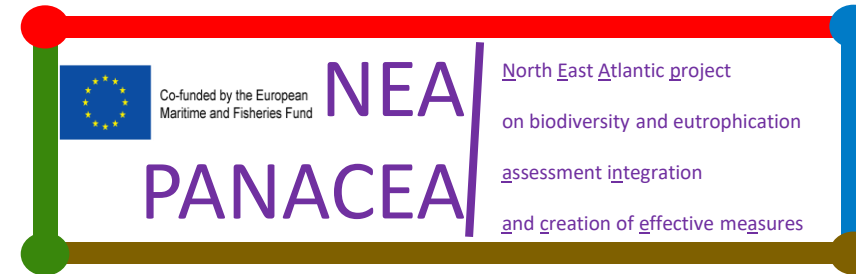


Assess once, report many !

New biodiversity standards and techniques to assess European (coastal (reef)) habitats

Laurent Guérin*, Anna Lizińska, Petra Schmitt
and the OSPAR Benthic Habitat Experts Group

* laurent.guerin@mnhn.fr

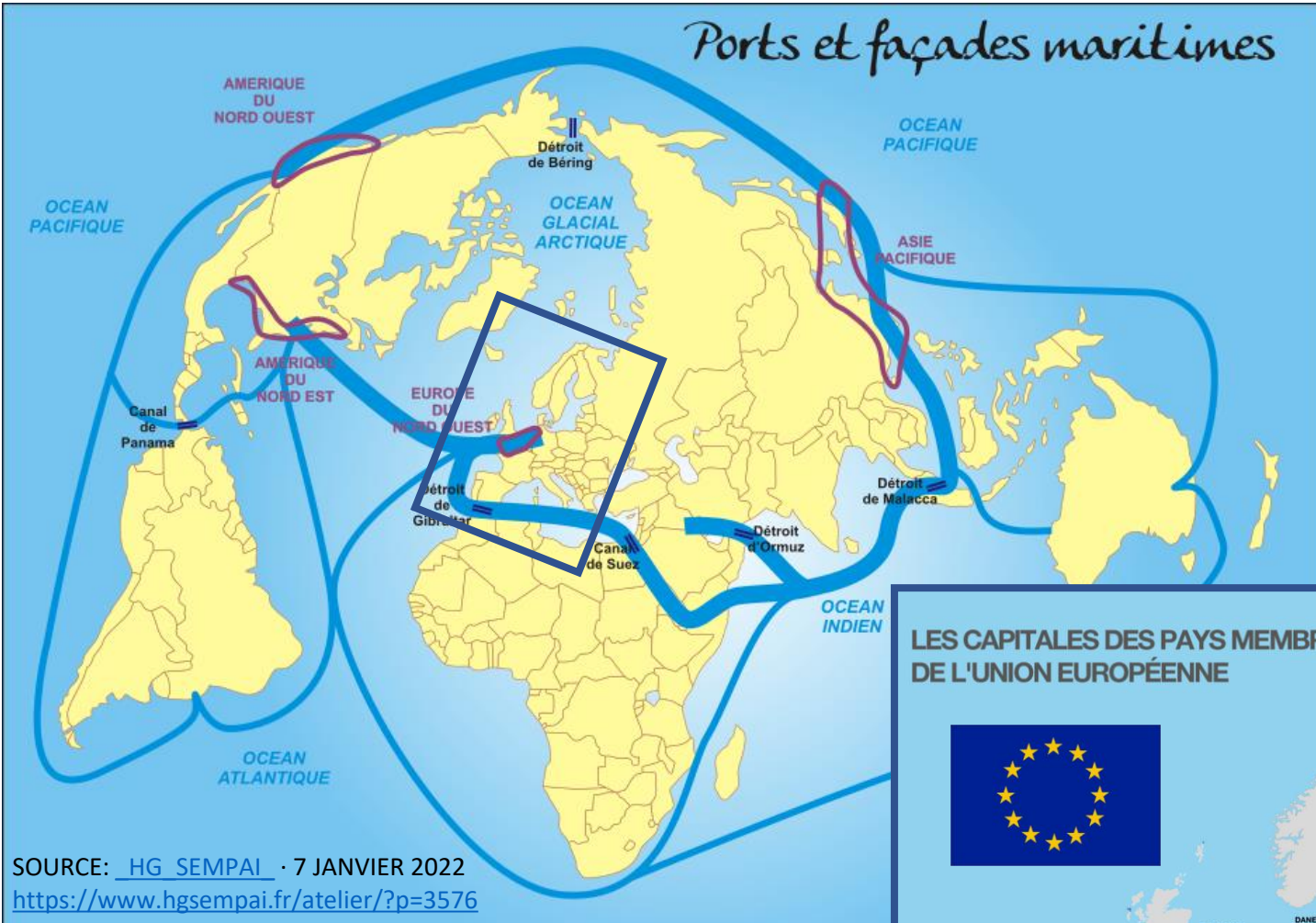


@DrLaurentGuerin



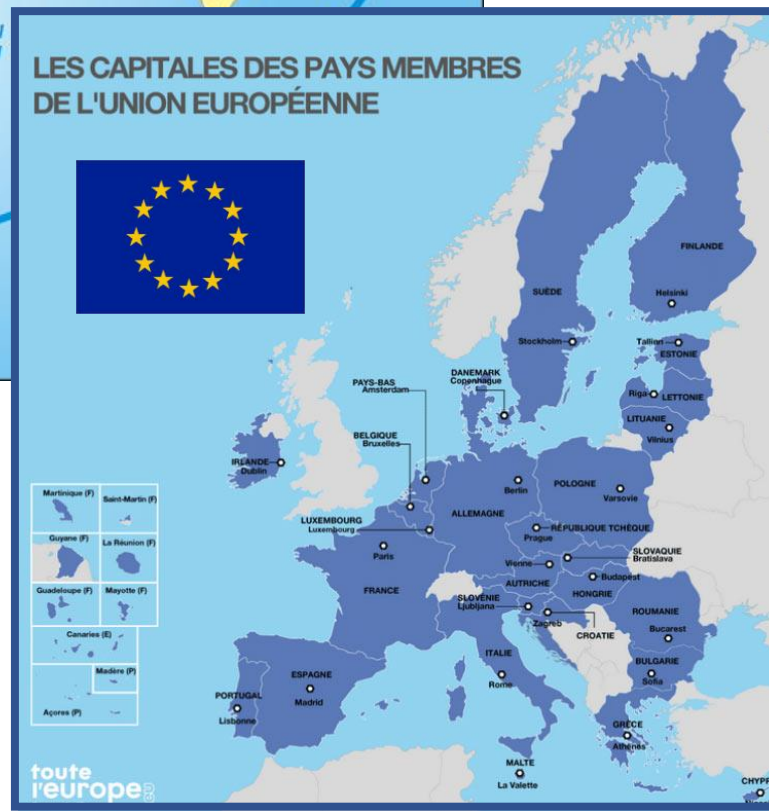
laurent.guerin@mnhn.fr

Ports et façades maritimes

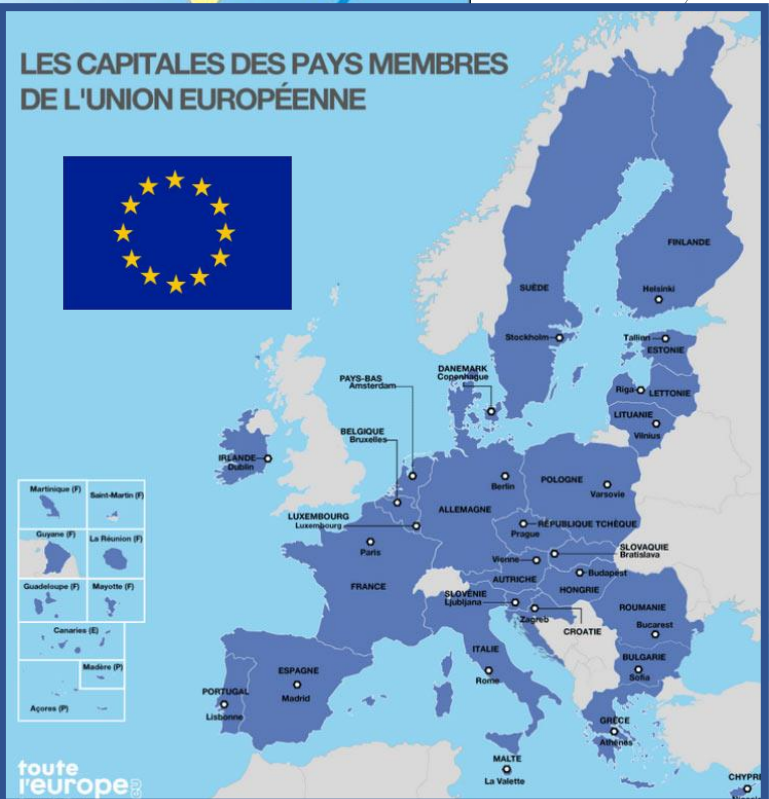
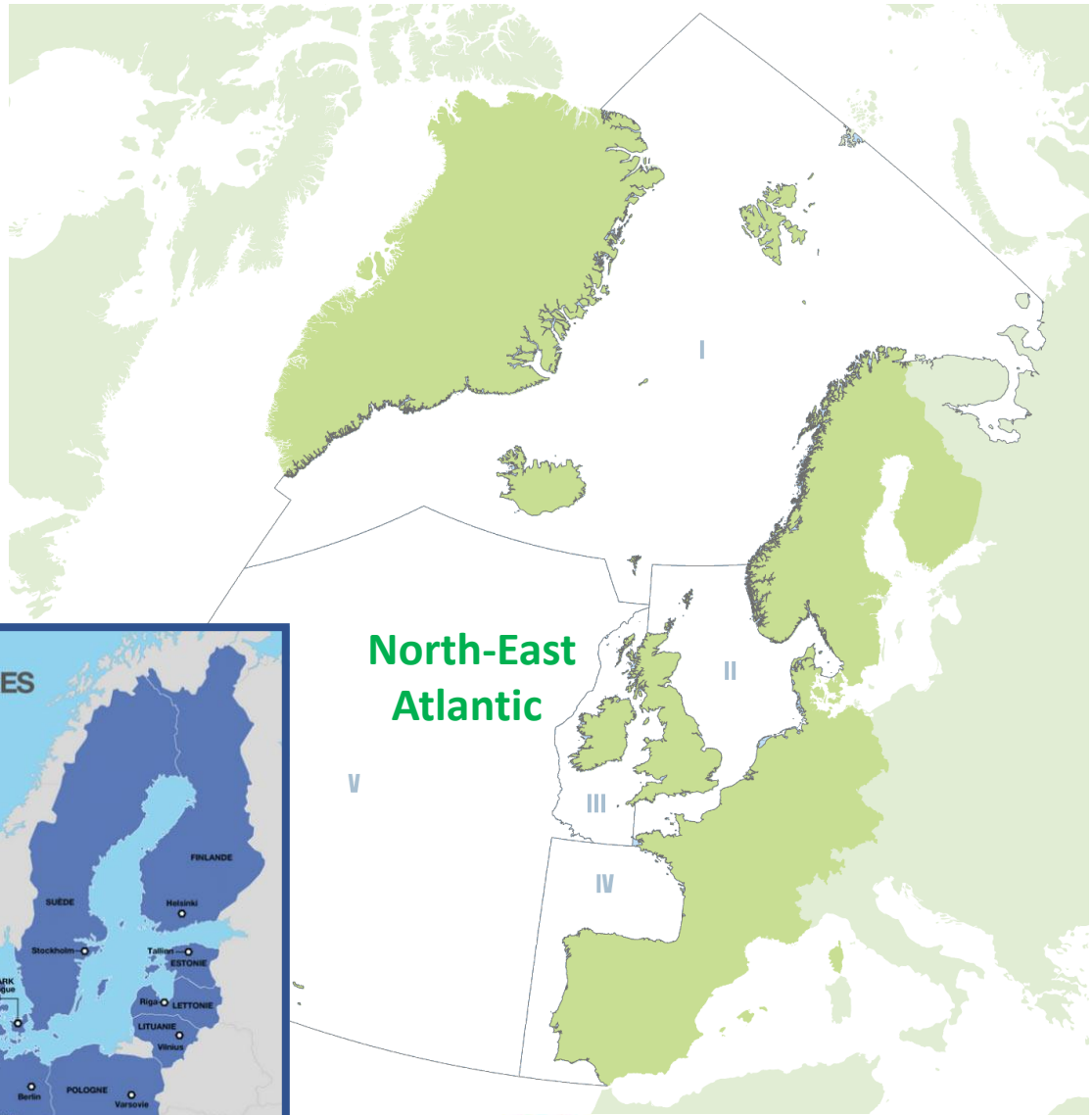
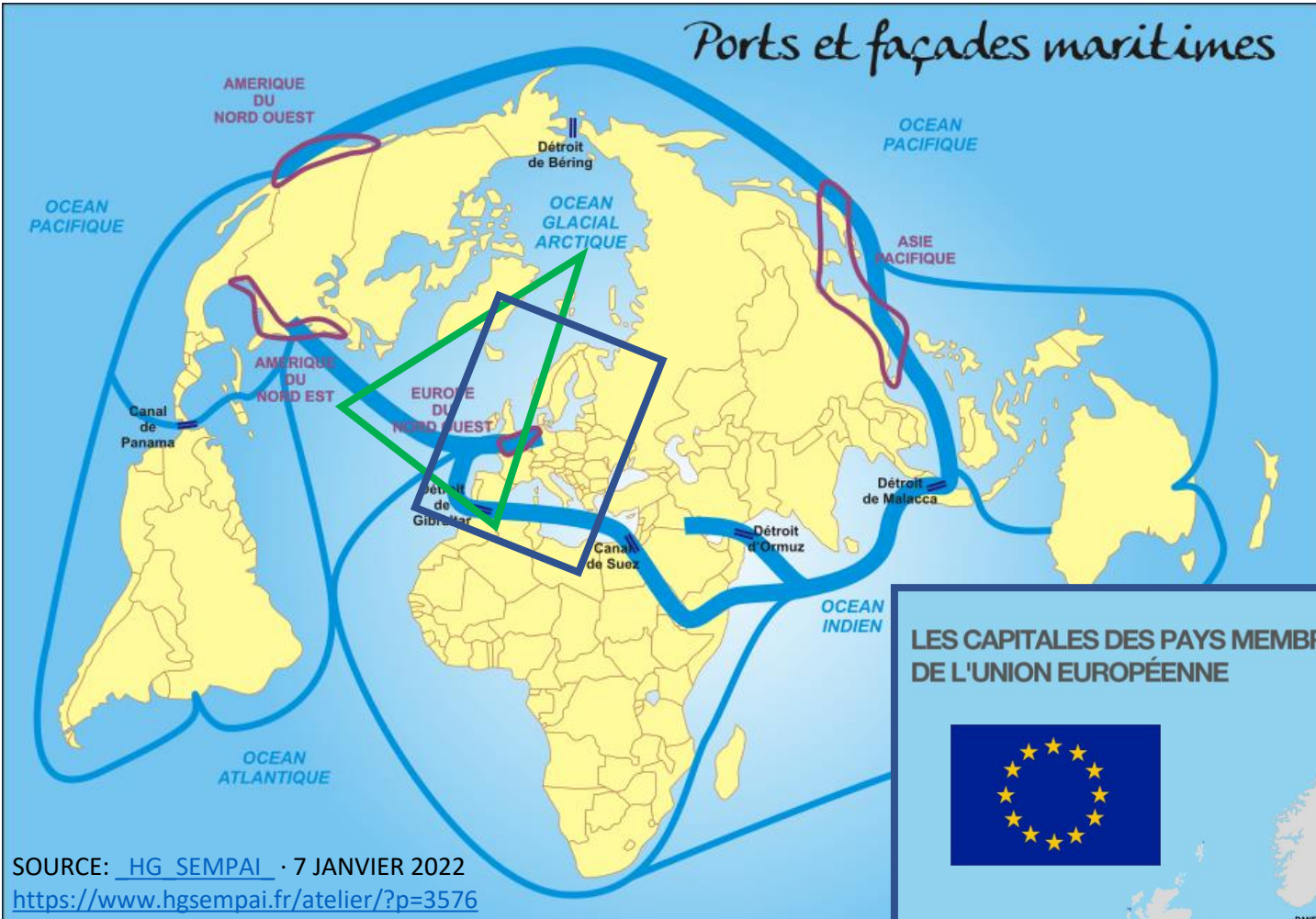


