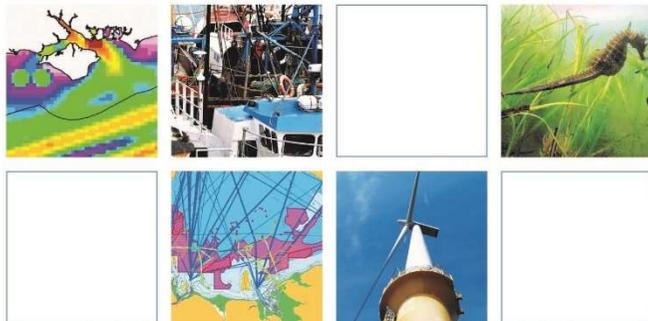


Spatial Data and Evidence Projects

Incorporating Marine Ecosystem Services in Ireland's Marine Planning System

28th November 2019



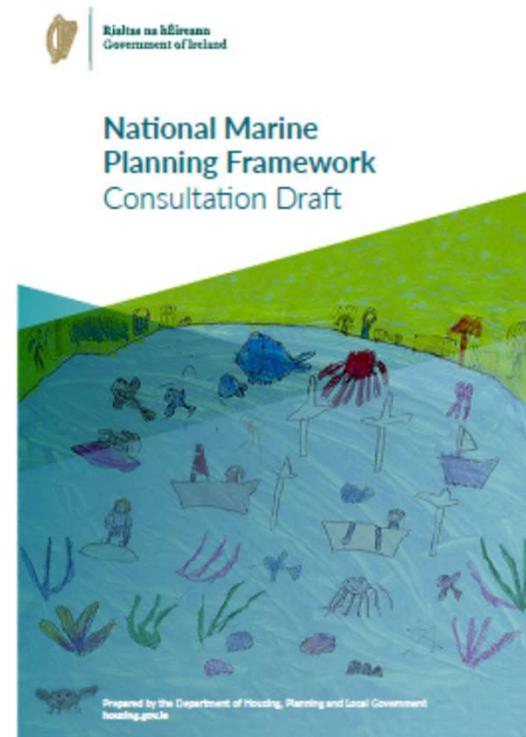
European Maritime & Fisheries Fund



- ❑ National Marine Planning Framework
- ❑ Spatial Data and Evidence Projects
- ❑ Marine Natural Capital and Ecosystem Services
 - ❑ Marine NC and ES Frameworks
 - ❑ Quantifying and spatialising marine NC and ES
 - ❑ Using marine NC and ES information in decision-making

Marine Planning and the NMPF

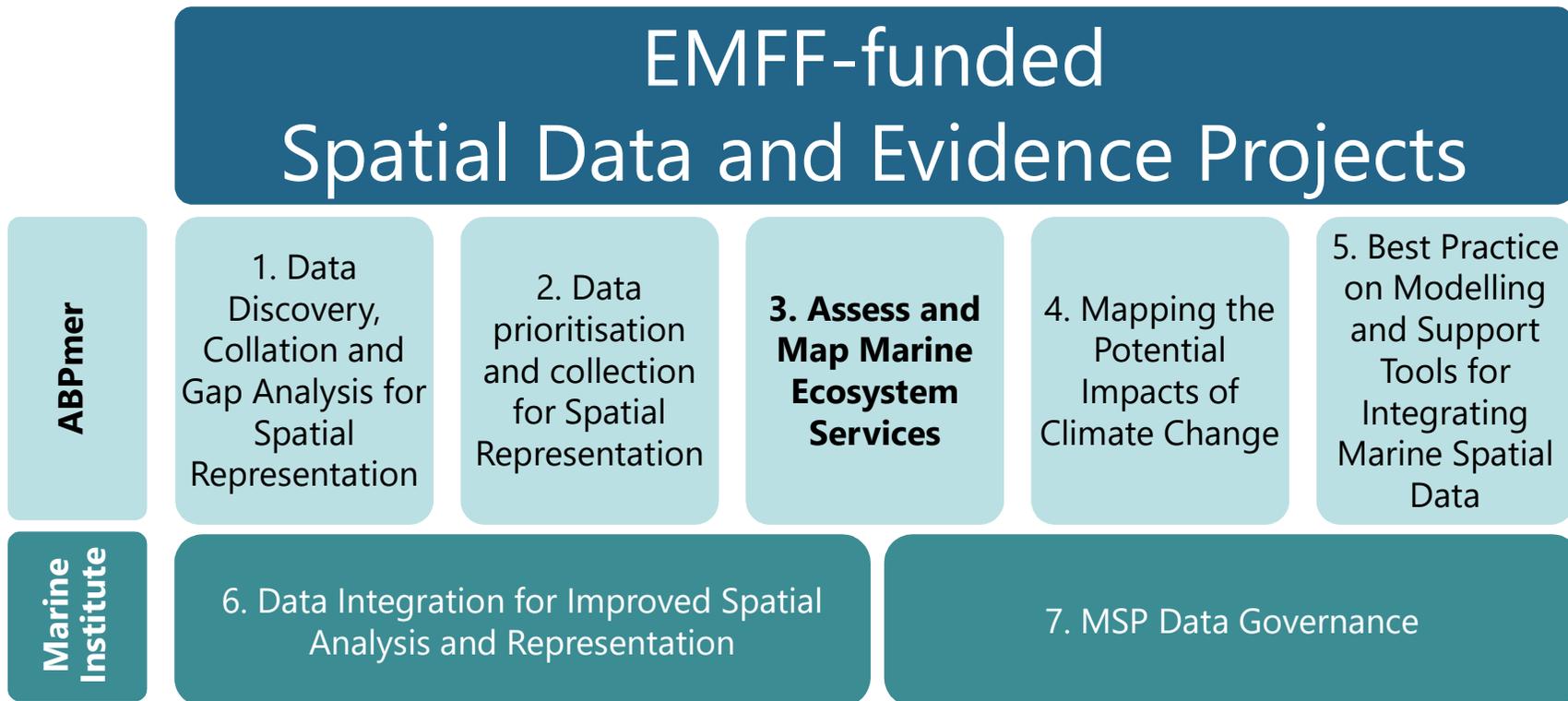
- ❑ Marine planning definition
- ❑ MSP Directive – March 2021
- ❑ NMPF - consultation draft
- ❑ Characteristics of marine planning
 - ❑ Broad scope – economic, social and environmental
 - ❑ Plan is to inform and guide decision-making
 - ❑ Use of ecosystem approach



