

# COASTAL WETLAND BLUE CARBON IN AOTEAROA NEW ZEALAND

**Current projects,  
reflections and  
recommendations  
for a community  
of practice**

April 2024



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# Foreword

The Nature Conservancy Aotearoa New Zealand (TNC) is an organisation of dedicated staff, scientists and members who are advancing effective, lasting conservation in Aotearoa New Zealand. It is part of an international organisation working in more than 70 countries around the world. TNC's priorities are reducing carbon emissions, restoring natural habitats that protect people from climate impacts, conserving oceans and rivers, restoring and improving land and building leadership in local communities. It works in partnership with local communities, iwi, universities, and central and local government. With its expertise in ecosystem conservation, TNC has been at the forefront of promoting the importance of blue carbon ecosystems in mitigating climate change impacts. As part of a national project, TNC is working on unlocking the carbon storage potential of blue carbon ecosystems in Aotearoa.

The Department of Conservation (DOC) promotes the conservation of indigenous biodiversity in Aotearoa and has a particular role in supporting coastal wetland management in relation to the New Zealand Coastal Policy Statement<sup>1</sup> and the implementation of Te Mana o te Taiao – the New Zealand Biodiversity Strategy.<sup>2</sup> Coastal wetlands are important habitats for threatened species and freshwater fish, and DOC manages a large number of coastal wetland reserves. DOC is committed to supporting communities with their work to make a difference to these special spaces. As part of this commitment, DOC developed the Our Estuaries hub, which provides a wealth of information, including best practice restoration resources and an interactive map that shows where restoration work is happening around Aotearoa.<sup>3</sup>

TNC and DOC both have a strong interest in the protection and restoration of coastal ecosystems and working with, and supporting, communities. The two organisations have complementary resources and, from working in this developing area, it became apparent that bringing the evolving coastal wetland blue carbon 'community' (CWBC community) together would help greatly with building understanding, creating important connections and bringing efficiencies of effort.

The project output is this report, which contains a valuable catalogue of projects, and thinking, that will help Aotearoa achieve its greenhouse gas (GHG) emissions reduction targets. The authors' role was to provide resources to facilitate the finite hui process, to listen and to record the outcomes of this conversation. The contents, and recommendations, came from the hui participants via consensus decision making. Some of their recommendations involve supporting existing projects – for example, TNC and the Ministry for the Environment's work on market development and policy, and a parallel, and independent, proposal being developed for an Aotearoa Marine Carbon Forum. The latter would enable this informal CWBC community to continue as a formal Community of Practice (CoP).

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<sup>1</sup> [doc.govt.nz/about-us/our-role/managing-conservation/coastal-management](https://doc.govt.nz/about-us/our-role/managing-conservation/coastal-management)

<sup>2</sup> [doc.govt.nz/nature/biodiversity/te-mana-o-te-taiao--aotearoa-new-zealand-biodiversity-strategy-2020/te-mana-o-te-taiao-implementation-plan](https://doc.govt.nz/nature/biodiversity/te-mana-o-te-taiao--aotearoa-new-zealand-biodiversity-strategy-2020/te-mana-o-te-taiao-implementation-plan)

<sup>3</sup> [doc.govt.nz/nature/habitats/estuaries/restoring-estuaries-map](https://doc.govt.nz/nature/habitats/estuaries/restoring-estuaries-map)

During the hui, GNS Science committed resources for a project to further the thinking around a National Coastal Wetland Blue Carbon Strategy recommendation. Coordinating the next steps is outside the scope of DOC and TNC's commitment at this stage, but both organisations can continue to contribute to this work as members of the CWBC community. Importantly, this publicly available resource will support further efforts by participants and other interested parties.

Supported by:



# Acknowledgements

The authorship team would like to thank the many people who participated in the hui, both in person and online, and their varied contributions throughout the process. Some people contributed time as part of their paid business-as-usual jobs (e.g. central and local government employees), while others provided in-kind support (e.g. researchers and practitioners, whose time is closely allocated to specific funded projects). We are particularly grateful to those who contributed pro bono (TNC provided airfares to some, but their time and efforts were freely given) – this included mana whenua, independent contractors and students.

We are very grateful to have received early career perspectives and, importantly, mana whenua viewpoints. People contributed in various ways – for example, by helping bring projects together for the table, leading breakout group discussions for the pou, reviewing drafts of this report and helping with final editorial work. This process has involved much debate, collaboration and good will. The level of engagement is testament to people's commitment to working together to achieve timely action on climate change. The discussion, and connections, continue.

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A list of the participants and their affiliations is provided in Appendix 1.

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# Executive summary

## Coastal ecosystems and climate change

Over the past decade, interest in the use of coastal ecosystems as a solution to help mitigate the effects of climate change and increase community resilience has significantly increased both within Aotearoa New Zealand and globally.

Aotearoa has greenhouse gas (GHG) emissions reduction targets for 2030 and 2050, a primary focus of which is reducing gross GHG emissions (MfE 2022). However, nature also plays a crucial role in removing some of the carbon that has already been emitted.

Improving the health of coastal wetlands (saltmarshes, mangroves, seagrass meadows and unvegetated tidal flats) will not only increase their ability to capture and store carbon (referred to as blue carbon sequestration) but also increase protection against storm surges, improve water quality, support cultural resources and practices, enhance fish nurseries and increase biodiversity.

There is significant potential to accelerate this work in Aotearoa.

## Progress to date

Increased interest in coastal ecosystems has seen a relatively ad hoc growth of coastal wetland blue carbon research and implementation in Aotearoa. This research has yielded some high-quality, high-impact outcomes. There is scope to advance this with an overarching national-scale strategy, which will support connections between research practitioners, mana whenua and communities (as has happened with the South Australia Blue Carbon Strategy<sup>4</sup>).

Scientists, planners and communities have already established connections through various past coastal wetland blue carbon hui (meetings) run by the Department of Conservation (DOC), the Ministry for the Environment (MfE), The Nature Conservancy Aotearoa New Zealand (TNC) and the Tasman Environmental Trust (TET).

In 2023, DOC and TNC brought together this evolving coastal wetland blue carbon 'community' (CWBC community) to further progress strategic outcomes, and a project catalogue was collated as a very valuable output from the hui. As part of this process, a timeline and mapping exercise built a picture of milestones and progress from ongoing coastal wetland blue carbon projects in Aotearoa. The catalogue also identified initiatives that would enhance carbon sequestration science, covering areas such as carbon stocks and sediment dynamics, and includes broader, national-level projects, such as mapping coastal wetlands, which will be crucial for providing a comprehensive national overview.

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<sup>4</sup> [environment.sa.gov.au/topics/climate-change/government-action-on-climate-change/climate-change-blue-carbon-strategy](https://environment.sa.gov.au/topics/climate-change/government-action-on-climate-change/climate-change-blue-carbon-strategy)

A number of partnerships with mana whenua are already focused on coastal wetland blue carbon and include te ao Māori (the Māori world view) and mātauranga Māori (traditional knowledge). However, there is great potential to grow the leadership, partnership and involvement of mana whenua in coastal wetland blue carbon practice.

The hui participants suggested that six interrelated pou (pillars), each representing a particular work theme, should be established to progress work by the CWBC community: 1) Socio-Ecological Research; 2) Empowering Communities; 3) Market Development and Policy; 4) Te Ao Māori and Mātauranga Māori; 5) Coastal Wetland Habitat Protection and Restoration; and 6) National Coastal Wetland Blue Carbon Strategy.

Over the course of the 9 months from the first in-person hui, discussions explored the scope and questions for each pou and suggested the next key actions for the CWBC community to work towards.

## Where to from here?

A more strategic and coordinated approach is needed to accelerate coastal wetland work in Aotearoa. Resourcing an overarching marine carbon forum would enable coordination to advance the wider marine carbon removal approaches, and the CWBC community could then progress actions under this holistic umbrella group.

The participants in this process identified a number of next steps, as outlined in sections 4 and 5. Some of these can be actioned in the near future, while others depend on resourcing being made available.





## Build the CWBC community kaupapa (purpose)

An independent process is underway to establish a marine carbon forum. Collaboration with the steering group who are working on establishing the Aotearoa Marine Carbon Forum was identified as a key next step to maintain the momentum of the CWBC community and encourage participation. This is also a potential mechanism for progressing recommendations in this report. This steering group will seek funding for pou leads and administrative support, and including this report as an appendix to a forum proposal would demonstrate the level of thinking the CWBC community has already done.

The actions of the forum could build on this report and could include:

- developing guidance for running each pou and creating a process to enable information sharing among the pou leads;
- appointing pou leads to clearly define the objectives and scope, oversee activities, ensure project collaboration, and facilitate communication;
- establishing a pou core working group of genuinely interested individuals who can actively participate – i.e. through face-to-face engagement, virtual platforms/spaces, sharing ideas and collaborating; and
- providing opportunities for wider contribution, discussion and activities (e.g. themed workshops, webinars).

It is envisaged that the informal CWBC community could then continue as a formal coastal wetland Community of Practice (CoP),<sup>5</sup> which would operate under the umbrella of this wider marine carbon forum.

## Advance research to strengthen the development of a coastal wetland blue carbon credit scheme in Aotearoa

*(Market Development and Policy Pou)*

TNC and MfE have already partnered to conduct a research analysis on the policy, legal and market conditions necessary for establishing a blue carbon credit scheme focused on coastal wetlands (including seagrass, mangrove and saltmarsh habitats) in Aotearoa. This included leading a workshop on 5 December 2023 to which the CWBC community was invited. The CWBC community should continue to engage with this important work.

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<sup>5</sup> A community of practice is a group of people who share an interest, or expertise, in a topic and who come together to fulfil both individual and group goals.

# Develop a National Coastal Wetland Blue Carbon Strategy

*(National Coastal Wetland Blue Carbon Strategy Pou)*

A national strategy would link the various strands of work together. GNS Science has proposed to host a systems-thinking approach project, with hui planned from February to June 2024 to advance thinking towards a National Coastal Wetland Blue Carbon Strategy.

## Future actions

As resources become available, additional actions can be progressed, including:

- creating a decision-making tree for restoration and protection projects to assist action on the ground – this tree would guide which parts of a landscape to protect and/or restore to maximise the overall benefits, would be tailored for different users (e.g. protection versus restoration interest from government agencies, mana whenua, community groups, landowners and the private sector who care about the environment and/or are looking for carbon offsets), and would identify the potential data needs and where the data might come from (Coastal Wetland Habitat Protection and Restoration Pou);
- arranging for the many project leads of the mapping projects presented in the project catalogue (Appendix 4) to come together to better understand the opportunities arising from these projects, how spatial data can be accessed and priority gaps for future investment (Coastal Wetland Habitat Protection and Restoration Pou);
- exploring options to resource mana whenua to wānanga (a Māori method of sharing and acquiring knowledge) to develop a vision for the Te Ao Māori and Mātauranga Māori Pou – the outcomes of the wānanga would then be used to define what the CWBC community could do to support mana whenua in their aspirations related to coastal wetland blue carbon (Te Ao Māori and Mātauranga Māori Pou);
- bringing together a communication plan for the CWBC community – examples include defining the audience(s), articulating the main focus areas of coastal wetland blue carbon versus restoration work, and organising relevant activities such as webinars, online presence and case studies (Empowering Communities Pou);
- ensuring that there is a comprehensive understanding of the breadths of the other pou and how the intent and actions interact with the Socio-Ecological Research Pou before defining key next steps in the research agenda (Socio-Ecological Research Pou); and
- potentially maintaining the project catalogue as a living resource.

# 1 Introduction

## What is blue carbon and why is it important?

Colours are used to describe the properties and distribution of organic carbon on Earth, among which blue and green are the most significant in relation to the role of ecosystems in the climate crisis (Zinke 2020). Green carbon represents the carbon that is stored in land ecosystems, while blue carbon describes the carbon that is stored in coastal and marine ecosystems.<sup>6</sup> It is important to note that the terms blue and green carbon do not apply to all types of carbon in these systems – only to those that have the potential to be effectively managed (IPCC 2022).

The importance of protecting and restoring terrestrial ecosystems for climate benefits has long been known. However, the importance of marine and coastal ecosystems in climate change mitigation has only recently been recognised, despite their great ability to store carbon.<sup>7</sup> There are a limited number of studies addressing this topic for Aotearoa New Zealand, with notable examples including works by Bulmer et al. (2020) and Pérez et al. (2017).

The 15,000-km-long coastline of Aotearoa is the ninth longest in the world and includes over 300 estuarine ecosystems. As such, there are many potentially valuable coastal carbon sinks that are worthy of protection and have potential for restoration given the degraded ecological state of many of them. A preliminary estimate indicates that the current coastal wetland blue carbon stock of Aotearoa is 2.66–3.76 Mt of carbon, which is equivalent to 0.16% of the country's gross emissions in 2021 based on a carbon sequestration rate of 0.12 (0.05–0.26) Mt CO<sub>2</sub>/year (Ross et al. 2023).

## Why are coastal wetlands important?

Interest in coastal ecosystems as a solution to help mitigate the effects of climate change has increased significantly over the past decade both within Aotearoa and globally. Most research on this topic has focused on coastal wetlands, which include saltmarshes, seagrass meadows and mangroves.

Improving carbon sequestration and storage as a climate change mitigation strategy is just one of the many benefits from coastal wetland management. Improvements in wetland health and extent also assist climate change adaptation (e.g. by increasing storm surge protection) and provide co-benefits such as improved water quality, the provision of cultural resources and practices, enhanced fish nurseries and enhanced biodiversity (Duarte et al. 2013).

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<sup>6</sup> Further information on blue carbon and international examples of blue carbon initiatives can be found in Appendix 2.

