

Coastal Monitoring Programmes in the Severn Estuary

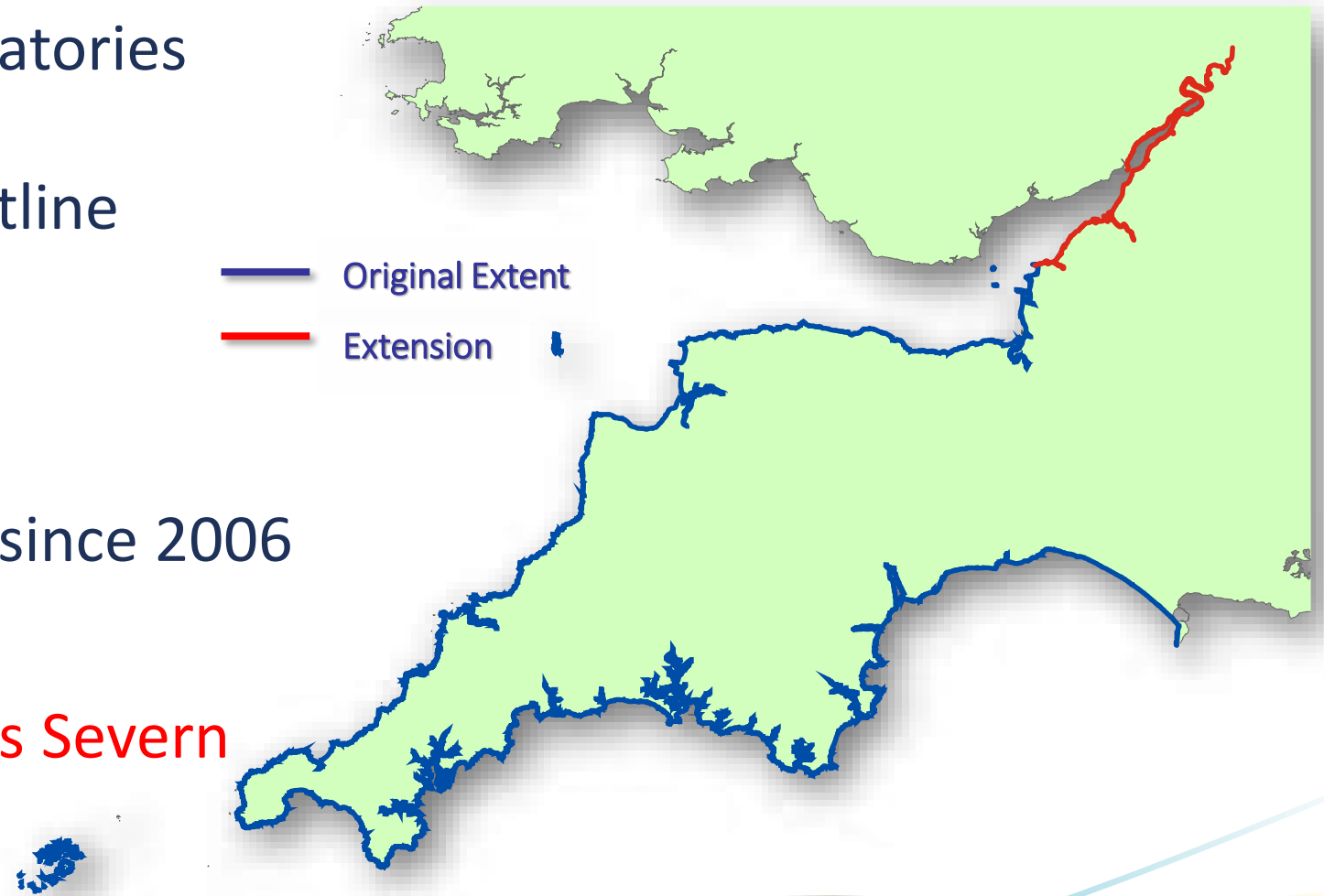
The South West Coastal Monitoring Programme

Emerald Siggery - SWCM



South West Coastal Monitoring

- One of Seven Coastal Observatories
- Cover over ~2450 km of coastline
- Funded through Defra
- Collecting and collating data since 2006
- 2009 extension to encompass Severn Estuary






Programme Aim

To promote a **standard, repeatable** and **cost effective** method of monitoring the coastal environment in the South West of England over the long term.



Why Are We Monitoring?

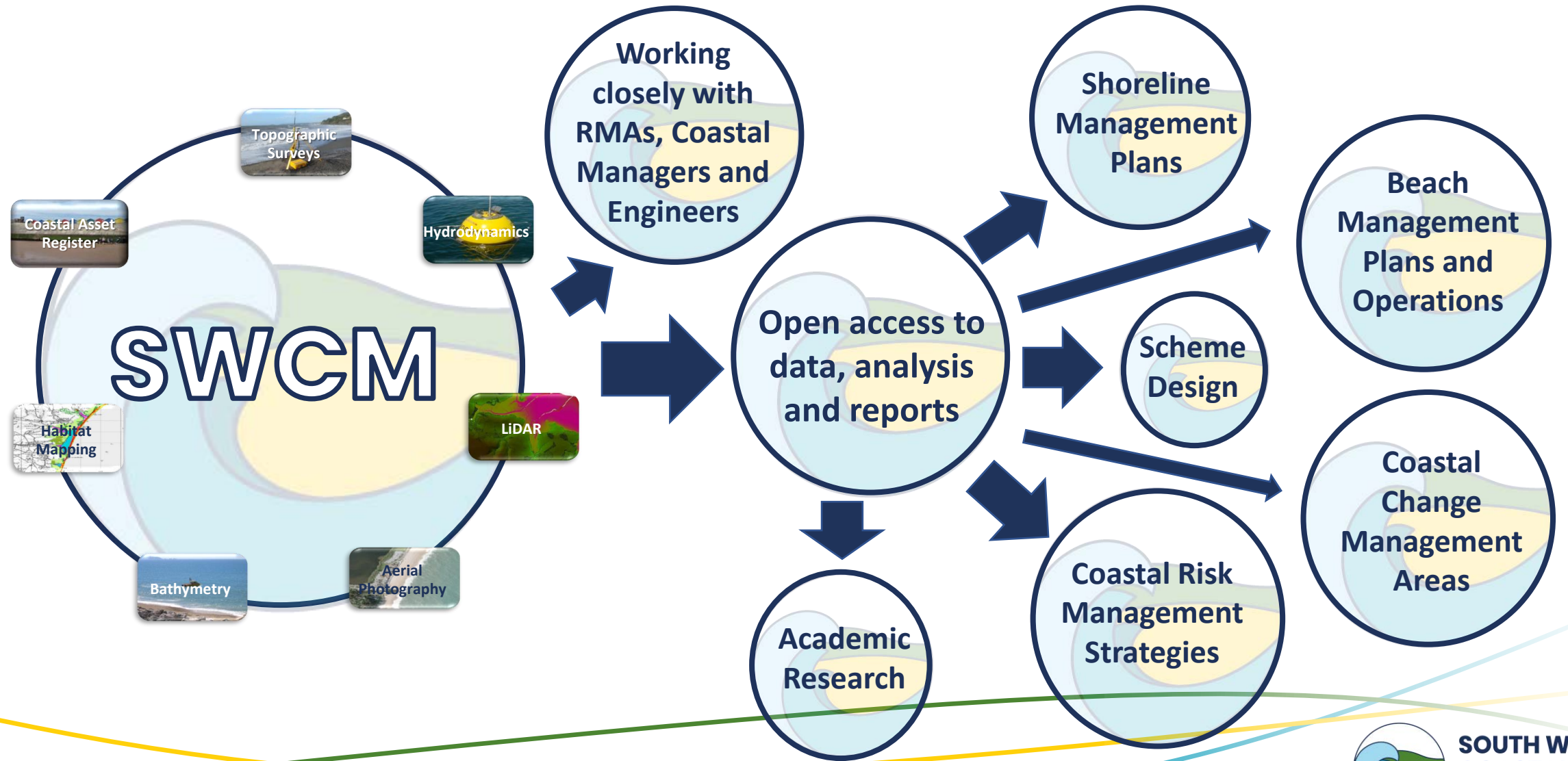
- 18 Maritime Local Authorities
- Coastal data was rarely archived
- Repeatable and reliable evidence base
- Foundation to inform coastal management decisions



“Good evidence is
the cornerstone of
effective policy
making”

Defra 25 year Environment
Plan

Evidence Base



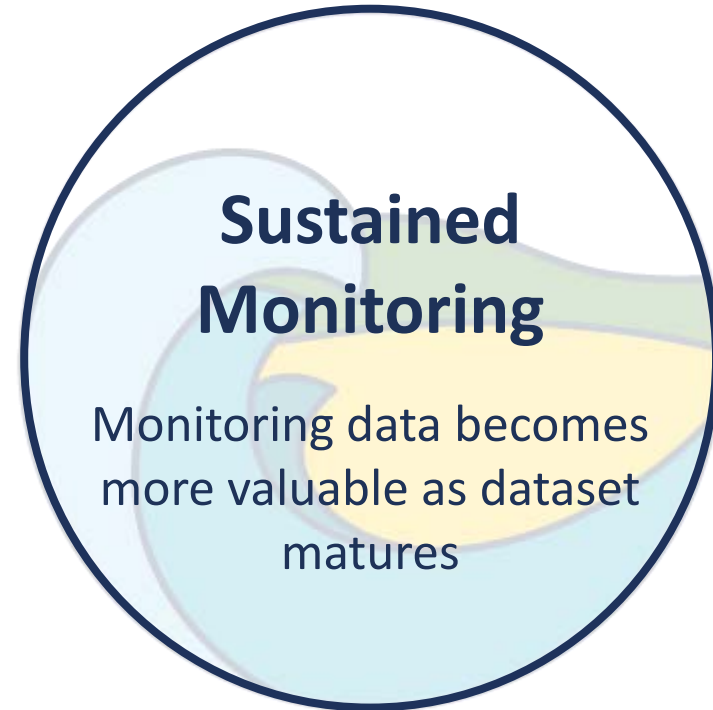
Monitoring in the Severn Estuary

- 2 Directional WaveRider Buoys
 - Minehead
 - Weston-super-Mare
- Wave Radar Tide Gauge
 - Prince of Wales Bridge
- Weather Station
 - Weston Super Mare
 - Minehead (planned)
- Topographic Beach Surveys
 - Minehead to Severn Beach
- LiDAR – Up to 10 Flights
- Aerial Photography - 4 Full Flights, 1 in Progress
- Habitat Mapping – 3 Datasets



The Future

- Continued Partnership Working
- Flexibility - become more responsive to events and regional needs and characteristics
- Research and Development – efficiency, changing needs and technology



Thank you for listening

Emerald Siggery

Team Leader – South West Coastal Monitoring

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www.southwest.coastalmonitoring.org



UNIVERSITY OF
PLYMOUTH



Department
for Environment
Food & Rural Affairs



CMAC : WCMC

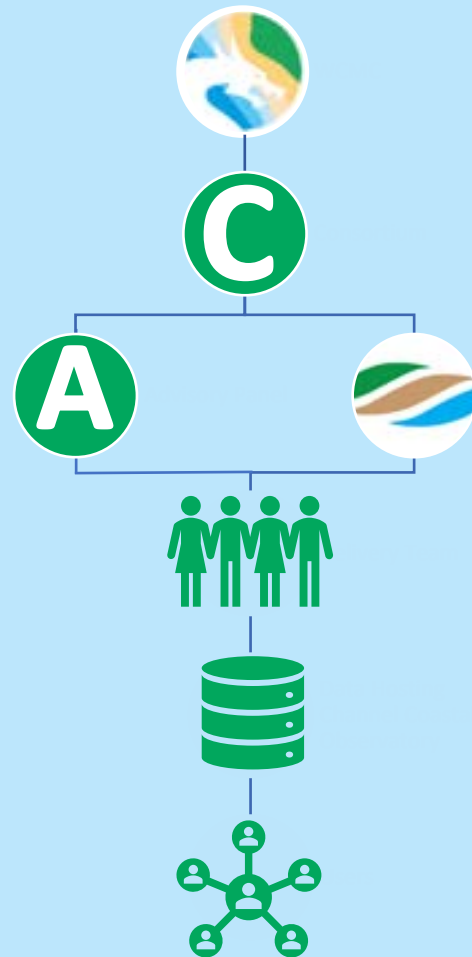
Canolfan Monitro Arfordirol Cymru
Wales Coastal Monitoring Centre

**Severn Estuary Forum
8/06/2023**



Gwyn Nelson

Who Are The WCMC? *People of Wales.*



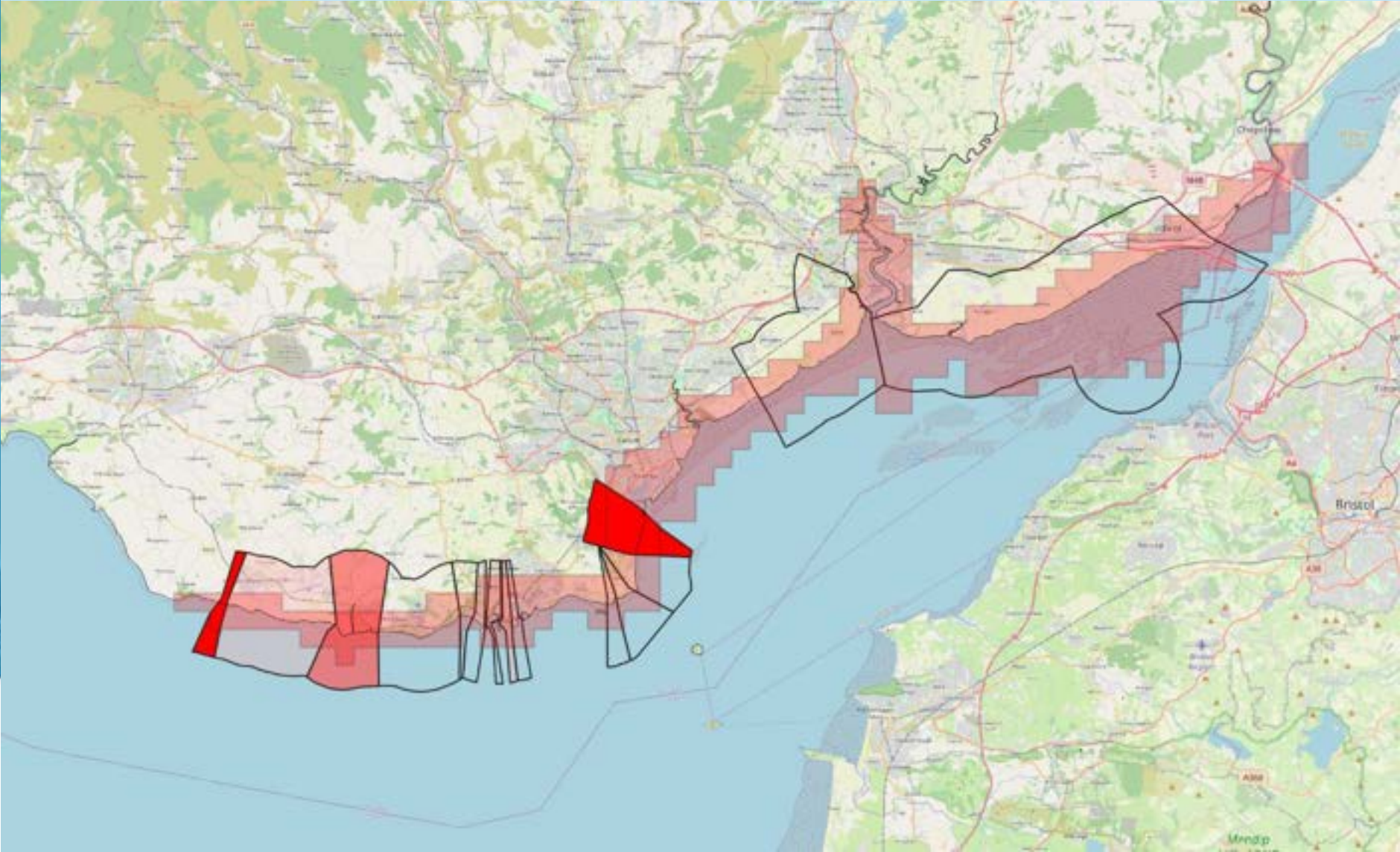
Welsh Government	Provide 100% FCERM Funding
Wales Coastal Monitoring Centre	Public Sector Organisation
Consortium	Vale of Glamorgan Council Gwynedd Council Conwy Council Welsh Local Government Association
Advisory Panel	Wales Coastal Groups Forum, NRW, National Trust, Network Rail, Welsh Government, Chair of Coastal Groups
Delivery Team	WCMC + Marine Local Authority Support (surveyors) + Contractors
Data Hosting	Channel Coastal Observatory
Users	Marine Local Authorities, Consultancies, Universities



How- Surveys



Severn Estuary (Welsh side!)



