



OSPAR  
COMMISSION



# Natural Capital Accounting in the North-East Atlantic

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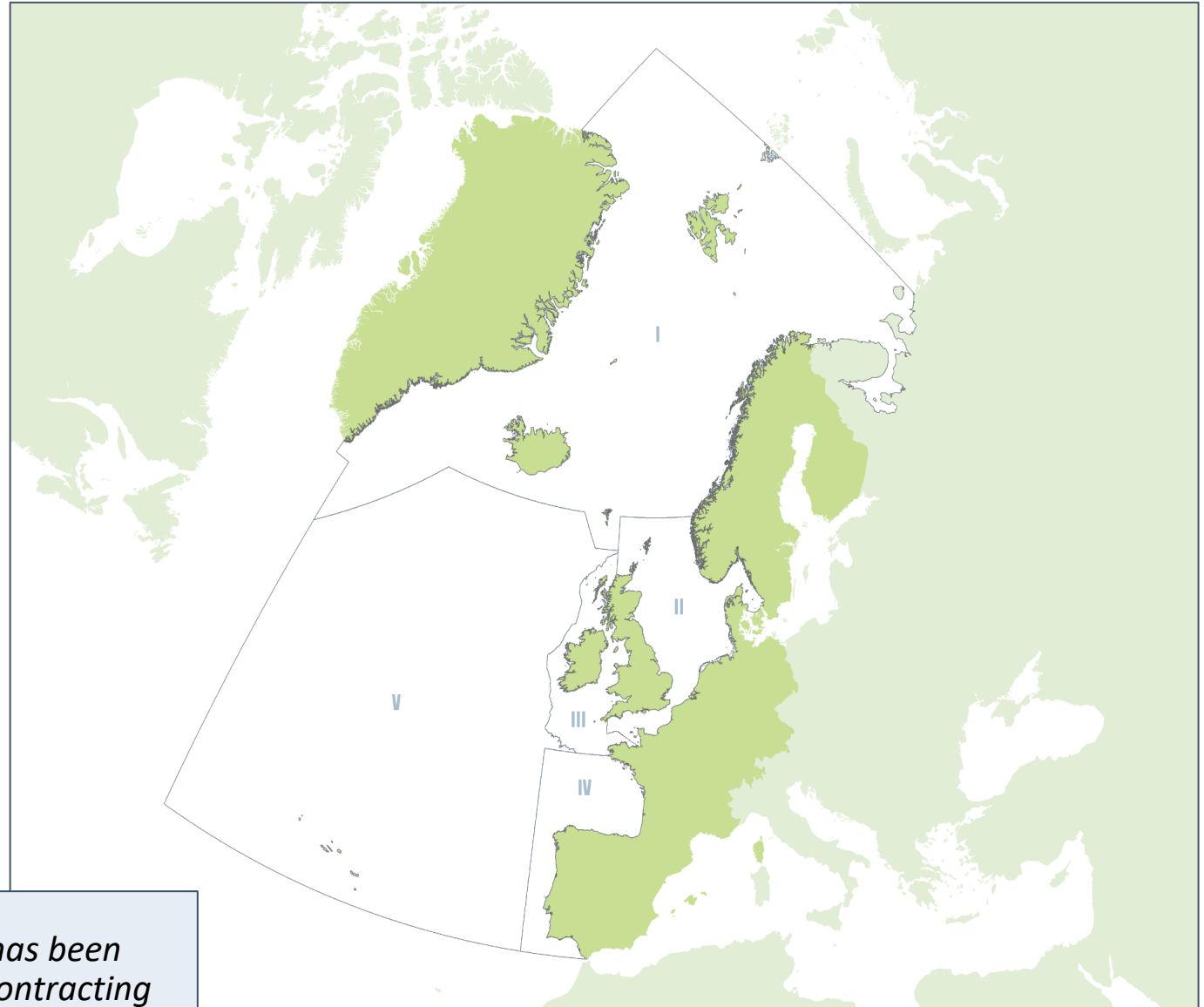
*The values included in this presentation are just first estimates and should be treated with caution*



# OSPAR COMMISSION

## The Convention for the Protection of the Marine Environment of the North-East Atlantic:

- *Region I: Arctic Waters*
- *Region II: Greater North Sea*
- *Region III: Celtic Seas*
- *Region IV: The Bay of Biscay and Iberian Coast*
- *Region V: Wider Atlantic*