SOURCE: [HG SEMPAL](http://hg.sempai.fr) · 7 JANVIER 2022
<https://www.hgsempai.fr/atelier/?p=3576>

European Seas



Ports et façades maritimes



SOURCE: [HG SEMPAL](http://hg.sempai.fr) · 7 JANVIER 2022
<https://www.hgsempai.fr/atelier/?p=3576>

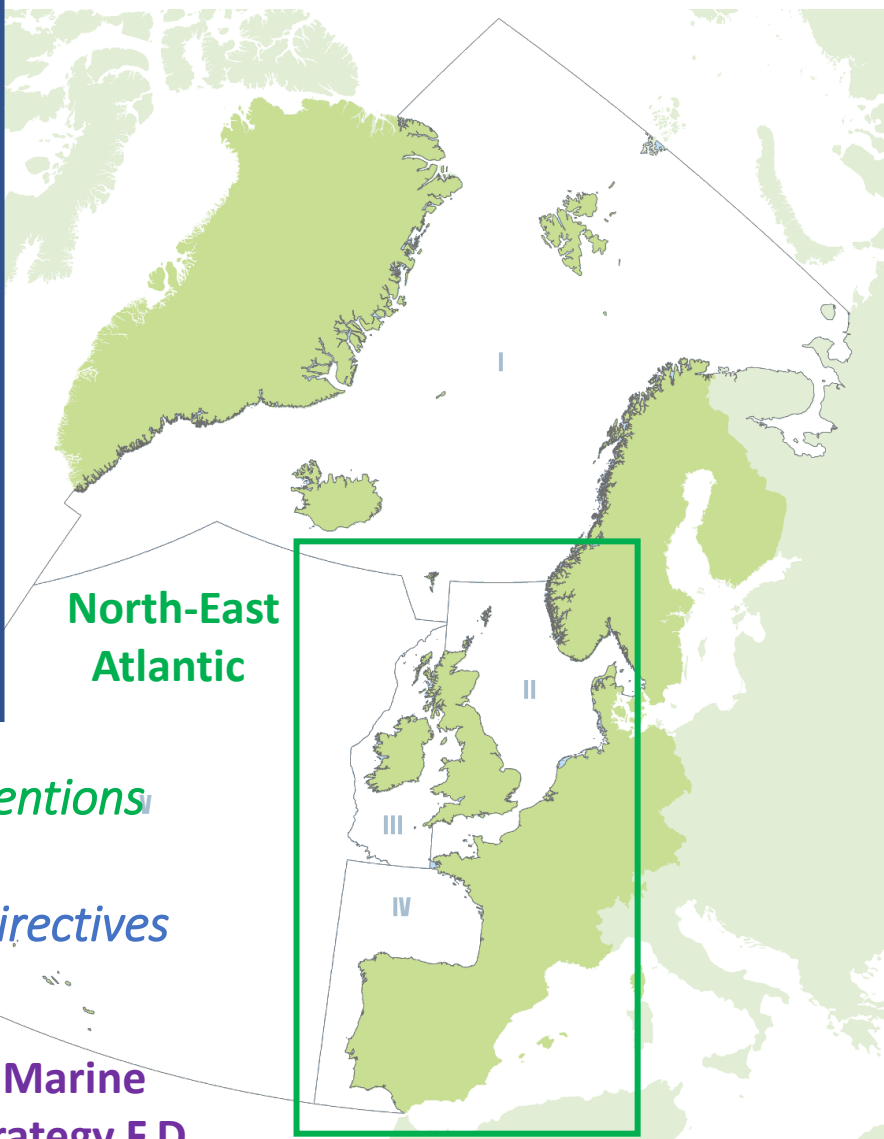
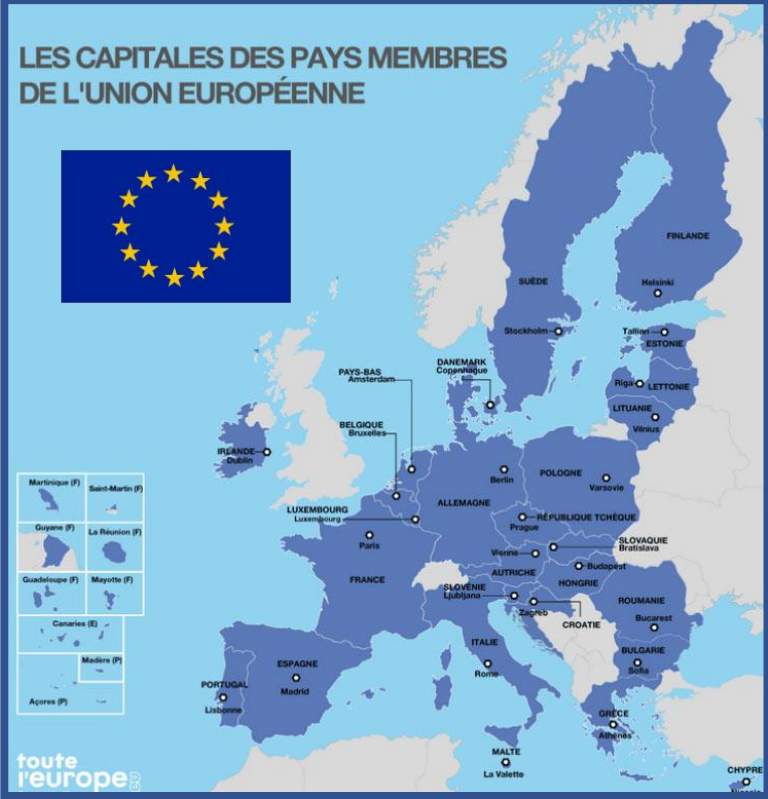
European Seas & the North-East Atlantic



