was proposed in 2016, but this is not specifically aimed at the flat oyster. Moreover, the proposal has not yet been implemented. Measures specifically for the flat oyster are more focused on recovery;;
j) The importance of flat oyster (reefs) is recognized. Concrete examples for this are: 1) The Netherlands has proposed flat oyster (beds) to OSPAR for inclusion in the list of endangered and declining species and habitats (OSPAR, 2009); 2) Lindeboom et al. (2008) describe the importance of flat oyster beds in the Central Oyster Grounds: "With the disappearance of oysters from the area, an important structure-forming element in the benthic fauna has been lost. Oysters, often clustered, formed the hard substrate in an area that consisted of soft muddy sediment. In this way they formed the basis for those species that need a hard surface as an attachment (sponges, hydroids). In addition, these overgrown aggregates with cavities and nooks formed shelters for smaller bottom-dwelling organisms and young fish. "; 3) During an expert workshop in 2015 (Bos & Sneekes, 2016) the seeding of flat oysters in an area without fishing was seen as an opportunity to increase the resilience of the North Sea .; 4) In a study of the possibilities for restoring natural structures that naturally belong in the North Sea and what possibilities there are to contribute to the ecological status of the North Sea by offering artificial hard substrata, the flat oyster plays an important role (van Duren et al., 2016).
k) Oyster restoration takes place within offshore wind farms, by wind farms themselves (Gemini, Eneco), by NGOs (Stichting de Noordzee, Natuur en Milieu), but also outside these parks (Stichting ARK, WWF). Various parties are monitoring oysters (Wageningen Marine Research, Bureau Waardenburg). See also website: www.platteoester.nl
l) information exchange takes place via the NORA network. Work is underway on a European manual for monitoring oyster restoration under NORA.

- **If not, what are the reasons for not implementing it?**

a) Legislation: Species protection is laid down in the Netherlands in the Nature Conservation Act. The Nature Conservation Act protects species that are mentioned in the Habitat or Bird Directive and a number of 'other species'. The flat oyster is not a species of the Habitat Directive. The Dutch government indicates that for species in the North Sea that are worthy of protection from a nature conservation point of view, but for which the Habitats Directive does not require protection, the OSPAR approach based more on characteristic species and ecotopes of the marine system is more suitable (PBL, 2008). This concerns, for example, long-lived species with a low reproduction rate, which suffer from chronic influences such as permanently high fishing pressure, chronic oil pollution or damage caused by seabed fishing such as most sharks and rays, a number of shellfish and structure-forming organisms (PBL, 2008).). The flat oyster falls under this framework.

- **What opportunities are there for the Netherlands?**

There are a number of initiatives to restore the flat oyster in the North Sea at offshore wind farms and at the Borkum Reef, a natural reef. An overview can be found on www.platteoester.nl.
The ministry of LNV (pers. Com. E. Knegtering) is currently considering whether oyster beds can be seen as part of habitat type H1170. This requires an adjustment of the Habitat profiles.

- **What are the changes with respect to the previous report?**

Progress has been made with regard to knowledge development (including research into a reef with flat oysters in the Dutch North Sea (Christianen et al., 2018) and restoration (including in combination with the development of offshore wind farms (Lengkeek et al., 2017).

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1, 2, 3, 15, 16, 23, 31 (see Appendix 1)

- How can the Netherlands contribute to joint actions?

Action 1: Communication / knowledge:

• The website www.platteoester.nl describes the Dutch oyster research.
• The European network NORA (https://noraeurope.eu/) brings together researchers working on oyster restoration. A European handbook for oyster restoration is being developed within the framework of NORA.

Action 2: Cards. Maps with locations and potential locations of reef-forming shellfish and worms were published in 2019 (Bos et al., 2019), and can be included in the OSPAR database.

Action 3: Monitoring. Various projects are working on monitoring techniques (eg EcoFriend: https://www.wur.nl/en/project/ecofriend.htm). See also www.platteoester.nl.

Action 14: Legislation. The species could be classified under N2000 habitat type H1170 (reefs). In the Netherlands, the definition of H1170 should be adjusted for this.

Action 15, 16, 23, 31: Fisheries and other disturbance. In the Netherlands, the Ministry of LNV knows where oyster beds are (see Bos et al. 2019).
OSPAR could review if the flat oyster could fall under H1170 in all relevant countries.
Not only fishing can affect flat oysters. Another point of concern is the effects of seismic research in the vicinity of oyster bed restoration projects (near the Borkum Stones).

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4.2 Birds

4.2.1 Black-legged kittiwake (Drieteenmeeuw, *Rissa tridactyla*)

Black-legged kittiwake (Drieteenmeeuw, *Rissa tridactyla*)

Figure 4. Black-legged kittiwake, Rissa tridactyla (https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats).

- **Introduction**

The kittiwake is a seabird that lives on cliffs and prefers clear, deep and salty seawater. The distribution area of the kittiwake *Rissa tridactyla tridactyla* is the entire northern Atlantic. However, the majority of the breeding population (85% in 2008) occurs within the OSPAR area (OSPAR, 2009). Due to the declining trend, the susceptibility (long-lived species with relatively low reproduction), and the threat with regard to food availability (such as sand eel) and in some areas predation, the species has been added to the OSPAR list of endangered species (OSPAR, 2009). In the Netherlands it is a new breeding bird on offshore platforms with a very small distribution and population (van Kleunen et al., 2017). The species has been breeding in the Netherlands since 2000 (Camphuysen & de Vreeze, 2005) and is still very rare as a breeding bird in the Netherlands. Despite the fact that there are no annual reports / counts, it is likely that the species breeds annually in the Netherlands. Observations are rare, because remote oil/gas platforms on the North Sea that are visited very irregularly. In 2017, colonies of kittiwakes were observed on two platforms on the south side of the Frisian Front with at least 50 and 112 nests counted. At least 73 chickens or juvenile birds could also be identified (Geelhoed et al., 2018). Previous records are listed in Geelhoed et al. 2011)

The species is on the European Red List and for the first time also on the Dutch Red List (category Sensitive) (van Kleunen et al., 2017). The colonization of the Dutch North Sea is associated with an unfavorable food situation in nearby, important breeding areas such as Great Britain. There was a series of bad breeding seasons as a result of unfavourable food conditions, as a result of which kittiwakes may have been searching for new breeding grounds (van Kleunen et al., 2017). The Frisian Front is an area with a favourable food situation for this gull. The Brown Bank is also important. In February / March and in July 2017, hundreds of kittiwakes were counted by means of shipbased counts on the Frisian Front. At the Brown Bank in January of that year, also hundreds of

kittiwakes were counted (Geelhoed et al., 2018). The distribution seems largely determined by human activities: a large proportion of the birds were associated with a fish cutter (35%) or associated with a gas production platform (60%) (Geelhoed et al., 2018).

- **OSPAR recommendations**

3. Programmes and measures
3.1 Each Contracting Party should:
a. consider the introduction of national legislation to protect the Black-legged kittiwake;
b. take relevant conservation measures in key areas where significant numbers of the Black-legged kittiwake occur;
c. consider whether any sites within its jurisdiction justify selection as Marine Protected Areas for the protection of populations of and critical habitats for the Black-legged kittiwake;
d. in accordance with OSPAR Recommendation 2003/3 as amended by OSPAR Recommendation 2010/2, report to the OSPAR Commission on sites selected for inclusion as components of the OSPAR Network of Marine Protected Areas and develop appropriate management plans and measures that include the conservation of the Black-legged kittiwake;
e. promote monitoring and assessment programmes for the Black-legged kittiwake and contribute to the development of a data collation strategy;
f. raise awareness of the status of and threats to the Black-legged kittiwake among management authorities, users of the marine environment and the general public;
g. support the development and implementation of National Plans of Action in accordance with the International Plan of Action for reducing incidental catch of seabirds in longline fisheries ; and
h. where appropriate, support, promote and implement the priority actions identified in the Nordic Action Plan for Seabirds .

- **Have the recommendations been implemented?**

Yes, partially implemented.

- **If yes, how Have the recommendations been implemented? What is the result?**

a) Birds naturally occurring in the Netherlands, including kittiwakes, are protected under the European Birds Directive. The protection of the kittiwake in the Netherlands is regulated in the Nature Conservation Act. The species is also on the Dutch Red List of Birds 2016 (van Kleunen et al., 2017). However, this has no legal status. The Minister promotes research and activities necessary for the protection and management of species on the Red List.
b, c & d) The Frisian Front and the Brown Bank are important, specifically the oil and gas production platforms. The Frisian Front is a protected area under the Birds Directive, whereby only the guillemot is designated (EZ, 2016). The Brown Bank is probably going to be designated as Natura 2000 area on the North Sea because of the significance for the seabird species razorbill and guillemot. In 2009, protected areas on the Dutch North Sea were registered as OSPAR MPA. This concerns the Dogger Bank, Cleaver Bank, North Sea Coastal Zone, Vlakte van de Raan and Voordelta. The Frisian Front, which was designated in 2016 (Ministry of Economic Affairs, 2016), is not yet covered by this network.
e) Monitoring of seabirds in the Dutch part of the North Sea takes place using aircraft counts (MWTL programme). In 2016-2018 shipbased counts were also carried out at the Frisian Front and at the Brown Bank.
f) we are not aware of any information on this. g) longline fishing is not a problem in the Netherlands. h) is not relevant for NL

- **If no, what are the reasons not to implement the recommendation?**

In the Netherlands it is a new breeding bird with a very small distribution and population (van Kleunen et al., 2017). The relative importance of the Netherlands for the species is very small: <1% of the European population brood in the Netherlands (BirdLife International, 2015).

- **Which opportunities and possibilities are there for the Netherlands?**

Protection of the Brown Bank as a Bird Directive area, although the effect can be questioned. [perhaps protection of off shore platforms in relation to decommisioning]

- **What are the changes compared to the previous reporting period?**

This species has not been reported in 2016.

- **Implementation of OSPAR joint actions**
  - which actions refer to this species or habitat?

Actions 1, 5, 36, 37 (see Annex 1)

  - How can the Netherlands contribute to joint actions?
  -

Action 1: Communication. No special attention is given to kittiwakes in the Netherlands. SOVON describes the numbers of breeding birds in an annual breeding bird report (https://www.sovon.nl/nl/soort/6020). The trend of the Kittiwake on the basis of sea tensile counts and MWTL aircraft counts is analyzed by the Central Bureau of Statistics (CBS). The intention is that this is updated annually and published on the Compendium for the Living Environment, but this is not yet happening (pers. Com. Steve Geelhoed, WMR).
Action 5. Monitoring. The species is included in the MWTL monitoring of Rijkswaterstaat (aircraft counts). Furthermore, an aircraft survey of offshore platforms, taking pictures of nesting birds, would be an efficient way of collecting data. This could take place in an international context.
Action 36. ICES. The European Seabirds At Sea (ESAS) database (http://www.seabirds.net/esas.html), containing ship counts of birds, is stored at ICES (pers. Com. Steve Geelhoed, WMR).

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4.3 Fish

4.3.1 Allis shad (Elft, *Alosa alosa*)

Allis shad (Elft, Alosa alosa)	
	*Figure 5. Allis shad Alosa alosa (https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats)*

➢ **Introduction**

The allis shad is an "anadromous" migratory fish that spends its main growth period in salt water and migrates to rivers to spawn. The species belongs to the herring family (*Clupeidae*) and is the largest representative of this family with a maximum length of up to 80 cm. The species is a typical plankton-filtering fish that filters out small free-floating organisms from the water to feed them (Ministry of Economic Affairs, 2008).

Populations in Europe have declined sharply (OSPAR, 2009). Within the OSPAR region, the majority of the threats for the allis shad are in the inland waters that are used for the migration (OSPAR, 2009). Dams are the main threat, followed by poor water quality and sand and gravel extraction in spawning areas. Little is known about the distribution of this species in the marine environment (OSPAR, 2009). In the Netherlands, the allis shad was formerly caught in the big rivers, but now the species has virtually disappeared from the Netherlands (Ministry of Economic Affairs, 2008). This is due to the effective fishing at the end of the nineteenth and early twentieth century, stagnation of the major rivers, riverbank surfacing and gravel extraction, causing spawning grounds to disappear (Patberg et al., 2005). Suitable growth areas (well-functioning estuaries and freshwater tidal area) have been lost due to the construction of the Delta works. Spawning grounds are located outside Dutch territory, upstream in the rivers with gravel beds (Ministry of Economic Affairs, 2008). The Netherlands is the gateway to the spawning grounds in the Rhine basin. However, the allis shad cannot or hardly use our country as a transit area. In the Rhine (via the Nieuwe Waterweg and Waal) and Eems, the upstream migration of fish is possible, but the Haringvlietdam and Afsluitdijk probably act as an obstacle to the passage (Ministry of Economic Affairs, 2008).

➢ **OSPAR recommendations**

a. the possibility of introducing legislation to protect the Allis shad in all its life stages;
b. taking relevant conservation measures particularly in key areas where the population is either depleted or locally extinct, with a special focus on estuarine habitats, spawning habitats and river migration routes taking relevant measures to facilitate the restoration of the species; especially in river basins where it previously occurred;
c. whether any of the key areas justify selection and designation as marine protected areas for the protection of the Allis shad and whether such areas may become a component of the OSPAR network of marine protected areas;
d. monitoring the Allis shad in marine, estuarine and freshwater habitats;
e. developing and incorporating appropriate measures to mitigate habitat destruction (e.g. caused by maintenance dredging, sand and gravel extraction or dams) and degradation of the water quality in estuaries;

f. supporting initiatives taken by industry and the recreational fishing sector in the development of techniques and equipment to facilitate the safe release of this species from fishing gears if and when this species is not targeted;
g. promote the inclusion of the Allis shad as protected species in relevant international biodiversity conventions, taking into account the OSPAR Regions for which threats and/or decline have been indicated in the OSPAR List of threatened and/or declining species and habitats (OSPAR Agreement 2008-6);
h. acting for the fulfilment of the purpose of this Recommendation within the framework of relevant competent authorities;

- **Have the recommendations been implemented?**

Yes.

- **If yes, how have the recommendations been implemented? What is the result?**

a) the allis shad is a protected species under the Nature Conservation Act (Habitat Directive Annex II species). The target for the species is to maintain the distribution, size and quality of the habitat. for the expansion of the population (Ministry of LNV, 2006, 2008). In the Netherlands, sport fishing is subject to a year-round obligation to put back the fish.
b) An important measure is the implementation of the Kierbesluit in 2019. This means that the Haringvliet locks are 'put ajar' (starting from 16 Jan 2019) when the water level on the Haringvliet is lower than at sea. In this way, migratory fish, including salmon and sea trout, can pass through the locks towards their spawning areas, which are located upstream. This measure provides a very important improvement in the quality of the habitat for migratory fish (Ministry of I & M, 2016). For the shad, the Haringvliet could become more important in the future as a spawning or growing area, if there are more shallow areas and the water quality improves further. Measures from the EU Life-IP project Delta nature for new tidal nature (associated with suitable structure on the sediment) already partly contribute to this. Within the scope of the WFD (and related environmental policy and water legislation) the improvement of water quality is on the agenda (Ministry of I & M, 2016). The species can also benefit from the measures taken to restore the migration routes of salmon (entire river basin) and twaite shad (downstream) (Ministry of LNV, 2006). Hop (2011) provides an overview of the knowledge regarding fish migration in the Dutch Rhine-Meuse basin and addresses the bottlenecks with regard to the different forms of fish migration.
c) The Dutch downstream area (Haringvliet, Biesbosch) was an important growing area for young allis shad coming from Germany. The allis shad is designated as a Habitat Directive species in, among others, these two areas. The allis shad is also protected in the Natura 2000 area, the Voordelta, which is also part of the OSPAR MPA network (http://mpa.ospar.org/home_ospar). The Natura 2000 sites Vlakte van de Raan and Noordzeekustzone are not designated for the allis shad as the relative contribution of both areas to the national population is very likely to be negligible (Ministry of LNV, 2014).
d) Since the allis shad is a species of the Habitats Directive, it must be monitored as a result to determine whether the conservation objective is being met (Verver, 2014). Passive monitoring (using fykes) of diadromous fish at Kornwerderzand (in the Wadden Sea) is carried out annually since 2001 and in the fresh waters since 2012. In the fresh waters, seven locations are monitored annually. In 2015, this monitoring was expanded at four locations in the major rivers (Maas, Waal, Rijn and IJssel) for the Water Framework Directive (KRW). These last four locations will be monitored once every three years (van der Sluis et al., 2018). Since 1993, the passive MWTL fish monitoring has been running, a fishing program in which Wageningen Marine Research, in collaboration with professional fishermen in the National Waters in the Netherlands, registers the occurrence of fish (basically four traps per location). The program comprised 32 locations, but after the closure of areas due to the dioxin problem, the current number of sampled locations consists of 13 areas (Winter et al., 2014).
e) There is a core task for the North Sea, Wadden Sea and Delta with regard to, among other things, the allis shad: "Key task 1.06 Restoration salt-influence Haringvliet". The assignment concerns the restoration of the salt influence in Haringvliet, especially for migratory fish such as sea lamprey, allis shad and salmon (Ministry of LNV, 2006). For the Natura 2000 landscape River area "Key task 3.01 Migratory fish" is relevant. This key task means that there must be no barriers in the migration route of salmon, sea lamprey, river lamprey and shad (Ministry of LNV, 2006).

f) There is a code of conduct for sport fishing, including measures for restoring fish (Boer et al., 2010).
g) The species is protected under the HD
h) The protection of the species is ensured under different relevant authorities.

- **If no, what are the reasons not to implement the recommendation?**

Not relevant

- **Which opportunities and possibilities are there for the Netherlands?**

For migratory fish, the removal of barriers between salt and fresh water is important. The Haringvliet has been partially opened again since 2018 (Kierbesluit Haringvliet, open from 16 January 2019). Furthermore, the migration river will be built in the Afsluitdijk (from 2018), to allow fish from the Wadden Sea to migrate to the IJsselmeer and beyond.
In Germany, millions of young elves have been released since 2008 and fish traps have been installed in the migratory route and estuaries. In the Netherlands, however, there is still no independent population (Profieldocument Elft: Min LNV, 2008a). Because no third LIFE reintroduction program has been honoured by the EU, the initiators have drawn up an alternative plan for 2016-2021. Sport fishing Netherlands is involved. Since a few years, at least a few dozen adult elves have been raising annually via the fish passage in the Rhine at Iffezheim in Germany (Bos et al., 2018).

- **What are the changes compared to the previous reporting period?**

The previous report indicated that only recommendations 3.1.d, f, g had been implemented. Since then, the following recommendations have been implemented: 3.1.a (with the implementation of the Nature Conservation Act in 2017 whereby the Elft is included as a Habitat Directive type); 3.1.b & e (with the opening of the Haringvliet in 2019); 3.1.c (the shad is assigned in the Voordelta, which is also part of the OSPAR MPA network).

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1,4,14,15,33,35 (see Appendix 1)

- How can the Netherlands contribute to joint actions?

Action 1. Communication: The shad will be reported on in 2019 in the context of the Habitats Directive Art 17 reporting. It contains information about the status of the species (in prep). There is a knowledge document from Sportvisserij Nederland from 2009 (http://edepot.wur.nl/3426).

Action 4. Monitoring. No comments.

Action 14. Legislation. The species is protected under the Habitats Directive and nationally under the Nature protection Act.

Action 15. Fisheries. The species is hardly ever found in the North Sea.

Action 33. Research. The species is monitored in freshwater monitoring in the Netherlands (see e.g. Bos et al., 2018), but is sporadically found.

Action 35. Cooperation. In Germany, hundreds of thousands of allis shad larvae are released each year (https://www.sportvisserijnederland.nl/actueel/nieuws/20811/uitzet-elften.html). Sportvisserij Nederland contributes financially to this re-introduction project and with research.

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4.3.2 European Eel (aal, *Anguilla anguilla)*

European eel (aal, Anguilla anguilla)

Figure 6. Eel (Anguilla anguilla) (https://www.wur.nl/nl/nieuws/Helpt-het-aalbeheerplan-de-Nederlandse-aal.htm)

- **Introduction**

The European eel belongs to the order *Anguilliformes*, which includes the families of the moray eels, conger-ales and real eels (*Anguillidae*). The *Anguillidae* family contains only one taxonomic genus, *Anguilla*, which contains a number of species including the European eel (*Anguilla anguilla*). The species most likely spawns in the Sargasso Sea. The eel displays several metamorphoses throughout its life cycle (Klein Breteler, 2005): 1) larval stage; 2) glass eel (appearance of the 'adult' eel, but lacks pigment and is therefore transparent.) Glass eel drift to the coast and most swim into the lagoons and rivers), some stay; 3) yellow eels (fully pigmented eels, the growth stage of the eel in fresh water and partly in the coastal waters); 4) silver eels (sexually mature and migratory to the sea).
Since the 1980s, the glass eel migration and the eel population in Europe have declined sharply (ICES, 2019). Eel is listed on the IUCN Red List as seriously threatened. The advice of the International Council for Exploration of the Sea (ICES) is to reduce all human activities that reduce the production and migration of spawning eel (silver eel) to sea, such as fishing and fish migration bottlenecks, preferably to zero. To enable recovery of the eel population, the European Union drafted the Eel Regulation in 2007, which obliges Member States to draw up a national eel management plan. The European objective here is that at least 40% of the estimated biomass can migrate to sea.
This objective is included in the Dutch eel management plan (The Ministry of Agriculture Nature and Food Quality, 2009), in which the pristine biomass is estimated at 13,000 tons of yellow eel, of which 10,400 tons in fresh water. The eel management plan of the Netherlands includes a number of measures, including 4 measures that limit the mortality of eel by fishing. These are: 1. Closed eel fishing season September 1 to December 1 in each year. 2. Stop issuing fishing permits for 'peur nets' on State waters. 3. Fishing-free zones in areas that are important for eel migration. 4. Close fishing in the main major rivers, due to dioxin contamination. Evaluation of the eel management plan (by the Wolfshaar et al., 2018) shows that fisheries have the largest share in the anthropogenic mortality from glass eel to silver eel, followed by infrastructure at migration bottlenecks. The factors, and their relative importance, which caused the decline in eel stocks are not yet known, which makes it uncertain whether the target will be met with the current measures in the future (van de Wolfshaar et al., 2018).
The eel population is a widespread species. The recovery of the eel in the Netherlands is therefore not only dependent on the eel status and the (enforcement of) the management measures in the Netherlands, but on all countries in which eel is present.

- **OSPAR recommendations**

3.1 Each Contracting Party should consider in Regions I, II, III and IV:
a. ensuring the implementation of its national eel management plans for the conservation and restoration of the European eel, where appropriate;
b. reviewing its national legislation in order to better restore and protect the European eel in all its life stages, and to enhance the connectivity between marine and inland habitats;
c. taking measures to further reduce discharges, emissions and losses of relevant hazardous substances to a level that is compatible with breeding success of European eel;
d. taking relevant measures to restore habitat accessibility and extent of suitable habitats (in particular in estuaries, lowland rivers, floodplains and backwaters);
e. taking relevant measures to reduce anthropogenic mortality from hydropower turbines and water pumping stations;
f. taking relevant measures to control and restrain illegal fisheries and illegal trade;
g. taking relevant measures to increase the traceability of the trade of eels (especially for restocking of glass eels) from southern to northern Europe;
h. setting up monitoring of the European eel population, for all life stages: recruits, including glass eels or eels <12cm, yellow eels, and silver eels. The monitoring should provide, on a regular basis, assessments of population characteristics (abundance, age structure, size structure and sex ratio). This entails using all appropriate means and tight cooperation between governmental organisations, research institutes, professional and non-professional fisheries and non-governmental organisations;

i. whether any of the key areas justify selection and designation as marine protected areas for the protection of European eel populations and whether such areas may become a component of the OSPAR network of marine protected areas;
j. improving knowledge on marine sub populations in coastal areas;
k. setting up research and monitoring to assess the effects of management actions - including restocking, fishery restrictions, migration pathways improvement, habitat restoration - on the yellow and silver eel population characteristics (number, sex ratio, size structure) and spawner quality (lipid content, fulton condition, parasitism and hazardous substances);
l. acting for the fulfilment of the purpose of this Recommendation within the framework of other competent organisations and bodies.