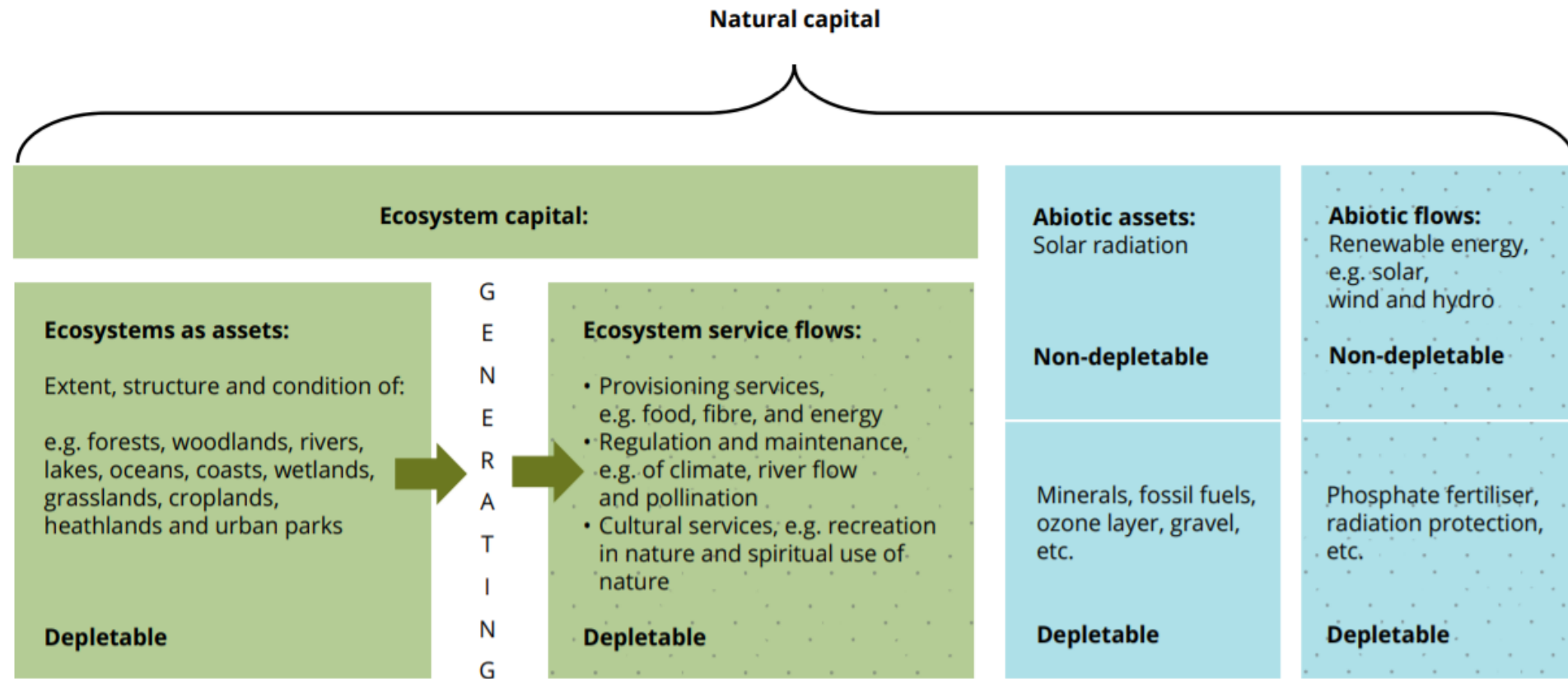


***This initial attempt of NCA for the OSPAR area has been prepared by the Netherlands in its capacity as a Contracting Party of the OSPAR Convention***



# Natural Capital

*The **elements of nature** that directly and indirectly produce value or **benefits to people**, including ecosystems, species, freshwater, land, minerals, the air and oceans, as well as natural processes and functions.*



**Note:** Global solar radiation is constant above the atmosphere and hence considered a stable asset.

Source: (European Commission, 2013; European Environment Agency, 2019)

# Natural Capital Accounting and the SEEA framework

*The System of Environmental- Economic Accounting (SEEA) is a framework that integrates economic and environmental data to provide a more comprehensive and multipurpose view of the interrelationships between the economy and the environment.*