Stakeholder Needs

VISION

The vision for 2026 is to be a role model monitoring centre that provides an accessible platform of understandable coastal process data



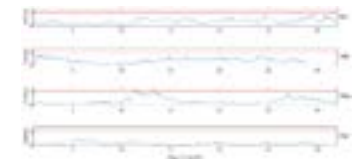
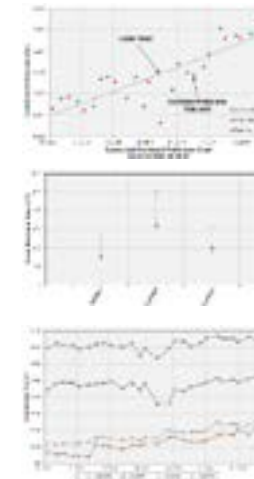
Extra Content to consider implementing:

Tier 1:

- Location synopsis
 - Orientation
 - Wind rose diagrams
 - Summer/Winter wave climate
 - Sediment Type
 - Beach slope
 - Structures

Tier 2:

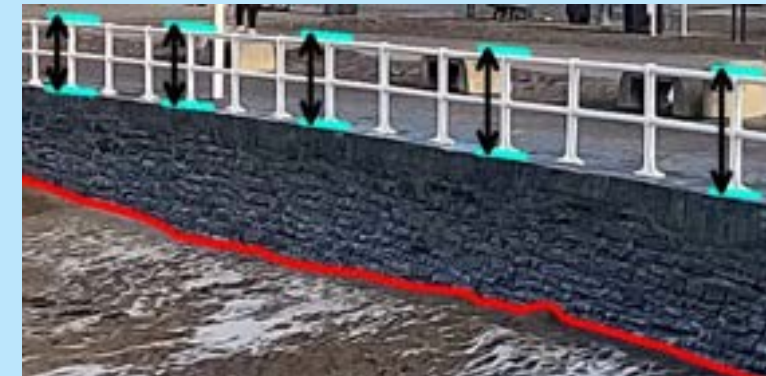
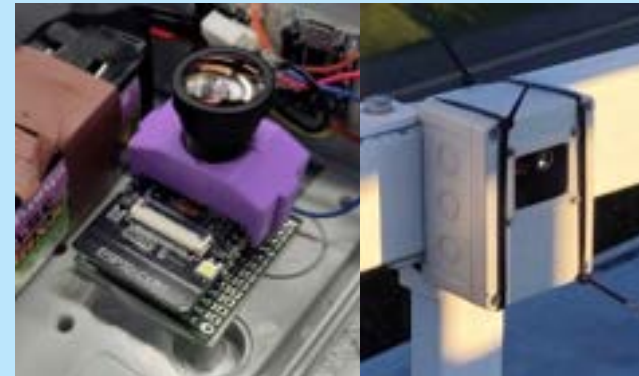
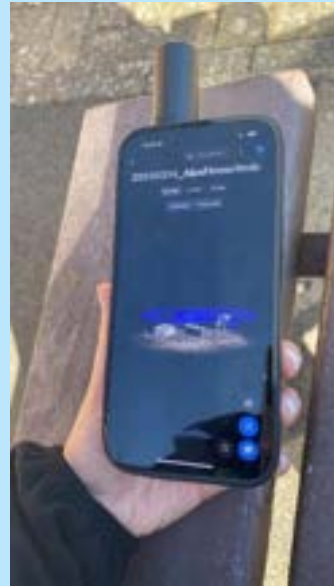
- CSA time series
- Profile extremes analysis
- Baseline volume change
 - DTM Analysis
 - Cross shore/Alongshore sediment transport
- Sediment budgets
- Combined data set analysis
 - Plane flown LiDAR
 - UAV LiDAR
 - Photogrammetry
- Orthomosaic
- 3D data
- Profile extraction tools
- Cliff line mapping
- Hydrodynamic hindcasting
- Natural resilience and response capacity analysis



User + Content + UX = Dashboard Reporting



Collaborations/Research/Future



Collaboration – Primary Schools Programme

- National Curriculum
- Attractive slides
- Thorough lesson plans
- Expert collaboration
- Important topic
- Interactive Content

Mapping Risk 2
Lesson 10

Year Group: 5/6 Topic: Maths

AOLE: Knowledge and understanding of the world - WM: Our natural world is diverse and dynamic, influenced by processes and human actions. Progression step: 3. I can describe spatial patterns of places, environments and landforms in my locality and in Wales, as well as in the wider world.

DCF: Data and computational thinking: Data and information literacy - create, explore and analyse data sets, highlighting relationships within them, e.g. using tables, charts, spreadsheets and databases.

Measuring skills, angle and position - use coordinates to specify location:

Ethical, informed citizens who... Find, evaluate and use evidence in forming views	Ambitious Capable Learners who... Understand how to interpret data and apply mathematical concepts.	Healthy & Confident individuals who... Take measured decisions about lifestyle and manage risk.
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“Civilization is in a race between education and catastrophe”
- H. G. Wells

COASTAL MANAGEMENT

In this lesson you'll be identifying issues with coastal management and addressing how communities around Wales and Internationally are affected.



Collaboration - Schools Programme

2022 – 461 Completed
2023 – 410 signed up



*'Ensuring our young people are equipped with the right skills for the future will strengthen our public services and the decisions they make'**



Climate Change Podcasts

Here a listen to our Climate Conscious Conversations:



Episode 1 - Climate Conscious Conversation with Barry Island Fishers School and Natural Resources Wales



Episode 2 - Climate Conscious Conversation with Mr. Moor of the Isle of Gwynedd Council, visiting topics such as coastal flooding



Episode 3 - Climate Conscious Conversation with Barry Island Primary School and Plymouth University, covering topics such as flood forecasting and wave overtopping

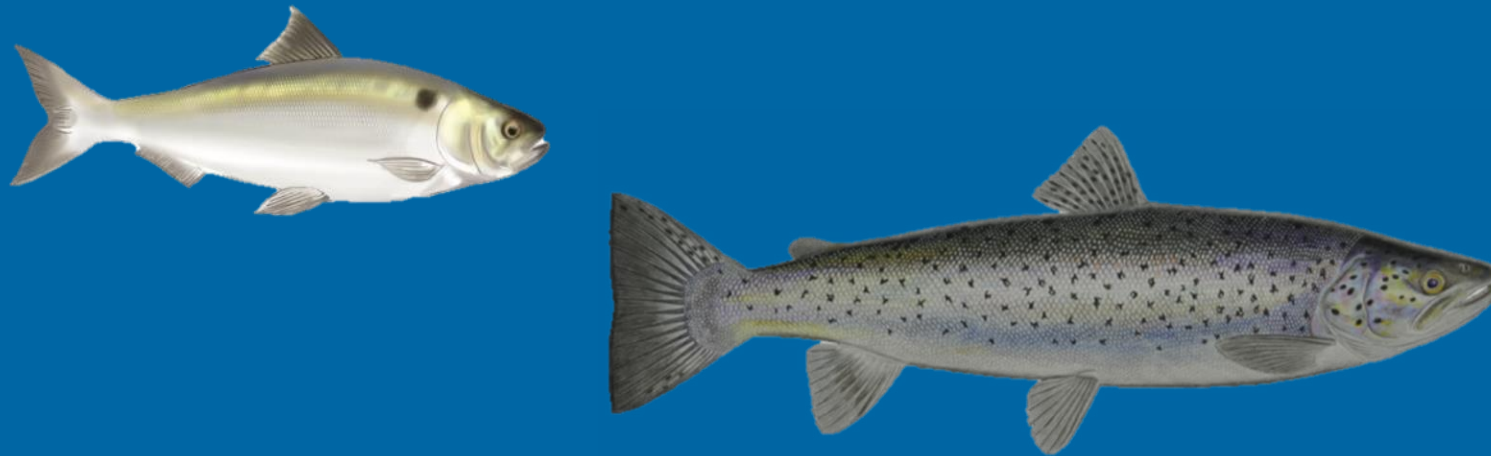


*Sophie Howe, Future Generations Commissioner for Wales



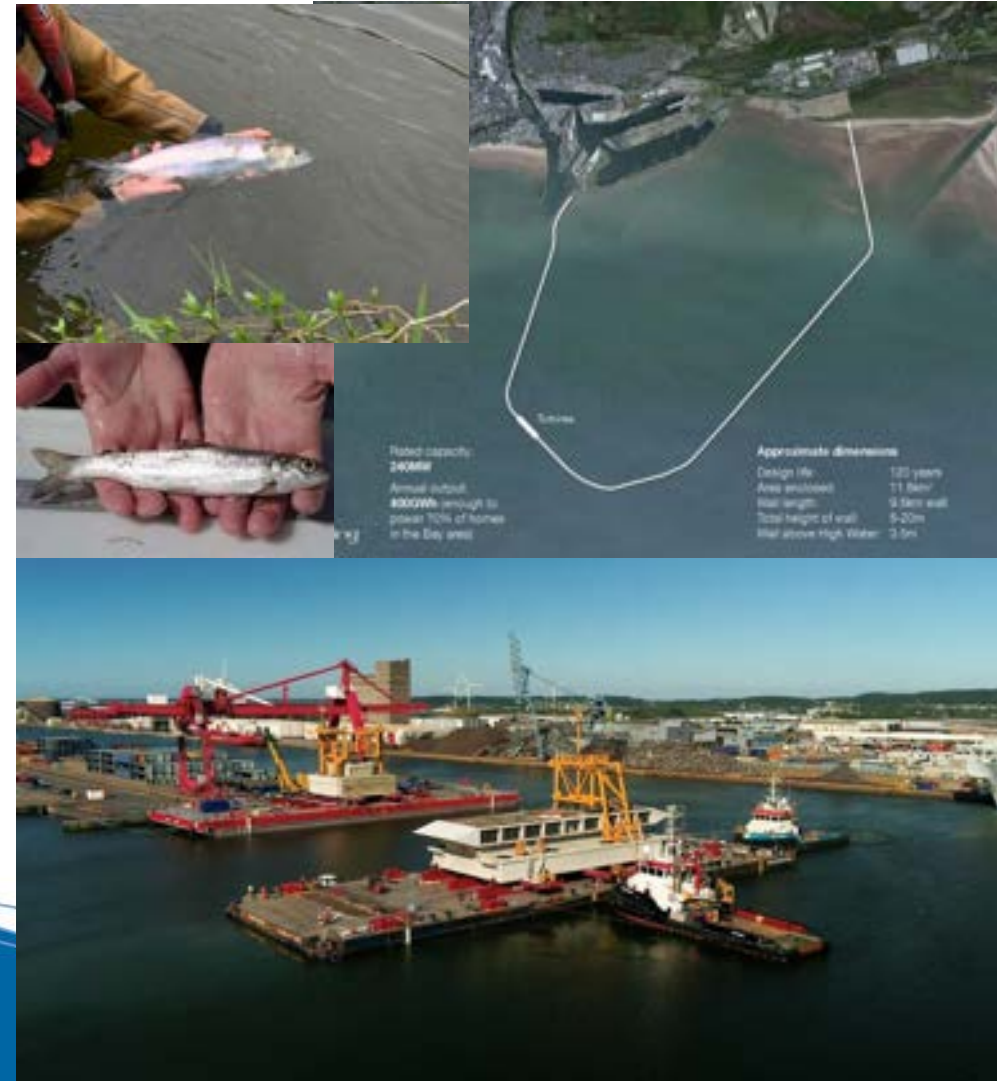
Swansea University
Prifysgol Abertawe

Fish Tracking in the Severn Estuary / Bristol Channel



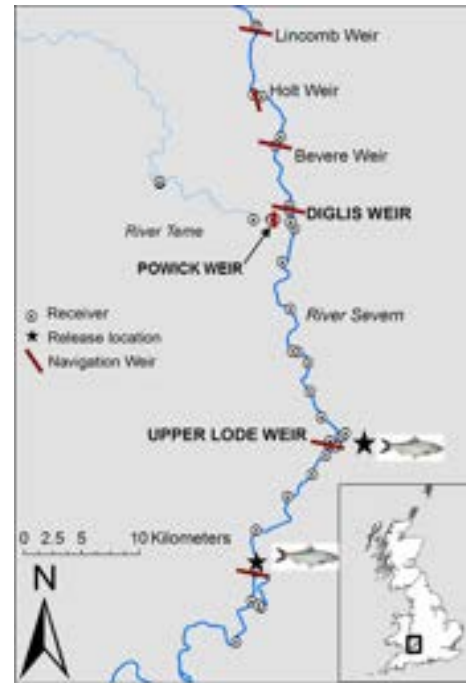
What are we doing ?

- Looking to understand migration paths of key anadromous species (twaite shad, salmon, sea trout) and quantify potential development risks
- Key sites inc. Swansea Bay, and Hinkley point, Carmarthen Bay SAC, (+ Minehead to follow)
- Using individually identifiable coded acoustic tags to track fish in the Severn Estuary/Bristol Channel; individually identifiable; some with depth sensors internally inserted
- Detection via passive acoustic receivers
 - ca 100 receivers deployed
- Multi season tracking of individuals;
 - V7 12 - 18 months; V9 2-3 years



Shad Tagging (UTS)

Year	Total tagged	Emigrants
2018	73	58
2019	100	91 (67+24)
2020	0	33(4+29)
2021	47	46 (34+12)
2022	100	62(55+7)
2023	50 (depth sensor)	?
2018-21	370	290+?



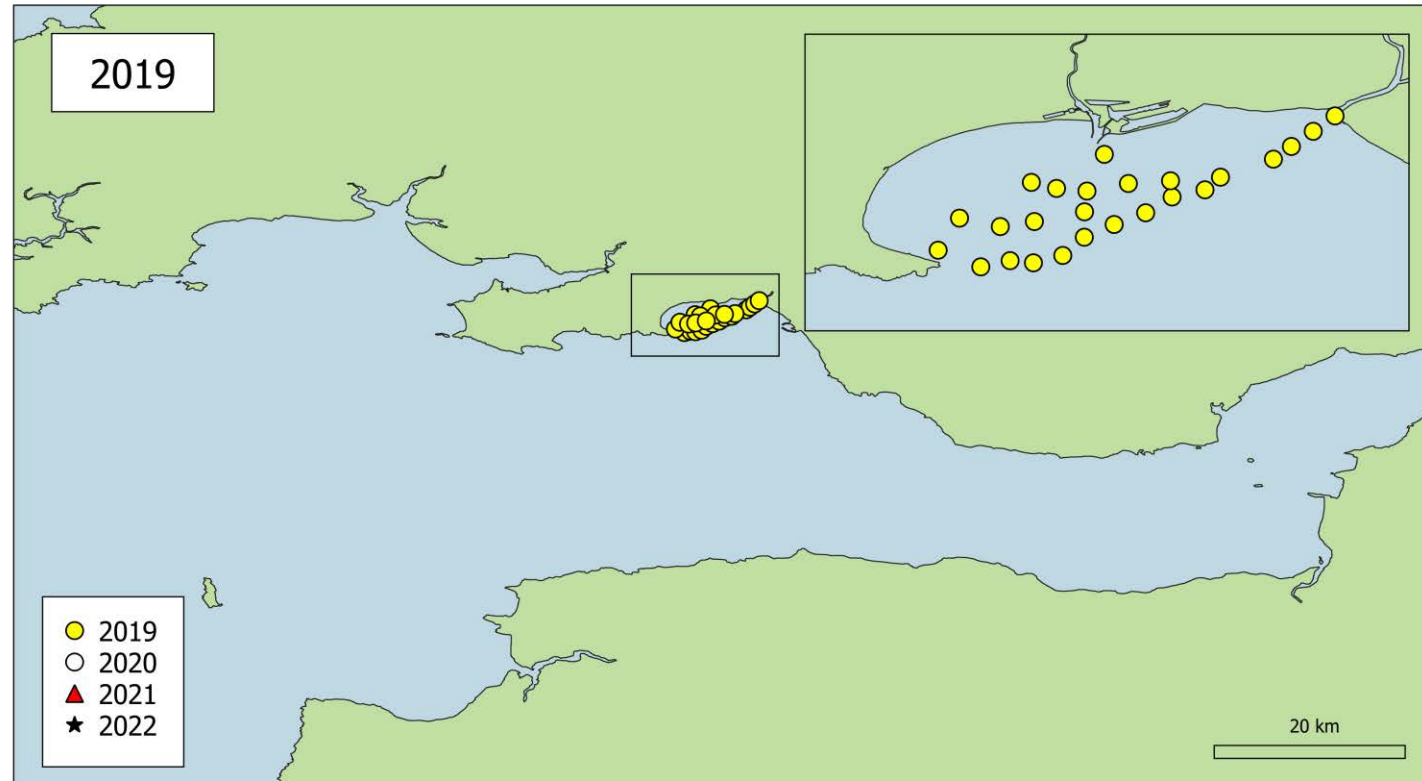
- + 2023 50 Tywi + 11 Wye 2023; ongoing tagging

