ABM
ASSOCIATION OF BAYSIDE MUNICIPALITIES

Topic:	Blue Carbon - introduction to initiatives and opportunities in Port Phillip Bay.

This forum provided an introduction to blue carbon and the Deakin University Blue Carbon Lab, looking at nature-based solutions to climate change (the co-benefits of coastal protection, biodiversity, fisheries, tourism). It also covered the relevance of blue carbon to Port Phillip Bay councils, the opportunities and how to get involved.

Date: Wednesday 15th July 2020

Speaker: Dr Peter Macreadie
Associate Professor of Environmental Science and Head of Blue Carbon Lab
Deakin University
www.bluecarbonlab.org

Recording: Click here to access a recording of this forum and all other *Talk of the Tide* events.
Access password: !m@v!

Resources:

www.blucarbonlab.org
Facebook: @ Blue Carbon Lab
Twitter: @BlueCarbonLab @PeterMacreadie #bluecarbonarmy

Victorian Coastal Wetland Restoration Program (ARC GIS Storymaps)
The Program targets threatened, high-priority conservation areas along the Victorian coast, spanning Port Phillip Bay, Western Port Bay, and the Gippsland Lakes. Coastal wetlands in each of these locations have been highly degraded. Port Phillip Bay, for example, has lost ~50% (1700 ha) of its coastal saltmarsh due to agricultural development, anthropogenic modifications to tidal flow, and urban development.

The Victorian Coastal Wetland Restoration Program incorporates four key outcomes:

1. Development of a management plan to take industrial land (former salt works) and transform back into a natural wetland to improve the existing ecological features (biodiversity and Blue Carbon).
2. Completion of on-ground, low-cost coastal wetland protection works, including fencing and weed management that preserved and improved wetland habitat.
3. Working with Traditional Owners to protect sites of cultural heritage across a coastal landscape within Port Phillip Bay.
4. Engaging the community in appreciating coastal wetlands and contributing to the ongoing monitoring of coastal wetland protection works.

Evaluating coastal natural capital to support smart decision-making investments
Coastal wetlands, such as mangroves, saltmarshes and seagrasses, are Australia's forgotten coastal habitats. However, these habitats provide many benefits to humans

including supporting coastal fisheries, protecting our coastlines, storing carbon (aka Blue Carbon) and providing areas for tourism and recreational activities.

Mapping Ocean Wealth Project in Australia

This project is a partnership between The Nature Conservancy, Deakin University, Department of Land Water and Planning, Victoria, Victorian Fisheries Authority, Parks Victoria, NSW Department of Primary Industries – Fisheries, and NSW Office of Environment and Heritage with support from The Thomas Foundation, HSBC Australia, Ian Potter Foundation and Australian Research Council.

Additional information can be found in this brochure, or at this website.

Mapping Ocean Wealth Explorer

The Mapping Ocean Wealth data viewer is a live online resource for sharing understanding of the value of marine and coastal ecosystems to people. It includes global maps, regionally specific studies, reference data, and several "apps" providing key data analytics. Maps and apps can be opened according to key themes or geographies. The navigator the left of the maps enables you to add or remove any additional map layers as you explore. Information keys explain how the maps were made and provide additional links. Further information and resources
http://maps.oceanwealth.org/

Teal Carbon

Teal Wetlands for Carbon Offsetting
Victoria's Teal Carbon

Publications:

Estimating the Potential Blue Carbon Gains from Tidal Marsh Rehabilitation: A Case Study from South Eastern Australia.

Mapping Ocean Wealth Australia – The Value of Coastal Wetlands to People and Nature

Carbon stocks, sequestration, and emission of wetlands in south eastern Australia.

Drivers and modelling of blue carbon stock variability in sediments of south-eastern Australia.

Variability and vulnerability of coastal 'blue carbon' stocks: A case study from southeast Australia.

Media Coverage:

Some media coverage can be found here and here.

Policy Connections:

- Marine and Coastal Policy
- DELWP' s commitment to zero net emissions by 2050

- Biodiversity 2037 target
- RAMSAR obligations

Suggested Future Work to Support Local Government Action in Blue Carbon:

- Detailed modelling of blue carbon stocks and sequestration rates for your council area.
- Economy of scale in terms of costs if councils want to work together, as it would be easy for Blue Carbon Lab to do some local assessments
- Opportunities for signage to inform communities about blue carbon in local catchments.
- On ground works / restoration – involving prioritisation analysis of best sites (greatest "bang for carbon buck"), feasibility assessments, restoration action plans, on-ground works and citizen science events.

