



# Mangrove and seagrass research at Deakin University

A/Prof. Peter Macreadie

Western Port Environment Research Forum

12 February 2019 – Cardinia Cultural Centre

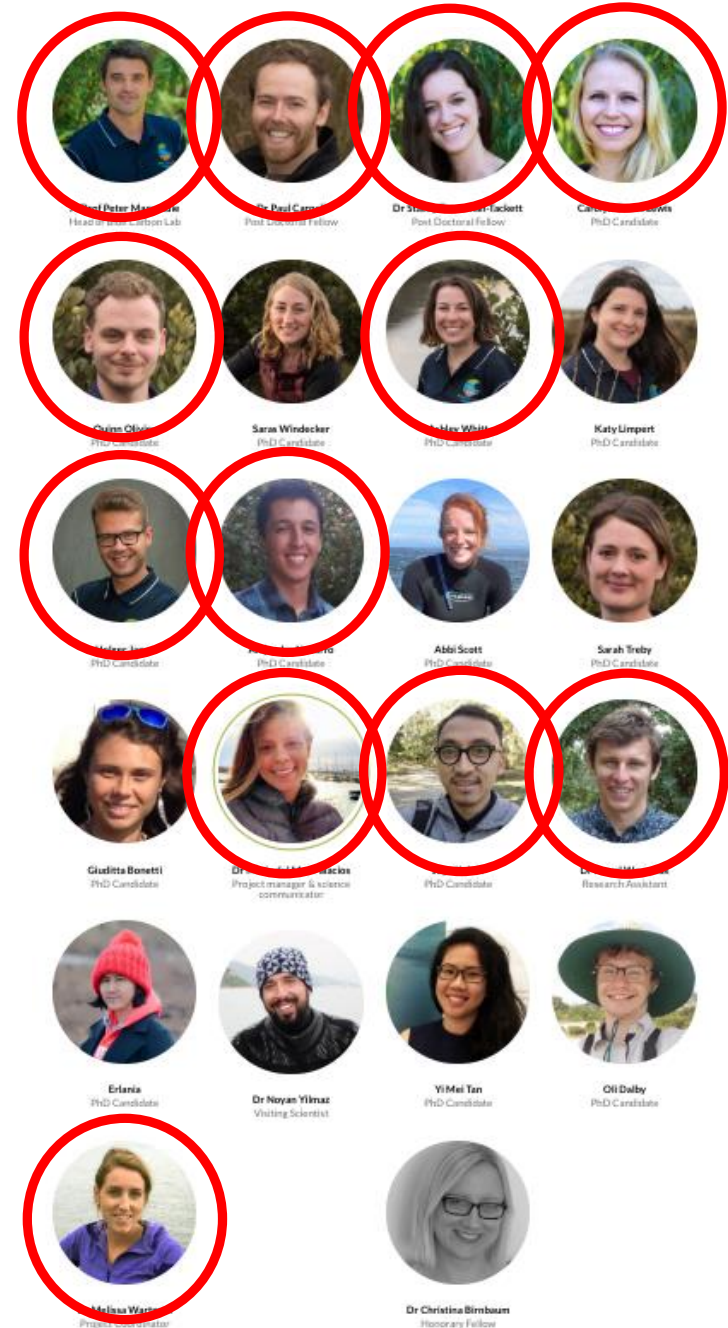



@BlueCarbonLab  
#BlueCarbonArmy

# Who we are



Innovative research solutions for helping to mitigate climate change and improve natural capital, while also contributing to jobs, economic growth, capacity building and community wellbeing.