<sup>7</sup> Freshwater systems such as peatlands also provide significant mitigation benefits but are not classified as blue carbon.

## How do coastal wetlands feature in climate change policy in Aotearoa?

Aotearoa has greenhouse gas (GHG) emissions reduction targets for 2030 and 2050, a primary focus of which is reducing gross GHG emissions (MfE 2022). However, nature-based sequestration also plays a crucial role in removing emitted carbon (UNEP and IUCN 2021). Although coastal wetland blue carbon is currently outside the reporting mechanism of the Aotearoa national greenhouse gas inventory, coastal wetlands are mentioned in the country's Emissions Reduction Plan (ERP; MfE 2022), and the Government is exploring ways to include wetlands in emissions reduction schemes.

The case for protecting and restoring coastal wetlands continues to strengthen, given their numerous benefits (Macreadie et al. 2021). In relation to climate change mitigation, a project is being led by The Nature Conservancy Aotearoa New Zealand (TNC) and the Ministry for the Environment (MfE) to analyse the policy and legal landscape required to introduce a coastal wetland blue carbon credit scheme in Aotearoa. However, it is also crucial that we understand whether there are trade-offs, or opportunities to maximise co-benefits.

## What is needed to unlock the value of coastal wetland blue carbon in Aotearoa?

The relatively ad hoc growth of coastal wetland blue carbon research and implementation in Aotearoa has yielded some high-quality, high-impact outcomes. However, the lack of a strategic approach and communication between researcher practitioners, as well as with mana whenua and other local communities, has meant that much of the potential value of this research has not been achieved. To enhance this value, it is important to support and improve these connections, as occurs elsewhere (e.g. in Australia through the South Australia Blue Carbon Strategy<sup>8</sup>).

People from across Aotearoa gathered at hui (meetings) in 2019–2023 to talk about coastal wetland blue carbon and the opportunities it presents. This included a one-day hui in Te Whanganui-a-Tara (Wellington) in November 2019 that was led by the Department of Conservation (DOC) and involved participants from central government,<sup>9</sup> and hui in Whakatū (Nelson) in August 2020<sup>10</sup> and March 2023,<sup>11</sup> which were led by the Tasman Environmental Trust and involved a diverse group of participants. These hui, along with the hui presented here and collaborative projects that include many of the hui participants, have already helped to create and strengthen connections within the CWBC community that has informally formed.

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<sup>8</sup> [environment.sa.gov.au/topics/climate-change/government-action-on-climate-change/climate-change-blue-carbon-strategy](https://environment.sa.gov.au/topics/climate-change/government-action-on-climate-change/climate-change-blue-carbon-strategy)

<sup>9</sup> A visual record was made available to participants of the 2019 hui and is included as Appendix 3.

<sup>10</sup> [tet.org.nz/tet-projects/nelson-tasman-hosts-nzs-first-blue-carbon-workshop](https://tet.org.nz/tet-projects/nelson-tasman-hosts-nzs-first-blue-carbon-workshop)

<sup>11</sup> [stuff.co.nz/environment/climate-news/131634450/blue-carbon-project-pivotal-in-efforts-to-help-protect-and-restore-estuaries-hui-hears](https://stuff.co.nz/environment/climate-news/131634450/blue-carbon-project-pivotal-in-efforts-to-help-protect-and-restore-estuaries-hui-hears)

It is timely that people are now taking action on coastal wetland blue carbon in Aotearoa, as the climate crisis is pressing and the timeframe for containing global warming within the 1.5°C threshold is rapidly diminishing.<sup>12</sup>

## How did the CWBC community come together?

To accelerate progress and build upon the existing technical groundwork in Aotearoa, DOC and TNC organised a series of hui throughout 2023 with key experts and interested parties working in the blue carbon space in Aotearoa.<sup>13</sup> This was the first step towards the development of a more connected CWBC community to improve understanding of coastal wetland blue carbon and help address the urgent challenge of climate change.

## Report scope and purpose

This report describes the 2023 hui series organised by DOC and TNC and summarises the findings from these gatherings of specialists who have formed an informal CWBC community. It also includes a catalogue of projects in Aotearoa that are aimed at advancing knowledge on coastal wetland carbon storage and sequestration.

The objectives of this report are to:

- report activity of the 2023 hui; and
- describe a potential pathway for the informal CWBC community to come together as a formal CoP, which sits under the umbrella of a national marine carbon forum, to progress actions as a collective.

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<sup>12</sup> [ipcc.ch/report/sixth-assessment-report-cycle](https://www.ipcc.ch/report/sixth-assessment-report-cycle)

<sup>13</sup> A need for shared dialogue was identified during meetings in 2022 between Helen Kettles (DOC), Erik van Eindhoven (TNC) and Lauren Walker (Core & Restore project).

## 2 Hui series

*Mā pango mā whero, ka oti te mahi*

*With black and with red, the work will be done*

The above whakataukī (proverb) was the foundation for the first hui to bring the CWBC community together to help advance the coastal wetland blue carbon agenda in Aotearoa. It refers to the red and black patterns often used in Māori art and was chosen because it reflects the connectivity between ngā tāngata (people), the universe and te taiao (the environment) through whakapapa (genealogy). The whakataukī also refers to the elaborate tukutuku (weavings) on the walls of wharehau (meeting houses), symbolising the CWBC community coming together and weaving strands of knowledge to improve understanding. This framework is the ethos by which the CWBC community members will use meaningful partnership and collaboration to work towards a common purpose.

In 2023, DOC and TNC facilitated a series of hui to:

1. enable and support the cataloguing of and reflection on coastal wetland blue carbon technical project work that is currently underway in Aotearoa;
2. identify potential areas of overlap and collaboration;
3. raise the profile of coastal wetland blue carbon work;
4. stimulate the creation of a formal CoP to help advance the coastal wetland blue carbon agenda in Aotearoa; and
5. outline recommendations for the CWBC community going forward, including workstreams and next steps.

The first hui in the series was a one-day, in-person Coastal Wetland Blue Carbon Hui held on 27 April 2023 in Whakatū (Nelson). This hui brought together over 40 representatives from various groups that are actively working on coastal wetland blue carbon, including central and local government, research institutes, universities, private researchers, community groups, and hapū/iwi. The full list of attendees across all hui and a photograph of the attendees of the April hui are provided in Appendix 1.

In this hui, plenary talks exploring the idea of a formal CoP were followed by a group activity to take stock of the ongoing coastal wetland blue carbon work across the motu (country). Breakout groups then explored several themes relating to coastal wetland blue carbon<sup>14</sup> and identified three to four priority next steps. A media statement was released after this hui.<sup>15</sup>

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<sup>14</sup> Themes included gathering knowledge and data, generating ideas around mātauranga Māori (Māori knowledge) and science, empowering communities, the frameworks we work in, and marketing and incentivising.

<sup>15</sup> [doc.govt.nz/news/media-releases/2023-media-releases/creating-connections-across-the-coastal-blue-carbon-sector](https://doc.govt.nz/news/media-releases/2023-media-releases/creating-connections-across-the-coastal-blue-carbon-sector)

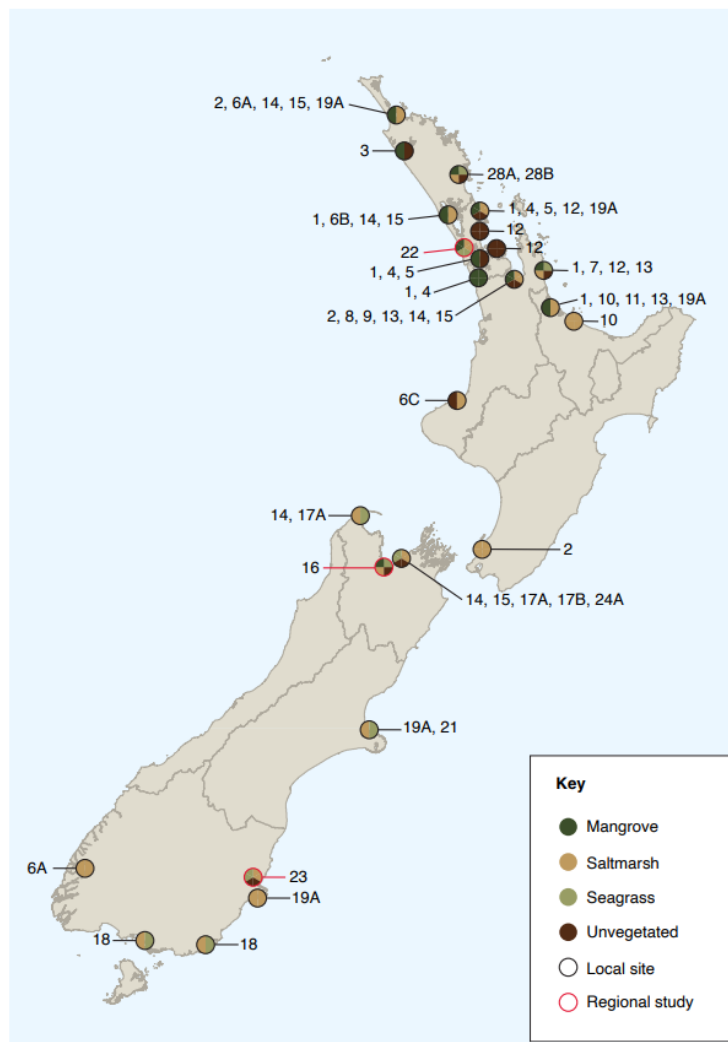
Ideas generated at the April hui were refined during two one-hour, online hui (13 September and 28 November 2023) utilising the online collaboration and dialogue facilitation tools Padlet and Google Forms. In these hui, some of the participants from the April hui were joined by others with interests in coastal wetland blue carbon (see Appendix 1), increasing the number of participants and adding valuable fresh perspectives.

After each hui, a draft report was circulated to the CWBC community for feedback. Additionally, 10 one-on-one meetings were held with project leads throughout the process to refine the project catalogue (section 3). After the November hui, a smaller mandated editorial group refined this final report.

### 3 Project catalogue

The April 2023 hui included a timeline and mapping exercise to build a picture of the milestones and progress of previous and current coastal wetland blue carbon projects in Aotearoa. Through this exercise, participants refined and collated project elements (e.g. scope, deliverables, project partners and funding). These are summarised in the catalogue provided in Appendix 4, with key observations summarised below.

The project catalogue focuses on identifying initiatives that would enhance carbon sequestration science, covering areas such as carbon stocks and sediment dynamics. It also includes broader, national-level projects, such as mapping coastal wetlands, which are crucial to provide a comprehensive national overview. The exercise also identified coastal wetland blue carbon projects (fieldwork or desktop) and their locations (see Figure 1, in which the numbers correspond to the project list provided in Appendix 4).



**Figure 1. Locations where assessments of coastal wetland carbon stocks, sequestration rates and/or other coastal wetland blue carbon related information were available in 2023. The research type at each site is shown in the figure key. See Appendix 4 for project details.**



## Key observations from the project catalogue

The primary focus of the April 2023 hui was the carbon benefits of coastal wetlands, with only a brief discussion of additional benefits such as storm surge protection, improved biodiversity and increased marine fisheries populations.

The catalogue was intended as an initial spotlight on the breadth and depth of the coastal wetland blue carbon work that is currently underway in Aotearoa rather than a comprehensive review, which still needs to be undertaken and should also include any examples from the private sector. More in-depth data analysis would also be beneficial to inform future work programmes, funding needs and gaps.

Several key points were identified from the collated coastal wetland blue carbon projects, as summarised below. Note that the projects here are often identified by numbers as per Appendix 4. This will be an important resource for organisations, researchers and other collaborators in the blue carbon space.

### Coastal wetland blue carbon research may be growing.

Coastal wetland blue carbon research output increased in 2023, which may indicate the start of significant growth or a potential boom, influenced by growing relevance, interest and funding. This pointed to the value in adding a temporal (time) component to the spatial map provided in Figure 1, which could visually inform understanding of project expansion drivers. There is also, however, a scarcity of projects extending beyond 2025, which may be due to insufficient long-term funding.

Improving knowledge among the CWBC community of the big policy questions, timings and needs from central and local government, as well as the private sector, will help such research to be aligned with national policy and to better inform national policy development.

### Valuable spatial outputs are being delivered.

A large number of national-scale projects are delivering valuable spatial outputs that are advancing coastal wetland blue carbon understanding and are necessary for planning management.

The **Quantifying carbon sequestration and greenhouse gas emissions** project (Project 28, Appendix 4), funded by the Ministry of Business, Innovation & Employment's (MBIE's) Endeavour Fund – Smart Ideas project, will produce GIS layers of restoration potential and use the coastal wetland blue carbon accounting model (BlueCAM) methodology (Lovelock et al. 2021)<sup>16</sup> to estimate the total (and regional council specific) carbon sequestration potential that could be obtained from restoration while accounting for sea level rise.

The **Future Coasts Aotearoa** (FCA) programme of work (Project 19) is investigating the impacts of sea level rise, tectonics and changes to sedimentation on coastal wetland resilience, and is also collating a database of verified saltmarsh surveys. This will

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<sup>16</sup> [hcleanenergyregulator.gov.au/DocumentAssets/Pages/Blue-carbon-accounting-model-BlueCAM-technical-overview.aspx](https://hcleanenergyregulator.gov.au/DocumentAssets/Pages/Blue-carbon-accounting-model-BlueCAM-technical-overview.aspx)

supplement the database of seagrass and mangrove spatial information that is managed by DOC.<sup>17</sup> FCA aims to use the data it collects to explore remote sensing as a tool to map the extent of saltmarsh, mangroves and seagrass in Aotearoa. MBIE's Endeavour Fund – Smart Ideas project and a regional council Envirolink<sup>18</sup> project (Project 29) are also exploring remote sensing tools to map coastal wetlands, while another project, led by the Ministry for Primary Industries (MPI; Project 32), aims to improve mapping of the coastal wetland boundaries.

