



4th IMMERSE

Transnational Estuary Exchange Lab: 'Ecological restoration and habitat creation'

9. November 2021, Online

Workshop Report

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The IMMERSE Transnational Estuary Exchange Labs (TEEL) provide a platform to share practices and progress on the development of solutions for estuarine management issues. The purpose is to advance development and transfer of solutions across those involved in estuary management in the North Sea Region.

The main themes of the fourth exchange lab were **habitat creation, ecological effects of management measures** and **green financing** mechanisms to fund habitat creation. The three sessions aimed to define healthy estuaries and their wider **societal value**; explore how measures affect estuarine ecosystems and how **nature-based solutions** can enhance management strategies, with focus on **intertidal** habitat creation and **managed realignment** to showcase the measures in the Tees and Humber estuaries as part of the IMMERSE project.

The following report presents a summary of the presentations, discussions, and audience engagement from the three sessions, starting off with the **Introductory Session – 'Setting the Scene,'** which introduced participants to the IMMERSE project, the TEEL concept, and the topic of habitat creation. The introductory session introduced the topic within the context of the Humber estuary in the UK, with two presentations highlighting the national as well as a local perspective. The next session was dedicated to the topic of **Habitat Creation and Ecological Effects of Management Measures**, discussing different approaches to habitat creation across the North Sea Region. The final session **Green Financing: Blue Carbon Credits to Fund Habitat Creation** saw presentations and discussions on the Tees, Humber and Thames estuaries, their ecological history and financial instruments for habitat creation.

The TEEL was attended by 62 individuals, and all materials from the TEEL can be found on the IMMERSE TEEL webpage: <https://northsearegion.eu/immerse/transnational-exchange-labs/>.



