



Acting on climate
change to build
a better tomorrow

THE IMPORTANCE OF UK SALTMARSHES

INTRODUCTION

Over the past 60 years, WWF has become one of the world's largest conservation organisations, working to build a future where people and nature thrive together.

Aviva, one of the UK's largest insurance, wealth, and retirement companies has an ambition to be a Net Zero company by 2040¹. It was the first major insurer worldwide to have such an aim, and it recognises the role it has to play in the global response to climate change.

In 2021, WWF-UK and Aviva joined forces with a goal to restore UK landscapes, build healthier, more climate resilient communities, and strive for a transformational shift in the finance sector to achieve net zero.

Right now, the UK is one of the most nature-depleted countries in the world². Climate change is making it warmer and wetter, leading to more extreme weather and flooding. The latest government National Flood Risk Assessment (NaFRA) shows that around 6.3 million properties (homes and businesses) in England are in areas at risk of flooding from one or a combination of sources (rivers, sea, surface water)³. With climate change the total number of properties in areas at risk from rivers and the sea or surface water could increase to around 8 million by mid-century.

As a major home insurer, Aviva knows that while insurance can help people rebuild, it can't replace treasured family belongings or undo the emotional toll of a flood. That's why our partnership has worked to develop projects that will help reduce the effects

of extreme weather, particularly flooding, to protect communities from the effects of climate change.

One of our most exciting projects started in 2023 when we installed the UK's first 'carbon flux tower' in a new UK saltmarsh network on the Ribble Estuary, to confirm the vital role of saltmarsh in fighting climate change and how these habitats respond to sea-level rise.

Our research – carried out in collaboration with the UK Centre for Ecology & Hydrology and the RSPB – is paving the way for better conservation of and greater investment in saltmarsh as a critical Nature-based Solution in the UK. This report summarises our findings after a full year of data collected from our tower in Lancashire, helping us better understand the carbon capture and storage capabilities of saltmarsh – one of Britain's most precious natural ecosystems.

Together, WWF and Aviva are evidencing that protecting nature isn't just good for the planet – it's essential for our future.

1. <https://static.aviva.io/content/dam/aviva-corporate/documents/socialpurpose/pdfs/2024-transition-plan.pdf>

2. [TP25999-State-of-Nature-main-report_2023_FULL-DOC-v12.pdf](#)

3. [National assessment of flood and coastal erosion risk in England 2024 - GOV.UK](#)

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As a leading insurer, we understand the impact flooding has on our customers and the role that nature-based solutions can play in helping residents and businesses get ready for the impacts of climate change. The Ribble Estuary Saltmarsh Flux Tower has yielded promising results, outlining the impact that saltmarshes can have, not only in storing carbon but also in protecting our coastlines and supporting biodiversity. This research will help to develop a Saltmarsh Carbon Code which can be used as the UK works towards achieving net zero.

Jason Storah,
CEO, UK and Ireland General Insurance, **Aviva**

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The results are in... and mud matters! This research proves just how vital saltmarshes are – not only in shielding our coastlines but also as carbon stores. By establishing the first tower in the UK's new Saltmarsh network, we've now developed a blueprint for long-term monitoring, testing novel methods and providing the essential data needed to guide coastal conservation and restoration. With this knowledge, we can prioritise action and ensure saltmarshes play a key role in the UK's path to net zero.

Tom Brook,
Ocean Conservation Specialist, **WWF**

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WHAT IS SALTMARSH?

Saltmarshes are coastal wetlands found where land meets salt water. Filled with salt-tolerant plants like grasses and shrubs, they are regularly flooded by tides and provide crucial habitats for diverse wildlife like herons, egrets, otters, and marine life.

WHY ARE SALTMARSHES IMPORTANT?

- **Carbon storage:** Saltmarshes are highly efficient at capturing and storing carbon, playing a vital role in mitigating climate change.⁴
- **Coastal protection:** They act as natural flood barriers, absorbing wave energy and reducing storm impacts – Saltmarsh provide over £1 billion in flood protection benefit for UK homes.⁵
- **Biodiversity hotspots:** Although they cover only 6% of the Earth's land surface, 40 percent of all plant and animal species live or breed in wetlands, which includes saltmarshes.⁶
- **Water purification:** Saltmarshes filter pollutants and sediments, improving coastal water quality and marine health.
- **Recreation & wellbeing:** These “blue spaces” offer opportunities for walking, birdwatching, and enjoying nature, benefiting mental and physical health.
- **Economic & community value:** Saltmarshes support local jobs and investment while providing essential ecosystem services that sustain people and nature.