Salmon and Sea Trout - Tawe

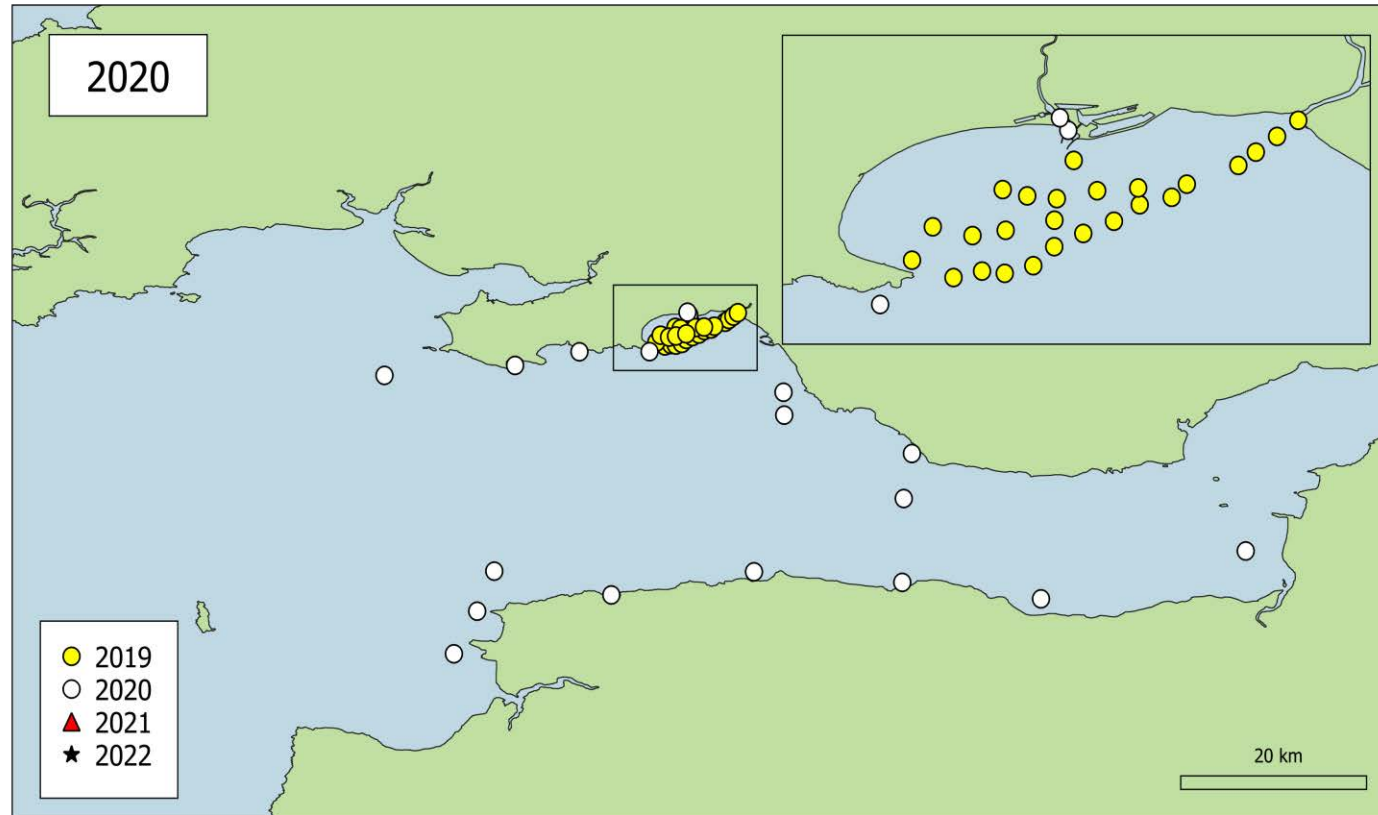
- Sea trout smolts 2020 and 2021 (101 tagged; 66 emigrants)
- Salmon smolts(102 – 2021, 88 emigrants)
- 2023 sea trout smolts 15, salmon smolts 95; (no emigration data yet)
- Sea Trout adults 70 tagged 2020/21



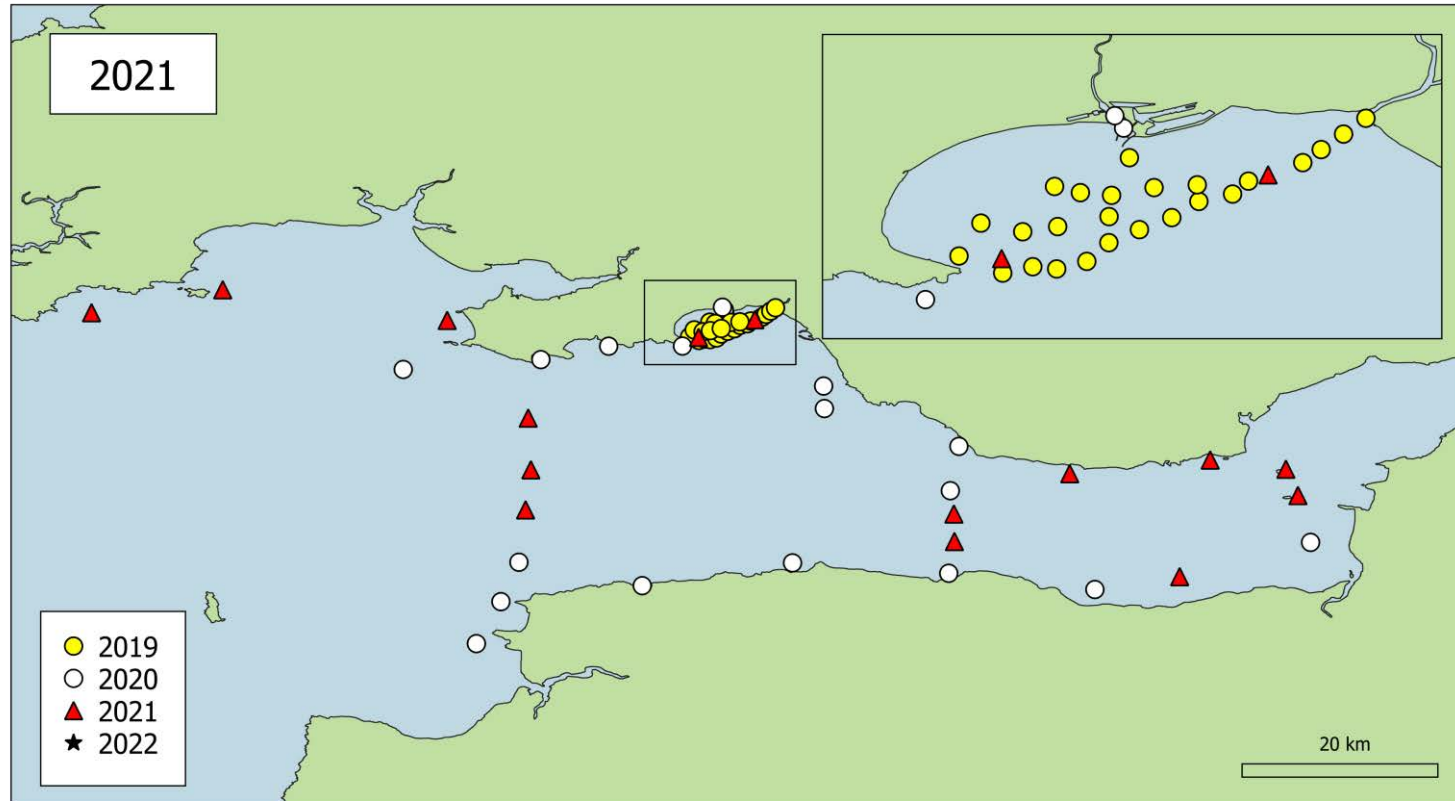
Array in 2019



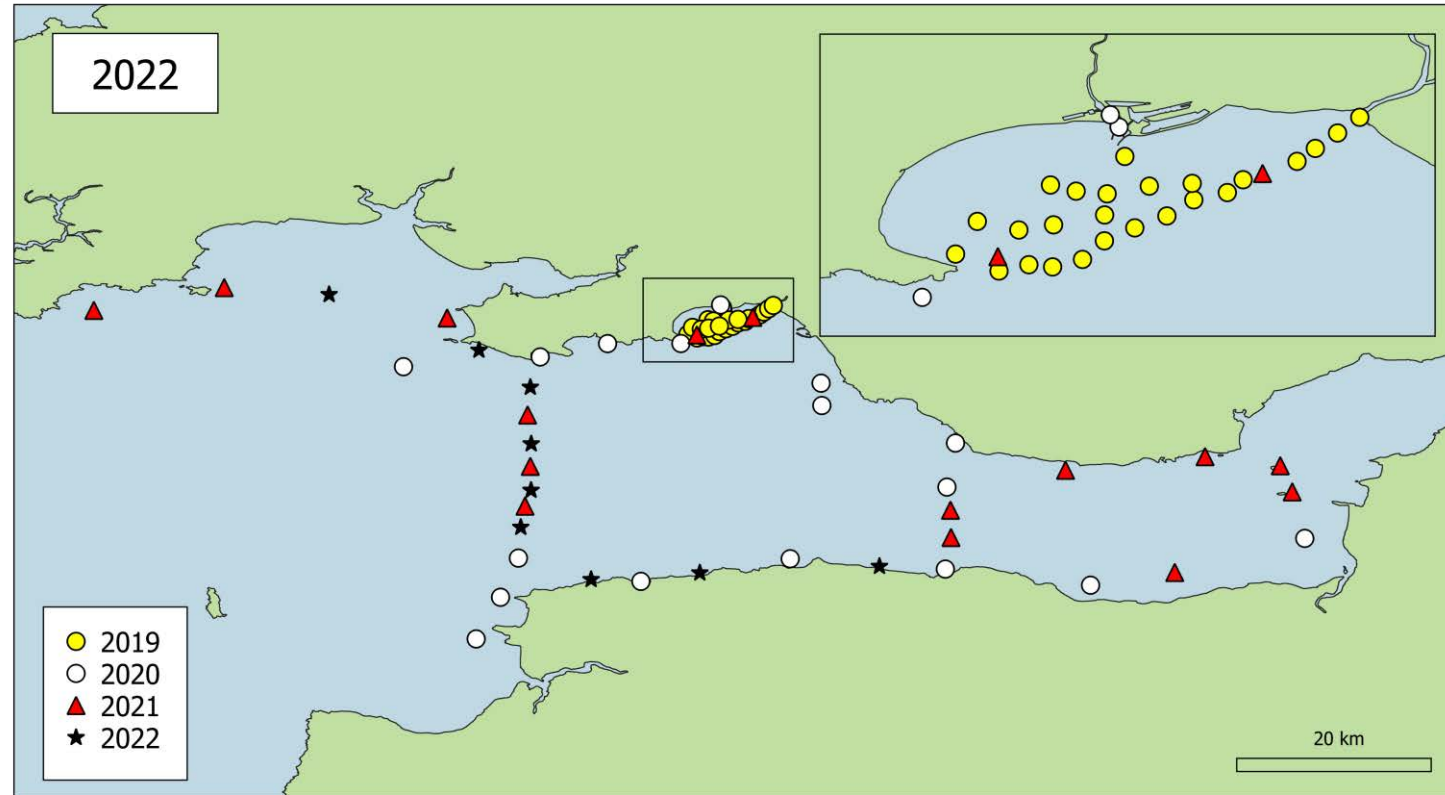
Array in 2020



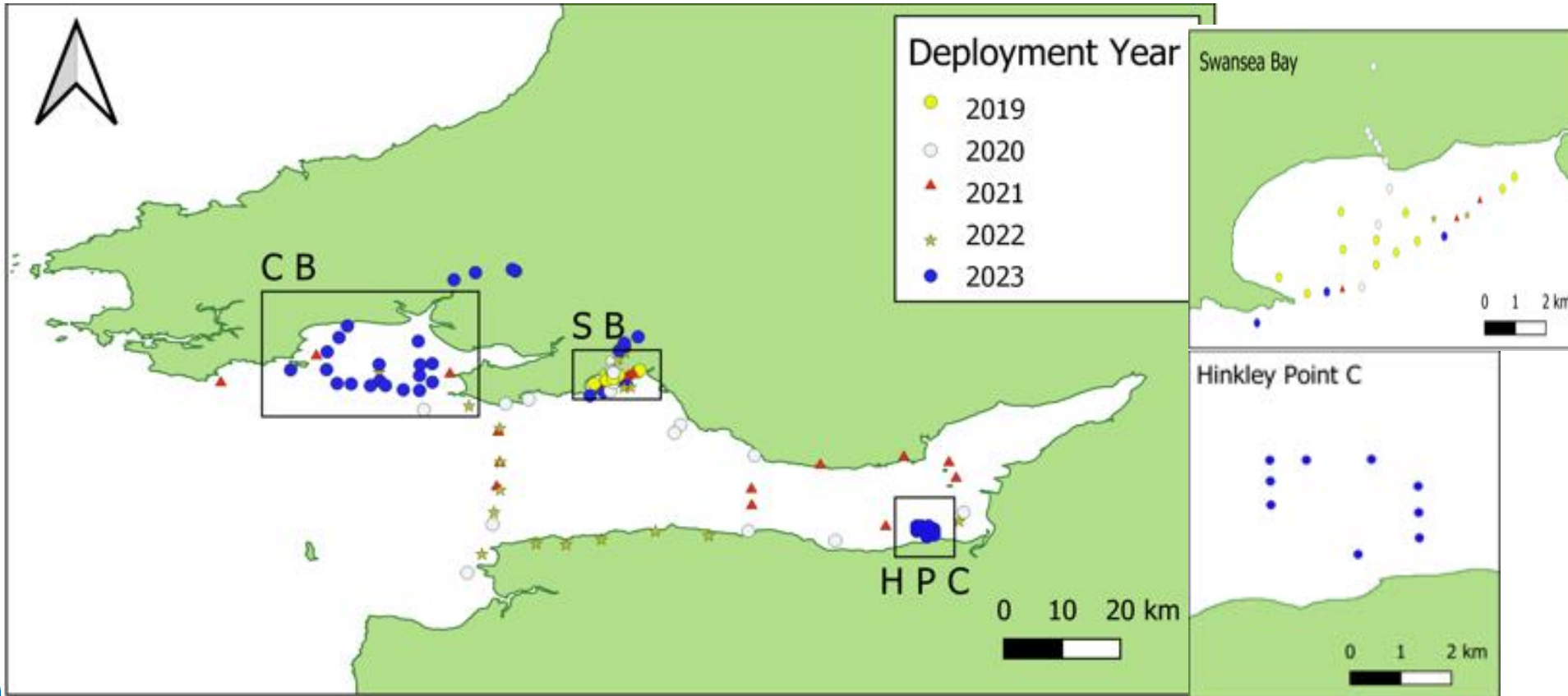
Array in 2021



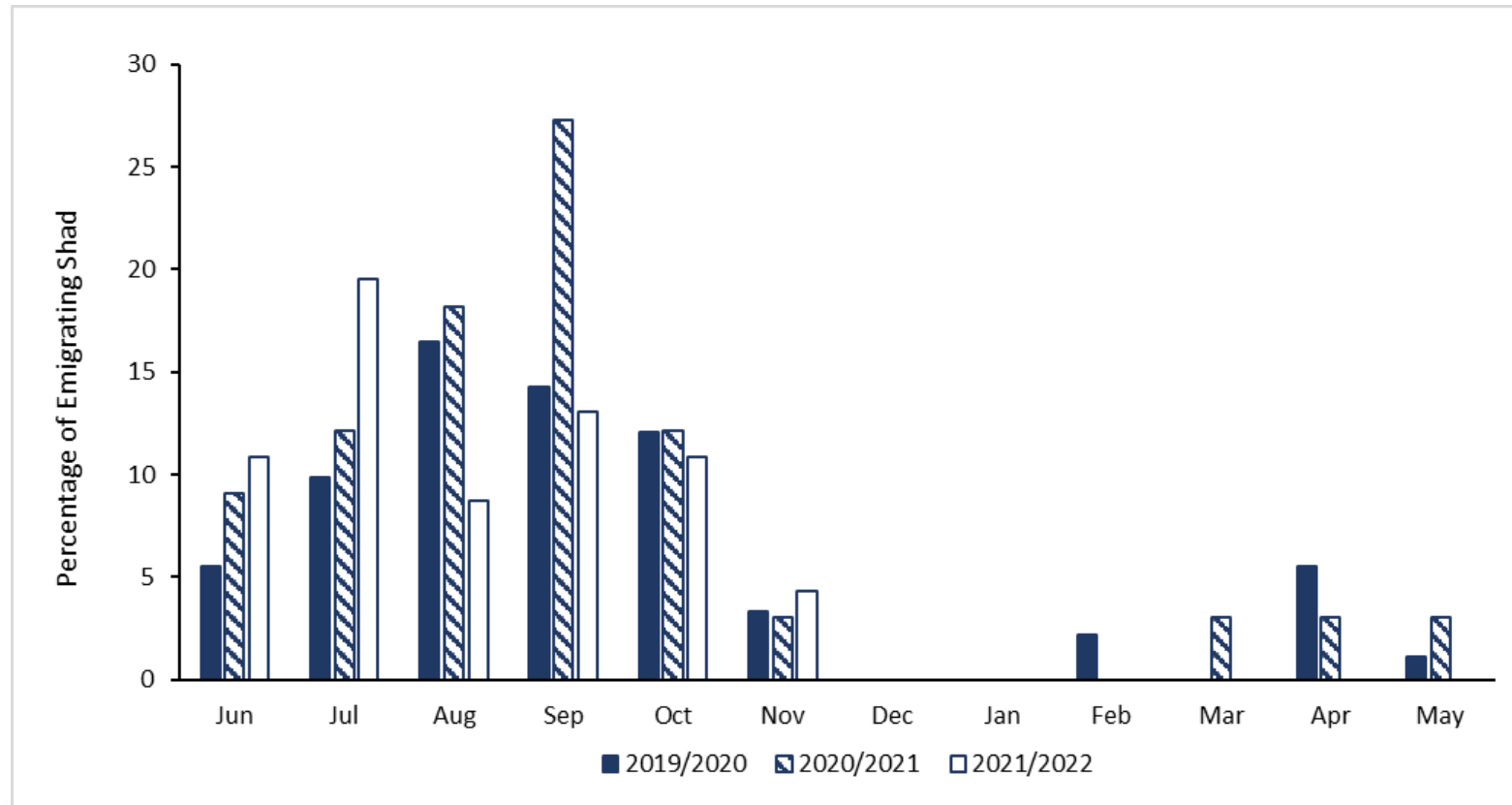
Array in 2022 (current deployment)