- **Have the recommendations been implemented?**

Yes

- **If yes, how Have the recommendations been implemented? What is the result?**

a) The Dutch eel management plan was implemented in 2009 (The Ministry of Agriculture Nature and Food Quality, 2009) and evaluated in 2018 (Van de Wolfshaar et al., 2018).
b) the eel is protected under the Nature Conservation Act;
c) The emissions of priority substances to water must be reduced in such a way that the standards for water quality are met. In the long term, the standard setting as a result of the Water Framework Directive (EC, 2000) is decisive. This standard is set for the Netherlands in 2009, which includes limit values for the priority substances. The priority substances also include dioxins and dioxin-like compounds, which are particularly relevant for eels. No additional measures have been taken in the context of the protection of eels to reduce emissions of hazardous substances;
d & e) The eel sector in the Netherlands, in collaboration with the government, is taking various actions aimed at restoring the eel, including assisted migration of eels during migration. This leads to an estimated up to 1-3 tons extra withdrawing silver eel per year (WUR, 2019). When replacing pumping stations attention is paid to fish-friendly pumps. Due to adjustments to the infrastructure at migration bottlenecks, relative mortality has decreased in 2011-2013 and afterwards (i.e. the probability that an eel dies during passage of a migration point), but the absolute mortality seems to have been increased (van de Wolfshaar et al., 2018);
f) In the months of September, October and November, professional fishermen are prohibited from fishing eel in Dutch sea waters, coastal waters and inland waters. Hobby fisherman must always release trapped eel. The Dutch Food and Consumer Product Safety Authority (NVWA) and other government organizations enforce this prohibition, which also applies to trading. Fines are handed out and illegal catches, fishing equipment and used vessels and vehicles can be confiscated;
g) According to the rules that have been in force since 2009, eel can only be traded freely within EU borders. From 2009, the European eel was included in Appendix II of the CITES agreement and Annex B of the CITES regulation (EC 338/97). As a result, import and export outside the EU is only permitted under license and trade in eel is only possible if the legal origin of the eel can be determined. Relevant legislation in the Netherlands has been adapted to meet these requirements (The Ministry of Agriculture Nature and Food Quality, 2009);
h) Monitoring of eel takes place in the context of contamination levels (Kotterman, 2016). In addition, various monitoring programs for eels are being conducted in the Netherlands (de Graaf & Bos, 2016). For example, the entry of young eel (glass eel) from the sea to our inland waters is sampled at various locations along the coast (see for example Foekema et al., 2014). An intensive sampling has been carried out at Den Oever since 1938. In addition to this glass eel monitoring, research is also carried out into the distribution dynamics and migratory successes of glass eels. Yellow eels are also monitored in the port at Mokbaai (Texel) and in the IJsselmeer and Markermeer. The fishery for eels in the Netherlands was hardly documented until recently. The Ministry of Economic Affairs has included the fishing effort in the compulsory digital catch registration as of 1/1/2012, as a result of which the weekly fishing effort and landfall are known since then; i) There are no areas in the Netherlands that qualify as a protected area for eels; j) knowledge has not yet been increased. Species are hardly ever caught in surveys at sea; k) Evaluation of the eel management plan taken place every 3 years (van de Wolfshaar et al., 2018). However , the factors that caused the decline in eel stocks are not yet sufficiently known, making it uncertain whether the target will be met with the current measures in the future (van de Wolfshaar

et al., 2018). Additional research is therefore necessary. The eel research by Wagenigen Marine Research was further expanded in 2017 by entering into a public private partnership within the Top Sector Agri & Food with Stichting Duurzame Eelsector Nederland (DUPAN), the Ministry of Economic Affairs and private parties. The aim is to enable aquaculture of eel without the use of glass eels from nature.
l) Governments are aware of the decline of eel and are taking measures.

- **If no, what are the reasons not to implement the recommendation?**

c) The standards set as a result of the Water Framework Directive (EC, 2000) determine the emissions of hazardous substances. No additional measures have been taken to reduce emissions of hazardous substances in the context of eel protection.

- **Which opportunities and possibilities are there for the Netherlands?**

For migratory fish, the removal of barriers between salt and fresh water is important. The Haringvliet has been partially opened again since 2018 (Kierbesluit Haringvliet, open from 16 January 2019). Furthermore, the migration river will be built in the Afsluitdijk (from 2018), to allow fish from the Wadden Sea to migrate to the IJsselmeer and beyond.

- **What are the changes compared to the previous reporting period?**

The previous report indicated that all recommendations had been implemented, with the exception of 3.1.c & j. Since then, no additional recommendations have been implemented.

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1, 4, 14, 15, 19, 21, 30, 33, 35, 46 (see Appendix 1)

- How can the Netherlands contribute to joint campaigns?

Action 1. Communication: results of glass eel monitoring for Rijkswaterstaat: https://www.wur.nl/nl/Research-Results/Research institutes/marine-research/Expertiseg regions/Mariene-monitoring/Monitoring-glasaal.htm

Action 4. Advice. The Netherlands is active in the working group Aal (WGEEL) of ICES, in which annual assessments of population sizes, fishing mortality, stocking etc. are carried out on a European scale (http://www.ices.dk/community/groups/Pages/WGEEL.aspx) . Report 2018: http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/WGEEL/wgeel_2018.pdf. The Dutch eel management plan contains measures to improve the eel stock. This was evaluated in 2018 (Van de Wolfshaar et al., 2018).

Action 14. No comments (with regard to inclusion type in other conventions).

Action 15. Sportvisserij Nederland points out to anglers about the ban on eel fishing at sea: https://www.sportvisserijnederland.nl/vispas/visserijwet-en-regel/kustwater-zee/

Action 19. No comments (with regard to pollution)

Action 21. No comments

Action 30. Toxic substances. The following is reported annually on toxic substances in eels: van Leeuwen, S. P. J., Nijrolder, A. W. J. M., Hoogenboom, L. A. P., & Kotterman, M. J. J. (2019). Dioxins, dioxin-like and non-dioxin-like PCBs in red eel and scaly fish from Dutch inland waterways: results from 2018 (RIKILT report; 2019,003). Wageningen: RIKILT Wageningen University & Research. https://doi.org/10.18174/476059

Action 33. Monitoring: A major project was carried out in Noord-Holland in 2018 to gain a better understanding of the migration of glass eels: https://www.wur.nl/nl/Onderzoek-Results/Researchinstituten/marine-research/show -marine / Fish-migration-disco-fish-in-the-North Sea canal.htm.

Action 35. Cooperation with ICES and other organizations. See Action 4.
Action 46. No comments.

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4.3.3 Spotted ray (Gevlekte rog, *Raja montagui*)

Gevlekte rog (spotted ray, Raja montagui)

Figure 7. *Spotted ray, Raja montagui (https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats).*

- **Introduction**

The spotted ray occurs (in small numbers) in Dutch waters (Heessen, 2010, Bos et al., 2016). Due to the slow growth, high age of sexual maturation and low reproduction, rays are very vulnerable to extra mortality as caused by fishing. They also remain easily in fishing nets, among other things, due to their size and body shape. The EU set up a TAC for "skates" in the North Sea in 1999. For 2008, an additional measure was introduced whereby the supply of a number of fish species (including the spotted rays) must be declared separately by the Member States. This has greatly improved the species-specific data collection. This is particularly important for spotted rays, as they are often confused with blond rays.

- **OSPAR recommendations**

3.1 Each Contracting Party should consider in Regions II, III, IV and V:

a. encouraging liaison within their national administrations to facilitate the adoption, implementation and enforcement of fisheries management measures taking account of ICES and, where applicable, the European Commission Scientific, Technical and Economic Committee for Fisheries (STECF) advice;

b. investigating the distribution of spotted ray aggregation, oviposition (spawning) and nursery grounds, and the size and seasonality of demersal fisheries operating in these areas;

c. investigating spotted ray discard survival from demersal fisheries;

d. whether any of the key areas justify selection and designation as marine protected areas for the protection of spotted ray populations and whether such areas may become a component of the OSPAR network of marine protected areas;

e. providing guidelines and training where necessary to improve the identification of the spotted ray, with a view to ensuring that this species is not confused with the blonde ray (R. brachyura) and that neonates of spotted, blonde and thornback ray (R. clavata) can be distinguished;

f. ensuring that accurate species-specific survey, catch and landings data are collected and provided to ICES;

g. facilitating and improving research on the life history and biology of the spotted ray, including age/length keys and fecundity, and trend data on populations and distribution (particularly in Region II);

h. establishing information campaigns about the identification, conservation, management and protection status of the spotted ray, particularly addressing commercial and recreational fishermen and fisheries observers. Information campaigns may serve the purpose of data collection on spotted ray occurrence, its critical habitats and incidental catches in order to improve knowledge of its distribution at different life stages;

i. the introduction of the spotted ray as a protected species under regional and international biodiversity conventions;

j. acting for the fulfilment of the purpose of this recommendation within the framework of relevant competent authorities.

- **Have the recommendations been implemented?**

Partly.

- **If yes, how have the recommendations been implemented? What is the result?**

In the framework of the MSFD, preparations were made in the period 2013-2014 for an action plan for sharks and rays in the North Sea. To this end, research institute IMARES, the Dutch Elasmobranch Association (NEV), Bureau Wing and the LEI, on behalf of the Ministry of Economic Affairs, have issued advice on the protection of sharks and rays that occur in the North Sea and an exploration of possible measures (Walker & Kingma, 2013; Walker et al., 2015). The results were presented to a sounding board, which included representatives from environmental organizations and the fishing sector and also discussed in meetings of the North Sea Advisory Council. The results and the interviews with the aforementioned organizations form the basis for the KRM sharks action plan (Ministry of Economic Affairs, 2016). (NB: "Sharks" means all cartilaginous fish, including rays) in the action plan. The protection of the sharks and rays in the North Sea has been shaped in the action plan via 3 tracks: 1. Education and communication; 2. Reducing unwanted by-catches; 3. Increasing the chances of survival.

a) The spotted ray falls under the Fisheries Act. There is no targeted commercial fishing for sharks and rays in Dutch waters. However, rays are considered valuable and brought to land (Walker & Kingma, 2013). In the reform of the Common Fisheries Policy in 2013, it was decided to introduce a landing obligation. The European landing obligation means that fishermen have to land all individuals of commercial species in the catch. In the current European regulations a number of exception rules are included in the landing obligation (https://www.wur.nl/nl/Dossiers/dossier/Discards- Undesired- by-catch.htm). This includes, for example, endangered shark and ray species. These species still have to be thrown overboard as quickly as possible and unharmed. The spotted ray is not covered here. Dutch fisheries have a limited quota for ray (Steins et al., 2018). The TAC for rays (Rajiformes) is 237 tonnes/y, with catches to be recorded separately by species (EU, 2018). Most of the Dutch catch of spotted ray is thrown overboard (ICES, 2017).
b) The project "Sharks and rays back in the North Sea" is part of the Dutch Sharks Action Plan and focuses specifically on collecting knowledge on the species-specific suitability of the Dutch coastal area and, where possible, on supporting population recovery through the restocking (CCD, 2016; Buijs, 2017). Restocking mainly focuses mainly on the thornback ray and not yet on the spotted rayThe project started in December 2016 and has a duration of 5 years. By-catch is also part of the sharks action plan (Ministry of Economic Affairs, 2016).
c) research into discard survival takes place in the context of the MSFD sharks action plan (Ministry of Economic Affairs, 2016). There are indications that rays have a considerable chance of survival (Enever et al., 2010, Depestele et al., 2014).
d) the spotted ray has been mentioned as a distinctive species for the Cleaver Bank, for the notification of this area as a Habitats Directive area (Bos et al., 2008). Potentially, the area is also important for the reproduction of fish such as rays and herring, which require hard substrates. There are indications that this has been the case in the past, the current situation is unknown (Bos et al., 2008). The Klaver Bank was designated as a Habitat Directive area in 2014 and is also part of the OSPAR MPA network;
e & f) research into the occurrence of sharks and rays in the North Sea and possible protective measures have been investigated (Walker & Kingma, 2013; Walker et al., 2015). Monitoring takes place within the framework of the MSFD (Ministry of Infrastructure and the Environment and Ministry of Agriculture, Nature and Food Quality, 2012).
g) Population size, condition and distribution of sharks and rays in the North Sea have been included by the Netherlands as indicators for the MSFD, with an objective for an improvement for the year 2020 set (Ministry of I&M and Ministry of LNV, 2012). However, little work has been done on rays for population size and condition research. h) Education and communication are an important part of the MSDF shark action plan (Ministry of Economic Affairs, 2016). (i) relevant organizations are reached through the shark action plan and the international shark strategy. The MSFD shark action plan is part of a broad strategy on the Dutch commitment (International Shark Strategy 2019; Min LNV, 2019) to the protection of sharks and rays in the Caribbean Netherlands, in international forums such as the EU, fisheries management organizations (RFMOs), fisheries partnership agreements , Convention on Migratory Species, OSPAR, trade in endangered species (CITES) (Ministry of Economic Affairs, 2016).

- **If no, what are the reasons not to implement the recommendation?**

Not relevant.

- **Which opportunities and possibilities are there for the Netherlands?**

Offshore wind farms may offer a habitat for the species, which requires hard substrate for reproduction.

- **What are the changes compared to the previous reporting period?**

This species has not been reported in 2016.

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1, 4, 13, 15, 33, 34 (see Appendix 1)

- How can the Netherlands contribute to joint campaigns?

Action 1. Communication. A shark ID card for the North Sea is available in 3 languages (NL, EN, F). https://www.sportvisserijnederland.nl/vis-water/visonderzoek/haaien-en-roggen/herkenning-identification.html.
Species ID factsheet: https://www.sportvisserijnederland.nl/files/raja-montagui-gevlekte-rog-factsheet_9747.pdf
Action 4. ICES advice. The Netherlands is closely linked to ICES work on elasmobranchs (the chair of the working group comes from the Netherlands). Wageningen Marine Research also participates in the working group (chair of the ICES working group from 2020).
Action 13. No comments
Action 15. No comments
Action 33. Improvement of research. In the Netherlands work is being done on automatic image recognition of stingrays on board fishing vessels in the INNORAYS project, in order to arrive at better stock estimates (https://www.wur.nl/nl/project/Innorays-videomonitoring.htm). This program focuses primarily on thornback ray and blonde ray.
Action 34. Studies on the suitability of the stingray for the Dutch Delta area have been carried out (Jongbloed et al., 2017). Such studies can also be performed for other species. Wageningen Marine Research is working with Rijkswaterstaat in the LIFE-IP project to carry out monitoring on the basis of data storage tags in 2020. This should map the migration patterns of a few species.

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4.3.4 Cod (Kabeljauw, *Gadus morhua*)

Cod (Kabeljauw, Gadus morhua)	
	Figure 8. Cod, *Gadus morhua* (photo : Oscar Bos, Wageningen Marine Research)

➢ **Introduction**

The cod is a 'sensitive species' on the Red List, but it is also covered by the Fisheries Act and is a target species for fisheries (Röckmann et al., 2015). The fishing mortality rate has declined since 2000 but is still above the MSY (Maximum Sustainable Yield: the maximum sustainable harvest). The spawning biomass has increased after the historic low in 2006 but is still below the desired level (ICES, 2018). Since 2018, cod in the North Sea has been fully covered by the European landing obligation (ICES, 2018).

➢ **OSPAR recommendations**

3.1 Each Contracting Party should consider in Regions II and III:
a. facilitating the adoption, implementation and enforcement of measures to conserve cod, as well as their habitats, in OSPAR regions II and III;
b. facilitating and improving research on the:
(i) life history, biology and stock discrimination of cod;
(ii) trend data on populations and distribution;
(iii) genetic and behavioural divergence of local populations; and
(iv) multispecies interactions;
c. communicating with stakeholders and relevant bodies about the status and conservation of cod and in particular regarding best fishing practices that have a low impact on associated biodiversity and the marine environment;
d. whether any of the key areas justify selection and designation as marine protected areas for the protection of cod populations and whether such areas may become a component of the OSPAR network of marine protected areas;
e. acting for the fulfilment of the purpose of this recommendation within the framework of relevant competent authorities.

➢ **If yes, how Have the recommendations been implemented? What is the result?**

Ja, deze aanbeveling is geïmplementeerd.

a) In connection with the Dutch implementation of the European cod recovery plan (EC, 2008), the government has developed a cod avoidance plan in consultation with the fishing industry. The implementation of this is monitoring and analysis of the cod fishery (among others from Hal & Machiels, 2017) and reporting to, among others, the STECF. In addition, total cod catches (landings and discards) remain below 5% of the total catch. The Netherlands also has a TAC for cod (EU, 2018). The multi-annual plan for demersal stocks in the North Sea, which entered into force in 2018, is also relevant for cod fishing (Minister of LNV, 2018). The cod recovery plan has been withdrawn in the North Sea long-term plan. The capacity ceiling per fishing category included in the cod recovery plan was continued nationally under the North Sea multi-annual plan with effect from 5 August 2018;
b) the influence of wind farms on the distribution and behaviour of fish, especially cod, has been studied (Winter et al., 2010, Van Hal et al., 2012);
c) see a .;
d) Cod is one of the distinctive fish species for the Cleaver Bank (Bos et al., 2008), which in 2016 was designated as the Habitat Directive area. The species also occurs in high densities in the Dogger Bank area and eggs are deposited along the southern and eastern edges of the area by various species of fish, including the Cod (Jak et al., 2009) in the period January-March. Cod, however, does not qualify as a Habitat Directive type so that specific protection in the Natura 2000 areas does not apply;
e) PM

- **If no, what are the reasons not to implement the recommendation?**

Not applicable

- **Which opportunities and possibilities are there for the Netherlands?**

In the construction of wind farms, the protection of the earth around a wind turbine ('monopile') and the monopile itself form a hard substrate on which organisms can settle. The new hard substrate communities are a valuable source of food for fish species such as cod (Bouma & Lengkeek 2009). Higher cod abundances have been observed at the rock dump near the monopiles and it is also possible that the species spawns and settles within the park (Winter et al., 2010, Van Hal et al., 2012).

- **What are the changes compared to the previous reporting period?**

The previous report already indicated that all recommendations have been implemented.

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1, 4, 15, 28, 33, 35 (see Appendix 1)

- How can the Netherlands contribute to joint actions?

Action 1. Communication. No comments.
Action 4. ICES advice. NL participates intensively in ICES.
Action 15. Pay attention to fishing threat: No comments.
Action 28. KRM implementation. Cod is included in research for the MSFD (see Initial Assessment: Min IenW & Min LNV (2018))
Action 33. Improve coordination of research. There is collaboration with Belgium (E. Winter, WMR) on research into cod in wind farms.
Action 35. Cooperation with ICES. NL participates intensively in ICES.

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4.3.5 Long-snouted seahorse (Langsnuitzeepaardje, *Hippocampus guttatulus*)

Langsnuitzeepaardje (Long-snouted seahorse, Hippocampus guttatulus)

Figure 9. Long-snouted seahorse Hippocampus guttatulus (https://www.ospar.org/site/assets/files/1888/massimiliano_de_martino_hippocampus_guttulatus.jpg).

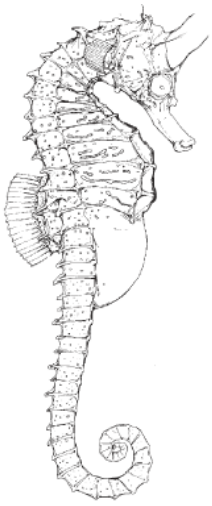

Figure 10. Long-snouted seahorse Hippocampus guttatulus (iSeahorse, 2018).

- **Introduction**

Seahorses belong to the same family as the sea needles. The long-snouted seahorse has a relatively long snout, a crown that is distinct from the back, a small belly and well-developed spines compared to the short-nosed seahorse. Not much is known about the long-snouted seahorse *Hippocampus guttatulus* (synonym *Hippocampus ramulosus*). Seahorses seem to occur mainly at a water depth of up to 7 meters, and the long-snouted seahorse occurs relatively shallower compared to the short-nosed soap-horse. For *H. guttatulus* a specific form of shelter seems to be necessary, such as macroalgae and seagrass (OSPAR, 2009). In the Netherlands the species hardly occurs and

has the status 'disappeared in the wild'. The species is rare in the Netherlands and has the status of 'disappeared in the wild'. Only one observation of the species is known in the Netherlands, which dates from 2016 at Vlieland (www.waarneming.nl). The species may also have been observed in Zeeland (https://www.duikersgids.nl/actueel/1736-langsnuitzeepaardje-in-oosterschelde)

- **OSPAR recommendations**

3. Programmes and measures
3.1 Each Contracting Party should:
a. consider the introduction of national legislation to protect the Long-snouted seahorse;
b. report on existing management measures taken, assess whether these existing management measures for the protection of the Long-snouted seahorse are effective and determine what further measures are needed to address the key threats;
c. identify and select appropriate areas important to the Long-snouted seahorse for inclusion in the OSPAR MPA network;
d. develop and implement the actions and measures to prevent the significant loss of seagrass habitat within the population range of the Long-snouted seahorse;
e. implement paragraphs c) and d) taking into account the particular link established between the Long-snouted seahorse and Zostera beds;
f. support and implement measures for the protection of Zostera beds;
g. consider, and where appropriate, set up information campaigns concerning the identification, conservation and legal status of this threatened species, particularly targeting commercial and recreational fishermen and fisheries observers;
h. raise awareness of status and threats to the species among relevant management authorities, fishermen, retailers (e.g. aquariums, souvenirs) and the general public;
i. improve communication and information exchanges between Hippocampus sp. Researchers and authorities.

- **Have the recommendations been implemented?**

Partially implemented.

- **If yes, how have the recommendations been implemented? What is the result?**

b, d & f) Restoration measures for eelgrass (see section 4.5.5) will increase the habitat for seahorses in the Netherlands, making it possible to return for this species. Monitoring of seagrass takes place according to the Trilateral Monitoring and Assessment Program (TMAP). RWS is the Dutch monitoring authority of the TMAP program (via the MWTL monitoring program) and is involved in the reporting thereof.

- **If no, what are the reasons not to implement the recommendation?**

a & b) The species was listed on the Red List 2004 (minez.nederlandsesoorten.nl) but no longer on the Red List 2016 (Ministry of Economic Affairs, 2015). The species is hardly ever found in the Netherlands. Seagrass fields, an important habitat of the long-snouted seahorse, are very limited in size and quality in the Netherlands. Given the current limited status of the main habitat, (legal) protection of the species does not (yet) have priority, but the focus should be on the recovery of the habitat first.
c) there are currently no or hardly any observations of the long-snouted seahorse, so there are no important areas in the Netherlands that qualify for this.
e) if remedial measures are successful and the size and quality of the seagrass in the Wadden Sea and Oosterschelde has increased, the areas might be eligible for registration for inclusion in the OSPAR MPA network. Currently, given the current state of the seagrass, this is not yet the case.
g, h, i) all forms of communication and information exchange / provision are currently not a priority for the same reason as mentioned above and would be better applied if the seagrass fields in the Netherlands have been sufficiently restored.

- **Which opportunities and possibilities are there for the Netherlands?**

There are possibilities for further research into known observations. The species occurs sporadically and is mainly seen by Scuba divers in Zeeland. These observations could be studied further.

- **What are the changes compared to the previous reporting period?**

This species was not reported last time.

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1.5 (see Appendix 1)

- How can the Netherlands contribute to joint actions?

Action 1. Communication. The Duikersgids (https://www.duikersgids.nl/actueel/1736-langsnuitzeepaardje-in-oosterschelde), a website for scuba divers, regularly reports sightings of seahorses.
Action 5. Monitoring as part of JAMP. Stichting Anemoon (www.anemoon.org) collects data from divers. The species is also recorded in fish surveillance by Wageningen Marine Research when caught.

- **References**

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4.3.6 Short-snouted seahorse (Kortsnuitzeepaardje, *Hippocampus hippocampus*)

Kortsnuitzeepaardje (Short-snouted seahorse, Hippocampus hippocampus)

Figure 11. Kortsnuitzeepaardje (Hippocampus hippocampus). Photo: Stefan Verheyen, www.nederlandsesoorten.nl).