# March of the Mangroves: drivers of encroachment into salt marshes of Western Port Bay

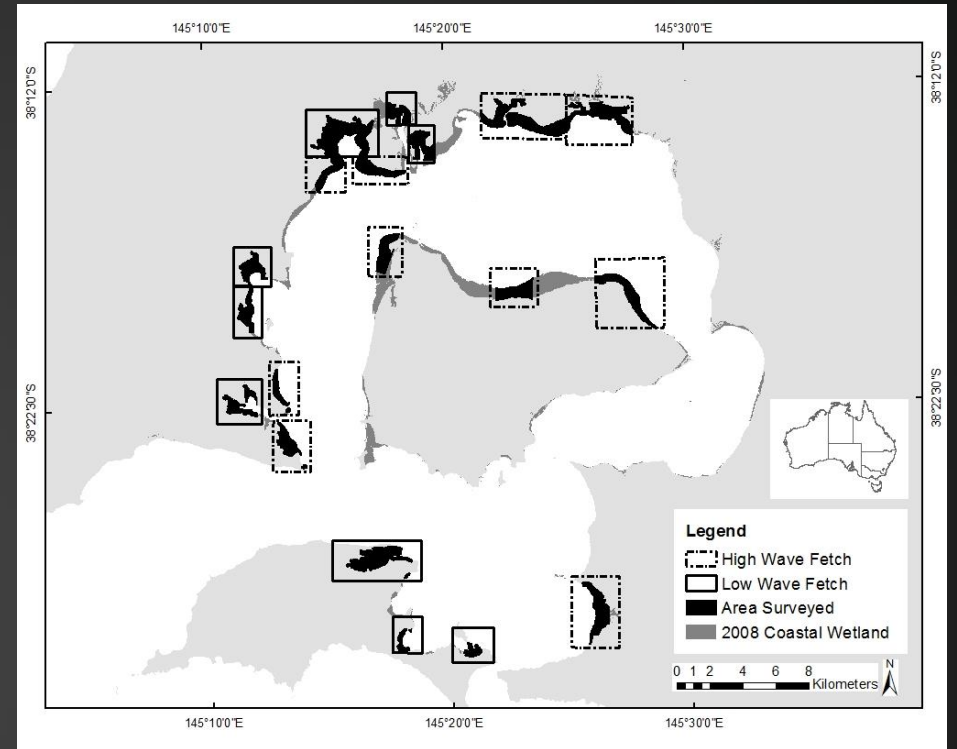
## Ashley Whitt

Supervisors: Peter Macreadie, Rhys Coleman, Chris Gillies, Catherine Lovelock



How has mangrove and saltmarsh distribution changed?

Rewind...

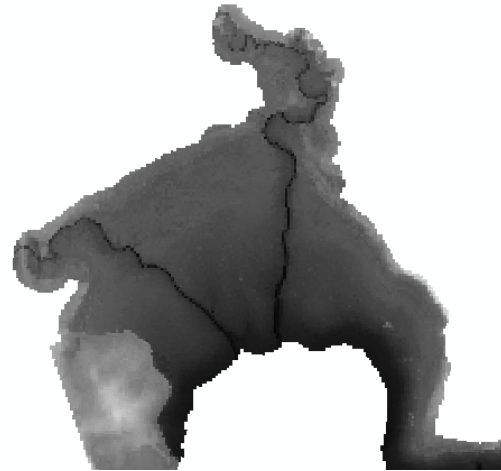




Spectral



Textures



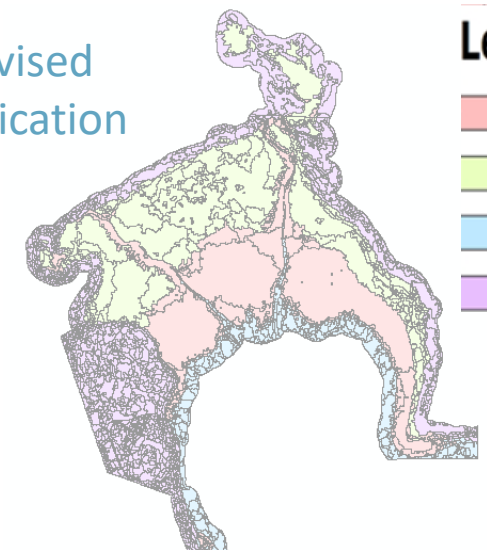
Elevation





Segmentation



Supervised  
classification



**Legend**

-  mangrove
-  salt marsh
-  water
-  upland/other

Mangroves are marching into salt marsh!!!



