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11-12th July, 2023

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Session 4

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SESSION FOUR

CHAIR: Dr Natasha Bradshaw

Ocean and Coastal Futures

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SESSION FOUR: CONNECTION

For people and nature: partners from catchment to coast

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Matt Service, AFBI

Soil to Sea – A Northern Ireland Perspective

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A holistic framework for soil to sea management

Northern Ireland

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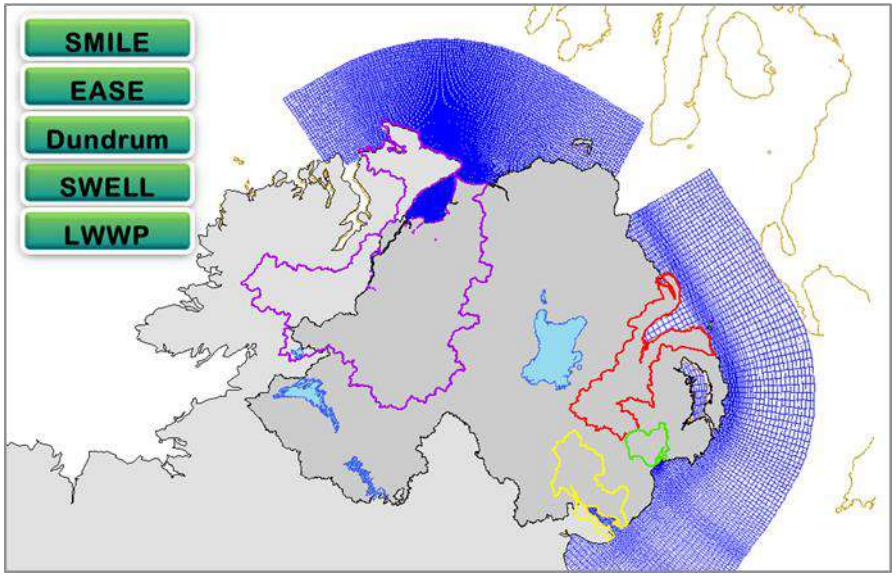
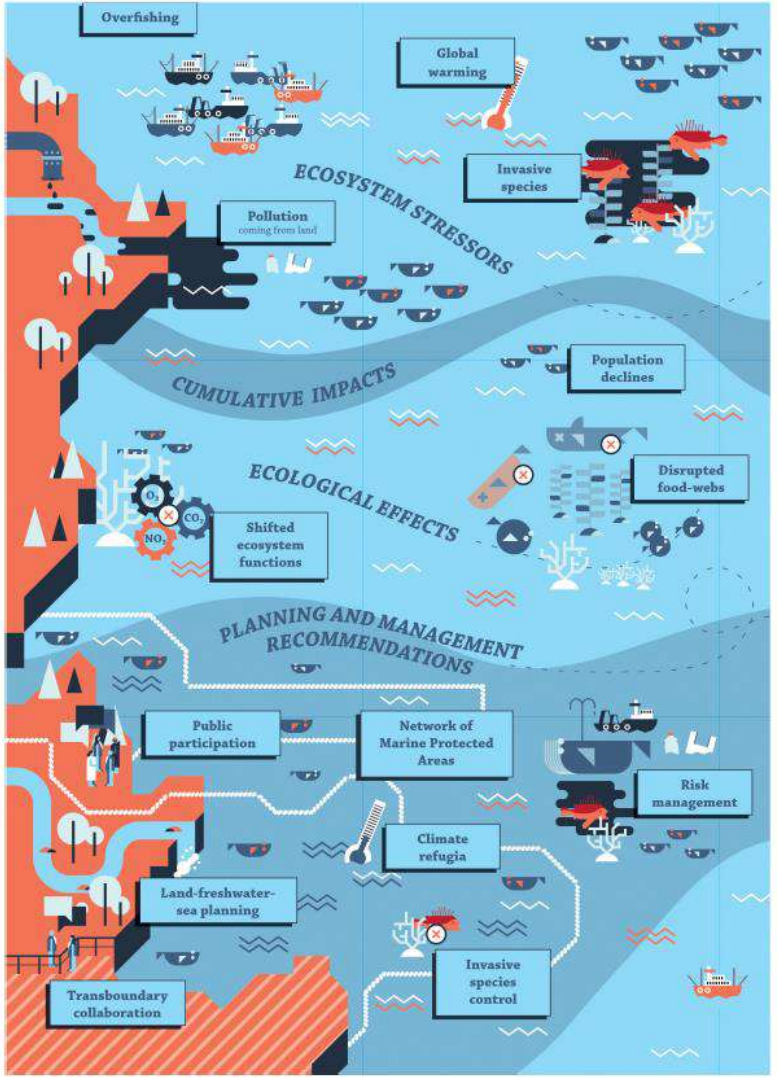


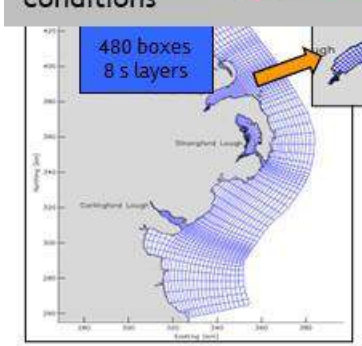


The Coastal Space extends to the top of catchment and vice versa
Management plans need to reflect this

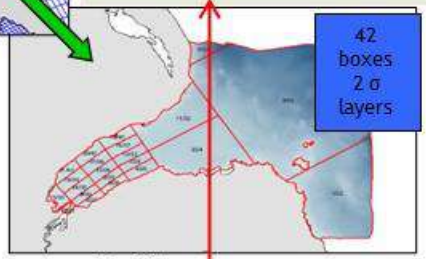
Fine scale hydrodynamics
Fluxes, boundary conditions

EcoWIN.net
Ecological Model
System scale

Individual growth model



Delft3D Hydrodynamic model



EcoWin
ecological boxes

Measured environmental drivers (survey, moorings)
Shellfish growth trials

growth model (AquaShell)

Mass balance

Anabolism: 80.0 kcal
Catabolism: 57.9 kcal

Energy assimilated 22.1 kcal

Phytoplankton filtration 234.8 mg chl m-3

Detritus filtration 32.1 g POM m-3

Respiration 17.2 g O2

Digestion

Excretion 0.3 g NH4

Faeces 19.1 g DW

Pseudofaeces 24.2 g DW

Organic losses 43.2 g DW

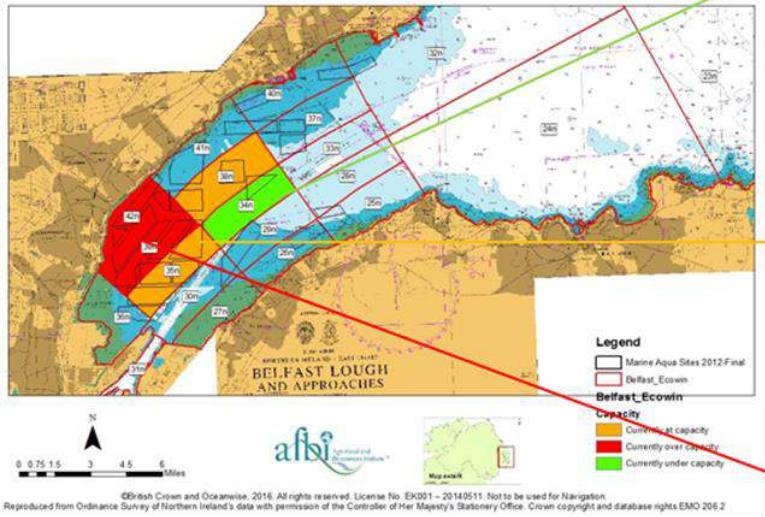
Inorganic losses 0.3 g NH4

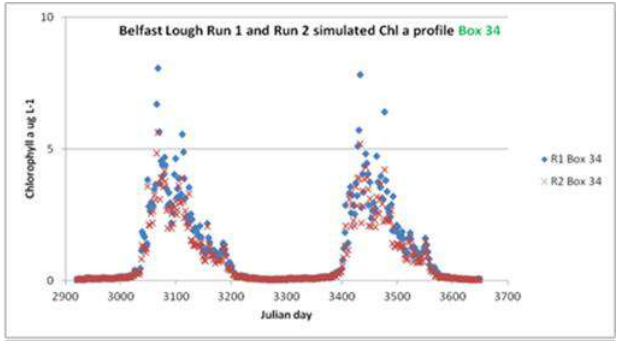
Cultivation: 540 days
Clearance: 43.0 m3
Live weight: 71.0 g FW
Shell length: 8.7 cm
Nitrogen removal: 0.83 g N
N / production: 1.22 %

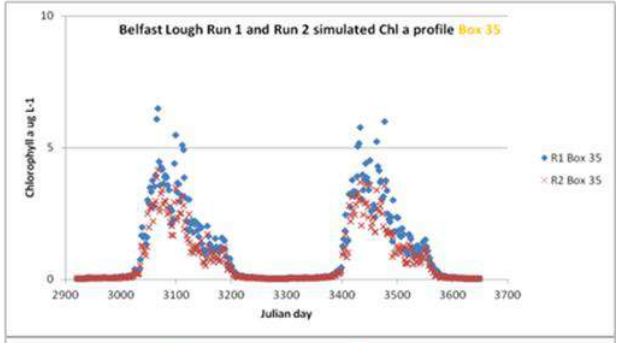
Mean filtration rate of wild species calculated for each habitat type.

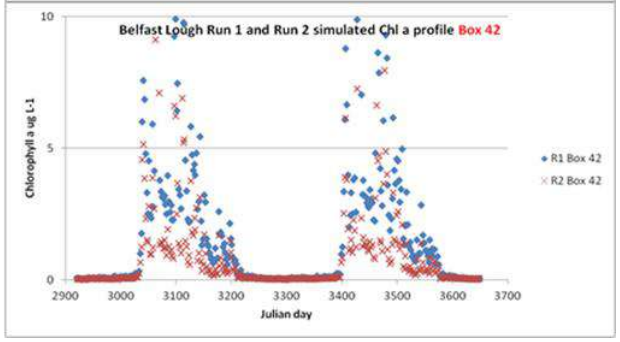
Habitat type	Mean filtration rate (L ind.–1 h–1)
Sand:	0.042
Medium Sand	0.145
Mud:	0.079
Muddy sand	0.140

Effects on primary production and phytoplankton biomass

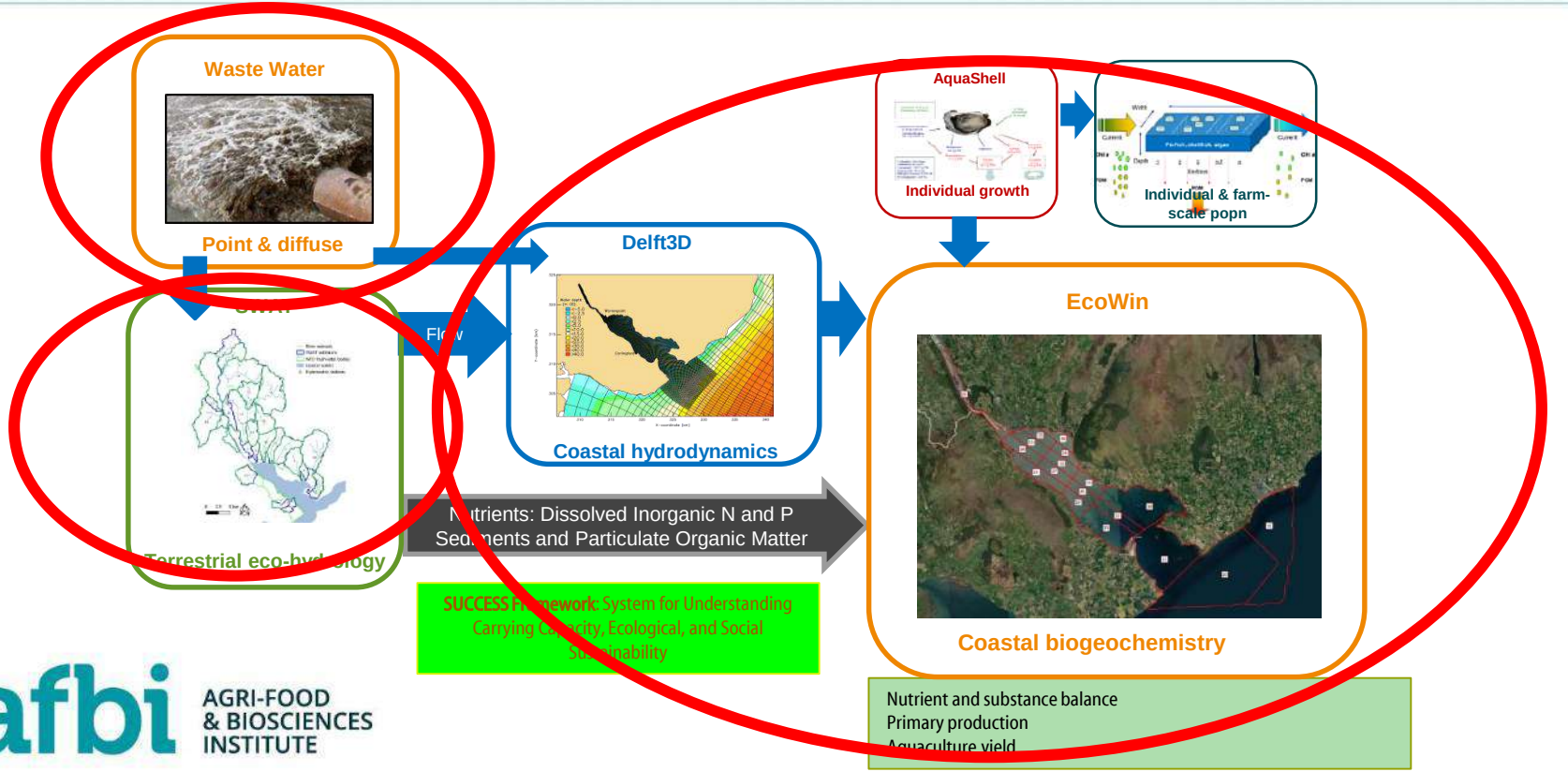








Multi-model cascade



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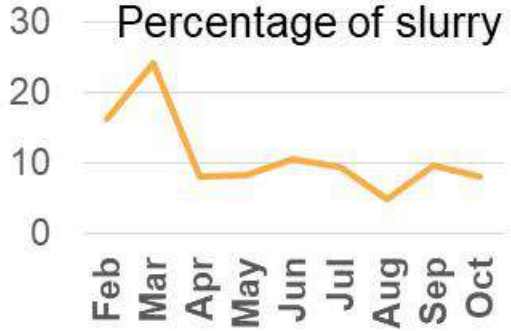
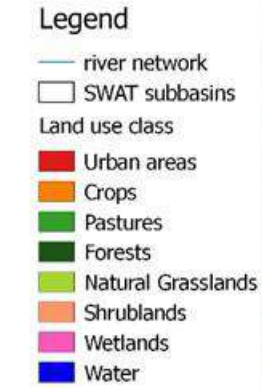
Land use and agricultural practices

Use of the best available data to build detailed management practices schedule:

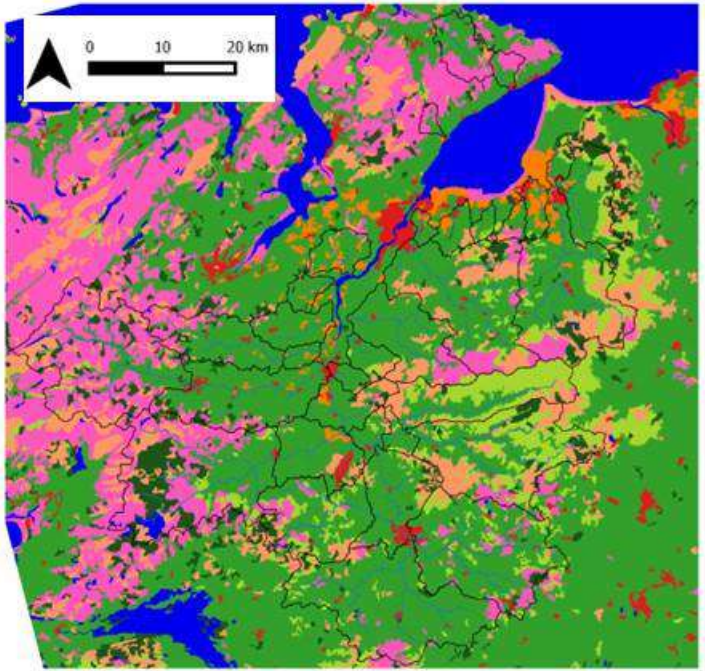
Sources:

- *Farm business data 2018*
- *Agricultural Census in Northern Ireland 2018*
- *Fertilizer statistics 2018*
- *Nitrate (Nutrient) Action Programme (NAP) 2015-2018*
- *Survey of slurry spreading practices in Northern Ireland*





SWAT land use classes



Organic fertiliser application based on storage rates and housing period:

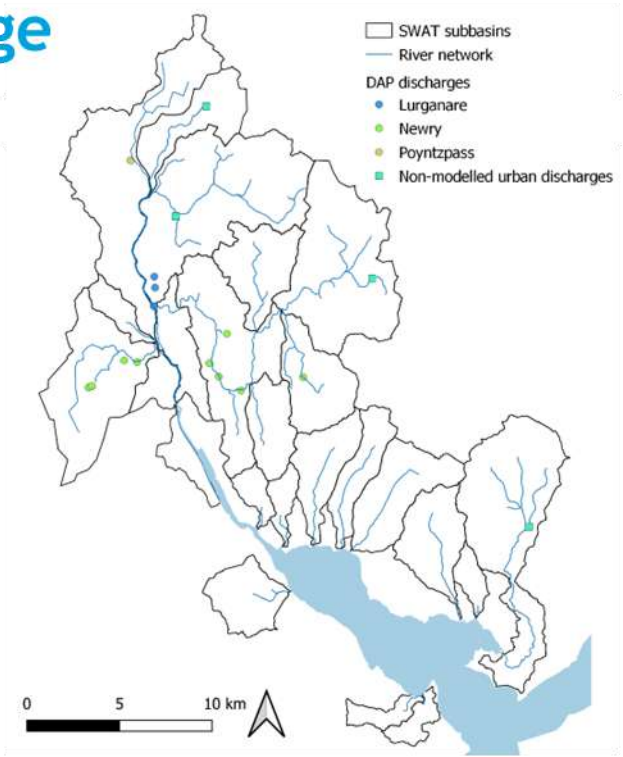
Stocking rates (head.ha^{-1})

Livestock	Carlingford	Foyle
Cattle	2.2	1.6
Sheep	2.5	3.6
Pigs	0.3	0.5
Poultry	23.7	17.1

Urban discharge integration

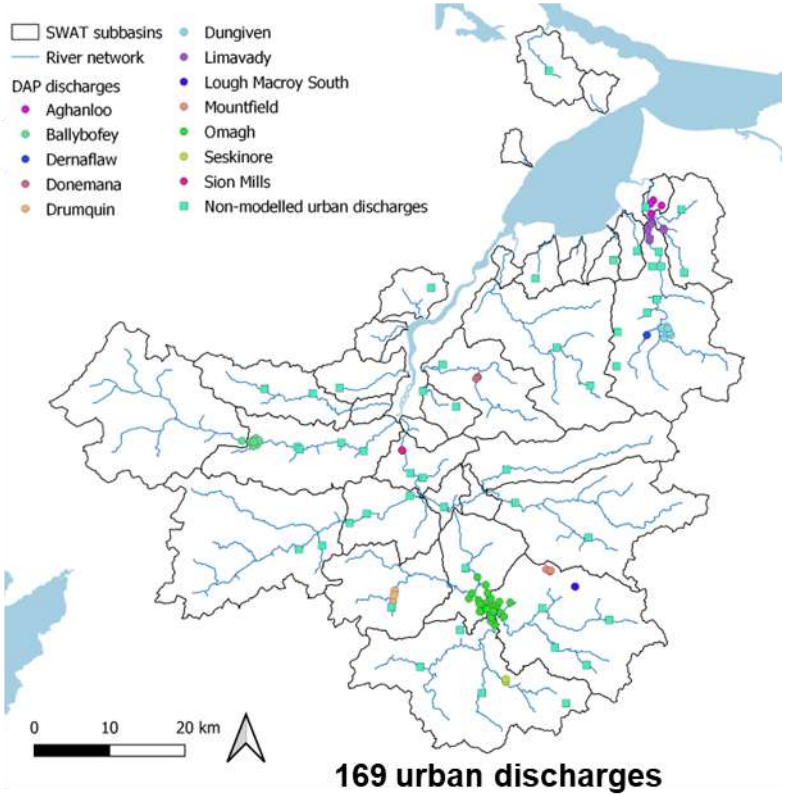
Three sources of urban discharges:

- Simulated DAP (drainage area plan) for the largest urban areas
- Non-simulated DAP for the smallest urban areas
- Septic tanks are aggregated by subbasin