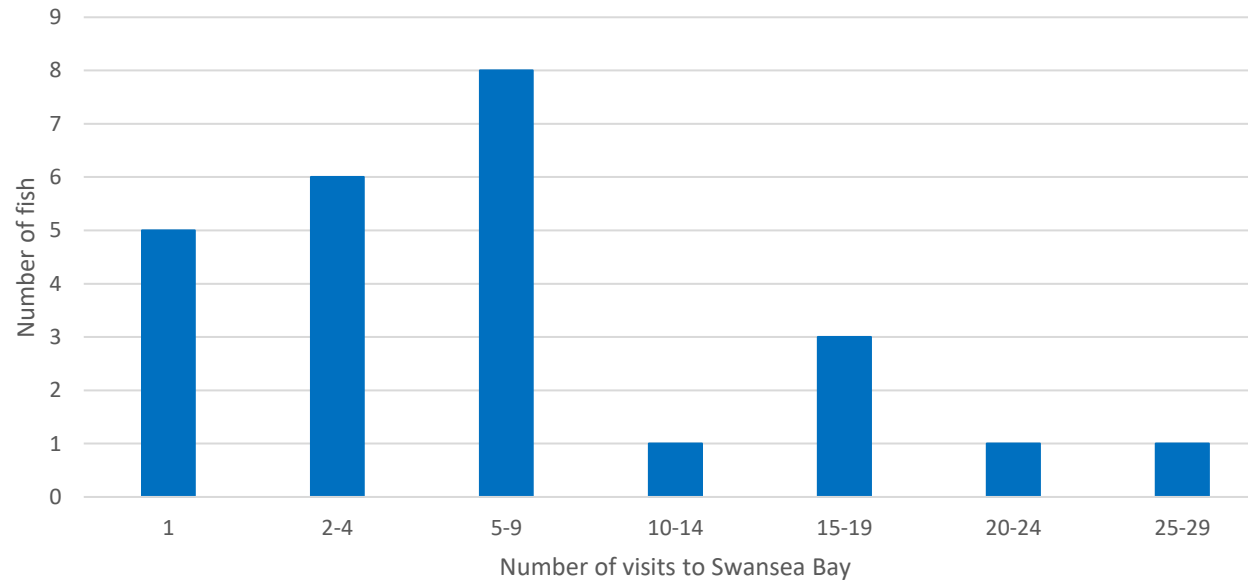
Current Receiver array 2023



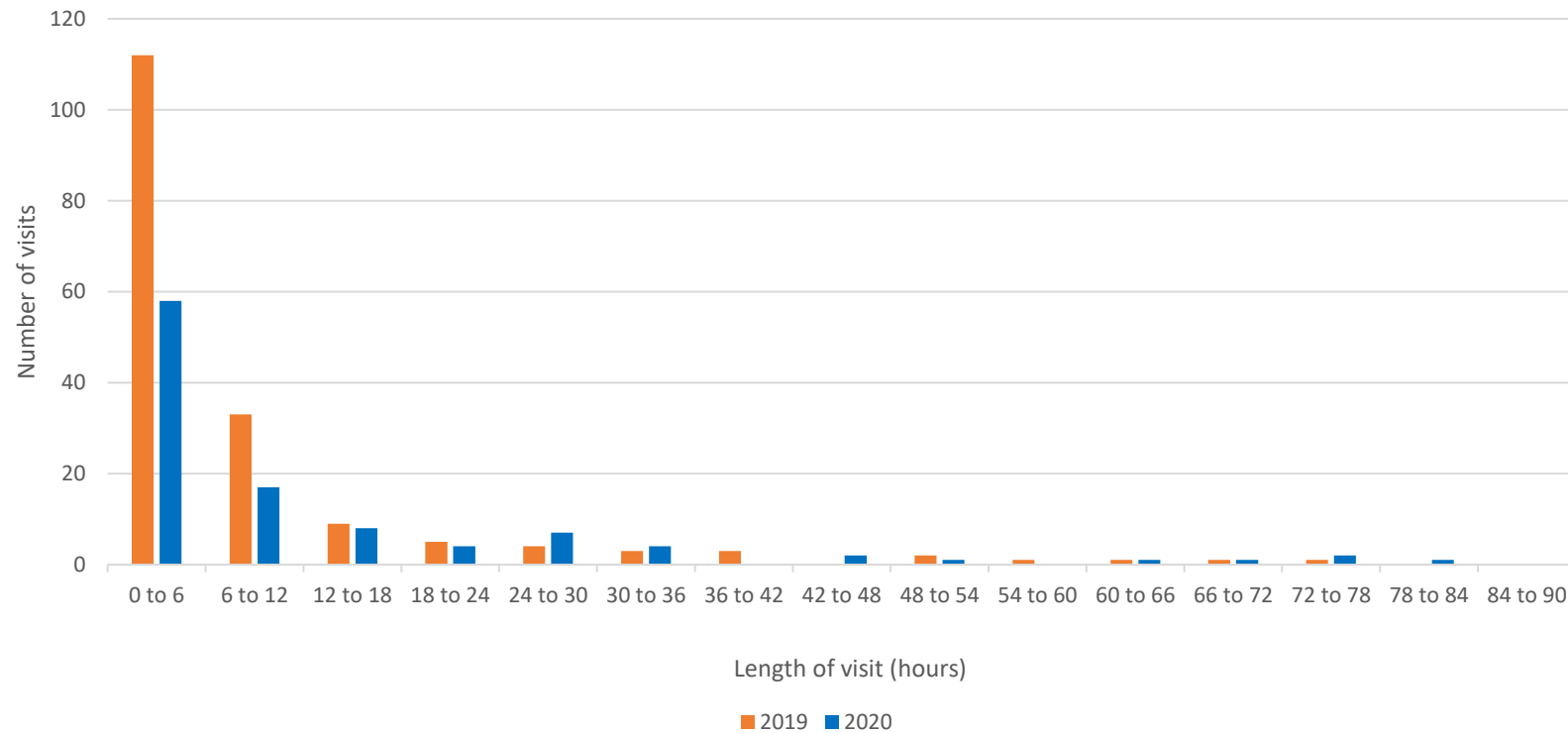
Example data - Percentage of Twaite shad that left the Severn detected in Swansea bay by month



Example data - frequency of Twaite Shad visits to Swansea bay (2019 data only)



Example data : Duration of Twaite Shad visits to Swansea bay



Wider migration (Number of fish adjusted for availability for detection)

May-Nov



Dec-Feb



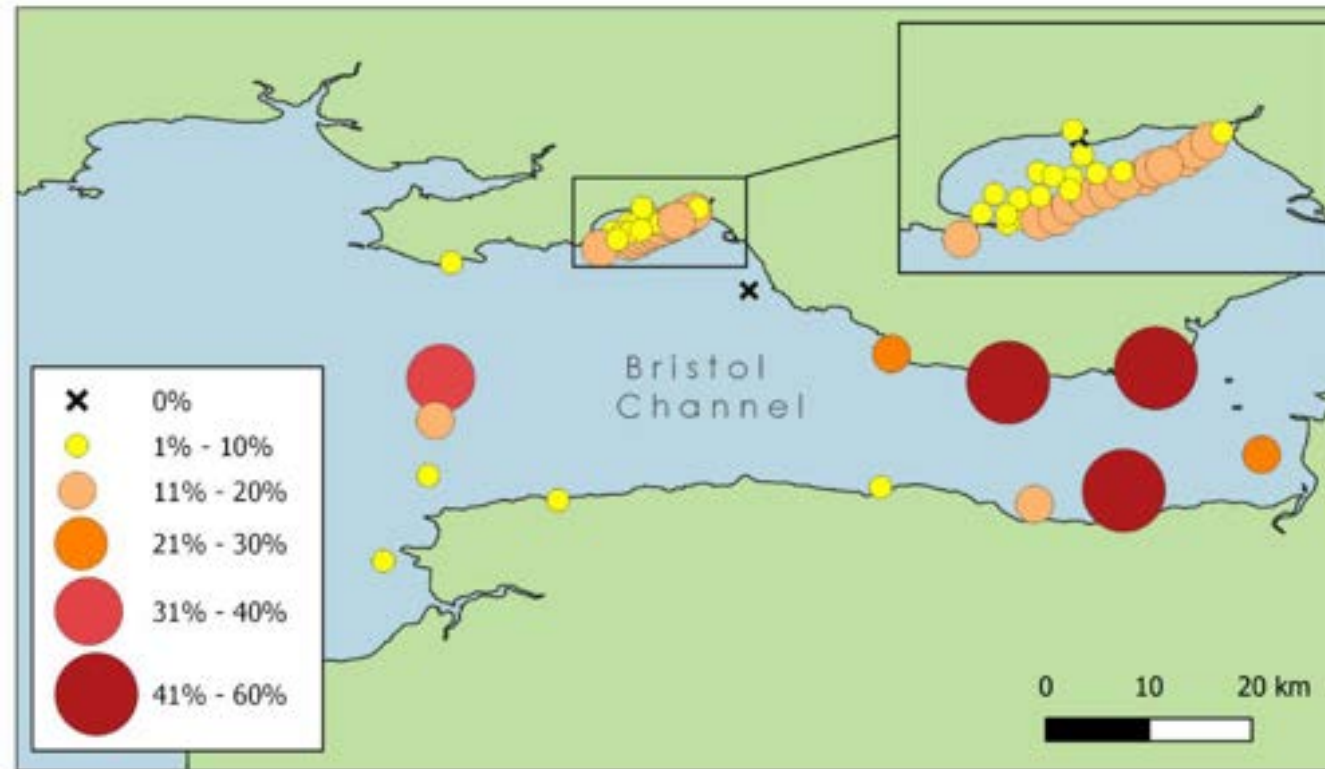
Mar-Apr



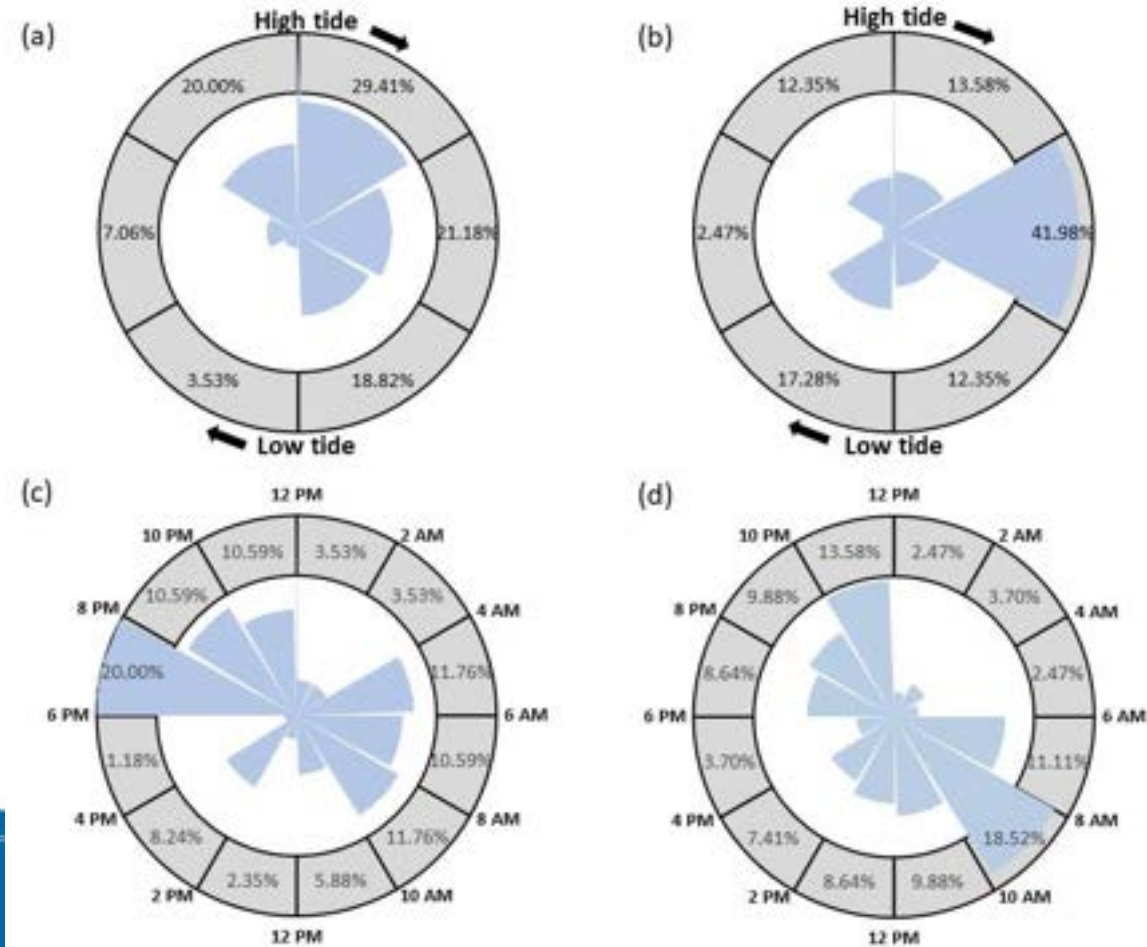
Overall



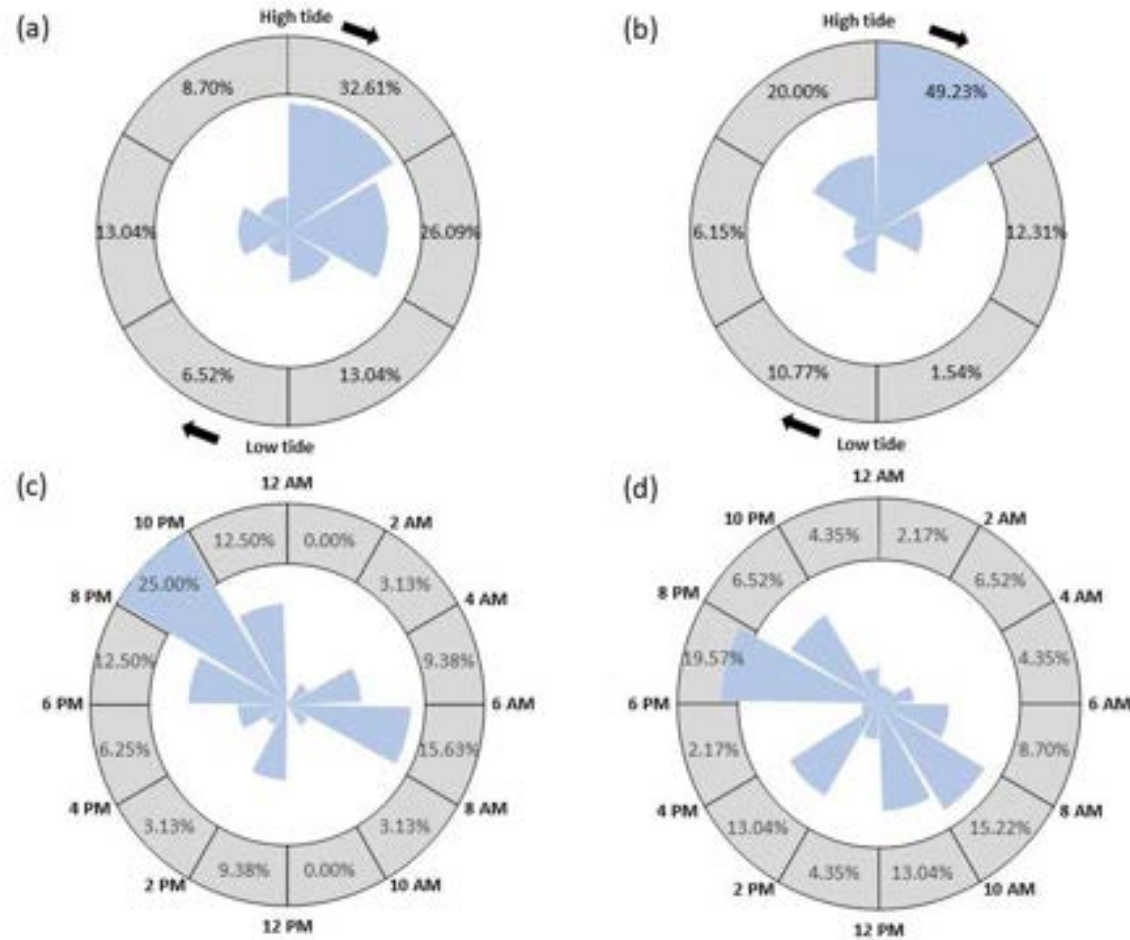
Wider migration (Proportion of tagged fish seen in summer foraging period)