Various desktop exercises are also underway to help target restoration at both national (Projects 33 and 34) and regional (Projects 21, 22 and 23) scales.

It was noted that different agencies may be conducting similar mapping activities motivated by different questions (e.g. to support climate change adaptation or mitigation, address biodiversity issues, or improve fisheries outcomes). Therefore, synergies could arise from improved communication and cross-institutional collaboration.

### **There is some spatial clustering of research projects.**

The project catalogue includes a representation of projects from those who attended the initial April 2023 hui and so likely does not fully capture the current state of coastal wetland blue carbon research in Aotearoa. However, it was observed that the locations of study sites tended to cluster around specific research organisations or large projects – for example, projects led by NIWA Hamilton, the University of Waikato, and the Core & Restore project. Notably, there appear to be substantial gaps in the lower North Island and the majority of the South Island, which should be explored further and could potentially be addressed through increased information sharing between regions. There is also an overlap of sites among projects, implying the potential for consolidating data from the same sites or estuaries.

### **Saltmarshes are receiving the most research interest.**

The prevailing body of research on coastal wetlands in Aotearoa pertains to saltmarshes, with mangroves receiving the second-highest amount of attention, and seagrass and unvegetated habitats remaining the least studied.

### **A strategic approach to sampling is required.**

Hundreds of core samples have been taken from around the country to assess carbon stocks.

These are being compiled and reviewed as part of the MBIE Endeavour Fund – Smart Ideas project (Project 28), and any gaps are being identified. Given the costs of core sample collection and analysis, a strategic approach is required to ensure the efficient gathering and sharing of further data (which is also essential for developing a functioning credit system). A project to develop community guidance for sampling (Project 17D) will also enable efficient

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<sup>17</sup> [doc.govt.nz/nature/habitats/estuaries/our-estuaries/seagrass-and-mangrove-extent](https://doc.govt.nz/nature/habitats/estuaries/our-estuaries/seagrass-and-mangrove-extent)

<sup>18</sup> Envirolink is a regional-council-driven funding scheme, with funds administered by MBIE.

local input into gathering this information. Ultimately, all data should be visible and easily accessible via databases such as the international Coastal Carbon Network.<sup>19</sup>

### **More research is needed on restoration sites.**

Only a small number of projects relate to biophysical research on restoration sites with a known history of management or investment (Projects 10, 11, 14, 17A and 28B). It should be noted that the project catalogue did not collate the restoration methodologies for these sites but did include some national restoration guidance that is currently being developed.

### **Carbon cycle questions are being investigated.**

Some projects are investigating carbon cycle questions, including fluxes (Projects 1, 15 and 28A), microbial processes (Project 30) and how microbial processes respond to anthropogenic nutrient enrichment (Project 13).

### **Mana whenua leadership and involvement is invaluable.**

While mana whenua are involved in a number of projects (e.g. Projects 6C, 10, 17, 19, 24, 28 and 30), there is much to be done to nurture and grow these relationships, and to enhance rangatiratanga (self-determination) in coastal wetland blue carbon research and practice. Therefore, there is much opportunity to support mana whenua in leading restoration work and meeting their aspirations for te taiao and ngā tāngata (the people).

### **Coastal wetland blue carbon restoration brings multiple benefits.**

More can be learned from past and current projects delivering across multiple research themes about how a holistic approach to coastal wetland blue carbon restoration can bring co-benefits (e.g. where carbon assessments occur alongside restoration; see Appendix 4). This better reflects a systems approach and is in line with te ao Māori (the Māori world view).

### **Funding is key.**

Funding for past and current projects has come from many sources, including central government (MPI via the Greenhouse Gas Inventory Research Fund and MBIE via the Endeavour Fund – Smart Ideas), local government (individual regional councils and via Envirolink), research agencies, universities and non-governmental organisations (NGOs). A large number of projects required a variety of funding sources to ‘get them over the line’, including from the private sector. This indicates the high level of interest and involvement in coastal wetland blue carbon and the growing commercial relevance to and interest from business. However, systematic, long-term restoration research needs steady funding, rather than effort going into seeking money from different sources.

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<sup>19</sup> [serc.si.edu/coastalcarbon](http://serc.si.edu/coastalcarbon)

## 4 Recommended pou for the CWBC community

The hui participants suggested that six interrelated pou (pillars) should be established for the CWBC community, each representing a particular work theme. These included a:

- Socio-Ecological Research Pou;
- Empowering Communities Pou;
- Market Development and Policy Pou;
- Te Ao Māori and Mātauranga Māori Pou;
- Coastal Wetland Habitat Protection and Restoration Pou; and
- National Coastal Wetland Blue Carbon Strategy Pou.

Over the course of the nine months from the first in-person hui, discussions explored the scope and questions for each pou and suggested the next key actions for the CWBC community to work towards (see section 2 for a description of the wider process). It would be valuable for the CWBC community to further target the objectives and key actions for each pou, but this will require resourcing a suitable person (or people) to lead each pou.

### Socio-Ecological Research Pou

The Socio-Ecological Research Pou encompasses broad socio-ecological topics and provides a space to look across all research that is currently underway as part of the other pou (e.g. restoration or market development).

Some of the initial topics proposed as being in scope include:

- understanding sediment dynamics, carbon cycle influences from mountains to sea, carbon sequestration and fluxes, and bacterial assemblages, and exploring beyond physical coastal wetland blue carbon research by incorporating elements from related fields to provide a broader perspective (e.g. social);
- identifying existing knowledge, and prioritising the identification of knowledge and expertise gaps at regional and national levels;
- distinguishing between research gaps and the need for more specific frameworks; and
- better understanding the incentives of different sectors in advancing the coastal wetland blue carbon agenda (e.g. the blue economy, banking, insurance and finance).

### Recommended next steps for this pou

Ensure that there is a comprehensive understanding of the breadth of the other pou and how their intent and actions interact with the Socio-Ecological Research Pou before defining key next steps in the research agenda.

## Empowering Communities Pou

Participants acknowledged that the communities of Aotearoa are diverse and that giving special recognition to whānau, hapū and iwi and communities at place is inherent in how Aotearoa operates. Increasing the diversity of the emerging CWBC community will enable the group to connect with various segments of the wider community, engage at local, national and global levels, and set examples for various problem-solving and self-guidance methods.

The priority actions that were identified to empower communities include:

- telling the coastal wetland blue carbon story and having an aspirational goal for Aotearoa that individual projects can contribute to;
- further identifying who the CWBC community includes at particular places (e.g. mana whenua, the local authority, restoration groups, landowners, the private sector);
- educating the above communities to increase understanding of coastal wetland blue carbon and, in the process, learn from those communities about their aspirations and potential knowledge contributions to the ongoing work;
- creating a strong, accessible online presence (e.g. a library of diverse webinars, frequent Q&As, links to government programmes, profiles of participants and their work);
- making the case for providing incentives and empowerment around the restoration and protection of coastal wetland ecosystems to benefit carbon sequestration;
- aligning national restoration and protection reporting for the national ERP carbon outcomes and Te Mana o te Taiao – Aotearoa New Zealand Biodiversity Strategy (DOC 2020) biodiversity outcomes; and
- communicating the ways in which various communities can contribute to the coastal wetland blue carbon agenda and identifying key players to work with on the ground (e.g. restoration groups around the country) to help inform and empower them.

The group also discussed the importance of sharing information about existing and novel funding methods while crafting innovative approaches. Studying empowered community models and successful restoration projects will allow effective strategies to be adopted and replicated. Additionally, there is an intention to foster community engagement in coastal wetland blue carbon research through initiatives such as teabag citizen science (Projects 13

and 17B) and offering communities first-hand exposure to this concept within the research realm. To achieve such engagement, it is crucial that the community landscape is understood by identifying engaged members, those with opportunities for action and potential leaders. This includes understanding their preferences and aspirations.

### Recommended next steps for this pou

Bring together a simple communications plan for the CWBC community. Examples include defining the audience(s), articulating the main focus areas of coastal wetland blue carbon versus restoration work, and organising relevant activities (e.g. webinars, online presence and case studies).

## Market Development and Policy Pou

The discussion for this pou revolved around incentivising coastal wetland blue carbon markets in Aotearoa through integration into the relevant frameworks. Coastal wetlands are currently excluded from the National Greenhouse Gas Inventory and the Emissions Trading Scheme (ETS) due to sediment carbon data limitations. Opinions vary about whether coastal wetland blue carbon should be fully included in the National Greenhouse Gas Inventory and ETS or remain in the voluntary market. Work is also required to better understand how carbon markets interact with other credit systems, such as biodiversity credits or resilience credits, in coastal wetland environments. The joint TNC and MfE policy research project will provide the national direction on this.

The potential for market integration lies in formal measurement standards that could offer financial incentives for coastal wetland restoration. There is already a globally recognised 'Wetlands' supplement to the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories (IPCC 2014), and coastal wetland blue carbon projects are eligible for international voluntary market carbon offsets. Therefore, MfE is currently exploring a domestic voluntary carbon market to incentivise voluntary emissions reductions and removals, similar to the domestic scheme that has already been implemented in Australia.<sup>20</sup>

Incentivising and integrating coastal wetland blue carbon into markets presents a range of challenges. A better understanding of the legal, planning and financial frameworks in Aotearoa is needed to effectively integrate coastal wetland blue carbon projects. Some key issues that research could help to further understand and address include:

- identifying the interplay between existing policies for coastal wetland restoration and blue carbon projects;
- determining the implications of land ownership for carbon projects, particularly privately-owned and Māori-owned lands and Te Tiriti (Treaty) settlements;

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<sup>20</sup> [cleanenergyregulator.gov.au/DocumentAssets/Pages/The-blue-carbon-accounting-model-BlueCAM.aspx](http://cleanenergyregulator.gov.au/DocumentAssets/Pages/The-blue-carbon-accounting-model-BlueCAM.aspx)

- balancing carbon rights on publicly-owned lands and addressing conflicts with land use regulations, which add nuances to project development;
- understanding the interaction between carbon projects and other conservation priorities, such as biodiversity conservation and coastal resilience, and how climate change would factor into national project development;
- learning from and adapting relevant international coastal wetland blue carbon schemes to the unique context of Aotearoa – this includes ensuring accurate accounting, monitoring and reporting while preserving restoration integrity, including Māori values; and
- understanding current and future coastal wetland blue carbon credit demands (this is pivotal).

### Recommended next steps for this pou

- Advance research to strengthen the development of a coastal wetland blue carbon credit scheme in Aotearoa.

The research analysis being undertaken in partnership by TNC and MfE will explore key aspects, including environmental and planning law, GHG inventories and carbon trading, coastal land tenure and carbon rights, existing coastal wetland blue carbon schemes and methodologies, market demand and dynamics, and the co-benefits of coastal wetland blue carbon projects such as biodiversity conservation. The research will be supported through engagement with central and local government, and hapū and iwi. An initial hui took place in December 2023, and hui participants were invited to help frame the research agenda.

## Te Ao Māori and Mātauranga Māori Pou

Participants emphasised the need for coastal wetland blue carbon research and management to be led by, and more connected to, te ao Māori and mātauranga Māori. From the hui held to date, it is clear that there are already a number of partnerships with mana whenua focused on coastal wetland blue carbon that include te ao Māori and mātauranga Māori. However, there is great potential to grow the leadership, partnership and involvement of mana whenua in the CWBC community and in coastal wetland blue carbon practice in general.

We acknowledge that the vision for this pou is still in the early stages of development. Some potential initial steps to build on include exploring:

- the best ways to support mana whenua to develop leadership in coastal wetland blue carbon related projects, such as through capacity and capability building, whakawhanaungatanga (the process of establishing relationships) between mana whenua and researchers/practitioners, and developing targeted funding streams;

- the link to other relevant Māori marine data initiatives such as that being run by Toitū te Whenua Land Information New Zealand’s Hydrographic Office (which is also running a three-dimensional [3D] coastal mapping programme of work);
- how to make the data collected in coastal wetland blue carbon research and implementation inclusive, meaningful and accessible to mana whenua to achieve their broader aspirations for te taiao and ngā tāngata; and
- how to establish links with leaders in Māori data sovereignty and ethics, such as Te Kotahi Research Institute,<sup>21</sup> to develop appropriate codes of ethics for data sovereignty, ownership, access and responsibilities – this will foster collaboration, standardisation, inclusivity, effective data management and decision-making for coastal wetland blue carbon work in Aotearoa.

### Recommended next steps for this pou

- Explore options to resource mana whenua to wānanga (a Māori method of sharing and acquiring knowledge) to develop a vision for this pou.
- Based on the outcomes of the wānanga, define what the CWBC community could do to support mana whenua in their aspirations related to coastal wetland blue carbon.

## Coastal Wetland Habitat Protection and Restoration Pou

Focusing on coastal wetland restoration alone would not see climate benefits being realised if the release of stored carbon was accelerated through further habitat degradation in other wetland areas. Therefore, the protection of existing coastal wetlands is critical in addition to restoration.

Protection efforts for coastal wetlands can be highly varied and may include formal spatial protection or efforts focused on improving catchment health and reducing pressures from stock damage, vehicle disturbance, hardened edges and increased (or in some cases reduced) fresh/saltwater inflows to alleviate detrimental nutrient and sediment inputs. Such varied protection requires the use of a variety of regulatory levers – for example, national policy statements (NPSs), protection tools such as scientific reserves and marine protected areas (MPAs), QEII covenants, and hapū/iwi management plans.