43 urban discharges

- **16 simulated DAP**
- **5 non-simulated DAP**
- **22 septic tanks**



169 urban discharges

- **88 simulated DAP**
- **61 non-simulated DAP**
- **33 septic tanks**

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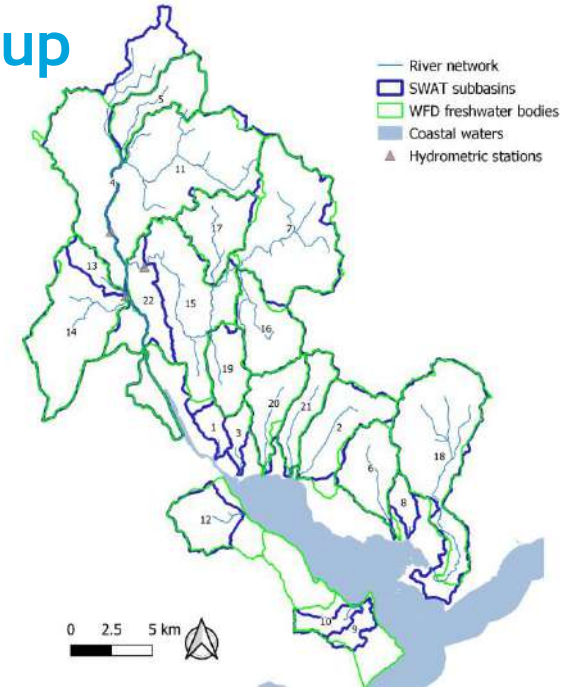
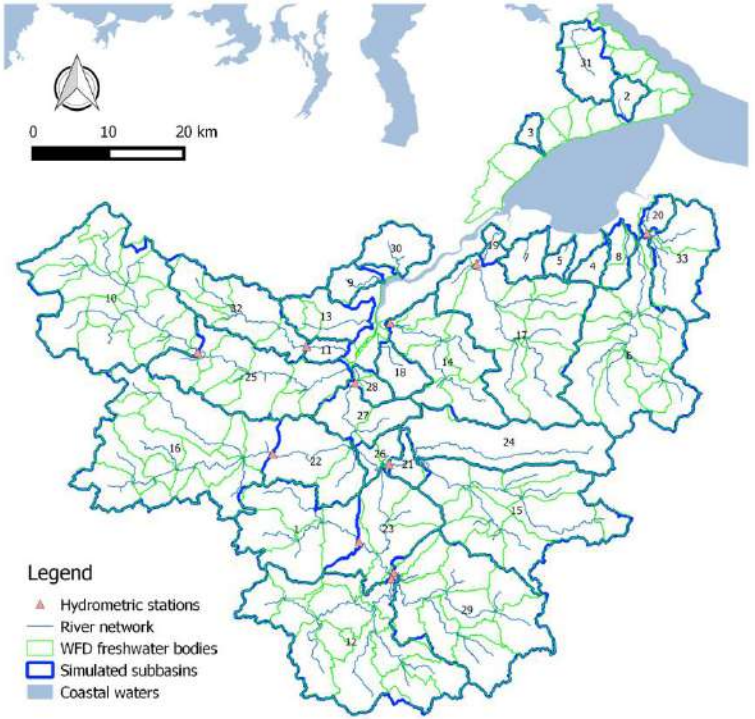
SWAT Model setup

- Hourly time step
- 10-year period
- WFD delineation
- Use of the best available data





Characteristics	Carlingford	Foyle
Simulated area	425 km^2	3640 km^2
Number of subbasins	22	33
Number of WFD freshwater bodies	17	138
Average area of subbasins	19 km^2	110 km^2
Contact points with the coastal model	11	17

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SWAT and DAP for Lough Foyle and Carlingford Lough
Partitioning of nitrogen loads

	CARLINGFORD LOUGH			LOUGH FOYLE		
Parameter	Urban (DAP + septic tanks)	Diffuse from land (SWAT)	Total	Urban (DAP + septic tanks)	Diffuse from land (SWAT)	Total
Nitrogen load (kg y^{-1})	734,298	316,006	1,050,304	486,608	4,884,338	5,370,947
N per unit area (kg ha^{-1})	7.44	17.28	24.7	1.34	13.42	14.75
Population Equivalents (PEQ)	222,514	95,759	318,274	147,457	1,480,103	1,627,560
Percentage	30%	70%	100%	9%	91%	100%

Point sources

Diffuse sources

Point sources

Diffuse sources

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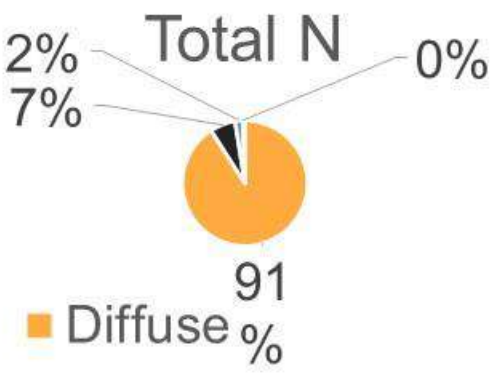
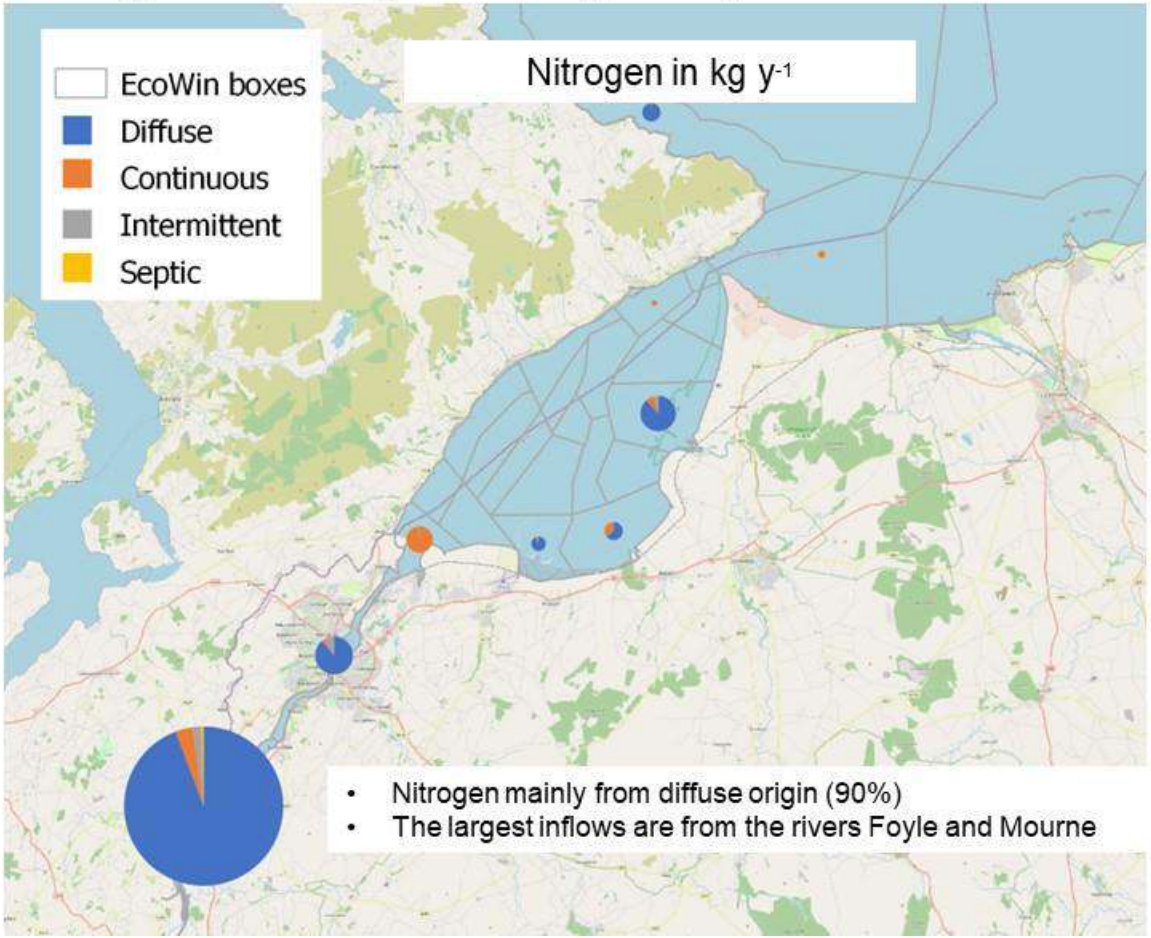
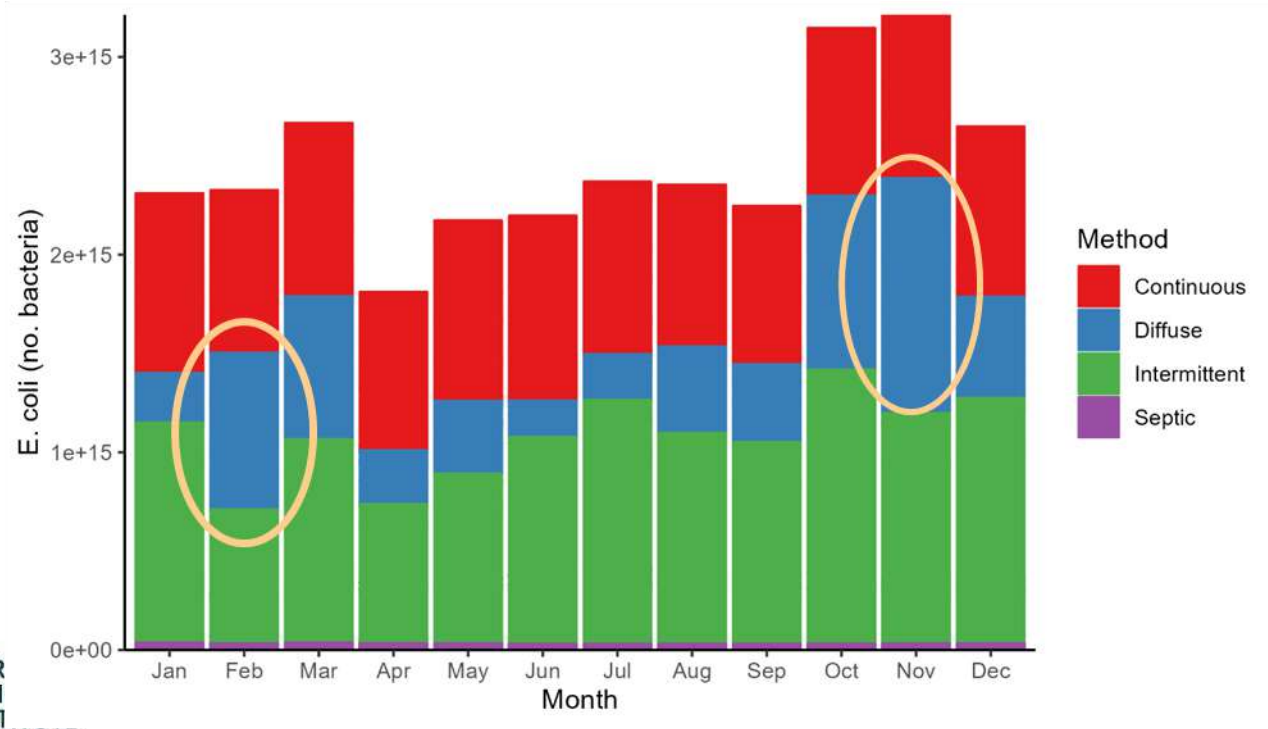
Source apportionment: Nitrogen loading to Lough Foyle





Average monthly load of *E. coli* into Carlingford Lough



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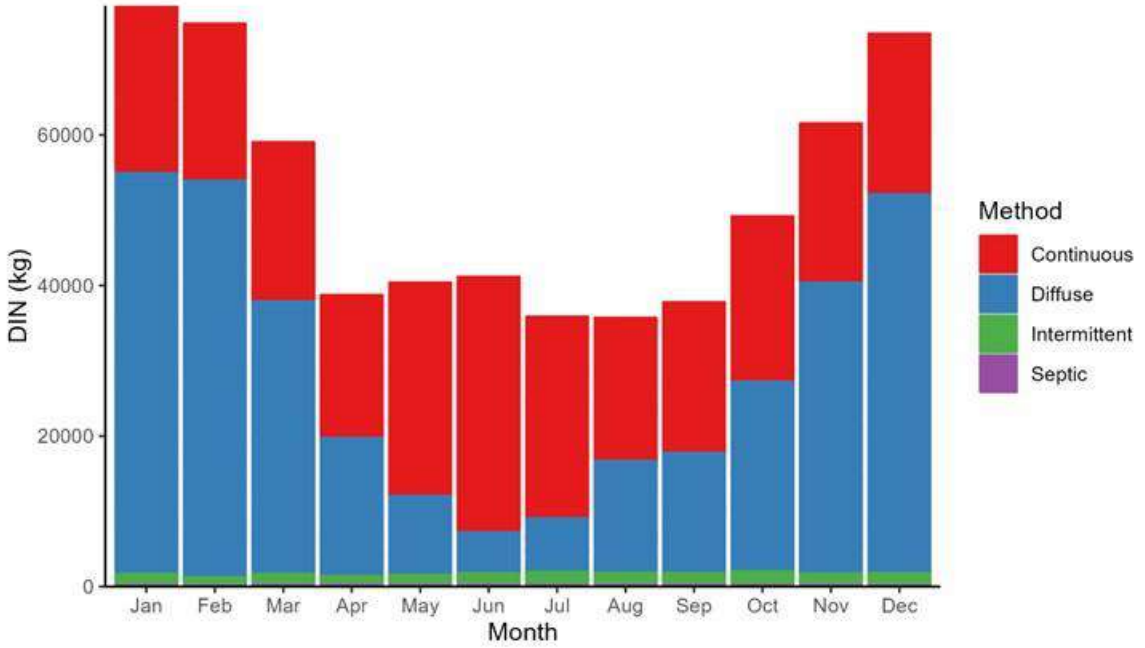
Nutrient load of dissolved inorganic nitrogen into Carlingford Lough

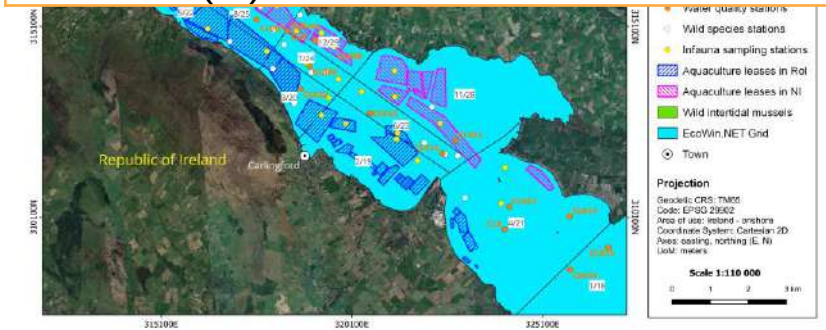
Average monthly nutrient load of dissolved inorganic nitrogen into Carlingford Lough via four different sources.



EcoWin.NET Carlingford Lough – Key indicators for the WFD: Bottom up control scenario (Year 9)

Bivalve harvest (t y^{-1})	Box 20	Box 22	Box 26	Box 31	Box 32	Box 33	Box 34	*Total*
Full N load	318.8	631.5	148.4	92.9	2.6	196.4	211.1	3833.3
50% N load	282.5	527.5	126.9	77.2	2.1	158.5	164.7	3503.6
Difference (%)	-11.4	-16.5	-14.5	-16.9	-17.0	-19.3	-22.0	-8.6

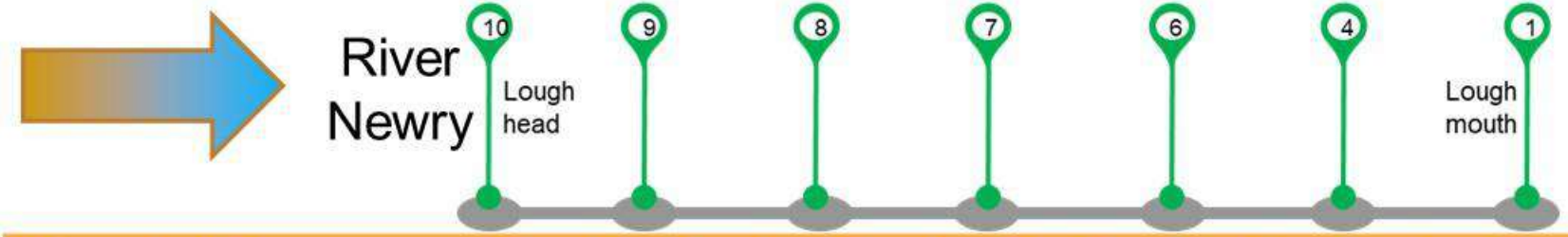
Highest impact on mussel culture



Areas in the upper reaches on the southern side (blue leases) are boxes 19-22, areas on the northern side are boxes 32-34

Bottom-up control of bivalve harvest is significant in most model boxes.

EcoWin.NET Carlingford Lough – Key indicators for the WFD: Bottom-up control scenario (Year 9)



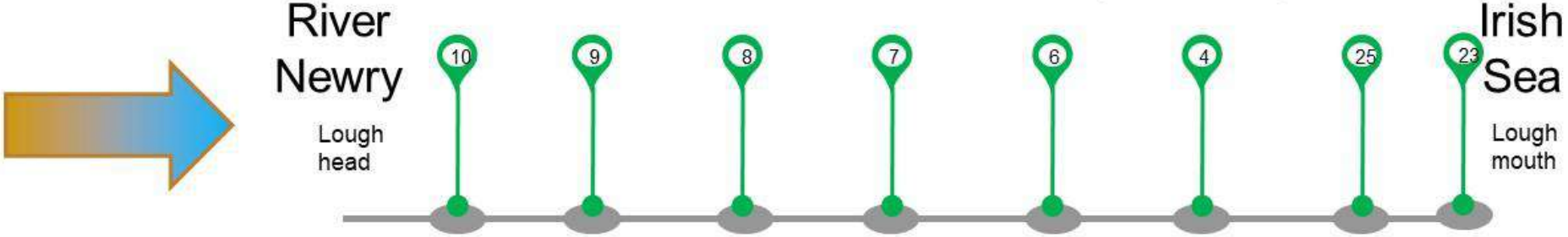
Chlorophyll P_{90}	Box 10	Box 9	Box 8	Box 7	Box 6	Box 4	Box 1	*Box 25*
Standard loading (μg L^{-1})	9.5	9.1	8.2	8.1	7.8	7.1	6.2	5.3
50% loading (μg L^{-1})	7.5	7.3	6.9	7.0	7.0	6.5	6.0	4.8
Difference (%)	-21.7	-19.6	-16.1	-13.9	-10.2	-5.7	-2.7	-10.1

Upper part of Carlingford Lough shows higher reductions

Bottom box

Bottom-up control is significant in parts of the lough. Standard model with bivalves active.

EcoWin.NET Carlingford Lough – Key indicators for the WFD: Top-down control scenario (Year 9)



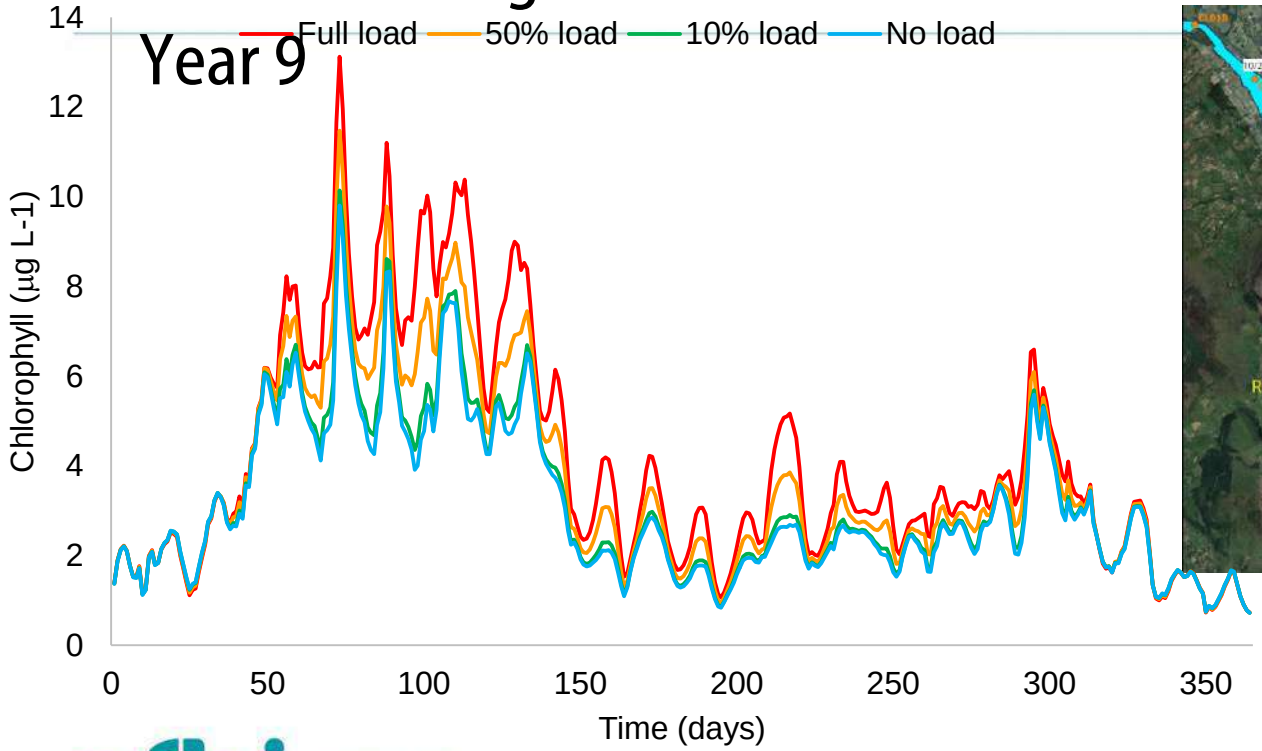
Chlorophyll P_{90}	Box 10	Box 9	Box 8	Box 7	Box 6	Box 4	Box 25	Box 23
Mussels & oysters (µg L^{-1})	9.5	9.1	8.2	8.1	7.8	7.1	5.3	5.0
No top-down control (µg L^{-1})	11.9	11.2	9.8	9.4	8.8	7.7	7.0	5.8
Difference (%)	19.7	18.8	16.2	14.4	10.6	7.4	23.2	14.0

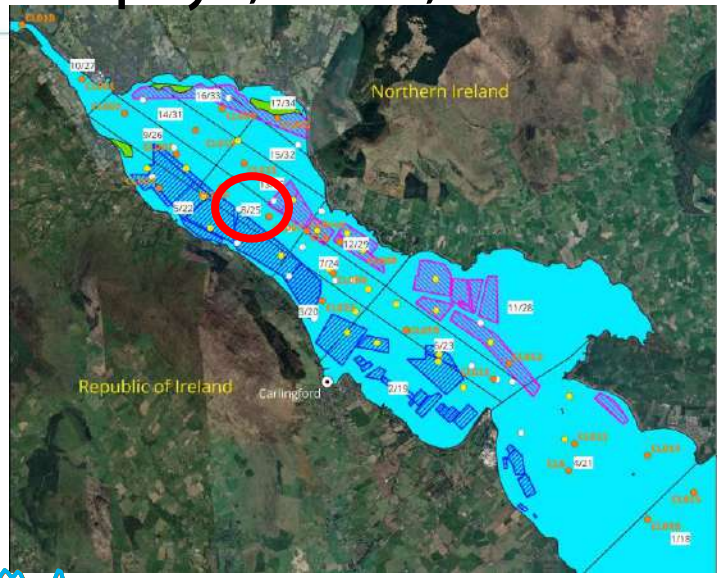
Top-down control is significant across all the lough.
Reduction of bivalve culture will impact chlorophyll.