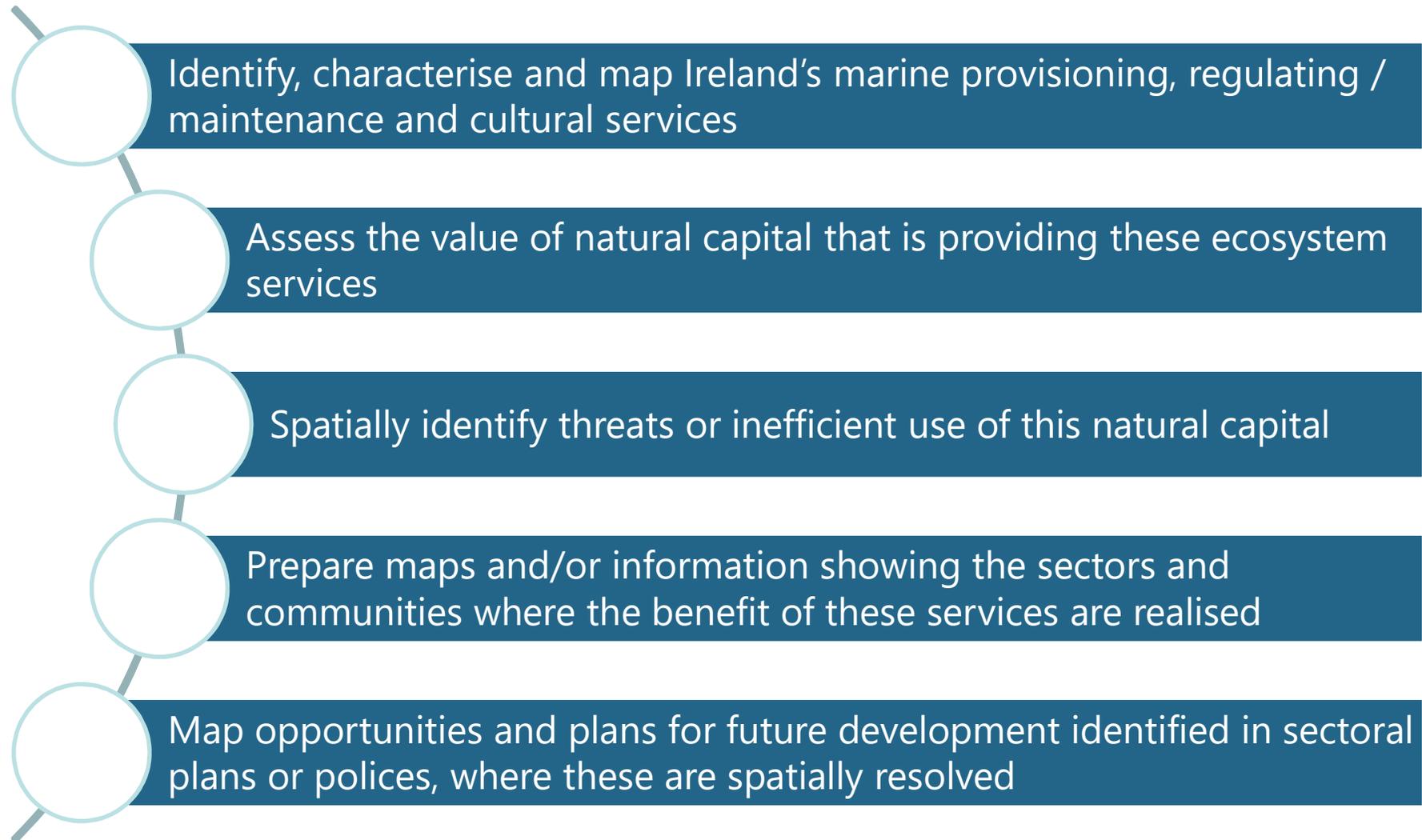
Marine spatial planning is a public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that usually have been specified through a political process.

Spatial Data and Evidence Projects Overview

- ❑ DHPLG leading implementation of MSP
- ❑ MI supporting implementation, particularly on data and evidence

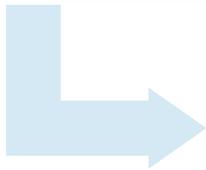


Project 3 Objectives

- 
- Identify, characterise and map Ireland's marine provisioning, regulating / maintenance and cultural services
 - Assess the value of natural capital that is providing these ecosystem services
 - Spatially identify threats or inefficient use of this natural capital
 - Prepare maps and/or information showing the sectors and communities where the benefit of these services are realised
 - Map opportunities and plans for future development identified in sectoral plans or policies, where these are spatially resolved

Project 3 Tasks

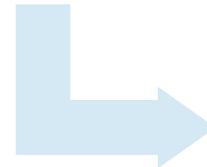
Task 3.1 - Framework development and characterisation of Ireland's marine ecosystem services



Task 3.2 - Data collection



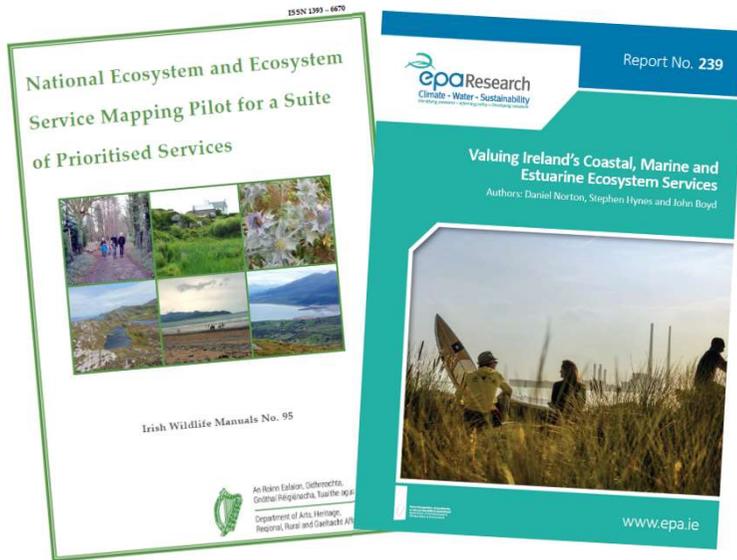
Task 3.3 - Natural capital and ecosystem services mapping



Task 3.4 - Natural capital and ecosystem services opportunities and threats mapping

Previous Work

□ Ireland:



□ UK studies:

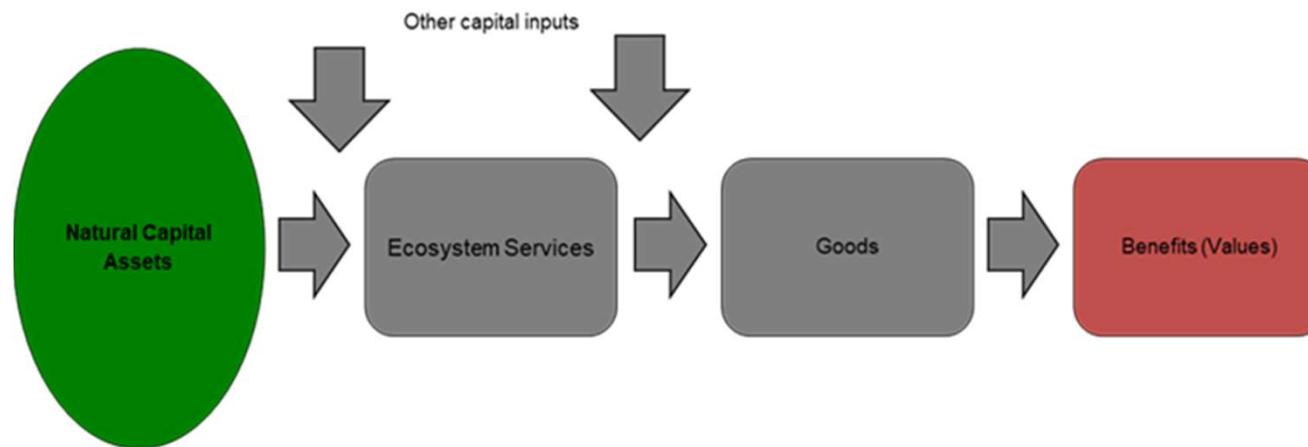
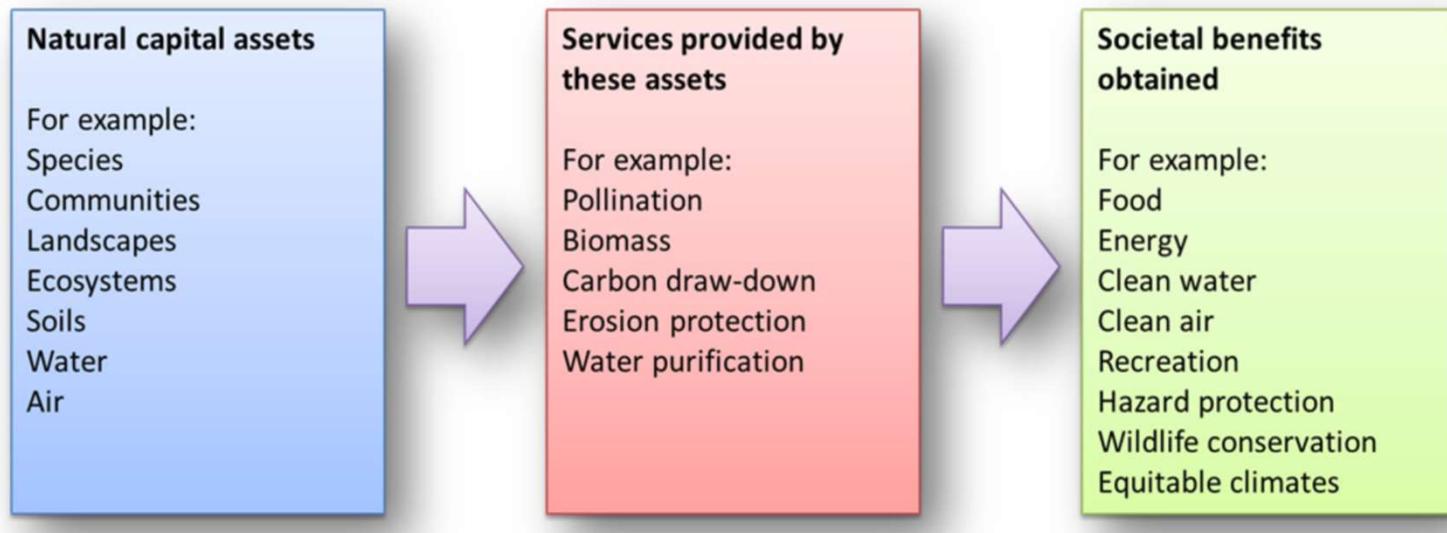


□ European studies:



... and theoretical studies looking at ecosystem approach in marine planning

NC and ES Frameworks



UK Natural Capital Committee Framework

Terrestrial vs marine NC and ES

Terrestrial	Marine
Approaches largely 2d, based on habitat	Very much 3d – water surface, water column, seabed and subsea bed
Linkages between assets and services can be modelled relatively simply (based on habitat distribution)	Linkages between assets and services can be very complex (e.g. food production (fish); climate regulation)
	Other capital inputs important in realising offshore provisioning benefits (e.g. vessels)
Complex interplay between marine and coastal environments (many land-based coastal benefits relate to their marine setting)	
Evidence base on ES value more extensive	Evidence base on ES value less extensive

- ❑ Published NC frameworks are high-level
- ❑ No agreed detailed framework for assets/stocks
- ❑ Stocks expressed as (e.g. UK NCC):
 - ❑ Species (inc. genetic variation)
 - ❑ Ecological Communities (Habitats)
 - ❑ Soils
 - ❑ Freshwaters
 - ❑ Land
 - ❑ Atmosphere
 - ❑ Minerals
 - ❑ Sub-soil assets
 - ❑ Coasts
 - ❑ Oceans

- ❑ Broad scope for marine planning
 - ❑ Needs to cover both coastal margins and marine
 - ❑ Includes abiotic natural capital (e.g. energy, aggregates)
 - ❑ Includes other capital inputs (e.g. infrastructure, vessels, footpaths)

Asset Categories for Marine Planning

Habitat Assets	Species Assets	Abiotic Assets	Other Capital Inputs
Coastal Margins	Fish and cephalopods	Marine aggregates	Marine Infrastructure
Sand dunes	Phytoplankton	Oil and gas reserves	Coastal open space
Machair	Zooplankton	Offshore wind	Slipways and marinas
Shingle	Marine mammals	Wave energy	Cultural heritage
Sea cliffs	<ul style="list-style-type: none"> ▪ Cetacean 	Tidal stream energy	Ports and harbours
Coastal	<ul style="list-style-type: none"> ▪ Seals 	Tidal range energy	Vessels
Intertidal rock	<ul style="list-style-type: none"> ▪ Otter 	Water surface	Landside Infrastructure <ul style="list-style-type: none"> ▪ Coastal footpaths ▪ Car parks ▪ Coastal access
Intertidal sediments	Shellfish	Seawater	
Mudflat	<ul style="list-style-type: none"> ▪ Molluscan 	Seabed	
Saltmarsh	<ul style="list-style-type: none"> ▪ Crustacean 	Subsurface geology	
Littoral seagrass	<ul style="list-style-type: none"> ▪ Echinoderms 	Seascape	
Biogenic reef	Macroalgae		
Shelf	<ul style="list-style-type: none"> ▪ Kelps 		
Subtidal rock	<ul style="list-style-type: none"> ▪ Wracks 		
subtidal sediments	<ul style="list-style-type: none"> ▪ Red algae 		
Sublittoral vegetated habitats	<ul style="list-style-type: none"> ▪ Green algae 		
Biogenic reef	Birds		
Deep sea rock			
Deep-sea sediment			
Pelagic			