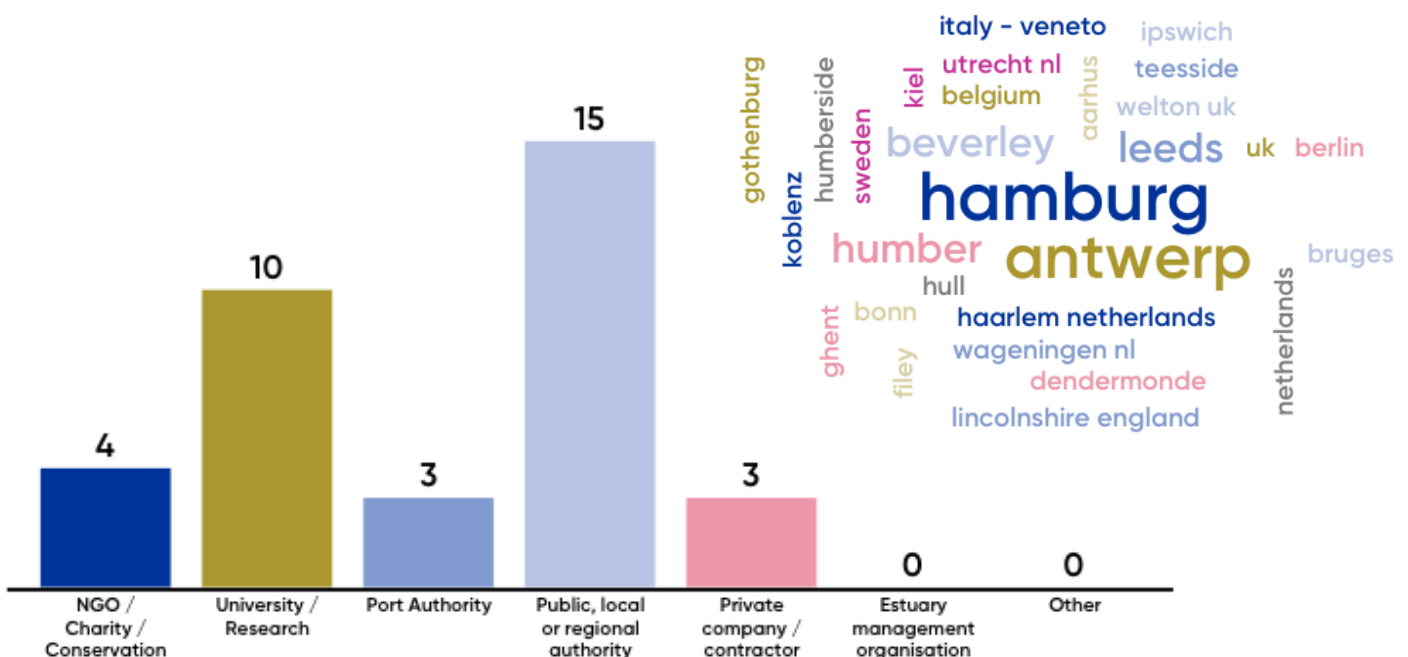
Introductory Session: Setting the Scene

Healthy estuaries and their wider societal value

Estuaries can provide a wide range of ecosystem services that underpin coastal livelihoods and support climate adaptation. However, despite the importance of these ecosystems, they face multiple pressures from man-made interventions to storm surges and rising sea levels. There is a need for a range of incentives and mechanisms to both mitigate impacts with more sustainable practices and align with or amend conservation goals for these ecosystems, such as Natura 2000. Involvement and leverage from the private sector are crucial to address these challenges.

The introductory session emphasised the value of healthy, resilient estuaries for local communities and the environment in terms of physical and mental health, as well as the need for estuary managers and stakeholders to understand estuarine behaviour, be dynamic and adapt to a changing climate by using soft, nature-based measures where possible. The Yorkshire Wildlife Trust's presentation showed how measures are being taken to restore oyster beds and seagrass meadows to their former glory, highlighting the capacity of nature to bounce back if given a chance, and the importance of raising awareness among local communities to support those measures, as they create long-term value for all.

The session was introduced by the external project coordinator, s.Pro and Frederik Roose from lead partner MOW, who introduced the IMMERSE project. Mentimeter was used as an interactive tool, engaging participants in an icebreaker quiz with real-time feedback from the audience (see below screenshots). This was followed by an introduction to the TEEL concept by Frederik Roose, who subsequently introduced the two speakers in the session.





Flood resilience and nature-based solutions: delivering multiple outcomes

Dr. Sue Manson, Environment Agency England

Summary

The increasing risk of tidal flooding affects around half a million people, nationally important industrial and energy infrastructure and over 100,000 ha of agricultural land around the Humber Estuary, which is internationally important for wildlife. Central government policy in England is moving the nation from a concept of flood protection to flood resilience. Flood defences will remain an important part of a much broader toolkit for reducing the consequences of flooding, which includes making greater use of nature-based solutions. Within a dynamic estuary environment, the Humber 2100+ partnership is working together to develop a long-term approach for managing the consequences of sea level rise and tidal flooding, to support sustainable development. The long term needs of the estuary's natural environment will be embedded into any future approach for managing tidal risk, enhancing the ecological systems' ability to respond to pressures such as climate change, and in turn enhancing the resilience of the Humber region.

[Presentation: Flood resilience and nature-based solutions: delivering multiple outcomes](#)

Q1: Is contamination of sediments and suspended matter an issue at the Humber estuary?

A1: Heavy metal loads are lower now than in the 70s and 80s but there are still a few hotspots. The last IMMERSE report has a table with details. Other types of pollution may also be emerging - pharmaceutical waste products, microplastics...

Comment: Organopollutants are also lower compared to previous decades, levels at or around the detection limit for the outer estuary. Fantastic tool for viewing the monitoring data here:

<https://environment.data.gov.uk/water-quality/view/explore>

Native Oyster and Seagrass Restoration

Andy Jayes, Yorkshire Wildlife Trust

Summary

Recognising the multiple benefits of seagrass as a habitat, ecosystem engineer and natural carbon solution, Yorkshire Wildlife Trust has started a project to increase the size of the seagrass meadow at Spurn in the UK. They're working with the University of Hull to test different areas of the mudflats and assess the best areas to plant. We want our seagrass to have the best chance to survive and thrive.

[Presentation: Native Oyster and Seagrass Restoration](#)



Session 1: Habitat Creation and Ecological Effects of Management Measures

This session elaborated the issues and challenges faced by estuary managers in applying measures with positive ecological impacts. Guest speakers presented examples of ecological impacts considered in management strategies, as well as tools used to monitor those impacts over time. The presentations gave participants a basis for discussion of good practices and cross-cutting topics. The role of estuaries as carbon sinks and biodiversity incubators were discussed. Presentations lasted around 30 minutes, followed by a discussion with the audience. Guest moderator Marcel Taal from Deltares introduced the session, the speakers and facilitated the discussion.