Figure 12. Kortsnuitzeepaardje (Hippocampus hippocampus), (iSeahorse, 2018).

- **Introduction**

Compared with the long-snouted seahorse, the short-snouted seahorse has a relatively short snout, a crown that flows smoothly into the back, big belly and no noticeable spines. Little is known about the population dynamics and ecology of the short-snouted seahorse in the Northeast Atlantic (OSPAR, 2009). Seahorses seem to occur mainly at a water depth of up to 7 meters. The short-snouted seahorse seems to have slightly less specific habitat preferences compared to the long-snouted seahorse. In addition to the association with eelgrass, the species also appears to occur in more open areas and in artificial hard substrata (OSPAR, 2009). In the Netherlands it is a rare species, which is occasionally observed in the Oosterschelde, the Wadden area and along the North Sea coast. In the period 2017 to the present (September 2018), eight observations were reported (www.waarneming.nl) of which four in the Oosterschelde, two in the North Sea (near the second Maasvlakte and South Holland) and two bodies washed ashore (Noordzeestrand van Vlieland). The species is regularly reported by divers via social media. The species is not mentioned on the Red List (http://minez.nederlandsesoorten.nl/content/rode-lijsten-soort-van-rode-lijst-vissen), in contrast to the long-snouted seahorse.

- **OSPAR recommendations**

3. Programmes and measures

3.1 Each Contracting Party should:

a. consider the introduction of national legislation to protect the Short-snouted seahorse;

b. report on existing management measures taken, assess whether existing management measures for the protection of the Short-snouted seahorse are effective and determine what further measures are needed to address the key threats;

c. identify and select appropriate areas for inclusion in the OSPAR MPA network;

d. develop and implement the actions and measures in areas of particular importance for the Short-snouted seahorse;

e. consider, and where appropriate, set up information campaigns about the identification, conservation and legal status of this threatened species, particularly targeting commercial and recreational fishermen and fisheries observers;

f. raise awareness of status and threats to the species among relevant management authorities, fishermen, retailers (e.g. aquariums, souvenirs) and the general public;

g. improve communication and information exchanges between Hippocampus sp. researchers and authorities.

- **Have the recommendations been implemented?**

Partially implemented.

- **If yes, how have the recommendations been implemented? What is the result?**

a) The species is listed on the Red List of Fish 2016 (Ministry of EZ, 2015). However, this has no legal status. The Minister promotes research and activities necessary for the protection and management of species on the Red List.

b, d & f) Restoration measures for eelgrass (see section on 'Zostera beds') will increase the habitat of the seahorse in the Netherlands, making it possible to return this species. Monitoring of seagrass takes place according to the Trilateral Monitoring and Assessment Program (TMAP). RWS is the Dutch monitoring authority of the TMAP program (via the MWTL monitoring program) and is involved in the reporting thereof.

- **If no, what are the reasons not to implement the recommendation?**

a - d) the species is sporadically observed in the Netherlands, particularly in the Oosterschelde and also in the Wadden Sea. In view of these observations, the possibility of protection of the short-tailed seahorse could be investigated. Partly due to lack of knowledge, there are no important areas in the Netherlands that are eligible for MPA. Nevertheless, it seems that the Oosterschelde and to a lesser extent the Wadden Sea and the North Sea coast are suitable habitats. If recovery measures for eelgrass are successful and the size and quality of suitable habitat in the Wadden Sea and Oosterschelde has increased, and the numbers and distribution of the seahorse are monitored, the areas might be eligible for inclusion in the OSPAR MPA network.

e - i) all forms of communication and information exchange / facility have not yet been prioritized. This would apply if there is more knowledge about the (potential) occurrence of the seahorse and the threats to the species in the Netherlands.

- **Which opportunities and possibilities are there for the Netherlands?**

There are possibilities for further research into known observations. The species is very sporadic and is mainly seen by Scuba divers in Zeeland. These observations could be studied further.

- **What are the changes compared to the previous reporting period?**

This species was not reported last time.

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1, 5 (see Appendix 1)

- How can the Netherlands contribute to joint campaigns?

Action 1. Communication. Duikeninbeeld (www.duikeninbeeld.tv), a website for scuba divers, regularly reports sightings of seahorses.
Action 5. JAMP monitoring. Stichting Anemoon (www.anemoon.org) collects data from divers. The species is also recorded in fish surveys by Wageningen Marine Research.

- **References**

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4.3.7 Sea lamprey (Zeeprik, *Petromyzon marinus*)

Zeeprik (Sea lamprey, Petromyzon marinus)

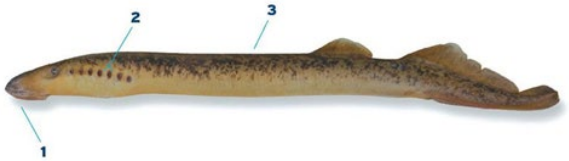

Figure 13. Zeeprik (photo: Sportvisserij Nederland, www.sportvisserijnederland.nl).

- **Introduction**

The sea lamprey (*Petromyzon marinus*) belongs to the family of lampreys (*Petromyzontidae*), which is part of a special class of organisms that used to be considered fish. Lampreys have, instead of jaws, a suction disc around the mouth, covered with teeth. The sea lamprey is yellowish brown in color and has a remarkably marbled pattern. The round eel-like animal is slightly laterally compressed to the rear. It is the largest lamprey species in Europe and can reach a length of more than 100 cm. The sea lamprey is a migratory fish: they live in the sea for a while, while the rivers serve as extension, growth and spawning areas. They live a parasitic life and feed on blood and tissue fluid of mostly larger fish and even porpoises, dolphins and whales. They do not eat during

the upstream migration in the rivers. The larvae live buried in silty river beds and feed on detritus and benthos (Ministry of EZ, 2008a). On a national level, the conservation status of the species is moderately unfavourable. This is mainly due to the presence of barriers that make the migration from and to the rivers more difficult. Water quality has improved over the past decades. The fishery entails the risk that migratory fish can occasionally be caught (Jak & Tamis, 2014).

- **OSPAR recommendations**

3.1 Each Contracting Party should consider in Regions I, II, III and IV:
a. the possibility of introducing legislation to protect the sea lamprey in all its life stages;
b. taking relevant conservation measures particularly in key areas where the population is either depleted or locally extinct, with a special focus on estuarine habitats, spawning habitats and river migration routes;
c. whether any key areas justify selection and designation as marine protected areas for the protection of the sea lamprey, with a particular attention to estuaries, and whether such areas may become a component of the OSPAR network of marine protected areas;
d. supporting initiatives taken by industry and the recreational fishing sector in the development of techniques and equipment to facilitate the safe release of this species from fishing gears if and when this species is not targeted;
e. monitoring the sea lamprey in marine, estuarine and freshwater habitats;
f. assisting industry and relevant authorities with the development of fish passage facilities adapted to sea lamprey;
g. assisting agriculture and forestry to find ways to reduce destruction or degradation of spawning habitats and river migration routes;
h. assisting industry and relevant authorities to reduce effects of dredging in estuaries on water quality;
i. promote the inclusion of the sea lamprey as a protected species in relevant international biodiversity conventions, taking into account the OSPAR Regions for which threats and/or decline have been indicated in the OSPAR List of threatened and/or declining species and habitats (OSPAR Agreement 2008-6);
j. acting for the fulfilment of the purpose of this Recommendation within the framework of relevant competent authorities;

- **Have the recommendations been implemented?**

Yes.

- **If yes, how have the recommendations been implemented? What is the result?**

a) The sea lamprey is protected as a Habitat Directive type under the Nature Conservation Act (Stb, 2016).
b) An important measure is the implementation of the Kierbesluit in 2018. This means that from 16 January 2019 the Haringvliet locks have been 'ajar'. In this way migratory fish can pass through the locks towards their spawning grounds, which are upstream. This measure provides a very important improvement in the quality of the habitat for migratory fish (Ministry of I&M, 2016). The Afsluitdijk forms an important barrier for migratory fish in the Netherlands. An innovative plan is being implemented to ensure that migratory fish can swim freely from saltwater to freshwater via a permanent opening in the Afsluitdijk: the fish migration river (Griffioen et al., 2014). The development of the Afsluitdijk in the area of nature is provided by the regional authorities, but Rijkswaterstaat is also taking measures to stimulate fish migration between the Wadden Sea and the IJsselmeer. For example, fish-friendly lock management is applied and a fish passage is being constructed at Den Oever (https://www.deafsluitdijk.nl/).
c) The sea lamprey is designated as a protected species in the Natura 2000-areas Wadden Sea, North Sea Coastal Zone, Voordelta, Vlakte van de Raan and Westerschelde & Saeftinghe (Ministry of Agriculture, Nature and Food Quality, 2008b-d: 2009, Ministry of EL & I, 2010). All areas except the Dutch Wadden Sea and the Westerschelde & Saeftinghe are part of the OSPAR MPA network (http://mpa.ospar.org/home_ospar).
d) no information found.
e) National trends for this species can be found in the annual report 'Fish monitoring for Fresh Waters and Transitional Waters (Tien et al., 2018). The sea lamprey is rarely caught in the

monitoring programs at sea in the Netherlands. The current monitoring of the species in the fresh water is sufficient for signalling trends in this species (Jak et al., 2009).
f, g, h) see b).
i&j). Species are protected under the Nature Protection Act (Stb, 2016). j). The species is protected by the government through the HD

- **If no, what are the reasons not to implement the recommendation?**

Not relevant.

- **Which opportunities and possibilities are there for the Netherlands?**

For migratory fish, the removal of barriers between salt and fresh water is important. The Haringvliet has been partially opened again since 2018 (Kierbesluit Haringvliet, open from 16 January 2019). Furthermore, the migration river will be built in the Afsluitdijk (from 2018), to allow fish from the Wadden Sea to migrate to the IJsselmeer and beyond.

- **What are the changes compared to the previous reporting period?**

The previous report indicated that recommendations 3.1.a, b, c, e, f, i had been implemented. Since then recommendations 3.1.g, h have been implemented by the Kierbesluit (partial opening of Haringvliet locks in January 2019 so that an important barrier has been removed and habitat (migration route) has been improved).

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1.4, 25, 33, 35 (see Appendix 1)

- How can the Netherlands contribute to joint campaigns?

Action 1. Communication. No comments.

Action 4. ICES advice. To our knowledge there is no ICES working group for this species.

Action 25. Mitigation measures for habitat destruction. Fish migration measures are being implemented (Haringvliet Kierbesluit, Afsluitdijk migration river).

Action 33. Improve coordination of research. Much can probably be improved in terms of international coordination. As far as we know, this hardly takes place.

Action 35. Contact with ICES. ICES would be a good platform for exchanging information about this species. But as far as we know this is not happening now.

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4.3.8 Thornback skate/ray (Stekelrog, *Raja clavata*)

Thornback skate/ray (Stekelrog, Raja clavata)

Figure 14. Thornback skate/ray (Raja clavata) (photo: Niels Daan, Wageningen Marine Research).

- **Introduction**

Thornback skate/ray can grow to about 100 cm and can reach an age of 15 years. Males become sexually mature when they are 7 years old, females at 9 years of age. The Thornback skate/ray used to be very common in Dutch waters, but now only in small numbers. There are, however, indications from the fishery that more and more stingrays are being caught. Specific research into this is yet to take place. Due to the slow growth, high age of sexual maturation and low reproduction, rays are very vulnerable to extra mortality as caused by fishing. Due to their size, their body shape and the possession of spines, they are also easily left in fishing nets. The EU set up a TAC for "skates" in the North Sea in 1999. Another restriction for the Thornback skate/ray has been the construction of the Afsluitdijk. As a result, an important spawning area, the Zuiderzee, has been lost (Heessen, 2010). Data from catches of sting rays in Dutch landings and surveys in Oosterschelde and Voordelta show that this species is found sporadically and that there is currently no question of a Thornback skate/ray population in these areas (Jongbloed et al., 2017). However,

the problem with fishing data is that the landings say little about the occurrence of stingrays, because fishing measures limit the catch per week for thornback ray to 40 kg per fishing trip (https://www.visned.nl/vissers/879-overzicht-po- Measures -2; J. Batsleer, WMR, pers. Com). Discards research in the context of the EU Data Collection Framework (DCF) probably shows an underestimation of the quantities of ray (ICES, 2018; Batsleer et al. 2019).

- **OSPAR recommendations**

3.1 Each Contracting Party should consider:
a. encouraging liaison within their national administrations to facilitate the adoption, implementation and enforcement of fisheries management measures taking account of ICES and, where applicable, the Scientific, Technical and Economic Committee for Fisheries (STECF) advice;
b. investigating the distribution of inshore thornback ray aggregation, oviposition (spawning) and nursery grounds, and the size and seasonality of inshore skate and ray fisheries operating in these areas;
a. investigating discard survival deployed in inshore and offshore fisheries;
d. whether any of the key areas justify selection and designation as marine protected areas for the protection of thornback ray populations and whether such areas may become a component of the OSPAR network of marine protected areas;
e. ensuring that accurate identification keys are developed and circulated and that accurate species-specific survey, catch and landings data are collected and provided to ICES;
f. facilitating and improving research on the life history and biology (including age/length keys and fecundity) and stock discrimination of the thornback ray, and monitor trend data on populations and distribution;
g. establishing information campaigns about the identification, conservation, management and protection status of the thornback ray, particularly addressing commercial and recreational fishermen and fisheries observers. Information campaigns may serve the purpose of data collection on thornback ray occurrence, its critical habitats and incidental catches in order to improve knowledge of its distribution at different life stages;
h. acting for the fulfillment of the purpose of this recommendation within the framework of relevant competent authorities.

- **Have the recommendations been implemented?**

Yes.

- **If yes, how have the recommendations been implemented? What is the result?**

The species is listed on the Red List for the species of fish. In the framework of the MSFD, preparations were made in the period 2013-2014 for an action plan for sharks and rays in the North Sea. To this end, research institute IMARES, the Dutch Elasmobranchen Association (NEV), Bureau Wing and the LEI, on behalf of the Ministry of Economic Affairs, have issued advice on the protection of sharks and rays that occur in the North Sea and an exploration of possible measures (Walker & Kingma, 2013; Walker et al., 2015). The results were presented to stakeholders, which included representatives from environmental organizations and the fishing sector and were also discussed in meetings of the North Sea Advisory Council. The results and discussions with the aforementioned organizations form the basis for the MSFD sharks action plan (Ministry of Economic Affairs, 2016). (NB: "Sharks" means all cartilaginous fish, including rays) in the action plan). LNV also published the international Shark Strategy 2019 in 2019, which covers all seas and oceans where the Netherlands has influence (https://www.rijksoverheid.nl/documenten/rapporten/2019/05/01/internationale-haaien-strategy-2019-ihs-19).
The protection of the sharks and rays in the North Sea has been shaped in the action plan via 3 tracks: 1. Education and communication; 2. Reducing unwanted by-catches; 3. Increasing the chances of survival.
a) There is no targeted commercial fishing for sharks and rays in Dutch waters. However, rays are considered valuable and brought to land (Walker & Kingma, 2013). According to the ICES advice, the main fishery measure for the stingray quota is the Total Allowable Catch (TAC). The abolition of the TAC for stingray in the North Sea could pose a high risk for the sustainable fishing of the stock (ICES, 2018). Dutch fisheries have a limited quota for ray (Steins et al., 2018).

b) The project "Sharks and rays back in the North Sea" is part of the Dutch Sharks Action Plan and focuses specifically on collecting knowledge on the species-specific suitability of the Dutch coastal area and, where possible, on supporting population recovery through expansion (CCD, 2016; Buijs, 2017). The project started in December 2016 and has a duration of 5 years. Marked sting rays have been plotted in the Oosterschelde within that project. By-catch is also part of the shark action plan (Ministry of EZ, 2016).
c) research into discard survival takes place in the framework of the MSFD sharks action plan (Ministry of Economic Affairs, 2016). There are indications that rays have a considerable chance of survival (Enever et al., 2010, Depestele et al., 2014, Schram & Molenaar, 2018).
d) the stingray is mentioned as a natural value of the Dogger Bank, for the registration of this area as a Habitats Directive area (Bos et al., 2008).
e & f) research into the occurrence of sharks and rays in the North Sea and possible protective measures have been investigated (Walker & Kingma, 2013; Walker et al., 2015 Monitoring takes place via regular fish monitoring that is coordinated by ICES. Data on sharks and rays are collected from these databases within the framework of the MSFD. (Min I&M and Min LNV, 2012; Min I&W & Min LNV, 2018). g) Education and communication are an important part of the MSFD sharks action plan (Ministry of Economic Affairs, 2016)
h) Population size, condition and distribution of sharks and rays in the North Sea have been included by the Netherlands as indicators for the MSFD, with an improvement is set for the year 2020 (Ministry of I & M and Ministry of LNV, 2012). The MSFD shark action plan is part of a broad strategy on Dutch efforts to protect sharks and rays in the Caribbean Netherlands, in international forums such as the EU, fisheries management organizations (RFMOs), fisheries partnership agreements, Convention on Migratory Species, OSPAR, trade in endangered species (CITES) (Ministry of Economic Affairs, 2016).

- **If no, what are the reasons not to implement the recommendation?**

Not relevant.

- **Which opportunities and possibilities are there for the Netherlands?**

Reintroduction programme in the Oosterschelde. See also reports Jongbloed et al. (2017) and Winter & Jongbloed (2018). Through WWF reintroduction of cultivated stingrays is already taking place in the Oosterschelde. The LIFE-IP Delta Nature project (https://life-ip-deltanatuur.nl/) will investigate the migration patterns of stingrays. 100 stingrays will be provided with data storage tags.

- **What are the changes compared to the previous reporting period?**

A number of actions planned in the MSDF shark plan have now been implemented. Stingrays are released in the Oosterschelde.

- **Implementation of OSPAR joint actions**
  - Which actions refer to this species or habitat?

Actions 1, 4, 13, 15, 33, 34 (see Appendix 1)

- How can the Netherlands contribute to joint campaigns?

Action 1. Communication. A shark ID card for the North Sea is available in 3 languages (NL, EN, F). https://www.sportvisserijnederland.nl/vis-water/visonderzoek/haaien-en-roggen/herkenning-identification.html

Action 4. ICES. The Netherlands is closely linked to ICES work on elasmobranchen (the chair of the working group comes from the Netherlands). Wageningen Marine Research also participates in the working group.

Action 13. OSPAR MPAs. It has not yet been evaluated for this species which OSPAR MPAs would be suitable, as was done for the Oosterschelde and Westerschelde (Jongbloed et al., 2017; Winter & Jongbloed 2018).

Action 15. Attention for species threat due to fishing. See action 33.

Action 33. Improvement of research. Work is being done in the Netherlands on automatic image recognition of stingrays on board fishing vessels in order to arrive at better stock estimates (https://www.wur.nl/nl/project/Innorays-videomonitoring.htm). In addition, a DNA relationship analysis is used to map the population structure and size for spine and blonde ray. This method could also be applied to other species (https://www.wur.nl/nl/project/Innorays-DNA-verwinity-analysis.htm).

Action 34. For the Dutch Delta area, studies have been carried out into habitat suitability for the stingray (Jongbloed et al., 2017; Winter & Jongbloed, 2018).

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4.3.9 Salmon (Zalm, *Salmo salar*)

Salmon (Zalm, Salmo salar)

Figure 15. Salmon, Salmo salar (photo: Sportvisserij Nederland, www.sportvisserijnederland.nl)

- **Introduction**

Salmon (*Salmo salar*) lives mainly at sea and uses the Netherlands as a transit area. The most important area is the Rhine catchment area. The species spawns across the border in fast-flowing mountain rivers with gravel beds. The young salmon grows up in the river area for 1 to 2 years and then leaves for the sea (Salmon profile document: Min LNV, 2008; Bos et al., 2018). The trend of salmon has been negative for years, after an initial increase in the period 1994-2005. The population does not stand by itself. Since the 1980s, salmon have been released at different stages and from different origins in the Rhine river basin and later on a smaller scale in the Meuse. These expansions continue to date. Because the mortality is too high, the occurrence of salmon in the Rhine and Meuse catchment is currently still dependent on restocking (Bos et al., 2018 and references therein).

- **OSPAR recommendations**

Each Contracting Party should consider in Regions I, II, III and IV:
a. the need to introduce additional measures to enhance the conservation and protection and restoration of the Atlantic salmon at all relevant life stages in light of the review carried out pursuant to paragraph 3.1b;
b. assessing whether all measures that contribute to the conservation protection and restoration of Atlantic salmon, and its ecosystems, are effectively addressing the key threats identified in the Background document (OSPAR publication 2010/480) including:
(i) habitat alteration or loss especially of spawning and juvenile grounds, resulting from riverbed engineering schemes and hydrological management (e.g. for flood defence or navigation);

(ii) obstacles to migration, such as construction of dams or navigation weirs blocking access to spawning grounds;
(iii) water pollution, such as nutrient and organic matter enrichment and hazardous substances from urban and agro-industrial activities affecting Atlantic salmon spawning grounds and their reproductive success (e.g. PCBs in substrates, acidification);
(iv) incidental by-catch of Atlantic salmon at sea and targeted fisheries in key areas and overfishing of Atlantic salmon food sources (e.g. sand eel);
(v) fish farming, through escape and accidental release, resulting in interbreeding and genetic effects, or spread of diseases and parasites;
(vi) climate change, through changes in water temperatures and flows known to influence salmonid growth, life history and distribution;
c. encouraging liaison within their national administrations in developing future NASCO Implementation Plans and in reporting on progress against those plans as well as effectiveness of the actions taken, as reported through NASCO Annual Progress Reports;
d. whether any of the critical habitat or key areas justify selection and designation as marine protected areas for the protection and recovery of Atlantic salmon populations and whether such areas may become a component of the OSPAR network of marine protected areas;
e. improving scientific communication and information exchange including participating in and supporting NASCO's research priorities to coordinate research on Atlantic salmon;
f. raising awareness of the status of and threats to the Atlantic salmon among relevant sectors and authorities and the general public;
g. acting for the fulfilment of the purpose of this Recommendation within the framework of relevant competent authorities.

- **Have the recommendations been implemented?**

Yes.

- **If yes, how have the recommendations been implemented? What is the result?**

a) Although many fish passages have already been installed, there are still many obstacles that make migration more difficult, there is still too much fishing mortality at sea and during the migration, and the habitat quality of spawning and growing areas is still too low in many places. To let the salmon return as a self-sustaining population will require additional measures in both fresh and salt water systems (Ministry of LNV, 2008). An important additional measure is the implementation of the Kierbesluit which is foreseen in 2018. This means that the Haringvliet locks are 'put ajar' when the water level on the Haringvliet is lower than at sea. In this way, migratory fish, including salmon and sea trout, can pass through the locks towards their spawning areas, which are located upstream. This measure provides a very important improvement in the quality of the habitat for migratory fish (Ministry of I & M, 2016). Within the scope of the WFD (and related environmental policy and water legislation) the improvement of the water quality is on the agenda (Ministry of I & M, 2016).
b) In the past, measures have been taken, such as reducing barriers on the migration routes and reintroductions where eggs and young salmon have been deposited in tributaries of the Meuse and the Rhine. Although the measures yield results, there is no self-sustaining population in the Rhine (Ministry of LNV, 2008, Tien et al., 2018). Due to improved water quality, the quality of the habitat has increased. In assessing the national conservation status of the salmon, it was concluded that for a favourable conservation status a viable population of salmon must occur in the Rhine and the Meuse. A free passage between river tops and sea must be possible in both directions. For the migration on the Dutch routes, the main discharge routes of the Rhine and Maas waterways must be easily passable (Ministry of LNV, 2008). Hop (2011) provides an overview of the most important knowledge regarding fish migration in the Dutch Rhine-Meuse basin and addresses the bottlenecks with regard to the different forms of fish migration. The species is monitored with a passive gear (salmon fyke) (see Tien et al. 2018). The national trend of the population uses data from the main area, the Rhine catchment area. The migration period is spring and summer. The national trend is reported annually (Tien et al., 2019).

c) Cooperation between governments takes place both nationally and internationally. At national level, for example, in the Kierbesluit; a collaboration between the Ministry of I & M, Rijkswaterstaat, the Hollandse Delta Water Board and Evides Waterbedrijf (Ministry of I & M, 2016). At international level, for example, in the cross-border fish migration policy. Both in the Netherlands and in Germany, many authorities, both governments and non-governmental organizations, are working on the theme of fish fauna and fish migration. These organizations have been part of the Working Group (WG) Fish Migration since 2012. At the end of 2015, the WG Fish Migration included 18 actively participating organizations from the Netherlands and Germany (WGRD Working Group on Fish Migration, 2017).
d) According to the Habitats Directive, the salmon is only protected in fresh water (Ministry of LNV, 2008). The Wadden Sea, North Sea Coastal Zone and Voordelta, areas that are important for the species, therefore do not have to be designated. The designated HR areas for the salmon are: Rhine branches; Haringvliet; Hollands Diep; Biesbosch; and Grensmaas.
e + f) The main issue was raising awareness and sharing knowledge about the importance of good migratory routes for migratory fish. For example, in 2013 a brochure was published on the work of Rijkswaterstaat on fish migration (Rijkswaterstaat, 2013). In 2018, several Dutch parties took part in the World Fish Migration Day at various locations (https://www.worldfishmigrationday.com). For example, Rijkswaterstaat and Sportvisserij Nederland organized an information market and excursion to Haringvlietdam to share knowledge about fish migration to the public.
g) This recommendation has been implemented.