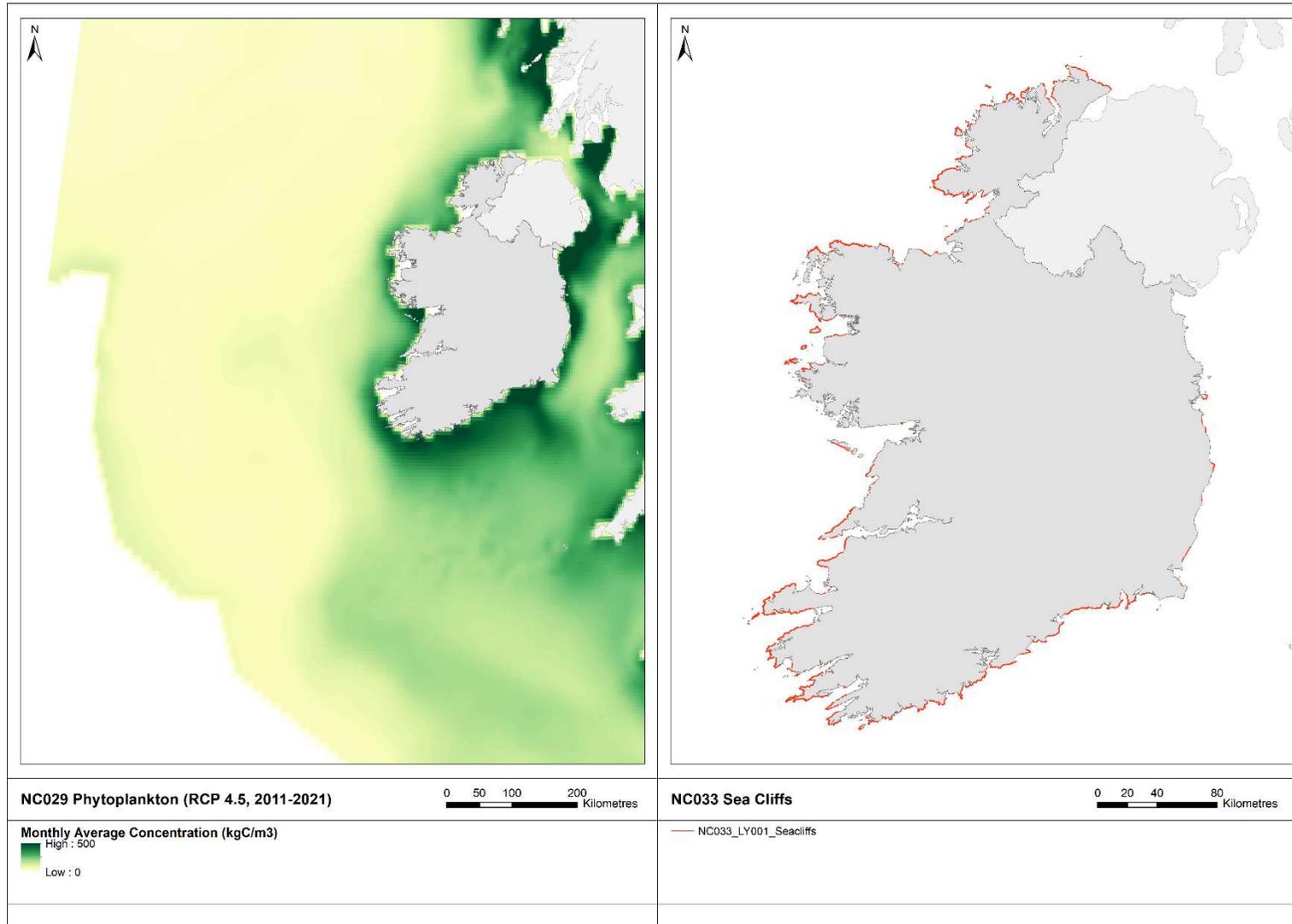
- ❑ Broad scope for marine planning
 - ❑ Include abiotic services
- ❑ Consistent with existing work on ES in Ireland

⇒ CICES 5.1

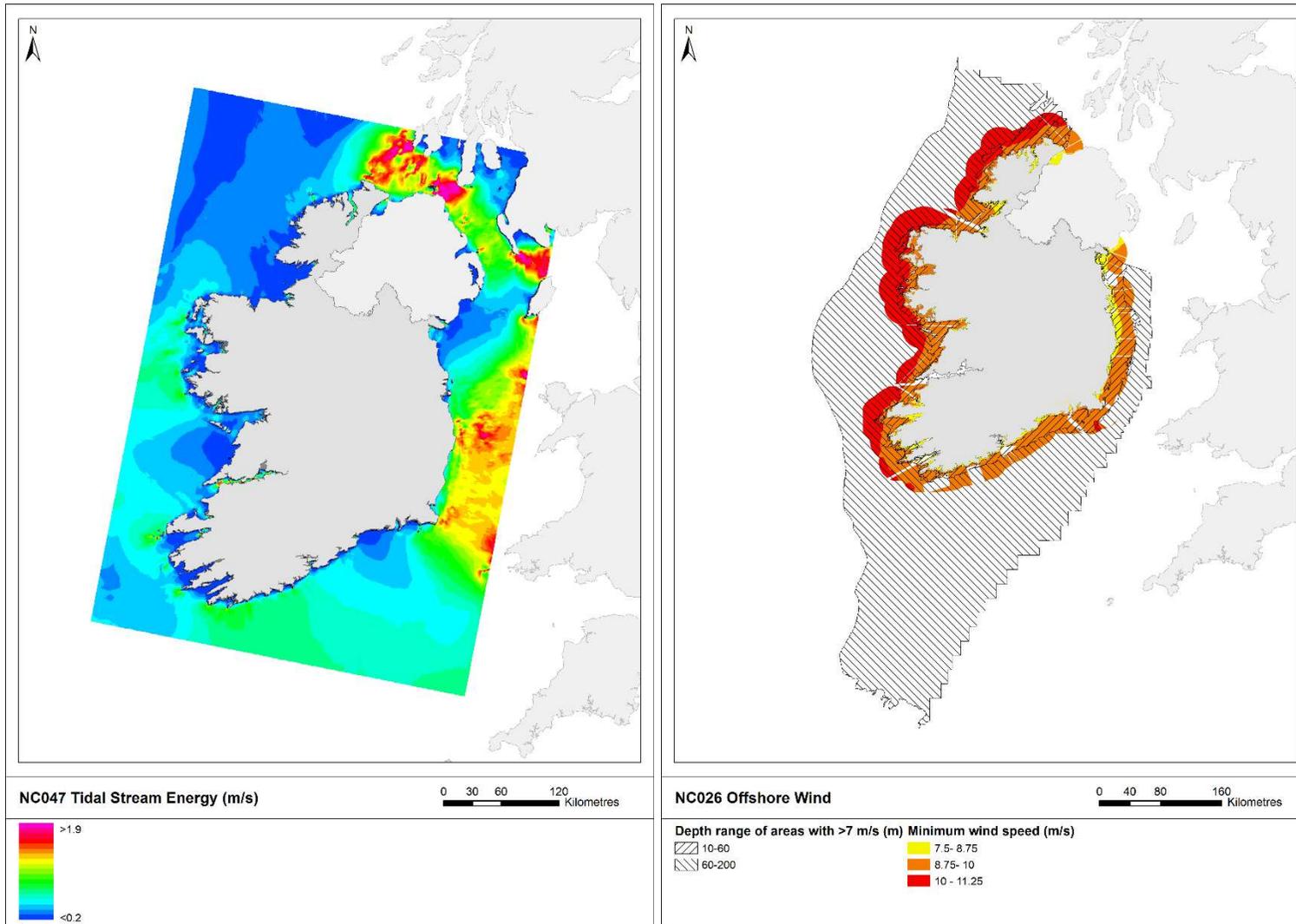
Final Marine ES Framework (after CICES 5.1)

Provisioning Services	Regulating Services	Cultural Services
Seaweed aquaculture	Mediation of wastes	Recreation and tourism
Fish and shellfish aquaculture	Regulation of flows	Scientific and educational
Wild seaweed harvesting	Lifecycle maintenance	Cultural heritage
Wild capture fisheries and shellfisheries	Pest and disease control	Aesthetic
Genetic material from all biota	Climate regulation and carbon sequestration	Spiritual and emblematic
Water for non-drinking purposes		Existence and bequest
Mineral substances: aggregates, oil and gas		
Non-mineral substances: offshore wind, wave and tidal energy.		

