

Biodiversity assessment in the greater North Sea

World Conference Marine Biodiversity, Canada

May 2018, Oscar Bos, Wageningen Marine Research



Europe: MSDF



- Marine Strategy Framework Directive (2008) covers
 - All activities and pressures
 - All major aspects of the marine ecosystem
 - Legally binding
- Aim: reach Good Environmental Status by 2020
- Our role: contribute science to policy process

MSFD: Good Environmental Status (GES)

- 11 descriptors (or pillars)
 - **Biodiversity**
 - Non-indigenous species
 - **Food webs**
 - **Seafloor integrity**
 - Plastics
 - Eutrophication,
 - Commercial fish stocks,
 - etc.



European MSFD 6 years cycle



1. Assessment (2012)
2. Indicators & Targets
3. Determination of Good Environmental Status (GES)

2014:
Monitoring programs

2018: Evaluation of
Environmental Status
(Good or not?)

2015/16:
Program of measures



GFS

MSFD

■ Regional cooperation

★ Dublin

★ København

★ Berlin

★ Amsterdam

★ London

★ Bruxelles

★ Praha

★ Luxembourg

★ Paris

★ Bratislava
GO

527 km

© 2011 Tele Atlas
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US Dept of State Geographer
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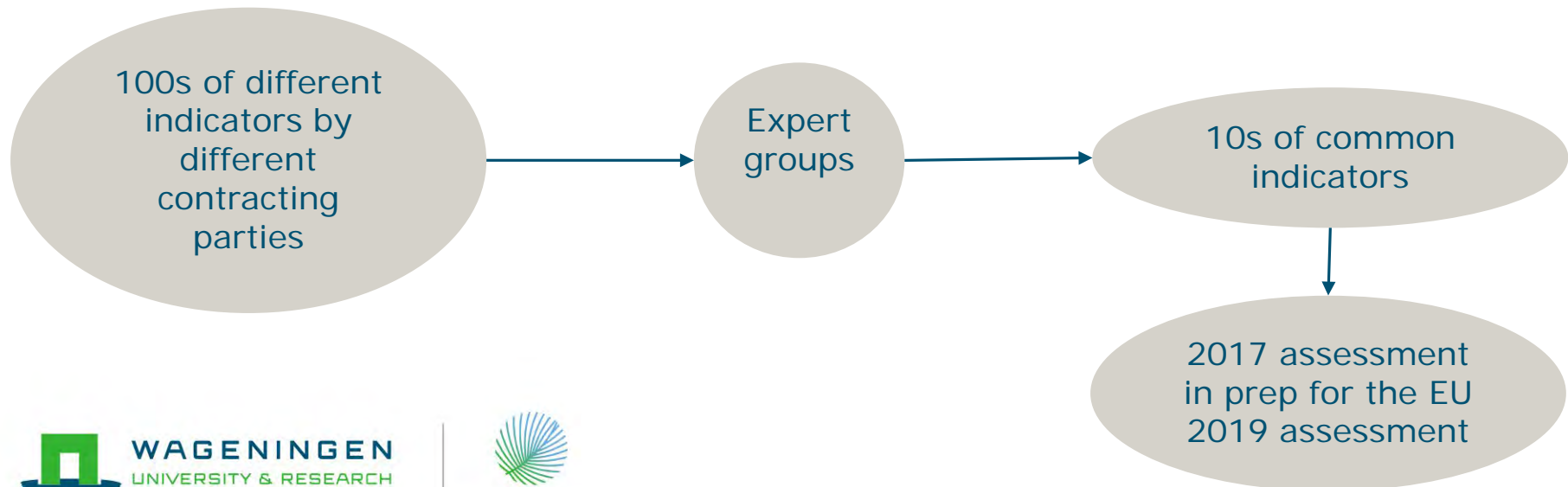
Cooperation through OSPAR

16 Contracting Parties

5 maritime areas



OSPAR indicator development



European MSFD 6 years cycle



1. Assessment (2012)
2. Indicators & Targets
3. Determination of Good Environmental Status (GES)

2014:
Monitoring programs

2018: Evaluation of

**2017 OSPAR
assessment**

2015/16:
Program of measures

OSPAR assessment

Continental
margin

Biodiversity Status



Marine Protected Areas



Habitats



Marine Mammals



Fish and Food Webs



Marine Birds

Marine Mammals



Seal Abundance and Distribution



Grey Seal Pup Production



Harbour Porpoise Bycatch



Abundance and Distribution of Cetaceans

Seal Abundance and Distribution

D1 - Biological Diversity

D1.1 - Species distribution

D1.2 - Population size

Atlantic grey seals and harbour seals are resident in the Greater North Sea and Celtic Seas. Harbour seal abundance is stable or increasing in most of the Greater North Sea, but declining in a few areas. The reasons for this decline are unclear. Grey seal abundance is increasing and distribution is stable.