→ The SEEA Central Framework was adopted as an international statistical standard by the UN Statistical Commission in 2012 to *measure the environment and its relation with the economy*

*However, neither the SNA nor the SEEA CF were designed for accounting for ES or ecological capital*



→ The SEEA Ecosystem Accounting (SEEA EA) complements the Central Framework and represents international efforts toward coherent ecosystem accounting

→ It was adopted in March 2021

# Why is OSPAR interested in NCA



Contribution of **marine ecosystems** to human well-being is **crucial**



The global **condition** of marine ecosystems has **rapidly deteriorated**



**Current** management **tools** and indicators are **not enough**



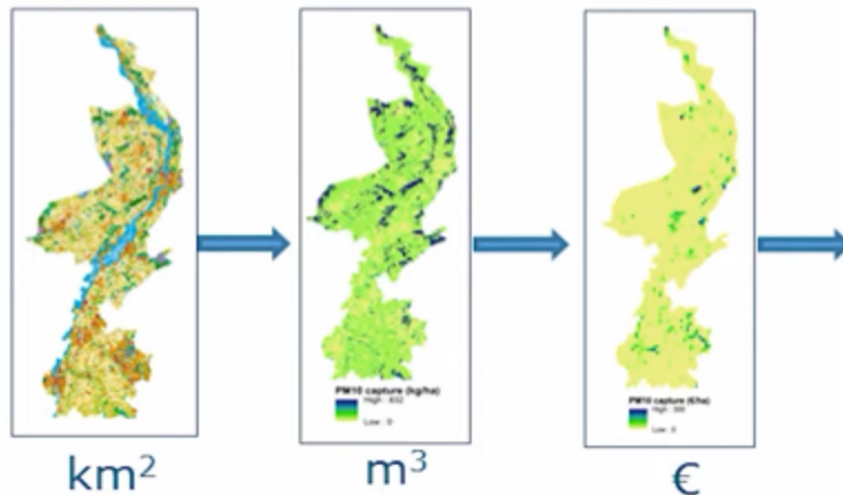
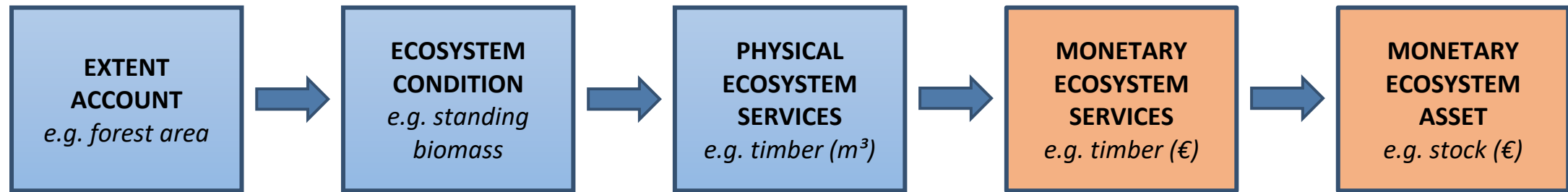
**NCA** is on the **European and global agenda** SEEA EA adopted in 2021



**NCA** can **contribute to achieving** some of the **OSPAR North-East Atlantic Environment Strategy 2030** Strategic objectives:

Operational objective 7.03: *‘By 2025 OSPAR will start **accounting for ES and natural capital** by making maximum use of existing frameworks to recognise, assess and consistently account for human activities and their consequences in the implementation of ecosystem-based management.’*