Sadly, over the past century, the UK has lost over 85% of its saltmarshes due to development, pollution, and climate change.⁷ Restoring them is vital – for every £1 invested they return up to £9 back.⁸ Protecting these ecosystems strengthens our climate resilience, preserves biodiversity, and safeguards their essential services.

In short, saltmarshes are vital for both nature and people. The conservation of our existing saltmarshes and creation of new ones is key to a sustainable future.

4. www.wwt.org.uk/uploads/documents/2023-01-30/wwt-blue-carbon-route-map-2023.pdf

5. www.ons.gov.uk/economy/environmentalaccounts/bulletins/saltmarshfloodmitigationinenglandandwalesnaturalcapital/2022

6. www.fws.gov/story/2023-04/why-healthy-wetlands-are-vital-protecting-endangered-species

7. www.ceh.ac.uk/sites/default/files/2023-10/Saltmarsh-factsheet-Oct2023.pdf

8. www.wwt.org.uk/using-data-to-put-wetlands-to-work

SALTMARSHES AND CARBON CAPTURE

Saltmarshes are key Nature-based Solutions for tackling climate change – storing carbon, protecting coastlines, and supporting biodiversity. However, the lack of detailed information on how their carbon storage mechanisms work and their true carbon capture potential makes it hard to include them in the UK's greenhouse emissions reporting⁹. Understanding how saltmarshes capture carbon is crucial for shaping conservation policies as the UK works towards net zero.

To fill this gap, our partnership installed the first flux tower in the UK's saltmarsh network on the Ribble Estuary in Lancashire, with UKCEH taking the lead on technical delivery. This tower monitors the seasonal carbon capture and storage potential of this vital habitat and helps expand the UK's Saltmarsh Tower Network.



UK Centre for
Ecology & Hydrology

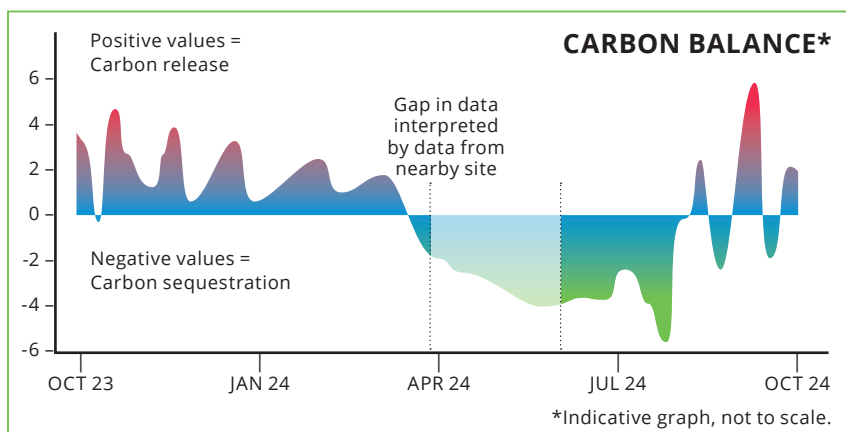
Q KEY FINDINGS

It's official - saltmarshes are immense stores of carbon!

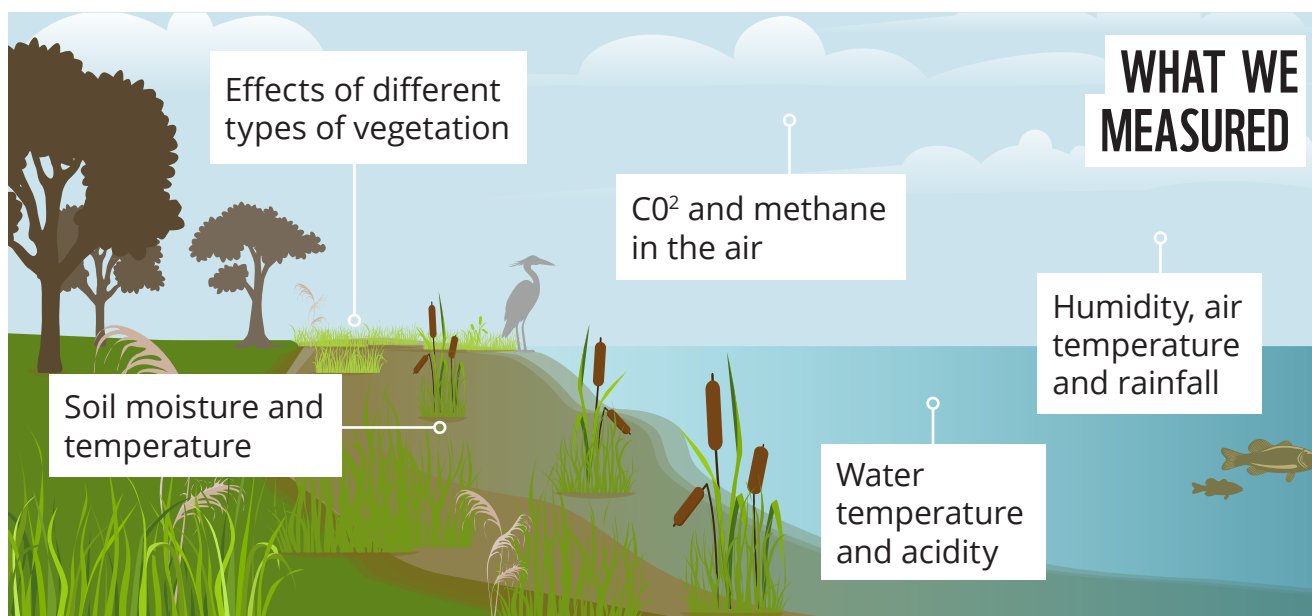
This first set of data from our tower installed on the Ribble Estuary, together with findings from a nearby saltmarsh tower on the Hesketh realignment tower site (funded by Natural England), have confirmed that saltmarshes act as significant carbon sinks.