Area Assessed



Printable Summary

Background

Atlantic grey seals and harbour seals are both regularly found in the Greater North Sea and Celtic Seas. As higher predators, seals can be used as an indicator to reflect the state of the marine ecosystem. This assessment of seal abundance and distribution aims to determine if populations of both

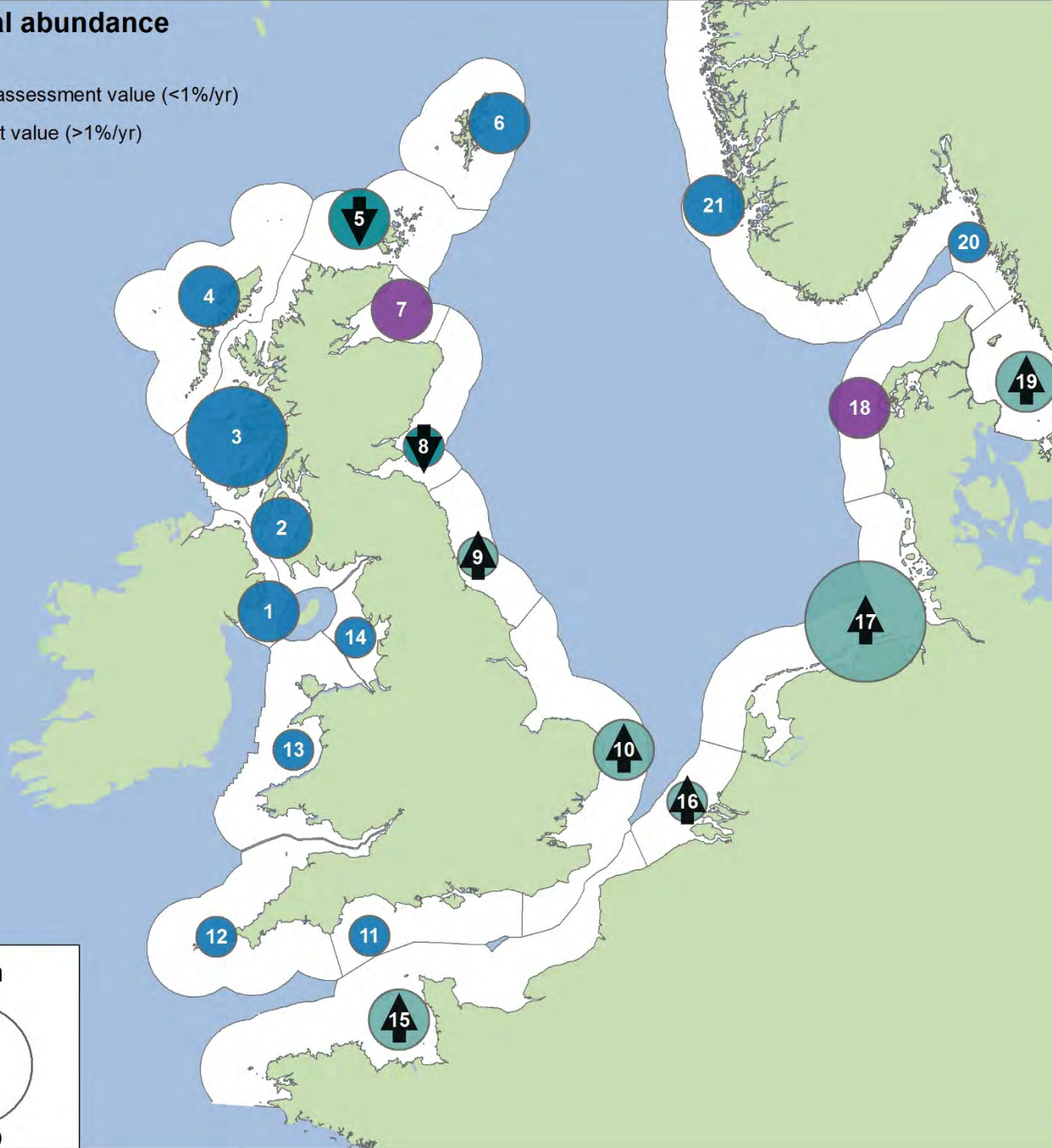
Assessment of trend in harbour seal abundance 2009 - 2014