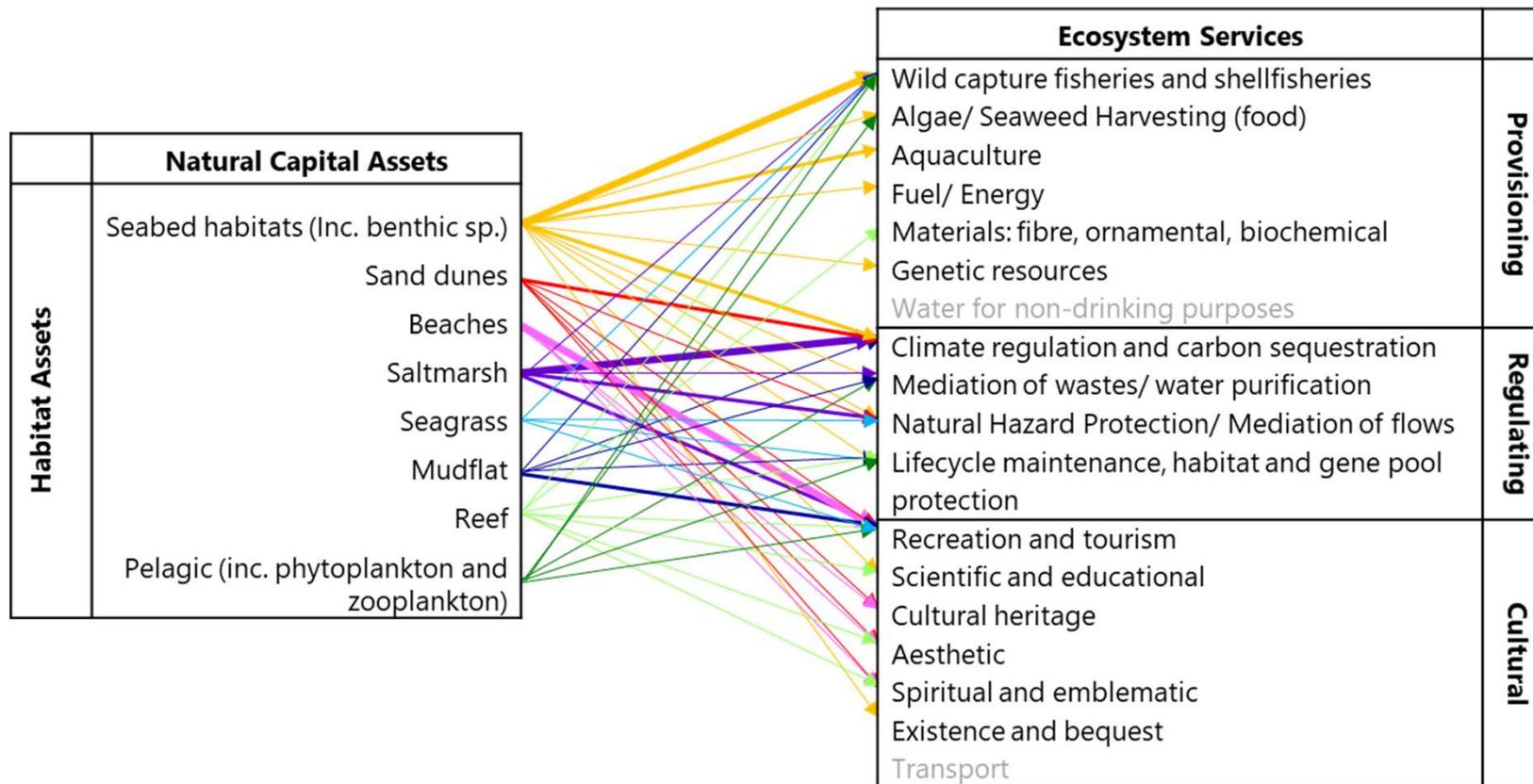
Biotic assets – phytoplankton and sea cliffs



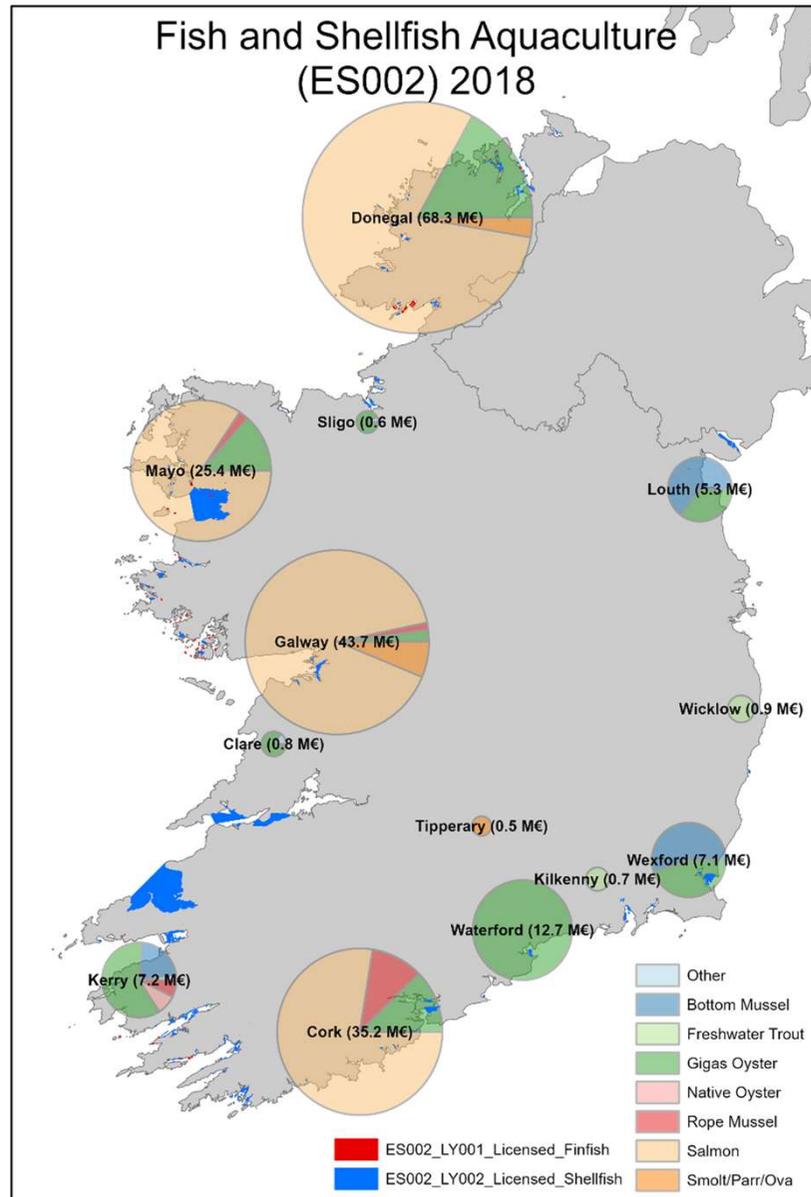
Abiotic assets – tidal energy and offshore wind