Salmon smolt marine movements; tidal state and time of day for entry to and exit from Swansea Bay

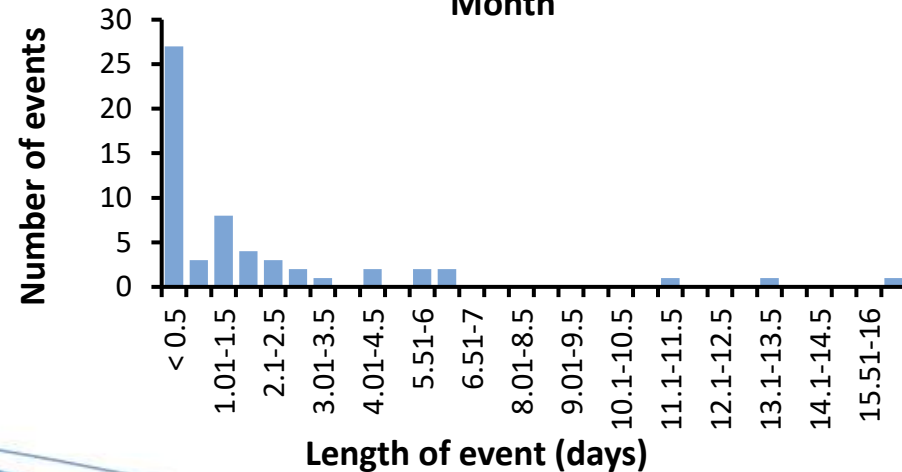
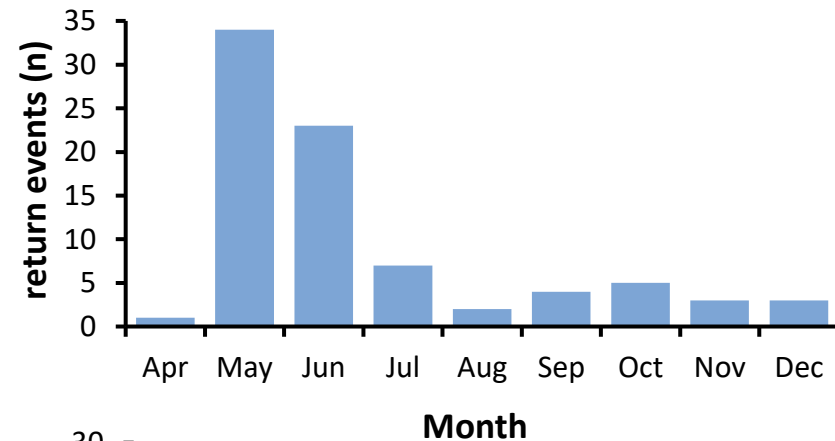


Sea trout smolt marine movements; tidal state and time of day for entry to and exit from Swansea Bay (initial exit migration only)



Returning sea trout

- 30/66 (46%) of sea trout were detected returning to Swansea bay
- 82 return events (most May -Jun)
- 11/30 approached Tawe barrage
- 4 (6% of those entering the sea) crossed the barrage as 0+ fish and were seen leaving in autumn/ winter
- 7 did not enter the river; 44 approach events where fish did not cross the barrage
- Most events <12 hours, a few much longer



Conclusions

- Quantitative data can be collected for multiple species eg:
 - seasonal proportion of population present
 - number and duration of visits
 - tidal/diurnal availability,
 - migration pathways
 - migration speed
 - freshwater and marine survival
- Improves parameterisation of impact models / increases regulator confidence
- Can also understand general migration patterns
- Data collected in reasonable timescales (3 year study so far)
- Re-use of array across multiple species increases cost effectiveness
- Collaborating data across research projects adds huge value

Next steps

- Tagging of 4 ray species, spurdog and Atlantic herring this year
- Adding a 'hotspot' around Minehead
- Shad tracking around Hinkley 'C'
- Writing papers (shad, sea trout, salmon)
- Longer term : further expanding array / securing future funding

Authors/collaborators

- Swansea DC, Georgie Blow, Nicole Esteban, Chris Lowe, Novella Franconi
 - NE Randy Velterop
 - Hull Jon Bolland
 - Plymouth Tom Stamp, Emma Sheehan
 - Bournemouth Pete Davies, Rob Britten, Mark Yeldham
 - Salar Environmental Andy Schofield
 - EA Charles Crundwell
 - NRW Ida NielsenUK
- (Home office licenced
- PD6C17B56 (2020)
- PP2802770 (2021))

MoRPh Estuaries

A field-based method for assessing and monitoring the physical habitat of estuaries with examples from the Thames and Wyre catchments



Ryan Smith¹

Geraldene Wharton¹, Lucy Shuker^{1,2}, Richard Charman³, Kate Spencer¹

¹Queen Mary University of London, ²Cartographer Studios Ltd, ³Environment Agency



WYRE RIVERS TRUST
"from Bowland to Bay"



National
Trust



The need for assessing estuary condition

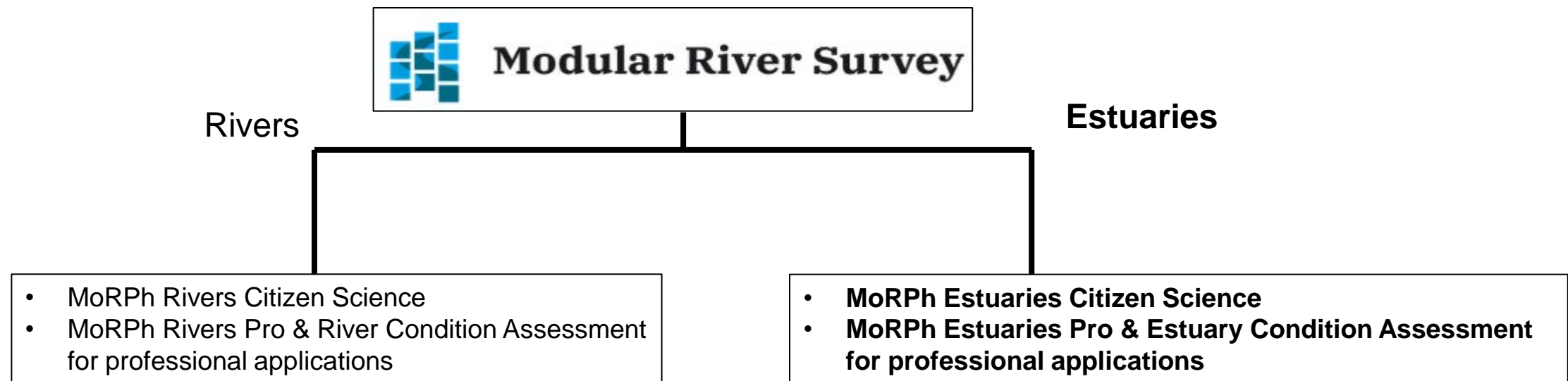
- Estuaries are rich in biodiversity, and provide essential ecosystem services like the storage of carbon, filtering of pollutants and transport of sediment.
- “The position of the UK makes our estuaries globally important, providing refuge for wintering birds from across the northern hemisphere” – David Attenborough, 2023.
- Globally, estuaries are heavily modified (hydrologically and morphologically), polluted, and highly vulnerable to the impacts of climate change.
- **Consequently, there is an urgent need to develop tools to monitor the biophysical characteristics of estuaries.**




The Alaw, a fjard type estuary in Anglesey, Wales.

The Modular River Survey and MoRPh

- MoRPh, short for the ‘Modular River Physical’ field survey is part of the Modular River Survey family of physical assessment methods.
- MoRPh Estuaries is complementary to MoRPh Rivers, **making it easy to survey a river from the source to the sea with an integrated approach.**
- Data from both approaches can be stored and visualised in the same online platform, Cartographer.



MoRPh Estuaries and its components

MoRPh Estuaries Pro 

Showing data recorded at SH 30889 81886 at 11:00 on 14/02/2023. [View survey](#)

[View photographs](#)

General

Estuary Alaw

Subreach Alaw, Middle, AlawMid

Module Number 2

Project Name Alaw_Middle_Fjard

Project Code -


WFD Waterbody ID -

Survey Type scenario

Indices (WIP)

E1: Number of Present/Extensive (Exposed) Sediment Material Types 3

E2: Coarsest Present/Extensive Mineral Cobble



Field survey element

4 survey sheets assessing the physical habitat across the supratidal, vegetated and unvegetated intertidal, and the subtidal

Data platform: Cartographer

Desk study element

Comprised of 3 parts:

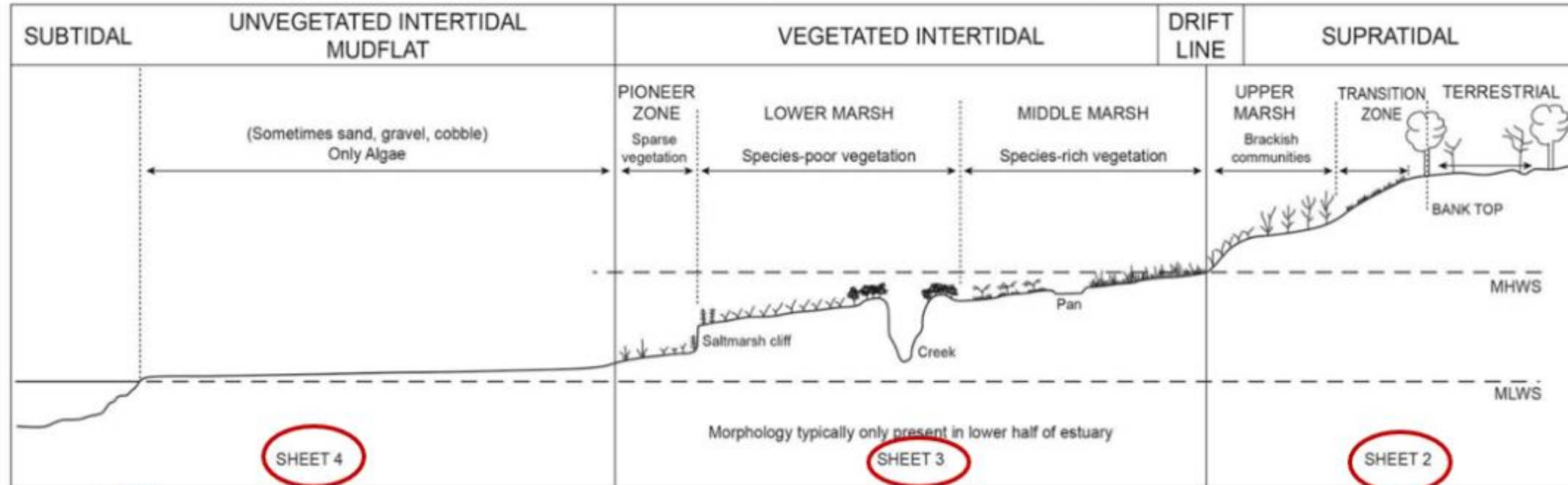
- 1) Estuary Zone
- 2) Estuary Type
- 3) Saltmarsh Assessment

Professional use



How to conduct a MoRPh Estuaries survey

Natural estuary – generic cross-section



Sheet:
4. Intertidal (unvegetated) & Sub-tidal



3. Intertidal (Vegetated)

1. General information
2. Supra-tidal (within 10 m)



How to conduct a MoRPh Estuaries survey

Urban estuary – generic cross-section



MoRPh Estuaries CSci Pilot Study (2021-22) funded by The Championing Coastal Coordination (3Cs) initiative

The need for a tool to assess physical habitat in estuaries has been identified across all stakeholder sectors, including statutory organisations, professional consultants, and NGOs.

Pilot Project Aims

- Test field survey tool and training materials through local trials in the Thames and Wyre estuaries.
- Collaborate with communities, local authorities, developers and statutory authorities.
- Share the tool and generate interest via the Coastal Partnership Network Community.

Pilot Project Outcomes

- In the Wyre catchment, a team of 12 Citizen Scientists have been trained and are continuing to conduct surveys (40 to date).
- An online StoryMap was created as a publicly available knowledge resource. **See the Modular River Survey Website** (modularriversurvey.org)



Vicky Henderson, The Wyre Estuary, 2022

Tom Myerscough
Heather Stott



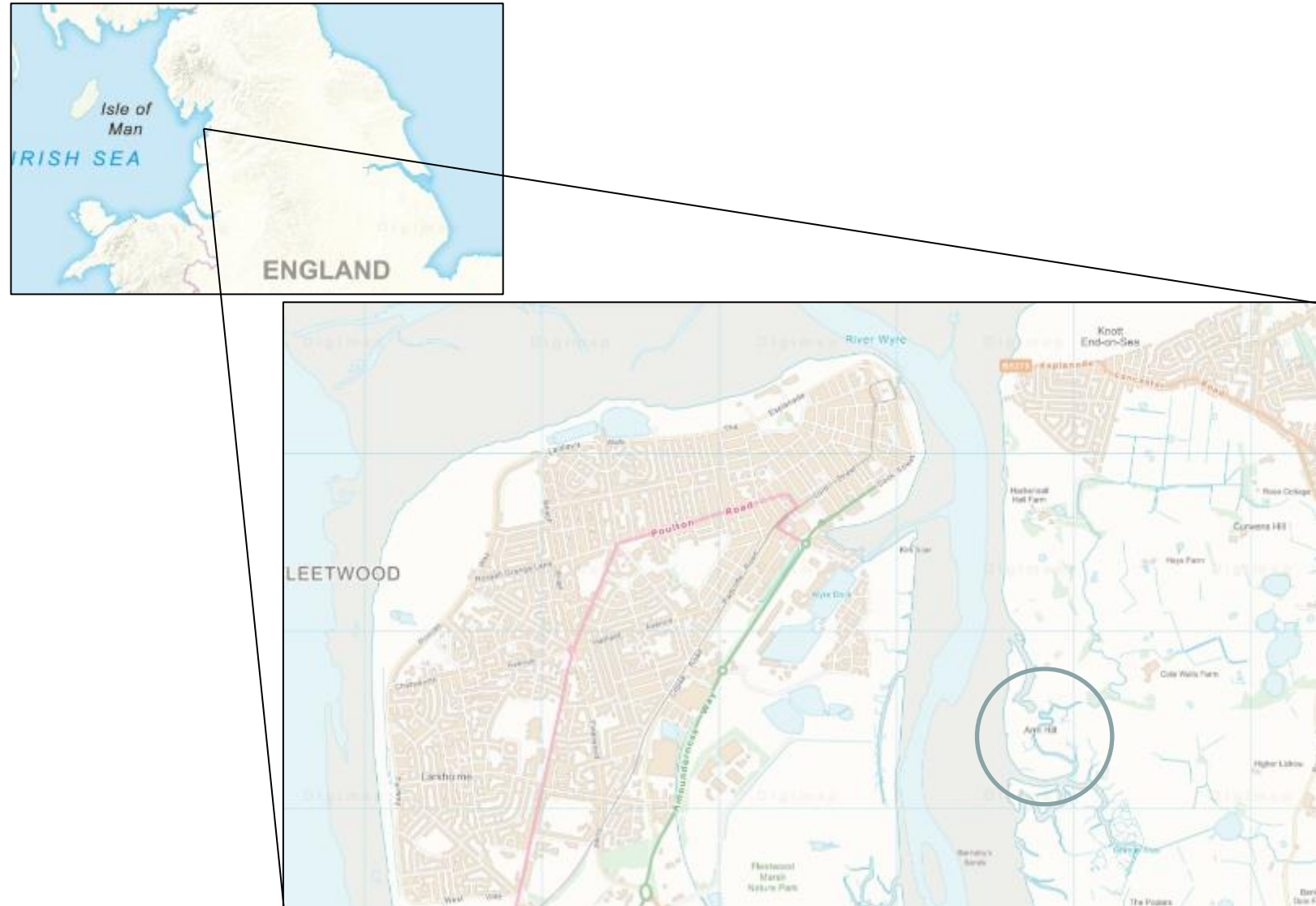
Using MoRPh Estuaries CSci for monitoring