- Increasing, or decreasing at a rate less than assessment value (<1%/yr)
- Decreasing at a rate greater than assessment value (>1%/yr)
- Inconclusive
- Not enough data points

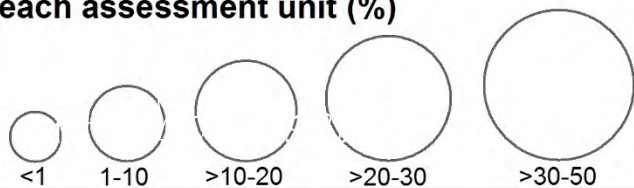
- Increasing
- Decreasing

Harbour seal trends

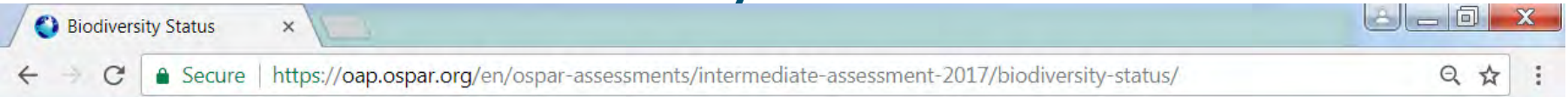
2009-2014



Relative proportion of harbour seals in each assessment unit (%)



OSPAR biodiversity assessment



The header of the website features the OSPAR OAP logo on the left, which includes a globe icon and the text "OSPAR OAP" and "OSPAR Assessment Portal". On the right, there are flags for the United Kingdom and France. Below the logo, a navigation menu contains the following items: "Home", "Search", "Browse Categories", "OSPAR Assessments" (with a dropdown arrow), and "About".

[Home](#) / [OSPAR Assessments](#) / [Intermediate Assessment 2017](#) / [Biodiversity Status](#)

Biodiversity Status



Marine Protected Areas



Habitats



Marine Mammals



Fish and Food Webs

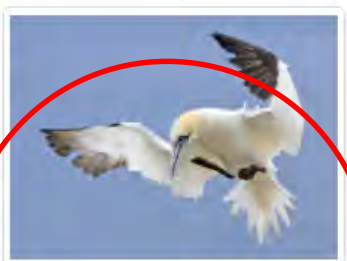


Marine Birds

Marine Birds



Marine Bird
Abundance



Marine Bird
Breeding Success
/ Failure

Marine Bird Breeding Success / Failure

D1 - Biological Diversity

D1.3 - Population condition

Key Message

Seabird species have experienced frequent and widespread breeding failure over the period assessed (2010 to 2015 inclusive) in Norwegian parts of Arctic Waters, the Greater North Sea and in the Celtic Seas. The surface feeding birds in the Greater North Sea and Celtic Seas frequently failed to raise young.



Area Assessed



Printable Summary

Background

Breeding failure is the extreme event of almost no chicks being produced by a seabird colony in a single breeding season. This assessment describes changes in breeding failure rates in seabird colonies throughout the North-East Atlantic. The assessment is based on how many chicks are fledged (having wing feathers that are large enough for flight) annually, per pair, clutch or nest.

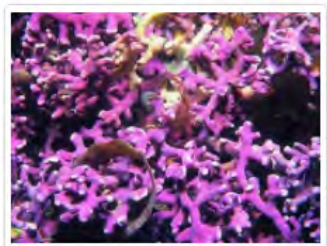
For tern species, widespread breeding failure occurs when the percentage of colonies failing per year exceeds the mean percentage for the preceding 15 years. For all other species, widespread breeding failure occurs when the percentage of colonies failing per year exceeds 5%. Frequent breeding failure is