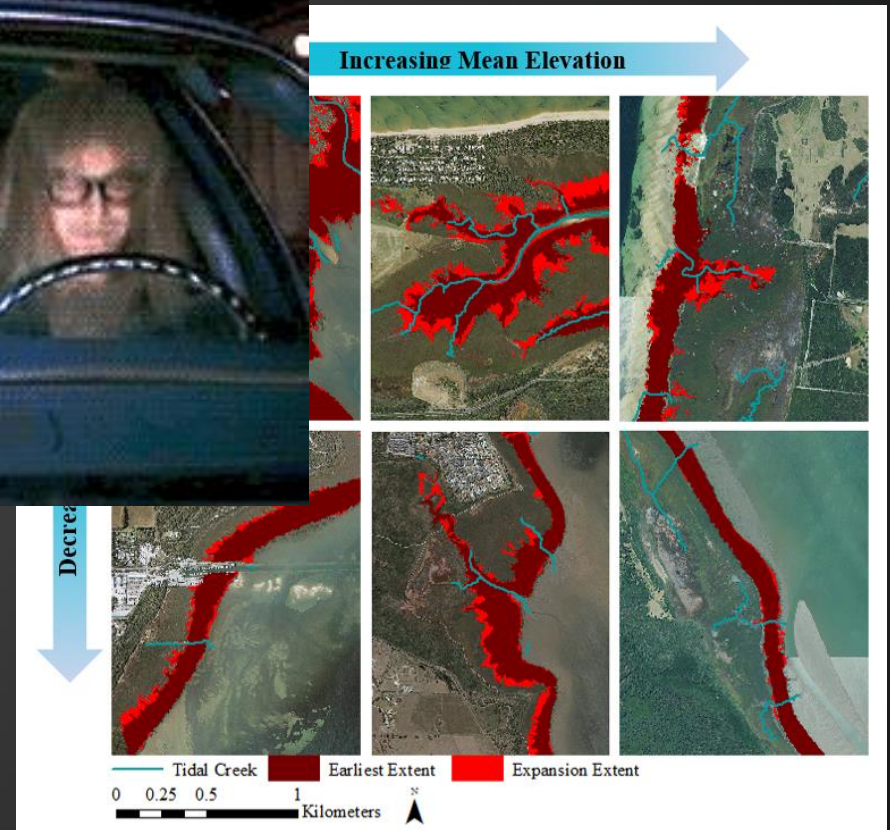
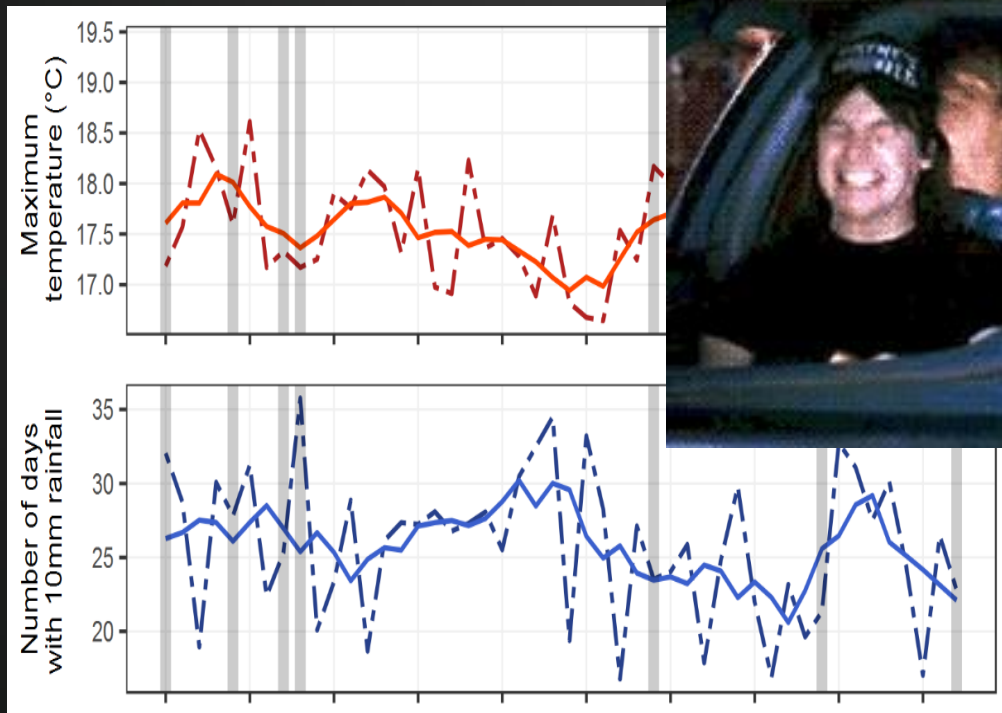
# What's driving change?