The session saw discussions on how to motivate politicians to take habitat creation measures more seriously and understand their value for the environment and for society, as in the case of the Elbe Habitat Foundation. The question of leadership was also raised when there is no official authority responsible for such measures, but the Elbe Tidal Forum at least provides a productive platform for multi-stakeholder dialogue. Rodney Forster described recent research from their PhD students on the effects of managed realignment on tidal flows, sedimentation and biodiversity, with a stark warning that intervention can have different outcomes for different species, the complexity of which is further compounded by rising sea levels and global temperatures. Finally, Yves Plancke presented sediment management strategies on the Scheldt, describing how they turned the problem of sediment disposal into a potential solution by creating low dynamic areas with ecological potential. He emphasised the fact that each estuary is unique, but the same principles of understanding functions with multi-tool, dynamic and holistic approaches apply to all estuary managers.

Habitat creation in the tidal Elbe

Dr Elisabeth Klocke, Elbe Habitat Foundation

Summary

The Elbe Habitat Foundation is a foundation under public law with legal capacity. Its purpose is to contribute to the ecological enhancement of the Tidal Elbe. It is predominantly financed from port fees. Founded in 2010, it has now implemented more than 120 projects or is in the process of implementing or planning them. The foundation has invested more than EUR 10 million on these projects and more than EUR 2 million in land acquisition.

[Presentation: Habitat Creation in the tidal Elbe](#)

Q1: You spoke about slicing the groynes but what do you think would happen on the Elbe if the groynes were completely removed? Would the channel migrate in an uncontrolled way?

A1: We have not considered this but would expect so, yes.



Expected and unexpected effects of managed realignment in an urbanised estuarine environment

Dr Rodney Forster, University of Hull

Summary

The urbanised estuaries of the North Sea Region have important roles in the global carbon cycle and attempts to reduce greenhouse gas emissions must centre on these sites. Fossil-fuel intensive industries are located in and around the estuaries, as are their replacements – offshore wind, green hydrogen and carbon capture and storage. The living estuary itself is also important: the large estuaries (Schelde, Thames, Gironde) are on balance heterotrophic ecosystems, meaning that they release CO₂ from the respiration of organic matter (in large amounts). But parts of the estuary can act as carbon sinks due to the growth of marine plants and algae, and the sequestration of carbon-rich sediments. The talk looked at how managed realignment sites, which are primarily for flood risk management, can also play a role in increasing the estuarine carbon sink.

[Presentation: *Expected and unexpected effects of managed realignment in an urbanised estuarine environment*](#)

Q1: You spoke about increase of biomass. Do you have any ideas about shifts in foodwebs over the years? And were there any shifts showing from pioneer species to more persistent ones?

A1: There is still a lack of research in this respect. Pioneer species are vulnerable to sea level rise, so establishment of one species can quickly be undone by extreme weather events or spring tides.

Morphological management in the Scheldt estuary: Harmonizing ecosystem functions with sediment management

Yves Plancke, Flanders Hydraulics

Summary

Yves Plancke is an expert research engineer at Flanders Hydraulics for almost 20 years. His work concentrates on the hydrodynamics, sediment transport and morphology of Schelde-estuary. In his presentation he showed results from a new sediment management strategy in the Western Scheldt and results from an explorative study on how sediment could be used to create benefits for other estuarine functions such as low dynamic areas behind sandbars and megadunes to create ecological potential from sediment disposal measures.

[Presentation: *Morphological management in the Scheldt estuary: Harmonising ecosystem functions with sediment management*](#)

Q1: Have these sediment placement strategies, to create low dynamic areas and to dampen tidal range, already been tested / applied in other estuaries?



A1: The concept of morphological management was applied at different locations in the past (pre 2000, e.g. Congo, Bolivia, Bangladesh => see TIDE-report); recently (within the scope of European Bird/Habitat Dir) I'm not aware of similar projects, but maybe other can give examples. There are ideas of tidal damping in the Elbe, but don't know present status. See https://www.tide-toolbox.eu/tidetools/morphological_management/

A1.1: Tidal damping elements in form of sediment placements are part of the mitigation measures on tidal effects of the Elbe deepening.