To maximise wetland protection, it is imperative that the focus extends well beyond considering only benefits for coastal wetland blue carbon to include co-benefits such as providing wave and storm surge protection, improving biodiversity and habitat for marine fisheries, and enabling cultural practices. However, the CWBC community would provide a specific lens on the carbon storage aspects of these more holistic considerations, without

<sup>21</sup> [waikato.ac.nz/rangahau](http://waikato.ac.nz/rangahau)



losing sight of the bigger picture and the efficiencies that could be gained from working across multiple facets and undertaking a systems approach.

Achieving good outcomes requires thinking at large scales and considering how different potential restoration sites could deliver different combinations of benefits, as well as their place-based suitability in relation to factors such as mana whenua and/or community aspirations and the surrounding environment. For example, protecting intact coastal wetlands that are close to restoration sites would provide for species migration and local plant eco-sourcing. Site selection for projects with a coastal wetland blue carbon focus should also consider protecting the richest storage sinks at intact wetlands and targeting potential restoration of those sites with the greatest potential increases in carbon sequestration (typically sites with the highest rates of sediment delivery). However, in the bigger picture of marine ecosystem health, reducing sedimentation from runoff in catchments and maximising soil carbon in the catchment is also a broader priority.

In terms of the interrelationships with the other pou, further work and thinking could include:

- understanding if there are investment trade-offs against other benefits if the focus is only on restoration for coastal wetland blue carbon (e.g. mangroves might be prioritised over shellfish and the investment might not be the best use across the benefits) – carbon markets may also facilitate additional investment;
- understanding what facilitates successful coastal wetland restoration to help prioritise sites (e.g. in relation to sediment transport into wetlands, their characteristics and retention, and relationships with blue carbon outcomes);
- better aligning funding for wetland restoration and protection, which comes from a variety of places, in some cases depending on the benefits being sought (e.g. climate change mitigation and adaptation, biodiversity);
- agreeing on standard methodologies for quantifying carbon burial rates, sources and permanence, and then obtaining more measurements of carbon sequestration that account for variation at a range of scales – this is needed to develop credit systems and to support awareness and understanding about why protection and restoration are important;
- identifying where carbon sequestration is occurring and articulating this alongside the wider co-benefits so that they can be weighed up in assessments; and
- keeping up with and learning from the Tasman Environmental Trust's coastal wetland blue carbon Core & Restore project (Project 17) to understand how this and other work (e.g. the Bay of Plenty Regional Council [BOPRC] coastal wetland blue carbon restoration projects [Projects 10 and 11]) can be shared and scaled up around Aotearoa.

## Recommended next steps for this pou

Create a decision-making tree for restoration and protection projects. This tree would:

- guide which parts of a landscape to protect and/or restore to maximise the overall benefits (e.g. protect pristine wetlands with lots of carbon, restore high-sediment-supply areas to trap carbon versus exposed sites for storm surge protection; where are the trade-offs, how economic is the investment, etc.?) – this approach could be used to identify opportunities to also deliver co-benefits;
- encompass biophysical, economic, cultural and social factors;
- be tailored for different users (e.g. protection versus restoration interest from government agencies, mana whenua, community groups, landowners and the private sector who care about the environment and/or are looking for carbon offsets); and
- identify the potential data needs and where the data might come from.

As a timely next step, arrange for the many project leads of mapping projects presented in the catalogue (Appendix 4) to come together to better understand the opportunities arising from these projects, how spatial data can be accessed and priority gaps for future investment.

Consider how te ao Māori and mātauranga Māori could contribute to the design of the decision tree, and identify any areas that need support.

Focus on additional work areas, including:

- creating an index of restoration resources and methods (e.g. NIWA and Our Estuaries hub best practice resources, and practical logistics, including setting up nurseries);
- gathering case studies of low-cost restoration projects to learn from existing work (e.g. Core & Restore and BOPRC saltmarsh projects) and obtain information about restoration method costs (e.g. planting and stop bank removal); and
- developing a standard for identifying sample collection sites where the most useful carbon sequestration and stock information would be obtained (e.g. based on the history of the site, the level of disturbance or if it is a restoration site [to provide a baseline and monitor changes to show gains from investment]) – this work is underway in existing projects, including the MBIE-funded draft BlueCAM (Project 28B), the work of TNC (Project 14) and BOPRC (Projects 10 and 11), and the Core & Restore project (Project 17D), which is creating practical guidance.

## National Coastal Wetland Blue Carbon Strategy Pou

The discussion for this pou explored policy, strategy and legal considerations in the context of coastal wetland blue carbon research and planning in Aotearoa. This included discussion about various related special interest groups around the country, council planning, biodiversity and wetland restoration, and offsetting regional carbon footprints. Key points included that:

- the current planning framework is uncertain due to pending changes to the Resource Management Act 1991 (RMA), presenting an opportunity for local and central

government to establish a comprehensive coastal wetland blue carbon strategy that incorporates scientific, policy, data and legal considerations;

- a strategic vision should precede policy development – the ownership and alignment of this strategic vision with government bodies such as MfE, DOC and MBIE was discussed, suggesting the need for a coordinated project plan at the central government level; MfE emphasised that a national strategy would require a clearly defined problem statement and should set objectives to support government involvement;
- a comprehensive strategy would require policy, legal and planning frameworks to align with scientific understanding, ecological preservation and the rights of tāngata whenua, reflecting the complexity of integrating coastal wetland blue carbon into various aspects of governance and conservation efforts in Aotearoa; participants agreed that central government should host the strategy, but effective alignment across government agencies would also be crucial for a smooth transition from strategy to action, and that mana whenua, the private sector and communities should be involved from the outset;
- transparency and data sharing will be essential, emphasising the need for a collaborative model and a strategic plan for clear intent and progress; and
- researchers require clarity on the strategy's initiation, with MfE staff suggesting an open working process with a clear vision; participants also stressed the importance of defining key objectives, including considerations for coastal wetland blue carbon credits, biodiversity, coastal resilience, and alignment with national and regional conservation goals, and anticipated that the joint TNC and MfE policy research project (Project 27) could provide valuable insights to address these questions.

### Recommended next steps for this pou

- Advance thinking towards a National Coastal Wetland Blue Carbon Strategy.

GNS Science has proposed to host a project to achieve this from February to June 2024. This project will utilise systems-thinking approaches<sup>22</sup> to describe and visualise the connections between the pou, and will prioritise the activities required to develop a National Coastal Wetland Blue Carbon Strategy for Aotearoa. This project will be completed in a small-group facilitated setting and is envisaged to include pou coordinators (or their nominees), mana whenua and government agencies.

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<sup>22</sup> Systems thinking is a way to describe and understand the causality and interrelations between variables within a system. It is particularly useful for addressing complex problems that cannot be solved by any one individual or understood from only a single perspective.

## 5 Establishing a formal coastal wetland CoP under a marine carbon forum

It was clear from the hui process and the project catalogue that an informal coastal wetland CoP is forming in Aotearoa, with many shared projects/data and conversations already happening. The recent series of hui outlined in this report provided a platform for wider, more accessible communication and collaboration, and potentially formalisation.

The current CWBC community includes a wide range of expertise, interests, sectors and perspectives. This leads to an important question:

**How can the CWBC community maximise its contribution to advance the holistic and equitable understanding and utilisation of coastal wetland blue carbon in Aotearoa?**

The following sections outline the steps that would need to be taken to establish a formal CoP as part of a wider marine carbon forum.

### Bring the CWBC community together formally under a marine carbon forum

There was a strong sentiment among hui participants that the pou relating to coastal wetlands should be encompassed within a broader marine carbon forum that also covers marine carbon dioxide removal (mCDR) pathways and other blue carbon habitats (beyond coastal wetland environments) to provide a more comprehensive and strategic perspective.

A formal forum would:

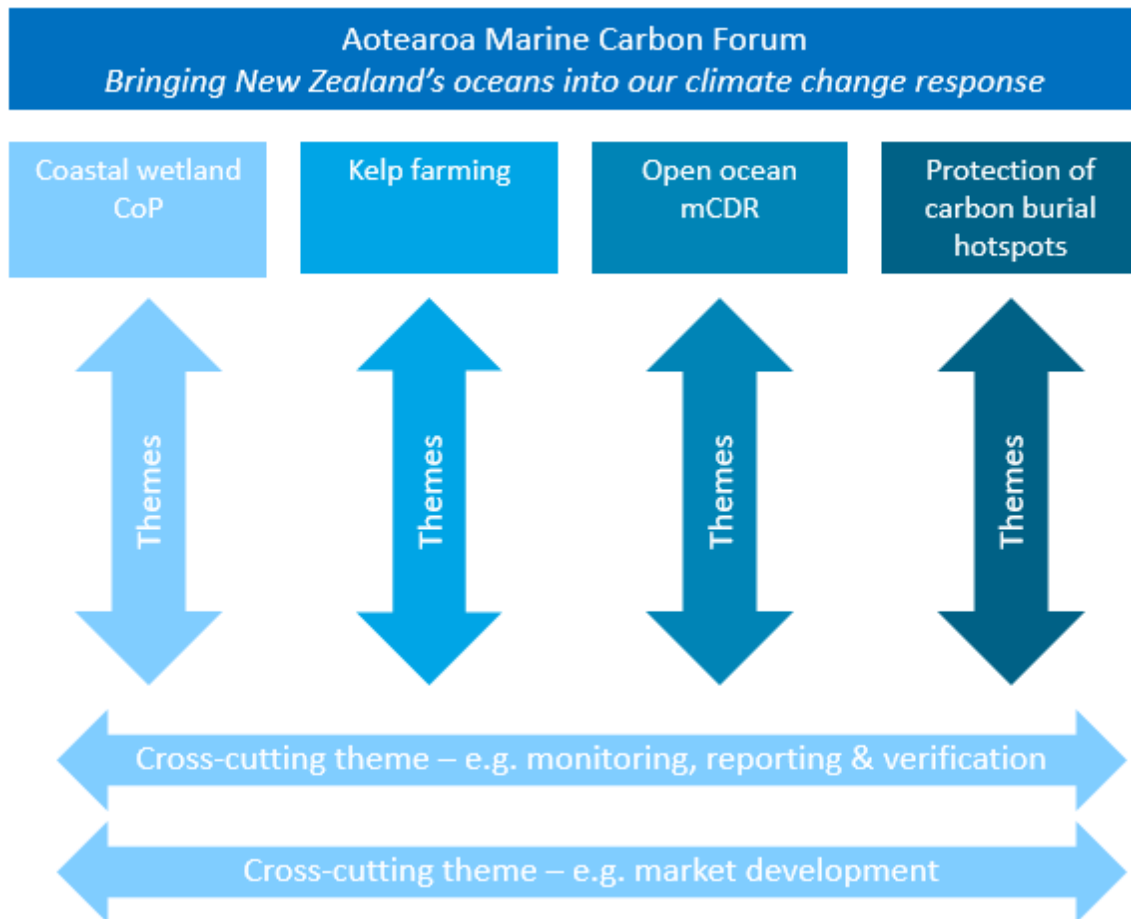
- bring together practitioners from a diverse range of mCDR areas, providing a platform for multidisciplinary connection, such as between kaitiaki, trusts, researchers and policy makers, to enable information exchange and ultimately align research and policy development strategies;<sup>23</sup>
- advise the New Zealand Government on a range of mCDR options;
- enable Aotearoa to engage with other countries and multinational initiatives to assess and strategically advance mCDR opportunities;
- allow the use of a systems approach to understand the carbon cycle within and between the different marine environments that sequester and permanently remove carbon from the atmosphere; and

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<sup>23</sup> [theconversation.com/harnessing-the-oceans-to-bury-carbon-has-huge-potential-and-risk-so-nz-needs-to-move-with-caution-217553](https://theconversation.com/harnessing-the-oceans-to-bury-carbon-has-huge-potential-and-risk-so-nz-needs-to-move-with-caution-217553)

- allow the use of a systems approach for the relevant human socio-ecological systems.

If the CWBC community is formally brought together under a wider Aotearoa marine carbon forum, the scope of the suggested pou will need to be revisited. For instance, it may be appropriate for the Te Ao Māori and Mātauranga Māori Pou to be cross-cutting, encompassing all mCDR pathways, while the Coastal Wetland Habitat Protection and Restoration Pou would likely remain focused on these habitats, since the methodologies and communities are distinctive. Other pou identified may also remain separate within a formal coastal wetland CoP that sits within the forum (as discussed in the next section). Additionally, new pou could be added to the wider forum, including kelp farming, the identification and protection of marine sediments as carbon reservoirs, and ocean technologies and manipulations (e.g. ocean fertilisation and alkalinity enhancement) (Figure 2).



**Figure 2. Relationship between a formal coastal wetland CoP and the proposed Aotearoa Marine Carbon Forum (light blue themes would incorporate aspects of the coastal wetland pou).**

This framework would acknowledge that there are a range of potential pathways/solutions in the ocean that could protect natural carbon sequestration and burial and seek to restore or enhance carbon dioxide removal via natural or manipulated processes. The potential mCDR approaches each come with opportunities, challenges and risks that require careful

assessment in the environmental, economic and cultural context of Aotearoa. It should also be noted that each potential mCDR solution is currently at a different stage of understanding, policy development and management intervention opportunity.

A steering group has formed, led by Dr Rebecca McLeod (University of Otago), to develop a proposal for the establishment of an Aotearoa Marine Carbon Forum. The proposal will be presented to interested parties in the first half of 2024. The impetus for an Aotearoa Marine Carbon Forum developed during a special session at the New Zealand Marine Sciences Society conference in June 2023 entitled 'Blue carbon as a viable solution to mitigate climate change?'. The session included presentations on a wide range of mCDR environments and a facilitated discussion on how best to approach mCDR opportunities in the Aotearoa context. Many participants of the CWBC community hui process outlined in this report also engaged in that wider dialogue.