Protecting and conserving the North-East Atlantic and its resources

<https://www.ospar.org/>

LES CAPITALES DES PAYS MEMBRES DE L'UNION EUROPÉENNE



1970-1990's Regional Sea Conventions

2000's European Environmental Directives



NATURA 2000

Water F.D.



Marine Strategy F.D.



marine spatial planning global



...to ecosystem-based management

From conservation...



Water Framework Directive - National Coastal water bodies : biological quality element – Benthic habitats

From OSPAR “**BH2 (condition of benthic habitats)**” C.E.M.P. + “**BH2a**” methodological standards <https://www.ospar.org/documents?v=39000>

BH2a = “assessment of coastal habitats in relation to nutrient and/or organic enrichment” (mainly from land-based and riverine inputs)

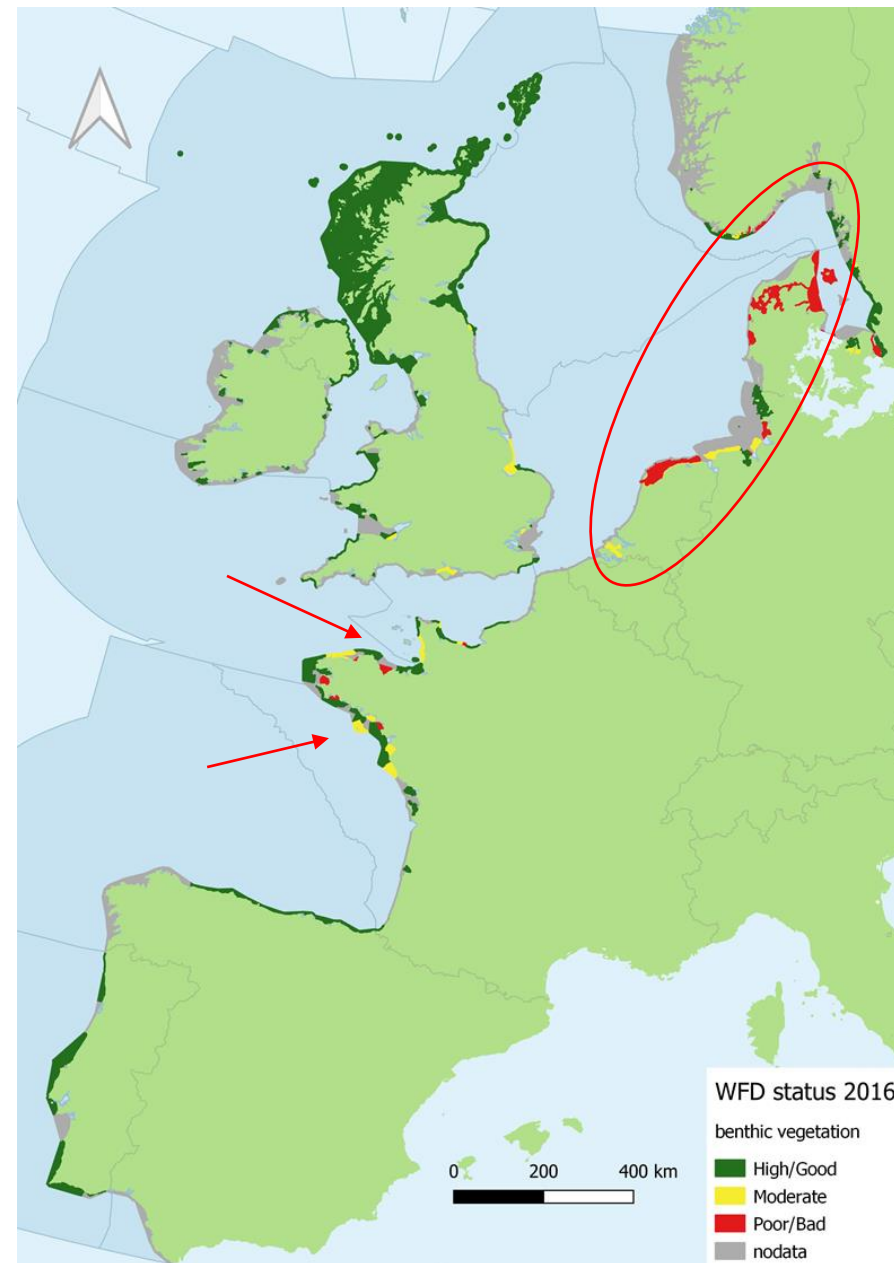
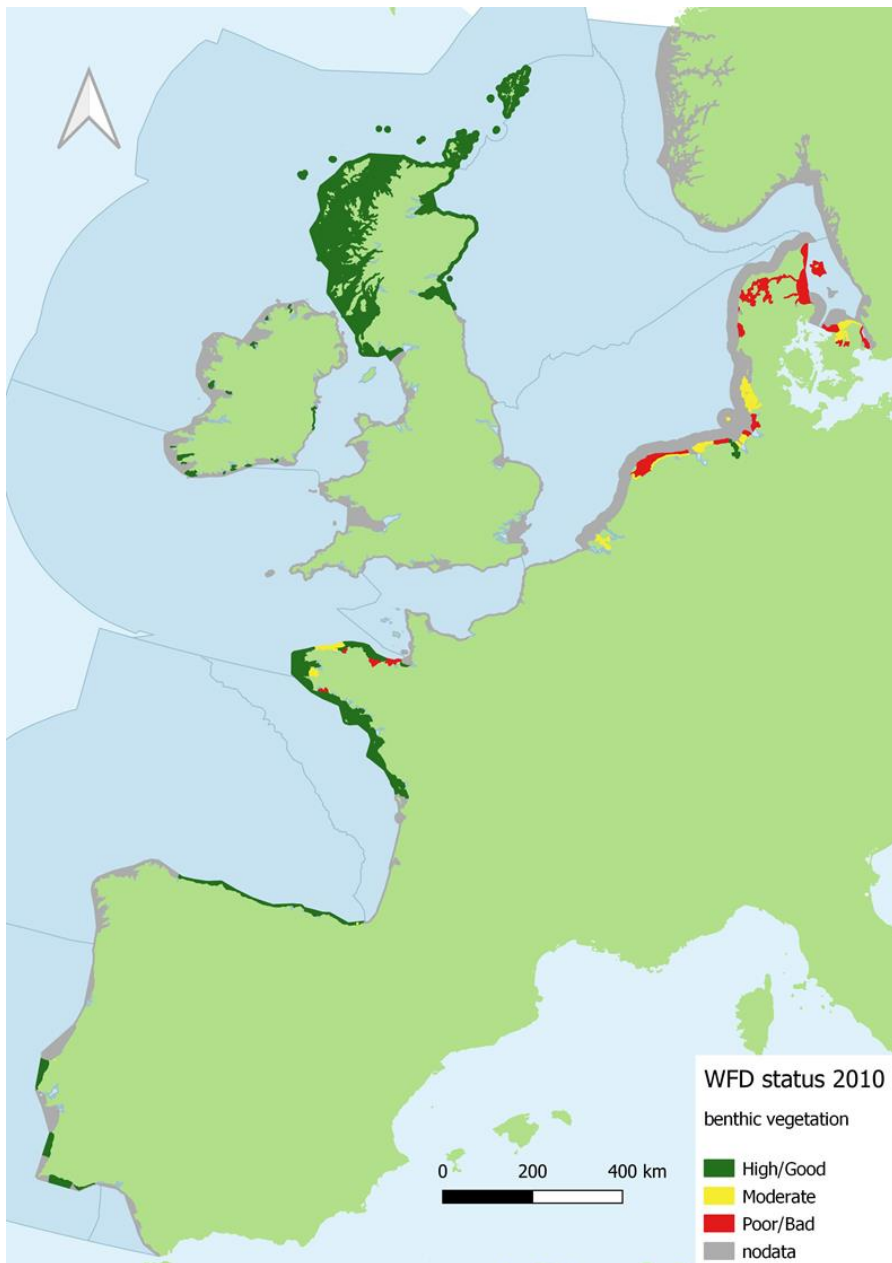
Reporting year	Biological quality element	BE Belgium	DE Germany	DK Denmark	ES Spain	FR France	IE Ireland	NL Netherlands	NO Norway	PT Portugal	SE Sweden	UK United-Kingdom
2010	Benthic invertebrates	Green	Green	Grey	Green	Green	Grey	Green	White	Green	Green	Green
	Macroalgae (reefs)	Grey	Green	Grey	Green	Green	Green	Grey	White	Green	Grey	Green
	Angiosperms	Grey	Green	Grey	Green	Green	Green	Grey	White	Green	Grey	Green
	Other aquatic flora	Grey	Green	Green	Green	Green	Grey	Green	White	Green	Grey	Green
2016	Benthic invertebrates	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
	Macroalgae (reefs)	Grey	Green	Grey	Green	Green	Green	Grey	Green	Green	Green	Green
	Angiosperms	Grey	Green	Green	Green	Green	Green	Grey	Green	Green	Grey	Green
	Other aquatic flora	Grey	Green	Grey	Green	Grey	Green	Green	Grey	Green	Grey	Grey
reported and assessed				reported and not assessed				not reported				