Session 2: Green Financing: Blue carbon credits to fund habitat creation

This session aimed to present incentives for **nature-based solutions** to multiple pressures such as coastal squeeze and environmental factors such as sea-level rise and biodiversity loss. The focus in this session was on softening hard estuary edges, use of citizen science and funding mechanisms. This included specific **funding mechanisms** such as NEIRF grants in the UK and **blue carbon credits** as strategies to facilitate climate-resilient intervention, creating **long-term value** for the maximum number of stakeholders. The session was introduced and moderated by Frederick Bruce of sPro.

The final session presented the progress made by the Environment Agency England in researching possible avenues to upscaling green financing mechanisms to include blue carbon credits. Until now, the focus has generally been on terrestrial schemes, with coastal areas receiving less attention. Several carbon codes have been developed such as the salt marsh code by the UK Centre for Ecology and Hydrology and GIGL water credits, taking inspiration from social enterprises as well as US carbon markets, which tend to be more advanced.

The Thames Estuary Partnership presented their Estuary Edges initiative and the corresponding guidance material. They showed how certain measures such as reed bed terraces and vegetative 'stepping stones' significantly increased biodiversity and even local property values. Amy Pryor also showed the quantification of social value through post-appraisal surveys, standardised monitoring of 'natural capital', virtual assets and training schemes for young people. Here she highlighted the importance of including habitat creation in planning and development by design at an early stage for optimal results. Ben Lamb introduced the history of the Tees estuary, its ongoing recovery from industrialisation and the measures implemented under the IMMERSE project, such as using willow branches to trap sediment. He also indicated the importance of citizen science to mobilise the local community and youth groups, to develop a sense of ownership for their local outdoor spaces. This was followed by Phil Marshall's presentation,



mentioning the Tees Tidelands Programme and Teesworks projects which seek to develop green circular funding for local projects by re-using brownfield sites and selling BNG (biodiversity net gain) units to developers to fund habitat creation in a virtuous upward spiral.

Investing in Nature: Ecosystem Services and Funding Mechanisms

Andy Slaney, Environment Agency England

Summary

Investing in Nature – funding the development, testing and demonstration of commercial, natural environment business models generate a sustainable financial return and contribute to the delivery of the goals of the UK governments 25 Year Environment Plan. How the Environment Agency, England is testing green finance approaches to encourage new markets and revenue streams.

[Presentation: Investing in Nature: Ecosystem Services and Funding Mechanisms](#)

Comment from Andy: This link may help with exploring some of the US comparisons related to green finance initiatives <http://cpicfinance.com/>

Estuary Edges: Intertidal habitat creation in UK estuaries

Amy Pryor, Thames Estuary Partnership

Ben Lamb, Tees Rivers Trust

Summary

The Thames Estuary Partnership (TEP) is an independent charity that improves and builds understanding of one of the world's most famous rivers. They bring together key stakeholders in the tidal Thames, working in partnership to improve the river both for London's inhabitants and for the wildlife that it is home to. In this presentation, they presented their guidance documents 'Estuary Edges' and other implementation, communication and training activities in the Thames estuary.

This transitioned into a presentation from IMMERSE partner Ben Lamb of the Tees Rivers Trust, showcasing the IMMERSE intertidal habitat creation measures on the Tees estuary, with good practices such as citizen science volunteering schemes and educational work with local schools.

[Presentation: Estuary Edges: Intertidal habitat creation in UK estuaries](#)

[Presentation: Tees Estuary Intertidal Habitat Creation](#)



Comment: The EA has launched three new restoration handbooks (for restoring saltmarsh, seagrass and restoring intertidal habitats using dredged material) at COP26 last week. More info under: <https://catchmentbasedapproach.org/learn/saltmarsh-restoration-handbook/>

Comment: Heather Hilburn, the CEO from Thames Estuary Partnership would like discuss connecting funders across different sectors to this agenda - and how can estuary managers better share information and benchmarks internationally to inform different investment models?

Comment: A link to German research Project: Technical-biological bank protection measures along Federal Waterways (including tidal areas): <https://ufersicherung-baw-bfg.baw.de/index-en.html>

Tees Tidelands – Rewilding the Tees Estuary

Phil Marshall, Environment Agency England

Summary

Over the last 200 years the Tees Estuary has been transformed from an ecological treasure into one of the UK's industrial heartlands. Economic development at the expense of the environment the estuary now faces a new future, integrating sustainable economic growth with ecological restoration. Tees Tidelands is central to this providing a mechanism, to restore parts of the estuary while helping future economic prosperity, using the commercial value of 'biodiversity net gain' units to fund habitat restoration.