- **If no, what are the reasons not to implement the recommendation?**

Not applicable.

- **Which opportunities and possibilities are there for the Netherlands?**

Due to improved water quality, the quality of the habitat has increased. Although many fish passages have already been installed, there are still many obstacles that make migration more difficult, there is still too much fishing mortality at sea and during the migration, and the habitat quality of spawning and growing areas is still too low in many places. Whether the salmon can return as a self-sustaining population will require additional measures in both fresh and salty water systems (Profel Paper Salmon: Min LNV, 2008).

- **What are the changes compared to the previous reporting period?**

This species was previously not reported.

- **Implementation of OSPAR joint actions**
- Which actions refer to this species or habitat?

Actions 1, 13, 14, 15, 20, 21, 33, 35 (see Appendix 1)

- How can the Netherlands contribute to joint campaigns?

Action 1. Communication. The national trend of salmon in the Netherlands is reported annually by Wageningen Marine Research (Tien et al., 2019).

Action 13. MPAs. The salmon is protected in the Netherlands in fresh water. The Voordelta and the North Sea coastal zone (marine Natura 2000 areas and OSPAR MPAs) border respectively on the Natura 2000 area Haringvliet, in which salmon is protected and on the marine Natura 2000 area Wadden Sea, which again borders on the Natura 2000 area IJsselmeer. The Haringvliet is part of the most important salmon migration route. The Kierbesluit should allow for migration between Voordelta and Haringvliet again. To make migration possible, a fish migration river is being constructed between the Wadden Sea and IJsselmeer (https://deafsluitdijk.nl/projecten/vismigratierivier/).

Action 14. Promote as protected species. The species is protected in the Netherlands.

Action 15. Threat from fishing. In the Netherlands, sport fishing is subject to a year-round obligation to put back protected species.

Action 20. International cooperation on aquaculture threats. It is unknown what the Dutch government does about international cooperation in this area. The NGO Good Fish Foundation points out the importance of using recircular aquaculture systems (RAS), a promising closed system for aquaculture (http://goodfish.guide/?p=2482).

Action 21. International cooperation on loss of habitat. Takes place via the Fish migration working group (see point (c) above).

Action 33. Improve coordination of research with regard to biology. There are national initiatives to better understand salmon migration through telemetry surveys (transmitters). (https://www.naturetoday.com/intl/en/nature-reports/message/?msg=24318; https://www.vistelemetrie.nl/nl/uitgvoeren-vistelemetrie-onderzoeken/onderzoek- naar-migratiegedrag- adult-salmonides-from-lith-to-upstream-spawning-sites-in-the-mesh-2008-2013).

Action 35. Cooperation with ICES. ICES has a working group for salmon, WGNAS (Working Group on North Atlantic Salmon). The Netherlands is not represented in this working group.

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4.3.10 Spurdog (Doornhaai, *Squalus acanthias*)

Spurdog (Doornhaai, Squalus acanthias)

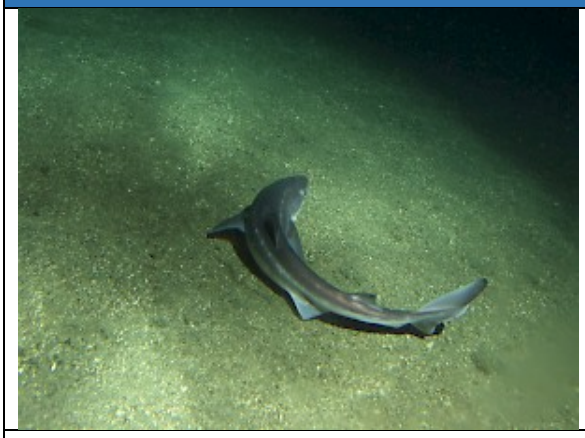

Figure 16. *Spurdog, Squalus acanthias (https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats).*

- **Introduction**

The spurdog reproduces near the coast. Dogfish are viviparous (live-bearing), with a gestation period of 18-22 months. Between 1-20 juveniles are produced at a time. Females give birth every 2 years. Females are only sexually mature after 12 years at a length of 75 cm, males after 6 years at a length of 60 cm. The species has been highly fished in the past. The spurdog migrates to a large extent, and is protected only in a small part of its distribution area. Its long lifespan and slow reproduction make it vulnerable to fishing (Shark Trust, 2010).

- **OSPAR recommendations**

3.1 Each Contracting Party should consider:

a. encouraging liaison within their national administrations to facilitate the adoption, implementation and enforcement of fisheries management measures taking account of ICES and, where applicable, the Scientific, Technical and Economic Committee for Fisheries (STECF) advice;

b. the possibility to introduce legislation to protect all life stages of the spurdog in the OSPAR maritime area;

c. improving funding for research (including fishery-independent surveys) into spurdog life history and biology (particularly growth parameters for larger individuals, reproductive biology and estimates of natural mortality), movements and stock discrimination, population abundance and distribution (with estimates of variance), discard data, and into all aspects of the issue of bycatch of spurdog in fisheries targeting other species (examples are described in the background document on spurdog), including research on applied mitigation measures;

d. ensuring that spurdog research data are made available to the appropriate national and regional organisations to support stock assessments and the development of management advice;

e. improving funding and undertaking research to identify critical spurdog habitats, particularly pupping and nursery grounds, and other aggregation sites, and their temporal stability;

f. taking relevant conservation measures (e.g., through conservation plans) for the spurdog ;

g. whether any of the key areas, justify selection and designation as marine protected areas for the protection of spurdog populations and whether such areas may become a component of the OSPAR network of marine protected areas;

h. establishing information campaigns about the identification, conservation, management and protection status of the spurdog, particularly addressing commercial and recreational fishermen and fisheries observers. Information campaigns may serve the purpose of data collection on spurdog occurrence, its critical habitats and incidental catches in order to improve knowledge of its distribution at different life stages and to disseminate any best practice for the handling and release of spurdog;

i. if not already signatory to the Memorandum of Understanding on Migratory Sharks under the Convention on Migratory Species, associating themselves with that Memorandum of Understanding;

j. the introduction of the spurdog as a protected species under relevant regional and international biodiversity conventions;

k. acting for the fulfilment of the purpose of this recommendation within the framework of relevant competent authorities.

- **Have the recommendations been implemented?**

Yes.

- **If yes, how have the recommendations been implemented? What is the result?**

In the context of the MSFD, preparations were made in the period 2013-2014 for an action plan for sharks and rays in the North Sea. To this end, Wageningen Marine Research (formerly known as IMARES), the Dutch Elasmobranch Association (NEV), Bureau Wing and Wageningen Economic Research (formerly known as LEI), commissioned by the Ministry of Economic Affairs, issued advice on the protection of sharks and rays that occur in the North Sea and an exploration of possible measures (Walker & Kingma, 2013; Walker et al., 2015). The results were presented to stakeholders with representatives of environmental organizations and the fishing industry, among others, and also discussed in meetings of the North Sea Advisory Council. The results and the discussions with the aforementioned organizations form the basis for the MSDF shark action plan (Ministry of Economic Affairs, 2016). (NB. In the action plan, "sharks" means all cartilage fish, including rays). In 2019, LNV published the international Shark Strategy 2019, which covers all seas and oceans where the Netherlands has influence (https://www.rijksoverheid.nl/documenten/rapporten/2019/05/01/internationale-haaien- strategy) -2019-ihs-19).
In the MSFD shark action plan, the protection of sharks and rays is structured through 3 tracks: 1. Education and communication; 2. Reducing unwanted by-catches; 3. Increasing the chances of survival.
a) There is no targeted commercial fishing for sharks and rays in Dutch waters. When the Common Fisheries Policy was reformed in 2013, it was decided to introduce a landing obligation. The European landing obligation means that fishermen must land all commercial species. Current European regulations include a number of exception rules on the landing obligation (https://www.wur.nl/nl/Dossiers/dossier/Discards-Ongewenste-bijvangst.htm). This includes, for example, endangered shark and ray species. These species must still be put overboard as quickly as possible and unharmed. The spurdog is included below. Since 2009 a 0-TAC has been in place for the spurdog and since 2010 the species may no longer be landed (Walker & Kingma, 2013) (b) The project "Sharks and rays back in the North Sea" is part of the Dutch Shark Action Plan and targets focuses specifically on gathering knowledge about the species-specific suitability of the Dutch coastal area and, where possible, on supporting population recovery through expansion (CCD, 2016; Buijs, 2017). The project started in December 2016 and has a duration of 5 years. By-catch is also part of the shark action plan (Ministry of Economic Affairs, 2016). c) research into discard survival takes place in the context of the MSFD shark action plan (Ministry of Economic Affairs, 2016). d) research data from scientific fishing surveys are available via ICES and requested in 2017 for the Dutch part of the North Sea by the Ministry of LNV (Van Hal, 2017). e & f) research into the occurrence of sharks and rays in the North Sea and possible protection measures have been investigated (Walker & Kingma, 2013; Walker et al., 2015). Monitoring takes place via regular fishing surveys, coordinated by ICES. Data from this are collected within the framework of the MSFD (Ministry of I&M and Ministry of LNV, 2012). g) Education and communication are an important part of the KRM shark action plan (Ministry of Economic Affairs, 2016). (h) Population size, condition and distribution of sharks and rays in the North Sea have been included by the Netherlands as indicators for the MSDF, with an improvement for the year 2020 has been set (Ministry of I&M and Ministry of LNV, 2012). The MSDF shark action plan is part of a broad strategy on Dutch efforts to protect sharks and rays in the Caribbean Netherlands, in international forums such as the EU, fisheries management organizations (RFMOs), fisheries partnership agreements, Convention on Migratory Species, OSPAR, trade in endangered species (CITES) (Ministry of Economic Affairs, 2016).

- **If no, what are the reasons not to implement the recommendation?**

Not applicable

- **Which opportunities and possibilities are there for the Netherlands?**

The shark action plan includes possibilities and chances, such as research on maximum landings, better registration of catches, research on possible contributions to the protection of sharks and rays in closed areas for fishing (Natura 2000 areas, wind farms, MSFD areas), research into catches by sport fishermen, and optimization of existing surveys (Appendix MSFD shark action plan 2015-2021).

- **What are the changes compared to the previous reporting period?**

In the previous report is was already indicated that all recommendations have been implemented.

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1, 4, 13, 15, 33, 34 (see Appendix 1)

- How can the Netherlands contribute to joint actions?

Action 1. Communication.

- A shark ID card for the North Sea is available in 3 languages (NL, EN, F). https://www.sportvisserijnederland.nl/vis-water/visonderzoek/haaien-en-roggen/herkenning-identification.html.
- A mesopelagic photo ID guide has been made for the NO Atlantic (NL, EN), including the spiny shark: Schilling B, Couperus AS, Bos OG (2019) Mesopelagic fish photo guide, Northeast Atlantic. Photo guide mesopelagic fish, Northeast Atlantic Ocean. DOI: https://doi.org/10.18174/478437. Wageningen Marine Research.

Action 4. ICES: NL is closely linked to ICES work on elasmobranchs (the chair of the working group comes from the Netherlands). Wageningen Marine Research also participates in the working group. Information about the spiny shark population and fishery has been collected in: http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/WGEF/04%20WGEF%20Report%202018_Section%2002%20Spurdog .pdf

Actions 15. Threat from fishing, 33. (coordination of research). The Dutch shark action plan serves this purpose.

Action 34. Fisheries-independent research program. Data on the species are available through annual fishing surveys coordinated by ICES. There is no tag, channel or other research into migration in the Netherlands, nor is there research into critical habitats. Research could be set up for this. The NL shark action plan (Min EZ, 2016) contains detailed ideas.

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4.4 Marine mammals

4.4.1 Harbour porpoise (Bruinvis, *Phocoena phocoena*)

Harbour porpoise (Bruinvis, Phocoena phocoena)

Figure 17. Harbour porpoise Phocoena phocoena in the Voordelta (North Sea) (photo: Oscar Bos)

- **Introduction**

The porpoise is a small cetacean (length ca 1.4 m) and the most common marine mammal of the North Sea area. The food mainly consists of fish. Harbour porpoises live up to about twenty years old. In the Dutch (southern North Sea) waters a female porpoises are sexually mature after 4 to 5 years and can only raise one young per two years. The reproductive capacity is therefore low. Often the animals are observed alone or in small groups (1-3 animals) but sometimes groups of a few dozen animals are seen. Threats to the harbour porpoise include, for example, mortality as a result of bycatch and pollution and effects of disturbance and damage caused by underwater noise (Leopold & Camphuysen, 2006, Geelhoed et al., 2014, Ministry of Economic Affairs, 2014, IJsseldijk et al., 2018).

- **OSPAR recommendation**

3.1 Each Contracting Party should consider in Regions II and III:

a. the possibility to introduce legislation, where appropriate, to protect the harbour porpoise in Regions II and III of the OSPAR maritime area;

b. taking relevant conservation measures (e.g. through conservation plans) for the harbour porpoise, in particular where they are threatened and in key areas;

c. whether any of the key areas justify selection as marine protected areas for the protection of harbour porpoise populations and whether such areas may become a component of the OSPAR MPA network;

c. the implementation of measures to reduce bycatch of harbour porpoise to the lowest possible level within key areas within its jurisdiction, as a priority and outside key areas within its jurisdiction, as appropriate;

d. establishing a coordinated monitoring programme addressing abundance, distribution and trends of this species and its populations as well as health status, bycatch rates and effects of other human activities, such as noise disturbances and chemical pollutants so that management recommendations can be made, as necessary;

e. establishing measures to reduce or avoid disturbing and/or harmful acoustic effects to harbour porpoises especially from seismic surveys, pile driving, shipping traffic, military activities and underwater explosions;

f. conducting post mortem investigations on harbour porpoise carcasses to allow the assessment of inter alia health status, cause of death and other aspects including genetic analyses, reproduction status, age structure and feeding ecology;

g. continuing with the existing work under the OSPAR Hazardous Substances and Eutrophication Strategies and where applicable, work with EU measures for improving coastal water quality;

h. where appropriate, establishing information campaigns about the identification, conservation and protection status of harbour porpoises. Information campaigns may serve the purpose of data collection on the harbour porpoise occurrence, its critical habitats and incidental catches;

- **Have the recommendations been implemented?**

Yes.

- **If yes, how have the recommendations been implemented? What is the result?**

a) The harbour porpoise is protected as under the EU Habitat Directive that is implemented in the Dutch Nature Conservation Act (Stb, 2016). There is also additional protection by means of a site decision under the Offshore Wind Energy Act (http://wetten.overheid.nl/BWBR0036752/2017-01-01). In a site decision it is determined where and under what conditions a wind farm can be built and operated. Conditions include, among other things, that the noise level under water during the pile driving does not exceed the set noise standard and the preparation and implementation of a Monitoring and Evaluation Program.

b) In 2011, the protection plan for harbour porpoise was presented (Camphuysen & Siemensma, 2011). The plan provides an overview of threats and possible protection measures. With the implementation of the measures and the research from the protection plan, the Netherlands can meet the most important obligations for the conservation of the porpoise population (CBS et al., 2017). In 2020 an update of the plan will be published;

c) There are 4 protected areas on the North Sea where the porpoise is designated: Dogger Bank, Cleaver Bank, North Sea Coastal Zone and Vlakte van de Raan (Ministry of Agriculture, Nature and Food Quality, 2008, Ministry of Economic Affairs, 2016a, b, Ministry of EL & I, 2010). All areas are part of the OSPAR MPA network (http://mpa.ospar.org/home_ospar).

d) In the period 2012-2017, by means of remote electronic monitoring (REM), the number of porpoises in which the type of net was caught was investigated by means of cameras onboard gill fishermen (Scheidat et al., 2016). The number bycaught porpoises was relatively low (<0.1% of the population). It has also been investigated how bycatch can be efficiently reduced if this proves necessary for maintaining or reaching favourable conservation status of the population.

e) Aircraft counts are performed annually on the Dutch Continental Shelf (NCP). Three international counts of the entire NO Atlantic continental shelf were also carried out (SCANS I in 1994, SCANS II in 2005 and SCANS III in 2016). Aerial counts of marine mammals on the Dutch Continental Shelf are being carried out as part of a MSDF project 'monitoring porpoise' that is financed on an annual basis. ASCOBANS is reported annually (Ministry of EL & I, 2018). In addition, aerial bird counts take place a number of times per year on the NCP, where porpoises are also counted. Porpoises are also counted from the beach by bird migration observers. In the Oosterschelde, the Rugvin Foundation counts the number of porpoises using photoID.

f) The Ecology and Cumulation Framework project (KEC) investigated what the cumulative ecological effects of existing offshore wind farms can be. The component cumulative effects on marine mammals was carried out by the Underwater Sound Working Group (Heinis et al., 2015). This working group was set up at the initiative of Rijkswaterstaat Zee and Delta in early 2013. Participants come from Rijkswaterstaat, Directorate-General for Space and Water, TNO, HWE, SEAMARCO, Wageningen Marine Research, Arcadis, Royal Haskonig DHV and Deltares. The study focused on the population effects resulting from the development of offshore wind energy and derived a standard for underwater noise as a result of the construction of wind farms (Heinis et al., 2015). Other studies on effects and mitigation of noise on porpoise: effects of underwater explosions (Aarts et al., 2016); experimental research into the strength and frequency of simulated underwater sound disturbing the hearing perception of porpoises (Lucke, 2015 and many studies by Kastelein, e.g. Kastelein et al. 2017);

g) Post-mortem diet and contaminant research are part of the 'Monitor porpoise' project. Since 2016, the research on porpoises has been placed under the Legal Research Tasks Nature & Environment. Wageningen Marine Research and the Department of Pathobiology of the Faculty of Veterinary Medicine of Utrecht University carry out the research jointly. The Ministry of LNV is the client and the project runs from 2016-2020. The results published in the meantime (IJsseldijk, et al., 2017a & b; Geelhoed et al., 2016; Geelhoed & IJsseldijk 2017) can be found, for example, via the WMR online project file (https://www.wur.nl/nl/ Research-Results / Research institutes / marine-research / show-marine / Monitor-Harborfish-1.htm)

h) In 2018, the MSFD Dutch Marine Strategy Part 1 (initial assessment) for the North Sea environment has been updated (Min IW & Min LNV, 2018). An assessment of the North Sea basin is also carried out jointly by the North Sea countries in 2016-2017, including eutrophication, as part of the OSPAR Intermediate Assessment 2017 (Ministry of I & M, 2016).

i) There are no specific information campaigns as far as known. There are, however, numerous websites with information about the harbor porpoise. j) The harbor porpoise is protected and investigated in the Netherlands by various relevant authorities and other organizations.

- **If no, what are the reasons not to implement the recommendation?**

Not applicable

- **Which opportunities and possibilities are there for the Netherlands?**

Work will be carried out in 2019 on updating the harbor porpoise protection plan (Siemensma, pers. Com). It includes recommendations from the Harbor Porpoise Protection Committee (Van der Meer et al., 2016**)**

- **What are the changes compared to the previous reporting period?**

All recommendations were already implemented in 2016.

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1, 4, 12, 13, 29 (see Appendix 1)

- How can the Netherlands contribute to joint campaigns?

Action 1. Communication. Strandings are recorded on www.walvisstrandingen.nl. Trends are tracked at Natuurcompendium (https://www.clo.nl/indicatoren/nl1250-bruinvis-lang-de-nederlandse-kust).

Action 4. Monitoring. Various monitoring takes place, including numbers of porpoises on the continental shelf (see also https://www.wur.nl/nl/Research-Results/Researchinstitutes/marine-research/show-marine/Monitor-Bruinvis-1.htm).

Action 12. Setting MPAs. Setting specific MPAs for harbor porpoises makes no sense, therefore protection is arranged on a Dutch North Sea scale via the harbor porpoise protection plan (Camphuysen & Siemensma, 2011) and it's update (in 2020). For the international North Sea there is the ASCOBANS HP protection plan (https://www.ascobans.org/en/documents/action%20plans/North-Sea-Conservation-Plan)

Action 13. MPAs contribution to the protection of porpoises. Setting specific MPAs for harbor porpoises makes no sense, therefore protection is arranged on the Dutch North Sea scale via the harbor porpoise protection plan and the updating thereof (see above).

Action 29. Guidelines for reducing antropogenic disturbanceeee. For offshore wind there are guidelines i.v.m. underwater noise, developed by Rijkswaterstaat (see point (f).

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4.5 Habitats

4.5.1 Intertidal *Mytilus edulis* beds on mixed and sandy sediments

Mosselbanken op droogvallende platen (Intertidal Mytilus edulis beds on mixed and sandy sediments)

Figure 18. Mosselbank met jonge mosseltjes (foto: Oscar Bos, Wageningen Marine Research).

- **Introduction**

This habitat type is defined by OSPAR as coastal areas that are characterized by beds of the mussel *Mytilus edulis* that mainly occur on the middle and low coast with mixed substrate (gravel and stones on silt) but also on sand and silt (OSPAR, 2015). The EUNIS classification for the habitat type mussel beds distinguishes between the subtype littoral mixed substrate and the subtype littoral sand. Mussel beds are not considered as a separate HD habitat type in the Netherlands, but as a characteristic for structure and function of habitat type H1140 mud flats and sand flats (Ministry of LNV, 2008). This habitat type is described in section 4.5.2). The introduction of the Pacific oyster into the Wadden Sea has created many mixed (mussel / oyster) banks (Folmer et al., 2017).

Mussels attach themselves to dead and living shells such as cockles *Cerastoderma edule* and Pacific oysters (*Crassostrea gigas*) and other hard material and can grow into large banks (Glorius et al., 2018). Mussel beds are an important part of the ecosystem. The value of mussel beds is that they provide a habitat for the associated communities, a food source for shrimp, crabs and waders (either the mussel itself or the associated species) and have a function in the nutrient cycle of the ecosystem (water filtering and enrichment of the seafloor with high organic sludge) (Ministry of LNV, 2008). Mussel beds are also considered to be biogenic structures: hard substrate of biogenic origin arise from dead or living animals, which form a habitat for epibiotic species.