Linkages between NC Assets and ES are Complex



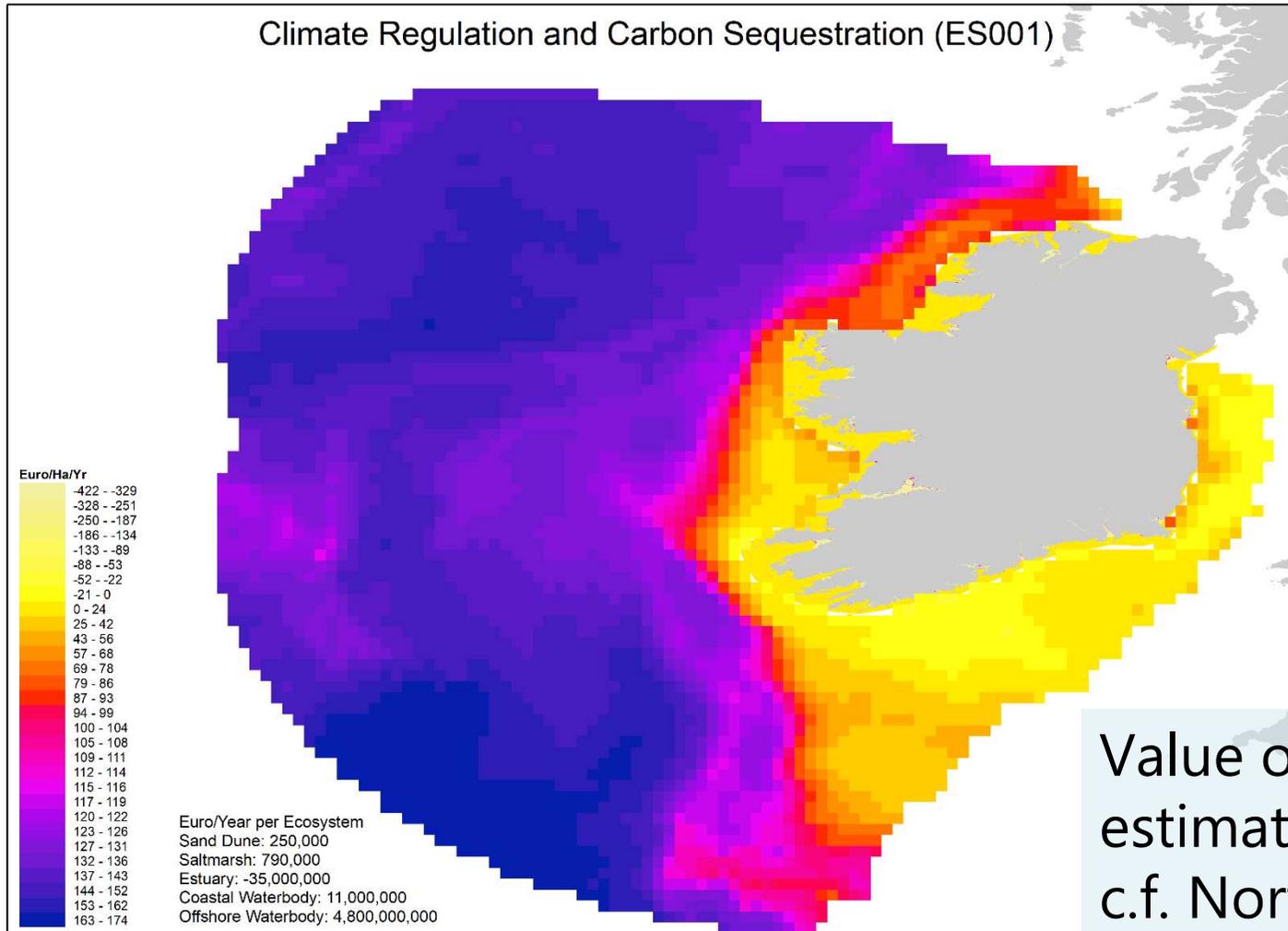
Provisioning Service - fish and shellfish aquaculture