# The SEEA Ecosystem Accounting framework



## Accounting tables

Physical supply, totals		1	2	4	5	21	22	23	24	26	27	28	31	
Ecosystem Units		Non-perennial plants	Perennial plants	Meadows (for grazing)	Foragers	Deciduous forest	Coniferous forest	Mixed forest	Heath land	Fresh water wetlands	Natural grassland	Public green space	Urban forest	Totals
Extent (ha)		53,600	8,130	27,330	2,900	11,400	7,300	10,400	2,100	900	3,300	4,800	14,100	220,900
Crops	tonnes/yr	1,427,300	65,000	-	-	-	-	-	-	-	-	-	-	1,492,400
Fodder	tonnes/yr	140,800	4,700	328,700	-	-	-	-	-	-	-	-	66,900	541,100
Meat (from game)	kg/yr	11,500	1,500	5,900	800	2,500	1,700	2,900	800	200	800	900	2,400	36,800
Ground water (drinking water only)	in 1000 m³/yr	9,000	1,400	4,200	500	1,900	100	500	500	-	700	400	1,300	27,000
Capture of PM10	tonnes/yr	400	100	200	-	300	400	500	-	-	100	100	100	2,300
Carbon sequestration	tonnes C/yr	-	2,400	4,900	500	16,500	10,300	15,100	400	200	600	1,200	2,800	59,000
Recreation (cycling)	1000s of bike trips/yr	1,800	300	1,000	100	600	200	400	-	-	100	200	600	9,100
Nature tourism	# tourists/yr	94,000	27,000	136,800	57,000	140,300	93,800	147,400	22,700	11,600	55,400	11,800	94,500	974,900

# 1. Extent account

*“Ecosystem extent accounts **organize data about the extent or area of the various ecosystem types**, differentiating between the different Ecosystem Assets present in the Ecosystem Accounting Area”*

- Recommendations agreed to consider the **IUCN Global Ecosystem Typology (GET)** as a **“reference classification”** but not available at the **OSPAR level**