Effect of filter-feeders in box with little aquaculture

Big difference between upper and lower box

EcoWin.NET Carlingford Lough Standard Model
Effect of nitrogen load reduction on chlorophyll, Box 8, Year 9





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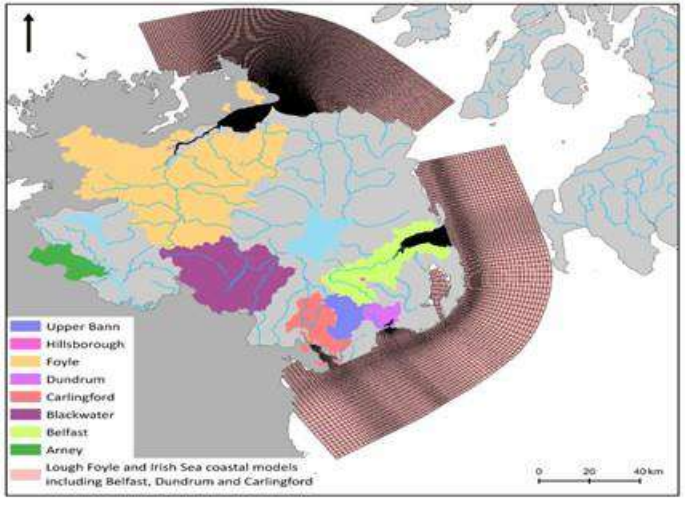
Reduction in chlorophyll P_{90} of 16% for 50% N load, 30% for 10% N load and 33% for 0% N load. N remains in the system due to ocean exchange and mineralisation.
Differences are evident in spring and summer.

Ecosystem Modelling

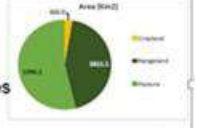


Novel addition of waste water inputs coupled to the SWAT model allows for improved source apportionment of nutrients / bacteria

Natural capital and ecosystem assessment approaches
Develop nature based solutions
Land use Scenarios
Climate Change

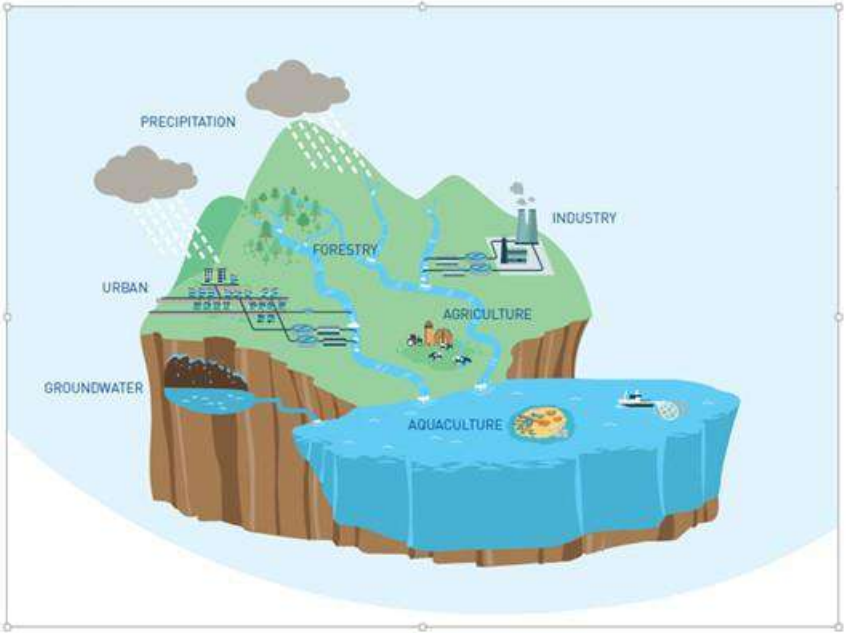
SWAT - source apportionment

- Main DIN source: diffuse pasture – follows fertilizer application
- DRP sources: point-source & diffuse
  - Diffuse: low erosion rates leads to exports at "background" values
- DIN & DRP results broadly agree with Foy and Girvan, 2004
- POM sources: diffuse – follows landuse
  - Diffuse: low erosion rates leads to exports at "background" values
  - Point source: negligible exports due to WW treatment



Source apportionment of nutrient loads is key for policy decisions. Source control in systems such as lough Foyle is complex, costly and socially challenging

What can we do with this?



- Promote evidence-based decision making
- Manage Shellfish Aquaculture
- Identify sources of pollution
- Help water utilities to target capital spend most effectively
- Help the regulators to set consent standards
- Promote flexibility in consenting policy by the regulator
- Model impacts of future shifts in climate change and land-use management techniques (i.e. farming, forestry)
- Quantify and valourise ecosystem services

Scenarios

1. Change in land use. The modelling framework will be used to assess the impact of making various changes to land use in the catchment. These will include changing pasture to crop and forestry to assess changes to nutrient loads and run-off.

2. Change to livestock stocking densities. The modelling framework will be used to assess the impact of changing the livestock densities in the catchment. These will include both increases and decreases.

3. Change to fertiliser application dates. The modelling framework will be used to assess the impact of changing the dates of manure and chemical fertiliser application in the catchment.

4. Change to fertiliser quantity. The modelling framework will be used to assess the impact of changing the rates of manure and chemical fertiliser application in the catchment.

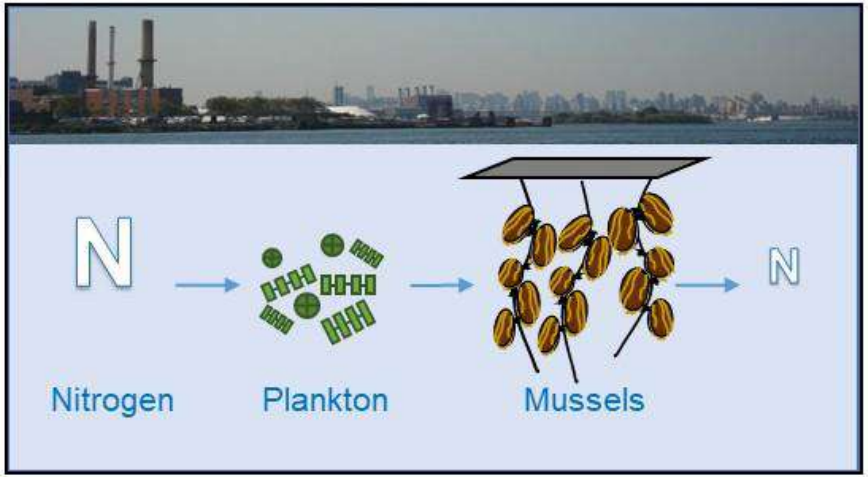
5. Climate change (rainfall). The modelling framework will be used to assess the impact of the most probable changes to rainfall patterns under current climate change predictions including more episodic rainfall events. These will be represented by simulating distributions of outcomes and their impacts in the catchment

Filter feeders can help by filtering plankton from the water

Assimilation into tissue and shell

Enhanced sediment **denitrification**

Burial in seafloor sediments



Other Modelled Components:

Riparian Strips

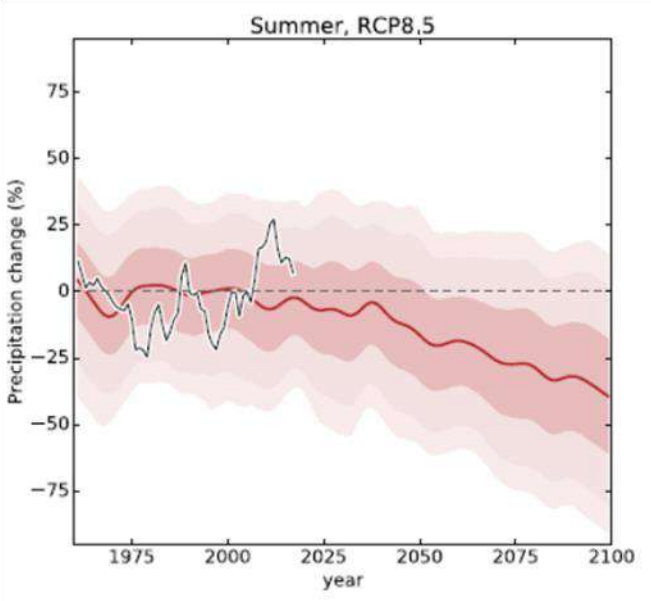
Native oyster restoration

Zostera

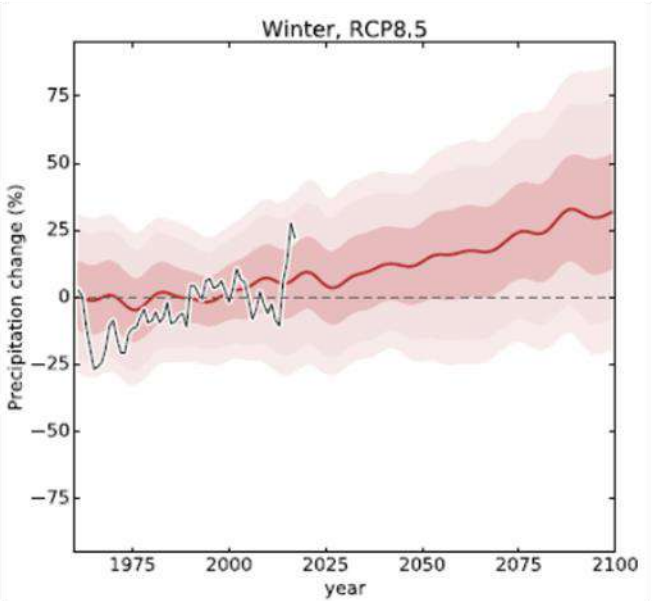
Salt Marsh

UKCP18 RCP8.5 – business as usual - precipitation

Dryer summers, but with more intense storms

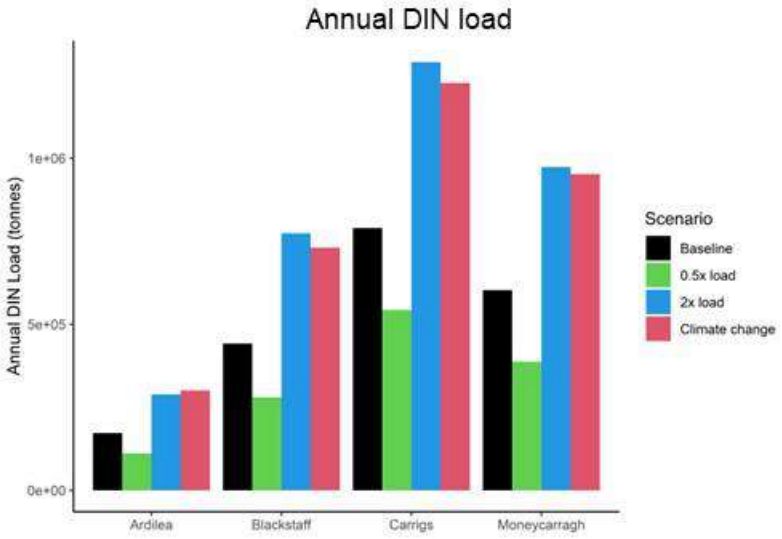


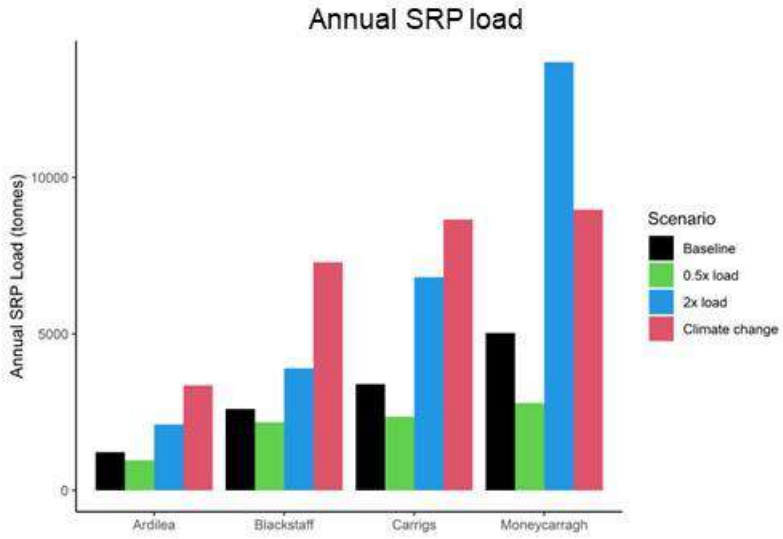
Wetter winters in most of UK



Annual loads of DIN and SRP from diffuse sources to Dundrum Bay

Data from typical rainfall year - 2038 for climate change scenario, 2017 for others.



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Konstancja Wozniacka, Seafish

Evaluating the benefits of bivalve bio-extraction for water quality improvement – a case study

Environment Agency

Scarborough Spa

11-12th July, 2023

OCEAN & COASTAL FUTURES

Valuing water quality improvement through bivalve aquaculture

Ecosystem services perspective on bivalves

12 July 2023


We’re here to give
the UK seafood sector
the support it needs
to thrive
seafish

Our Bivalve Ecosystem Services project

- Looking at the bivalve industry to highlight wider benefits from their cultivation
- Focus on the improvement of water quality provided by commercial bivalve aquaculture
- Provide financial estimates of this service to the entire UK
- Source and collate data from the UK on nutrients and bivalves

The FISHMONGERS' Company

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LONGLINE ENVIRONMENT

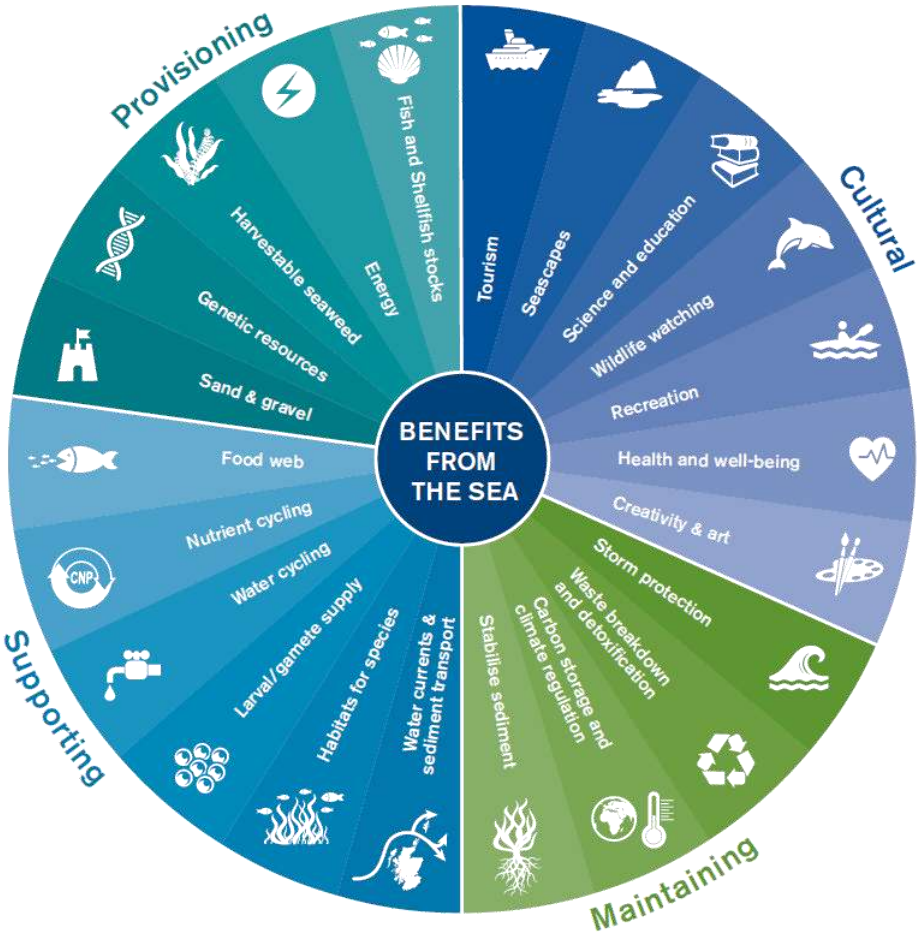
Aquatic Ecosystem Services

Any positive benefit that wildlife or ecosystems provide to people

£ **211 billion** – value of UK marine ecosystem services and the societal benefits

Known ecosystem services of bivalves:

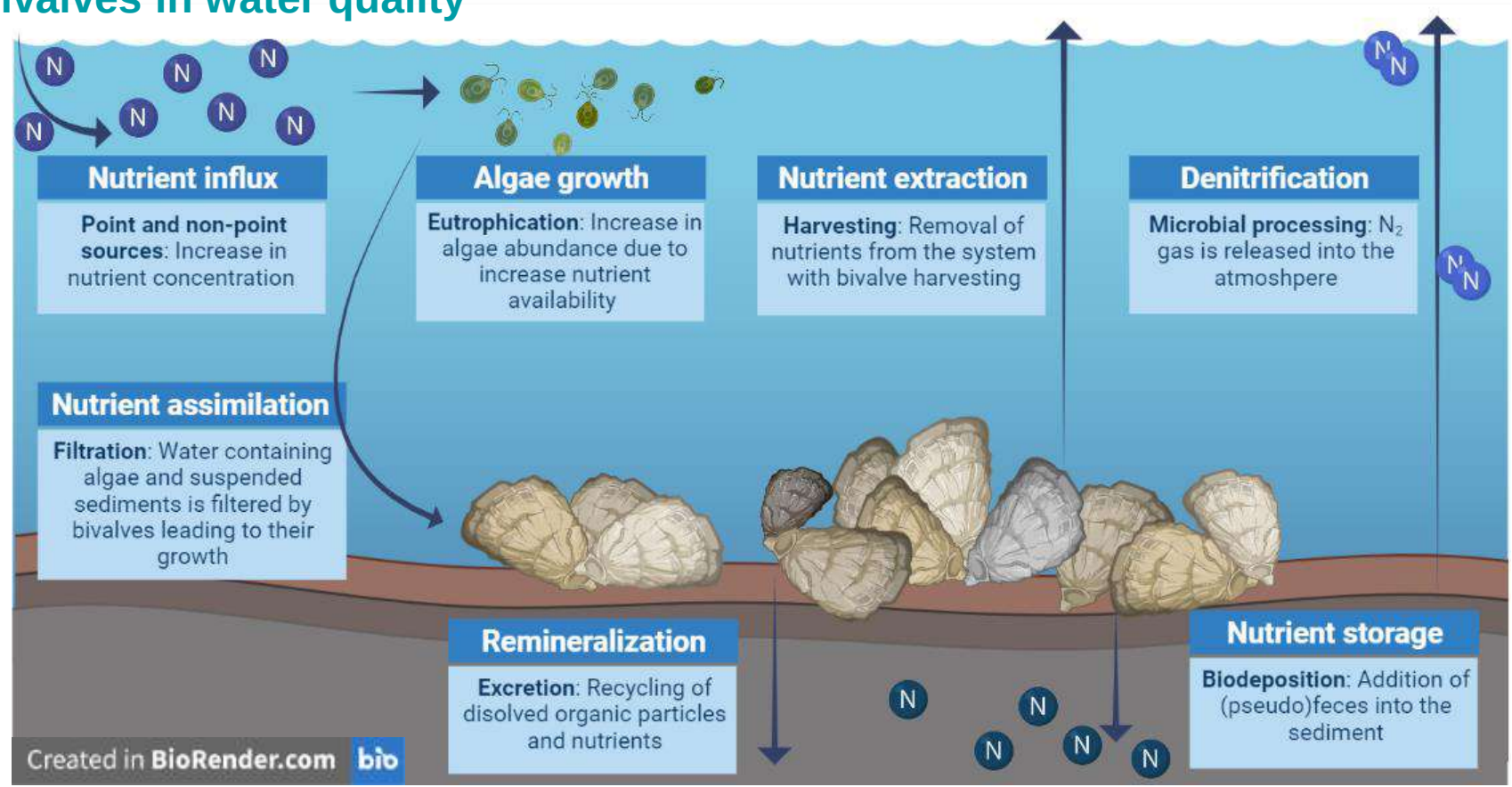
- Water quality maintenance and improvement
- Food provisions
- Livestock feed
- Source of calcium in the egg industry
- Habitat and ecosystem engineers
- Sediment stabiliser against coastline erosion
- Support for wild finfish populations
- Carbon sequestration



The Benefits from the Seas Wheel
Photo: nature.scot

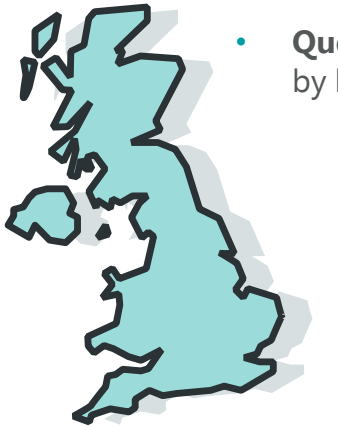
seafish

Bivalves in water quality



Project premise

- **Problem**: Water quality degradation through excessive (N)itrogen and other nutrient input
- **Idea**: Biological extraction
  - Bivalve feeding is associated with reduced algae levels (Chl a levels) and eutrophication suppression
  - Promote bivalve aquaculture as part of the wider ecosystem services network.
- **Question 1**: How much N and other nutrients can bivalves remove from their environment?
  - **Bonus**: How much Carbon can they remove?



- **Question 2**: What is the potential economic value of the water quality improvement services provided by bivalves?
  - **Area**: England, Northern Ireland, Scotland, Wales
  - **Organisms**: Commercially important bivalves
    - Mussels (*Mytilus edulis*)

How to estimate national bivalve contribution to water quality?

- **Question 1**: How much N can bivalves remove?