Creating a baseline at Arm Hill in the Wyre estuary

- A site of heavy gravel extraction (c 1950 – 1970); site abandoned and succession to scrubland.
- Complex saltmarsh site with varying topography
- Home to last Little Tern (*S. albifrons*) colony in Lancashire and rare plants including Rock Sea Lavender

Plans are being developed to actively restore the site. **Therefore, establishing a baseline to monitor future change is essential.**

MoRPh - Citizen Science



Using MoRPh Estuaries CSci for monitoring

Creating a baseline at Arm Hill in the Wyre estuary

- Multi-partner project: WRT; Wyre Council; EA; NE; RSPB; Lancashire Wildlife Trust; NPL; Fylde Bird Club; Lancaster University; Royal Society of Biology.
- **MoRPh Estuaries CSci surveys are providing an invaluable baseline dataset of physical habitat condition to support the design and delivery of future projects at this site**
- **The survey has enabled the WRT to pinpoint areas of the salt marsh under enhanced erosional pressure, due to changes to hydromorphological processes at the hydromorphological scale**



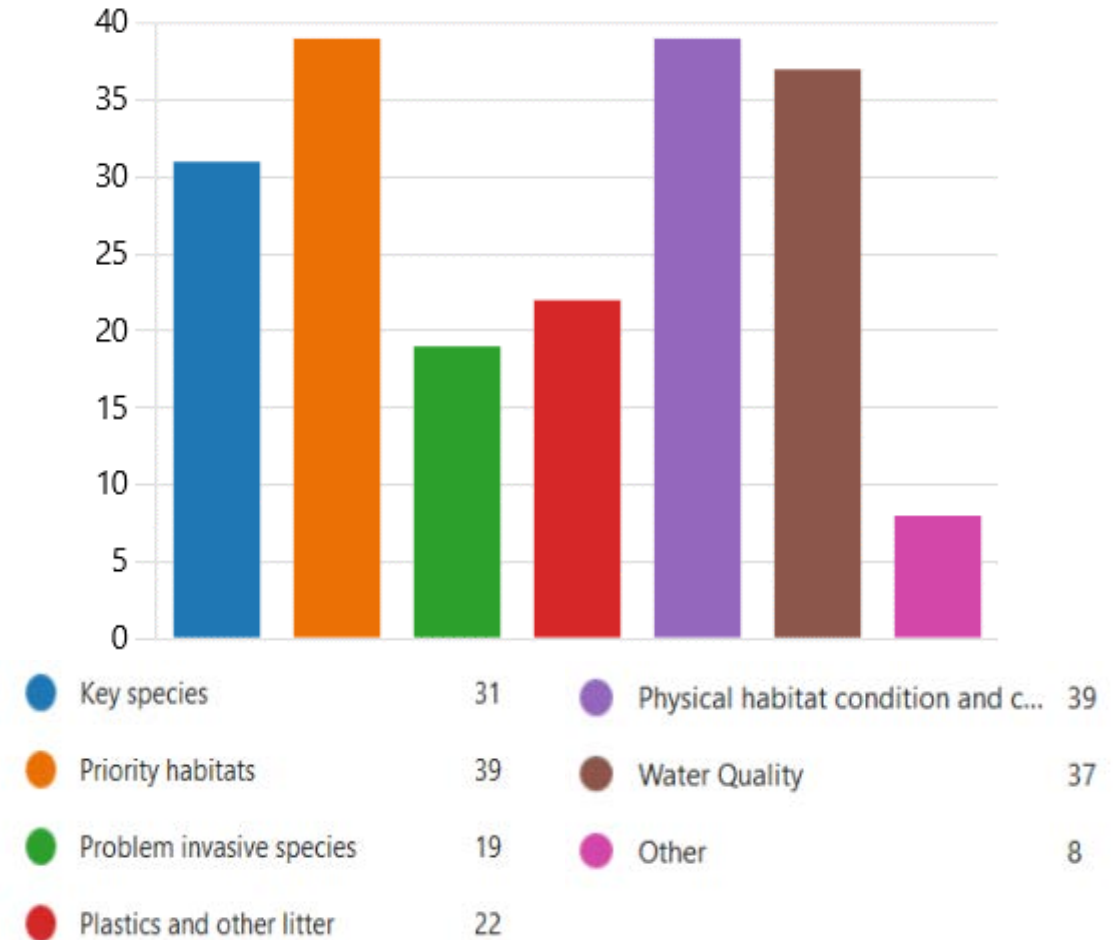
The Arm Hill Restoration Project site in the Wyre estuary



Championing MoRPh Estuaries CSci: Phase 1 (22-23)

- We created a national questionnaire assessing needs and opportunities for MoRPh Estuaries CSci
- We have had 60 responses from >36 organisations (including government bodies, partnerships, trusts, consultants, academics, local groups).
- Webinar 17th April 2023, provided information on the survey method and tool, training opportunities, and identify future leads to champion MoRPh Estuaries CSci.
- We will continue to extend our network of trained Citizen Scientists nationally and build support through regional hubs
 - Current hubs in the Wyre (WRT) and Thames (Thames21)

Evidence Priorities



Following the success of the Citizen Science pilot, we began to develop MoRPh Estuaries for professional applications...

Field survey element

4 survey sheets assessing the physical habitat across the supratidal, vegetated and unvegetated intertidal, and the subtidal

Data platform: Cartographer

Desk study element

Comprised of 3 parts:

- 1) Estuary Zone
- 2) Estuary Type
- 3) Saltmarsh Assessment

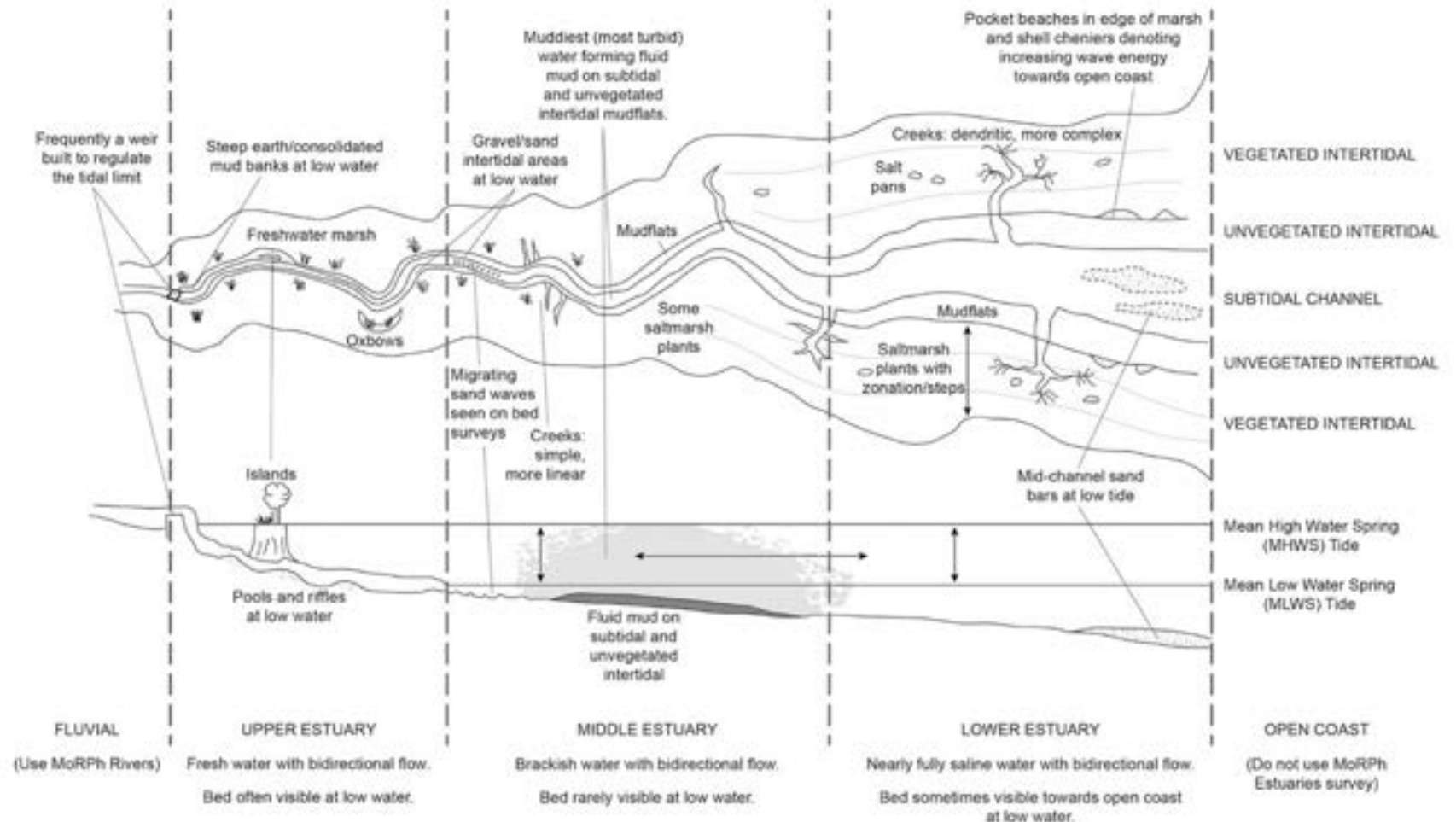
+ Pro indices

Professional use

MoRPh Estuaries Pro will allow for Estuary Condition Assessments for Biodiversity Net Gain calculations

Desk study: estuary zone and saltmarsh assessment

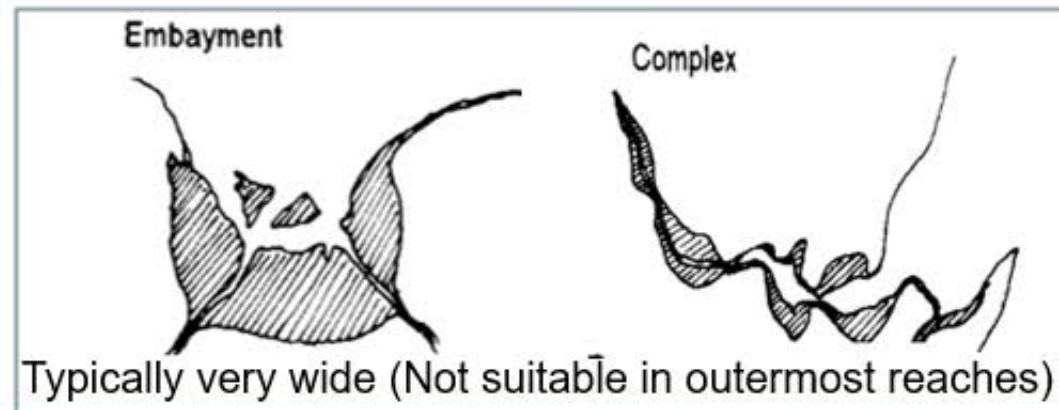
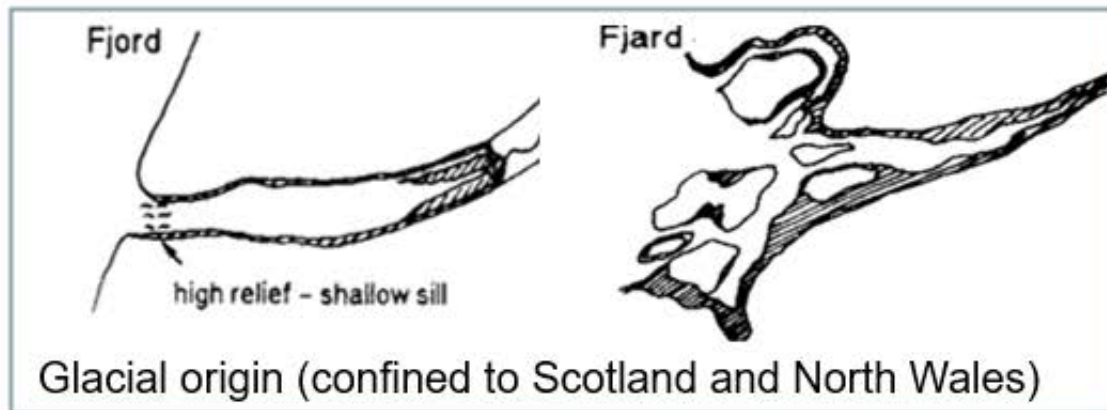
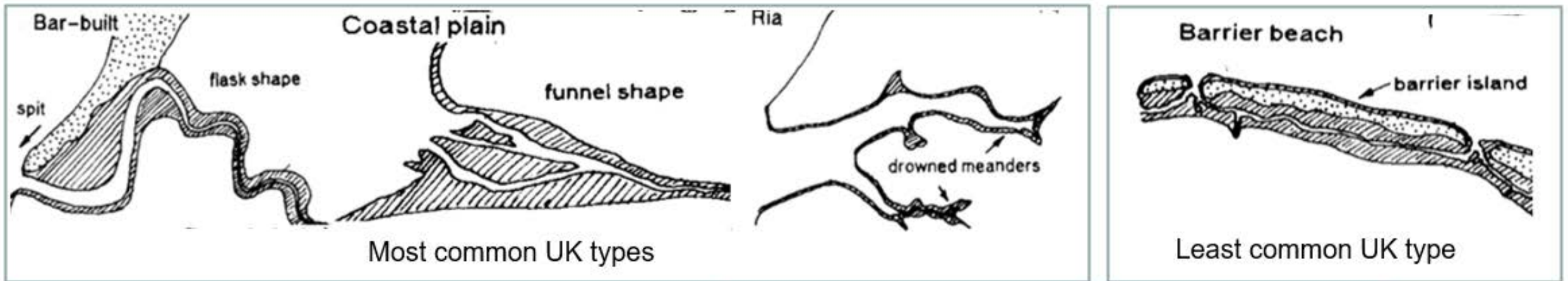
- **Upper, middle and lower estuary zones** have different features present, so it is important a final condition score considers what is characteristic for each zone.
- **Estuary zone** is calculated through a decision tree.
- **MoRPh Estuaries** is better suited to the upper and middle zones, although for some confined estuaries the lower zone may also be surveyed.



- **Desk study** also includes a method for assessing saltmarsh at your site.

Desk study: estuary type and its importance

- There are 8 geomorphologically distinct estuary types in the UK, with different physical habitat features.
- It is therefore important to consider estuary type when computing a final estuary condition score.



Davidson et. al, 1991. Nature Conservation and Estuaries in Great Britain. Nature Conservancy Council, Peterborough

How to work out estuary type



Is your site on a glaciated coast?
If not, then it **can't be a glacial type estuary such as a fjord or fjard**

Is your site confined by high relief?
It is most likely a ria or fjord type estuary



Is your site in an area *well known* for a specific estuary type?

Fjords are confined mainly the Scottish highlands, and rias to the south-west

Is your site on a microtidal coast?
- Microtidal coasts in the UK are very limited; as such **there are only 6 microtidal estuaries in the UK (1 embayment and 5 bar-built)**

Once an estuary type has been decided, double check against the literature and online resources!