- **OSPAR recommendations**

a. the possibility of introducing legislation to protect intertidal *Mytilus edulis* beds on mixed and sandy sediments;
b. investigating the distribution, quality and extent of intertidal *Mytilus edulis* beds on mixed and sandy sediments, by means of seabed habitat surveys and monitoring, in order to complete the knowledge base and provide indicators for the state and recovery of the habitat;
c. whenever applicable, seeking ways and means to broaden the knowledge base on the occurrence of and threats to intertidal *Mytilus edulis* beds on mixed and sandy sediments by gathering additional knowledge from sources such as national planning authorities, environmental impact assessments and post-development monitoring, research institutes, fisheries research, local sea-fisheries committees, commercial and recreational fisheries, Non-governmental organisations and the general public;
d. reporting any existing and new data on the distribution, quality and extent of intertidal *Mytilus edulis* beds on mixed and sandy sediments to OSPAR;

e. assessing whether existing management measures for the protection of intertidal *Mytilus edulis* beds on mixed and sandy sediments are effective and determine whether further measures are needed to address the key threats;
f. whether any sites justify selection and designation as marine protected areas for the protection and conservation of intertidal *Mytilus edulis* beds on mixed and sandy sediments and whether such areas may become a component of the OSPAR network of marine protected areas;
g. addressing and minimising adverse impacts on intertidal *Mytilus edulis* beds on mixed and sandy sediments arising from human activities such as bottom trawling and harvesting of adult and seed mussels in waters under its national jurisdiction;
h supporting, where practicable, the natural recovery of intertidal *Mytilus edulis* beds on mixed and sandy sediments, in areas where pressures have caused a decline or disappearance of the habitat and that are now adequately managed;
i. ensuring by appropriate management that introduction, hybridisation and intermixture with non-native Mytilus species through marine aquaculture and seed mussel imports/exports and associated invasive and/or non-indigenous species is avoided;
j. adapting coastal protection measures in such a way that undesired negative effects on intertidal *Mytilus edulis* beds on mixed and sandy sediments are avoided or minimised;
k. raising awareness for the importance and maintenance of good ecological conditions of intertidal *Mytilus edulis* beds on mixed and sandy sediments among relevant management authorities, relevant actors, including industry sectors and the general public;
l. acting for the fulfilment of the purpose of this Recommendation within the framework of relevant competent authorities;

- **Have the recommendations been implemented?**

Yes

- **If yes, how have the recommendations been implemented? What is the result?**

3.1.a) Tidal flats, and with that also mussel beds, are protected within the North Sea coastal zone, the Voordelta and the Wadden Sea, through area protection, which is anchored in the Nature Protection Act (Stb, 2016). In addition, conservation objectives have been established within this law for various bird species for which shellfish are an important food source such as oystercatchers. Mussels and mussel beds are thus legally protected as important components in the ecosystem (Glorius et al., 2018). The protection of mussel beds is also included in the European Water Framework Directive (WFD), included at national level in the Water Act. The target area for the Wadden Sea littoral mussel beds is range from 2000 to 4000 hectares. In addition, ecological objectives have been set between the Netherlands, Germany and Denmark to protect the natural values of the Wadden Sea and improve them where necessary (see also under 3.1.f.) Mussel beds in the Atlantic littoral zone are included in the Red List as endangered (Gubbay et al. al., 2016) b) Various monitoring programs are in place to assess the distribution, size and quality of mussel beds, all in the context of WOT (a full overview of monitoring programmes is available at https://www.walterwaddenmonitor.org/wp-content/uploads/Meetprogrammas-Waddengebied-mrt-20181.pdf): 1) WOT shellfish survey using a fixed sampling grid: Inventory of sublittoral shellfish stocks (annual monitoring using a suction-stamping basket, determining bank sizes by field visits, measuring recruitment) (Perdon et al. al., 2018). 2) WOT survey, no fixed samplnig locations: Inventory of intertidal mussel beds and oyster beds (prior to the survey an inspection flight in which the largest changes are noted. Subsequently field visit on foot) (van den Ende et al., 2017). 3) WOT survey of selected mussel beds: Structure littoral mussel beds (walking around musselbed to determine contours and sampling of mussels at a number of places. Analysis of population structure, composition of community and structure-forming variables (geological structure of the cover, patch size etc.)). All programs are a direct result of the Trilateral Monitoring and Assessment Program (TMAP) and sometimes also from the BD, HD and / or WFD. c) Mussel beds were probably very common in the past. It is estimated that there was an area of more than 4000 ha in the Wadden Sea in the late 1970s (Dankers and Koelamaij, 1989; Tydeman, 1996). Retrospective research in the context of EVA II (Evaluation of Shellfish Fisheries Policy) has reached extreme limits between 1000 and 6000 hectares (Dankers et al., 2003). In the 1980s the area of mussel beds decreased due to intensive fishing and severe winters. Less than 200 ha were left between

1991 and 1994 (Dankers et al., 2003). Many banks that subsequently emerged in the 1990s were not stable enough to survive winter storms and ice damage (Dankers et al., 2004), but the area gradually increased. In 2017, due to a large mussel seed fall, the total area of mussel beds had increased considerably compared to the spring of 2016 (van den Ende et al., 2017). In 2018, the area of mussel beds was estimated at 2672 ha (van den Ende et al., 2018). Compared to spring 2017, the number of mussels has decreased due to the disappearance of banks and damage (many bald and thinned places) to banks. This may have been caused by winter storms or the ice drift of the cold period at the beginning of 2018. The number of multi-year musselbeds has remained virtually unchanged compared to 2017 (van den Ende et al., 2018). Fishing on tidal mussel beds has been prohibited since 1995. According to the Policy Document on Shellfish Fisheries (2004), no mussels are fished on the intertidal area as long as there are less than 2,000 hectares of multi-year stable banks. If that surface is present, mussel seed banks may be fished as a test. The aim is to find out whether fished mussel seed banks develop better into stable banks than unfished banks. Multi-annual banks are defined in the Shellfish Fisheries Policy Decree (LNV, 2004) as banks that have survived at least one winter. According to this definition, all mussel beds mapped in the spring are multi-year. In 2008, the "Transition mussel sector transition and nature recovery Wadden Sea" agreement was reached, which means that the mussel seed fishery in the sublittoral of the Wadden Sea will be phased out with the result that mussel beds can develop undisturbed; and the development of alternative sources for mussel seed that enable profitable breeding of mussels (PRW, 2010). d) Data does not seem to have been reported to OSPAR yet. e) The effectiveness of measures is evaluated, inter alia, in the context of Natura 2000, with regard to the conservation objectives for the Habitat type 1140. Measures are described in the Natura 2000 site management plan. Monitoring takes place in Natura 2000 areas, which among other things serves to determine the effectiveness of measures (Rijkswaterstaat, 2014). The management plan includes a comparison of the status of the habitat type before and after the measure, for example in the Wadden Sea management plan (Ministry of Infrastructure and the Environment, 2016). In addition to this general assessment of the effectiveness of measures, there is a specific measure in place for mussel beds (LNV, 2004): no mussel fishing on the dike slabs as long as there are fewer than 2,000 hectares of stable banks and may be used as a test for more than 2,000 ha fished on mussel seed banks. The effectiveness of the measure is also determined in this way; f) Tidal flats in the Wadden Sea, and therefore also the mussel beds, are protected areas (H1140_A). In addition to maintaining the distribution and surface area of H1140_A, an improvement in quality has also been set as a goal (Ministry of LNV, 2006). The trilateral declaration on the protection of the Wadden Sea (Common Wadden Sea Secretariat, 2010) includes objectives for tidal flats and mussel beds: an increased undisturbed surface of tidal flats and a natural size, distribution and development of natural mussel beds. These objectives correspond to the WFD, national implementation of Natura 2000 and the UNESCO World Heritage criteria (Common Wadden Sea Secretariat, 2010). g) Reducing and eliminating external threats to the natural resources of the Wadden Sea is a primary objective of the Wadden Fund. To this end, projects are subsidized that contribute to, among other things, the conditions for maintaining and / or increasing the area of littoral (mud flats, salt marshes) with average sea level rise and reduction of the effects of human use, the combined effects of climate change and subsidence (Wadden Fund, 2017) . Mussel fishing was an important threat in the past (see 3.1.a). That threat was eliminated in 1995 by the prohibition of fishing for intertidal mussel beds. Measures have also been taken for the sublittoral. In 2008, the "Transition mussel sector transition and nature recovery Wadden Sea" agreement was reached and implies that the mussel seed fishery in the sublittoral of the Wadden Sea will be phased out, with the result that mussel beds can develop undisturbed; and the development of alternative sources for mussel seed that enable profitable breeding of mussels (PRW, 2010). h) support for the natural recovery of shellfish banks is receiving attention in the Netherlands. To restore the mussel beds south of Ameland, in 2014 Rijkswaterstaat placed biodegradable crates of potato starch as a base for mussel brood to attach to. Shellfish banks are also recovering in the North Sea (Sas et al., 2018). i) Ecological testing for the introduction of exotic species and the like is required for the import of mussel seed, both from abroad and within the Netherlands (LNV, 2004). A condition for moving mussels from the Oosterschelde to breeding plots in the Wadden Sea (“south north transports”) is that the risk is minimized that unwanted exotic species occurring in the Oosterschelde but not yet in the Wadden Sea can reach the Wadden Sea through these transports (PRW, 2018). In order to be able to carry out the transports in a responsible manner, an extensive protocol has been drawn up,

known as the shellfish import protocol (SIMP) (Gittenberger, 2018), coupled with intensive monitoring of the species present in the area of origin, in this case the Oosterschelde (SASI). South-north mussel transports are licensed up to 2020 (https://puc.overheid.nl/natuurvergunning/doc/PUC_4639_17/1/) for which an Appropriate Assessment has been carried out (van Stralen & Gittenberger, 2018). Import from abroad (Denmark, The Wash (an estuary on the east side of England), Sweden, Ireland and the United Kingdom) is permitted whereby the mussel seed is sown in the Oosterschelde, after extensive research protocols have been implemented in the areas of origin and measures have been taken for the breeding plots in the Oosterschelde. For example, mussel import from the United Kingdom to the Oosterschelde until March 2023 was licensed (https://puc.overheid.nl/natuurvergunningen/doc/PUC_274290_17/1/) j) The effects of sand nourishment in the Netherlands have been investigated in the past (Baptist et al., 2008; Mulder et al., 2005; van Dalfsen & Essink, 2001; Bos et al., 2009; Goudswaard et al., 2009; van der Wal & van Dalfsen, 2008; Leopold & Baptist, 2007). Particular attention has been paid to the benthic community. At the request of the Directorate-General for Public Works and Water Management, WMR is currently investigating the effects of sand nourishment (to strengthen the coastline) on nature, taking into account the nursery function of the North Sea coast; whether the ecology is permanently changing; and whether the natural dynamics can be influenced in a desired direction by means of nourishments. N.B. This recommendation also exists for the tidal flats (see section 4.5.2). k) A new campaign is launched every year to promote the Code of Honor (rules of conduct for holidaymakers in the Wadden Sea Region). In 2018, the 'Ik pas op het Wad' campaign, part of the Program for a Rich Wadden Sea, started. The campaign supports the Wadden Sea World Heritage Site (www.ikpasophetwad.nl). The tidal plates play an important role in this. N.B. This recommendation also exists for the tidal flats (see section 4.5.2). l) The relevant policy framework of this recommendation is trilateral cooperation for the protection of the Wadden Sea (Trilateral Wadden Sea Cooperation: TWSC) and the Common Fisheries Policy (GVB). With regard to fishing, the CFP provides the procedures and other instruments to achieve the objectives of the Birds and Habitats Directives and the Marine Strategy Framework Directive (Mosselbanken Wadden Sea Closure Area).

- **If no, what are the reasons not to implement the recommendation?**

Not applicable

- **Which opportunities and possibilities are there for the Netherlands?**

In the Ems-Dollard work is undertaken to restore mussel beds (https://www.wur.nl/nl/Research-Results/Research projects-LNV/Expertiseg regions/kennisonline/Herstel-mosselbanken-Hond-Paap-1.htm). Analyzes show that large-scale restoration makes no sense: mixed mussel / oyster beds increase naturally in size (Van der Meer et al. 2019).

- **What are the changes compared to the previous reporting period?**

In 2016, it was already established that all recommendations regarding mussel beds on tidal flats were implemented in the Netherlands.

- **Implementation of OSPAR joint actions**

Which actions refer to this species or habitat?

Actions 1, 2, 22 (see Appendix 1)

- How can the Netherlands contribute to join campaigns? (see Attachment 1)

Action 1. Communication: A handbook for the management and repair of mussel beds in the Wadden Sea was published in 2015: Dankers NMJA, Fey-Hofstede FE (2015) A sea of mussels: handbook ecology, protection, policy and management of mussel beds in the Wadden Sea (http: //www.mosselwad.nl/downloads/zeevanmosselen.pdf). Anemoon Foundation. Report 9789081524827

Action 2. OSPAR habitat database: An open access online ecotope map of the trilateral Wadden Sea was produced in 2019, with GIS shapefiles from mussel beds and seagrass among others (Baptist et al., 2019).

Data is collected by Wageningen Marine Research and published every year (Van den Ende et al., 2017, 1018). This data can be added to the OSPAR database by ordering, if this has not yet been done.

Action 22. Assess water quality. Water quality of the Wadden Sea is assessed through the Water Framework Directive and in a trilateral context in the Wadden Sea Quality Status reports (https://qsr.waddensea-worldheritage.org/reports/eutrophication#subsection_4).

4.5.2 Intertidal mudflats (Getijdenplaten)

Intertidal mudflats (Getijdenplaten)

Figure 19. Intertidal mudflats in the Dutch Wadden Sea (photo: Oscar Bos, Wageningen Marine Research).

- **Introduction**

Tidal flats and sandbanks concern the shallow intertidal coastal areas. Locally hard substrates can occur consisting of shellfish banks and so-called biogenic structures formed by organisms. The occurrence of this habitat type is limited to the coastal area and occurs in the Wadden Sea, the Westerschelde, the Oosterschelde, the Eems-Dollard, the Voordelta, the North Sea Coastal Zone and the areas between the Wadden Islands. Tidal flats with their rich benthic fauna are important as a food area for young fish and birds and are a resting area for seals. This makes them of worldwide importance as an indispensable stepping stone for migratory birds between wintering areas in West Africa and the northern breeding areas such as Siberia. The Dutch tidal flats also fulfill a function as an important nursery for fish in the North Sea (Ministry of Economic Affairs, 2008).

- **OSPAR recommendations**

Each Contracting Party should consider in Regions I, II, III and IV:

a. the possibility of introducing legislation to protect intertidal mudflats;

b. investigating the distribution, quality and extent of intertidal mudflats, by means of seabed habitat surveys and monitoring, in order to complete the knowledge base and provide indicators for the state and recovery of the habitat;

c. whenever applicable, seeking ways and means to broaden the knowledge base on the occurrence of and threats to intertidal mudflats (such as land claim for agricultural and industrial use, effluent discharges, oil spills, dredging, fishing and bait digging, sea level rise and saltmarsh encroachment) by gathering additional knowledge;

d. reporting any existing and new data on the distribution, quality and extent of intertidal mudflats to OSPAR;

e. assessing whether existing management measures for the protection of intertidal mudflats are effective and determine whether further measures are needed to address the key threats;

f. whether any sites justify selection and designation as marine protected areas for the protection and conservation of intertidal mudflats and whether such areas may become a component of the OSPAR network of marine protected areas;
g. addressing and minimising key threats to intertidal mudflats arising from: land claim for agricultural and industrial use, effluent discharges, oil spills, dredging, fishing and bait digging, sea level rise and saltmarsh encroachment;
h supporting, where practicable, the natural recovery of intertidal mudflats, in areas where pressures that have caused a decline or disappearance of the habitat are now adequately managed;
i. adapting coastal protection measures in such a way that undesired negative effects on intertidal mudflats are avoided or minimised;
j. raising public awareness of the ecological and socio-economic value of intertidal mudflats and educate planning authorities and developers on the important functions of mudflats in estuarine and coastal systems;
k. acting for the fulfilment of the purpose of this Recommendation within the framework of relevant competent authorities;

- **Have the recommendations been implemented?**

Yes

- **If yes, how have the recommendations been implemented? What is the result?**

3.1.a) Tidal flats are protected as Natura 2000 marine protected areas within the North Sea coastal zone, the Voordelta and the Wadden Sea, through the Nature Conservation Act (Stb, 2016);
b) In 2012-2013, the Ministry of Economic Affairs (EZ) and the Ministry of Infrastructure and the Environment (I & M) have assessed the monitoring in saline waters in the context of the Birds and Habitats Directives (BHD) and the MSFD (Paijmans & Asjes, 2012; van der Sluis et al., 2012; Paijmans & van der Sluis, 2013). Several monitoring programs are being conducted to assess the distribution, size and quality of tidal flats. A complete overview can be found in https://www.walterwaddenmonitor.org/wp-content/uploads/Meetprogrammas-Waddengebied-mrt-20181.pdf. c) In 2011, an innovative pilot for coastal management was started, the Sand Motor, a 128-hectare peninsula off the Delfland coast. It is intended to contribute to coastal safety in the long term, to add an attractive area for nature and recreation and to give an impetus to knowledge for coastal management. A Monitoring and Evaluation Program (MEP) has been carried out for the benefit of this knowledge development and to be able to evaluate the objectives (Taal et al., 2016). There are also pilot projects in the Wadden Sea ports where experiments are carried out with a 'sludge motor'. This research contributes to the development of knowledge about the distribution of sand and silt and the development of tidal flats (Baptist, 2015, de Vriend et al., 2015, Baptist et al., 2016, Baptist et al., 2017; van Eekelen). et al., 2017, van Regteren et al. 2017).
d) Data about the shape of tidal flats is available from Rijkswaterstaat
e) Effectiveness of measures is evaluated, among other things, in the context of Natura 2000, with regard to the conservation objectives for the Habitat type 1140. Measures are described in the management plans of the Natura 2000 areas. In Natura 2000 areas, monitoring takes place, which among other things serves to determine the effectiveness of measures (Rijkswaterstaat, 2014). The management plan states that the condition of the habitat type before and after the measure are compared, for example in the Waddenzee management plan (Ministry of I & M, 2016);
f) Tidal flats in the North Sea are protected within the Natura 2000 area of the North Sea Coastal Zone and Natura 2000 area Voordelta, with the objective of maintaining the distribution, surface area and quality of the habitat (H1140_B). In the Natura 2000 area of the Wadden Sea, the target for habitat quality H1140_A is not only maintaining the distribution and surface area but also an improvement in quality (Ministry of LNV, 2006).
g) Reducing and removing external threats to the natural values of the Wadden Sea is a main objective of the Wadden Fund. To this end, projects are being subsidized that contribute to, among other things, the conditions for conservation and / or increase of the acreage littoral (mudflats, salt marshes) in the event of average sea level rise and reduction of the effects of human use, the combined effects of climate change and subsidence (Waddenfonds, 2017). ;
h) support for the natural recovery is an important part of the Building with Nature program (https://www.ecoshape.org/nl/) and is mainly used in innovative projects such as the sand motor and the sludge motor (see c);

i) The effects of sand replenishments in the Netherlands have been studied in the past (Baptist et al., 2008, Mulder et al., 2005, Dalfsen & Essink, 2001, Bos et al., 2009, Goudswaard et al., 2009; der Wal & van Dalfsen, 2008, Leopold & Baptist, 2007). Particular attention was paid to the benthic community. At the request of Rijkswaterstaat, WMR is currently conducting research into the effects of sand reclamation (to strengthen the coastline) on nature, looking at the nursery function of the North Sea coast; whether the ecology changes permanently; and whether the natural dynamics can be influenced in a desired direction by means of nourishment.
j) Every year a new campaign is launched to draw attention to the Code of Honor (code of conduct for recreational users in the Wadden Sea area). In 2018 the campaign 'Ik pas op het Wad', part of the Program to a Rich Wadden Sea, has started and supports Wadden Sea World Heritage (www.ikpasophetwad.nl). The tidal flats play an important role in this.
k) The importance of tidal flats in the Wadden Sea is known to the relevant authorities and authorities (Ministry of LNV, 2006).

- **If no, what are the reasons not to implement the recommendation?**

Not applicable.

- **Which opportunities and possibilities are there for the Netherlands?**

Supporting natural recovery with the help of Building with Nature-like projects.

- **What are the changes compared to the previous reporting period?**

There was no report in 2016.

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1, 2, 22 (see Appendix 1)

- How can the Netherlands contribute to joint actions?

Action 1. Communication: In 2019 an open access online ecotope map was produced for the trilateral Wadden Sea, with GIS shapefiles from mussel beds and seagrass among others (Baptist et al., 2019). An overview of monitoring programs can be found at https://www.walterwaddenmonitor.org/wp-content/uploads/Meetprogrammas-Waddengebied-mrt-20181.pdf

Action 2. OSPAR habitat database:
• An open access online ecotope map of the trilateral Wadden Sea was produced in 2019, with GIS shapefiles from mussel beds and seagrass among others (Baptist et al., 2019).
• Data is collected by Rijkswaterstaat. Rijkswaterstaat may be able to add them if this has not yet been done.

Action 22. Assessment of water quality. Water quality of the Wadden Sea is assessed through the Water Framework Directive and in a trilateral context in the Wadden Sea Quality Status reports (https://qsr.waddensea-worldheritage.org/reports/eutrophication#subsection_4).

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4.5.3 *Ostrea edulis* beds (Platte oesterriffen)

See *Ostrea edulis*.

4.5.4 Zandkokerwormriffen *(Sabellaria spinulosa* reefs)

Zandkokerwormriffen (Sabellaria spinulosa reefs)

Figure 20. Sabellaria sp. (photo: Henk Heessen, Wageningen Marine Research).

- **Introduction**

The Ross worm *Sabellaria spinulosa* (closely related to the honeycomb worm *Sabellaria alveolata*) can occur as an individual but can also form relatively large reef structures on both hard substrate and on somewhat consolidated (rather solid) sediment. The tubes are about 3 cm long and the reefs around 50 cm high. Reefs of this species are common in other parts of the international North Sea but rare in the Dutch North Sea and Wadden Sea (Jak et al., 2009, Bos et al., 2014; Troost et al., 2014; van Duren et al., 2016). An overview of locations by divers and in surveys has been made by Bos et al. (2019). In 2017, *Sabellaria spinulosa* reefs were discovered at the Brown Bank during a survey in the framework of the 'Disclose' project (https://discloseweb.webhosting.rug.nl/). *Sabellaria* reefs on the Frisian Front were discovered by the NIOZ in November 2019 (see blog

NIOZ November 2019, www.nioz.nl). The reef structures have been identified as promoting biodiversity (van Duren et al., 2016).

- **OSPAR recommendations**

a. the possibility to introduce legislation to protect *Sabellaria spinulosa* reefs;
b. assessing whether existing management measures for the protection of *Sabellaria spinulosa* reefs are effective and determine whether further measures are needed to address the key threats;
c. investigating the distribution, quality and extent of *Sabellaria spinulosa* reefs by means of seabed habitat surveys and monitoring, in order to complete the knowledge base and provide indicators for the state and recovery of the habitat;
d. whenever applicable seeking ways and means to broaden the knowledge base on the occurrence of *Sabellaria spinulosa* reefs by looking at opportunities for habitat recording and mapping, particularly in association with surveys for proposed research and development projects, for example, offshore infrastructure, cable laying, aggregate extraction, and for fisheries research;
e. reporting any existing and new data on the distribution, quality and extent of *Sabellaria spinulosa* reef habitat to the OSPAR Commission;
f. whether any site justifies selection as a marine protected area for the conservation and recovery of *Sabellaria spinulosa* reefs and whether such areas may become a component of the OSPAR MPA network;
g addressing and minimising adverse impacts on *Sabellaria spinulosa* reefs arising from human activities in waters under its national jurisdiction;
h. raising awareness of the importance of *Sabellaria spinulosa* reefs among relevant management authorities, relevant industries and the general public;

- **Have the recommendations been implemented?**

Partly implemented.

- **If yes, how have the recommendations been implemented? What is the result?**

a) *Sabellaria spinulosa* is on the list of typical species of habitat type 'reefs' (H1170). This habitat type is protected in the Natura 2000 area the Cleaver Bank (Ministry of EZ, 2016);
b) There is a proposal to close approximately 688 km2 within the Cleaver Bank (± 45% of the area, ± 1.2% of the Dutch North Sea) for all forms of seabed fishing. This proposal must now be approved at European level (Stichting de Noordzee, 2018). The existing and planned measures within the framework of the MSFD are not specifically aimed at sand-tube worm reefs. However, it is noted that there is a chance that in certain areas hard biogenic substrates which are still present on a small scale, such as reef-building tube worms such as *Sabellaria* could actively be restored (Ministry of I & M and Ministry of Economic Affairs, 2015). One of the priorities for knowledge programming within the framework of the MSFD is exploring the possibilities for active restoration of (lost) biogenic reefs;
c & d) In 2009, biobuilders in the Wadden Sea were investigated as part of the Wadden Sea nature recovery plan (van Duren et al., 2009). It concluded that a larger area of sediment stabilizing bio builders, including *Sabellaria* reefs, is desirable. Currently, reefs on the Brown Bank are being investigated in the context of the 'Disclose' project (https://discloseweb.webhosting.rug.nl/), which will be completed in 2020;
e) data have not yet been reported to OSPAR.
f) the Cleaver Bank has been designated in the Netherlands as Natura 2000 area (Ministry of Economic Affairs, 2016c) and is also part of the OSPAR MPA network (http://mpa.ospar.org/home_ospar). In the Borkum Reef area, the species is too rare (Bos et al., 2014). Protection of the Brown Bank could possibly be relevant given the recent discovery of Ross worm reefs;
g) As far as is known, there are few reasons why reefs could not occur in the Netherlands. Their absence may be due to seafloor disturbance, which makes it difficult for reefs to develop (van Duren et al., 2016). Currently 0.3% of the Dutch North Sea is protected against all forms of fishing and 4% against the most disturbing forms of fishing. In 2020 this would have to be 5 and 11% respectively (Stichting de Noordzee, 2018). Key factors have been identified that can promote reef formation by this species (van Duren et al., 2016).
h & i) The species is at the forefront of policy and NGOs.