- **Calculating capacity of bivalve stocks to remove N**
  - Data on nutrient concentration/loading and shellfish production
  - Species-specific nutrient removal capability and growth parameters
  - Two analyses:
    - Proximate analysis (nutrient content of bivalves * production of bivalves)
    - Modelling using FARM population model, implemented at farm scale

Previous evaluation (for UK region) done at:

- Valuing oyster beds in the Solent (Plymouth Marine Laboratory) | Watson et al. 2020
- Shellfish in nutrient management at Dundrum Bay | GAIN 2021

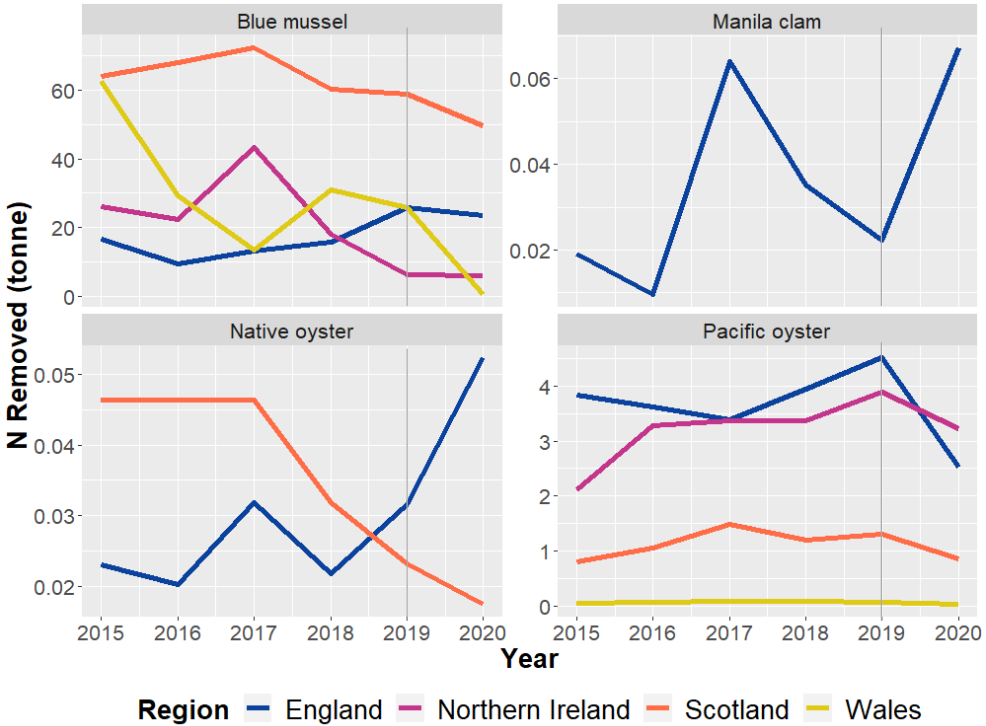
SOLENT OYSTER RESTORATION PROJECT

afbi AGRI-FOOD & BIOSCIENCES INSTITUTE

GAIN Green Aquaculture Intensification

seafish

Proximate analysis results (N * Production)



- Based on shellfish production data 2015 -2020 data from Cefas

NTB – Different Y scales

- % of N in Total Fresh weight (mean)
  - **Mussels – 0.88 %**
  - Pacific oyster – 0.37 %
  - Native oyster – 0.29 %
  - Manila clam – 0.32%
- Total Nitrogen Removed (2019) – **126.57 t**

  0.032 %
- Total Nitrogen loading into the UK seas (2019):

Country	N-Total input [t]
England	140 173.30
Northern Ireland	10 283.14
Scotland	77 598.87
Wales	173 371.70
Grand Total	**401 427.00**

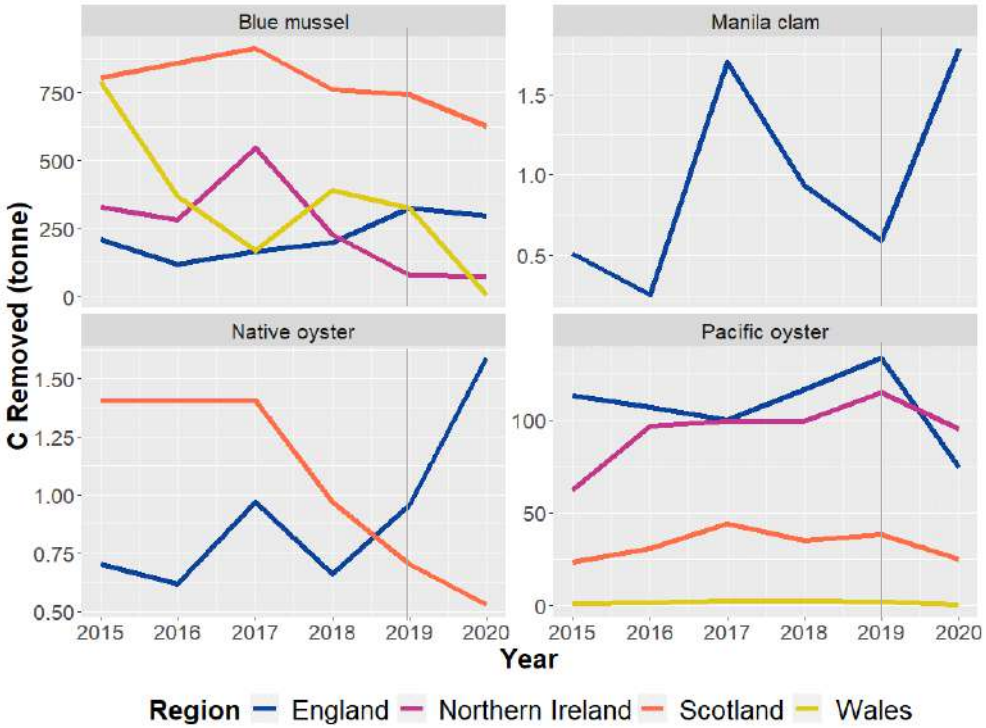
How to put value on bivalve water quality services?

- **Question 2**: What is the potential economic value of the water quality improvement services provided by bivalves?
- **Economic value will be estimated based on the cost of alternative N removal strategies (avoided cost)**
  - Stormwater control measures
  - Approved agricultural Best Management Practices (BMP)
  - Wastewater treatment
- **N removal through sand filters and Methanol dosing:**
  - £58,300 / tonne of N removed annually
  - Estimated saving – £7,379,031 annually
- **Replacement and Abatement:**
  - £ 295,000 /tonne of N removed annually (average)
    - Estimated saving – £37,241,150
  - £ 500 -1,100,000 /tonne of N removed (min-max)
    - Estimated saving – £63,285 – 139,227,000

Total N Removed by Shellfish (2019)
126.57 tonnes

seafish

Proximate analysis results (C * Production)



- Based on shellfish production data 2015 -2020 data from Cefas

NTB – Different Y scales

- % of C in Total Fresh weight (mean)
  - **Mussels – 11.1 %**
  - Pacific oyster – 10.9 %
  - Native oyster – 8.80 %
  - Manila clam – 8.50%
- Total Carbon Removed (2019) – 1762 T
- **Replacement and Abatement potential:**
  - 30-90 £/tonnes of C removed
  - Estimated savings – £52,875 – £158,625

Thank you

Konstancja.wozniacka@seafish.co.uk | 07984561954

ReMeMaRe

CONNECTION

Dr Andy Rees, Plymouth Marine Lab

Towards a catchment to coast understanding of the transport of material between land to sea

Environment Agency

Scarborough Spa

11-12th July, 2023

OCEAN & COASTAL FUTURES

PML | Plymouth Marine Laboratory

Research excellence supporting a sustainable ocean


Agriculture


Beaver Re-introduction


Peatland Restoration


Managed Re-alignment


Seagrass


Warming, Acidification, Deoxygenation

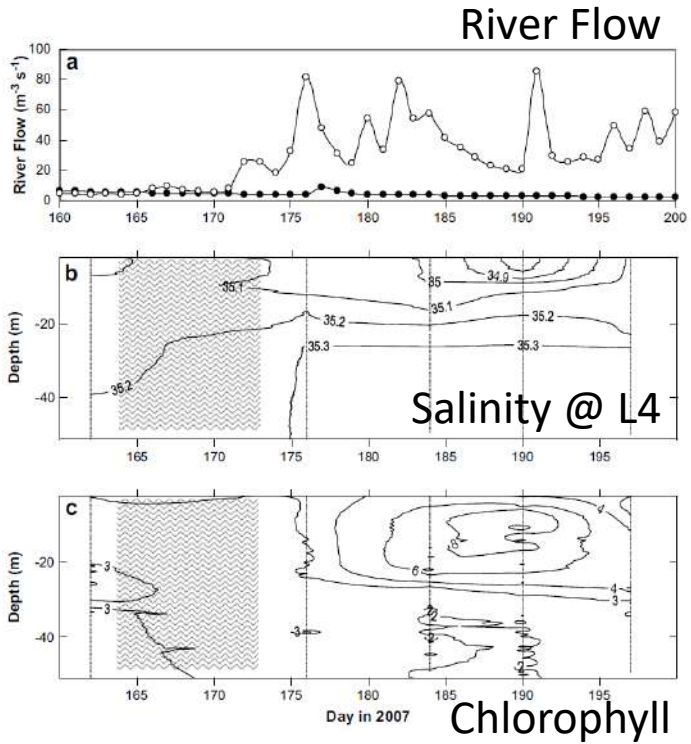
Towards a catchment to coast understanding of the transport of material between land and the coastal sea

Andy Rees
apre@pml.ac.uk

Western Channel Observatory

LOCATE

AgZero+ Towards sustainable, climate-neutral farming



July 2007
River Flow from EA at Gunnislake

MetOffice “Rainfall was double the monthly average”

Salinity stratification in near surface over ~3 weeks

elevated DIN at L4 – 2.2 µM relative to 2007 mean of 0.35 µM
not paralleled with changes in DIP

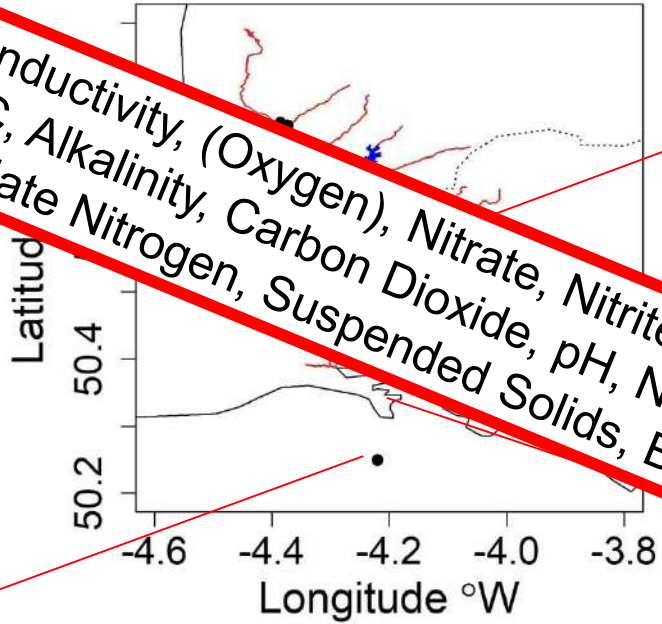
intense bloom of diatom *Chaeotoceros debelis* followed by massive dinoflagellate increase

Rees et al., 2009 Est, Coast & Shelf Science 81, (2009), 569-574

Catchment to Coast – River Tamar

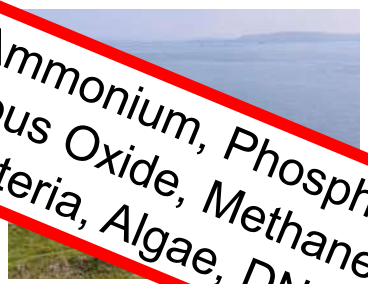
thly monitoring of 15
Tamar to Estuary
microbes)

Temperature, Salinity, Conductivity, (Oxygen), Nitrate, Nitrite, Ammonium, Phosphate
Silicate, CDOM, DOC, DIC, Alkalinity, Carbon Dioxide, pH, Nitrous Oxide, Methane,
Particulate Carbon, Particulate Nitrogen, Suspended Solids, Bacteria, Algae, DNA/RNA



Quarterly sampling
of new wetland (C, N, P, GHGs,
microbes)

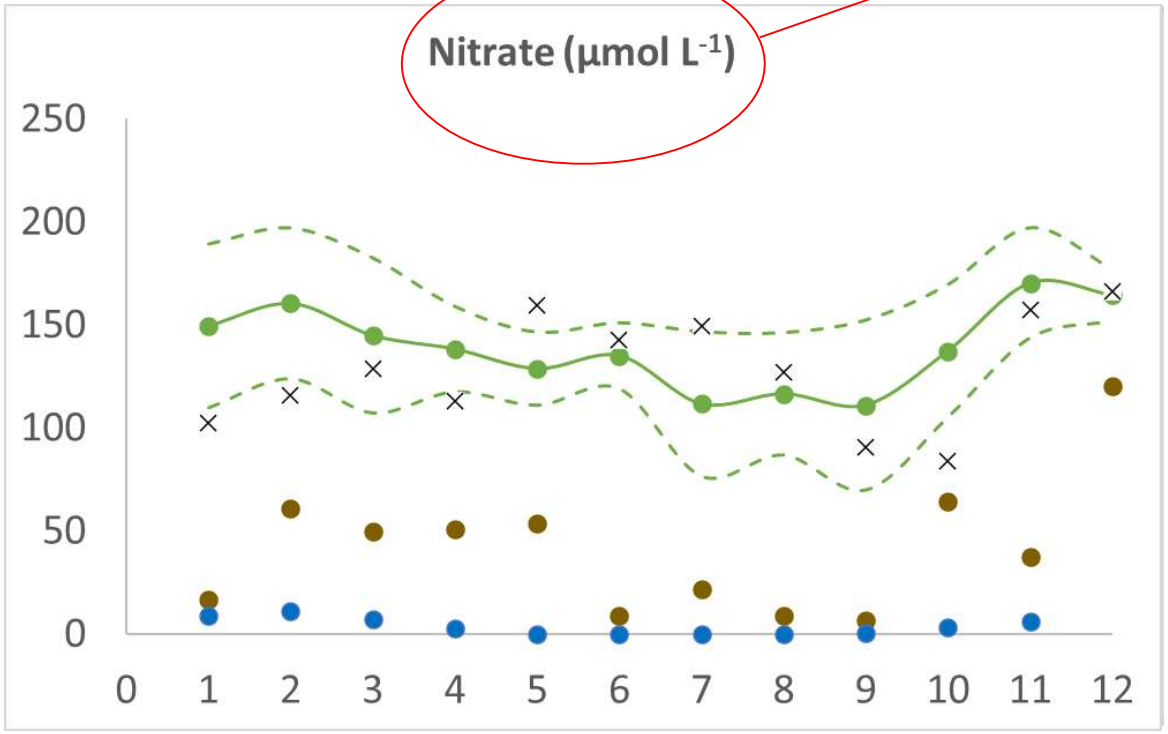
Weekly sampling at
Western
Channel Observatory



Continuous at
observations of NH_3,
aerosol NO_3, NH_4 at
Penlee Point Observatory

Nitrate distribution

For the marine people!



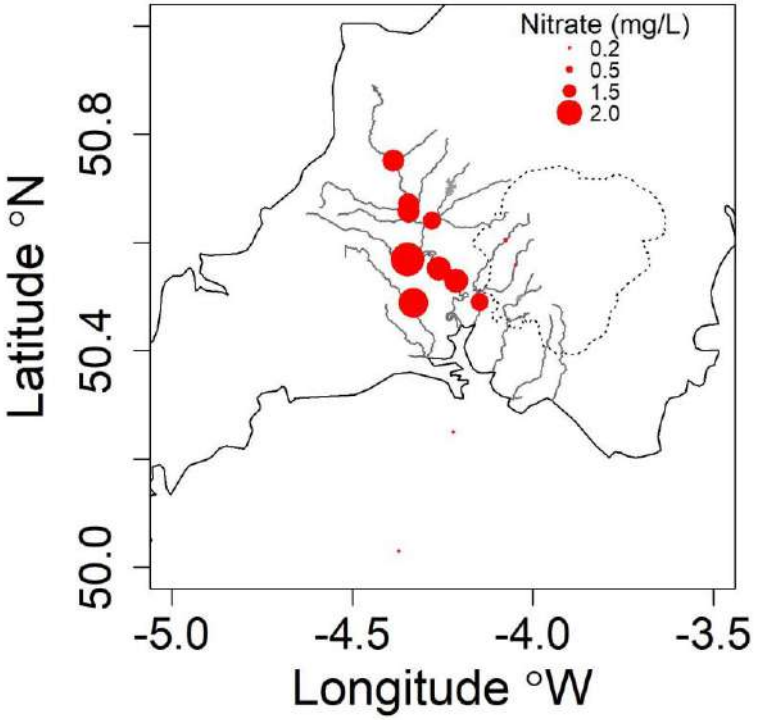
Mean (± 1sd) nitrate at Gunnislake (2017 – 2022)

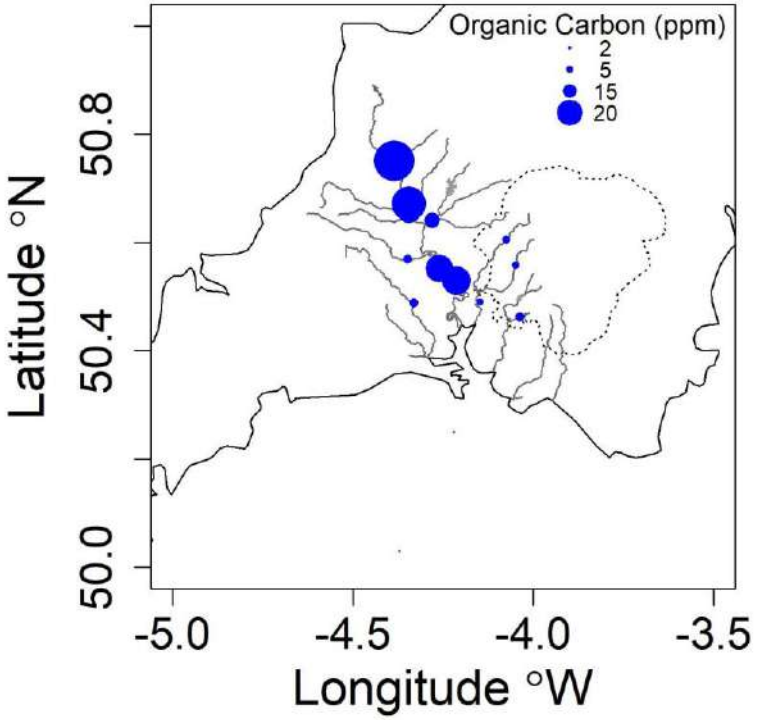
X nitrate at Gunnislake 2021

● nitrate at Saltash 2021

● nitrate at L4 2021

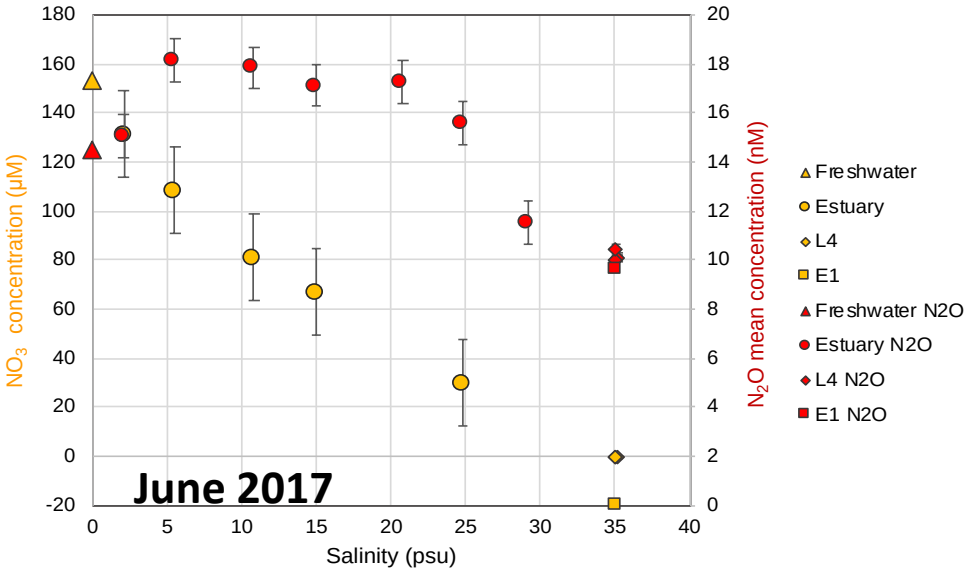
Annual mean

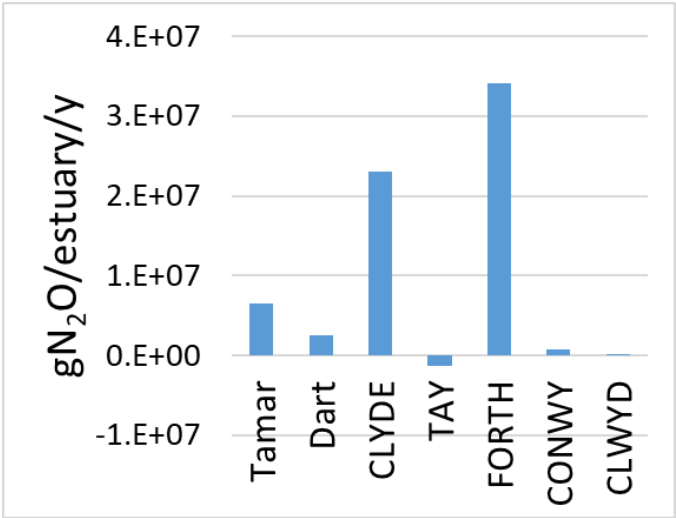

Nitrate (mg/L)
0.2
0.5
1.5
2.0
Latitude °N
50.0
50.4
50.8
-5.0
-4.5
-4.0
-3.5
Longitude °W

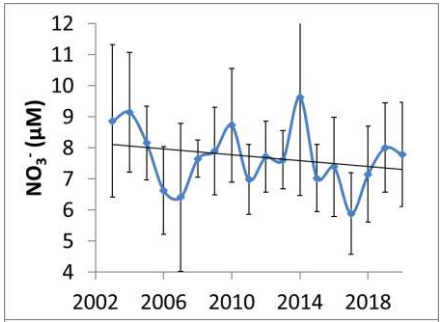

Organic Carbon (ppm)
2
5
15
20
Latitude °N
50.0
50.4
50.8
-5.0
-4.5
-4.0
-3.5
Longitude °W

N_2O catchment to coast

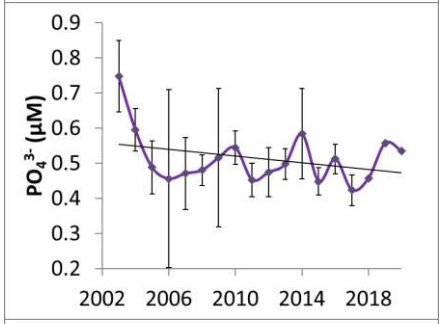
Nitrous oxide is a potent Greenhouse Gas