Undertaken work with Hobsons Bay City Council.
Upcoming program with Geelong Ports.

Your Questions

Q. What is the 'big question mark' around the role of salt marsh in carbon drawdown which you mentioned at the head of your presentation?
Around seaweed, not salt marsh. Salt marsh has been a question mark in Great Barrier Reef project where there was no salt marsh data. The amount of macroalgae (seaweed) grown naturally around the Australian coast is 250,000km^2 which is roughly the area of Victoria. The amount of carbon produced by that seaweed, if sequestered in the deep ocean it would offset all of Australia's omissions. The research big question is, to what extent does macroalgae (seaweed) contribute to carbon drawdown? Currently not factored into our greenhouse gas inventories. Currently being researched via Blue Carbon Lab.

Q. Are the research papers published and available?
Several papers / resources mentioned in the presentation are provided as links on the previous page. A full list of papers can be found here. If there is a specific paper you are interested in please in contact Jacquie (ABM) or Peter (Blue Carbon Lab).

Q. Insurance incentives – tell us more about your thoughts on how this might take place?
Blue Carbon Lab working around Australia observing the value of mangroves in coastal protection. Currently working with QLD ports who are spending $M's each year to insure their coastal assets, looking at if they could reduce their insurance premiums and the number of times, they have to rebuild their shorelines by rehabilitating mangroves. Could we bring back coastal wetlands (mangroves), reducing the damage bill for insurance companies next time a major storm comes through? This is an area that warrants further investigation.

Q. Have you faced many hurdles from different levels of government to go out and collect samples? Are there locations you want to collect data at but can't get there?
Yes! To do a new project it can take six months plus to get permits through – permits that Blue Carbon Lab consider low impact / benign. Other hurdle is access to information about indigenous artefacts on coastal land that need to be considered before sampling.

One of Blue Carbon Lab's initial programs in Victoria was funded by the coastal CMAs which included a permit to sample all 2000km of coastline.

Q. What are the factors that make some wetlands better than sequestering than others?
Found areas of high rates of sequestration have high sediment deposition, such as land runoff during rainfall event or areas of flood/drought cycles (really muddy environments). They are the environments more likely to keep pace with sea level rise, as the environment can accrete vertically as the plants build up layer on layer. Another mystery is microbes – found that areas that are anoxic (low oxygen) microbes don't metabolise the carbon. In these areas the carbon is stored and not released into the atmosphere as CO_2. In general, the more pristine wetlands seem to do a better job of preserving carbon.

Q. Is blue carbon, by definition, to do with coastal only or are there inland waters opportunities?
Blue carbon is anything in the coast and ocean. Teal carbon is inland carbon – billabongs, freshwater swamps, freshwater wetlands, farm dams. Deakin University PhD student published first paper internationally on emissions from farm dams – per unit area there are more emissions from Australian farm dams than any other water body. Research found if you reduce nutrient inputs by 25% you can

approximately halve the emissions from farm dams. Future opportunities in the teal carbon space, such as working with farmers in an emission reduction program – floating wetlands that would mop up nutrients but also provide hotspots for biodiversity, reduce evaporation and improve water quality. More information here and here.

Also here is a paper on teal carbon in Victoria: Carnell PE, Windecker SM, Brenker M, Baldock J, Maque P, Brunt K, Macreadie PI (2018) Carbon stocks, sequestration, and emission of wetlands in south eastern Australia. Global Change Biology | https://doi.org/10.1111/gcb.14319

Q. Can I please get some more information regarding the financial value of birdwatching.
Paper not currently published, but data from the research is shared via the e-bird database. Best data is coming from around Port Phillip Bay and Westernport Bay. Found birdwatchers spending approximately $111US per trip. Further information on bird watching values at Mapping Ocean Wealth Australia – The Value Of Coastal Wetlands To People And Nature (page 20, Figure 4).

Graham's Wetland Reserve (Wyndham City Council) discussing possibility of site becoming a RAMSAR site with DELWP, and potential of the site long term.