- **If no, what are the reasons not to implement the recommendation?**

Since reefs of this species were not known before 2017 in the Dutch North Sea and Wadden Sea, the protection is currently limited to the status of typical species of H1170 (reefs) which only applies within the N2000 area the Cleaver Bank. However, due to the recent discovery (2017) of Ross worm reefs at the Brown Bank (Van der Reijden et al., 2019) and the Frisian Front (www.nioz.nl, blog November 2019), additional research and protection of these reefs might be necessary.

- **Which opportunities and possibilities are there for the Netherlands?**

Sabellaria reefs are currently not part of the HR Habitat type Reefs (H1170) in the Netherlands. They could be better protected if they were to be classified as reefs, as is the case in Germany, for example.

- **What are the changes compared to the previous reporting period?**

The previous report indicated that recommendations 3.1.c, d, f, h, i had been implemented. Regarding recommendation 3.1.g (tackling major threats), the objective is to protect 5% of the Dutch North Sea against all forms of fishing by 2020 and 11% against the most disturbing forms of fishing.

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1, 11, 42 (see Appendix 1)

- How can the Netherlands contribute to joint campaigns?

Action 1. Communication: Maps with locations and potential locations of reef-forming shellfish and worms were published in 2019: Bos et al. (2019).

Action 11. Collecting information: information has been collected about Sabellaria reefs and their context in the Disclose project (https://discloseweb.webhosting.rug.nl/) and through research by the NIOZ (Van der Reijden et al., 2019) and via Stichting Duik de Noordzee Schoon and Stichting Anemoon (observations by divers).

Action 42. List of research areas. A list of possible research areas has not yet been drawn up, but can be made on the basis of recent location and prediction maps (Bos et al., 2019; Van der Reijden et al., 2019).

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4.5.5 Sea-pen and burrowing megafauna communities

Sea-pen and burrowing megafauna communities (Zeeveer en gravende megafauna gemeenschappen)

Figure 21. Mud shrimp (foto: Oscar Bos, Wageningen Marine Research).

- **Introduction**

In the Dutch part of the North Sea this habitat type consists of the burrowing crustaceans: Norway lobster (*Nephrops norvegicus*), mud shrimp (*Callianassa subterranea*), hairy crayfish (*Upogebia deltaura*) and the crustacea *Upogebia stellata*. Sea-pen (*Pennulata phosphorea*) is absent in the Netherlands (Bos et al., 2012). The Norway lobster is common on soft substrate in the North Sea and lives in burrows in the mud. It is a target species for fishing (van der Hammen and

Steenbergen, 2011). Mud shrimps *C. subterranea* are also common in muddy sandy seafloors. They are small animals, with a maximum body length of 46 mm, digging deep extended tunnels. The mud lobster *U. deltaura* is larger and larger than the mud shrimp and digs simple tunnels in the muddy sandy seafloors. The similar species *U. stellata* is slightly smaller and finer and also digs a simple tunnel system (Fey-Hofstede & Witbaard, 2013).
The species mainly occur in the Frisian Front and the Central Oyster Grounds. *U. deltaura* is an indicator species of the Frisian Front, *U. stellata* of the Central Oyster Grounds and *C. subterranea* of both areas (Fey-Hofstede & Witbaard, 2013). The species are not protected under the Habitat Directive or Dutch legislation and regulations, and are not on the Dutch or European IUCN list of endangered species. The Norway lobster is covered by the Dutch fishing law.

- **OSPAR recommendations**

3.1 Each Contracting Party should:
a. consider the introduction of national legislation to protect sea-pen and burrowing megafauna communities;
b. assess whether existing management measures for the protection of sea-pen and burrowing megafauna communities are effective and determine what further measures are needed to address the key threats;
c. investigate systematically the distribution, quality and extent of sea-pen and burrowing megafauna communities by means of seabed habitat surveys and monitoring in order to complete the knowledge base and provide indicators for the state and recovery of the habitat;
d. seek ways and means to broaden the information base on the occurrence of sea-pen and burrowing megafauna communities by involving commercial fishermen, and integrating environmental and fisheries research;
e. improve access to fishing distribution, frequency and intensity data at the appropriate spatial resolution for nature conservation purposes;
f. report any existing and new data on the distribution, quality and extent of sea-pen and burrowing megafauna communities to the OSPAR habitat mapping database;
g. consider whether any sites within its jurisdiction justify selection as marine protected areas for the conservation and recovery of sea-pen and burrowing megafauna communities, and;
h. in accordance with OSPAR Recommendation 2003/3 as amended by OSPAR Recommendation 2010/2, report to the OSPAR Commission on sites selected for inclusion as components of the OSPAR Network of Marine Protected Areas and develop appropriate management plans and measures;

- **Have the recommendations been implemented?**

Partly implemented.

- **If yes, how Have the recommendations been implemented? What is the result?**

a) This habitat type is not protected in the Netherlands in the context of Natura 2000. Within the framework of the MSFD, targets have been set that relate (indirectly) to this habitat type. For the seabed integrity of the Dutch North Sea, among other things, an improvement in the quality of the deeper silt-rich parts has been set, as well as a target to protect of 10 to 15% of the seafloor from significant human disturbance (Ministry of I & M and the Ministry of Economic Affairs, 2015). For a total area of 2000 km2 of the Frisian Front and Central Oyster Grounds the status 'seafloor protection area' has been proposed. It is not yet known when the European Commission will make a decision (Ministry of I & M and the Ministry of Economic Affairs, 2018).
b) A monitoring program for the long term has been drawn up for monitoring habitat quality of the protected areas. In this way, the effectiveness of the MSFD measures can also be assessed and it is possible to determine whether the management objectives are being achieved (Ministry of I & M and the Ministry of Economic Affairs, 2015);
c & d) the species of this habitat type in the Dutch North Sea are included as indicator species for the Central Oyster Grounds and the Frisian Front and are part of the Dutch monitoring program within the scope of the MSFD (Ministry of Infrastructure and the Environment, 2014);
e) In the context of the WOT research, Wageningen Marine Research maintains four databases for storing fishing data (Verver, 2016): FishFrame (an international database with data on fisheries and biological sampling of fish stocks from national databases); FIDAREQ (Fisheries Data Requests,

where requests from third parties to submit data are recorded); VISSTAT (catch and fishing effort database of the Dutch fleet, based on data from the VMS (Vessel Monitoring System) and VIRIS (Fishery Registration and Information System)); Frisbe (biological database). The structured storage of data in these databases makes it possible to efficiently meet the demand for data products for international workgroups and DCF. Access to the database is regulated through specific protocols and security measures, taking into account the requirements of privacy legislation (Verver, 2016).
f) Data from the MSFD monitoring programme are collected by Rijkswaterstaat (RWS).
g, h & i) Parts of the areas where the fauna occurs (the Frisian Front and the Central Oyster Grounds) have been proposed as a seafloor protection area within the framework of the MSFD (Ministry of I & M, 2016; Ministry of I & M and the Ministry of Economic Affairs, 2018)), see also part a of this recommendation. The areas are not part of the N2000 network or the OSPAR network of protected areas. i) Restriction of the seafloor disturbing fishery has been proposed (Ministry of I & M and the Ministry of Economic Affairs, 2018), see also point a). The Netherlands has a fleet of around 20 cutters that practice fishing for Norway lobster, especially in July, August and September (van der Hammen and Steenbergen, 2011, Molenaar et al., 2016). In 2008 a Norway lobster management plan was drawn up in order to be able to fish up the limited national quota as optimally as possible and to make this branch of fisheries more sustainable (Meun, 2008).

- **If no, what are the reasons not to implement the recommendation?**

Not applicable

- **Which opportunities and possibilities are there for the Netherlands?**

Protected areas under the MSFD

- **What are the changes compared to the previous reporting period?**

There was no report on this habitat type in 2016.

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1, 6, 9, 15 (see Appendix 1).

- How can the Netherlands contribute to joint actions?

Action 1. Communication: Fact sheets have been made for a number of species within these habitats for the stakeholder process around seafloor protection (Frisian Front, Central Oyster Grounds) (Fey-Hofstede & Witbaard, 2013)

Action 6. Reporting unwanted by-catch. Researchers annually monitor, in collaboration with fishermen, what by-catch consists of, by order of the Ministry of LNV (https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/kennisonline/Monitoring-bijvangsten.htm).

Action 9. Use video recordings stock assessment *Nephrops*. The use of commercial underwater images for the monitoring of seafarers and burrowing mega fauna has not yet been investigated.

Action 15. Threat from fishing. Fact sheets have been made about these species (Fey-Hofstede & Witbaard, 2013) and KRM areas are being developed within which these species should be protected. The benthic fauna is monitored via the MSFD monitoring program.

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4.5.6 *Zostera* beds (Zeegrasvelden)

Eelgrass (Zostera beds)

Figure 22. Seagrass Zostera marina (https://www.ospar.org/site/assets/files/1892/thomas_abiven_zosetra_marina_01.300x0-is.jpg).

- **Introduction**

Seagrasses are vascular plants of shallow coastal waters. There are 2 species in the Netherlands: common eel grass (*Zostera marina* L.) and dwarf eel grass (*Zostera noltii* Hornem). Sea grass can have major effects on biodiversity and the functioning of the ecosystem. Littoral and sublittoral seagrass has declined sharply in the entire Wadden Sea since the 1930s due to a disease, the construction of the Afsluitdijk and eutrophication (Wanink & van der Graaf, 2008; Folmer, 2015). Nowadays eelgrass is only present in a few places in small fields; in the Wadden Sea (Terschelling, along the Groninger coast, and on the Hond / Paap in the Ems estuary near Delfzijl), at a number of locations in the Oosterschelde and in a small field in the Western Scheldt (Sloehaven). Seagrass fields have recently emerged spontaneously in the Wadden Sea near Rottum. Furthermore, planted fields near the island of Griend seem to be successful (https://zeegrasherstelwaddenzee.com/2019/07/30/hoogtepunt-voor-zeegras-griend/). In total there are only about 150 hectares of sea grass in the Netherlands. (https://www.rijkswaterstaat.nl/water/waterbeheer/waterkwaliteit/indicatoren-voor-waterkwaliteit/zeegras/index.aspx).

- **OSPAR recommendations**

3. Programmes and measures

3.1 Each Contracting Party should:

a. consider the introduction of national legislation to protect *Zostera* beds;

b. assess whether existing management measures for the protection of *Zostera* beds are effective and determine what further measures are needed to address the key threats;

c. investigate systematically the distribution, quality and extent of *Zostera* beds, by means of seabed habitat surveys and monitoring, in order to complete the knowledge base and provide indicators for the state and recovery of the habitat;

d. whenever applicable seek ways and means to broaden the knowledge base on the occurrence of *Zostera* beds by gathering additional knowledge from sources such as commercial and recreational fishers, fisheries research and the general public;

e. report any existing and new data on the distribution, quality and extent of *Zostera* beds habitat to the OSPAR habitat mapping database;

f. consider whether any site within its jurisdiction justifies selection as a marine protected area for the conservation and recovery of *Zostera* beds; and

g. implement paragraph f with regards to the particular link established between *Zostera* beds and any species noted in the OSPAR List of Threatened and/or Declining Species and Habitats1;

h. address any significant adverse impacts on *Zostera* beds arising from human activities in waters under its jurisdiction;

i. regulate land reclamation, coastal constructions, including marinas and ports, and downscaling of water exchange between open sea and inshore shallow waters, e.g. lagoons;

j. adapt coastal protection measures in such a way that undesired negative effects on *Zostera* beds are minimised;

k. raise awareness of the importance of *Zostera* beds among relevant management authorities, the fishery sector and the general public;

- **Have the recommendations been implemented?**

Yes

- **If yes, how Have the recommendations been implemented? What is the result?**

a) The protection of seagrass is regulated within legal frameworks on both interprovincial (Wadden provinces), national, trilateral (Wadden Sea countries) and European level (MSFD, WFD). In general, the aim is to increase the seagrass acreage, in particular by preventing seafloor disturbance, and a more natural spread and development of seagrass fields (Wanink & van der Graaf, 2008). For example, the density of sea grass is mentioned as a criterion for good environmental status in the context of the MSFD (EC, 2010) and within the scope of the WFD the aim in 2028 is to have realized around 10,000 hectares of sea grass in the Wadden Sea, with a minimum coverage of 5% (STOWA, 2012). Common eel grass was protected under the Flora and Fauna Act, but not under the current Nature Conservation Act. Both species are listed on the Red List for the species group of vascular plants in the threatened category (Ministry of Economic Affairs, 2015). However, this has no legal status; the Minister promotes research and activities necessary for the protection and management of species on the red list. In an exploration of the sludge management of the Wadden Sea, the effects of turbidity on seagrass and the need for measures were investigated (van Duren et al., 2015).
b) A vision on the future of eelgrass in the Wadden Sea was published by Korporaal et al. (2016), commissioned by the Rich Wadden Sea Programme, Rijkswaterstaat Noord-Nederland and Natuurmonumenten initiated the agenda for the management, measures, research and monitoring of seagrass in the Wadden Sea area.
c) Monitoring takes place according to the Trilateral Monitoring and Assessment Program (TMAP). RWS is the Dutch monitoring authority of the TMAP program (via the MWTL monitoring program) and is involved in the reporting thereof. The developments and location options for littoral seagrass have been studied in the Wadden Sea (Folmer, 2015);
d) Research and repeated experiments with the distribution of seagrass seed in the Wadden Sea region by, among others, Rijkswaterstaat, the Waddenvereniging, Natuurmonumenten and involved universities have yielded a great deal of knowledge (Korporaal et al., 2016).
e) It is not known if Rijkswaterstaat (RWS) has reported data to OSPAR.
f) & g) the areas where sea grass (potentially) occurs are protected under N2000, namely the Wadden Sea, the Oosterschelde and the Western Scheldt (Ministry of LNV, 2008, 2009a, b).
h) RWS, as manager of the Wadden Sea, sets up management measures. RWS is the initiator of various projects to preserve seagrass. Examples include the reintroduction of common eel grass in the western and eastern Wadden Sea and the migration of seagrass in the Oosterschelde (https://www.rijkswaterstaat.nl/water/waterbeheer/waterkwaliteit/indicatoren-voor-waterkwaliteit/zeegras/index.aspx).
i & j) the areas where sea grass (potentially) occurs are protected under Natura 2000 so that interventions and constructions may not take place without a permit. In doing so, it will test for possible effects on the natural values and, if necessary, set conditions for the intended activities.
k) a website has been set up to provide information about the importance of eelgrass in the Wadden Sea and about the restoration measures being implemented (https://zeegrasherstelwaddenzee.com).

- **If no, what are the reasons not to implement the recommendation?**

Not relevant.

- **Which opportunities and possibilities are there for the Netherlands?**

In recent years, seagrass fields seem to have emerged spontaneously in the Wadden Sea near Rottum. Furthermore, planted fields near the island of Griend seem to be successful (https://zeegrasherstelwaddenzee.com/2019/07/30/hoogtepunt-voor-zeegras-griend/).

- **What are the changes compared to the previous reporting period?**

There was no report on this habitat type in 2016.

- **Implementation of OSPAR joint actions**

- Which actions refer to this species or habitat?

Actions 1, 2, 22 (see Appendix 1)

- How can the Netherlands contribute to joint campaigns?

Action 1. Communication: A website has been set up to provide information about the importance of seagrass in the Wadden Sea and about the remedial measures being implemented (https://zeegrasherstelwaddenzee.com)

Action 2. OSPAR habitat database: An open access online ecotope map of the trilateral Wadden Sea was produced in 2019, with GIS shapefiles from mussel beds and seagrass (Baptist et al., 2019). Data is collected by Rijkswaterstaat. Rijkswaterstaat may be able to add them if this has not yet been done.

Action 22. Assessment of water quality. Water quality of the Wadden Sea is assessed through the Water Framework Directive and in a trilateral context in the Wadden Sea Quality Status reports (https://qsr.waddensea-worldheritage.org/reports/eutrophication#subsection_4).

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5 Conclusions and recommendations

A large part of the approximately 188 OSPAR recommendations for OSPAR species and habitats relevant for the Netherlands have been implemented (*Table 4*).

Table 4. Implementation level of OSPAR recommendation per species and habitat, according to the methods described in Table 1*. In Annex 2 a complete overview is given.*

SCIENTIFIC NAME	Name UK	Name NL	No	Yes
Invertebrates				
Arctica islandica	Ocean quahog	Noordkromp		8
Ostrea edulis	Flat oyster	Platte oester	1	11
Birds				
Rissa tridactyla	Kittiwake	Drieteenmeeuw	5	3
Marine Mammals				
Phocoena phocoena	Harbour porpoise	Bruinvis		10
Fish				
Alosa alosa	Allis shad	Elft		8
Anguilla anguilla	Eel	Aal	2	10
Coregonus lavaretus oxyrinchus (Linnæus, 1758)	Houting	Houting	1	
Gadus morhua	Cod	Kabeljauw	1	8
Hippocampus guttulatus (synonym: Hippocampus ramulosus)	Long-snouted seahorse	Langsnuitzeepaardje	4	5
Hippocampus hippocampus	Short-snouted seahorse	Kortsnuitzeepaardje	6	1
Petromyzon marinus	Sea lamprey	Zeeprik		10
Raja clavata	Thornback skate / ray	Stekelrog		8
Raja montagui	Spotted ray	Gevlekte rog		10
Salmo salar	Salmon	Zalm		13
Squalus acanthias	[Northeast Atlantic] spurdog	Doornhaai		11
Habitats				
Intertidal mudflats	Intertidal mudflats	Getijdenplaten		11
Intertidal Mytilus edulis beds on mixed and sandy sediments	Intertidal Mytilus edulis beds on mixed and sandy sediments	Mosselbanken op droogvallende platen	1	11
Sabellaria spinulosa reefs	Sabellaria spinulosa reefs	Zandkokerwormriffen	1	8
Sea-pen and burrowing megafauna communities	Sea-pen and burrowing megafauna communities	Zeeveer en gravende megafauna gemeenschappen	1	8
Zostera beds	Zostera beds	Zeegrasvelden	1	10
TOTAL			**24**	**164**

6 Quality Assurance

Wageningen Marine Research utilises an ISO 9001:2015 certified quality management system. This certificate is valid until 15 December 2021. The organisation has been certified since 27 February 2001. The certification was issued by DNV GL.

If the quality cannot be guaranteed, appropriate measures are taken.

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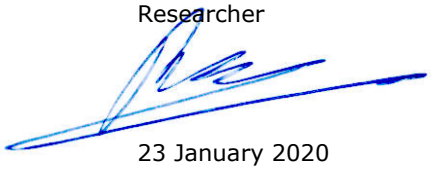
Justification

Report C006/20EN
Project Number: 4318200059

The scientific quality of this report has been peer reviewed by a colleague scientist and a member of the Management Team of Wageningen Marine Research

Aproved:	Dr. R.H. Jongbloed Researcher
Signature:	
Date:	23 January 2020

Aproved:	Drs. J. Asjes Manager integration
Signature:	
Date:	23 January 2020

Annex 1 Joint actions

Action Nr	Type	Action	Habitats/Species
1	Communication and awareness raising actions	Building on existing material (e.g. OSPAR website) develop and implement a phased communications strategy for OSPAR listed species and habitats to: Share knowledge including on status and threats to help promote action by others; Share knowledge and experience on measures that have been implemented and lessons learned, among both relevant management authorities and general public	All
2	Monitoring and assessment actions	Improve the OSPAR habitat mapping database in relation to all Habitats, and publish regularly updated quality assessments and distribution records; in particular to improve the data contained within the database relating to listed habitats; Clearly define the questions that can be asked of the data in the database and identify gaps/ what other needs are there to deliver OSPAR requirements?; develop the content of the database to respond to the needs for use of this database.	All habitats: Zostera beds, littoral chalk communities, Ostrea edulis beds, Cymodocea meadows, intertidal Mytilus edulis beds, Sea-pen and burrowing megafauna, Sabellaria spinulosa reefs, Modiolus modiolus beds, Maerl beds, intertidal mudflats, Lophelia pertusa reefs, coral gardens, deep sea sponge aggregations, hydrothermal vents/fields occurring on oceanic ridges, seamounts, carbonate mounds
3	Monitoring and assessment actions	Develop and implement an appropriate monitoring and assessment strategy addressing the distribution, extent and condition of coastal habitats, coordinating activities to build on existing monitoring work and where possible developing synergy with monitoring of other species and habitats.	Sabellaria spinulosa reefs; littoral chalk communities; Ostrea edulis beds; Zostera beds; Modiolus modiolusbeds, Cymodocea meadows and Maerl beds
4	Monitoring and assessment actions	Request and review ICES advice, and other fisheries assessments based on monitoring and fisheries survey information, to assess: a. the distribution, population status, biology, conservation measures and research needs for the species;; b. the recovery of species and as appropriate, to produce periodic status/conservation assessments;	Sturgeon, Allis shad, European eel, cod, orange roughy, sea lamprey), common skate species complex, white skate, Angel shark, basking shark, spurdog, gulper shark, leafscale gulper shark, Portugese dogfish, porbeagle, spotted ray, thornback ray, quahog, Azorean limpet, harbour porpoise
5	Monitoring and assessment actions	Develop and implement a monitoring strategy, as part of the JAMP, leading to the periodic assessment of the status of species, to promote and coordinate the collection of information on distribution, status of, threats to and impacts on the species, using as appropriate information from other competent authorities	Loggerhead turtle, leatherback turtle, bowhead whale, blue whale, Northern right whale, lesser black-backed gull, ivory gull, little shearwater, Balearic shearwater, black-legged kittiwake, Roseate tern,thick-billed murre, Steller's eider, Iberian guillemot, Ostrea edulis, long snouted Seahorse, short snouted seahorse
6	Monitoring and assessment actions	In the context of Article 4 Annex V of the Convention and in line with the common understanding (OSPAR 13/13), cooperate with relevant competent organisations to develop a strategy to encourage commercial fishermen to report incidental by-catches key habitat forming species, including information about location and date. This would aim to improve (a) knowledge on habitat occurrence (b) where appropriate, understanding of the habitat as a VMEs.	Lophelia pertusa reefs, coral gardens, deep sea sponge aggregations, seapen and burrowig megafauna,
7	Monitoring and assessment actions	Carrying out appropriate periodic monitoring, where appropriate this could include visual observation e.g. video of habitat presence and condition at selected sites, and evidence of pressures such as	Carbonate mounds, Sabelleria spinulosa reefs

Action Nr	Type	Action	Habitats/Species
		trawling damage, ghost fishing and percentage cover of live and dead or destroyed coral	
8	Monitoring and assessment actions	Compile evidence on the species and habitats that form on carbonate mounds, hydrothermal vents and seamounts in the OSPAR maritime area and assess which are threatened by on going and potential human activities	Carbonate mounds; hydrothermal vents; seamounts
9	Monitoring and assessment actions	Evaluate the extent to which ecological data from commercial Nephrops stock assessment and commercial video footage and photographic evidence can be used to assess the status of sea-pen and burrowing megafauna communities, and as appropriate develop protocols for assessment purposes.	Seapen and burrowing megafauna
10	Monitoring and assessment actions	Monitor key pressures including loss and change of substratum, levels of eutrophication, removal of species, introduction and spread of non-indigenous species and physical damage	Littoral chalk
11	Monitoring and assessment actions	Gather contextual information on activities, such as aggregate dredging, offshore development or fishing, likely to have an effect on Sabellaria spinulosa reefs in the vicinity of areas selected for monitoring;	Sabelleria spinulosa reefs
12	Marine protected areas actions	Analyse whether any of the key areas justify selection as MPAs for the protection of whales populations and whether such areas may become a component of the OSPAR MPA network	Bowhead whale, blue whale, Northern right whale, harbour porpoise
13	Marine protected areas actions	Evaluate the extent to which critical habitat for the following species are already included within the OSPAR network of marine protected areas, and whether this coverage can be improved as a complementary measure to other conservation and management measures	Spurdog, gulper shark, leafscale gulper shark, Portuguese dogfish, porbeagle shark, spotted ray, thornback ray, harbour porpoise, Atlantic salmon
14	Legislation and legal protection	Promote their inclusion as a protected species in other relevant biodiversity conventions	Sea lamprey, Allis shad, European eel, sturgeon, orange roughy, Atlantic salmon, common skate, white skate, Angel shark, basking shark
15	Pressures from human activities	In the context of Article 4 of Annex V of the Convention and in line with the common understanding (OSPAR 13/13), draw to the attention of relevant competent organisations instances where fishing activities constitute a threat to relevant species and habitats and where appropriate encourage those organisations to take appropriate measures	Lophelia pertusa reefs, coral gardens, and deep sea sponge aggregations, carbonate mounds, hydrothermal vents, seapen and burrowing megafauna, seamounts; maerl beds, Ostrea edulis beds Cymodocea, Sabellaria spinulosa reefs, Modiolus modiolus beds, sturgeon, Allis shad, European eel, cod, orange roughy, sea lamprey, Atlantic Salmon, Common skate, white skate, Angel shark, basking shark, spurdog, gulper shark, leafscale gulper shark, Portugese dogfish, porbeagle, spotted ray, thornback ray, Iberian guillemot, Ostrea edulis and Ostrea edulis beds
16	Pressures from human activities	In the context of Article 4 of Annex V of the Convention and in line with the common understanding (OSPAR 13/13), draw to the attention of relevant competent organisations instances where other physical disturbance to seafloor (e.g. mineral extraction, biological and geological sampling, construction) constitute a threat to relevant habitats and where appropriate encourage those	Hydrothermal vents; seamounts; Ostrea edulis beds, Cymodocea, Sabellaria spinulosa reefs.