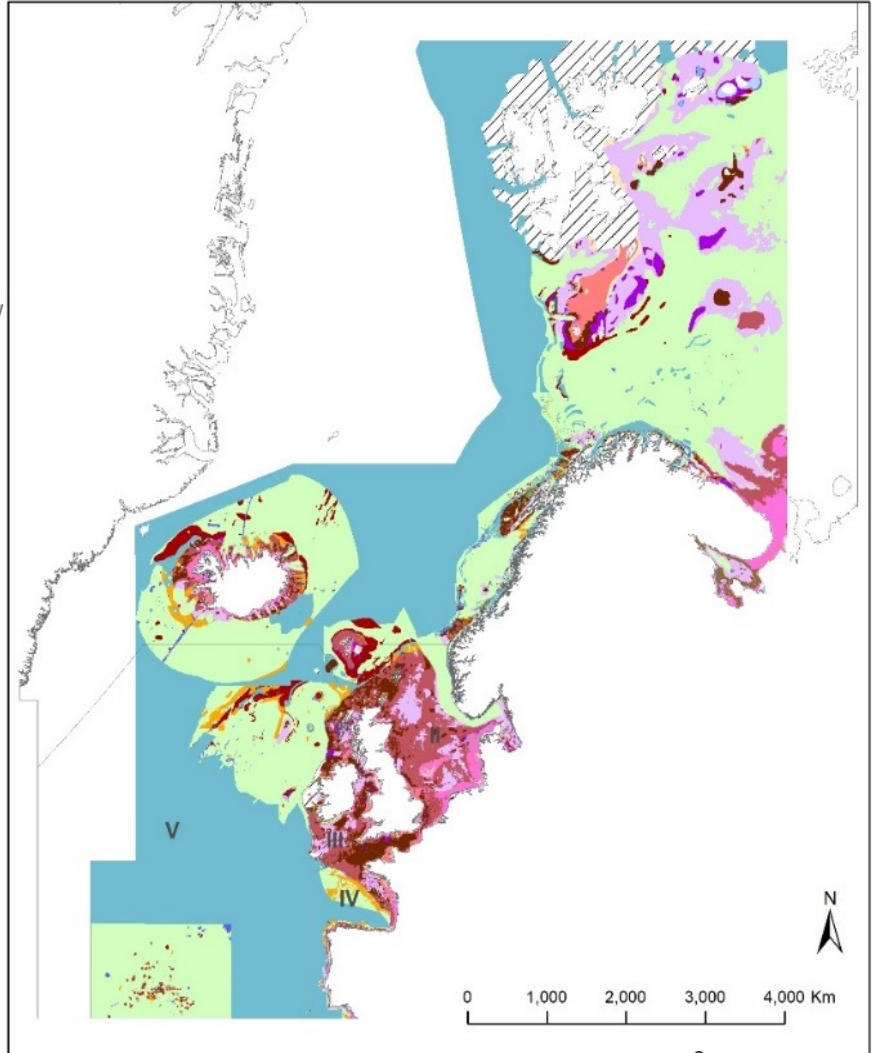


**EMODnet**

→ *the EMODnet broad-scale seabed habitat map for Europe (EUSeaMap 2019) used*

# OSPAR seabed habitat map based on EUSeaMap 2019 (EUNIS classification)

- EUNIS Habitats**
- OSPAR Regions
  - A3.1: Atlantic and Mediterranean high energy infralittoral rock
  - A3.2: Atlantic and Mediterranean moderate energy infralittoral rock
  - A3.3: Atlantic and Mediterranean low energy infralittoral rock
  - A3: Infralittoral rock and other hard substrata
  - A4.12 or A4.27 or A4.33: Sponge communities on deep moderate energy circalittoral rock or Faunal communities on deep low energy circalittoral rock
  - A4.12: Sponge communities on deep circalittoral rock
  - A4.1: Atlantic and Mediterranean high energy circalittoral rock
  - A4.27: Faunal communities on deep moderate energy circalittoral rock
  - A4.2: Atlantic and Mediterranean moderate energy circalittoral rock
  - A4.33: Faunal communities on deep low energy circalittoral rock
  - A4.3: Atlantic and Mediterranean low energy circalittoral rock
  - A4: Circalittoral rock and other hard substrata
  - A5.13: Infralittoral coarse sediment
  - A5.14: Circalittoral coarse sediment
  - A5.15: Deep circalittoral coarse sediment
  - A5.23 or A5.24: Infralittoral fine sand or Infralittoral muddy sand
  - A5.25 or A5.26: Circalittoral fine sand or Circalittoral muddy sand
  - A5.27: Deep circalittoral sand
  - A5.33 or A5.34: Infralittoral sandy mud or Infralittoral fine mud
  - A5.33: Infralittoral sandy mud
  - A5.34: Infralittoral fine mud
  - A5.35 or A5.36: Circalittoral sandy mud or Circalittoral fine mud
  - A5.35: Circalittoral sandy mud
  - A5.36: Circalittoral fine mud
  - A5.37: Deep circalittoral mud
  - A5.43: Infralittoral mixed sediments
  - A5.44: Circalittoral mixed sediments
  - A5.45: Deep circalittoral mixed sediments
  - A5: Sublittoral sediment
  - A6.11: Deep-sea rock
  - A6.2: Deep-sea mixed substrata
  - A6.3 Deep-sea sand or A6.4 Deep-sea muddy sand
  - A6.5: Deep-sea mud
  - A6: Deep-sea bed
  - Na



Date: 14/06/2021

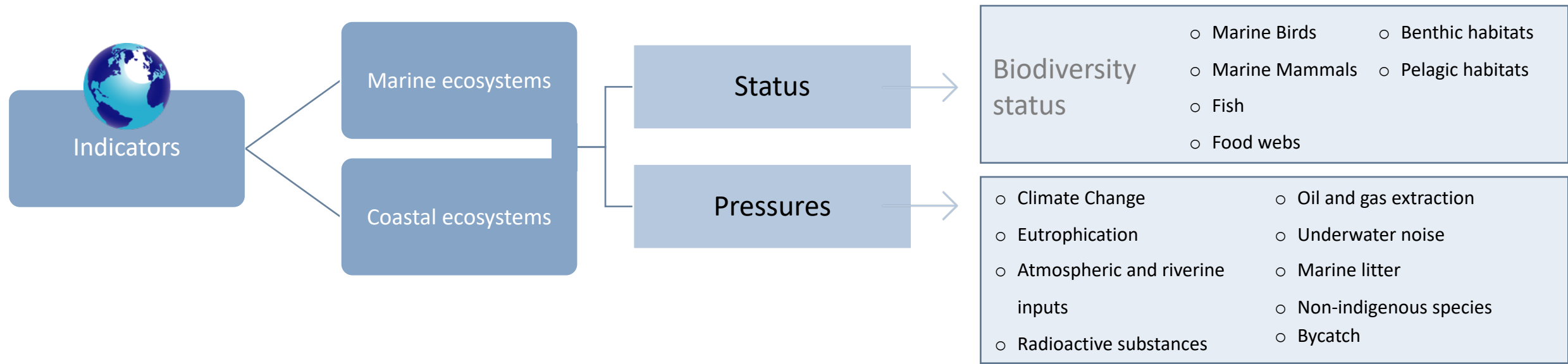
- Good starting point, extent account basis of NCA
- **Almost 70%** of the OSPAR Maritime Area identified
- Baseline for future accounts?