Suggestions to also try Birdlife Australia will have data on the economic value of birdwatching.

Q. With the fencing project (Westernport) how did you ensure a long-term outcome? Was the land leased or acquired?
No legal agreements of covenants with landholders established. Worked through groups like Greening Australia and the CMAs who knew the landholders interested in conservation. Concerned a legal structure would prevent uptake. Progressed through 1:1 on-farm conversations.

Work undertaken on public land (Parks Victoria) and private land. Community can access the public land. The ARC GIS story maps show the public and private land sites.

Q. We have very active groups at Ricketts Point Marine Reserve. Are you active in the reserve?
Blue Carbon Lab not undertaken work at Ricketts Point – rocky reef, intertidal environment and not much blue carbon extent. When engaging community, rely on project partners to inform who needs to be consulted.

Q. I would have thought the phytoplankton would also be a significant component of blue carbon?
It's a good question. Phytoplankton tends to be mostly part of the temporary carbon pool due to its high turnover, and does not tend to contribute to long-term drawdown (an exception being if it ends up in the deep ocean, which was something scientists tried to accelerate via 'iron fertilisation'). That is to say that phytoplankton take up a lot of carbon, but then when they die, they release it back to the atmosphere. You can think of it a bit like grass in terrestrial settings.

Q. You mention working with the coastal Catchment Management Authorities. Have you got any data for East Gippsland and the Gippsland Lakes?
When the Blue Carbon Lab first formed, Corangamite CMA drew together the other four CMAs to fund a statewide blue carbon project. Most impressive systematic data set in Australia and has been used to report back to the United Nations Framework on Climate Change and the Australian Government. Some media coverage can be found here and here.

Additional research papers:

Ewers Lewis, C. J., Young, M. A., Ierodiaconou, D., Baldock, J. A., Hawke, B., Sanderman, J., Carnell, P. E., and Macreadie, P. I. 2020 Drivers and modelling of blue carbon stock variability in sediments of southeastern Australia. Biogeosciences, 17, 2041–2059

Ewers CJ, Carnell PE, Sanderman J, Baldock JA, Macreadie PI (2017). Variability and vulnerability of coastal 'blue carbon' stocks: A case study from southeast Australia. Ecosystems *21:* 263-279

Q. Opportunity for the identified carbon sinks to be incorporated into State Planning schemes to protect them – is there discussions with DELWP on this?
Opportunities for blue carbon to be picked up in policy to inform and support planning decisions. Question will be explored further with DELWP / VMaCC as the Marine and Coastal Strategy preparations commence.

Keen to see strategy look in detail for sites of additionality for carbon drawdown – systematic estimation and mapping of areas of potential wetland restoration and cost-benefit analysis to understand the trade-offs. Also, ways to reward activities that improve wetlands (state of the environment in general) – incentives for organisations and individuals doing activities that have a positive impact on the environment.

Q. We have a marine and coastal strategy being prepared this year…what should the strategy say about blue carbon to realise some of the investments/approaches you've talked about today?
Blue carbon part of the approach to dealing with climate change.

Q. Are there opportunities in the current Environment Protection and Biodiversity Conservation Act review to strengthen wetland protection?
And RAMSAR obligations…and Victorian Climate Strategy. ABM to take up question with DELWP.

Q. Did you say that seagrass meadows, tidal marshes, and mangrove forests are half of all blue carbon ecosystems and draw down carbon 40 times faster than green carbon ecosystems?
Seagrass meadows, tidal marshes, and mangrove forests occupy 1% of the sea floor and sequester more than half the ocean's carbon.

Q. Can the research be integrated into the RASP for the western side of Port Phillip Bay?
ABM will follow up with the Port Phillip and Westernport CMA.

Feedback
Thanks for an excellent presentation Peter
Thanks, Peter, for the really interesting presentation
Great presentation
Great presentation. One of the better webinars I have attended recently
Thanks Peter. Great presentation
Inspiring at this time when we need to be inspired! Thanks Peter and ABM.
Thanks, really interesting :)
Very informative presentation. Will have to re watch to digest all the possibilities.
Just excellent, thanks so much!
Thanks - very interesting
Thank you Peter and Jacquie. Very interesting!

ASSOCIATION OF BAYSIDE MUNICIPALITIES

Attendance

33 participants