Action Nr	Type	Action	Habitats/Species
		organisations to take appropriate measures	
17	Pressures from human activities	In the context of Article 4 of Annex V of the Convention and in line with the common understanding (OSPAR 13/13), draw to the attention of relevant competent organisations instances where ship noise and ship strikes constitute a threat to relevant species and where appropriate encourage those organisations to take appropriate measures	Northern right whale, blue whale, bowhead whale, harbour porpoise, loggerhead turtle, leatherback turtle
18	Pressures from human activities	In the context of Article 4 of Annex V of the Convention and in line with the common understanding (OSPAR 13/13), draw to the attention of relevant competent organisations instances where entanglement and ingestion of marine Litter and ADLFG constitute a threat to relevant species and where appropriate encourage those organisations to take appropriate measures	Leatherback turtle, loggerhead turtle, leafscale gulper shark, Portugese dogfish, blue whale, bowhead whale, Northern right whale
19	Pressures from human activities	In the context of Article 4 of Annex V of the Convention and in line with the common understanding (OSPAR 13/13), draw to the attention of relevant competent organisations instances where pollution from oil and hazardous substances constitute a threat to relevant species and where appropriate encourage those organisations to take appropriate measures	Loggerhead turtle, leatherback turtle, European eel, Iberian guillemot
20	Pressures from human activities	Cooperate and coordinate with other relevant competent international organisations and bodies, drawing upon the actions and measures suggested in the Background Document (OSPAR publication 2010/480) to address threats from aquaculture activities	Cymodocea, maerl beds, Atlantic salmon
21	Pressures from human activities	Cooperate and coordinate with other relevant competent international organisations and bodies, drawing upon the actions and measures suggested in the Background Document (OSPAR publication 2010/480) to address threats from habitat alteration or loss, obstacles to migration and pollution	European eel, Atlantic salmon
22	Pressures from human activities	Identify whether further measures to maintain or improve water quality (contaminants and nutrients) are necessary to safeguard relevant habitats and implement if required	Maerl beds, zostera beds, Mytilus edulis beds, Cymodocea; Intertidal mudflats
23	Pressures from human activities	Consider whether existing and new measures to manage the impacts of pressures both within and outside waters under their national jurisdiction require additional action through the OSPAR Commission;	Littoral chalk, Ostrea edulis beds
24	Pressures from human activities	Developing, within the competence of OSPAR, effective mitigation actions against further anthropogenic threats to whale populations and incorporate them into appropriate measures for the protection of these species;	Blue whale, bowhead whale, Northern right whale
25	Pressures from human activities	Develop and incorporate appropriate measures to mitigate habitat destruction (e.g. caused by degradation of spawning habitats through silting due to agriculture intensification or dams; maintenance dredging and sand and gravel extraction) and degradation of the water quality in estuaries;	Sea Lamprey, sturgeon
26	Pressures from human activities	Develop and/or refine relevant measures and strategies for preventing and	*Leatherback turtle, loggerhead turtle*

Action Nr	Type	Action	Habitats/Species
		reducing impact on turtles of entanglement in and ingestion of marine litter (in particular plastic bags), pollution, collision and bycatch	
27	Pressures from human activities	Advocate management measures (for example, management measures in marine protected areas such as Natura 2000 sites, OSPAR MPAs or address necessary measures under the Marine Strategy Framework Directive (MSFD) with the appropriate authorities.	Ocean quahog
28	Pressures from human activities	Where applicable, ensure the implementation of the Marine Strategy Framework Directive, by working to achieve good environmental status of habitats essential to the life cycles of cod and the cod stocks, including age and size structure of cod populations, as well as their role in the marine food web.	Cod
29	Pressures from human activities	Develop guidelines on how to minimise the disturbing and/or harmful acoustic effects to harbour porpoises especially from seismic surveys, pile driving, shipping traffic, military activities and underwater explosions	Harbour porpoise
30	Pressures from human activities	Take measures to further reduce discharges, emissions and losses of relevant hazardous substances to a level, that is compatible with breeding success of European eel, referred to in the background document;	European eel
31	Pressures from human activities	Develop measures within OSPAR's competence to reduce or eliminate the impact of habitat alteration from human activities on the Ostrea edulis and Ostrea edulis beds through bottom disturbance	Ostrea edulis and Ostrea edulis beds
32	Pressures from human activities	https://www.ospar.org/site/assets/files/38908/action32_preventing_reducing_oil_pollution.pdf	Iberian guillemot
33	Research and knowledge generation actions	Improve coordination of research to improve understanding of life history, distribution, track trends in populations and address specific issues identified in the recommendations	Sturgeon, Allis shad, European eel, cod, orange roughy, sea lamprey, Atlantic salmon, common skate, white skate, Angel shark, basking shark, spurdog, gulper shark, leafscale gulper shark, Portugese dogfish, porbeagle, spotted ray, thornback ray
34	Research and knowledge generation actions	Coordinate with fisheries research and funding agencies to consider the establishment of a collaborative fisheries-independent research programme to evaluate the status of the species, monitor stock recovery and track movements, and identify any networks of critical habitats;	Common skate, white skate, angel shark, basking shark, spurdog, gulper shark, leafscale gulper shark, Portugese dogfish, porbeagle, spotted ray, thornback ray
35	Research and knowledge generation actions	Maintain cooperation with ICES and fisheries organisations to get regular advice and to coordinate monitoring and research programs. Link with IUCN and wider academic research networks for non-commercial species.	Sturgeon, Allis shad, European eel, cod, orange roughy, sea lamprey, Atlantic salmon, leatherback turtle, loggerhead turtle
36	Research and knowledge generation actions	https://www.ospar.org/site/assets/files/38909/0205a8_actionsheet36_birddata.pdf	Black backed gull, LIttle shearwater; Balearic shearwater; black-legged kittiwake; Roseate tern; Iberian guillemot; thick-billed murre
37	Research and knowledge generation actions	Bring to the attention of relevant competent authorities the status of and threats, and the need for further research and data collection	Lesser black-backed gull; Ivory gull; little shearwater; Balearic shearwater; black-legged kittiwake; Roseate tern; thick-billed murre
38	Research and knowledge generation actions	Further research on source populations, status and distribution and other causes for decline. This means to develop a research agenda on this topic/ species in national waters and ABNJ	Leatherback turtle, loggerhead turtle

Action Nr	Type	Action	Habitats/Species
39	Research and knowledge generation actions	Undertake further research the causes of decline in the Steller's Eider, in particular through the Norwegian-Russian Environmental Commission	Steller's eider
40	Research and knowledge generation actions	Seek advice on the latest knowledge of species and habitats supported by seamounts located within the OSPAR maritime area, then evaluate possible inclusion of these biological communities in the OSPAR List of Threatened and/or Declining Species and Habitats	Seamounts
41	Research and knowledge generation actions	Enhance knowledge exchange between researchers, and between researchers, management authorities and OSPAR	Roseate tern
42	Research and knowledge generation actions	Compile and promote a list of useful future research areas that would inform the protection and conservation of Sabellaria spinulosa reefs to relevant scientific funding bodies and existing national monitoring programmes	Sabellaria spinulosa reefs
43	Other management actions	Promote implementation of the European Commission Species Action Plan for the species	Baleric shearwater, roseate tern
44	Other management actions	Promote the updating and implementation of the Arctic Council CAFF Action Plan (1996)	Thick-billed murre
45	Other management actions	Develop and implement an OSPAR action plan for Lesser black-backed gull	Lesser black-backed gull
46	Other management actions	Request the international Council for the Exploration of the Seas (ICES) to continue to improve its assessment of the effectiveness of European and national management plans	European eel

Annex 2 Evaluation of recommendations

Overview of the implementation of the recommendations.

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
INVERTEBRATES INVERBEBRATEN					
Arctica islandica Noordkromp Ocean quahog	3.1.a	the possibility to introduce legislation to protect the ocean quahog in all its life stages;	Yes	administrative action	Implemented via other mechanisms
	3.1.b	collaborating on recommended monitoring strategies	Yes	administrative action	Partially implemented
	3.1.c	facilitating and improving research and collecting trend data on populations and distribution of ocean quahog using suitable sampling methods to obtain quantitative reliable density estimates such as the combination of 'triple-D' dredges and box cores	Yes	administrative action	Partially implemented
	3.1.d	working towards mapping and assessment of population size of existing ocean quahog distribution	Yes	administrative action	Fully implemented
	3.1.e	compiling overviews of historical data of the distribution and density of ocean quahog, and strive towards the preparation of maps/models indicating the possible former distribution of this species;	Yes	administrative action	Fully implemented
	3.1.f	whether any site justifies selection as a marine protected area (MPA) for the conservation and recovery of the ocean quahog, and whether such areas may become a component of the OSPAR MPA network;	Yes	administrative action	Partially implemented
	3.1.g	the introduction of the ocean quahog as a protected species under regional and international biodiversity conventions	Yes	administrative action	Implemented via other mechanisms
	3.1.h	acting for the fulfilment of the purpose of this recommendation within the framework of other competent organisations and bodies.	Yes	administrative action	Fully implemented
Ostrea edulis Platte oester Flat oyster	3.1.a	the possibility to introduce legislation to protect the Ostrea edulis and Ostrea edulis beds	Yes	administrative action	Implemented via other mechanisms
	3.1.b	investigating the occurrence of the Ostrea edulis, the species distribution and population dynamics, and assessing the extent and quality of the Ostrea edulis beds, by means of monitoring and seabed habitat surveys, in order to complete the knowledge base and provide indicators for the state and recovery of the species and habitat.	Yes	administrative action	Partially implemented

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
	3.1.c	whenever applicable, seeking ways and means to broaden the knowledge base on the occurrence of and threats to the Ostrea edulis and Ostrea edulis beds by gathering additional knowledge from sources such as national planning authorities, environmental impact assessments and post development monitoring, research institutes, fisheries research, local sea fisheries committees, commercial and recreational fisheries, Non-governmental organisations (NGOs) and the general public	Yes	administrative action	Partially implemented
	3.1.d	reporting any existing and new data on the distribution, quality and extent of the Ostrea edulis beds to the OSPAR Commission	Yes	administrative action	Partially implemented
	3.1.e	whether any site justifies selection as a marine protected area for the conservation and recovery of the Ostrea edulis and Ostrea edulis beds and whether such areas may become a component of the OSPAR MPA network	Yes	administrative action	Partially implemented
	3.1.f	addressing and minimising adverse impacts on the Ostrea edulis and Ostrea edulis beds arising from human activities in waters under its national jurisdiction	Yes	administrative action	Partially implemented
	3.1.g	in areas where pressures have caused the decline/disappearance of the Ostrea edulis, and that are now adequately managed, exploring, where practicable, restoration through seeding or translocation of adult Ostrea edulis to promote recovery or re-establishment of the habitat	Yes	administrative action	Partially implemented
	3.1.h	ensuring that populations used as donors for seeding (as mentioned in §3.1.g. above) are pathogen and parasite free;	Yes	administrative action	Fully implemented
	3.1.i	reporting the management measures taken specifically for the protection of the Ostrea edulis and Ostrea edulis beds to the OSPAR Commission and assessing whether these are effective and determining whether further measures are needed to address the key threats	No	Not implemented	Not considered
	3.1.j	raising awareness of the importance of the Ostrea edulis and Ostrea edulis beds among relevant management authorities, relevant industries and the general public	Yes	administrative action and negotiated action	Fully implemented
	3.1.k	acting for the fulfillment of the purpose of this Recommendation within the framework of other competent organisations and bodies	Yes	administrative action and negotiated action	Fully implemented
	3.1.l	consider individually addressing any of the actions outlined in §3.2 below	Yes	administrative action	Fully implemented
BIRDS VOGELS					
Rissa tridactyla Drieteenmeeuw Black-legged kittiwake	3.1.a	consider the introduction of national legislation to protect the Black-legged kittiwake	Yes	legislation	Fully implemented
	3.1.b	take relevant conservation measures in key areas where significant numbers of the Black-legged kittiwake occur	Yes	administrative action	Partially implemented
	3.1.c	consider whether any sites within its jurisdiction justify selection as Marine Protected Areas for the protection of populations of and critical habitats for the Black-legged kittiwake	No	Not implemented	Considered and not relevant/conditions do not apply

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
	3.1.d	in accordance with OSPAR Recommendation 2003/3 as amended by OSPAR Recommendation 2010/2, report to the OSPAR Commission on sites selected for inclusion as components of the OSPAR Network of Marine Protected Areas and develop appropriate management plans and measures that include the conservation of the Black-legged kittiwake	No	Not implemented	Considered and not relevant/conditions do not apply
	3.1.e	promote monitoring and assessment programmes for the Black-legged kittiwake and contribute to the development of a data collation strategy	Yes	administrative action	Partially implemented
	3.1.f	raise awareness of the status of and threats to the Black-legged kittiwake among management authorities, users of the marine environment and the general public	No	Unknown	Not considered
	3.1.g	support the development and implementation of National Plans of Action in accordance with the International Plan of Action for reducing incidental catch of seabirds in longline fisheries [www.fao.org/docrep/006/x3170E/x3170E00.htm]; and	No	Not implemented	Considered and not relevant/conditions do not apply
	3.1.h	where appropriate, support, promote and implement the priority actions identified in the Nordic Action Plan for Seabirds [Action plan for seabirds in Western-Nordic areas. Report from a workshop in Malmö, Sweden, 4-5 May 2010. TemaNord 2010:587].	No	Not implemented	Considered and not relevant/conditions do not apply
FISH **VISSEN**					
Alosa alosa Elft Allis shad	3.1.a	the possibility of introducing legislation to protect the Allis shad in all its life stages;	Yes	legislation	Fully implemented
	3.1.b	taking relevant conservation measures particularly in key areas where the population is either depleted or locally extinct, with a special focus on estuarine habitats, spawning habitats and river migration routes taking relevant measures to facilitate the restoration of the species; especially in river basins where it previously occurred;	Yes	administrative action	Fully implemented
	3.1.c	whether any of the key areas justify selection and designation as marine protected areas for the protection of the Allis shad and whether such areas may become a component of the OSPAR network of marine protected areas;	Yes	legislation and administrative action	Fully implemented
	3.1.d	monitoring the Allis shad in marine, estuarine and freshwater habitats;	Yes	administrative action	Fully implemented
	3.1.e	developing and incorporating appropriate measures to mitigate habitat destruction (e.g. caused by maintenance dredging, sand and gravel extraction or dams) and degradation of the water quality in estuaries;	Yes	administrative action	Fully implemented
	3.1.f	supporting initiatives taken by industry and the recreational fishing sector in the development of techniques and equipment to facilitate the safe release of this species from fishing gears if and when this species is not targeted;	Yes	administrative action	Fully implemented
	3.1.g	promote the inclusion of the Allis shad as protected species in relevant international biodiversity conventions, taking into account the OSPAR Regions for which threats and/or decline have been indicated in the OSPAR List of threatened and/or declining species and habitats (OSPAR Agreement 2008-6);	Yes	legislation and administrative action	Fully implemented

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
	3.1.h	acting for the fulfilment of the purpose of this Recommendation within the framework of relevant competent authorities;	Yes	administrative action	Fully implemented
Anguilla anguilla Aal European eel	3.1.a	ensuring the implementation of its national eel management plans for the conservation and restoration of the European eel, where appropriate;	Yes	administrative action and negotiated action	Fully implemented
	3.1.b	reviewing its national legislation in order to better restore and protect the European eel in all its life stages, and to enhance the connectivity between marine and inland habitats;	Yes	legislation	Fully implemented
	3.1.c	taking measures to further reduce discharges, emissions and losses of relevant hazardous substances to a level that is compatible with breeding success of European eel;	Yes	administrative action	Partially implemented
	3.1.d	taking relevant measures to restore habitat accessibility and extent of suitable habitats (in particular in estuaries, lowland rivers, floodplains and backwaters);	Yes	administrative action and negotiated action	Fully implemented
	3.1.e	taking relevant measures to reduce anthropogenic mortality from hydropower turbines and water pumping stations;	Yes	administrative action and negotiated action	Fully implemented
	3.1.f	taking relevant measures to control and restrain illegal fisheries and illegal trade;	Yes	administrative action	Fully implemented
	3.1.g	taking relevant measures to increase the traceability of the trade of eels (especially for restocking of glass eels) from southern to northern Europe;	Yes	legislation	Fully implemented
	3.1.h	setting up monitoring of the European eel population, for all life stages: recruits, including glass eels or eels <12cm, yellow eels, and silver eels. The monitoring should provide, on a regular basis, assessments of population characteristics (abundance, age structure, size structure and sex ratio). This entails using all appropriate means and tight cooperation between governmental organisations, research institutes, professional and non-professional fisheries and non governmental organisations;	Yes	administrative action	Fully implemented
	3.1.i	whether any of the key areas justify selection and designation as marine protected areas for the protection of European eel populations and whether such areas may become a component of the OSPAR network of marine protected areas;	No	Not implemented	Considered and not relevant/conditions do not apply
	3.1.j	improving knowledge on marine sub populations in coastal areas;	No	Not implemented	Considered and not relevant/conditions do not apply
	3.1.k	setting up research and monitoring to assess the effects of management actions - including restocking, fishery restrictions, migration pathways improvement, habitat restoration - on the yellow and silver eel population characteristics (number, sex ratio, size structure) and spawner quality (lipid content, fulton condition, parasitism and hazardous substances);	Yes	administrative action	Fully implemented
	3.1.l	acting for the fulfilment of the purpose of this Recommendation within the framework of other competent organisations and bodies.	Yes	administrative action	Fully implemented

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
Raja montagui Gevlekte rog Spotted Ray	3.1.a	encouraging liaison within their national administrations to facilitate the adoption, implementation and enforcement of fisheries management measures taking account of ICES and, where applicable, the European Commission Scientific, Technical and Economic Committee for Fisheries (STECF) advice;	Yes	legislation and negotiated action	Partially implemented
	3.1.b	investigating the distribution of spotted ray aggregation, oviposition (spawning) and nursery grounds, and the size and seasonality of demersal fisheries operating in these areas;	Yes	administrative action	Partially implemented
	3.1.c	investigating spotted ray discard survival from demersal fisheries;	Yes	administrative action	Fully implemented
	3.1.d	whether any of the key areas justify selection and designation as marine protected areas for the protection of spotted ray populations and whether such areas may become a component of the OSPAR network of marine protected areas;	Yes	administrative action	Partially implemented
	3.1.e	providing guidelines and training where necessary to improve the identification of the spotted ray, with a view to ensuring that this species is not confused with the blonde ray (R. brachyura) and that neonates of spotted, blonde and thornback ray (R. clavata) can be distinguished;	Yes	administrative action	Partially implemented
	3.1.f	ensuring that accurate species-specific survey, catch and landings data are collected and provided to ICES;	Yes	administrative action	Partially implemented
	3.1.g	facilitating and improving research on the life history and biology of the spotted ray, including age/length keys and fecundity, and trend data on populations and distribution (particularly in Region II);	Yes	administrative action	Partially implemented
	3.1.h	establishing information campaigns about the identification, conservation, management and protection status of the spotted ray, particularly addressing commercial and recreational fishermen and fisheries observers. Information campaigns may serve the purpose of data collection on spotted ray occurrence, its critical habitats and incidental catches in order to improve knowledge of its distribution at different life stages;	Yes	administrative action	Partially implemented
	3.1.i	the introduction of the spotted ray as a protected species under regional and international biodiversity conventions;	Yes	administrative action	Fully implemented
	3.1.j	acting for the fulfillment of the purpose of this recommendation within the framework of relevant competent authorities.	Yes	administrative action and negotiated action	Partially implemented
Gadus morhua Kabeljauw Cod	3.1.a	facilitating the adoption, implementation and enforcement of measures to conserve cod, as well as their habitats, in OSPAR regions II and III;	Yes	administrative action and negotiated action	Fully implemented
	3.1.b	facilitating and improving research on the:	Yes	administrative action and negotiated action	Partially implemented
	3.1.b.i	life history, biology and stock discrimination of cod;	Yes	administrative action and negotiated action	Partially implemented

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
	3.1.b.ii	trend data on populations and distribution;	Yes	administrative action and negotiated action	Partially implemented
	3.1.b.iii	genetic and behavioural divergence of local populations; and	Yes	administrative action and negotiated action	Partially implemented
	3.1.b.iv	multispecies interactions;	Yes	administrative action and negotiated action	Partially implemented
	3.1.c	communicating with stakeholders and relevant bodies about the status and conservation of cod and in particular regarding best fishing practices that have a low impact on associated biodiversity and the marine environment;	Yes	administrative action and negotiated action	Fully implemented
	3.1.d	whether any of the key areas justify selection and designation as marine protected areas for the protection of cod populations and whether such areas may become a component of the OSPAR network of marine protected areas;	No	Not implemented	Considered and not relevant/conditions do not apply
	3.1.e	acting for the fulfilment of the purpose of this recommendation within the framework of relevant competent authorities.	Yes	administrative action	Partially implemented
Hippocampus guttulatus (synonym: *Hippocampus ramulosus*) Langsnuit-zeepaardje Long-snouted seahorse	3.1.a	consider the introduction of national legislation to protect the Long-snouted seahorse;	No	Not implemented	Decided not to implement
	3.1.b	report on existing management measures taken, assess whether existing management measures for the protection of the Long-snouted seahorse are effective and determine what further measures are needed to address the key threats;	Yes	administrative action	Partially implemented
	3.1.c	identify and select appropriate areas for inclusion in the OSPAR MPA network;	No	Not implemented	Considered and not relevant/conditions do not apply
	3.1.d	develop and implement the actions and measures in areas of particular importance for theLong-snouted seahorse;	Yes	administrative action	Partially implemented
	3.1.e	implement paragraphs c) and d) taking into account the particular link established between the Long-snouted seahorse and Zostera beds;	Yes	administrative action	Partially implemented
	3.1.f	support and implement measures for the protection of Zostera beds;	Yes	administrative action	Partially implemented