EUNIS Habitat		Extent Area (km2)	Extent Area (ha)
Level 2	Level 3		
A3: Infralittoral rock and other hard substrata		2,429.59	242,959.40
	A3.1: Atlantic and Mediterranean high energy infralittoral rock	3,768.38	376,837.57
	A3.2: Atlantic and Mediterranean moderate energy infralittoral rock	1,293.70	129,369.70
	A3.3: Atlantic and Mediterranean low energy infralittoral rock	1,490.00	148,999.60
A4: Circalittoral rock and other hard substrata		2,850.93	285,092.77
	A4.1: Atlantic and Mediterranean high energy circalittoral rock	18,696.42	1,869,642.19
	A4.2: Atlantic and Mediterranean moderate energy circalittoral rock	11,143.75	1,114,375.20
	A4.3: Atlantic and Mediterranean low energy circalittoral rock	31,067.48	3,106,747.69
A5: Sublittoral sediment		6,784.75	678,475.40
	A5.1: Sublittoral coarse sediment	373,680.92	37,368,092.26
	A5.2: Sublittoral sand	683,052.59	68,305,259.10
	A5.3: Sublittoral mud	453,612.14	45,361,213.77
	A5.4: Sublittoral mixed sediments	55,398.25	5,539,825.10
A6: Deep-sea bed		4,200,112.73	420,011,273.35
	A6.1: Deep-sea rock and artificial hard substrata	46,089.16	4,608,916.40
	A6.2: Deep-sea mixed substrata	147,561.10	14,756,109.53
	A6.3 Deep-sea sand or A6.4 Deep-sea muddy sand	150,385.88	15,038,588.17
	A6.5: Deep-sea mud	3,033,135.36	303,313,536.47
	Na	170,298.02	17,029,801.74
	<b>Total Area</b>	<b>9,392,851.15</b>	<b>939,285,115.43</b>



# 2. Condition account

*“Ecosystem condition accounts record the condition of ecosystem assets in terms of selected characteristics at specific points in time. Over time, they record the changes to their state and provide valuable information on the health of ecosystems”*



# 3. Physical supply and use accounts

*“The supply and use tables intend to **record the flows of final ES** supplied by ecosystem assets, and used by economic units during an accounting period”*

- The marine natural capital accounts published by **the Netherlands and UK** are used as main **guidance**
- The ES flow accounts in physical terms include the **supply of final ES by ecosystem type** and the **use** of the services selected by **economic units**
- The **economic units** distinguish between **households**, **enterprises** and **government**, and constitute one of the central features of ecosystem accounting

ES and abiotic flows included in the report

Ecosystem services	
Provisioning services	Fisheries Aquaculture
Regulating services	Carbon sequestration
Cultural services	Outdoor recreation
Abiotic flows	
Renewable electrical energy from wind power	
Extraction of oil and gas	
Extraction of minerals (sand & gravel)	

# 4. Monetary supply and use accounts

Commonly, estimates of ES in monetary terms are based on estimating prices for individual ES and multiplying through by the physical quantities.

- The estimations used are calculated by **benefit transfer** from other studies conducted within the OSPAR area
- Benefit transfer is the projection of benefits from one place and time to another time at the same place or to a new place. Thus, benefit transfer includes the adaptation of an original study to a new policy application at the same location or the adaptation to a different location.



*From physical terms*



*To monetary terms*

## 5. Monetary asset account

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- **Information on stocks and changes** (additions and reductions) of ecosystem assets.
- This includes **accounting for ecosystem enhancement and degradation.**
- **Beyond GDP value**