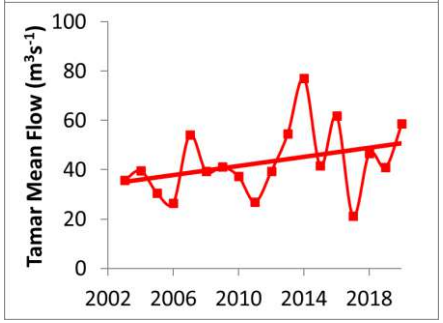




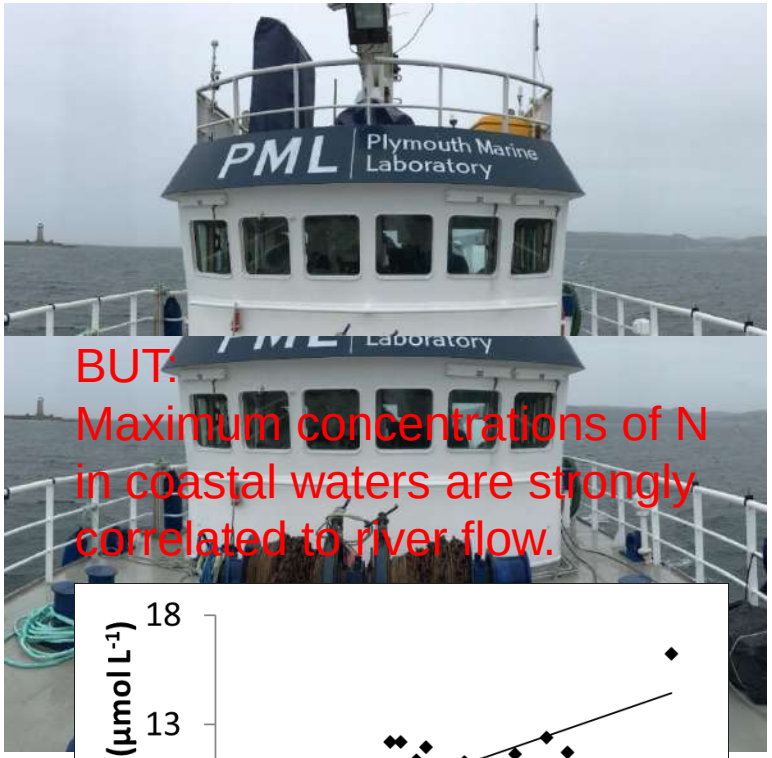
Mean winter-time nitrate at L4 decreased at ~ 48 nmol L^{-1} y^{-1}



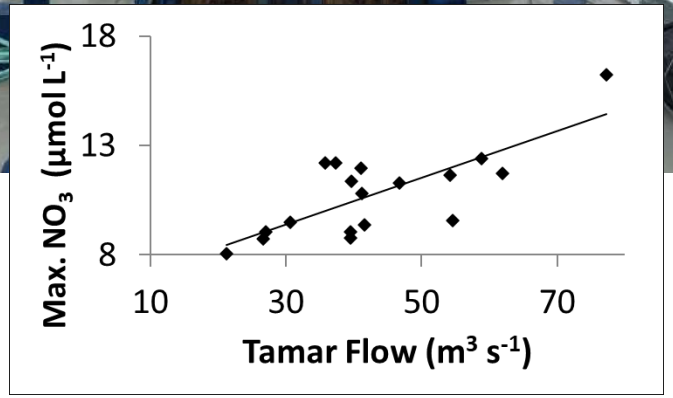
Mean winter-time phosphate at L4 decreased at ~ 5.0 nmol L^{-1} y^{-1}



Mean winter-time flow rate of Tamar increased at ~ 1.0 m^3s^{-1} y^{-1}



BUT:
Maximum concentrations of N in coastal waters are strongly correlated to river flow.



Nature Based Solutions – wetland creation

Gas Exchange

Burial
Sediment-C, Denitrification…

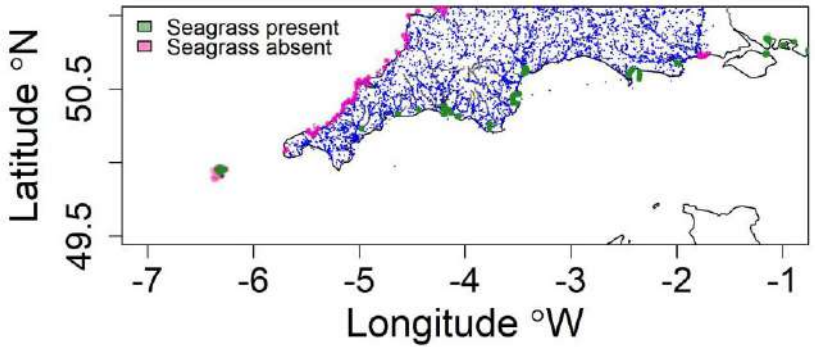
Exchange w. River Tamar

Digital Elevation
Plant growth December-August
Sediment Accretion

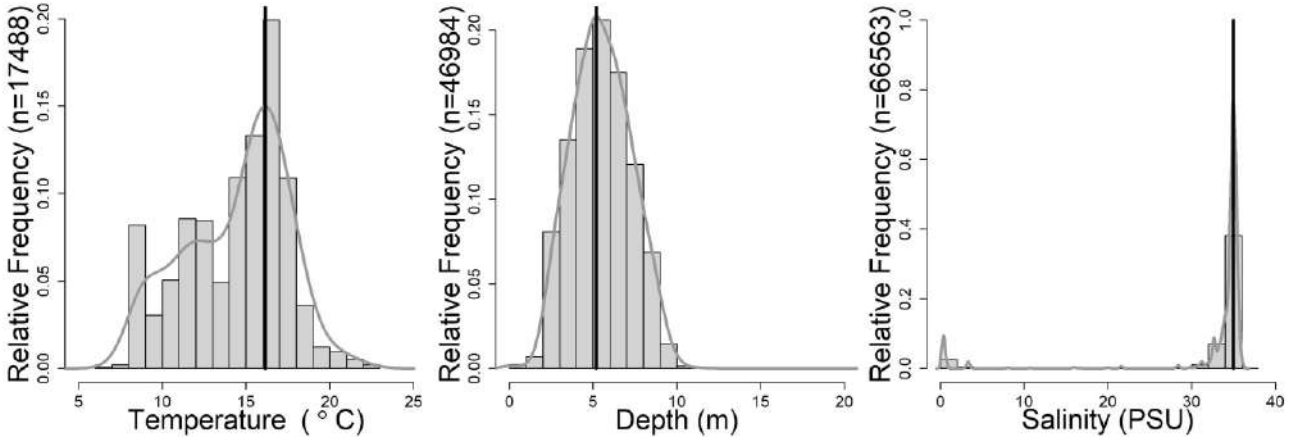
Socioeconomic Valuation

Photo: Will Jay, Aser Mata

Nature Based Solutions – seagrass

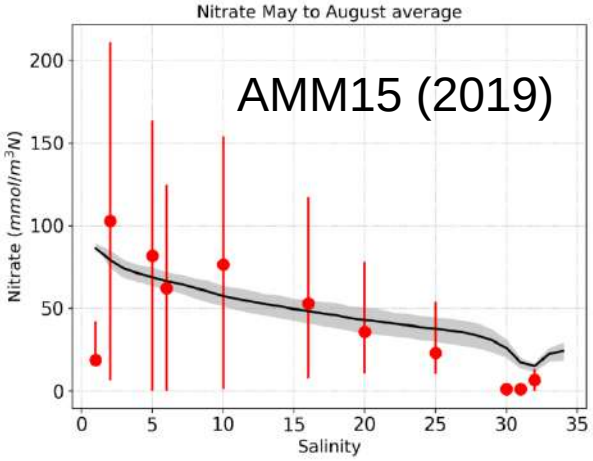


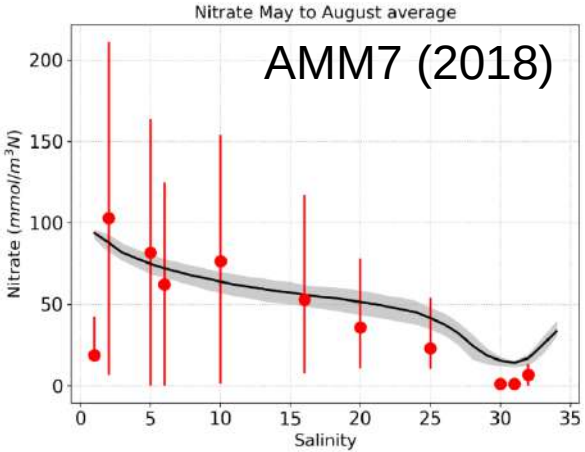
See poster by Ollie Thomas: Magic meadows: A case of Intertidal seagrass restoration without intervention



- Seagrasses prefer warm, shallow, saline water with low nutrients

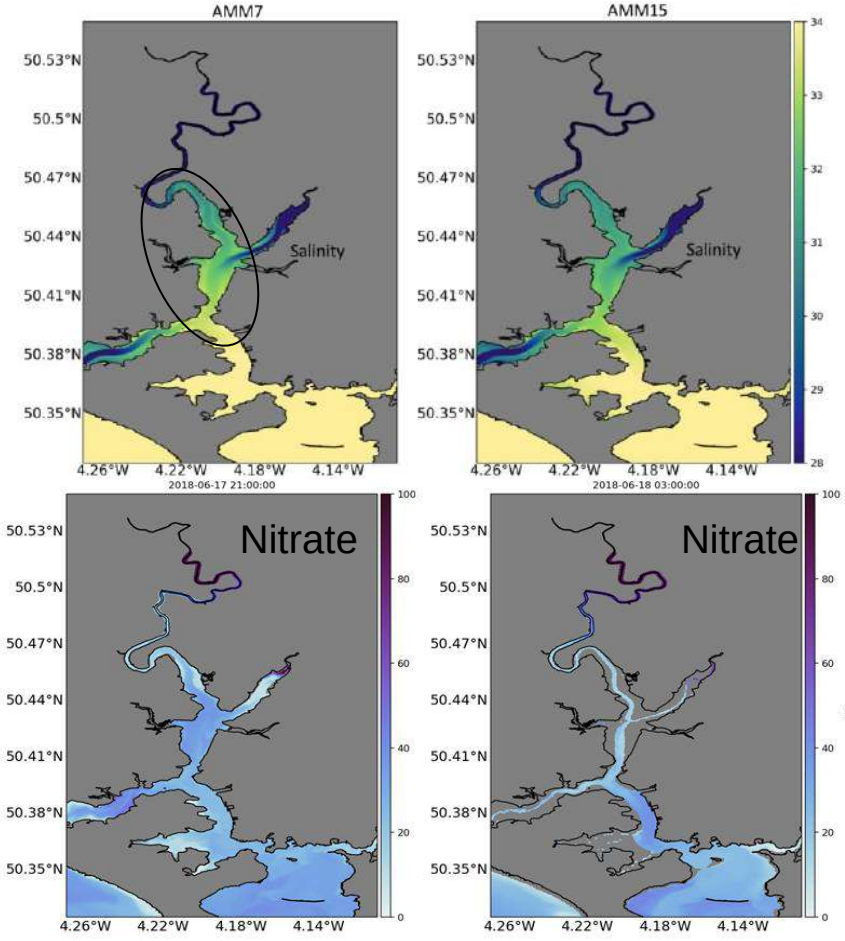
2018-2019: Biogeochemical model





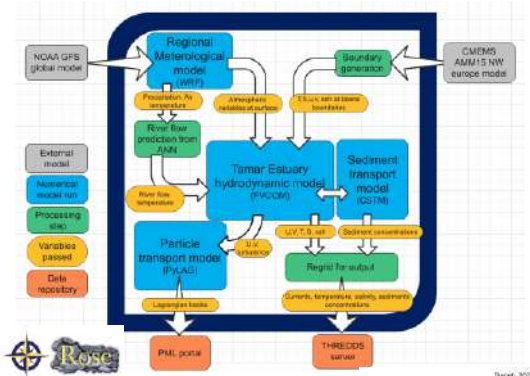
Results are from 2 different years

Largest differences in a narrow salinity band that occupies the middle part of the estuary



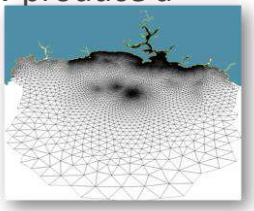
Operational Model

Forecast system



Operational models of Tamar estuary and SW UK shelf now produce a 1 day nowcast, 2 day hydrodynamic forecast

https://plymouthmarineforecasts.org/

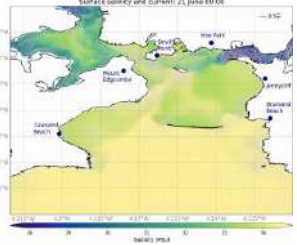


Interreg Atlantic Area | MyCoast | Interreg Atlantic Area | PRIMROSE

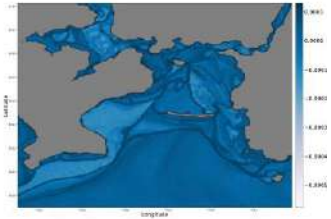
Predicting the Impact of Regional Scale events on the Aquaculture Sector

These support experimental risk management tools for a variety of end users

Users



Conditions reports for local marine users



Accumulation of pollutants

Search and Rescue support

Harmful algal bloom advection forecast

Future

- Integrate WCO/EO observations with model outputs for new operational products (e.g. HAB risk)
- Integrate into smart sound, using machine learning approaches combine with autonomous platforms

Thank You


Marine Biogeochemistry and Observations (MBO)
River, Estuary, Sea
Marine Biogeochemistry and Observations (MBO)
Atmosphere
Marine Ecosystem Models and Predictions (MEMP)
Modelling
Plus One
Sea and Society (SaS)
Socio-economics

ReMeMaRe

CONNECTION

Dr Joanne Preston, University of Portsmouth

Developing the evidence base and consensus to achieve seascape scale restoration

Environment Agency

Scarborough Spa

11-12th July, 2023

OCEAN & COASTAL FUTURES

Seascape Restoration Hub

Developing the evidence base and consensus to achieve seascape scale restoration in temperate coastal ecosystems.

ReMeMaRe Conference July 2023

Joanne Preston[1,2]

Alison Debney[2], Celine Gamble[2], Angus Garbutt[3] Graham J.C. Underwood[4], Philine zu Ermgassen[5],

[1]University of Portsmouth [2]Native Oyster Network [3]UK Centre for Ecology & Hydrology. [4]University of Essex. [5]University of Edinburgh

Joanne.preston@port.ac.uk @jprestondiggles

Working together to facilitate the restoration of the native oyster

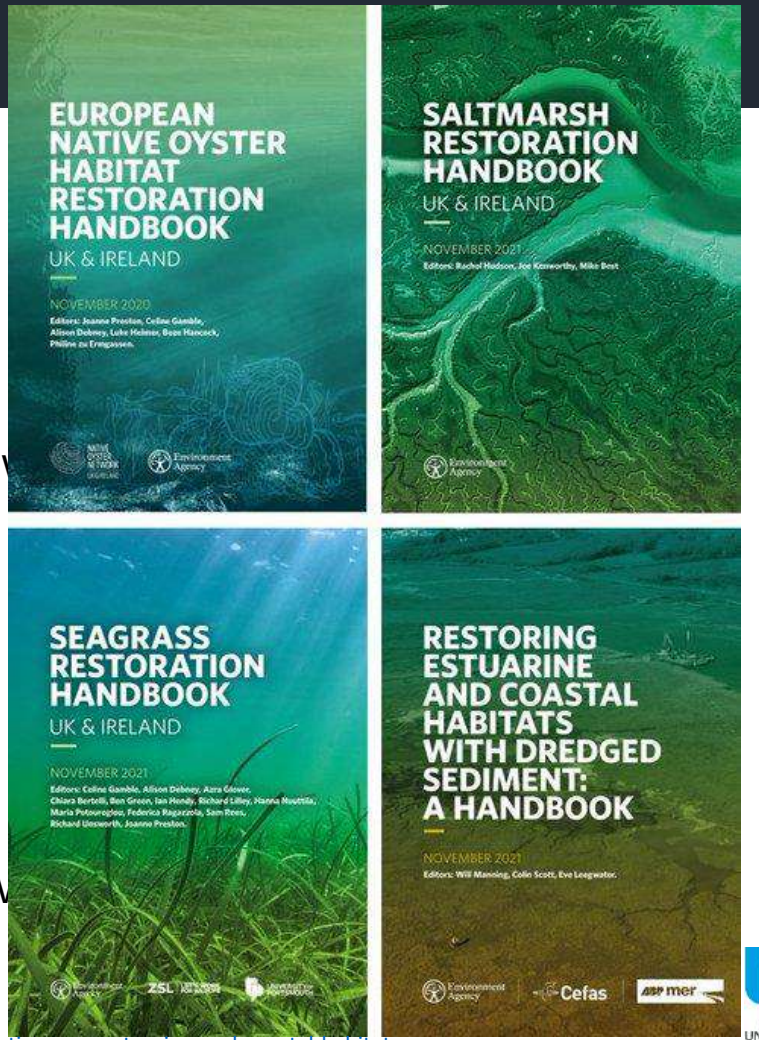
Loss of habitat and eco

RESTORATION

"the process of establishing or re-establishing a degraded habitat or ecosystem that in time can come to closely resemble a natural condition in terms of structure and function" (Baggett *et al*. 2014).

- Requires ACTIVE HUMAN INTERVATION
- Is TARGET and GOAL DRIVEN

Restoration ecology is the scientific study supporting the practice of ecological restoration.



https://www.gov.uk/government/news/restoration-handbooks-published-to-give-best-practice-advice-on-creating-new-estuarine-and-coastal-habitats

UNIVERSITY PORTSMOUT

ZSL SYMPOSIUM

Ecological connectivity across temperate coastal habitats – moving towards seascape scale restoration

22nd November – 23rd November 2022

2 Day conference

Zoological Society of London

#SeascapeSymposium
@ZSLScience
@NativeOysterNetwork

NATIVE OYSTER NETWORK UK & IRELAND

ZSL | LET'S WORK FOR WILDLIFE

UNIVERSITY OF PORTSMOUTH

THE UNIVERSITY of EDINBURGH

Life

ZSL SYMPOSIUM

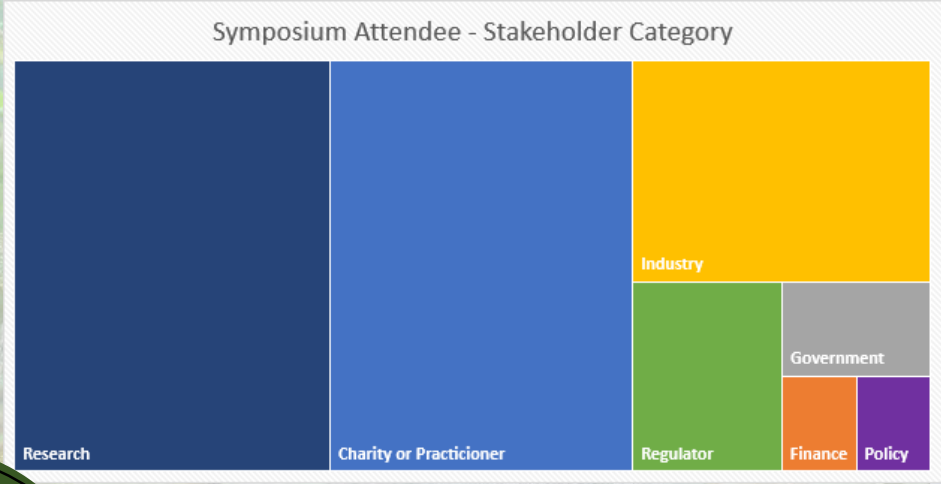
Session		
1	INTERNATIONAL CONTEXT FOR SEASCAPE RESTORATION	USA & EU
2	HISTORICAL ECOLOGY & CURRENT KNOWLEDGE OF TEMPERATE MARINE HABITATS	UK wide
3	INTEGRATED HABITAT RESTORATION & SEASCAPE CONNECTIVITY	Australia & NL
4	MECHANISMS AND EVIDENCE OF CONNECTIVITY	Interactive
5	SCIENCE OF CONNECTIVITY	USA & UK
6	DECISION MAKING IN HABITAT RESTORATION	Aus, USA, UK
7	COASTAL RESTORATION AND THE FUTURE	UK Wide

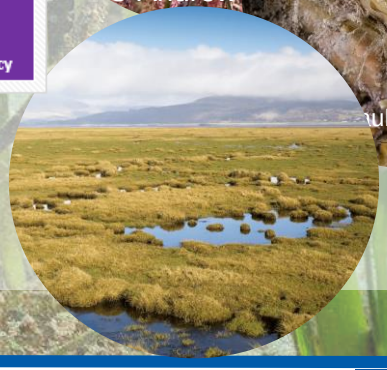
ZSL SYMPOSIUM

30 Speakers
9 countries

166 delegates

89 institutions





NATIVE OYSTER NETWORK UK & IRELAND

ZSL | LET'S WORK FOR WILDLIFE

UNIVERSITY OF PORTSMOUTH

THE UNIVERSITY of EDINBURGH

Life

What does seascape mean to you?

82% Strongly agreed they felt inspired to further the science move towards seascape scale restoration

78% excellent

The event was amazing and inspiring and the organisers should be very proud. I believe it will have made an active difference towards seascape scale restoration occurring in the UK.