The tower also revealed clear seasonal patterns, with saltmarsh breathing in carbon at higher rates over the summer months. We found that CO₂ emissions rose in winter due to ecosystem respiration, while carbon capture peaked during the summer growing season as seen below.

These results – made possible by experiments never before applied to saltmarsh – add to growing evidence of how saltmarshes store carbon, demonstrating the need for further monitoring. We now have a blueprint for installation and data processing, which we will replicate across future towers in the UK.



⁹ https://uk-air.defra.gov.uk/assets/documents/reports/cat09/2208110942_UKCEH_NAEI_ad_hoc_Coastal_wetlands_report_final.pdf and <https://sciencesearch.defra.gov.uk/ProjectDetails?ProjectId=21693>



LESSONS LEARNED

Insights from this project secured further investment to study saltmarsh carbon capture across the UK.

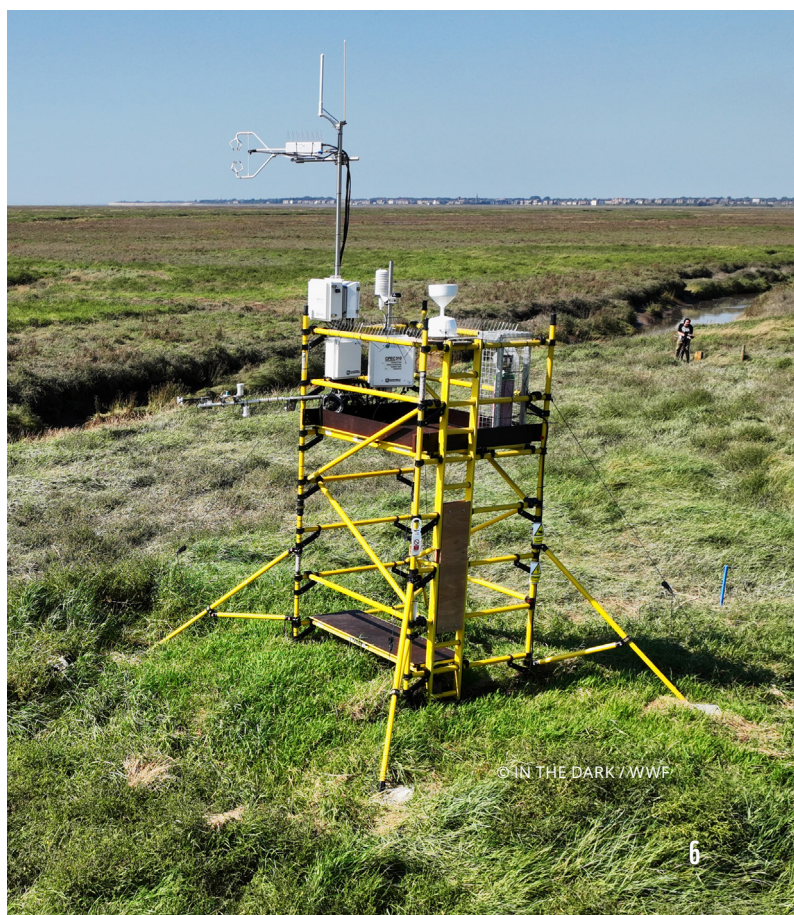
The project has advanced saltmarsh carbon research – improving measurement techniques and streamlining operations, maintenance, and deployment, guiding future studies in the UK and beyond. The Ribble Estuary site was a key testing ground, helping develop methods for full carbon budget assessments, and formally evidencing assumptions about the carbon sequestration value of saltmarsh.