## Develop an operating model for a formal coastal wetland CoP

It is envisaged that a formal coastal wetland CoP would operate under the umbrella of a wider marine carbon forum. Hui participants identified several elements that need further thought before formalising a CoP, as well as some questions that require future discussion and some early steps for maintaining the current momentum of the informal CWBC community.

### Purpose of a CoP

Having a clear purpose is essential to amplify effort and give a CoP visibility (e.g. finding a balance between information, science and policy, and understanding who, or what, a CoP would be trying to influence) and to align with proposed actions. The following purpose statement is a suggested starting point:

*Our kaupapa (purpose): To ethically advance the blue carbon agenda for Aotearoa New Zealand across multiple world views and knowledge systems.*

*To achieve this purpose, we will:*

- create a collaborative and supportive community that works together to achieve outcomes that are greater than what we could accomplish as individual people or organisations;*
- recognise the importance of mana whenua, te ao Māori (the Māori world view), including mātauranga Māori (Māori knowledge) and tikanga Māori (Māori customary ways of doing things), in guiding our work, and strive to develop ways to support mana whenua aspirations;*
- be inclusive of a variety of stakeholders, including central and local government, research providers, community groups, and the private sector; and*

- *undertake work under each of the pou (pillars) for blue carbon, which reflect the key areas of focus that are essential to advance the understanding and application of blue carbon science, policy and restoration practices in Aotearoa New Zealand.*

## Function of a CoP

A CoP should allow for the respectful sharing of multiple knowledge systems. To achieve this, it is important that resources for practices that reflect Māori data sovereignty and ethics are encouraged and shared, the development of enduring partnerships with mana whenua is supported, and funding streams to meaningfully support mana whenua are established.

The suggested pou could be used to organise discussions, but it should be emphasised that all the pou are interconnected and provide different perspectives. Therefore, there should be collaboration between the pou to leverage combined expertise and energy, and a summary of the objectives of each pou to facilitate cooperation and alignment.

Before a formal CoP is established, the following questions will need to be answered.

- What goals would the informal CWBC community have for knowledge sharing, and should the project catalogue be maintained as a living resource?
- Should the group have a narrow scope and undertake key activities within defined workstreams that people identify more closely with?
- Will the group be a basis for knowledge sharing (e.g. through webinars) and/or be action driven, with working groups that deliver specific actions (e.g. guidance documents, policy frameworks, collaborative research programmes, outputs that tell a story such as factsheets or videos)?

## Funding a CoP

To date, DOC and TNC have contributed financial resources for the informal CWBC community. However, the other participants in the hui, and the creators of this report, have also contributed large amounts of resources in terms of their time and expertise (see Appendix 1).

To keep the momentum going and continue to build this network, there needs to be a mechanism to compensate key contributors to the process (e.g. chair[s] and pou leads) and to ensure inclusivity (e.g. to cover costs for mana whenua to attend future meetings).

## Operation of a CoP

Hui participants felt that having a chair, or co-chairs, with facilitation skills will be vital for successful CoP operation. Producing a webinar series may be an ‘easy win’ as a starting point and could potentially feed into workshops or conferences with similar kaupapa (e.g. marine conferences) to provide support and reduce travel requirements for those who may attend such events. However, in the longer term, regular meetings will be required.

Therefore, the following key questions need to be answered.

- How frequently should meetings occur, both online and in person, and where should virtual workshops/catch-ups be hosted from?
- What sort of virtual space would be ideal for a CoP and how much face-to-face connection will be needed?
- How will an authentic approach to developing the Te Ao Māori and Mātauranga Māori Pou be developed and resourced?

## Additional questions

It is important that a CoP focuses on maximising the potential for co-benefits across multiple potential sites in the landscape through projects that deliver win-wins, or at least avoid win-losses. To achieve this, the following questions need to be answered.

- Who else should be included and what should their roles be? This includes the following.
  - How many people is a workable number?
  - Who will host a CoP and who is accountable for making things work well?
  - What can be learnt from other special interest groups in terms of what does and does not work well?
- How can this information be shared more broadly and who should it be shared with? This includes determining the right language to use when communicating about blue carbon and co-benefits.

### Recommended next steps to formalise a coastal wetland CoP under a marine carbon forum

- Seek support and funding to enable the informal CWBC community to continue as a formal CoP under the umbrella of a wider marine carbon forum.

A key next step that was identified to maintain the momentum of the informal CWBC community and encourage participation was to connect with the steering group who are developing a proposal for establishing an Aotearoa Marine Carbon Forum. This steering group is seeking funding for pou leads and administrative support. Including this report as an appendix to a forum proposal would demonstrate the level of thinking that the CWBC community has already done.

The actions of a wider marine carbon forum could build on this report and could include:



- developing guidance for running each pou and creating a process to enable information sharing among the pou leads – it should be emphasised that the pou are interconnected and should provide multiple perspectives, with connected research across the various pou to bridge gaps and complement research efforts;
- appointing pou leads to clearly define the objectives and scope, oversee activities, ensure project collaboration, and facilitate communication;
- establishing a pou core working group of genuinely interested individuals who can actively participate (i.e. through face-to-face engagement, virtual platforms/spaces, sharing ideas and collaborating); and
- providing opportunities for wider contribution, discussion and activities (e.g. themed workshops, webinars).

This report provides a useful resource for any future initiatives. If a marine carbon forum is not developed, the CWBC community could reconvene (with DOC and TNC as participants) to progress other recommendations from their process, including other options to formalise a CoP.

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# Appendix 1 – Hui attendees

## Key

<sup>a</sup> Nelson hui attendee – 27 April 2023

<sup>b</sup> Online hui attendee – 13 September 2023

<sup>c</sup> Online hui attendee – 28 November 2023

\* Editorial group

## Mana whenua

Ngāti Tama: Dayveen Stephens<sup>a,c,\*</sup>

Ngāti Apa: Jen Skilton<sup>a</sup>

Ngāi Takoto: Joseph Cook<sup>a</sup>, Wiremu Marsden<sup>a</sup>

## Government (central and local)

Bay of Plenty Regional Council: Josie Crawshaw<sup>a,b</sup>, Pim de Monchy<sup>c</sup>

Department of Conservation: Helen Kettles<sup>a,b,c,\*</sup>

Marlborough District Council & Coastal Special Interest Group: Oliver Wade<sup>a</sup>

Ministry of Foreign Affairs and Trade: Anna Broadhurst<sup>c</sup>

Ministry for the Environment: Bruno Aldaz<sup>b</sup>, David Ross<sup>a,b,c</sup>, Jo Martin<sup>a,b</sup>, Jordan Goodrich<sup>b</sup>, Pierre Tellier<sup>b</sup>, Robyn Crisford<sup>a,b</sup>, Romilly Cumming<sup>a</sup>, Kaya Freeman<sup>a</sup>

Ministry for Primary Industries: Shay Lalich<sup>a</sup>, Vikki Ambrose<sup>a,b,c</sup>

Nelson City Council: Harry Allard<sup>a</sup>, Jo Martin<sup>a,b</sup>, Maggie Fellowes<sup>a</sup>, Scott Butcher<sup>a</sup>

Waikato Regional Council: Eleanor Gee<sup>c</sup>, Michael Townsend<sup>b</sup>

## Universities

Deakin University: Finn Ross<sup>c</sup>

University of Auckland: Luitgard Schwendenmann<sup>c</sup>

University of Otago: Rebecca McLeod<sup>c,\*</sup>

University of Waikato: Jack Hamilton<sup>a,c,\*</sup>, Jade Visser<sup>a</sup>, Timothy Thomson<sup>a,b,c,\*</sup>, Rewi Boy (Te Rūnanga o Ngāti Whakaue)<sup>a</sup>

## Crown Research Institutes

GNS Science: Joe Prebble<sup>a,b,c,\*</sup>, Kyle Bland<sup>a,b,c</sup>

Manaaki Whenua Landcare Research: Suzanne Lambie<sup>a,b</sup>

NIWA: Andrew Swales<sup>b</sup>, Carolyn Lundquist<sup>a</sup>, Phoebe Stewart-Sinclair<sup>a,b,c,\*</sup>, Scott Nodder<sup>b</sup>, Scott Stephens<sup>a</sup>

## Private research providers and consultants

Anderson Lloyd: Georgia Ramsey<sup>c</sup>, Maree Baker-Galloway<sup>c</sup>

Beca: Dan Chamberose<sup>a,b</sup>

Cawthron Institute: Anna Berthelsen<sup>a,b,c,\*</sup>, Dana Clark<sup>a,b</sup>, James Butler<sup>a</sup>, Sean Waters<sup>a</sup>

Ekos: Emma Crane<sup>a,b,c</sup>

Jacobs: Gavin Alford<sup>c</sup>, Kate Simmonds<sup>a</sup>, Matt Balkham<sup>a,c</sup>

PDP: Chris Bender<sup>a</sup>, Shari Gallop (Ngāti Maru & Te Rarawa)<sup>b,c,\*</sup>

Terra Moana: Katherine Short<sup>c,\*</sup>

Tidal Research: Richard Bulmer<sup>a,b,c,\*</sup>

Growing Dialogue: Scott Nicol<sup>a,b,c</sup>

## NGOs and Trusts

Forest & Bird: Chanel Pagel<sup>c</sup>

Tasman Environmental Trust: Gillian Bishop<sup>a,b</sup>

The Nature Conservancy Australia: Stella Kondylas<sup>a</sup>

The Nature Conservancy Aotearoa New Zealand: Becca Gentry<sup>a</sup>, Debs Martin<sup>a</sup>, Erik van Eyndhoven<sup>a</sup>, Kaeli Lalor<sup>a,b,c,\*</sup>, Olya Albot<sup>a,b,c,\*</sup>



**Figure 3: Coastal Wetland Blue Carbon Hui participants, 27 April 2023 in Whakatū (Nelson).**  
*Photo: Scott Nicol, Growing Dialogue*

# Appendix 2 – Coastal wetland blue carbon research and initiatives

## Coastal wetland blue carbon ecosystems

Coastal wetland blue carbon ecosystems, including mangroves, seagrasses and saltmarshes, and adjacent soft-sediment habitats, play a vital role in mitigating climate change by capturing and storing large amounts of carbon, thereby helping to reduce greenhouse gases in the atmosphere and combat the impacts of global warming. Improving the health of these ecosystems can also bring other benefits, such as coastal protection, fish nurseries, cultural materials and wellbeing. Unvegetated intertidal flats are also components of coastal wetlands and so, while they are generally classified as wider blue carbon, have been included within the scope of the hui process outlined in this report.

Given the importance of coastal wetland blue carbon, many countries and regions have shown interest in conserving and restoring coastal wetland blue carbon ecosystems as part of their climate change mitigation and adaptation strategies. Consequently, research into coastal wetland blue carbon is well underway, and there is growing recognition of the sequestration and storage value by policy makers, coastal management entities and carbon markets internationally.

Interest in coastal wetland blue carbon has had a slower uptake in Aotearoa New Zealand than elsewhere in the world but is now at a stage where efficiencies of effort can be identified that also leverage off international efforts.

## Examples of global blue carbon initiatives

Globally, there are many initiatives that are fulfilling a purpose similar to what we wish to achieve here, making them valuable points of reference for further learning. Below, we outline two of the many communities that exist, which could be used to mould a formal coastal wetland CoP, as part of a wider marine carbon forum, as discussed in this report.

### The Blue Carbon Initiative

The Blue Carbon Initiative is a global programme that is dedicated to conserving and revitalising coastal and marine ecosystems such as mangroves and seagrasses, which are renowned for their exceptional carbon sequestration ability.

In safeguarding blue carbon habitats, the Initiative is improving carbon capture, climate change mitigation, biodiversity protection and essential ecosystem services. The Initiative is working in collaboration with governments, non-governmental organisations (NGOs), scientific institutions and local communities to undertake research, restoration, capacity building and policy advocacy, tailored to a diverse range of regions and ecosystems.

With a focus on enhancing carbon storage, combating climate change and sustaining marine life, the Initiative also plays a vital role in raising awareness and support for the vital contributions of these ecosystems in a changing world.