Maps: 2010 WFD quality status - benthic vegetation (coastal water bodies) - 2016 WFD quality status

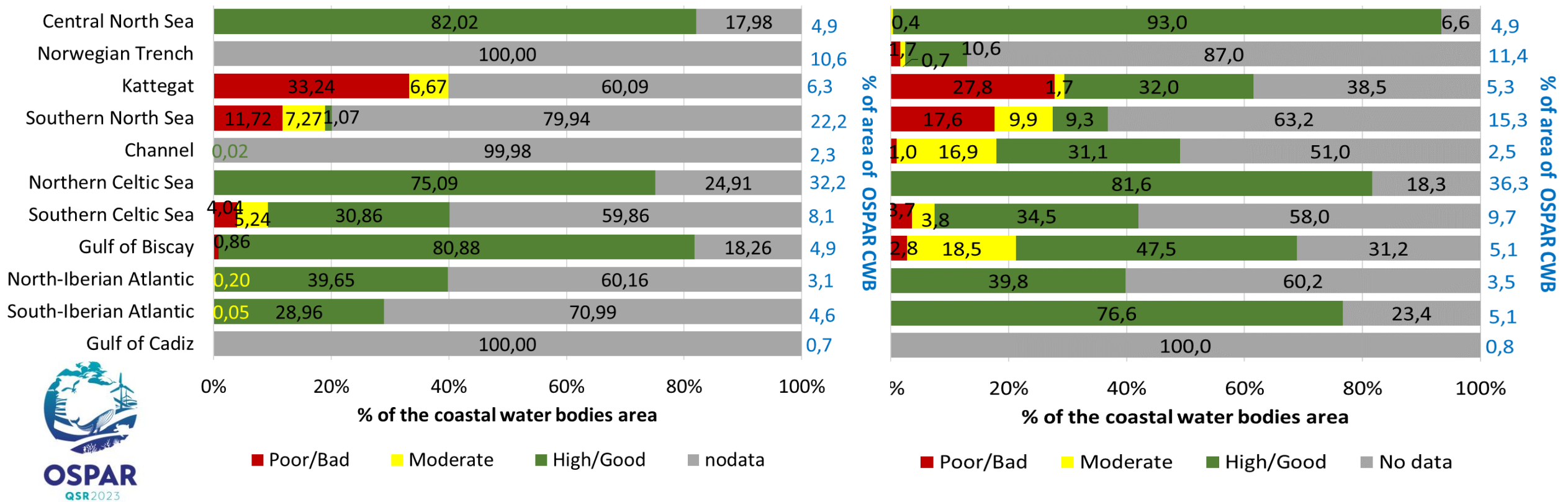
Water F.D.



OSPAR
QSR 2023



Stats: 2010 WFD quality status - benthic vegetation (coastal water bodies) - 2016 WFD quality status



Coastal water bodies were assessed for only 72% (invertebrates), and 59% (vegetation) of the total area of 3 OSPAR regions. From those, the Water Framework Directive quality status was **good or high for 79% (invertebrates) and for 86% (vegetation)**. However, **local eutrophic impacted areas** were highlighted for 2010 and 2016 reporting cycles.

Changes in proportions were caused by the **differences in total assessed area** of coastal water bodies, an increase in the **number of assessed sites** and **changes in the ecological status** of some coastal water bodies.



But this is only **a piece** of the diagnosis / puzzle !



	Broad Pressure Type							
	Physical disturbance	Extraction/injury of species	Hydrological changes	Eutrophication (nutrients or organic enrichment)	Non-indigenous, pathogens, cultivated and genetically modified species	Contaminants	Litter	Energy, including under-water noise
Benthic Broad Habitat Type, including their associated biological communities								
Littoral rock and biogenic reef				A				
Littoral sediment				A				
Infralittoral rock and biogenic reef				A				
Infralittoral sediment	P			A				
Circalittoral rock and biogenic reef				A				
Circalittoral sediment	P			A				
Offshore circalittoral rock and biogenic reef								
Offshore circalittoral sediment	P			P		P		
Upper bathyal rock and biogenic reef								
Upper bathyal sediment								
Lower bathyal rock and biogenic reef								
Lower bathyal sediment								
Abyssal								

Key:

A	Assessed and reported under OSPAR and the European Union Water Framework Directive (WFD)
	Considered under OSPAR and the European Union Marine Strategy Framework Directive (MSFD)
P	Partially assessed in the OSPAR Intermediate Assessment 2017
	Main risks (potentially widespread across the OSPAR maritime area)
	Relationship identified but not currently assessed

From OSPAR, 2018. BH2 CEMP
<https://www.ospar.org/documents?v=39000>

But this is only **a piece** of the diagnosis / puzzle !