Typology exemplar sites

Inner Solway - Complex



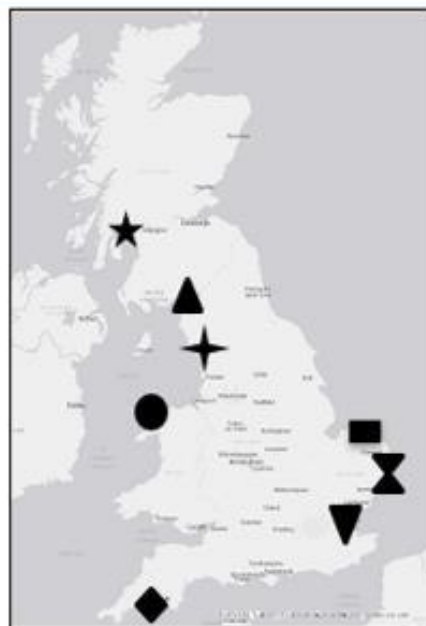
Loch Goil - Fjord



North Norfolk Coast (river Glaven) – Barrier beach



Morecambe Bay - Embayment



Butley, Suffolk – Bar built



Afon Alaw, Anglesey - Fjord



Looe, Cornwall - Ria

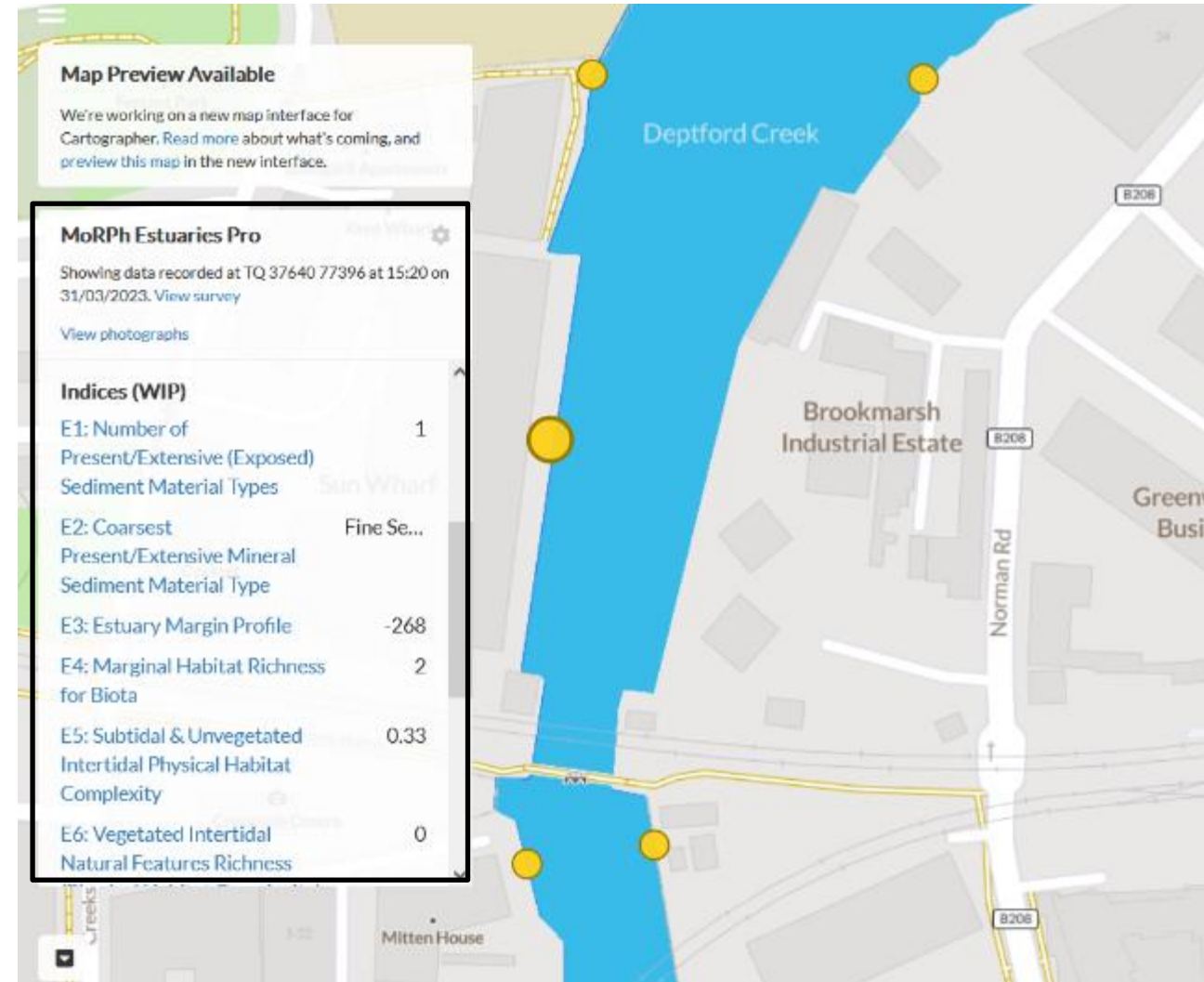


Thames (multiple sites), London – Coastal Plain



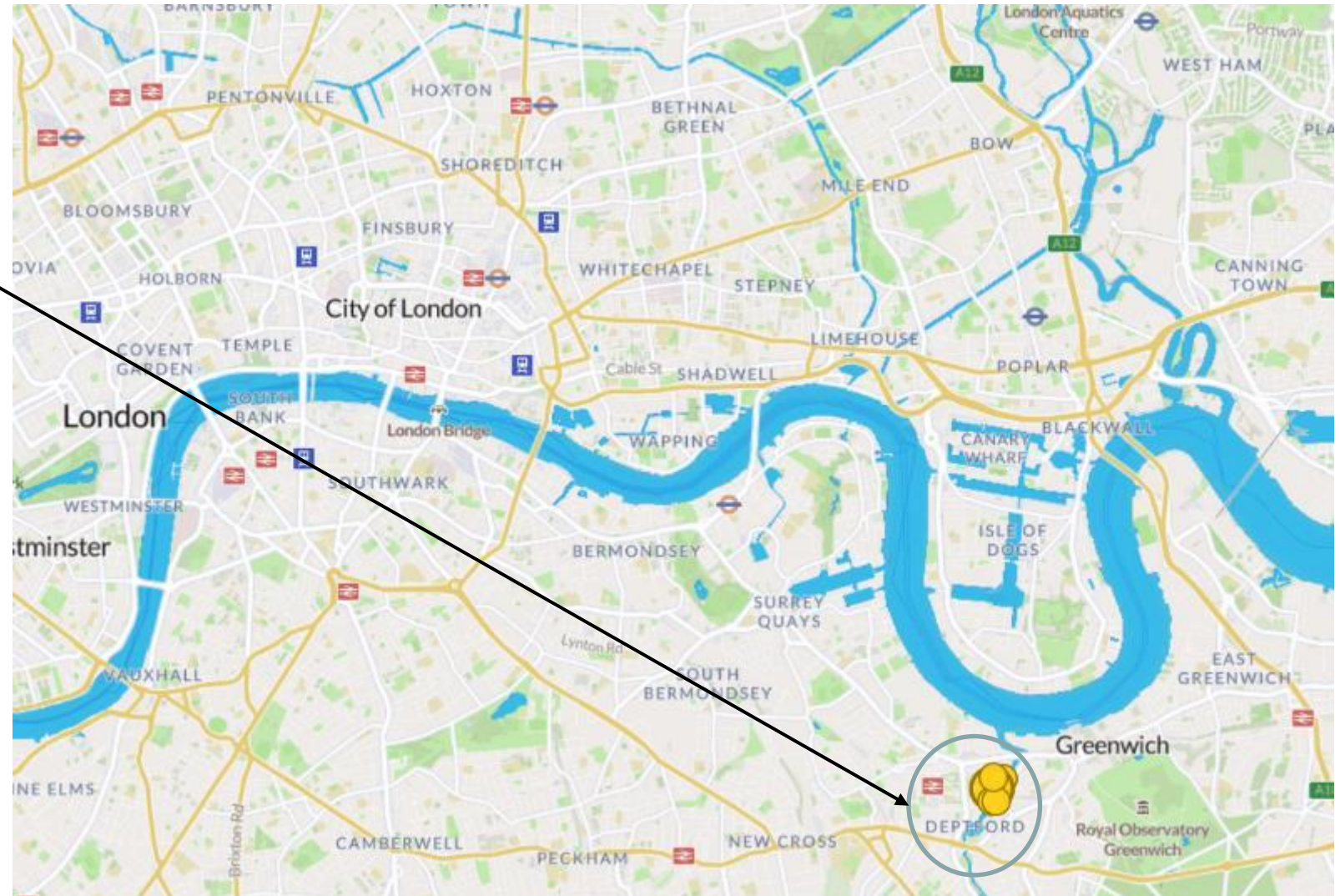
Indices development

- Based on exemplar field site surveys, a selection of Beta indices have been developed.
- MoRPh Estuaries Pro raw data will deliver a suite of positive and negative indices as the basis for an Estuary Condition Assessment (ECA) derived from field surveys and estuary typology.
- MoRPh Estuaries Pro and Beta indices have been tested at a set of rural and urban case study sites.



Indices: case study, Deptford Creek

- Urban case study site:
Deptford Creek, a small tributary to the Thames
(coastal plain estuary)



- <https://www.estuaryedges.co.uk/>

Indices: case study, Deptford Creek

Pre-restoration (proxy): vertical wall

Post-restoration: vertical wall with bolt-on timbers



C6	0	2	C6
C7	-355	-355	C7
E4	0	2	E4

C6	Bank face bare sediment extent
C7	Bank face artificial bank profile extent
E4	Marginal habitat richness

Indices: case study, Deptford Creek



C6	0	19	C6
E3	-355	-268	E3
E4	0	2	E4

- Extending bolt-on timbers improves margin profile
- Provides space for sediment to accrete



Indices: case study, Deptford Creek



P. Maritima (saltmarsh grass)

Current extent (<5%)

B1*	0
------------	---

Future extent? (>5%)

B1*	1
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The survey allows us to highlight in detail where things are beginning to develop – good for scientific monitoring

- B1* - Supratidal vegetation structure
- Includes terrestrial, wetland and upper marsh vegetation

Indices: case study, Flint Glass Wharf

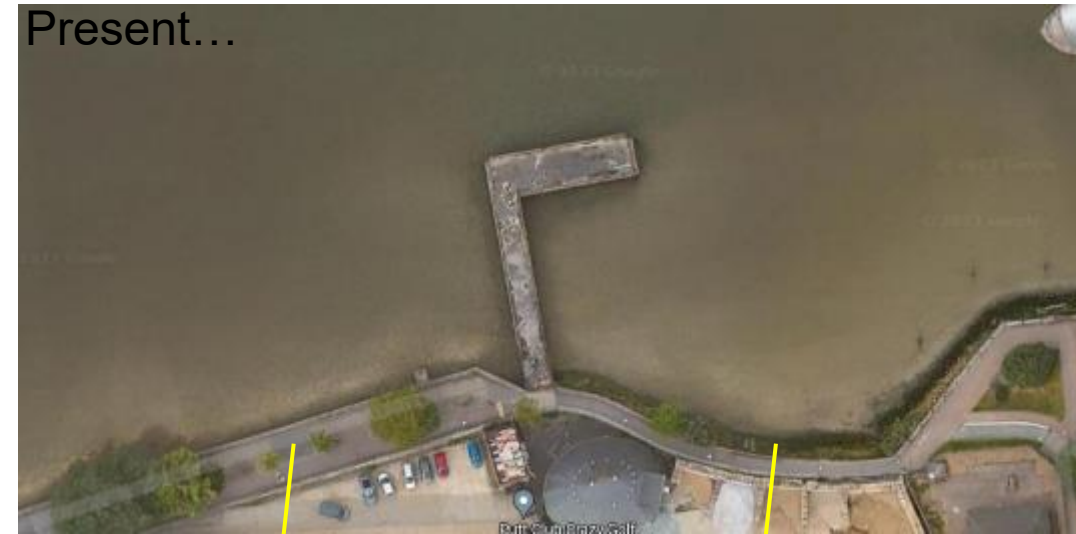
Present

E4 – Marginal habitat richness	0
E6 – Vegetated intertidal features richness	0

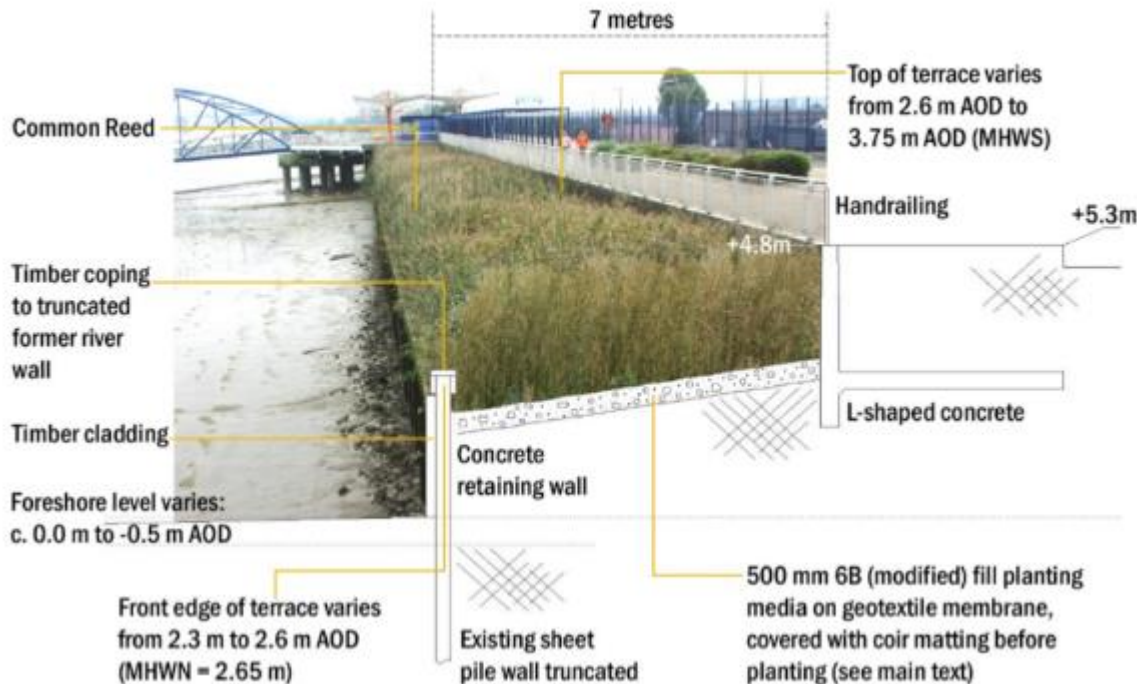
Predicted

E4 – Marginal habitat richness	5
E6 – Vegetated intertidal features richness	2

Present...



Future...



Conclusions and next steps

- The MoRPh Estuaries method has been developed for professional, citizen science, and research applications to support engagement and decision making by providing new evidence for transitional water bodies.
- MoRPh Estuaries provides a complementary and integrated approach for physical habitat surveys from freshwater into estuarine environments.
- We are developing an Estuary Condition Assessment (ECA), to complement the River Condition Assessment (RCA) which will contribute towards professional applications including the calculation of Biodiversity Net Gain.
- Inputs from the Environment Agency, Natural England, and consultancies involved in MoRPh Estuaries pilots are guiding where value can be added across a range of potential applications.



Photo: Richard Charman, EA.
Flint Glass Wharf, Thames
Estuary, November 2021.
Proposed redevelopment site.

Thank you for listening

If you want to know more
please contact us at:
modularriversurvey.org



Acknowledgements. We are grateful for support from the QMUL Impact Fund and *The Championing Coastal Coordination (3Cs) initiative*, a programme of work being led by the Environment Agency with support from Natural England, the Marine Management Organisation (MMO) and the Association of Inshore Fisheries and Conservation Authorities (IFCAs). It is a collaboration seeking to enhance and progress coordination for coastal sustainability and resilience in England. Thank you to all our Citizen Science surveyors.



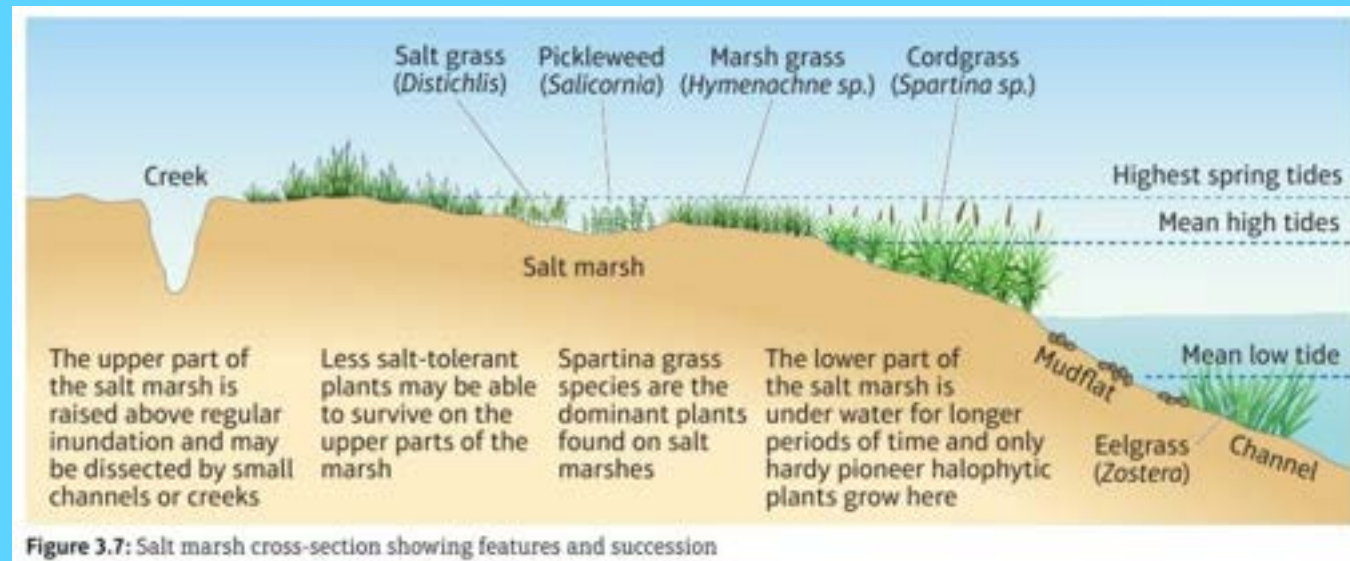
NATURAL ENGLAND

SEVERN ESTUARY 2017 SALTMARSH SURVEY REPORT

OLIVIA BEATTY, MARINE ADVISER, WESSEX
8TH JUNE 2023

WHAT IS A SALT MARSH?