85% Strongly agreed: they have increased knowledge of the science around temperate coastal ecosystem restoration increased knowledge of the science around temperate coastal ecosystem restoration

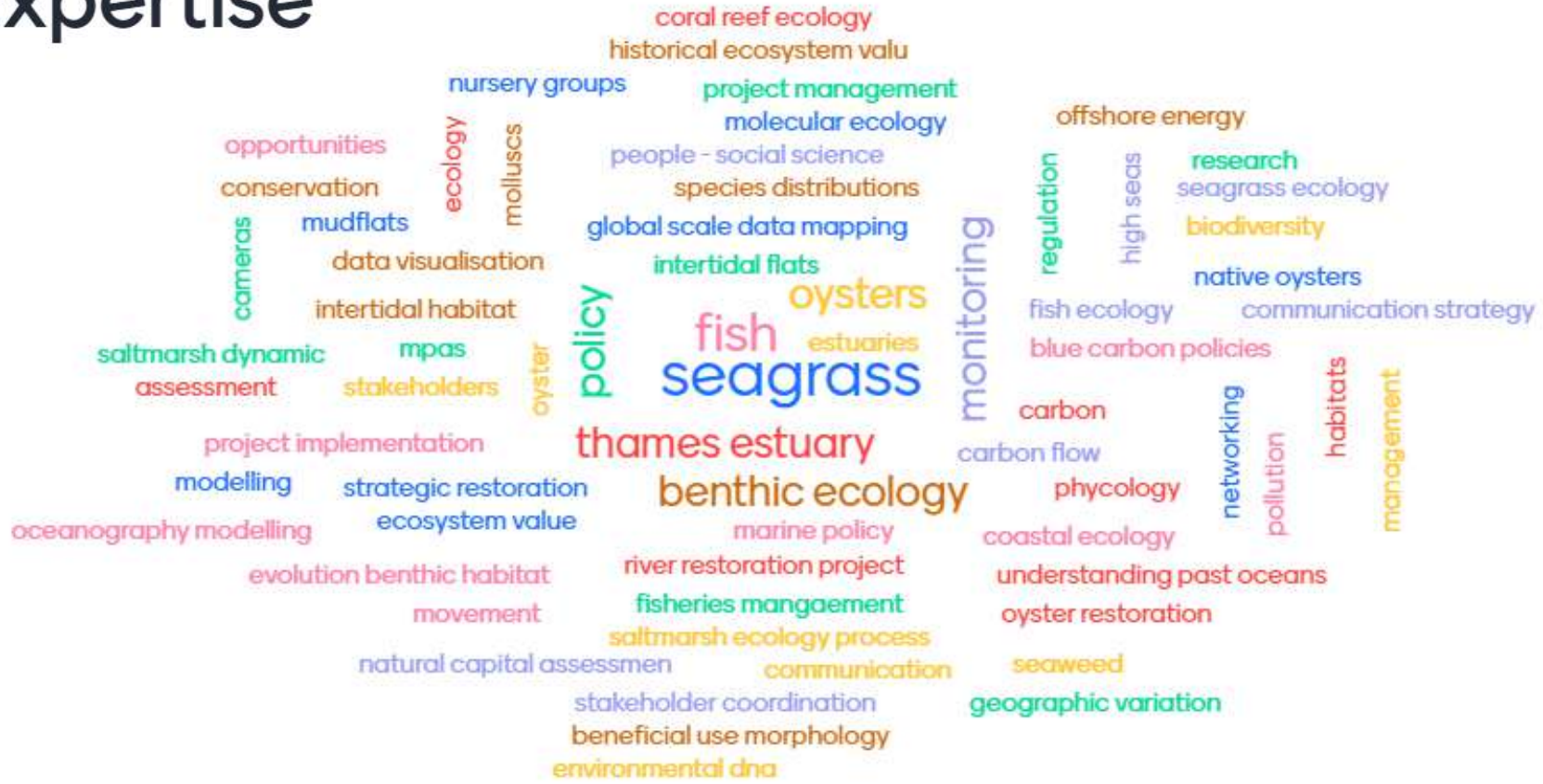
Workshop Day 3: Scope, aim and impact

***SCOPE**: Seascape Connectivity Workshop* collated expert **opinion** & **evidence** for a seascape approach, with a focus on **ecological connectivity** and **interactions** of habitats to multiply/enhance ecosystem services.

***AIM**: To bring together scientists, policy makers and expert practitioners to gather **evidence** and create a **state of knowledge** analysis of **connectivity** and interactions across the **temperate coastal seascape** with priority setting to enable better links between **science to practice and policy**, and vice versa.*

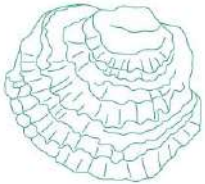
IMPACT: To *provide rationale and evidence that facilitates a shift to **large-scale, seascape** approach to **coastal habitat restoration** which is needed to deliver the ecological functions and services we need for human and planetary wellbeing, to reverse **biodiversity loss** and **mitigate climate change.***

Expertise


coral reef ecology
historical ecosystem valu
nursery groups
project management
molecular ecology
offshore energy
opportunities
ecology
molluscs
people - social science
regulation
high seas
research
conservation
species distributions
seagrass ecology
cameras
mudflats
global scale data mapping
biodiversity
data visualisation
intertidal flats
monitoring
native oysters
intertidal habitat
policy
oysters
fish ecology
communication strategy
fish
saltmarsh dynamic
mpas
estuaries
blue carbon policies
oyster
seagrass
assessment
stakeholders
habitats
carbon
networking
management
project implementation
thames estuary
carbon flow
pollution
modelling
strategic restoration
benthic ecology
phycology
oceanography modelling
ecosystem value
marine policy
coastal ecology
river restoration project
evolution benthic habitat
understanding past oceans
movement
fisheries mangaement
oyster restoration
saltmarsh ecology process
natural capital assessmen
communication
seaweed
stakeholder coordination
geographic variation
beneficial use morphology
environmental dna

Why is ecological connectivity important in the temperate coastal seascape?

Seascape Symposium & Workshop outputs:



NATIVE OYSTER NETWORK UK & IRELAND

Life

THE UNIVERSITY of EDINBURGH

ZSL | LET'S WORK FOR WILDLIFE | UNIVERSITY OF PORTSMOUTH

Working together to facilitate the restoration of the native oyster

1) Scientific Paper:
Seascape connectivity: evidence, knowledge gaps and implications for coastal habitat restoration practice and policy.

Nature Ocean Sustainability
Special Issue Jan 2024

2) Seascape Restoration Report:
& 2 Page summary
Policy and public facing document
Context, rationale and potential for seascape restoration of coastal habitats

BLUE MARINE FOUNDATION

UKCEH

UNIVERSITY OF PORTSMOUTH

University of Essex

3) POSTnote

ReMeMaRe

ECSA

ConnECTER Special Interest Group (SIG)

UK BLUE CARBON FORUM

Habitats, Conservation & Restoration WG

- ✓ Identify ecological knowledge gaps: focus research to enable a fuller understanding of connectivity across coastal habitats.
- ✓ Discuss implications for coastal habitat restoration practice and policy.
- ✓ Drive funding and upscaling of restoration
- ✓ State of knowledge re Ecosystem

Coastal Seascape definition

‘*The physical **mosaic** of interacting **habitats** occupying the coastal marine environment in time and space. This seascape is ecologically and physically connected via a body of water that facilitates the **movement** and flow of organisms, genetic material, matter and energy between habitats. The scale and distance between patches of different habitats will affect the **connectivity** and **functioning** coastal ecosystems, and therefore their ability to support coastal trophic webs, marine **biodiversity** and the flow of **natural processes** (such as carbon sequestration or denitrification). Connectivity the seascape operates at **scales** of 1’s m to 10kms and extends from the intertidal to the shallow coastal shelf seas (1nm + biogenic habitats at 50-80m depth). The mosaic of habitats within this seascape act as an important **boundary** where processes from the **land and sea** interact with each other and provide protective **buffers** for nature and people.’*

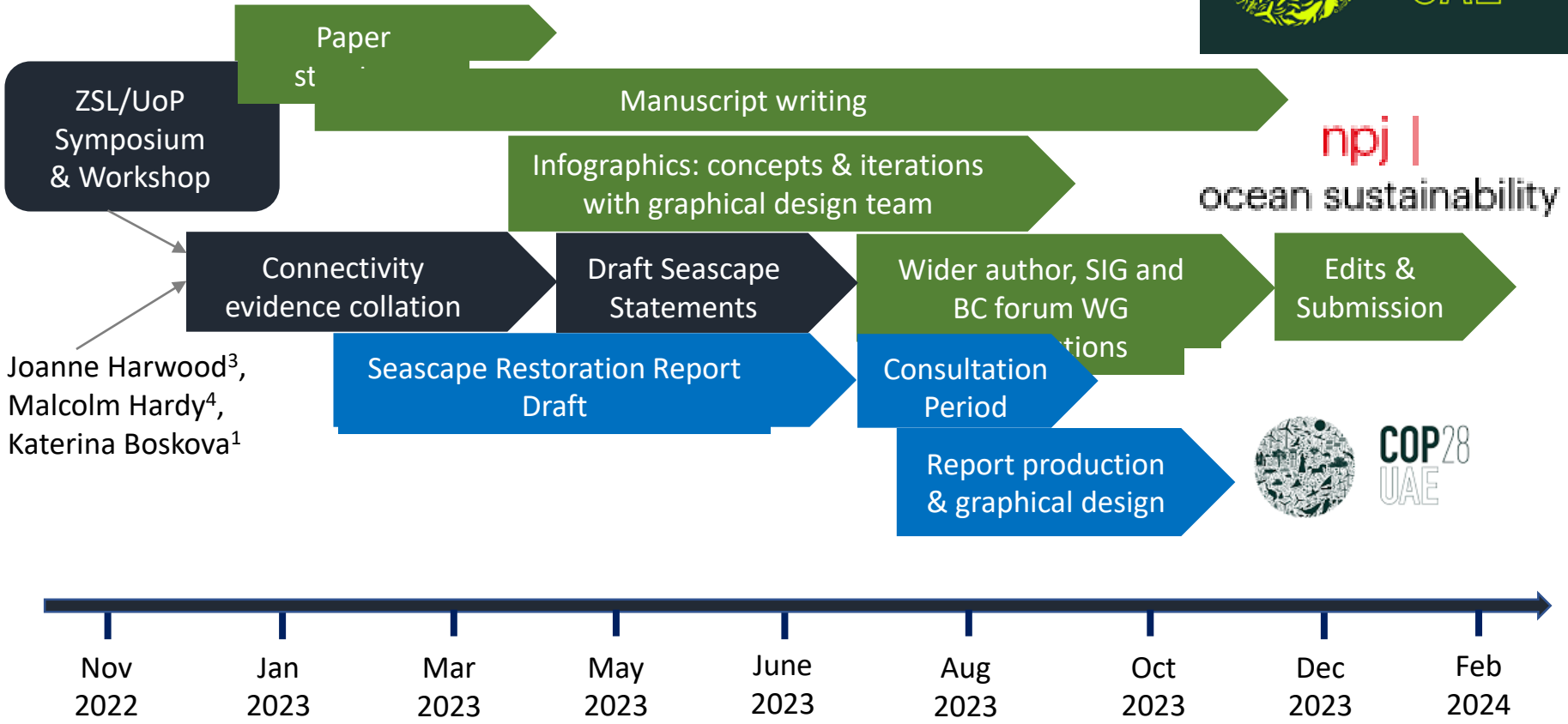
Joanne Preston June 2023

Seascape Restoration Statement

Everything in nature is connected and interdependent*. The seascape, as a concept, is rooted in this understanding that marine ecosystems are dynamic, heterogeneous, and* ***interconnected mosaics*** *of habitats and communities. Unlike terrestrial landscapes, the habitats within a seascape are connected by an ever-moving body of water through which* ***fish, larvae, genetics, seeds, carbon, nutrients and energy flow*** *constantly. This perspective transcends traditional boundaries and encompasses not only the physical and biological components of the marine environment, but also the* ***complex relationships*** *among them, including ecological, evolutionary, and anthropogenic processes. Fundamentally, the seascape approach recognises that because of the connectedness and interdependence of coastal habitats, to only restore single habitats will fail to restore the* ***trophic webs, biodiversity and full functioning*** *that depends on the existence of a healthy* ***mosaic*** *of coastal habitats and the* ***feedback loops*** *that occur between them. Recognizing the interconnected nature of these systems, allows for more* ***effective*** *and* ***holistic*** *management, conservation, and restoration strategies. It is proposed here that a* ***seascape approach*** *is the key to restoring* ***healthy and functioning coastal ecosystems****, because restoring functional, structural and ecological* ***connectivity*** *is crucial for* ***successful rewilding and restoration****.*

Joanne Preston June 2023

Timeline and consultation periods



NATIVE OYSTER NETWORK
UK & IRELAND

Thank You!

Let's bend the curve back for future generations

Joanne.preston@port.ac.uk

ReMeMaRe

CONNECTION

Michael Thompson, Mott MacDonald

Nurturing nature-based solutions to support net gain across dynamic coasts

Environment Agency

Scarborough Spa

11-12th July, 2023

OCEAN & COASTAL FUTURES

Nurturing nature-based solutions to support net gain across dynamic coasts

Michael B Thompson

ReMeMaRe 2023, Scarborough

11 May 2023

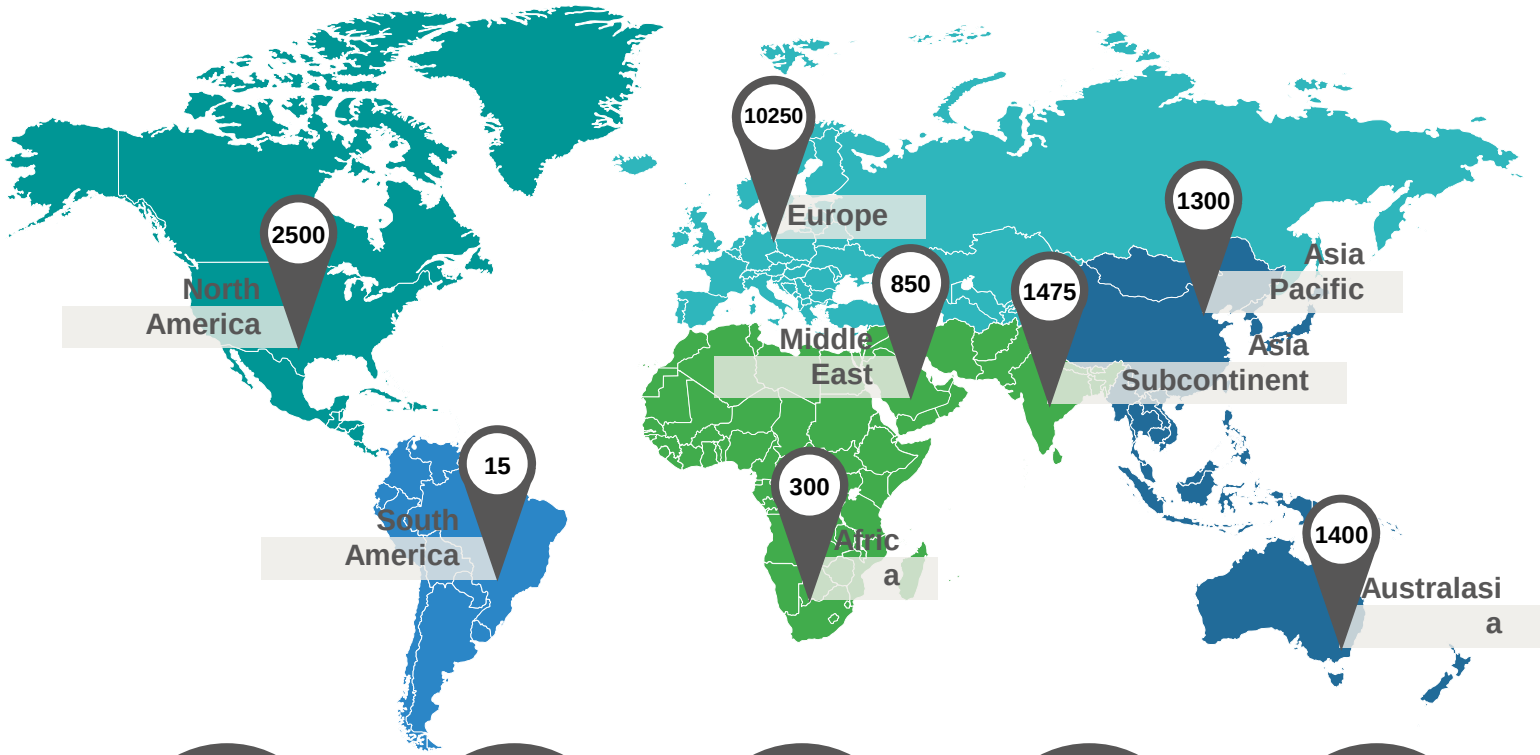
Outline

1. Who are Mott MacDonald
2. Biodiversity Net Gain
3. Enhancing Coastal Structure to Encourage Nature
4. Enhancements to Solutions
5. Challenges Raised

Who are Mott MacDonald?

We’re a global engineering, management and development consultancy.

Our purpose is to improve society by considering **social outcomes** in everything we do, relentlessly focusing on **excellence** and **digital innovation**, transforming our clients’ businesses, our communities and employee opportunities.



We work in 135 countries

170 permanent offices in 50 countries

18k staff

$2 billion turnover

Over 150 years' heritage

Biodiversity Net Gain

Biodiversity Net Gain

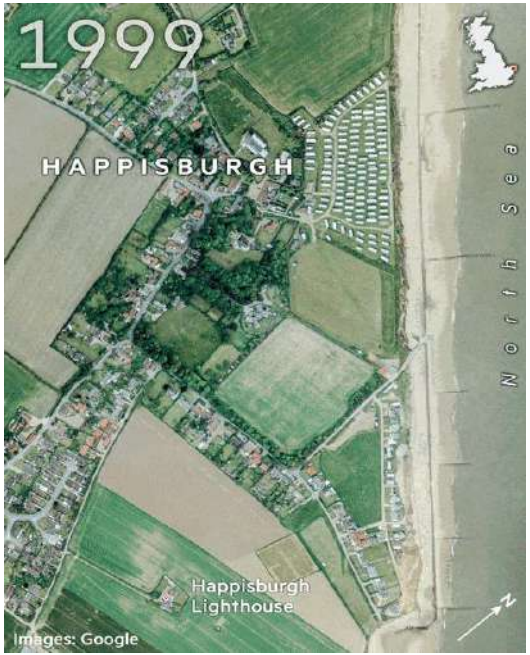
Intertidal areas (Biodiversity net gain)

- Environmental Act (2021) requires the majority of developments a minimum of 10% net gain from November 2023
- However, percentage can be increased based upon LPA
- Habitat secured for at least 30 years
- On or off site, or purchase credits (not there yet)
  - Watch this space
- Valued by the Biodiversity Metric 4.0

Subtidal (Marine net gain)

- Still under consultation though likely habitat and species

Coastal evolution and conflicts with us



Enhancing Coastal Structures to Encourage Nature

Southend Coastal and Flood Risk Management

1

Frontage is approximately 15km in length and supporting infrastructure

2

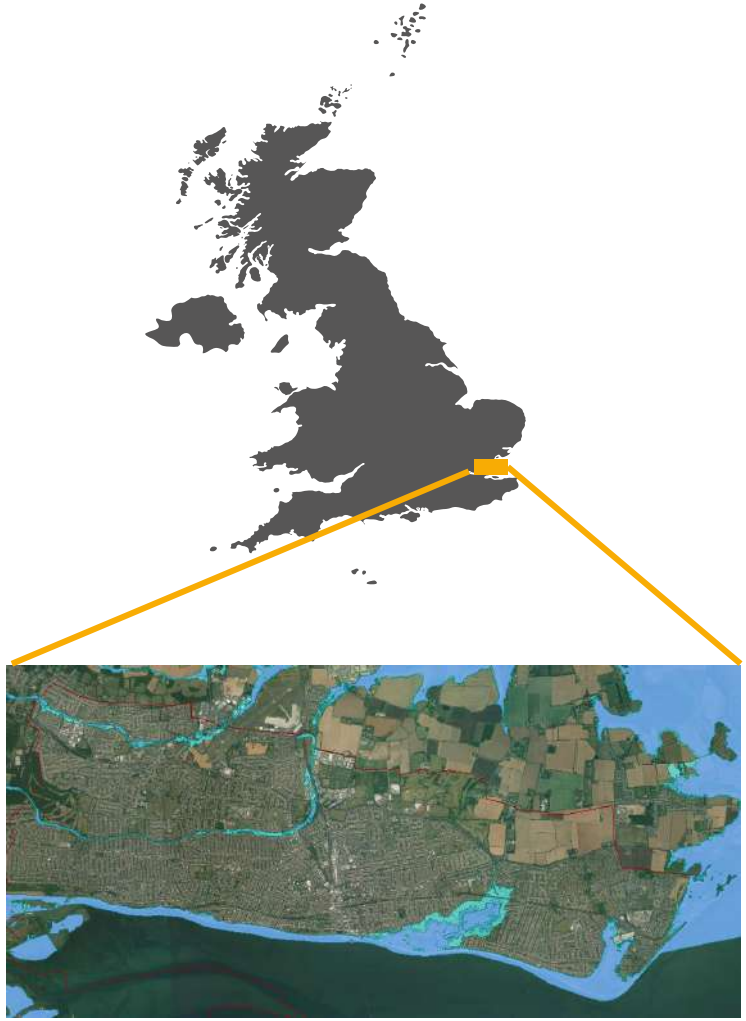
250,000 properties at risk of erosion and coastal flooding over 100 years

3

780 hectares of intertidal habitat loss over 100 years

4

Two projects presented here



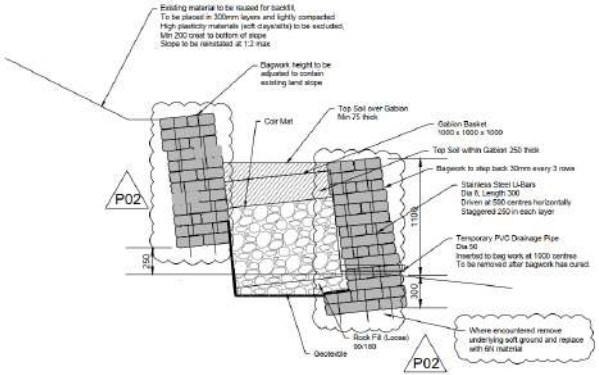
Southend Sustainable and Resilience Coastal Cities (SARCC)

Two Tree Island and Leigh-on-Sea

Project includes nature-based solutions and repairs to the concrete bags and inclusion of planting for Dune regeneration and vertipools

Tasks include:

- Detailed design
- Environmental considerations
- Consenting



Southend Sustainable and Resilience Coastal Cities (SARCC)