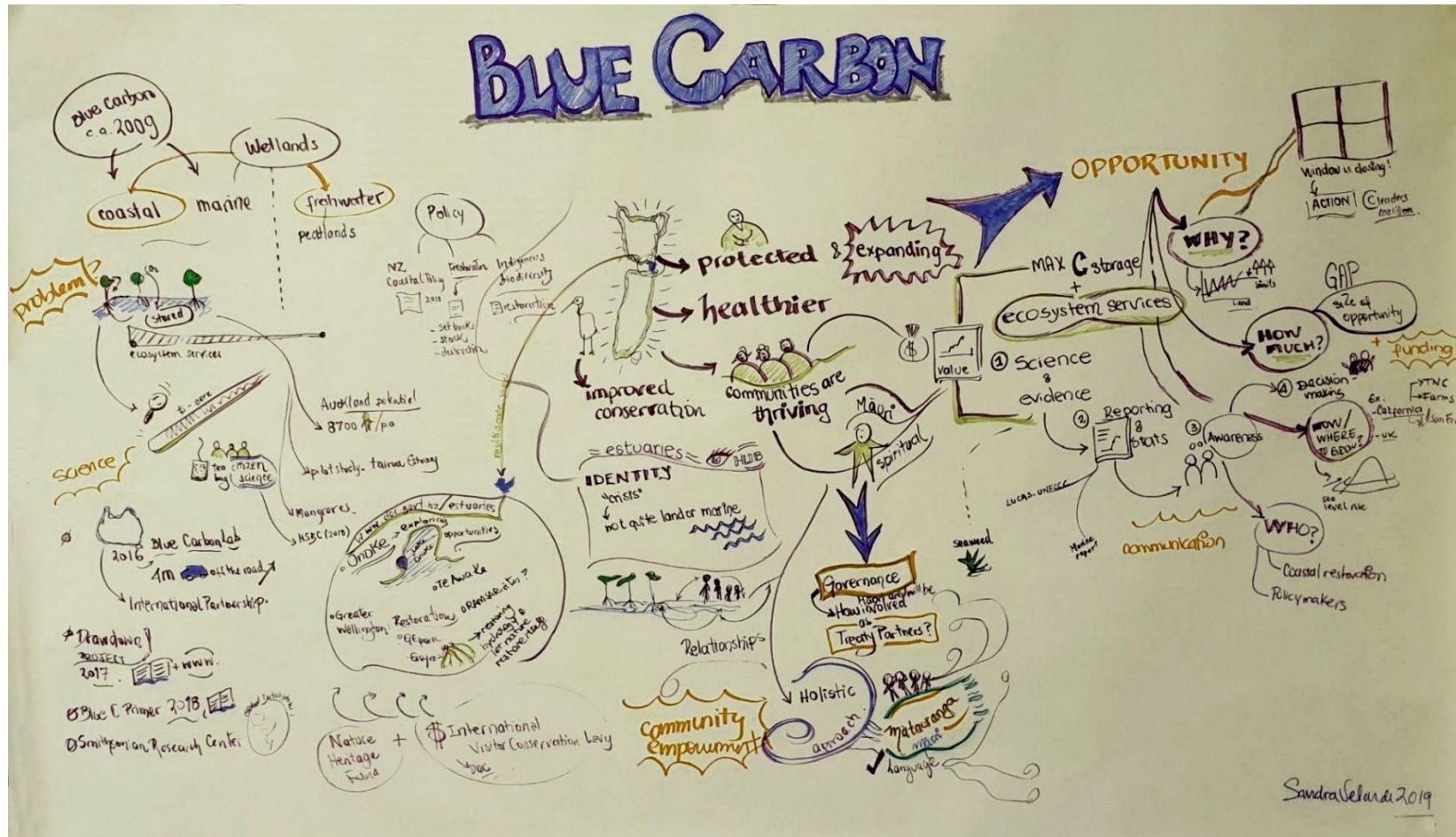
## Scottish Blue Carbon Forum

Led by a steering committee of select experts, the Scottish Blue Carbon Forum aims to connect key experts in research, NGOs, public bodies and the Scottish Government to collaborate and innovate in the blue carbon space. The Forum also provides scientific advice directly to the Scottish Government to facilitate policy making.

Notably, the Scottish Blue Carbon Forum has an ongoing research programme that aims to understand the ability of marine and intertidal habitats to store and trap carbon. Similar to the dialogues developed in the coastal wetland blue carbon hui series described in this report, the Scottish Blue Carbon Forum recognises the need for better-informed policy and management decisions around blue carbon.



# Appendix 3 – Visual record from the central government hui (November 2019)



# Appendix 4 – Catalogue of coastal wetland related research in Aotearoa New Zealand, as at November 2023

## Project catalogue

The table below provides details on all coastal wetland projects in Aotearoa New Zealand that we were aware of as at November 2023. The projects highlighted in grey are shown on Figure 1, while those with an asterisk alongside the project number do not have a carbon component. The first projects are those at specific locations (ordered roughly north to south), followed by large national-scale projects and various desktop exercises that are underway at regional and national scales.

A full list of the agencies and groups involved in these projects, and their abbreviations as used in this table, can be found in the Agencies and groups section, while further details can be found in the individual project reports and papers listed in the References section.

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
1	Mangrove carbon stocks and CO <sub>2</sub> flux	Hātea River, Whangateau Harbour, Māngere Stream, Panmure Basin, Pahurehure Inlet, Waiuku River, Whangamatā Harbour, Tairua Harbour, Welcome Bay, Waikaraka Estuary, Matua, Uretara Stream	Collecting carbon sediment cores and carrying out flux chamber studies to quantify carbon stocks and greenhouse gas emissions	PhD thesis (Bulmer 2017), research papers	Market Development and Policy, Socio-Ecological Research	Degraded, pristine and expansion areas	Mangrove	No	Richard Bulmer (Tidal Research, lead); Carolyn Lundquist and Andrew Lohrer (NIWA); Luitgard Schwendenman (UOA); WRC	UOA/NIWA PhD scholarship, WRC
2	Carbon stocks, sources and preservation within saltmarsh sediments  Link: <a href="http://wgtn.ac.nz/antarctic/about/grad-students/olya-albot">wgtn.ac.nz/antarctic/about/grad-students/olya-albot</a>	Rangaunu Harbour x2, Pāuatahanui, Pūkorokoro / Miranda	Collecting carbon stock data at 3 locations (5 survey sites), and measuring sequestration rates and other geochemical data to better understand the sources and preservation of organic carbon within saltmarsh sediments; performing two-dimensional (2D) modelling of saltmarsh and mangrove responses to sea level rise in Rangaunu Harbour	PhD thesis (early to mid-2025)	Market Development and Policy	Degraded, restored and unmodified	Saltmarsh	No	Olya Albot (VUW, lead); Richard Levy (GNS/VUW); Joss Ratcliffe (VUW)	VUW, GNS, DOC, MBIE, TNC

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
3	Hokianga Harbour sedimentation	Hokianga Harbour	Collecting sediment cores (up to 1.8 m long) at 7 sites within the middle to lower reaches of the harbour (as part of a wider study); analyses included the measurement of total organic carbon through the cores, stable isotope analyses to assess the source of the carbon (terrestrial versus marine – i.e. higher plants versus marine algae/plants); some radiocarbon dates were also obtained	Technical report	Socio-Ecological Research, Te Ao Māori and Mātauranga Māori	Healthy and degraded	Mangrove, unvegetated	No	Kyle Bland (GNS, lead); Te Rarawa	MBIE Vision Mātauranga Capability Fund; GNS
4	Carbon capture by expanding temperate mangrove forests  Link: <a href="http://bluecarbonlab.org">bluecarbonlab.org</a>	Whangateau Harbour, Mahurangi Harbour, Bayswater, Hobson Bay, Point Chevalier, Māngare Inlet, Pahurehure Inlet	Quantifying carbon stocks from 7 sites across the Auckland region where the mangrove extent has been increasing; sampling occurred between December 2018 and April 2019; the paper includes an estimate of carbon sequestration from mangrove expansion within the Auckland region	Research paper (2024)	Market Development and Policy, Socio-Ecological Research	Healthy	Mangrove	No	Richard Bulmer (Tidal Research), Peter Macreadie (Deakin University – Blue Carbon Lab) (co-leads); Maria Palacios, Pawel Waryszak, Stacey Trevathan-Tackett (Deakin University – Blue Carbon Lab); Pere Masqué (International Atomic Energy Agency, Edith Cowan University);	NIWA, Deakin University – Blue Carbon Lab

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
									Carolyn Lundquist (UOA, NIWA); Luitgard Schwendenman (UOA); Helen Kettles (DOC)	
5	Blue carbon characteristics across vegetated and non-vegetated coastal habitats in the Auckland region	Snells Beach, Hobson Bay (Auckland)	Quantifying the carbon stocks and nitrogen levels along transects from vegetated mangrove habitats to non-vegetated tidal flats in a muddy (Snells Beach) and sandy (Hobson Bay) estuary	PhD thesis (Wei 2022)	Market Development and Policy, Socio-Ecological Research	Range of states	Mangrove, unvegetated	No	Mengjie Wei (UOA, lead); Luitgard Schwendenman, Carolyn Lundquist (UOA)	
6	Carbon transport and burial									GNS, Strategic Science Investment Fund
6A		Rangaunu Harbour, Fiordland	Examining the origin of carbon in estuary settings (radiocarbon, biomarkers); creating 2D models of the impacts of sea level rise on accommodation space	Technical report (July 2025)	Socio-Ecological Research, Market Development and Policy	Healthy	Saltmarsh, mangrove	No	Joe Prebble (GNS, lead); TNC	
6B		Ruawai, North Kaipara	Assessing/ exploring ecosystem services in natural systems – social and environmental sciences	Technical report (July 2025)	Empowering Communities, Te Ao Māori and Mātauranga Māori	Healthy	Saltmarsh, mangrove	No	Kyle Bland (GNS, lead); Annet Forkink, Di Bradshaw (GNS)	

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
6C		Urenui and Mimi estuaries	Examining sedimentation and catchment change (total organic carbon, stable isotopes, pollen analysis)	Technical report (July 2025)	Socio-Ecological Research, Te Ao Māori and Mātauranga Māori	Healthy	Saltmarsh, unvegetated	No	Kyle Bland (GNS, lead); Ngāti Mutunga; TRC	
7	Tairua carbon stocks and subsidies in saltmarsh, mangrove, seagrass and unvegetated habitats	Tairua Harbour	Collecting carbon sediment cores and conducting isotope studies to show where the carbon came from (4 transects through different habitats, 12 sampling locations in total)	Research paper (Bulmer et al. 2020)	Market Development and Policy, Socio-Ecological Research	Good quality	Saltmarsh, mangrove, seagrass, unvegetated	No	Richard Bulmer (Tidal Research), Carolyn Lundquist (NIWA, UOA) (co-leads); Hannah Jones, Mike Townsend (WRC); Fabrice Stephenson (NIWA); Jenny Hillman, Luitgard Schwendenmann (UOA)	

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
8	Firth of Thames project (in NIWA Catchments to Estuaries Strategic Science Investment Fund [SSIF] programme)	Firth of Thames	Investigating how wetlands will respond to sea level rise (e.g. rod surface elevation tables [RSETs] as a monitoring tool) and their resilience to storm events; using sediment source tracing (a compound-specific stable isotope [CSSI] tool that is widely used) to determine the origin of marine sediments from the catchment; coastal wetlands are the subject of one project in this ongoing programme	Research paper (2024)	Socio-Ecological Research	Range of states	Mangrove	No	Andrew Swales (NIWA, lead); Stephen Hunt (WRC); Ian McDonald (NIWA); US Geological Survey; University of Queensland	NIWA, WRC, MBIE Endeavour Fund (Future Coasts)
9	The spatial variability of elemental and isotopic compositions of carbon and nitrogen within sediments in mangroves at the Firth of Thames	Firth of Thames	Collecting sediment core samples from across the entire coast, including from 80 sites in mangroves (plus 4 sites up the rivers), 4 sites in unvegetated tidal flats and 7 subtidal seabed sites; carbon stocks, sediment nitrogen and algal biomass were measured at all sites	MSc thesis (Ramirez-Matiz 2020)	Market Development and Policy, Coastal Wetland Habitat Protection and Restoration	Degraded to healthy	Mangrove, unvegetated	No	Yuliana Ramirez-Matiz (UOW, lead); Julia Mullarney (UOW)	UOW

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
10	Temporal variability of blue carbon stocks and sequestration rates across restored saltmarsh wetlands in the Bay of Plenty	Tauranga Harbour, Maketu Estuary	Collecting 12 cores from Tauranga Harbour (3 sites) and Maketu Estuary (3 sites); carbon stocks were measured (using bulk density, % carbon) and carbon dating was performed	MSc thesis (early 2024)	Coastal Wetland Habitat Protection and Restoration, Market Development and Policy, Te Ao Māori and Mātauranga Māori	Stages of restoration varied temporally across sites	Saltmarsh	Yes	Jade Visser (UOW, lead); Astrolabe Community Trust (Maketu); Shari Gallop (UOW); Josie Crawshaw (BOPRC); Richard Bulmer (Tidal Research); Rewi Boy Corbett (Te Rūnanga o Ngāti Whakaue ki Maketū)	BOPRC, UOW, Astrolabe Community Trust (Maketu)
11	Tauranga Harbour saltmarsh carbon stocks  No public information available	Tauranga Harbour (Katikati Inlet, Rereatukahia Estuary, Oikimoke Point)	Building an understanding of carbon stocks within existing saltmarsh habitats in Tauranga Harbour as a first step towards understanding the blue carbon restoration potential for the Bay of Plenty; this study is being carried out in three saltmarshes of different ages and involves collecting blue carbon cores for loss-on-ignition (LOI), carbon/nitrogen, X-ray and radioisotope dating	Technical report (April 2024)	Market Development and Policy, Coastal Wetland Habitat Protection and Restoration	Range of states	Saltmarsh	Yes	Shay Dean (BOPRC, lead); Josie Crawshaw (BOPRC); Andrew Swales (NIWA contract)	BOPRC