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
	3.1.g	consider, and where appropriate, set up information campaigns about the identification, conservation and legal status of this threatened species, particularly targeting commercial and recreational fishermen and fisheries observers;	No	Not implemented	Considered and not relevant/conditions do not apply
	3.1.h	raise awareness of status and threats to the species among relevant management authorities, fishermen, retailers (e.g. aquariums, souvenirs) and the general public;	Yes	administrative action	Partially implemented
	3.1.i	improve communication and information exchanges between Hippocampus sp. researchers and authorities.	No	Not implemented	Considered and not relevant/conditions do not apply
Hippocampus hippocampus Kortsnuit-zeepaardje Short-snouted seahorse	3.1.a	consider the introduction of national legislation to protect the Short-snouted seahorse;	Yes	administrative action	Partially implemented
	3.1.b	report on existing management measures taken, assess whether existing management measures for the protection of the Short-snouted seahorse are effective and determine what further measures are needed to address the key threats;	No	Not implemented	Considered and not relevant/conditions do not apply
	3.1.c	identify and select appropriate areas for inclusion in the OSPAR MPA network;	No	Not implemented	Considered and not relevant/conditions do not apply
	3.1.d	develop and implement the actions and measures in areas of particular importance for the Short-snouted seahorse;	No	Not implemented	Considered and not relevant/conditions do not apply
	3.1.e	consider, and where appropriate, set up information campaigns about the identification, conservation and legal status of this threatened species, particularly targeting commercial and recreational fishermen and fisheries observers;	No	Not implemented	Considered and not relevant/conditions do not apply
	3.1.f	raise awareness of status and threats to the species among relevant management authorities, fishermen, retailers (e.g. aquariums, souvenirs) and the general public;	No	Not implemented	Considered and not relevant/conditions do not apply
	3.1.g	improve communication and information exchanges between Hippocampus sp. researchers and authorities.	No	Not implemented	Considered and not relevant/conditions do not apply
Petromyzon marinus Zeeprik Sea lamprey	3.1.a	the possibility of introducing legislation to protect the sea lamprey in all its life stages;	Yes	legislation	Fully implemented

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
	3.1.b	taking relevant conservation measures particularly in key areas where the population is either depleted or locally extinct, with a special focus on estuarine habitats, spawning habitats and river migration routes;	Yes	administrative action	Fully implemented
	3.1.c	whether any key areas justify selection and designation as marine protected areas for the protection of the sea lamprey, with a particular attention to estuaries, and whether such areas may become a component of the OSPAR network of marine protected areas;	Yes	administrative action	Fully implemented
	3.1.d	supporting initiatives taken by industry and the recreational fishing sector in the development of techniques and equipment to facilitate the safe release of this species from fishing gears if and when this species is not targeted;	Yes	administrative action	Fully implemented
	3.1.e	monitoring the sea lamprey in marine, estuarine and freshwater habitats;	Yes	administrative action	Fully implemented
	3.1.f	assisting industry and relevant authorities with the development of fish passage facilities adapted to sea lamprey;	Yes	legislation, administrative action and negotiated action	Fully implemented
	3.1.g	assisting agriculture and forestry to find ways to reduce destruction or degradation of spawning habitats and river migration routes;	Yes	administrative action	Partially implemented
	3.1.h	assisting industry and relevant authorities to reduce effects of dredging in estuaries on water quality;	Yes	administrative action	Partially implemented
	3.1.i	promote the inclusion of the sea lamprey as a protected species in relevant international biodiversity conventions, taking into account the OSPAR Regions for which threats and/or decline have been indicated in the OSPAR List of threatened and/or declining species and habitats (OSPAR Agreement 2008-6);	Yes	administrative action and negotiated action	Fully implemented
	3.1.j	acting for the fulfilment of the purpose of this Recommendation within the framework of relevant competent authorities;	Yes	administrative action	Fully implemented
Raja clavata Stekelrog Thornback skate / ray	3.1.a	encouraging liaison within their national administrations to facilitate the adoption, implementation and enforcement of fisheries management measures taking account of ICES and, where applicable, the Scientific, Technical and Economic Committee for Fisheries (STECF) advice;	Yes	legislation, administrative action and negotiated action	Partially implemented
	3.1.b	investigating the distribution of inshore thornback ray aggregation, oviposition (spawning) and nursery grounds, and the size and seasonality of inshore skate and ray fisheries operating in these areas;	Yes	administrative action	Partially implemented
	3.1.c	investigating discard survival deployed in inshore and offshore fisheries;	Yes	administrative action	Fully implemented
	3.1.d	whether any of the key areas justify selection and designation as marine protected areas for the protection of thornback ray populations and whether such areas may become a component of the OSPAR network of marine protected areas;	Yes	administrative action	Partially implemented
	3.1.e	ensuring that accurate identification keys are developed and circulated and that accurate species-specific survey, catch and landings data are collected and provided to ICES;	Yes	administrative action	Fully implemented

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
	3.1.f	facilitating and improving research on the life history and biology (including age/length keys and fecundity) and stock discrimination of the thornback ray, and monitor trend data on populations and distribution;	Yes	administrative action	Fully implemented
	3.1.g	establishing information campaigns about the identification, conservation, management and protection status of the thornback ray, particularly addressing commercial and recreational fishermen and fisheries observers. Information campaigns may serve the purpose of data collection on thornback ray occurrence, its critical habitats and incidental catches in order to improve knowledge of its distribution at different life stages;	Yes	administrative action	Fully implemented
	3.1.h	acting for the fulfillment of the purpose of this recommendation within the framework of relevant competent authorities.	Yes	administrative action	Fully implemented
Salmo salar Zalm Salmon	3.1.a	the need to introduce additional measures to enhance the conservation and protection and restoration of the Atlantic salmon at all relevant life stages in light of the review carried out pursuant to paragraph 3.1b;	Yes	administrative action	Fully implemented
	3.1.c	encouraging liaison within their national administrations in developing future NASCO Implementation Plans and in reporting on progress against those plans as well as effectiveness of the actions taken, as reported through NASCO Annual Progress Reports;	Yes	administrative action	Fully implemented
	3.1.b	assessing whether all measures that contribute to the conservation protection and restoration of Atlantic salmon, and its ecosystems, are effectively addressing the key threats identified in the Background document (OSPAR publication 2010/480) including:	Yes	administrative action	Fully implemented
	3.1.d	whether any of the critical habitat or key areas justify selection and designation as marine protected areas for the protection and recovery of Atlantic salmon populations and whether such areas may become a component of the OSPAR network of marine protected areas;	Yes	administrative action	Partially implemented
	3.1.e	improving scientific communication and information exchange including participating in and supporting NASCO's research priorities to coordinate research on Atlantic salmon;	Yes	administrative action	Partially implemented
	3.1.f	raising awareness of the status of and threats to the Atlantic salmon among relevant sectors and authorities and the general public;	Yes	administrative action	Fully implemented
	3.1.g	acting for the fulfilment of the purpose of this Recommendation within the framework of relevant competent authorities.	Yes	administrative action	Fully implemented
	3.1.b.i	habitat alteration or loss especially of spawning and juvenile grounds, resulting from riverbed engineering schemes and hydrological management (e.g. for flood defence or navigation);	Yes	administrative action	Partially implemented
	3.1.b.ii	obstacles to migration, such as construction of dams or navigation weirs blocking access to spawning grounds;	Yes	administrative action	Fully implemented
	3.1.b.iii	water pollution, such as nutrient and organic matter enrichment and hazardous substances from urban and agro-industrial activities affecting Atlantic salmon spawning grounds and their reproductive success (e.g. PCBs in substrates, acidification);	Yes	administrative action	Fully implemented

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
	3.1.b.iv	incidental by-catch of Atlantic salmon at sea and targeted fisheries in key areas and overfishing of Atlantic salmon food sources (e.g. sand eel);	Yes	administrative action	Partially implemented
	3.1.b.v	fish farming, through escape and accidental release, resulting in interbreeding and genetic effects, or spread of diseases and parasites;	Yes	administrative action	Partially implemented
	3.1.b.vi	climate change, through changes in water temperatures and flows known to influence salmonid growth, life history and distribution;	Yes	administrative action	Partially implemented
Squalus acanthias Doornhaai [Northeast Atlantic] spurdog	3.1.a	encouraging liaison within their national administrations to facilitate the adoption, implementation and enforcement of fisheries management measures taking account of ICES and, where applicable, the Scientific, Technical and Economic Committee for Fisheries (STECF) advice;	Yes	administrative action	Partially implemented
	3.1.b	the possibility to introduce legislation to protect all life stages of the spurdog in the OSPAR maritime area;	Yes	administrative action	Partially implemented
	3.1.c	improving funding for research (including fishery-independent surveys) into spurdog life history and biology (particularly growth parameters for larger individuals, reproductive biology and estimates of natural mortality), movements and stock discrimination, population abundance and distribution (with estimates of variance), discard data, and into all aspects of the issue of bycatch of spurdog in fisheries targeting other species (examples are described in the background document on spurdog), including research on applied mitigation measures;	Yes	administrative action	Fully implemented
	3.1.d	ensuring that spurdog research data are made available to the appropriate national and regional organisations to support stock assessments and the development of management advice;	Yes	administrative action	Fully implemented
	3.1.e	improving funding and undertaking research to identify critical spurdog habitats, particularly pupping and nursery grounds, and other aggregation sites, and their temporal stability;	Yes	administrative action	Fully implemented
	3.1.f	taking relevant conservation measures (e.g., through conservation plans) for the spurdog ;	Yes	administrative action	Fully implemented
	3.1.g	whether any of the key areas, justify selection and designation as marine protected areas for the protection of spurdog populations and whether such areas may become a component of the OSPAR network of marine protected areas;	Yes	administrative action	Partially implemented
	3.1.h	establishing information campaigns about the identification, conservation, management and protection status of the spurdog, particularly addressing commercial and recreational fishermen and fisheries observers. Information campaigns may serve the purpose of data collection on spurdog occurrence, its critical habitats and incidental catches in order to improve knowledge of its distribution at different life stages and to disseminate any best practice for the handling and release of spurdog;	Yes	administrative action	Fully implemented
	3.1.i	if not already signatory to the Memorandum of Understanding on Migratory Sharks under the Convention on Migratory Species, associating themselves with that Memorandum of Understanding;	Yes	administrative action	Partially implemented

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
	3.1.j	the introduction of the spurdog as a protected species under relevant regional and international biodiversity conventions;	Yes	administrative action	Partially implemented
	3.1.k	acting for the fulfillment of the purpose of this recommendation within the framework of relevant competent authorities.	Yes	administrative action	Partially implemented
MARINE MAMMALS ZEEZOOGDIEREN					
Phocoena phocoena Bruinvis Harbour porpoise	3.1.a	the possibility to introduce legislation, where appropriate, to protect the harbour porpoise in Regions II and III of the OSPAR maritime area;	Yes	legislation, administrative action and negotiated action	Fully implemented
	3.1.b	taking relevant conservation measures (e.g. through conservation plans) for the harbour porpoise, in particular where they are threatened and in key areas;	Yes	administrative action and negotiated action	Fully implemented
	3.1.c	whether any of the key areas justify selection as marine protected areas for the protection of harbour porpoise populations and whether such areas may become a component of the OSPAR MPA network;	Yes	administrative action and negotiated action	Fully implemented
	3.1.d	the implementation of measures to reduce bycatch of harbour porpoise to the lowest possible level within key areas within its jurisdiction, as a priority and outside key areas within its jurisdiction, as appropriate;	Yes	legislation, administrative action and negotiated action	Fully implemented
	3.1.e	establishing a coordinated monitoring programme addressing abundance, distribution and trends of this species and its populations as well as health status, bycatch rates and effects of other human activities, such as noise disturbances and chemical pollutants so that management recommendations can be made, as necessary;	Yes	administrative action	Fully implemented
	3.1.f	establishing measures to reduce or avoid disturbing and/or harmful acoustic effects to harbour porpoises especially from seismic surveys, pile driving, shipping traffic, military activities and underwater explosions;	Yes	legislation, administrative action and negotiated action	Fully implemented
	3.1.g	conducting post mortem investigations on harbour porpoise carcasses to allow the assessment of inter alia health status, cause of death and other aspects including genetic analyses, reproduction status, age structure and feeding ecology;	Yes	legislation and administrative action	Fully implemented
	3.1.h	continuing with the existing work under the OSPAR Hazardous Substances and Eutrophication Strategies and where applicable, work with EU measures for improving coastal water quality;	Yes	legislation, administrative action and negotiated action	Fully implemented
	3.1.i	where appropriate, establishing information campaigns about the identification, conservation and protection status of harbour porpoises. Information campaigns may serve the purpose of data collection on the harbour porpoise occurrence, its critical habitats and incidental catches;	Yes	administrative action	Partially implemented
	3.1.j	acting for the fulfillment of the purpose of this recommendation within the framework of other competent organisations and bodies.	Yes	legislation, administrative action and negotiated action	Fully implemented

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
HABITATS					
Intertidal *Mytilus edulis* beds on mixed and sandy sediments Mosselbanken op gemixt en zandig sediment	3.1.a	the possibility of introducing legislation to protect intertidal Mytilus edulis beds on mixed and sandy sediments;	Yes	administrative action	Fully implemented
	3.1.b	investigating the distribution, quality and extent of intertidal Mytilus edulis beds on mixed and sandy sediments, by means of seabed habitat surveys and monitoring, in order to complete the knowledge base and provide indicators for the state and recovery of the habitat;	Yes	administrative action	Fully implemented
	3.1.c	whenever applicable, seeking ways and means to broaden the knowledge base on the occurrence of and threats to intertidal Mytilus edulis beds on mixed and sandy sediments by gathering additional knowledge from sources such as national planning authorities, environmental impact assessments and post-development monitoring, research institutes, fisheries research, local sea-fisheries committees, commercial and recreational fisheries, Non-governmental organisations and the general public;	Yes	administrative action	Fully implemented
	3.1.d	reporting any existing and new data on the distribution, quality and extent of intertidal Mytilus edulis beds on mixed and sandy sediments to OSPAR;	No	administrative action	Considered and still pending
	3.1.e	assessing whether existing management measures for the protection of intertidal Mytilus edulis beds on mixed and sandy sediments are effective and determine whether further measures are needed to address the key threats;	Yes	administrative action	Fully implemented
	3.1.f	whether any sites justify selection and designation as marine protected areas for the protection and conservation of intertidal Mytilus edulis beds on mixed and sandy sediments and whether such areas may become a component of the OSPAR network of marine protected areas;	Yes	administrative action	Fully implemented
	3.1.g	addressing and minimising adverse impacts on intertidal Mytilus edulis beds on mixed and sandy sediments arising from human activities such as bottom trawling and harvesting of adult and seed mussels in waters under its national jurisdiction;	Yes	administrative action	Fully implemented
	3.1.h	supporting, where practicable, the natural recovery of intertidal Mytilus edulis beds on mixed and sandy sediments, in areas where pressures have caused a decline or disappearance of the habitat and that are now adequately managed;	Yes	administrative action	Fully implemented
	3.1.i	ensuring by appropriate management that introduction, hybridisation and intermixture with non-native Mytilus species through marine aquaculture and seed mussel imports/exports and associated invasive and/or non-indigenous species is avoided;	Yes	administrative action	Fully implemented
	3.1.j	adapting coastal protection measures in such a way that undesired negative effects on intertidal Mytilus edulis beds on mixed and sandy sediments are avoided or minimised;	Yes	administrative action	Fully implemented

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
	3.1.k	raising awareness for the importance and maintenance of good ecological conditions of intertidal Mytilus edulis beds on mixed and sandy sediments among relevant management authorities, relevant actors, including industry sectors and the general public;	Yes	administrative action	Fully implemented
	3.1.l	acting for the fulfilment of the purpose of this Recommendation within the framework of relevant competent authorities.	Yes	administrative action	Fully implemented
Intertidal mudflats Wadplaten	3.1.a	the possibility of introducing legislation to protect intertidal mudflats;	Yes	legislation	Fully implemented
	3.1.b	investigating the distribution, quality and extent of intertidal mudflats, by means of seabed habitat surveys and monitoring, in order to complete the knowledge base and provide indicators for the state and recovery of the habitat;	Yes	administrative action	Fully implemented
	3.1.c	whenever applicable, seeking ways and means to broaden the knowledge base on the occurrence of and threats to intertidal mudflats (such as land claim for agricultural and industrial use, effluent discharges, oil spills, dredging, fishing and bait digging, sea level rise and saltmarsh encroachment) by gathering additional knowledge;	Yes	administrative action	Fully implemented
	3.1.d	reporting any existing and new data on the distribution, quality and extent of intertidal mudflats to OSPAR;	Yes	administrative action	Fully implemented
	3.1.e	assessing whether existing management measures for the protection of intertidal mudflats are effective and determine whether further measures are needed to address the key threats;	Yes	administrative action	Fully implemented
	3.1.f	whether any sites justify selection and designation as marine protected areas for the protection and conservation of intertidal mudflats and whether such areas may become a component of the OSPAR network of marine protected areas;	Yes	administrative action	Fully implemented
	3.1.g	addressing and minimising key threats to intertidal mudflats arising from: land claim for agricultural and industrial use, effluent discharges, oil spills, dredging, fishing and bait digging, sea level rise and saltmarsh encroachment;	Yes	administrative action	Fully implemented
	3.1.h	supporting, where practicable, the natural recovery of intertidal mudflats, in areas where pressures that have caused a decline or disappearance of the habitat are now adequately managed;	Yes	administrative action	Fully implemented
	3.1.i	adapting coastal protection measures in such a way that undesired negative effects on intertidal mudflats are avoided or minimised;	Yes	administrative action	Fully implemented
	3.1.j	raising public awareness of the ecological and socio-economic value of intertidal mudflats and educate planning authorities and developers on the important functions of mudflats in estuarine and coastal systems;	Yes	administrative action	Fully implemented
	3.1.k	acting for the fulfilment of the purpose of this Recommendation within the framework of relevant competent authorities;	Yes	administrative action	Fully implemented
Ostrea edulis beds Platte oesterbanken	See flat oyster				0

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
	zie platte oester				
Sabellaria spinulosa reefs *Sabellaria spinulosa* riffen	3.1.a	the possibility to introduce legislation to protect Sabellaria spinulosa reefs;	Yes	administrative action	Partially implemented
	3.1.b	assessing whether existing management measures for the protection of Sabellaria spinulosa reefs are effective and determine whether further measures are needed to address the key threats;	Yes	administrative action	Partially implemented
	3.1.c	investigating the distribution, quality and extent of Sabellaria spinulosa reefs by means of seabed habitat surveys and monitoring, in order to complete the knowledge base and provide indicators for the state and recovery of the habitat;	Yes	administrative action	Partially implemented
	3.1.d	whenever applicable seeking ways and means to broaden the knowledge base on the occurrence of Sabellaria spinulosa reefs by looking at opportunities for habitat recording and mapping, particularly in association with surveys for proposed research and development projects, for example, offshore infrastructure, cable laying, aggregate extraction, and for fisheries research;	Yes	administrative action	Partially implemented
	3.1.e	reporting any existing and new data on the distribution, quality and extent of Sabellaria spinulosa reef habitat to the OSPAR Commission;	No	Not implemented	Considered and still pending
	3.1.f	whether any site justifies selection as a marine protected area for the conservation and recovery of Sabellaria spinulosa reefs and whether such areas may become a component of the OSPAR MPA network;	Yes	administrative action	Partially implemented
	3.1.g	addressing and minimising adverse impacts on Sabellaria spinulosa reefs arising from human activities in waters under its national jurisdiction;	Yes	administrative action	Partially implemented
	3.1.h	raising awareness of the importance of Sabellaria spinulosa reefs among relevant management authorities, relevant industries and the general public;	Yes	administrative action	Fully implemented
	3.1.i	acting for the fulfilment of the purpose of this Recommendation within the framework of other competent organisations and bodies.	Yes	administrative action and negotiated action	Fully implemented
Sea-pen and burrowing megafauna communities Zeeveer en gravende megafauna gemeenschappen	3.1.a	consider the introduction of national legislation to protect sea-pen and burrowing megafauna communities;	Yes	administrative action	Implemented via other mechanisms
	3.1.b	assess whether existing management measures for the protection of sea-pen and burrowing megafauna communities are effective and determine what further measures are needed to address the key threats;	Yes	administrative action	Partially implemented
	3.1.c	investigate systematically the distribution, quality and extent of sea-pen and burrowing megafauna communities by means of seabed habitat surveys and monitoring in order to complete the knowledge base and provide indicators for the state and recovery of the habitat;	Yes	administrative action	Fully implemented

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
	3.1.d	seek ways and means to broaden the information base on the occurrence of sea-pen and burrowing megafauna communities by involving commercial fishermen, and integrating environmental and fisheries research;	Yes	administrative action	Partially implemented
	3.1.e	improve access to fishing distribution, frequency and intensity data at the appropriate spatial resolution for nature conservation purposes;	Yes	administrative action	Partially implemented
	3.1.f	report any existing and new data on the distribution, quality and extent of sea-pen and burrowing megafauna communities to the OSPAR habitat mapping database;	Yes	administrative action	Partially implemented
	3.1.g	consider whether any sites within its jurisdiction justify selection as marine protected areas for the conservation and recovery of sea-pen and burrowing megafauna communities, and;	Yes	administrative action	Partially implemented
	3.1.h	in accordance with OSPAR Recommendation 2003/3 as amended by OSPAR Recommendation 2010/2, report to the OSPAR Commission on sites selected for inclusion as components of the OSPAR Network of Marine Protected Areas and develop appropriate management plans and measures;	No	Not implemented	Considered and not relevant/conditions do not apply
	3.1.i	address any significant adverse impacts on sea-pen and burrowing megafauna communities arising from human activities in waters under its jurisdiction, where necessary, by working with appropriate international competent authorities.	Yes	administrative action	Partially implemented
Zostera beds Zeegras (*Zostera*) velden	3.1.a	consider the introduction of national legislation to protect Zostera beds;	Yes	administrative action	Fully implemented
	3.1.b	assess whether existing management measures for the protection of Zostera beds are effective and determine what further measures are needed to address the key threats;	Yes	administrative action	Fully implemented
	3.1.c	investigate systematically the distribution, quality and extent of Zostera beds, by means of seabed habitat surveys and monitoring, in order to complete the knowledge base and provide indicators for the state and recovery of the habitat;	Yes	administrative action	Fully implemented
	3.1.d	whenever applicable seek ways and means to broaden the knowledge base on the occurrence of Zostera beds by gathering additional knowledge from sources such as commercial and recreational fishers, fisheries research and the general public;	Yes	administrative action	Fully implemented
	3.1.e	report any existing and new data on the distribution, quality and extent of Zostera beds habitat to the OSPAR habitat mapping database;	No	administrative action	Considered and still pending
	3.1.f	consider whether any site within its jurisdiction justifies selection as a marine protected area for the conservation and recovery of Zostera beds; and	Yes	administrative action	Fully implemented
	3.1.g	implement paragraph f with regards to the particular link established between Zostera beds and any species noted in the OSPAR List of Threatened and/or Declining Species and Habitats1;	Yes	administrative action	Fully implemented
	3.1.h	address any significant adverse impacts on Zostera beds arising from human activities in waters under its jurisdiction;	Yes	administrative action	Fully implemented

Scientific name	Nr	Recommendation	Implemented?	Means	Implementation category NL
	3.1.i	regulate land reclamation, coastal constructions, including marinas and ports, and downscaling of water exchange between open sea and inshore shallow waters, e.g. lagoons;	Yes	administrative action	Fully implemented
	3.1.j	adapt coastal protection measures in such a way that undesired negative effects on Zostera beds are minimised;	Yes	administrative action	Fully implemented
	3.1.k	raise awareness of the importance of Zostera beds among relevant management authorities, the fishery sector and the general public;	Yes	administrative action	Fully implemented

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With knowledge, independent scientific research and advice, **Wageningen Marine Research** substantially contributes to more sustainable and more careful management, use and protection of natural riches in marine, coastal and freshwater areas.

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