- Coastal wetland partially submerged leading to a unique landscape! Inland length can be clearly split into zones characterised by the plant communities present



02

WHY ARE THEY IMPORTANT?

- Carbon sequestration = Climate Change defence
- Nurseries for juvenile fish
- Shoreline protection – buffer against incoming water.
- High biodiversity and specialist species
- Important habitat for birds



03

BACKGROUND CONTEXT

- Saltmarshes are significantly important habitats for conservation – Habitat Regulations, Ramsar Convention, Water Framework Directive and Wildlife and Countryside Act
- Severn Estuary Contains Atlantic Salt Meadows which is an Annex I Habitat.
- The Severn Estuary is connected to the Somerset Levels which is considered a 'High Priority Place' for NE



04

PURPOSE OF STUDY

- Dargie et al. 1998 – forms baseline of the Regulation 33 package
- Lacked up to date evidence of the extent, zonation, species composition and overall condition of the saltmarsh
- Required for upcoming Severn Estuary Condition Assessment.

The Severn Estuary / Môr Hafren European Marine Site

comprising :

**The Severn Estuary / Môr Hafren
Special Area of Conservation (SAC)**

**The Severn Estuary
Special Protection Area (SPA)**

**The Severn Estuary / Môr Hafren
Ramsar Site**

**Natural England & the
Countryside Council for Wales' advice
given under Regulation 33(2)(a) of the Conservation
(Natural Habitats, &c.) Regulations 1994, as amended.**

June 2009



A Welsh version of all or part of this document can be made available on request from the Countryside Council for Wales

METHODOLOGY

- Developed alongside NRW – Completed Welsh side.
- English side split into 11 zones (Bridgewater Bay-Beachley Head) with varying number of sites within each zone
- NE Area Team, Field Unit and coastal specialist completed the survey in 2017
- Survey based on Common Standards Monitoring guidance alongside EA Water Framework Directive methodology
- For each site **transects** and **quadrats** were recorded alongside a bespoke **Site Check** form

06

RESULTS

**TRANSCETS,
QUADRATS AND SITE
CHECKS**

**SALTMARSH
VEGETATION**

**SWARD
STRUCTURE**

**DISTRIBUTIONS
OF SPARTINA**

**DISTRIBUTIONS OF
RARE AND
NOTABLE SPECIES**

06

RESULTS

TRANSCETS, QUADRATS AND SITE CHECKS

Zone 1
Bridgewater Bay



- Mixture of all community types – max of 3
- Pioneer communities most observed – Newer saltmarsh?

06

RESULTS

TRANSCETS, QUADRATS AND SITE CHECKS

**Zones 2 + 4
Sand Bay and Chittening
Warf to Severn Beach**



Zone 2:

- **Pioneers rare mostly upper and middle**

Zone 4:

- **Communities varied but sites mostly dominated by upper**

06

RESULTS

TRANSCETS, QUADRATS AND SITE CHECKS

Zones 5, 6 + 7

Severn Beach, New Passage to Old
Passage and Littleton and Oldbury



Zone 5:

- Dominated by upper middle + transition

Zone 6:

- Dominated by transition

Zone 7:

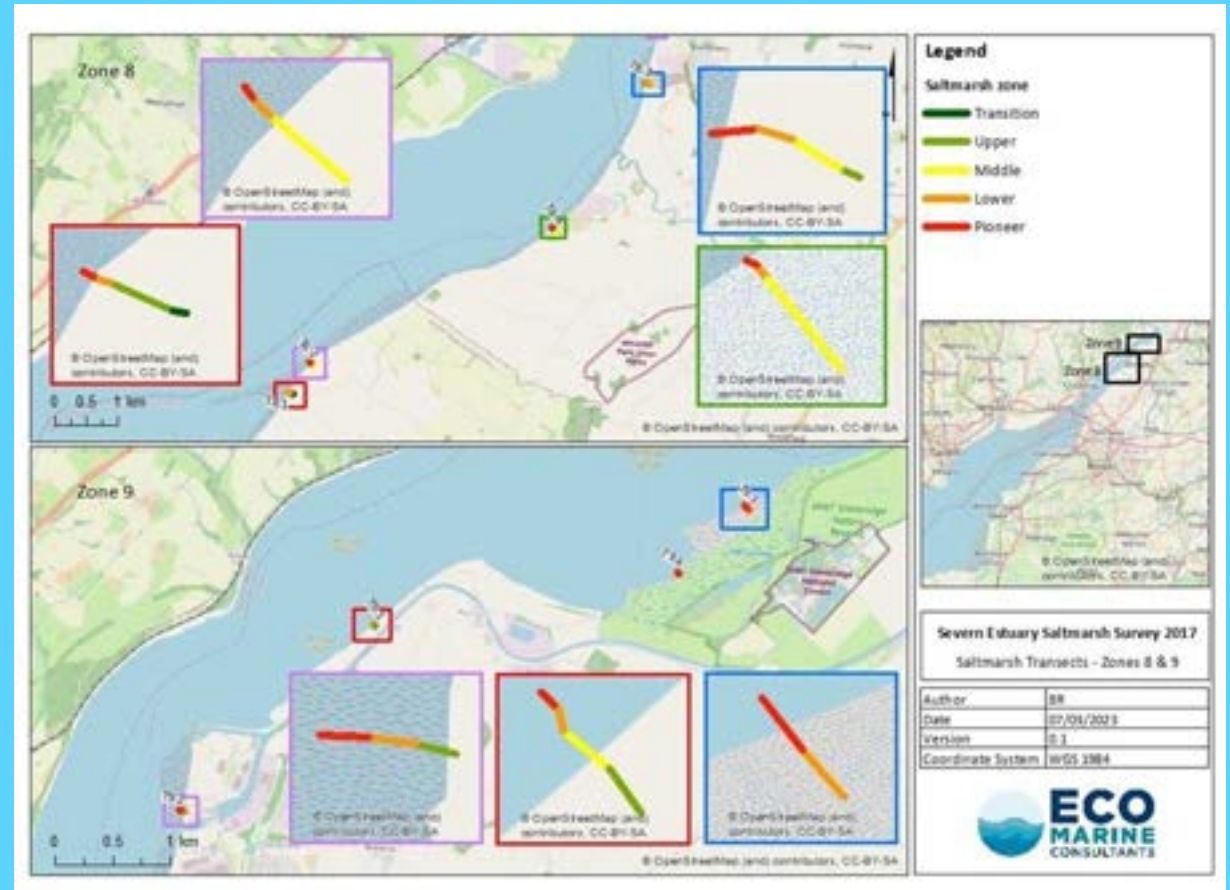
- Largely upper one transect recording pioneer

06

RESULTS

TRANSCETS, QUADRATS AND SITE CHECKS

Zones 8 + 9
Shepperdine Marsh to Berkely
and Purton Passage to
Slimbridge



Zone 8:

- **All communities excluding transitional recorded with middle and upper most prevalent**

Zone 9:

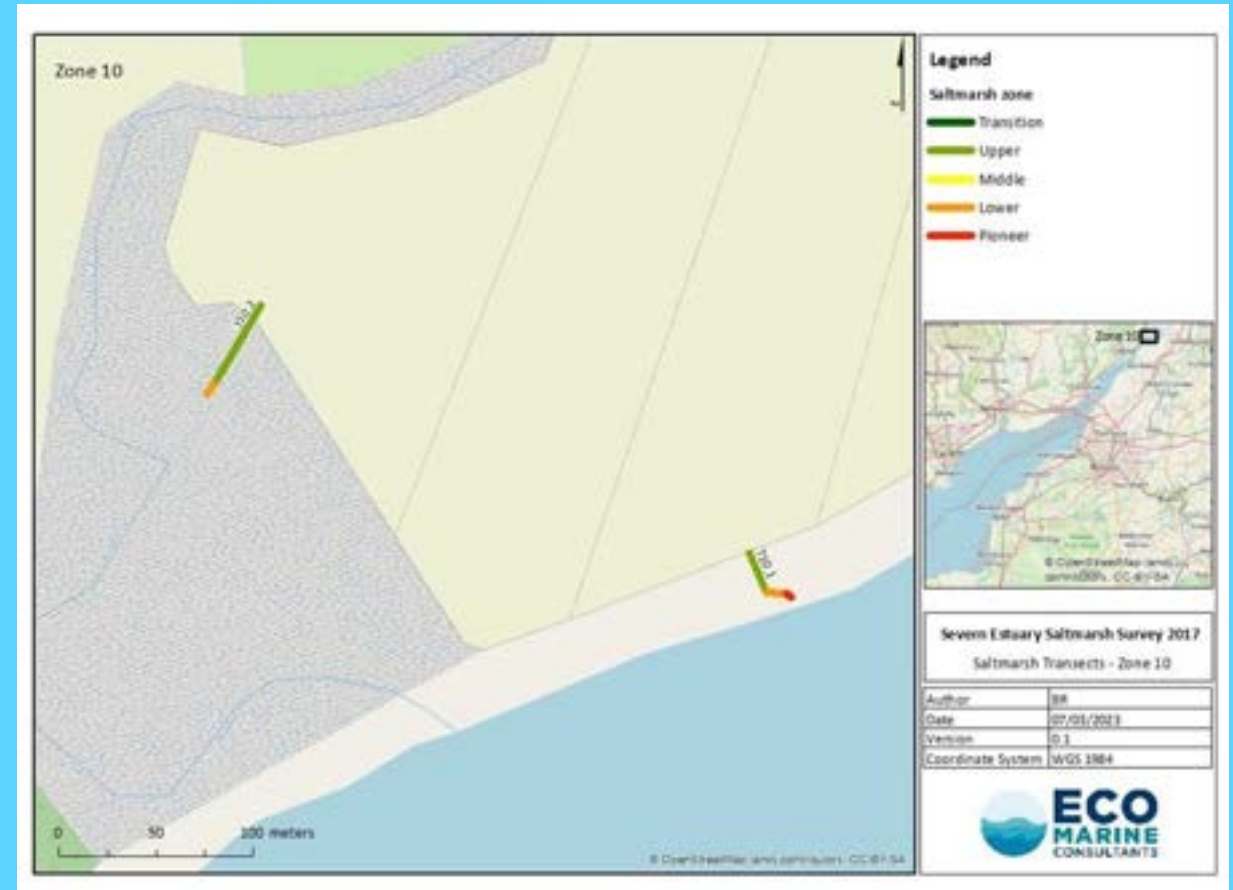
- **Predominantly Pioneer and Lower**
- **Sediment accretion and saltmarsh cliffs forming**

06

RESULTS

TRANSCETS, QUADRATS AND SITE CHECKS

**Zone 10
Awre to Poulton
Court**



Zone 10:

- **Dominated by upper zone**
- **Cattle grazing recorded and plant coverage similar to Dargie**

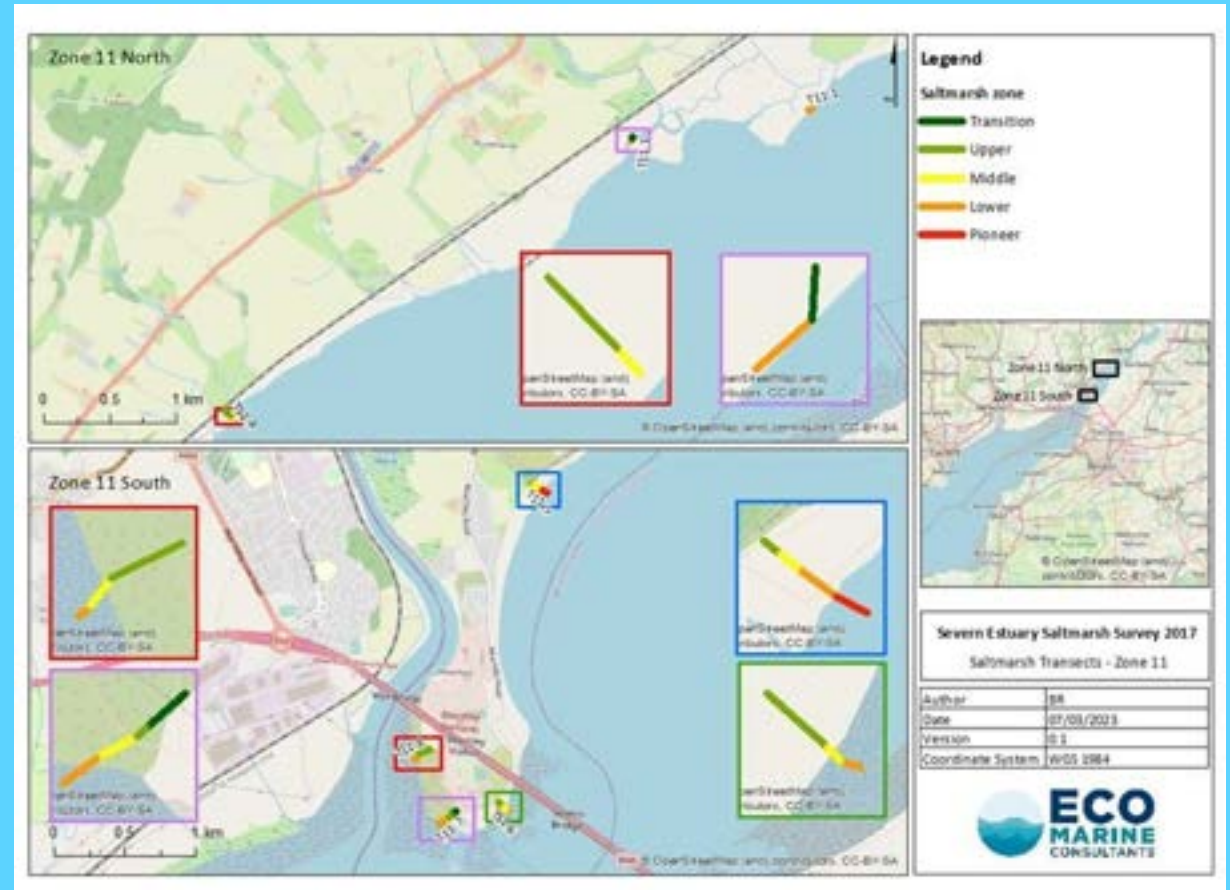
06

RESULTS

TRANSCETS, QUADRATS AND SITE CHECKS

Zone 11

Aylburton Warth to
Beachley Head



Zone 11:

- **Transects dominated by upper zones with exceptions**
- **Mixture of grazing and ungrazed however plant communities similar to Dargie – Zone 10**

06

RESULTS

**TRANSCETS,
QUADRATS AND SITE
CHECKS**

**SALTMARSH
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RESULTS

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Zone 9: Fence dividing grazed and ungrazed land

- Overall, light grass swards are the pioneer stage in Zones 1 and 10
- Sward structure or vegetation differences are present at some locations

OVERALL CONCLUSIONS

- **Dargie 1998 remains a good reflection of the saltmarsh habitat and vegetation communities assessed on 2017**
- **Common cordgrass (*Spartina anglica*) did not increase in area or dominance since Dargie**
- **Where grazing has reduced/ceased sea couch is becoming an issue -> reduces species diversity and suitable habitats for birds + invertebrates**
- **Reduced/ceased grazing -> unfavourable condition – measures needed to rectify or reinstate appropriate grazing (newly formed England Land Management team)**

08

GOING FORWARD

- **Next stage of analysis**
- **2017... Up to date?**
- **Whole estuary survey with NRW**
- **Severn Estuary Condition Assessment?**



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QUESTIONS?