Habitats of European interest
reporting obligations of Article 17 of the
EU Habitats Directive (92/43/EEC)

https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm



**OSPAR
COMMISSION**

*Protecting and conserving the
North-East Atlantic and its resources*

**OSPAR Convention list of
Threatening and Declining habitats**

<https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats>

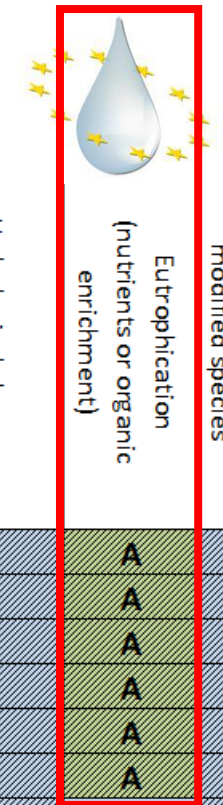
From conservation & single pressure...



**Benthic Broad Habitat Type, including their
associated biological communities**

	Broad Pressure Type						
	Physical disturbance	Extraction/injury of species	Hydrological changes	Eutrophication (nutrients or organic enrichment)	Non-indigenous, pathogens, cultivated and genetically modified species	Contaminants	Energy, including under-water noise
Littoral rock and biogenic reef				A			
Littoral sediment				A			
Infralittoral rock and biogenic reef				A			
Infralittoral sediment	P			A			
Circalittoral rock and biogenic reef				A			
Circalittoral sediment	P			A			
Offshore circalittoral rock and biogenic reef							
Offshore circalittoral sediment	P			P		P	
Upper bathyal rock and biogenic reef							
Upper bathyal sediment							
Lower bathyal rock and biogenic reef							
Lower bathyal sediment							
Abyssal							

Water F.D.



Key:

A	Assessed and reported under OSPAR and the European Union Water Framework Directive (WFD)
	Considered under OSPAR and the European Union Marine Strategy Framework Directive (MSFD)
P	Partially assessed in the OSPAR Intermediate Assessment 2017
	Main risks (potentially widespread across the OSPAR maritime area)
	Relationship identified but not currently assessed

From OSPAR, 2018. BH2 CEMP

<https://www.ospar.org/documents?v=39000>

But this is only **a piece** of the diagnosis / puzzle !



Broad Habitat Types, including their associated biological communities	Broad Pressure Types							
	Physical disturbance	Extraction/injury of species	Hydrological changes	Eutrophication (nutrients or organic enrichment)	Non-indigenous, pathogens, cultivated and genetically modified species	Contaminants	Litter	Energy, including under water noise
Littoral rock and biogenic reef				A				
Littoral sediment				A				
Infralittoral rock and biogenic reef				A				
Infralittoral sediment	P			A				
Circalittoral rock and biogenic reef				A				
Circalittoral sediment	P			A				
Offshore circalittoral rock and biogenic reef								
Offshore circalittoral sediment	P			P		P		
Upper bathyal rock and biogenic reef								
Upper bathyal sediment								
Lower bathyal rock and biogenic reef								
Lower bathyal sediment								
Abyssal								

Habitats of European interest

reporting obligations of Article 17 of the EU Habitats Directive (92/43/EEC)

https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm



OSPAR Convention list of

Threatening and Declining habitats

<https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats>



From conservation & single pressure...

...towards ecosystem- and (matrices)

multipressures risk-based approaches

= converging **Regional Sea Conventions** & **European Environmental Strategies**

Nested biological and geographical scales

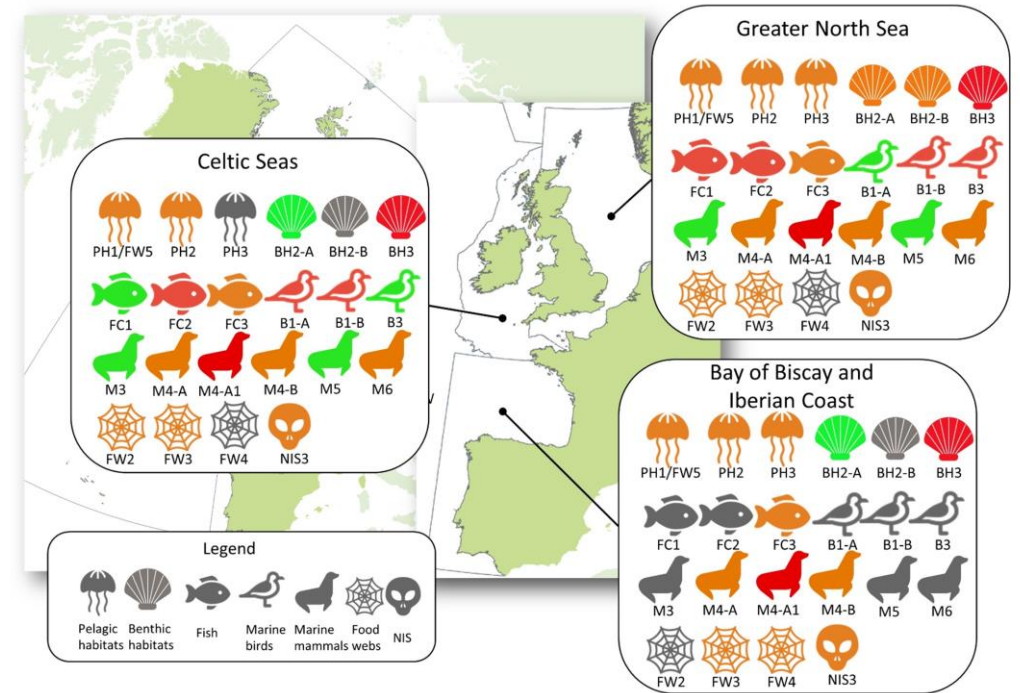
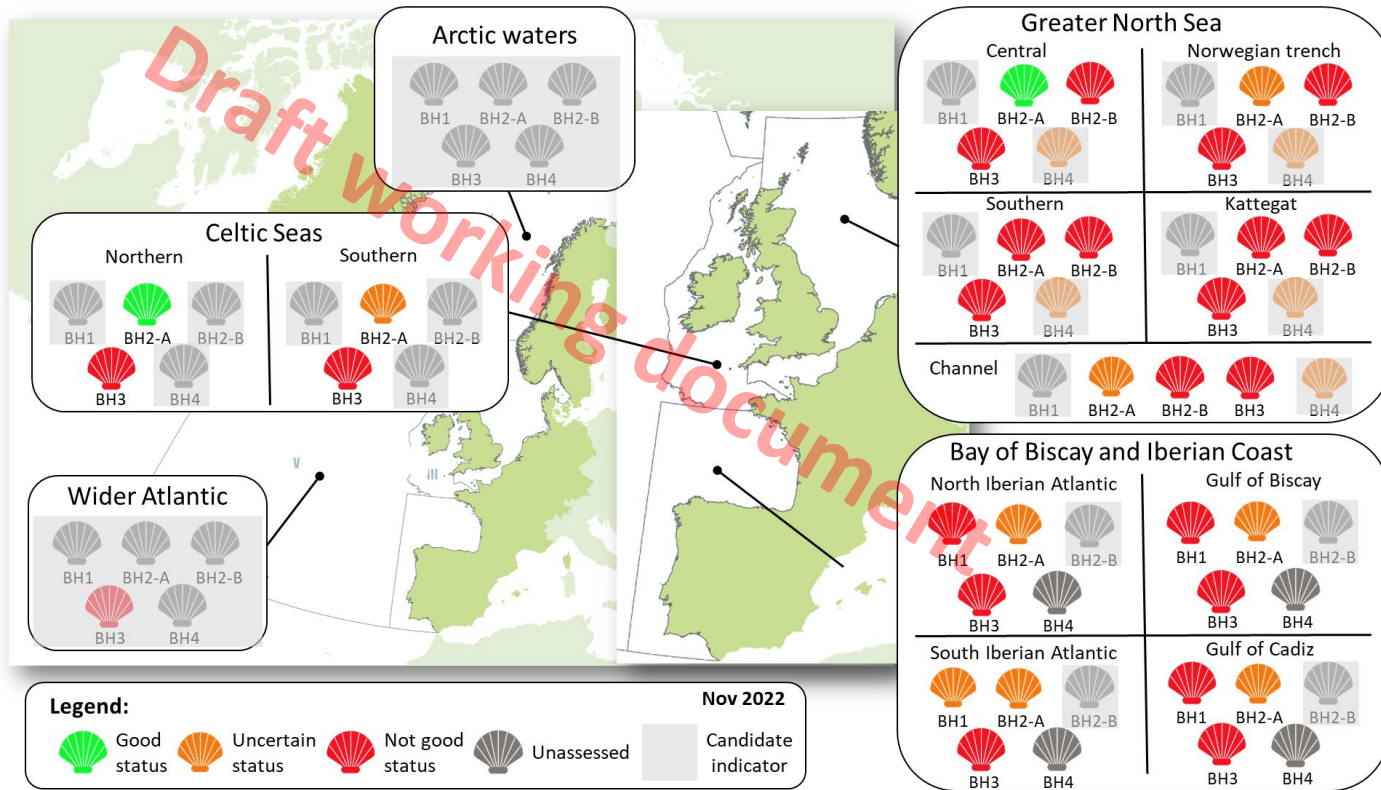
Key:

A	Assessed and reported under OSPAR and the European Union Water Framework Directive (WFD)
	Considered under OSPAR and the European Union Marine Strategy Framework Directive (MSFD)
P	Partially assessed in the OSPAR Intermediate Assessment 2017
	Main risks (potentially widespread across the OSPAR maritime area)
	Relationship identified but not currently assessed

From OSPAR, 2018. BH2 CEMP

<https://www.ospar.org/documents?v=39000>

From experts' judgement and policy/political support based on several indicators under development...



OSPAR QSR 2023 (in prep) + Guérin et al (in prep)

See details in the papers
+ **ITRS 2023 Poster!**



Poor	Indicator value is below assessment threshold, or change in indicator represents a declining state, or indicator change is linked to increasing effect of anthropogenic pressures (including climate change), or indicator shows no change but state is considered unsatisfactory
Uncertain	No assessment threshold and/or unclear if change represents declining or improving state, or indicator shows no change but uncertain if state represented is satisfactory
Good	Indicator value is above assessment threshold, or indicator represents improving state, or indicator shows no change but state is satisfactory
Unassessed	Indicator was not assessed in a region due to lack of data, lack of expert resource, or lack of policy support.

Assessing the state of marine biodiversity in the Northeast Atlantic

Northeast Atlantic marine biodiversity is subject to intense human pressure.

Using spatial and time-series data, the status of 52 biodiversity indicators was assessed across the Northeast Atlantic. This process involved 188 scientists, as well as policy-makers from 15 countries.

- This first ever holistic assessment showed widespread degradation of Northeast Atlantic marine habitats and species.
- Gaps in data and knowledge challenge assessment of some indicators.
- Science-policy synergy is critical to delivering holistic ecosystem assessment.

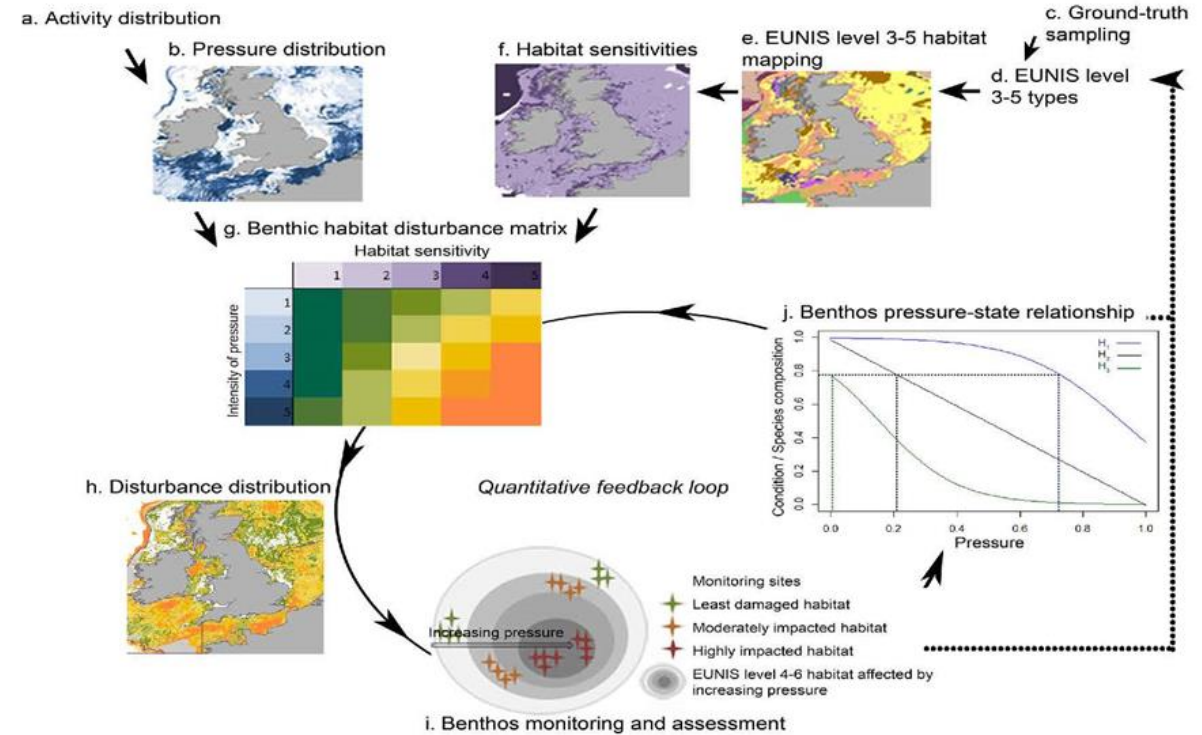
● 25% of indicators in poor status
● 58% of indicators in uncertain status
● 17% of indicators in good status

Reference: McQuatters-Gollop, A., Guérin, L., Arroyo, N.L., Aubert, A., Artigas, L.F., Bedford, J., Corcoran, E., Dierschke, V., Elliott, S.A.M., Geelhoed, S.C.V., Gilles, A., González-Irujo, J.M., Haelters, J., Johansen, M., Le Loc'h, F., Lynam, C.P., Niquil, N., Meakins, B., Mitchell, I., Padegimas, B., Pesch, R., Preciado, I., Rombouts, I., Safi, G., Schmitt, P., Schückel, U., Serrano, A., Stebbing, P., De la Torre, A., Vina-Herbon, C. Assessing the state of marine biodiversity in the Northeast Atlantic. Ecological Indicators. <https://doi.org/10.1016/j.ecolind.2022.109148>

...towards statistic integration methods between biodiversity components, and risk-based approaches for the human pressures management

Overarching conceptual approach for an integrated assessment of benthic habitat indicators at a sub-regional scale, to highlight the feedback of information gathered across indicator assessment and to provide increased confidence in benthic indicator assessment.