Regulating Service - Climate Regulation

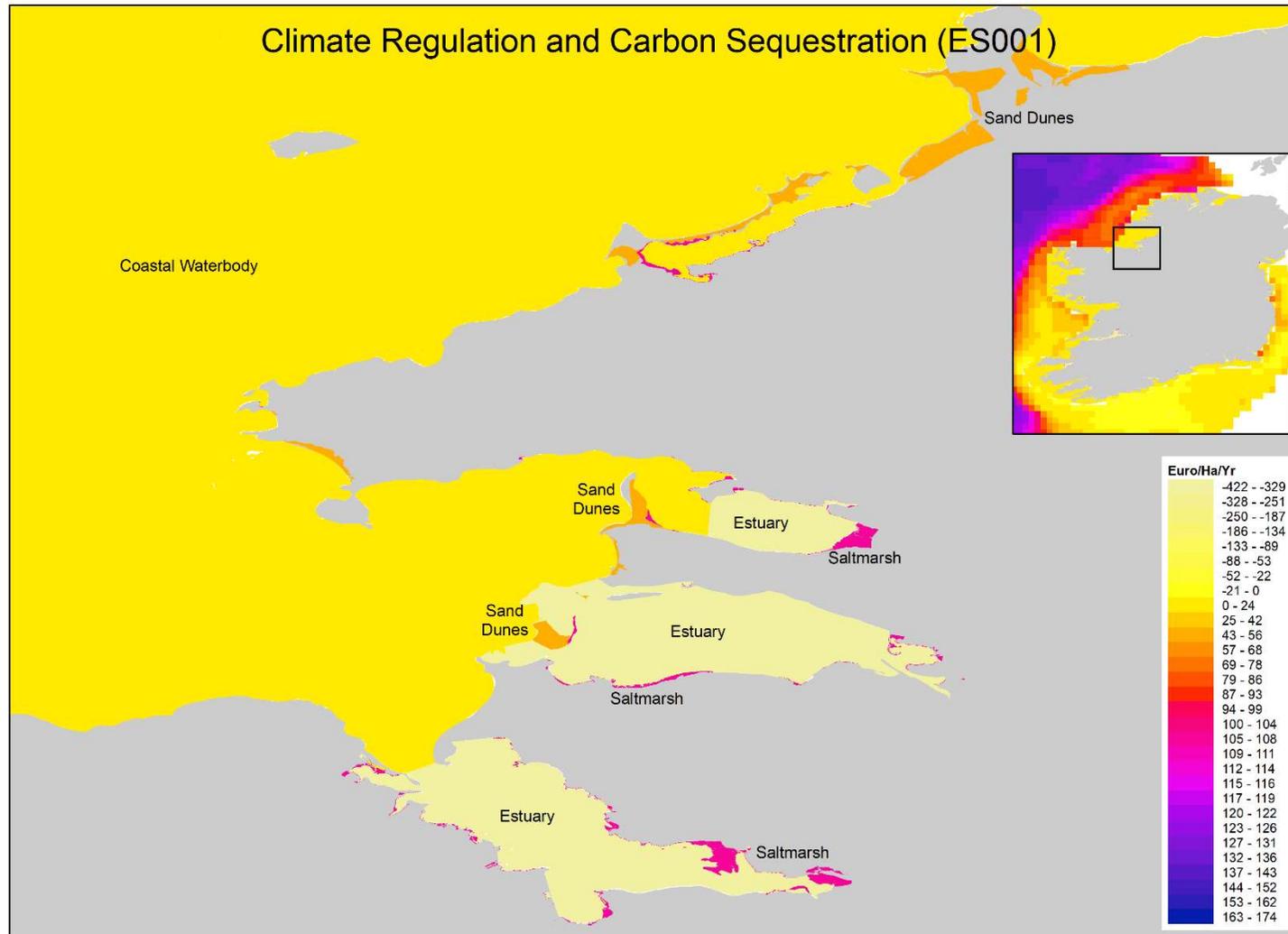
- ❑ Marine environment plays important role in climate regulation (CO₂, methane, NO_x, water vapour)
- ❑ Limited understanding of long-term carbon sequestration in marine environment (complex science)
 - ❑ Some habitats known to sequester carbon (e.g. saltmarsh, deep sea sediments over long time scales)
- ❑ Regional scale models can simulate air-sea carbon flux, near bed carbon etc e.g. POLCOMS-ERSEM
- ❑ Spatial model developed incorporates:
 - ❑ Air-sea carbon flux;
 - ❑ Estuarine/coastal flux
 - ❑ Some specific habitats – saltmarsh; sand dunes

