

Experimenting biophysical marine accounts and economic accounts based on maintenance cost in France

Introduction

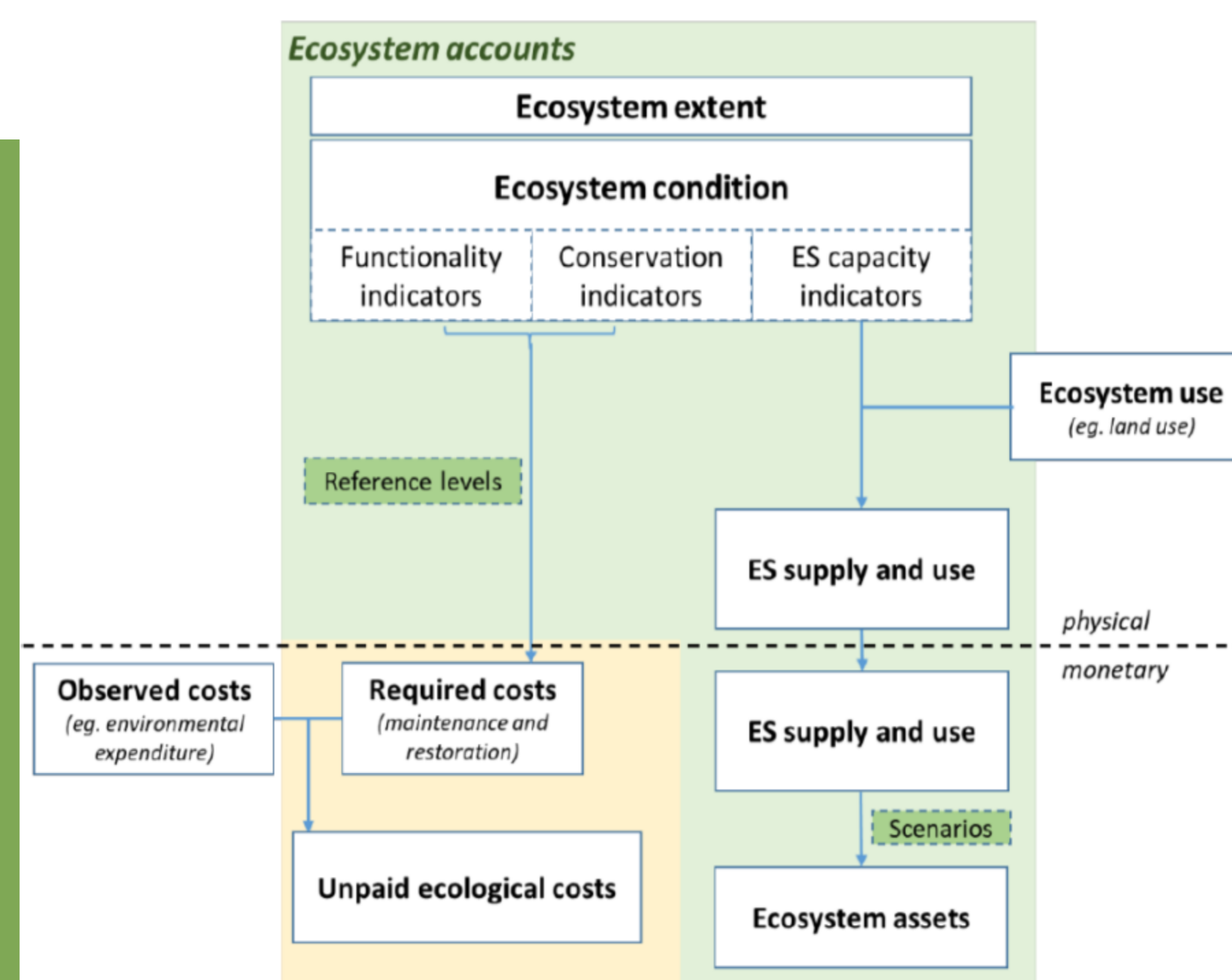
Focus on marine ecosystems in the French Exclusive Economic Zone (EEZ)

Benthic (seafloor) and pelagic (water column) ecosystems

Specific difficulties linked to the marine environment:

Context of poor datasets on habitats and species over space and time

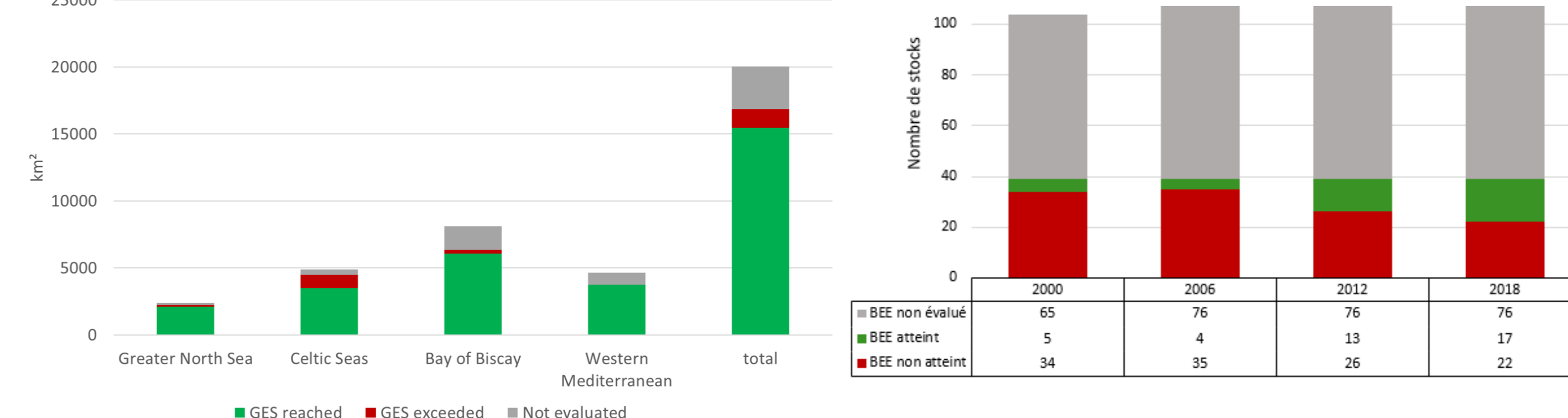
3Dimensions environment



Objectives

- Align the SEEA EA with the needs of ecosystem management and the principles of strong sustainability
- Extent account + ecosystem condition account of marine ecosystems
- Produce condition account divided in three categories linked to management objectives (1) Function: the maintenance of ecosystem overall functionality (2) Heritage: The conservation of specific features or elements (3) Capacity: The capacity of ecosystems to sustainably provide goods and services
- Define target conditions of good ecological status based on Marine Strategy Framework Directive
- Assess Unpaid ecological cost from gap between observed costs and required costs for the maintenance and restoration of natural capital. Net of incurred cost they allow to derive a measure of unpaid ecological costs (Vanoli, 1995, 2015)

Areas reaching good ecological status for Eutrophication (left) & number of fish stocks (right)



Unpaid Ecological Cost	Descriptors	ECNS	CS	BoB	WM	France
Heritage	Biodiversity (D1 – OFB)	19,911,500€	19,911,500€	19,911,500€	19,911,500€	79,646,000€
Heritage	Biodiversity (D1 – DOCOBs)	2,834,750€ - 3,825,000€	2,834,750€ - 3,825,000€	2,834,750€ - 3,825,000€	2,834,750€ - 3,825,000€	11,339,000€ - 15,300,000€
Capacity	Fishing (D3) – MSFD	28,287,000€ - 100,832,000€	26,144,000€ - 94,145,000€	81,054,000€ - 408,958,000€	58,724,000€ - 99,683,000€	194,207,000€ - 703,618,000€
Capacity	Fishing (D1 + D3 + D6 – outing of trawlers)	91,534,000€	35,164,000€	144,486,000€	16,008,000€	287,192,000€
Function	Eutrophication (D5 – MSFD)	3,049,000€ - 8,209,000€	29,074,000€ - 44,207,000€	2,164,000€ - 16,874,000€	213,000€ - 10,320,000€	34,500,000€ - 79,583,000€
Function	Micropollutants (D8 – MSFD)	153,651,000€ - 228,849,000€	36,256,000€ - 40,166,000€	21,553,000€ - 63,131,000€	80,178,000€ - 118,476,000€	291,908,000€ - 450,622,000€
Function	Health (D9 – MSFD)	6,394,000€ - 583,867,000€	9,476,000€ - 641,179,000€	7,428,000€ - 300,804,000€	25,981,000€ - 349,558,000€	49,279,000€ - 1,875,408,000€

Methods

- Ecosystem accounting area : French EEZ, divided into four marine sub-regions
- Ecosystem types : EUNIS classification (Figure 3)
- Unpaid ecological costs computed four steps (1) the correlation between observed costs evolution and ecosystem condition trends (2) Application of a dose-response model allowing the estimation of the change in ecological state (3) estimation the cost required to reach reference level from current condition (4) difference between required costs and observed cost to calculate unpaid ecological cost
- Data sources : French biodiversity office (OFB), Ifremer, SIMM, Quemmerais-Amice et al., (2020), CarpeDiem, INPN, MSFD reports

Results

- Extent: No-trend datasets available, composite map
- Contains multiple indicators that are all spatially explicit, but with various timeframes available (Table 1)
- Target conditions, described for 2/9 indicators : eutrophication (Figure 4) and fish stocks (Figure 5)
- Unpaid Ecological cost computed for several ecological descriptors as yearly required costs to reach reference levels of good ecological status (Table 2), broader than condition indicators described above

Analysis

Building ecosystem accounts allows helps to (1) assist in the identification of data gap (2) harmonize and integrate existing ecosystem monitoring processes (3) foster the development of more integrated policies (4) relate state of ecosystems to economic agents, but no spatial-explicit data on this link

Further work include (1) develop public architecture of spatial datasets (2) institutional capacity to scale-up the project (3) limited availability of spatial datasets for the marine environment and temporal trends, (4) clearly define reference conditions

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