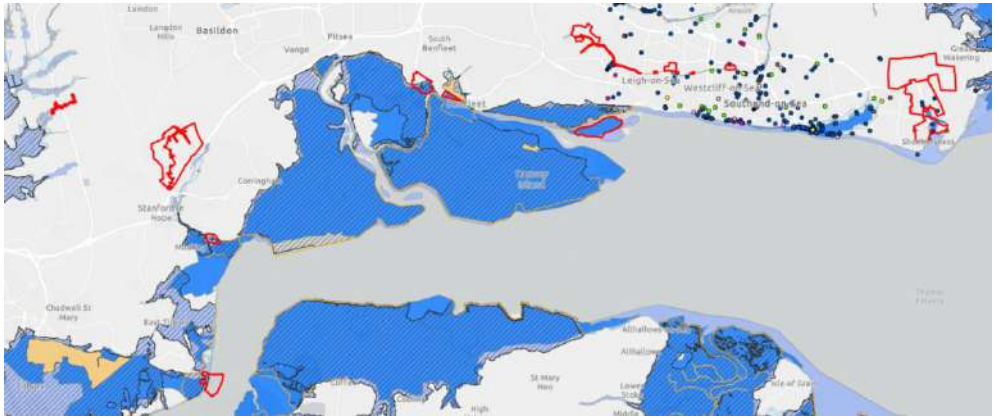
Two Tree Island and Leigh-on-Sea

Enhancements to Solutions

Catchment to Coast Flood and Coastal Resilience Innovation Programme Project

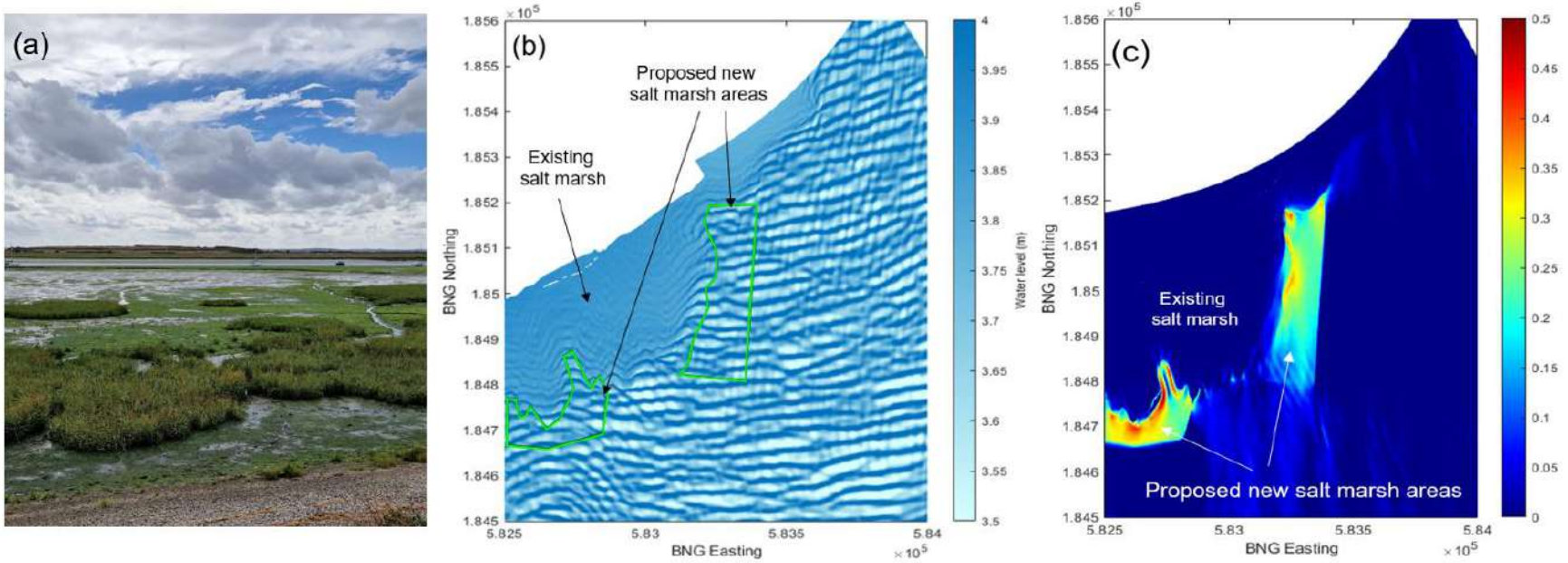
Scheme description:

- 1 of 25 projects for Defra's £150m innovation funding
- Taking a holistic approach to mitigating against flooding and coastal erosion
- Uses innovative measures and processes to gain meaningful learning, capacity and skills to implement future projects and also instigate planning policy changes
- Includes 14 project partners
- Use a nature-based solutions to protect landfill erosion into the estuary



Catchment to Coast Flood and Coastal Resilience Innovation Programme Project

- XBeach numerical model simulate interaction between waves
- Factoring successional height of new saltmarsh versus established
- cost-effective and sustainable solution



Stronger Shores Project

Scheme description:

- Another 1 of 25 projects for Defra's £150m innovation funding
- Mott MacDonald partnered with the National Oceanographic Centre, British Geological Survey and Newcastle University
- Use of sub-tidal restoration and regeneration of kelp bed and oyster reef habitats to increase protection against coastal erosion and flooding.
- Provide robust evidence on nature-based solutions

Anticipated effects

Increased wave energy dissipation.

Local decrease in sediment transport capacity.

Creation of a sediment transport gradient that favours sediment deposition.

Possible outcomes

Reduces the probability of coastal flooding and erosion

Improved water quality

Increased carbon sequestration

Biodiversity net gain

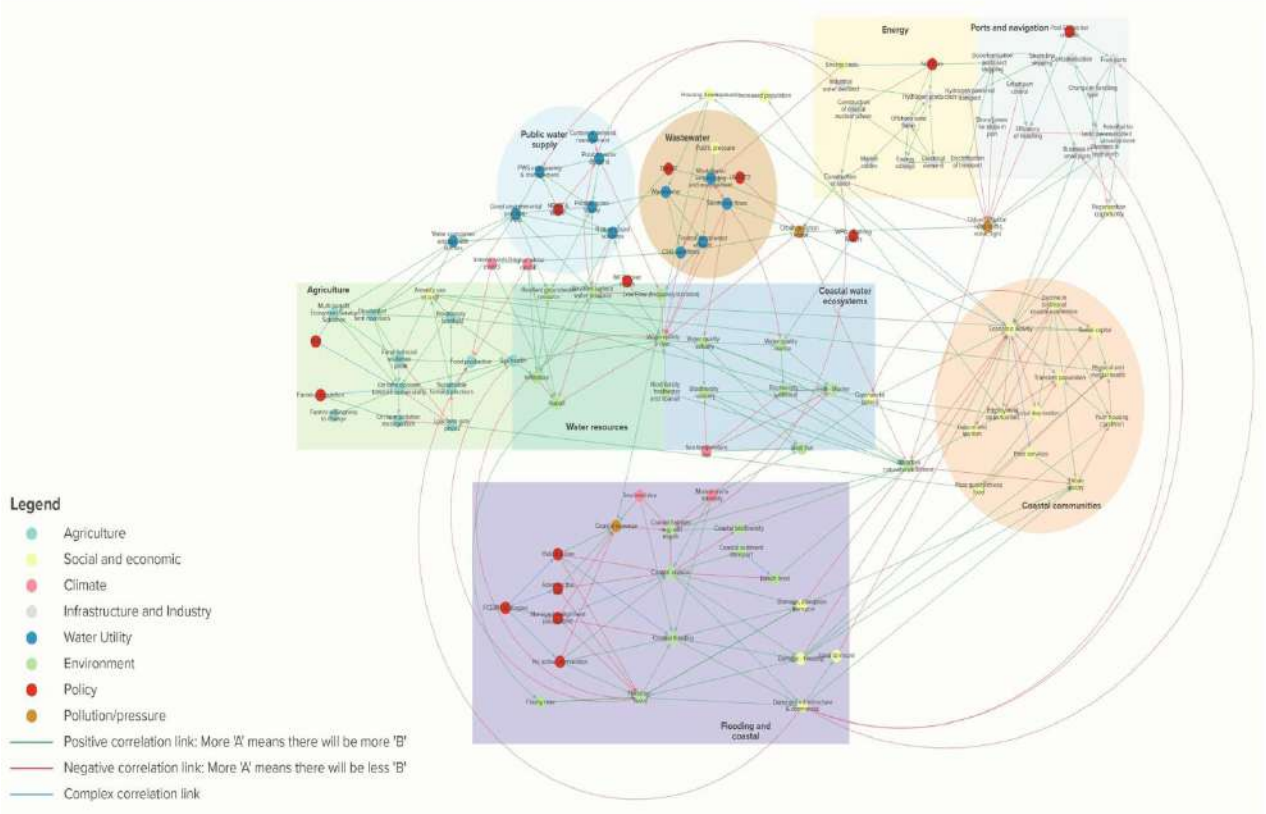
STRONGER SHORES
MARINE HABITATS PROTECTING COMMUNITIES

South Tyneside Council

Mott MacDonald

Challenges Raised

Coastal System Mapping



Stakeholders and policy are numerous

The interactions are complex

Local versus regional policy

Assessing people and nature's needs.

Questions?

Feel free to speak to me after the session or drop me an email:
Michael.Thompson@mottmac.com

MOTT MACDONALD

Thank you

ReMeMaRe

CONNECTION

Hellen Hornby, Groundwork

Revitalising our Estuaries – Grey to Green Coasts and Communities

Environment Agency

Scarborough Spa

11-12th July, 2023

OCEAN & COASTAL FUTURES

PROJECT EVALUATION

REVITALISING OUR ESTUARIES

JUNE 2023

CATERPILLAR FOUNDATION
CATERPILLAR

Green Recovery Challenge Fund
Department for Environment Food & Rural Affairs
The National Lottery Heritage Fund
Environment Agency
NATURAL ENGLAND

AT A GLANCE

Revitalising our Estuaries (RoE) was a rapid 18-month project that has delivered a programme of nature restoration and community engagement across the six major river estuaries in northeast England. The project was supported by Department for Environment, Food and Rural Affairs (Defra) and the National Lottery Heritage Fund (NLHF) through their Green Recovery Challenge Fund (GRCF).

Revitalising our Estuaries was delivered from September 2021 to March 2023, with a three-month extension granted to ensure completion of approved purposes through to the end of June 2023.

The aims of the project were to:

Restore and improve 464 hectares of estuary habitat and riparian corridors connected to six estuaries covering the northeast coastline, creating six innovative channel or bankside estuary habitats through Nature-based Solutions

Connect people to nature by direct engagement with 6,000 local residents through educational visits, events, volunteering and citizen science activities and provide opportunities for 85,000 with improved access to nature

Focus on increasing skills and employment opportunities for 38 young people in the region supported by four staff within Groundwork NE and Cumbria, increasing the resilience of the host organisation

The six estuaries and coastal areas covered by the project were:

- Wansbeck: Ashington and Choppington area
- Blyth: Port of Blyth and Bedlington Country Park
- Tyne: Newcastle Quayside, Gateshead and South Tyneside
- Wear: Sunderland (north bank)
- Tees: Hartlepool, Stockton, Middlesbrough and Redcar & Cleveland

NATURE BASED SOLUTIONS

RoE has led the way in pioneering Nature-based Solutions (NbS) for habitat enhancement and restoration, impacting over 467 hectares of landscape. NbS are actions to protect, sustainably manage and restore natural or modified ecosystems, providing social and environmental benefits.

The project has improved nature across six costal estuary areas. This has been delivered through the completion of a habitat management project which was a key outcome from the consultation undertaken (mention when) with partners and landowners. Over £300,000 match funding from the Environment Agency, the Caterpillar Foundation, NE1 Limited, South Tyneside Council, Northern Directions, Northumbrian Water and Organon have enabled these improvements to take place.

Some outputs and outcomes of the project include the installation of 100 vertipools, 700 metres of estuary edge restoration, three floating ecosystems, including a world first at Newcastle Quayside, 50 pod pools, 76 fish refugia and three safe bird nesting areas.

Key outputs and outcomes include:

324 ha of estuary habitat restoration
Improving 317 ha of sand dune habitat
Creating 7.41 ha of intertidal habitat

10 tonnes of carbon sequestration
from Nature-based Solutions and tree planting

143 ha of riparian corridor and urban green space improvements
with 1.3 ha of invasive species controlled

1,071 trees planted
to improve hedgerows and biodiversity

Photo: Groundwork / Floating Ecosystem -Tyne Estuary

EMPLOYMENT AND TRAINING

RoE has clearly demonstrated the rewarding opportunities to create jobs in the environment sector and support which has positively impacted on the wider economy. Groundwork created roles to increase capacity and facilitate the delivery of the project. This opportunity was made possible with match funding from Kickstart, Northern Directions and Caterpillar Foundation.

37 Kickstart placement trainees successfully gained experience within sector and developed new skills, preparing them for future employment. Upon completion of their placements 14 progressed into further employment opportunities and of the 14, six were retained within Groundwork NE & Cumbria.

The positive impact of the project is evidenced through many of the trainees expressing their thanks and gratitude to Groundwork for the caring and supportive approach adopted through the mentoring offered with the different role. This was of importance to a number of the trainees that had hidden disabilities or who had encountered personal challenges during the COVID 19 pandemic.

Evidence suggests that the work experience and training offered through RoE has increased the motivation of trainees to secure long term employment and create a better life for themselves and their families.

Key outputs and outcomes include:

41 full or part-time jobs created including 37 Kickstart trainees

556 training opportunities delivered

200 accredited and 349 unaccredited training qualifications provided from 21 different courses

> My placement has given me more direction by having opportunities to try out different roles. It has helped me focus on what I want to do in the future.
> RoE- Research and Monitoring Assistant

Photo: Groundwork / North ER Team

COMMUNITY ENGAGEMENT

Community engagement has played a pivotal role in ensuring project success. An objective of the project was to connect community and nature together and share the benefits that this can offer to support mental and physcial health and wellbeing. The community engagement element has been delivered through offering a series of events and education activities and supported the generation of volunteers.

We have been able to further evidence the positive impacts and benefits of community through volunteering opportunities, some securing direct employment. As well as local communities the project has gathered positive feedback from schools who have influenced and shaped the project through the educational activities.

Key outputs and outcomes include:

- Connected 365,224 people to nature through in person, press and social media activity
- Engaged 25 community groups and 8 corporate groups
- 14 schools participated in education activity with 832 children and adults engaged
- Directly engaged with 3,721 people
- Delivered 39 public events
- Recruited 113 informal volunteers
- 4.7 km of footpath improvements to improve access to nature

Photo: Groundwork / Butterfly Walk, Tyne - Hebburn Riverside Park

REFLECTIONS

WHAT WENT WELL?

- The employment opportunities offered to 37 young trainees was a real achievement.
- Sourcing additional match funding to support the final two cohorts of young trainees to continue the Kickstart programme.
- Pushing boundaries to create unique and innovative approaches to nature based solutions. The fish refuges on the Blyth “look like real pieces of art but have an ecological function as well.”
- The local mayor attended The Esk Estuaries Event in February 2023 which attracted over 400 people.
- The project has showcased the positive benefits and outcomes from true partnership working and community engagement.

“THE WIDE variety of marine conservation work that we have been able to work on and being involved in prototype nature conservation projects.”
- Project trainee

REFLECTIONS

CHALLENGES

THE PROJECT WAS INITIALLY COMPRESSED IN TO AN 18-MONTH TIMETABLE STARTING IN SEPTEMBER 2021 AND FINISHING IN MARCH 2023. RECRUITMENT OF SUPERVISORS AND LANDOWNER CONSENTS PROVED MORE DIFFICULT THAN ANTICIPATED AND DELAYED THE START OF PRACTICAL DELIVERY.

THE KICKSTART JOB TITLES COULD HAVE BEEN MORE SIMPLISTIC SO THAT THE APPLICANTS CLEARLY UNDERSTOOD WHAT THE ROLE INVOLVED. ADVICE FROM THE RECRUITMENT TEAM AND DWP WAS TO RENAME THEM TO 'RIVER RANGERS' OR 'PROJECT ASSISTANTS' TO INCREASE THE NUMBER OF APPLICANTS RECEIVED.

THE SIX MONTH PLACEMENTS COULD HAVE BEEN LONGER. AFTER INDUCTIONS AND TRAINING THERE WASN'T MUCH TIME LEFT TO ALLOW THE TRAINEES TO PUT THEIR GAINED SKILLS IN TO PRACTICE. A PERIOD OF 9 TO 12 MONTHS WOULD BE BETTER TO GIVE THEM SUFFICIENT PRACTICAL EXPERIENCE.

THE LARGE GEOGRAPHIC SPREAD OF THE PROJECT MEANT IT WAS DIFFICULT FOR THE PROJECT MANAGER AND ASSISTANTS TO HAVE A REGULAR PRESENCE AT ALL SITES. THE KICKSTART PROJECT ASSISTANTS WERE RECRUITED VIA THE MIDDLESBROUGH OFFICE AND IT WAS DIFFICULT FOR THEM TO SUPPORT WORK IN THE CENTRAL AND NORTHERN AREAS.

"USUALLY WITH LOTTERY FUNDED PROJECTS YOU GET A DEVELOPMENT PHASE TO PLAN AND RECRUIT IN ADVANCE OF DELIVERY. THIS WAS NOT INCLUDED IN GRCF AND MADE OBTAINING CONSENTS WITHIN THE TIMESCALES VERY TIGHT."
Hellen Hornby, RoE Project Manager

WHAT'S NEXT?

The outputs and outcomes to date from the RoE project has demonstrated that the project has had a significant impact on the environment through nature recovery, the local community, connecting people with nature and the economy, creating local jobs and trainee opportunities.

PROJECT LEGACY

Through Groundwork's ongoing partnership with the Environment Agency's Natural Environment Investment Readiness Fund (NEIRF) £100k has been secured. NEIRF supports the government's goals in the 25-year environment plan and aims to stimulate private investment and market-based mechanisms that improve and safeguard the natural environment by helping projects get ready for investment.

SHORT TERM DELIVERY

The project has raised Groundwork's profile in this area of work and generated an interest from local businesses, foundations and government bodies. In the short term we have secured additional funding to support further RoE delivery and other NbS delivery on projects taking place at Wansbeck, Tyne, Wear and Esk estuaries. With this delivery we have retained a team of four Estuary Rangers and one Supervisor.

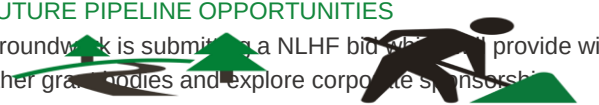
LONG TERM

The NEIRF support will continue the work started through the Green Recovery Challenge Fund and develop a method to value Biodiversity Net Gain, carbon sequestration and water quality benefits across three of the estuarine Nature-based Solutions.

We envision that the appetite for NbS linked to Biodiversity Net Gain, carbon sequestration, water quality and social impacts of our work will attract investment from the private sector and enable Groundwork to deliver further schemes of this type. However, our model does heavily rely on Government funding for trainee projects and has demonstrated without this RoE would not have been possible.

FUTURE PIPELINE OPPORTUNITIES

Groundwork is submitting a NLHF bid which will provide wider community engagement around c e are als y to other gra odies and explore corpo te sponsorshi




REVITALISING OUR ESTUARIES
INVESTMENT PORTFOLIO

Groundwork NE & Cumbria would like to thank all the organisations who have supported Revitalising our Estuaries. This includes funders, partners and members of the local communities who, without which, Revitalising our Estuaries would not be possible. We look forward to extending our Nature-based Solutions portfolio and continuing to foster and develop these relationships further.

FOR MORE INFORMATION ON ANY OF OUR INITIATIVES CONTACT: GNEC.DEVELOPMENT@GROUNDWORK.ORG.UK

This project is funded by the Government's Green Recovery Challenge Fund. The fund was developed by Defra and its Arm's-Length Bodies. It is being delivered by The National Lottery Heritage Fund in partnership with Natural England, the Environment Agency and Forestry Commission.

Visit: www.groundwork.org.uk/north-east-and-cumbria
Email: north.east@groundwork.org.uk
Telephone: 01388 662 666

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@Groundwork North East & Cumbria

Published June 2023

ReMeMaRe

CONNECTIION

Amy Pryor, Coastal Partnerships Network

Building a national framework for coastal coordination

Environment Agency

Scarborough Spa

11-12th July, 2023

OCEAN & COASTAL FUTURES

Coastal Partnerships Network
A National Framework Championing Coastal Coordination

Amy Pryor
Technical Director, Thames Estuary Partnership
Executive Leader, Coastal Partnerships Network

Context – What is Championing Coastal Coordination (3C's)

3Cs is an Environment Agency funded initiative with support from Natural England, the Marine Management Organisation, and the Association of Inshore Fisheries and Conservation Authorities. It is a collaboration seeking to explore how to enhance and progress coordination for coastal sustainability and resilience in England.