Breeding failure

Species (Common Name)	Arctic Waters	Greater North Sea	Celtic Seas
Black-headed Gull	Grey	Red	Red
Northern Fulmar	Red	Green	Green
Herring gull	Green	Green	Red
Common Gull	Grey	Red	Red
Lesser black-backed gull	Red	Red	Red
Glaucous gull	Green	Grey	Grey
Great Black-backed Gull	Green	Red	Green
Manx Shearwater	Grey	Green	Green
Black-legged kittiwake	Red	Red	Green
Arctic skua	Grey	Red	Green
Great Skua	Green	Green	Green
Roseate tern	Grey	Green	Grey
Common tern	Grey	Yellow	Red
Arctic tern	Grey	Green	Green
Sandwich tern	Grey	Red	Yellow
Little Tern	Grey	Green	Green
Razorbill	Green	Yellow	Green
Little Auk	Green	Grey	Grey
Black Guillemot	Green	Grey	Green
Puffin	Red	Green	Green
Northern gannet	Green	Green	Green
European shag	Red	Green	Green
Great Cormorant	Green	Green	Grey
Common Guillemot	Red	Green	Green
Brünnich's guillemot	Red	Grey	Green
Insufficient data/ non breeding	Breeding failure in three years out of six		
Breeding failure in two years or less out of six	Breeding failure in four or more years out of six		

Figure 1: Frequency of widespread breeding failure for seabird species in the North-east Atlantic area (2010–2015 inclusive).

Biodiversity Status



Marine Protected Areas



Habitats



Marine Mammals



Fish and Food Webs



Marine Birds

Fish and Food Webs



Pilot Assessment of Production of Phytoplankton



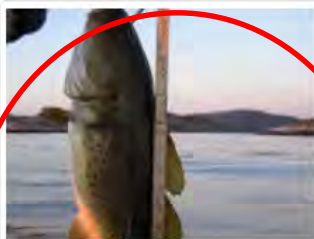
Size Composition in Fish Communities



Change in Mean Trophic Level of Marine Predators in the Bay Of Biscay



Recovery in the Population Abundance of Sensitive Fish Species



Proportion of Large Fish (Large Fish Index)



Pilot Assessment of Mean Maximum Length of Fish

Proportion of Large Fish (Large Fish Index)

D4 - Marine Food Webs

D1.7 - Ecosystem Structure

Recovery in the proportion of large fish in the demersal fish community is evident in the Greater North Sea. Assessment values indicating recovery are only met in the northern part of the Celtic Seas. In many individual survey-based assessments where assessment values are not currently met, recent recovery trends suggest they could be achieved by 2022, if current pressure levels are not increased.