Indicative climate regulation service map



Value of service
estimated €5bn p.a.
c.f. Norton *et al.*
(2018) €1bn p.a

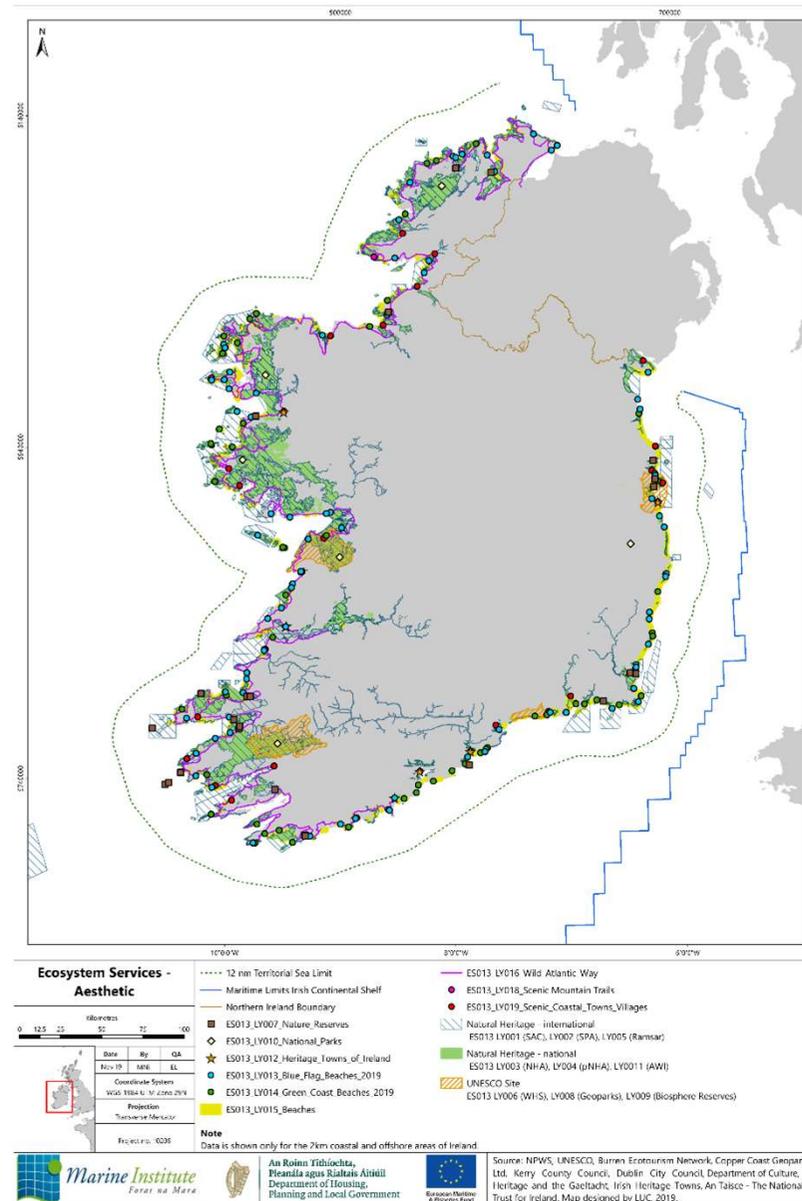
Climate regulation - detail



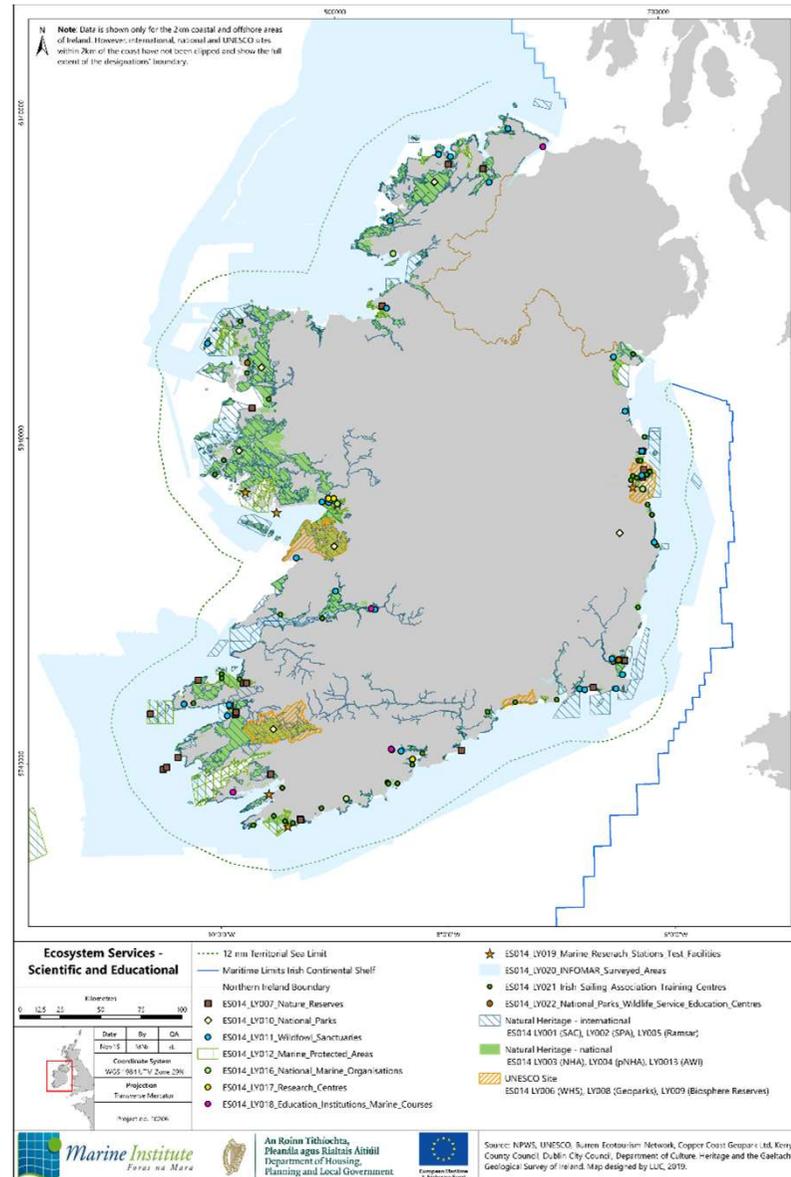
Cultural Services - Aesthetics

- ❑ Features that support aesthetic benefits:
 - ❑ Natural Heritage and World Heritage Sites
 - ❑ Ancient and Long-Established Woodland
 - ❑ Special Amenity Order areas
 - ❑ Local nature and landscape designations
 - ❑ Irish Heritage Towns and terrestrial heritage assets
 - ❑ Green Coast/Blue Flag beaches and 'Beaches' in Failte Ireland data
 - ❑ Wild Atlantic Way
 - ❑ Coastal touring/scenic routes; scenic mountain trails;
 - ❑ Scenic coastal towns and villages
 - ❑ Peninsulas and islands

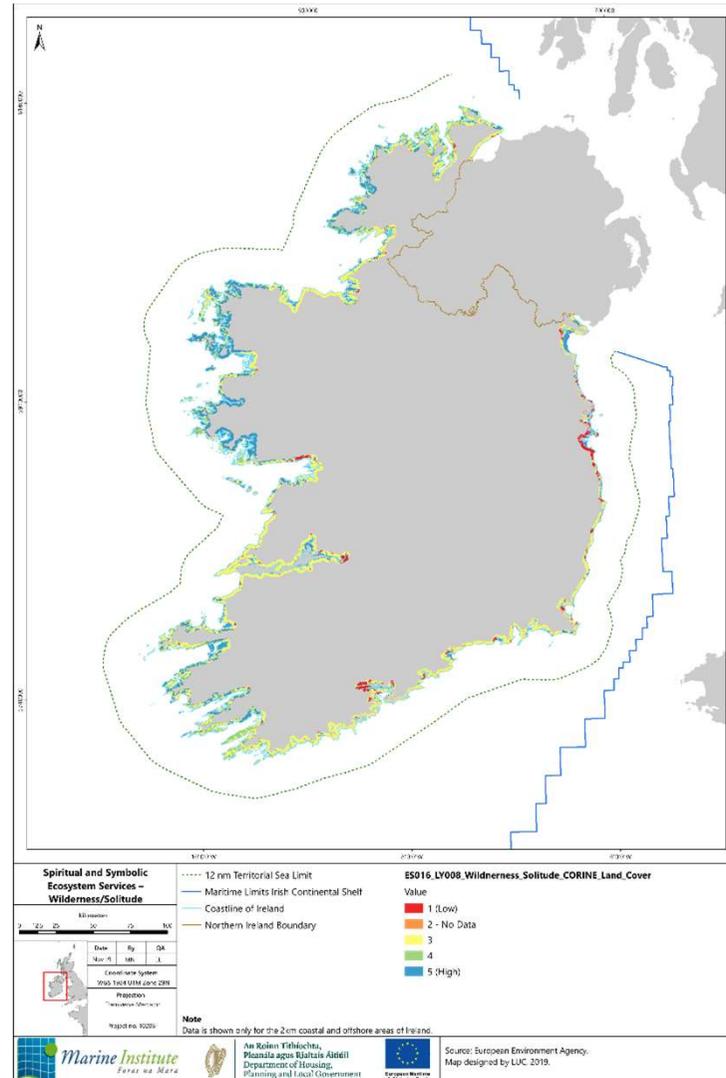
Aesthetic



Scientific & Educational



Spiritual & Symbolic - Wilderness



Threats and Opportunities

- ❑ Threats:
 - ❑ Overexploitation of fisheries
 - ❑ Intensive coastal tourism and recreation
 - ❑ Anthropogenic pressures
- ❑ Opportunities:
 - ❑ Biotic services – fish, shellfish and algae aquaculture
 - ❑ Abiotic services – offshore renewables, marine aggregates?
 - ❑ Cultural services – sensitive tourism and recreation development

Practical application of NC/ES in MSP

- ❑ Limited application to date
 - ❑ Marine NC/ES approaches seen as experimental and challenging to apply (lack of data/understanding)
 - ❑ Issues being identified by NC/ES thinking already recognised
- ❑ But...
 - ❑ NC/ES is integrative and aligns well with MSP objectives
 - ❑ Provides means to monetise environmental costs and benefits to better take them into account in decision-making
 - ❑ Draft NMPF policies require it ..

Example Draft NMPF Policies

❑ Biodiversity

- ❑ Proposals that protect, maintain, restore and enhance coastal habitats where important in their own right and/or for ecosystem functioning and **provision of ecosystem services** will be supported

❑ Climate regulation

- ❑ Proposals that may have a significant adverse impact on habitats that provide a flood defence or carbon sequestration **ecosystem service** must demonstrate that they will in order of preference (a) avoid, (b) minimise or (c) mitigate significant adverse impacts

Conclusions

- ❑ Mapping and valuing marine NC/ES is challenging
- ❑ Limited by data/science
- ❑ Science/social science community needs to continue to build evidence and demonstrate utility to marine decision-making
- ❑ Doing nothing is not an option – NC/ES thinking will be required under the NMPF and will become mainstream over coming decades

Thank you for your attention

shull@abpmer.co.uk
+44(0) 2380 711849