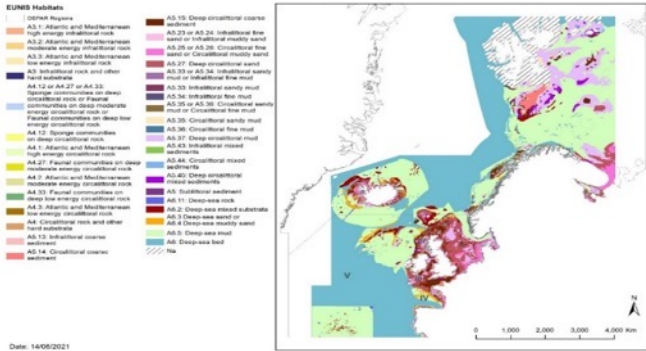


# SEEA-EA framework for marine NCA in the NEA

## STOCK ACCOUNTS (& change in the stocks)

## FLOW ACCOUNTS

### 1 EXTENT ACCOUNT



### 2 CONDITION ACCOUNT

Thematic Assessment	Indicator State change
A. Abiotic ecosystem characteristics	
A.1. Physical state characteristics	
A.2. Chemical state characteristics	
Benthic habitat	• Condition of benthic habitat communities: the common conceptual approach (BH2)
B. Biotic ecosystem characteristics	
B.1. Compositional state characteristics	
Marine Birds	• Marine bird abundance (B1)
Pelagic habitats	• Plankton biomass &/or abundance (PH2)
B.2. Structural state characteristics	
Food webs	• Biomass, species composition and spatial distribution of zooplankton (FW6)
B.3. Functional state characteristics	
Marine Mammals	• Grey seal pup production (M5)
C. Landscape level characteristics	
C.1. Landscape and seascape characteristics	

### 3 PHYSICAL ECOSYSTEM SERVICES ACCOUNTS



### 4 MONETARY ECOSYSTEM SERVICES ACCOUNTS



### 5 ECOSYSTEM ASSET ACCOUNT

Asset value of **125.75 EUR billion**, wherein **more than 40%** value comes from **carbon sequestration and outdoor recreation** (which are underestimated)

Ecosystem Services	Units	Industry								Households	Government	Export	
		Agriculture, hunting and fisheries	Mining and quarrying	Manufacturing	Electricity and gas supply	Construction wholesale and transportation	Water supply and treatment	Tourism and recreation	Other industries				
PROVISIONING													
Fisheries	mil. t fish landings	8,14											
REGULATION & MAINTENANCE													
Carbon sequestration	Mil tCO2e carbon captured										40,31		
CULTURAL													
Outdoor recreation	No. of potential visits										*		
Abiotic flows													
Generation of electricity from wind power	MW				6,773								
Minerals extraction	mil. t		46,09										
Oil and gas extraction	mil. TOEQ		295,49										

Physical accounts  
Monetary accounts

# Some NCA Applications



Understanding the **interdependency** of the blue **economy** and the marine **environment**



**Communication** and reporting  
(common language and narrative)



NCA as a tool to support **operational and management decisions** (e.g. Marine and Coastal Spatial Planning)



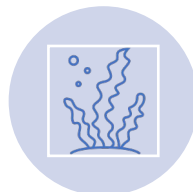
**Finance and investment** allocation



**Regulatory decision**  
(e.g. conditional permits and licenses for ocean economic activities)



Identify **trade-offs**



**Monitor status** of the marine environment and **ocean analysis**

# More policy implications



**Unified** agreed framework



**Measuring a sustainable use** of the marine environment



**Support marine policies** related to many topics  
*e.g. underwater noise, habitat protection...*



**Measuring the impact** of economic activities and **how to mitigate** them  
*e.g. the Netherlands plan to build many offshore windfarms*



Marine natural capital accounts can provide data and indicators for  
**Sustainability Development Goals**  
*e.g. SDG 14 - 'Life below water'*

# Some first lessons learned and final remarks

- > **Ecosystem extent account:**
  - 2d maps are available, but the sea is 3d. Additional challenge!
  - Lack of maps over time to record changes
- > **Condition account:**
  - Lots of data available. What to choose?
  - Most OSPAR condition indicators not focus on water column or compiled by ecosystem type (too weighted towards animal/species indicators)
- > **Ecosystem services:**
  - Include more ecosystem services in the next version of accounts
  - Links with other accounts (ecosystem types, condition)
- > **Monetary accounts:**
  - Valuation still controversial, methodology substantial impact on results

→ *Different limits, uncertainties, and risks identified during the process underline the **need for further standardisation and data challenges.***

→ *However, **increasing collaboration and harmonisation** among countries will improve and **facilitate NCA in the future.***



# Thank you for listening!

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***“This is a historic step forward towards transforming how we view and value nature. We will no longer be heedlessly allowing environmental destruction and degradation to be considered economic progress.”***

UN Secretary-General António Guterres