[Presentation: Tees Tidelands – Rewilding the Tees Estuary](#)

Conclusion

All in all, the TEEL highlighted the importance of nature-based solutions as cost-effective, resilient measures in creating societal and environmental value. However, it's not always as straightforward as that, since estuarine ecosystems are fragile and dynamic, with multiple pressures which are not yet fully understood. The general consensus was that estuaries need more recognition from politicians and environmental groups. The role of local communities was a recurring theme throughout the day, with grassroots actions acknowledged as an effective approach to reconnect people with their local environment, take ownership for its upkeep and hold authorities to account. Finally, there was a call for participants to establish an international estuary forum to keep each other updated on the latest developments.



Participants

Lisa Simone de Grunt	sustainable-projects.eu
Merle Leeds	environment-agency.gov.uk
Matthew Millington	eastriding.gov.uk
Jannie Dhondt	vlaamsewaterweg.be
Heather Hilburn	ucl.ac.uk
Alessandra Feola	isprambiente.it
Robert Sparkes	eastriding.gov.uk
Rachel Graham	nelincs.gov.uk
Martin Abratis	wsv.bund.de
Emanuela Lombardi	ambienteprogetti.it
Gerwin Obst	stiftunglebensraumelbe.de
Holly Laws	environment-agency.gov.uk
Melanie Schlimbach	bafg.de
Marc Kindermann	hpa.hamburg.de
Paul Kroll	wwf.de
Daniel Ruppert	wwf.de
Beatrice Claus	wwf.de
Kirsten Wolfstein	hpa.hamburg.de
Christin Juno Laschke	riseup.net
Cynthia Pauwels	portofantwerp.com
Katharina Kurzweil	web.de
Hellen Hornby	groundwork.org.uk
Graham Weaver	naturalengland.org.uk
Luuk van der Heijden	deltares.nl
Judith Sprenger	hpa.hamburg.de
Alice Watts	ucl.ac.uk
Ileana Schipani	yahoo.it
Clare Börsch	clareceleste.com
Steven Kaptein	mow.vlaanderen.be
Mike Pilsworth	rspb.org.uk
Richard Barnard	rspb.org.uk
Atsunari Katsuki	gmail.com
Valerie Biernaux	anteagroup.com
Mailin Eberle	bafg.de
Virginie Chotard	environment-agency.gov.uk
Frances Edwards	environment-agency.gov.uk
Nicola Farr	environment-agency.gov.uk
Jeroen Stark	mow.vlaanderen.be
Johanna Knüppel	hpa.hamburg.de
David Mould	jbaconsulting.com
Jeremy Pile	environment-agency.gov.uk
Luan Ho	hotmail.com
Amy Pryor	ucl.ac.uk
Duncan Kitts	bmtglobal.com
Phil Marshall	environment-agency.gov.uk
Jürgen Schaper	hereon.de
Henrik Bengtsson	sgi.se



Daniel Parsons	hull.ac.uk
Volker Steege	bmvi.bund.de
Jana Steenberg	swecobelgium.be
Andy Slaney	environment-agency.gov.uk
Karin Karlfeldt Fedje	chalmers.se
Paveen Ghalay	finance.earth
Ann-Margret Strömvall	chalmers.se
Tim McGrath	wwt.org.uk
Sarah Marx	rws.nl
Eline Sieben	students.uu.nl
Liz Inwards	environment-agency.gov.uk
Marta Merino	kyst.dk
Marcel Taal	deltares.nl
Sue Manson	environment-agency.gov.uk
Nikolas Uffmann	bafg.de
Yves Plancke	mow.vlaanderen.be
Victoria Ortiz	baw.de
Heike Markus-Michalczyk	naturundumwelt.info
Frederik Roose	mow.vlaanderen.be
Jacqueline Neubecker	gmx.de
Andrew Ridley	pdports.co.uk
Eline Van Malderen	mow.vlaanderen.be
Judy Power	teesriverstrust.org
Valerie Biernaux	anteagroup.be
Graeme Hull	environment-agency.gov.uk
Frank Neumann	imieu.eu
Anna Ossenkopp	imieu.eu
Rob Thomas	hull.ac.uk
Richard Charman	environment-agency.gov.uk
Andy Bailey	environment-agency.gov.uk
Lucy Marshall	environment-agency.gov.uk