Area Assessed



Printable Summary

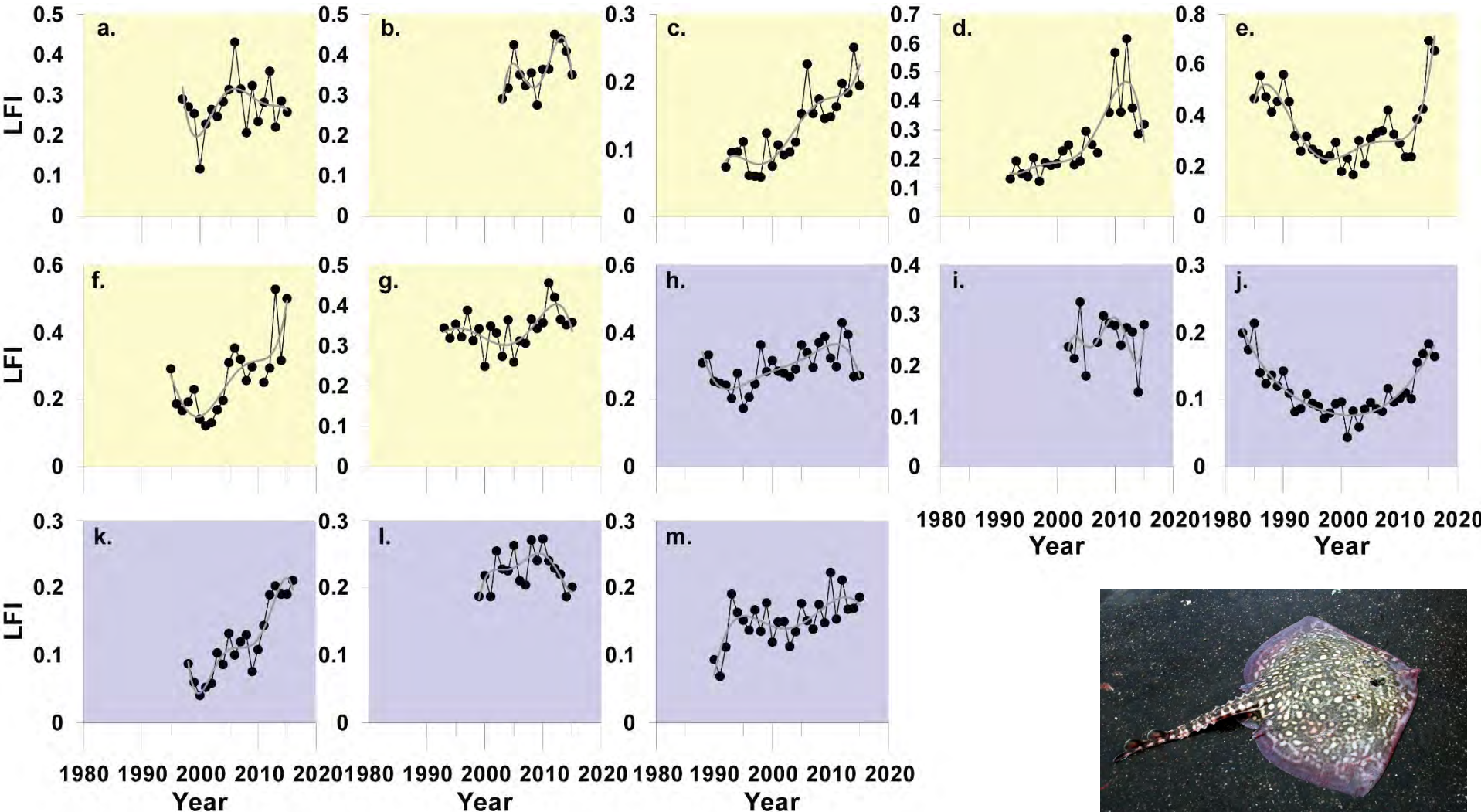
Background

Fishing mortality constrains the age structure of fish communities, reducing the proportion of larger / older individuals. Fishing is also size-selective, preferentially removing larger / older fish, and therefore affects fish community size composition. So far, three indicators relating to fish size have been developed to assess impacts of fishing on fish communities and the food web, considering parameters showing different responses in the ecosystem.

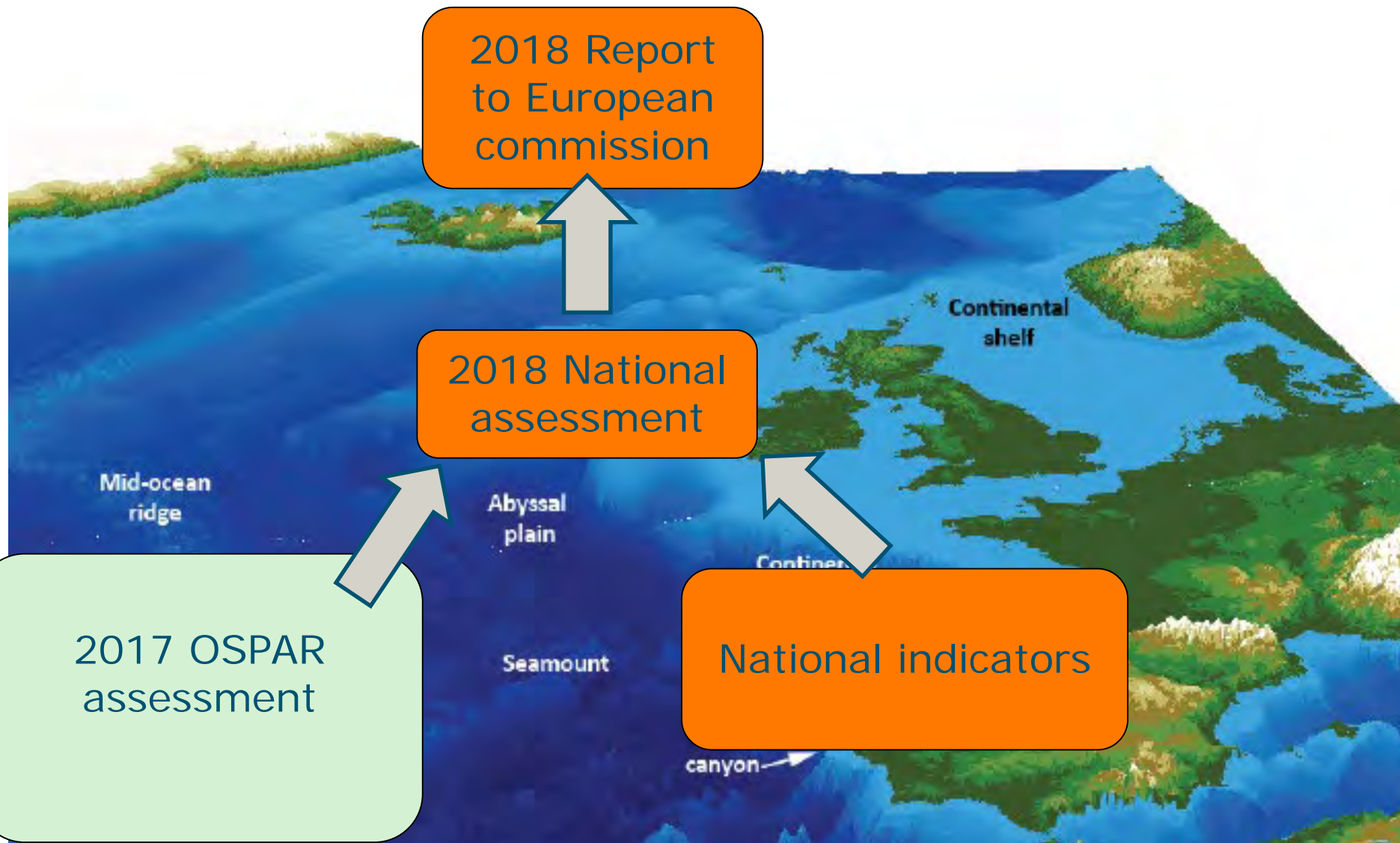
The Large Fish Index (LFI) has been developed to respond to fishing pressure on the proportion of large fish in demersal fish communities (species living on or near the seafloor). It was developed to support the Ecological Quality Objective for the North Sea demersal fish community. The North Sea