The findings add to global scientific knowledge and highlight the need for continued monitoring to improve coastal carbon assessments worldwide.

WHAT IS A CARBON FLUX TOWER?

A Carbon Flux Tower is a solar-powered collection of scientific instruments that collects vital data on the movement of CO₂ as it moves through the air, plant-life, soil and water, as well as information about rainfall, water level and temperature.

In the UK, flux towers have been instrumental in monitoring carbon capture and emissions from woodlands and peatlands, providing valuable insights into the role these ecosystems play in regulating our climate. Now, saltmarshes are being included in this conversation, marking the first time a coastal habitat is being studied in this way.





SALTMARSHES AND SEA-LEVEL RISE

© IN THE DARK / WWF

Saltmarshes play a crucial role in shielding our coasts from rising seas and storm surges, helping to protect assets worth £1.79 billion in England and £0.26 billion in Wales.¹⁰ But with sea levels climbing, there's a big question: can these marshes keep up? If they can't maintain their height, their ability to protect local ecosystems and coastal communities could be at risk.

To find out, we set up a network of 48 Surface Elevation Tables (SETs) across six UK saltmarshes. These sensors measure how marsh height changes over time, providing valuable insights on the impact of different rates of sea-level rise, along with data on plant life and soil.

Our aims were to:

- Build a national network to monitor saltmarshes
- Collect and share data on marsh height changes
- Make all data open and accessible to everyone
- Improve long-term tracking of saltmarsh health
- Explore how this data can help us understand greenhouse gas emissions from UK marshes

Q KEY FINDINGS

Initial data suggests that UK saltmarshes have generally gained height, though results vary by region. Marshes in areas like Chichester and The Wash in East Anglia appear to be expanding, while those in North Norfolk and the Ribble are showing signs of struggling to keep pace with sea-level rise. Ongoing monitoring will provide a clearer picture over time, helping us identify where extra attention is needed and guiding future restoration efforts.

🎓 LESSONS LEARNED

- Long-term monitoring is vital, with at least 10 years of data collection with more frequent measurements early on.
- Combining SET data with satellite images and sea-level trends will paint a clearer picture of marsh health.
- For marshes that are struggling, active restoration will help maintain their vital ecosystems, which are key to both local and global biodiversity, including the East Atlantic Flyway – a migration route for about 90 million birds annually.
- Restoration efforts must be tailored to each location, balancing cost, sustainability, and broader conservation goals to maximise benefits for nature and people alike.

10. Office of National Statistics: <https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/saltmarshfloodmitigationinenglandandwalesnaturalcapital/2022>

CONCLUSION

The partnership between WWF and Aviva has driven real progress in evidencing the case for saltmarsh conservation, climate resilience, and scientific research. By combining conservation expertise with business, we've delivered groundbreaking insights and set the stage for long-term investment in Nature-based Solutions.



KEY ACHIEVEMENTS:

- **Pioneering Carbon Research:** The first flux tower in the UK's new saltmarsh research network has provided new insights into how saltmarshes store carbon. The methods refined here have led to six more flux towers across the UK, with findings contributing to national carbon accounting and efforts to include saltmarshes in the UK Greenhouse Gas Inventory.
 - **Boosting Climate Resilience:** WWF and Aviva's research highlights how saltmarshes reduce flood risks and store carbon – critical as sea levels rise and extreme weather becomes more frequent. These ecosystems act as natural barriers, protecting communities from erosion and flooding.
 - **Tracking sea level rise:** A new national network of Surface Elevation Tables (SETs) is tracking how saltmarshes respond to rising sea levels and helping to identify marshes where active restoration is needed. This data is guiding smarter, more sustainable restoration strategies across the UK.
 - **Promoting Nature-based Solutions:** Research from the project has strengthened the case for saltmarsh restoration as a cost-effective climate solution. By demonstrating the ecological and economic benefits, WWF and Aviva set the stage for long-term investment in Nature-based Solutions.
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This partnership is a powerful example of what can be achieved when the environment and finance sectors unite, working together to protect nature, tackle climate change, and build a more resilient future. Together, we have significantly advanced saltmarsh carbon research, and paved the way for a robust, UK-wide set of data which will prove the value of saltmarsh and establish the much-needed UK Saltmarsh code.



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