No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
12	Unvegetated estuary blue carbon	Whangateau Harbour, Orewa River, Waiwera River, Waikōpua Creek, Tairua Harbour	Estimating burial rates, the variability in intertidal sediment carbon accumulation and the role of macrofauna	PhD thesis (June 2024)	Socio-Ecological Research	Healthy	Unvegetated	No	Jack Hamilton (UOW, lead); Richard Bulmer (Tidal Research, MBIE Smart Ideas)	UOW, NIWA, AC, WRC, NZMSS
13	Microbial processes in mangrove forests, with a focus on the role of organic matter degradation in response to anthropogenic nutrient enrichment	Tauranga Harbour x11, Coromandel Harbour x12 (plus 1 manipulative experiment at Whangamatā Harbour), Firth of Thames x7	Undertaking manipulative in situ experiments at Whangamatā Harbour to understand how nutrients and land management affect sediment carbon processes in mangroves; carrying out a study at 30 sites of teabag decomposition rates (which relate to the impacts of carbon stocks and the sequestration potential)	PhD thesis, research papers (early 2024)	Socio-Ecological Research	Degraded to pristine	Mangrove	No	Timothy Thomson (UOW, lead); Prof. Joanne Ellis (UOW); Carolyn Lundquist (NIWA)	UOW, NIWA
14	TNC Coastal Wetland Blue Carbon Programme – Financial benefits of blue carbon	Wakapuaka River, Ruataniwha Inlet, Rangaunu x2, Bay of Plenty, Kaipara Harbour, Pūkoro / Miranda River	Testing the draft blue carbon accounting model (BlueCAM) methodology at 7 study sites to assess the potential credit return from restoration	Technical report (mid-2025)	Market Development and Policy	Degraded	Saltmarsh	Yes	Olya Albot (TNC, lead); project partners (NCC, BOPRC, WRC, AC, DOC, landowners, iwi); subcontractors (NIWA, Tidal Research)	TNC

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
15	TNC Coastal Wetland Blue Carbon Programme – Carbon stocks and greenhouse gas monitoring in coastal environments	Wakapuaka River, Ruataniwha Inlet, Rangaunu x2, Bay of Plenty, Kaipara Harbour, Pūkoro / Miranda River	Measuring carbon stocks (7 sites), sequestration rates (2 sites) and greenhouse gas flux (5 sites) across degraded and intact saltmarsh sites	Technical report (mid-2025)	Market Development and Policy, Socio-Ecological Research	Degraded, restored and unmodified	Saltmarsh	No	Olya Albot (TNC, lead); TNC; project partners (landowners, iwi); subcontractors (Cawthron; GNS; PDP; MW-LR)	TNC
16*	Cultural Health Indicators Framework	Ngāti Tamarohē	All coastal areas of the Ngāti Tama coastline	2024/25	Te Ao Māori and Mātauranga Māori	Degraded to pristine	Saltmarsh, mangrove, seagrass, unvegetated	No	Dayveen Stephens (Ngāti Tama)	
17	Core & Restore – Enhancing estuaries in Te Tau Ihu									
17A	Blue carbon pilot study  Link:  <a href="https://tet.org.nz/projects/blue-carbon-core-and-restore">tet.org.nz/projects/blue-carbon-core-and-restore</a>	Waimea Inlet, Farewell Spit/ Onetahua	Measuring how much blue carbon is stored in coastal ecosystems; assessing the benefits of protecting and restoring blue carbon ecosystems (fieldwork completed in 2022); engaging with businesses to contribute funds and develop interest in future carbon credit benefits; creating media stories to spread the word about the importance of blue carbon and biodiversity; working with iwi to create partnerships and	Technical report (Berthelsen et al. 2023), overall summary report (Walker 2023)	Market Development and Research, Empowering Communities, Coastal Wetland Habitat Protection and Restoration, Te Ao Māori and Mātauranga Māori	Primarily intact saltmarsh and seagrass; 1 site was under active restoration	Saltmarsh, seagrass	Yes	Lauren Walker (Lauren Walker Ltd for TET, lead); Anna Berthelsen, Sean Waters, Elaine Asquith, James Butler (Cawthron); Jen Skilton (Ngāti Apa ki te Rā Tō); Dan Chamberose, Sam Flewitt (Beca); Helen Kettles (DOC); NCC; HealthPost Nature Trust;	TET, Pic's Peanut Butter, NCC, Live Ocean, HealthPost Nature Trust, Kidson Investments Ltd, Nelson Tasman Climate Forum

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
			understand the importance of tikanga (e.g. when obtaining core samples; there is Manawhenua ki Mohua involvement at Onetahua (Farewell Spit) to return the core samples to the land); this pilot study provides an opportunity to realise the cost for future restoration, but there is a need to identify funding to support continuation of the project and the writing of further outputs						Aaron Hemi (Ngāti Apa ki te Rā Tō); Makere Chapman, Ursula Passl (Manawhenua ki Mohua); Ian Shapcott, Daren Horne (Te Ātiawa); Andy McDonald (NZ Andy)	
17B	'Teabag' project  Link:  <a href="https://www.youtube.com/watch?v=LqAu2pmmWK0">youtube/LqAu2pmmWK0</a>	Waimea Inlet, Nelson Haven	Undertaking a community citizen science project using teabags to assess decomposition rates; this included an assessment of bacterial assemblages associated with carbon sequestration potential in marine wetland sediments; cultural advisors worked alongside the community	Technical report (Zaiko and Pearman 2022)	Empowering Communities, Socio-Ecological Research, Te Ao Māori and Mātauranga Māori	Range of states	Saltmarsh, seagrass, unvegetated	No	Vikki Ambrose, Harry Allard (NCC, successive leads); TET; NMIT; Ngāti Apa ki te Rā Tō; Ngāti Kuia; Art + Alchemy; Cawthron (technical report)	NCC, Envirolink (MBIE)
17C*	Evaluating social outcomes  Link:  <a href="https://tet.org.nz/projects/blue-carbon-core-and-restore/">tet.org.nz/projects/blue-carbon-core-and-restore/</a>	Nelson and Tasman regions	Evaluating social outcomes of the Core & Restore blue carbon pilot study	Technical report (Berthelsen et al. 2023)	Empowering Communities, Socio-Ecological Research	Primarily intact saltmarsh and seagrass; 1 site was under active restoration	n/a	No	See 17A, plus James Butler (Cawthron, technical lead for evaluating social outcomes)	See 17A

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
17D	Field monitoring protocol	Top of the South Island	Developing a community field core sampling protocol and guidance (fieldwork completed 2021/22)	Blue Carbon Field Protocol (Walker et al. 2023)	Empowering Communities	Primarily intact saltmarsh and seagrass; 1 site was under active restoration	Saltmarsh, seagrass, unvegetated	No	See 17A	See 17A
18	Drivers of blue carbon dynamics in saltmarsh ecosystems	Pounaweia, Mokomoko Bay	Investigating the influence of sea level rise on carbon accumulation and stocks, and identifying the drivers responsible for carbon stock variability between restored saltmarshes; one of the regional case studies involved taking carbon core samples in the southern South Island	PhD thesis (McMahon 2023)	Market Development and Policy, Socio-Ecological Research	Degraded to healthy	Saltmarsh, seagrass	No	Lucy McMahon (University of York, lead); Roland Gehrels (University of York)	University of York
19	Future Coasts Aotearoa  Link:  <a href="https://niwa.co.nz/natural-hazards/research-projects/future-coasts-aotearoa">niwa.co.nz/natural-hazards/research-projects/future-coasts-aotearoa</a>								Overarching lead: Christo Rautenbach (NIWA), co-developed with Te Puuaha Hapū; partnership with Ngāi Takoto	MBIE Endeavour Fund

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
19A	Core analysis	Ashley River/ Rakahuri, Omaha Taniko Wetlands Scientific Reserve, Athenree, Sinclair Wetlands, Rangaunu Harbour	Collecting cores for carbon analysis and conducting isotope dating of the cores to understand rates of sequestration; RSETs are being installed in all sites	Research papers (2025)	Market Development and Policy	Range of states	Saltmarsh, mangrove, kānuka	No	Andrew Swales (NIWA, lead); BOPRC (partnering for installing RSET in its region); DOC (at Sinclair Wetlands)	
19B*	GIS project including coastal wetland data (desktop)	National	Compiling a national database of surveyed coastal wetlands (primarily through aerial images and ground-truthing); GIS layers also include light detection and ranging (LIDAR), land use type, cultural drainage, infrastructure and other information	GIS layers (2025)	National Coastal Wetland Blue Carbon Strategy	n/a	Saltmarsh, mangrove, seagrass, unvegetated	No	Sanjay Wadhwa (NIWA)	
19C*	Modelling of sea level rise impacts on coastal wetlands	National	Modelling wetlands and intertidal evolution with sea level rise and sediment supply scenarios to produce maps of where coastal wetlands might migrate to and any barriers to that movement (topography, roading, coastal squeeze)	GIS layer, research papers (2025)	National Coastal Wetland Blue Carbon Strategy	n/a	Saltmarsh, mangrove, seagrass, unvegetated	No	Andrew Swales (NIWA)	

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
19D*	Modelling of sea level rise impacts on groundwater	National	Developing a national model of groundwater salinisation and groundwater rise with sea level rise	Model, research papers (2025)	National Coastal Wetland Blue Carbon Strategy	n/a	n/a	No		
19E*	(Desktop)	n/a	Creating a storyboard for the project	Web page (2024)	Empowering Communities	n/a	Saltmarsh, mangrove, seagrass, unvegetated	No		
20*	NZ SeaRise – sea level rise projections  Link:  <a href="https://searise.nz/gns.cri.nz/news/vertical-land-movement-key-to-understanding-future-sea-level-rise">searise.nz; gns.cri.nz/news/vertical-land-movement-key-to-understanding-future-sea-level-rise</a>	National	Making sea level rise projections for Aotearoa, including vertical land deformation	GIS layers (2022)	Socio-Ecological Research	n/a	n/a	No	Tim Naish (VUW), Richard Levy (GNS) (co-leads)	MBIE Endeavour Fund
21	What are the risks and opportunities of blue carbon as a response to sea level rise in the Lyttelton Harbour basin? (desktop)	Lyttelton Harbour/ Whakaraupō	Examining the viability of blue carbon habitats throughout the Lyttelton Harbour basin to understand if sea level rise could have any positive outcomes	Technical report (Price et al. 2021)	National Coastal Wetland Blue Carbon Strategy, Socio-Ecological Research, Coastal Wetland Habitat Protection and Restoration	Degraded to healthy	Saltmarsh, seagrass	No	Meghan Price, Hsin-Yu Miu, Hanna Lyford, Devon Ashcroft, Alex Hansby (UOC, co-leads); Di Lucas (Lucas Associates); Jillian Frater, Deirdre Hart, Jamie Shulmeister, Mads Thomsen, Shane Orchard (UOC); Justin Cope, Lesley	UOC

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
									Bolton-Ritchie (ECAN); Karen Banwell (Whaka-Ora Healthy Harbour)	
22	Benefits, co-benefits and policy implications of restoring coastal wetlands in Auckland: a climate change perspective (desktop)	Auckland region	Assessing whether and how the mitigation and adaptation benefits of coastal wetlands could be integrated into urban land use and land use change decision making; the research reviews global and national knowledge, estimates the carbon sink potential of Auckland's coastal wetlands, and discusses a variety of policy and management responses	PhD thesis (Khodabakhshi 2017)	National Coastal Wetland Blue Carbon Strategy, Socio-Ecological Research, Market Development and Policy, Coastal Wetland Habitat Protection and Restoration	Degraded to healthy	Mangrove, saltmarsh, seagrass	No	Behnaz Khodabakhshi (UOA, lead); Stephen Knight-Lenihan, Marjorie Van Roon, Luitgard Schwendenman (UOA); Catherine Lovelock (University of Queensland); Andrew Swales (NIWA); Neil Saintilan (Macquarie University); Peter Newsome (MW-LR)	UOA
23	Blue carbon habitat in the Otago region (desktop)	Otago region	Identifying the extent, and loss, of blue carbon habitats in 16 estuaries; estimates of the current above- and below-ground carbon stocks and sequestration rates were calculated	Technical report (Hoe et al. 2023)	National Coastal Wetland Blue Carbon Strategy, Socio-Ecological Research, Market Development and Policy,	Degraded to healthy	Saltmarsh, seagrass, unvegetated	No	Sam Thomas (ORC, lead); Maureen Ho (contractor); Anna Berthelsen, Dana Clark (Cawthron); Kerryn Roberts (Salt Ecology)	ORC

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
					Coastal Wetland Habitat Protection and Restoration					
24	Restore the Meadows								Dana Clark, Anna Berthelsen (Cawthron, co-leads); partnership with local iwi, Port Nelson, OneFortyOne, UOW	Westpac NZ Government Innovation Fund, Simplicity Foundation, Catalyst Fund, Friends of Nelson Haven and Tasman Bay Inc., NCC, Port Nelson, OneFortyOne, UOW, Envirolink (MBIE)
24A*	(Field)  Link:  <a href="https://cawthron.org.nz/research/our-projects/seagrass-restoration/#:~:text=Cawthron%20Institute%20has%20partnered%20with,change%20and%20improve%20ecosystem%20health">cawthron.org.nz/research/our-projects/seagrass-restoration/#:~:text=Cawthron%20Institute%20has%20partnered%20with,change%20and%20improve%20ecosystem%20health</a>	Nelson (Nelson Haven, Wakapuaka River, Waimea Estuary)	Developing new technologies for seagrass restoration	Reports (Clark and Berthelsen 2021; Hindmarsh and Hooks 2022; Fearn et al. 2023); technical report (March	Coastal Wetland Habitat Protection and Restoration	Fairly healthy	Seagrass	No		



No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
				2024); PhD thesis (late 2026)						
24B *	(Desktop)	National	Developing a Seagrass Restoration Blueprint	Report (March 2024)	Coastal Wetland Habitat Protection and Restoration	n/a	Seagrass	No		
25	Pre-feasibility assessment for a blue carbon voluntary market in Aotearoa; seagrass and saltmarsh sites around Aotearoa (desktop)  Link:  <a href="https://nature.org/en-us/about-us/where-we-work/asia-pacific/new-zealand/stories-in-new-zealand/blue-carbon">nature.org/en-us/about-us/where-we-work/asia-pacific/new-zealand/stories-in-new-zealand/blue-carbon</a>	National	Undertaking a technical feasibility assessment for the application of voluntary carbon markets for saltmarsh and seagrass restoration	Report (Weaver et al. 2022)	Market Development and Policy	Degraded	Seagrass, saltmarsh	No	Olya Albot (TNC, lead); landowners; subcontractors Sean Weaver (Ekos), Anna Berthelsen (Cawthron), Tom Bennion (Bennion Law)	TNC