(Elliott et al, 2018)



Conclusions and recommendations on the way forward towards a more integrated assessment of benthic habitats

The extension and standardisation of the assessed and reported coastal water bodies' WFD quality status should be further encouraged for the next cycles, as this provides important and relevant information to guide measures and notably identify their effects on targeted areas. This information can successfully be used for several policies, notably OSPAR, MSFD and the Habitat Directive, for the coastal habitats exposed to nutrients and/or organic enrichments. This assessment focused on the status of coastal habitats in relation to nutrient and/or organic enrichment, as one component of a more comprehensive indicator of the condition of benthic habitat defining communities ([Condition of Benthic Habitat Communities](#) and as part of the [OSPAR North-East Atlantic Benthic Habitat thematic assessment](#)).

Main references

- Birk S., Strackbein J. & Hering D. (2010). WISER methods database. Version: March 2011. Available at <http://www.wiser.eu/results/method-database/>
- Carvalho, L., Mackay, E. B., Cardoso, A. C., Baattrup-Pedersen, A., Birk, S., Blackstock, K. L., Borics, G., Borja, A., Feld, C. K., Ferreira, M. T., Globevnik, L., Grizzetti, B., Hendry, S., Hering, D., Kelly, M., Langaas, S., Meissner, K., Panagopoulos, Y., Penning, E., Rouillard, J., Sabater, S., Schmedtje, U., Spears, B.M., Venohr, M., van de Bund, W. & Solheim, A. L. (2019). Protecting and restoring Europe's waters: An analysis of the future development needs of the Water Framework Directive, Science of The Total Environment, Volume 658, pp. 1228-1238, ISSN 0048-9697, <https://doi.org/10.1016/j.scitotenv.2018.12.255>
- Elliott, S.A.M., Guérin, L., Pesch, R., Schmitt, P., Meakins, B., Vina-Herbon, C., González-Irusta, J.M., de la Torre, A., Serrano, A., (2018). Integrating benthic habitat indicators: Working towards an ecosystem approach. Marine Policy 90, 88-94. <https://doi.org/10.1016/j.marpol.2018.01.003>
- European Commission, (2018). Commission Decision (EU) 2018/229 of 12 February 2018 establishing, pursuant to Directive 2000/60/EC of the European Parliament and of the Council, the values of the Member State monitoring system classifications as a result of the intercalibration exercise and repealing Commission Decision 2013/480/EU (notified under document C (2018) 696). <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018D0229&from=HU>
- European Parliament, (2000). Directive 2000/60/CE of the European Parliament and the Council of 23 October 2000. establishing a framework for Community action in the field of water policy. Official Journal of the European Communities. L. 327/1. https://ec.europa.eu/environment/water/water-framework/index_en.html
- Lizińska A. & Guérin L., (2022). Analysis of the main elements of the "Good Environmental Status" from the 1st and 2nd MSFD cycles, reported by the European Member States for the Descriptor 6 (sea floor integrity), and links with Regional Seas' Conventions and D4 (food webs integrity) and D5 (eutrophication). August 2022. Nea Panacea European project. PatriNat joint unit (OFB, MNHN, CNRS). Station marine de Dinard, <http://dx.doi.org/10.13140/RG.2.2.16732.46728>
- McQuatters-Gollop A., Guérin, L., Arroyo, N.L., Aubert, A., Artigas, L.F., Bedford, E., Corcoran, V., Dierschke, S.A.M., Elliott, S.C.V., Geelhoed, A., Gilles, J.M., González-Irusta, J., Haelters, J., Johansen, M., Le Loc'h, F., Lynam, C.P., Niquil, N., Meakins, B., Mitchell, I., Padegimas, B., Pesch, R., Preciado, I., Rombouts, I., Safi, G., Schmitt, P., Schückel, U., Serrano, A., Stebbing, P., De la Torre, A. & Vina-Herbon C. (2022). Assessing the state of marine biodiversity in the Northeast Atlantic, Ecological Indicators, Volume 141, 109148, ISSN 1470-160X, <https://doi.org/10.1016/j.ecolind.2022.109148>
- OSPAR (2017a). BH2: Condition of Benthic Habitat Communities: the Common Conceptual Approach, in: OSPAR (Ed.), OSPAR Intermediate Assessment 2017. OSPAR, London, UK. Available at: <https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/biodiversity-status/habitats/condition-of-benthic-habitat-defining-communities/common-conceptual-approach/>.
- OSPAR (2017b). BH2a: Condition of Benthic Habitat Communities: Assessment of Coastal Habitats in relation to Nutrient and/or Organic Enrichment, in: OSPAR (Ed.), OSPAR Intermediate Assessment 2017. OSPAR, London, UK. Available at: <https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/biodiversity-status/habitats/condition-of-benthic-habitat-defining-communities/condition-benthic-habitat-communitites-assessment-coastal-habita/>
- OSPAR (2018). OSPAR CEMP Guideline. Common indicator BH2: Condition of Benthic Habitat Communities: the Common Conceptual Approach. 60 pp. Available at: <https://www.ospar.org/documents?v=39000>.
- Poikane S., Salas Herrero, F., Kelly, G. M., Borja, A., Birk S. & van de Bund W. (2020). European aquatic ecological assessment methods: A critical review of their sensitivity to key pressures, Science of The Total Environment, Volume 740, 140075, ISSN 0048-9697, <https://doi.org/10.1016/j.scitotenv.2020.140075>
- Salas Herrero F., Araújo R., Claussen U., Leujak W., Boughaba J., Dellsaea J., Somma F. & Poikane, S. (2020). Physico-chemical supporting elements in coastal waters: Links between Water and Marine Strategy Framework Directives and Regional Sea Conventions. EUR 30383 EN, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-22418-1, JRC121759, <https://doi.org/10.2760/444388>



Coming soon (2023): future publications of these collective works & processes

- **OSPAR 2023 Quality Status Report** (including BH2 CEMP + BH2a assessment) <https://oap.ospar.org/en/>
- **Science Journal articles:** Guérin, Lizińska and Schmitt, in prep; Guérin et al, in prep (North-East Atlantic's benthic and biodiversity assessments & Science-policy processes)

<https://crisisrelief.un.org/t/ukraine>