Large Fish Index – Celtic Sea & North Sea

Recovery evident



European MSFD 6 years cycle



National indicators

- Benthic Indicator (BISI):
- observed vs expected occurrence of 'smart' species (sensitive to fisheries)

'Smart' species

areas

Indicatoren voor Herstel (Lichaamsgrootte, Frequentie, Leeftijd)	<i>Echinocardium cordatum</i>	<i>Lanice conchilega</i>	<i>Naiadopsis batthica</i>	<i>Ophiura ophiura</i>	<i>Spisula subtruncata</i>	<i>Pontocrates alta marinus</i>	<i>Acrochorda brachiata</i>	<i>Bathyporeia elegans</i>	<i>Bathyporeia guilliamsoniana</i>	<i>Coryistes cassive launus</i>	<i>Euspira pulchella</i>	<i>Ensis ensis</i>	<i>Ensis sirique</i>	<i>Garr tervensis</i>	<i>Iphinoe trispinosa</i>	<i>Nephtys assimilis</i>	<i>Psammechinus millaris</i>	<i>Sigalion mathildae</i>	<i>Alcyonium digitatum</i>	<i>Clione dumeri</i>	<i>Galathea intermedia</i>	<i>Hydrozoa</i>	<i>Lithothamnion sonderi</i>	<i>Prodosermus patelliformis</i>	<i>Sabelaria spinulosa</i>	<i>Dosinia exoleta</i>	<i>Urticina</i> sp.	<i>Callinassa subterranea</i>	<i>Upogehia stellata</i>	<i>Brisopsis lyrifera</i>	<i>Corbula gibba</i>	<i>Acanthocardia echinata</i>	<i>Turritella communis</i>	<i>Amphiuva filiformis</i>	<i>Upogehia deltaura</i>	<i>Thracia conveza</i>	<i>Goneplax rhomboides</i>	<i>Nephtys incisa</i>	<i>Donax vittatus</i>	<i>Ensis</i> spp.	<i>Fria scutellata</i>	<i>Nephtys cirrosa</i>				
Voordelta (H1110B)	1	1	1	1	1	1																																								
Vlakte v/d Raan (H1110B)	1	1	1	1	1	1																																								
Noordzeekustzone (H1110B)	1	1	1	1	1	1																																								
Doggersbank (H1110C)		1						1	1	1	1	1	1	1	1	1	1	1	1																											
Klaverbank (H1170)																																														
Centrale Oestergronden																																														
Friese Front																																														
Bruine Bank			1																																											

Key messages from assessment

- The greater North Sea shows signs of recovery from fisheries
- Seabirds regularly show breeding failure
- Marine mammals (seals) are stable/increasing in numbers
- Uncertainty about harbour porpoise bycatch
- Benthos: 58% seafloor highly disturbed



Questions?

Have a look at www.ospar.org



Acknowledgements:

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ICESWG BIODIV

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