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
26	Contributions of coastal blue carbon to climate change mitigation (desktop)  Link:  <a href="https://www.youtube.com/watch?v=XvA1NnmDFbl">youtube.com/watch?v=XvA1NnmDFbl</a> ; <a href="https://www.newshub.co.nz/home/new-zealand/2023/09/scientists-uncover-how-blue-carbon-can-help-new-zealand-s-fight-against-carbon-emissions.html">newshub.co.nz/home/new-zealand/2023/09/scientists-uncover-how-blue-carbon-can-help-new-zealand-s-fight-against-carbon-emissions.html</a>	National	Providing a preliminary estimate of the contribution of coastal blue carbon to climate change mitigation in Aotearoa	Research paper (Ross et al. 2023)	Socio-Ecological Research, Market Development and Policy	n/a	Mangrove, saltmarsh, seagrass	No	Finn Ross (Deakin University – Blue Carbon Lab, lead); Dana Clark, Anna Berthelsen (Cawthron); Olya Albot (VUW); Richard Bulmer (Tidal Research); Josie Crawshaw (BOPRC); Peter McCreadie (Deakin University – Blue Carbon Lab)	Deakin University – Blue Carbon Lab, Seagreen Ltd
27	Coastal wetland blue carbon policy research (desktop)	National	Advancing the development of a blue carbon credit scheme in Aotearoa by exploring key aspects, including environment and planning law, greenhouse gas inventories and carbon trading, coastal land tenure and carbon rights, existing blue carbon schemes and methodologies, market demand and dynamics, and the co-benefits of blue carbon projects such as biodiversity conservation; this research will also be supported by	Technical report (mid-2024)	Market Development and Policy	Degraded	Saltmarsh, mangrove, seagrass	No	Olya Albot (TNC, lead); partner Kate Hebblethwaite (MfE); subcontractors (Jacobs, Environmental Accounting Services, Conservation International, Anderson Lloyd)	TNC, MfE

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
			engagements with central and local government and iwi							
28	Quantifying carbon sequestration and greenhouse gas emissions from blue carbon habitats in Aotearoa								Richard Bulmer (Tidal Research, programme lead)	MBIE Smart Ideas
28A	Stocktake of historic carbon core data and new sampling (field and desktop)	Whangārei Harbour	Collecting core samples (to measure carbon stocks and sequestration rates), measuring greenhouse gas emissions and undertaking mapping for a variety of habitats; carrying out a stocktake of all historic carbon core and carbon flux data to calculate the average and variance for each habitat type (this includes sign work as part of UOW and UOA theses – e.g. Bulmer et al. 2015, 2016, 2020; Suyadi et al. 2020)	Technical report – review (Sept 2024)	Market Development and Policy, National Coastal Wetland Blue Carbon Strategy	Degraded to pristine	Saltmarsh, mangrove, seagrass, unvegetated	No	Richard Bulmer (Tidal Research, lead); Phoebe Stewart-Sinclair, Orlando Lam-Gordillo, Carolyn Lundquist, Steph Mangan (NIWA); Karin Bryan, Jack Hamilton (UOW); partnering with Patuharakeke Te Iwi Trust Board via Taryn Shirkey (Patuharakeke Taiao unit)	

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
28B	BlueCAM (desktop)	Whangārei Harbour	Adapting the BlueCAM methodology to Aotearoa; determining a way to calculate the amount of carbon in sediments and relative credits from different restoration work, using Whangārei Harbour as a case study	Technical report (Sept 2024)	Market Development and Policy, Coastal Wetland Habitat Protection and Restoration	Degraded to pristine	Saltmarsh, mangrove, seagrass, unvegetated	Yes	Phoebe Stewart-Sinclair (NIWA, lead); Richard Bulmer (Tidal Research); Orlando Lam-Gordillo, Carolyn Lundquist, Steph Mangan (NIWA); Jack Hamilton (UOW); partnering with Patuharakeke Te Iwi Trust Board	
28C*	Mapping (desktop)	National	Using satellites to map the extent of seagrass, mangroves and saltmarsh; using digital elevation models to predict tidal influence, along with land use and ownership, in order to identify degraded sites and restoration opportunities; restoration costs will be collated from across Aotearoa, with the addition of some international data	GIS project, technical report (Jan 2024)	Market Development and Policy, National Coastal Wetland Blue Carbon Strategy	Degraded to pristine	Saltmarsh, mangrove, seagrass	No	Phoebe Stewart-Sinclair (NIWA, lead); Richard Bulmer (Tidal Research); Orlando Lam-Gordillo, Carolyn Lundquist, Steph Mangan (NIWA); Jack Hamilton (UOW)	

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
28D	Barriers (desktop)	National	Undertaking a review of legal and policy barriers to coastal restoration within carbon emissions trading systems (voluntary and Emissions Trading Scheme)	Technical report (Jan 2024)	Market Development and Policy, National Coastal Wetland Blue Carbon Strategy	n/a	Seagrass, saltmarsh, mangrove	No	Phoebe Stewart-Sinclair (NIWA, lead); Richard Bulmer (Tidal Research); Orlando Lam-Gordillo, Carolyn Lundquist, Steph Mangan (NIWA); Karin Bryan, Jack Hamilton (UOW); Liz Macpherson (UOC); Taryn Shirkey (Patuharakeke Taiao unit)	
28E	Guidance (desktop)	National	Developing blue carbon management guidelines, a toolbox and infographics; the toolbox will include information on planting, hydrology management, unintended consequences, management considerations with climate change, and social and economic considerations	Restoration guidance (June 2024)	Market Development and Policy, National Coastal Wetland Blue Carbon Strategy, Empowering Communities	Degraded	Saltmarsh, mangrove, seagrass, unvegetated	No	Richard Bulmer (Tidal Research, lead); Phoebe Stewart-Sinclair, Orlando Lam-Gordillo, Carlyn Lundquist, Steph Mangan (NIWA); Karin Bryan, Jack Hamilton (UOW); partnering with Patuharakeke Te Iwi Trust Board via Taryn Shirkey (Patuharakeke Taiao unit)	

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
29*	Using remote sensing to quantify coastal vegetation cover	National	Developing an open-source coastal vegetation mapping tool focusing on seagrass, macroalgae, mangroves and saltmarsh with an associated user guide; this will include documented case studies that demonstrate the relative accuracy of coastal vegetation detection using satellite imagery	Vegetation mapping tool and case studies (early 2026)	Market Development and Policy, National Coastal Wetland Blue Carbon Strategy	Degraded to pristine	Seagrass, mangrove, saltmarsh	No	Melanie Burns (ECAN, lead); Leigh Tait, Steph Mangan, Rose Pearson, Hamish Biggs, Hamish Sutton (NIWA); Sam Thomas (ORC); Nuwan DeSilva (ES); Josie Crawshaw (BOPRC)	EnviroLink (MBIE)
30*	Transforming coastal monitoring	Auckland, Avon Heathcote, Jacobs River, New River/ Kaimata, Whangateau, Waikawa, Tauranga, Akaroa and Whangārei estuaries and harbours; Waimea and Delaware inlets; Mahurangi and Blueskin bays	Developing new tools for estuary health assessments using environmental DNA (eDNA) / microbial communities, which may provide insights into the microbial processes associated with carbon sequestration; developing a guidance document on how eDNA monitoring tools could be used alongside conventional monitoring and mātauranga Māori to assess estuary health	Research papers, technical reports (2025–2026)	Socio-Ecological Research	Degraded to pristine	Saltmarsh, mangrove, seagrass, unvegetated	No	Dana Clark (Cawthron, lead); in partnership with UOW, AC, Manaaki Te Awanui, Te Whānau o Tauwhao	MBIE Smart Ideas

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
31	Organic soils (desktop)	National	Updating the national map of organic soil extent using S-Map where available (with uncertainties); this is mostly relevant to inland wetlands, grasslands and croplands, but there may be some coastal overlap	Spatial layers, technical report (Sept 2023–Dec 2024)	Market Development and Policy	Degraded to pristine	Saltmarsh	No	Joel Gibbs (MPI, lead); Jordan Goodrich (MfE); MW-LR; UOW	MPI Greenhouse Gas Inventory Research Fund
32*	Wetland mapping – inland and coastal delineation  Link:  <a href="https://mpi.govt.nz/dmsdocument/57106-Greenhouse-Gas-Inventory-Research-Fund-2023-24-Priorities">mpi.govt.nz/dmsdocument/57106-Greenhouse-Gas-Inventory-Research-Fund-2023-24-Priorities</a>	National	Delineating inland and coastal vegetated wetlands, which is vital to implementing the 2013 IPCC wetlands supplement (IPCC 2014) for carbon credits; this project will develop an approach to extend the current New Zealand Land Use Map (LUM) to capture all coastal wetlands, as the current boundaries are incorrect	Spatial layers (mid-to late 2024; TBC as project is in development)	Market Development and Policy	n/a	Saltmarsh, mangrove	No	Joel Gibbs (MPI)	MPI Greenhouse Gas Inventory Research Fund

No	Title	Locations	Brief overview	Delivery output	Relevant pou	State of habitats	Habitats	Restoration project?	Team	Funding sources
33*	National publicly managed historic wetland analysis (desktop)  Link:  <a href="https://koordinates.com/layer/113000-areas-of-historic-wetland-that-are-now-grass-but-still-in-public-ownership-sept-2022">koordinates.com/layer/113000-areas-of-historic-wetland-that-are-now-grass-but-still-in-public-ownership-sept-2022</a>	National	Undertaking a national analysis of the present management of historic wetlands by central and regional government; includes lands leased or licensed by DOC for grazing	GIS layer Sept 2022, technical report to follow (early 2024)	National Coastal Wetland Blue Carbon Strategy, Coastal Wetland Habitat Protection and Restoration	Degraded	Saltmarsh	No	Tom Kay (F&B)	F&B
34	Organic carbon stocks and vulnerability in marine sediments (desktop)  Link:  <a href="https://pce.parliament.nz/exploure/marine-organic-carbon">pce.parliament.nz/exploure/marine-organic-carbon</a>	New Zealand exclusive economic zone scale (including harbours, estuaries, fiords)	Mapping the distribution of organic carbon in marine sediments around Aotearoa, and assessing its vulnerability to seafloor disturbance, particularly bottom trawling; includes the delivery of a client report and ongoing work at NIWA	Client report (Nodder et al. 2023), marine sediment organic carbon database, organic carbon distribution and vulnerability maps	Socio-Ecological Research	Degraded to pristine	Unvegetated	No	Scott Nodder (NIWA, lead); Geoffroy Lamarche (PCE); Scott Nodder, Sally Watson (NIWA)	PCE, NIWA, with extensive data provided by a wide range of people



# Agencies and groups

The following table shows the agencies and groups involved in the coastal wetland blue carbon projects listed in the project catalogue.

Sector and name	Abbreviation
Iwi and hapū	
Manaaki Te Awanui	
Manawhenua ki Mohua	
Ngāi Takato	
Ngāti Apa ki te Rā Tō	
Ngāti Kuri	
Ngāti Mutunga	
Ngāti Tama	
Patuharakeke Te Iwi Trust Board	
Te Ātiawa	
Te Puuaha Hapū	
Te Rarawa	
Te Rūnanga o Ngāti Whakaue ki Maketū	
Te Whānau o Tauwhao	
<b>Environmental</b>	
Astrolabe Community Trust (Maketu)	
Conservation International	
Forest & Bird	F&B
HealthPost Nature Trust	
Live Ocean	

Nelson Tasman Climate Forum	
Parliamentary Commissioner for the Environment	PCE
Tasman Environmental Trust	TET
The Nature Conservancy Aotearoa New Zealand	TNC
Whaka-Ora Healthy Harbour	
<b>Private</b>	
Art + Alchemy	
Catalyst Fund (Royal Society)	
Friends of Nelson Haven & Tasman Bay Inc.	
Kidson Investments Ltd	
Lauren Walker Ltd	
NZ Andy	
OneFortyOne	
Pic's Peanut Butter	
Port Nelson	
Seagreen Ltd	
Simplicity Foundation	
Westpac NZ	
<b>Central and local government</b>	
Auckland Council	AC
Bay of Plenty Regional Council	BOPRC
Department of Conservation	DOC
Environment Canterbury	ECAN
Environment Southland	ES
Ministry for Primary Industries	MPI
Ministry for the Environment	MfE
Ministry of Business, Innovation & Employment	MBIE
Nelson City Council	NCC
Otago Regional Council	ORC

Taranaki Regional Council	TRC
Waikato Regional Council	WRC
<b>Research and education providers – Aotearoa</b>	
Anderson Lloyd	
Beca	
Bennion Law	
Cawthron Institute	Cawthron
Ekos	
Environmental Accounting Services	
Lucas Associates	
GNS Science	GNS
Jacobs	
Manaaki Whenua Landcare Research	MW-LR
National Institute of Water and Atmospheric Research Ltd	NIWA
Nelson Marlborough Institute of Technology	NMIT
Pattle Delamore Partners	PDP
Salt Ecology	
Tidal Research	
University of Auckland	UOA
University of Canterbury	UOC
University of Waikato	UOW
Victoria University of Wellington	VUW
<b>Research and education providers – international</b>	
Deakin University – Blue Carbon Lab	
Edith Cowan University	
International Atomic Energy Agency	
Macquarie University	
University of Queensland	
University of York	

US Geological Survey	
<b>Other</b>	
New Zealand Marine Sciences Society	NZMSS

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