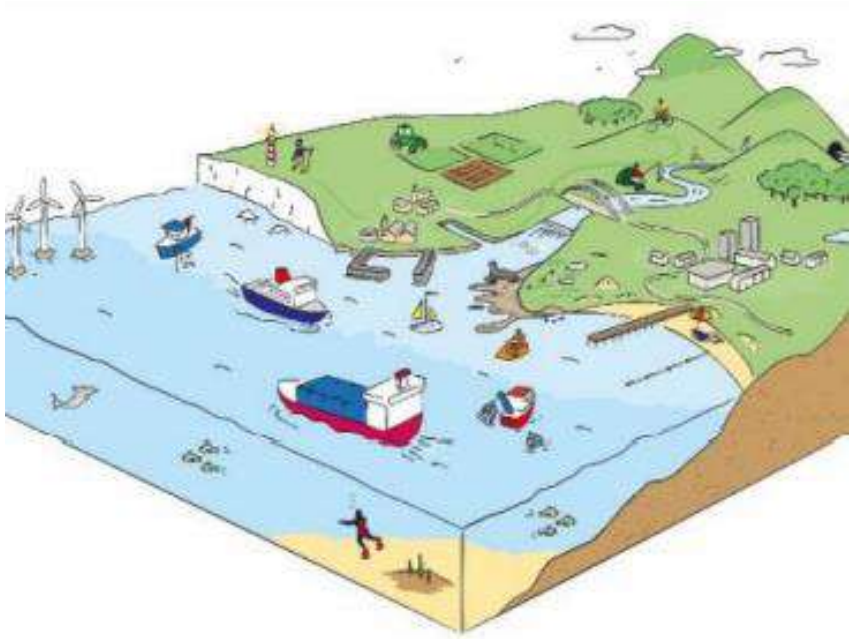
Position – significant loss of coastal habitat, communities at flood and erosion risk
Problem – management of coastal issues poses complex challenges
Proposal – enhance and progress coordination and collaboration

Key Pilot Headlines

- Opportunities to integrate and align delivery across the land/sea interface via Government agendas abound:
  - Flood and Coastal Risk with Coastal Group Network, Coastal Groups and RFCC
  - Coastal Habitat Restoration is NbS and Blue Carbon
  - Emerging Marine Natural Capital and BNG
  - Fisheries Management Plans
  - Climate Resilience

- 'Landing' marine development and restoration
  - Levelling Up and Shared Prosperity
  - Net Zero
  - Fisheries Management Plans
  - Local Nature Recovery Strategies
  - Marine Plan Refresh

- Shaping future policies and strategies
  - Nested Coastal Plans
  - UK Coastal Strategy



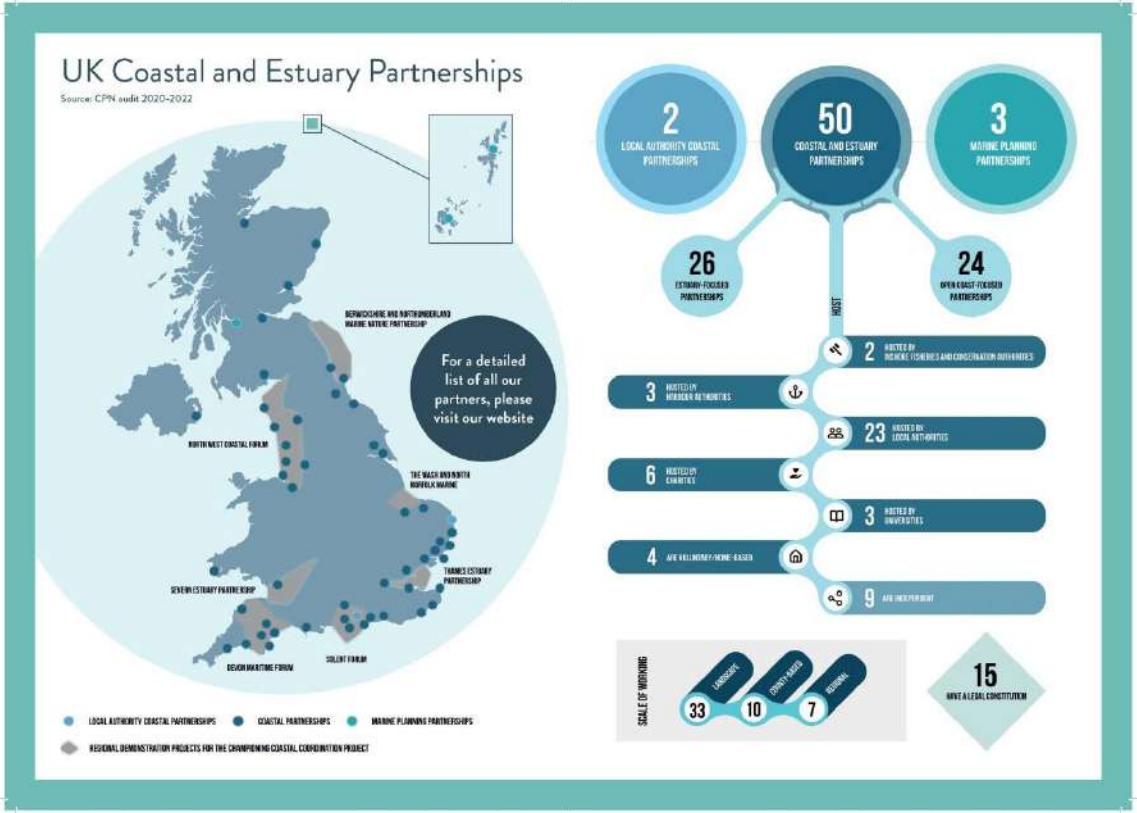
John Ellerman Foundation

CALOUSTE GULBENKIAN FOUNDATION UK BRANCH

Department for Environment Food & Rural Affairs

THAMES ESTUARY PARTNERSHIP

Coastal Partnerships Network



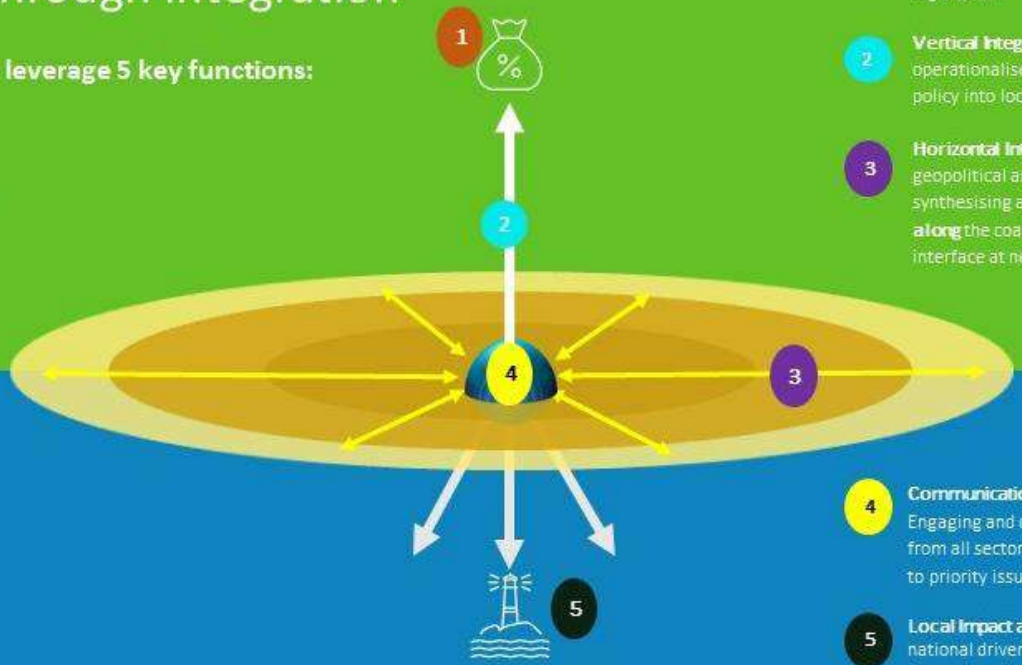
'Cross-sectoral place-based partnerships advocating for the system level approach, sustainable use of marine resources and integrated, coordinated management across a stretch of coastline or estuary'

Coastal and Estuary Partnerships

Coordination at the Coast:
resilience through integration

Coastal Partnership leverage 5 key functions:

1. Accessing funding
2. Vertical Integration
3. Horizontal Integration
4. Communications
5. Bottom-up delivery



1 **Harmonising funding:** Accessing and rationalising government funding instruments with integrated policy and legislation.

2 **Vertical Integration:** Working to distil, operationalise and translate national policy into local delivery and impact.

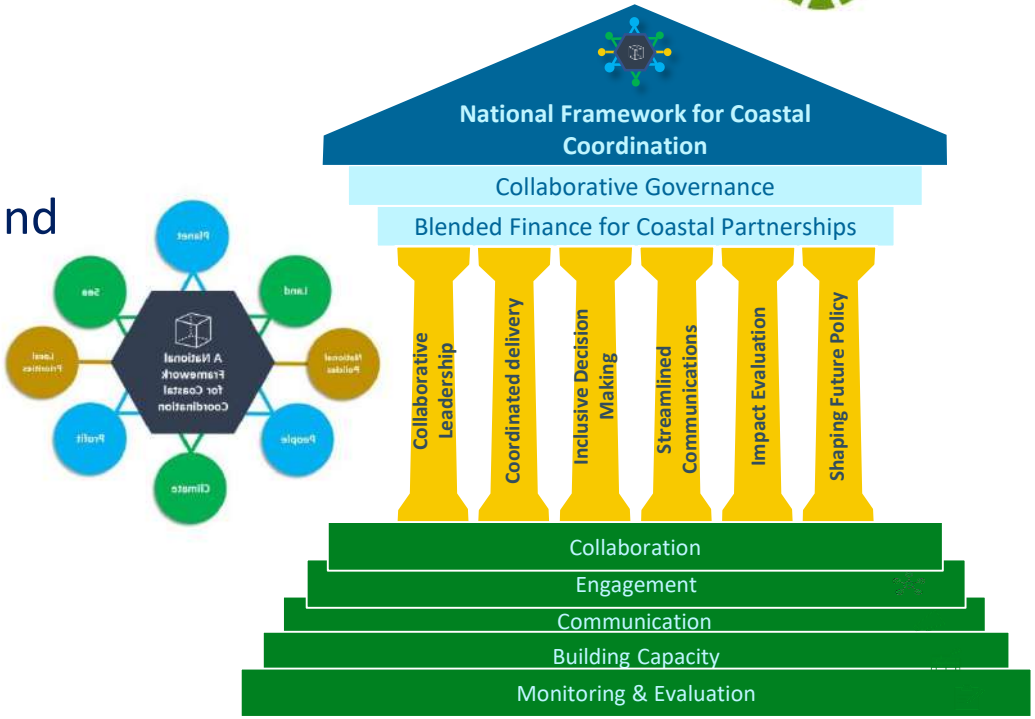
3 **Horizontal Integration:** Bridging geopolitical and sectoral divides by synthesising a broad range of issues **along** the coast and **across** the land-sea interface at nested scales.

4 **Communications for Coordination:** Engaging and convening stakeholders from all sectors to co-create solutions to priority issues.

5 **Local Impact and Delivery:** Translating national drivers in to meaningful action through partnerships and dialogue

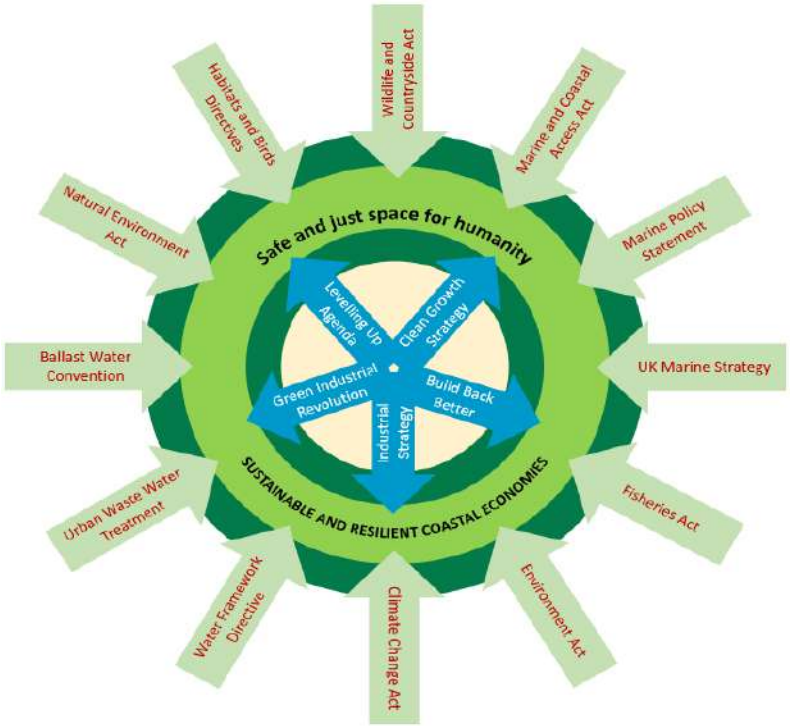
A National Framework for Coastal Collaboration

- Co-designing the framework with public, private and civic organisations
- Building collaborative governance
- Integrating delivery across socio-economic and environmental needs and targets
- Building capacity
- Streamlining communications
- Improving evidence
- Enabling inclusive decision making
- Advocating to shape future policies



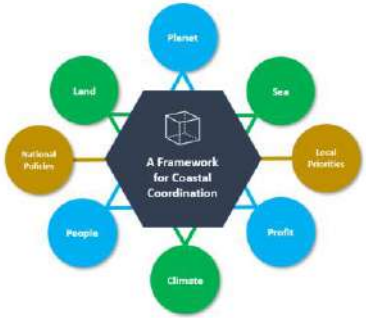
NFCC component parts

- Support and infrastructure needed to achieve coordination and collaboration across sectors, across land/sea and across socio-economic and environmental drivers
  - National Framework Leadership Group incl Transboundary WG
  - Deep engagement, particularly with private sector
  - Coastal Communications Hub – one stop shop for all things coastal
  - Coastal Data Explorer – improve access to data and data skills
  - Building capacity to level up understanding between and across sectors
  - CEPs provide neutral convening and local interpretation of national drivers
  - Evaluation of social capital and impact of CEPs to drive blended finance models



OneCoast

A public, private and civic consortia working together to enable a united voice to support our coastal communities and environment to be more resilient, sustainable and thrive



Other relevant APPGs: Ocean; Left-behind Neighbourhoods; Fisheries, Water, Climate Change, Environment

Evidence

Alignment & Coherence

Management
Secretariat & Facilitation

Coastal Partnerships Network

Evidence Synthesis
ONECOAST

Unified messaging & evidence-base

appg

Evidence-based policy advocacy & influence

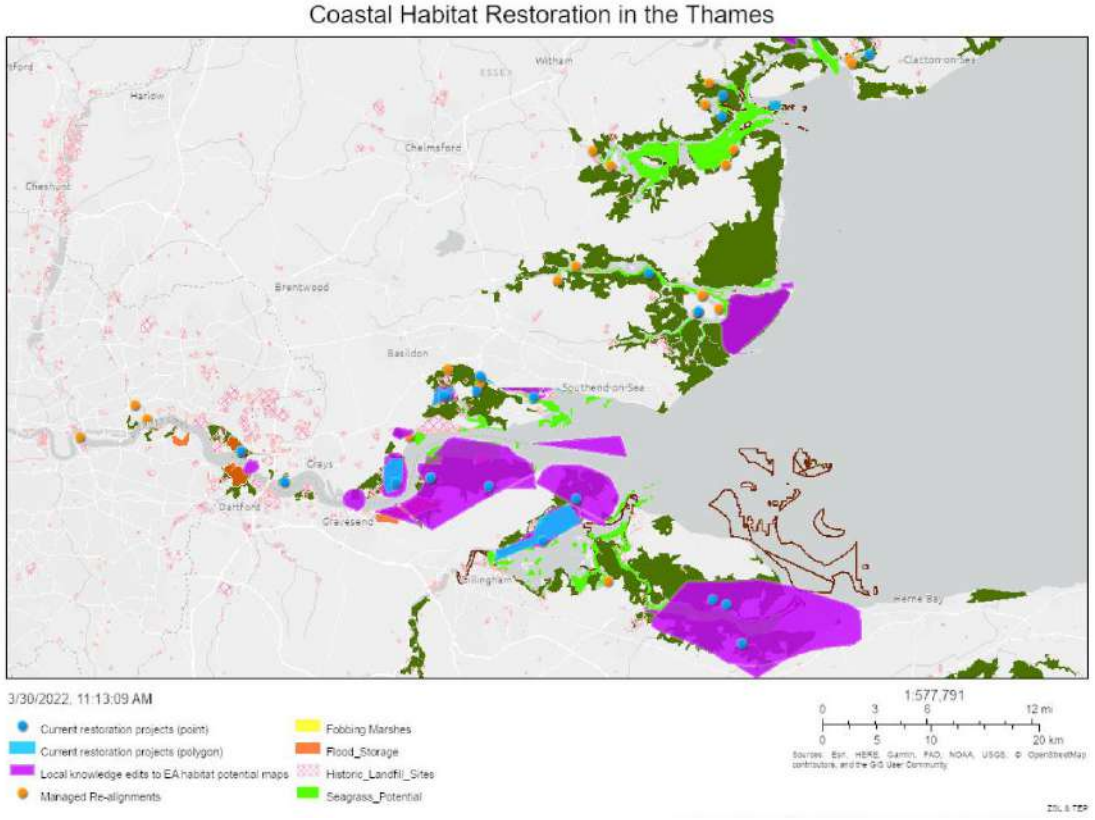
Cabinet Office
Treasury
DLUHC
DfT
DESNZ
DSIT
DBT
Defra
DCMS

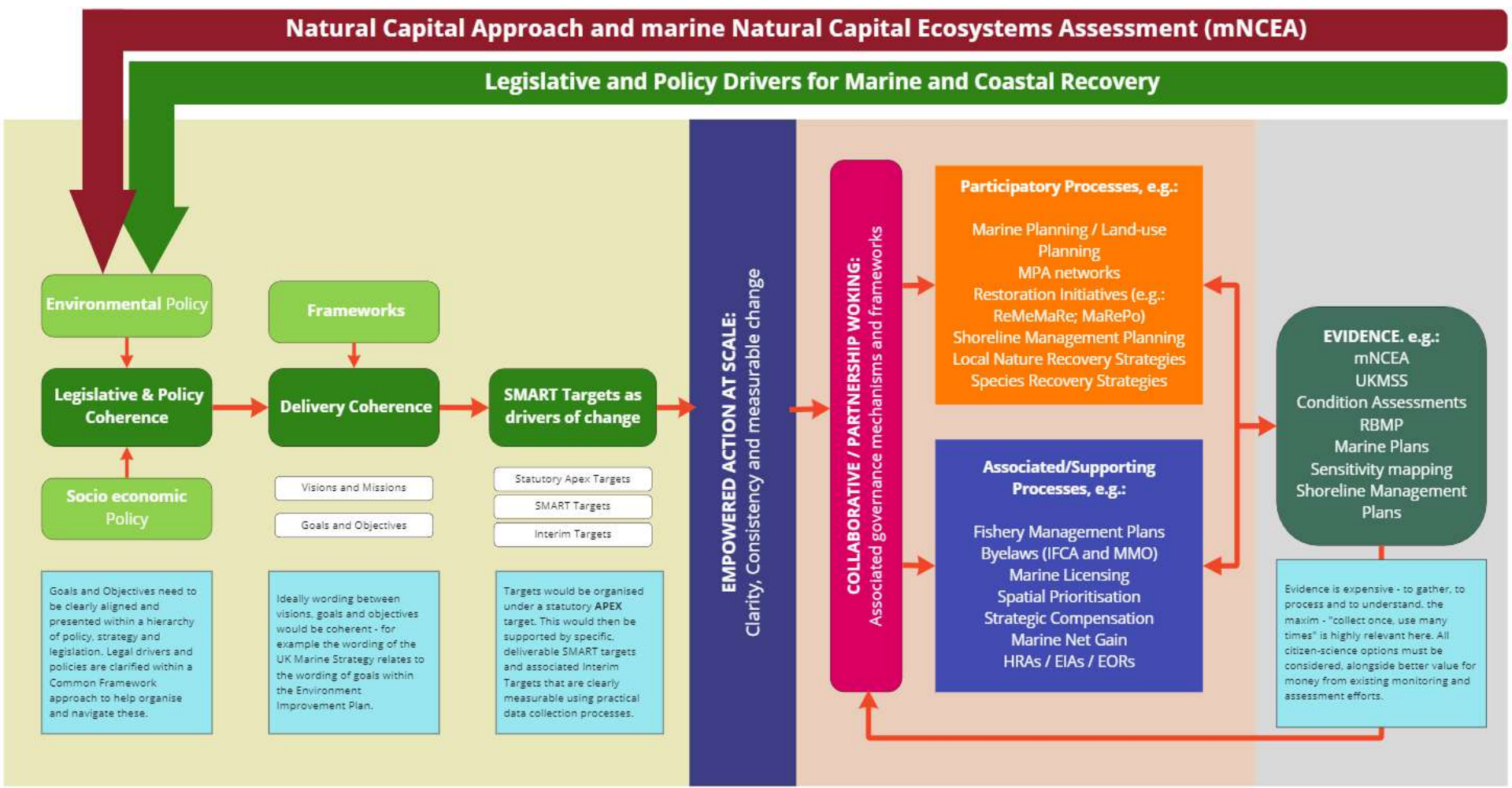
New Members:
Steering Group

ONECOAST Founders
- Coastal Communities Alliance
- Local Government Association Special Interest Group
- Coastal Partnerships Network
- National Coastal Tourism Academy
- New Economics Foundation

Coastal Habitat Restoration and Natural Capital

- Coastal habitat restoration planning through CEPs
- Key to connecting terrestrial, marine and catchment plans and legislation
- CaBA ECWG & WAMM
  - Sediment transport
  - Nutrient neutrality
  - Upstream/downstream benefits
  - CEPs and CaPs collaboration
- Beneficial Use
- Natural capital metric testing
- Social capital scoping
- Regional Demonstration Projects




Natural Capital Approach and marine Natural Capital Ecosystems Assessment (mNCEA)
Legislative and Policy Drivers for Marine and Coastal Recovery
Environmental Policy
Legislative & Policy Coherence
Socio economic Policy
Goals and Objectives need to be clearly aligned and presented within a hierarchy of policy, strategy and legislation. Legal drivers and policies are clarified within a Common Framework approach to help organise and navigate these.
Frameworks
Delivery Coherence
Visions and Missions
Goals and Objectives
Ideally wording between visions, goals and objectives would be coherent - for example the wording of the UK Marine Strategy relates to the wording of goals within the Environment Improvement Plan.
SMART Targets as drivers of change
Statutory Apex Targets
SMART Targets
Interim Targets
Targets would be organised under a statutory APEX target. This would then be supported by specific, deliverable SMART targets and associated Interim Targets that are clearly measurable using practical data collection processes.
EMPOWERED ACTION AT SCALE:
Clarity, Consistency and measurable change
COLLABORATIVE / PARTNERSHIP WOKING:
Associated governance mechanisms and frameworks
Participatory Processes, e.g.:
Marine Planning / Land-use Planning
MPA networks
Restoration Initiatives (e.g.: ReMeMaRe; MaRePo)
Shoreline Management Planning
Local Nature Recovery Strategies
Species Recovery Strategies
Associated/Supporting Processes, e.g.:
Fishery Management Plans
Byelaws (IFCA and MMO)
Marine Licensing
Spatial Prioritisation
Strategic Compensation
Marine Net Gain
HRAs / EIAs / EORs
EVIDENCE. e.g.:
mNCEA
UKMSS
Condition Assessments
RBMP
Marine Plans
Sensitivity mapping
Shoreline Management Plans
Evidence is expensive - to gather, to process and to understand, the maxim - "collect once, use many times" is highly relevant here. All citizen-science options must be considered, alongside better value for money from existing monitoring and assessment efforts.

a.pryor@ucl.ac.uk

www.thamesestuarypartnership.org

www.coastalpartnershipsnetwork.org.uk

ReMeMaRe Conference 2023

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Session 4

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Q&A / Panel Debate

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PANEL DEBATE

Matt Service, AFBI
Konstancja Wozniacka, Seafish
Dr Andy Rees, Plymouth Marine Lab
Dr Joanne Preston, University of Portsmouth
Michael Thompson, Mott MacDonald
Hellen Hornby, Groundwork
Amy Pryor, Coastal Partnerships Network

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REFRESHMENTS & POSTERS

10:45 – 11:15

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