Climatic Drivers



Geomorphic Drivers



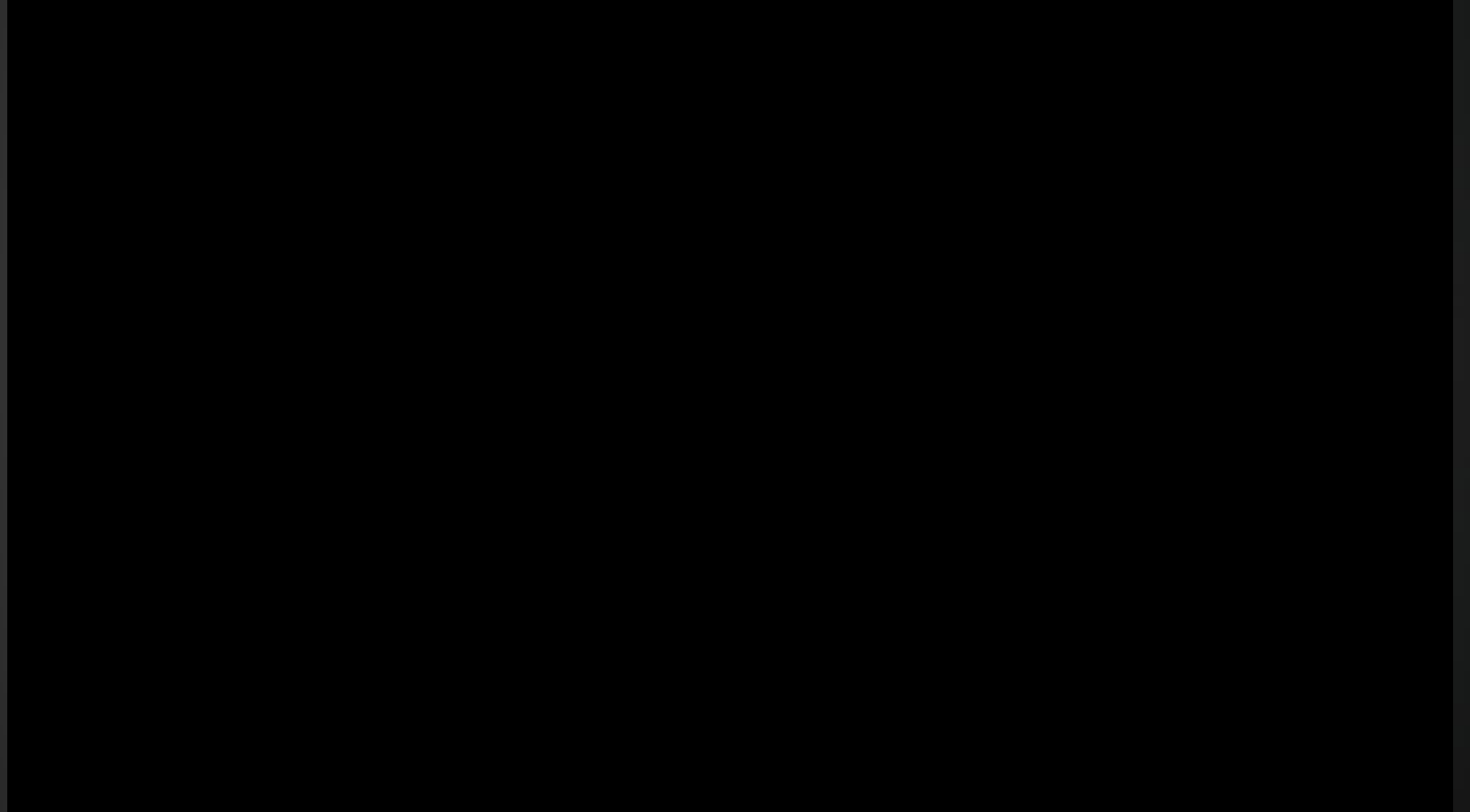
# The application of Unmanned Aerial Vehicles (UAVs) to estimate above-ground biomass of mangrove ecosystems



Alejandro Navarro –  
PhD candidate

(Principal Supervisor:  
Dan Ierodiaconou)

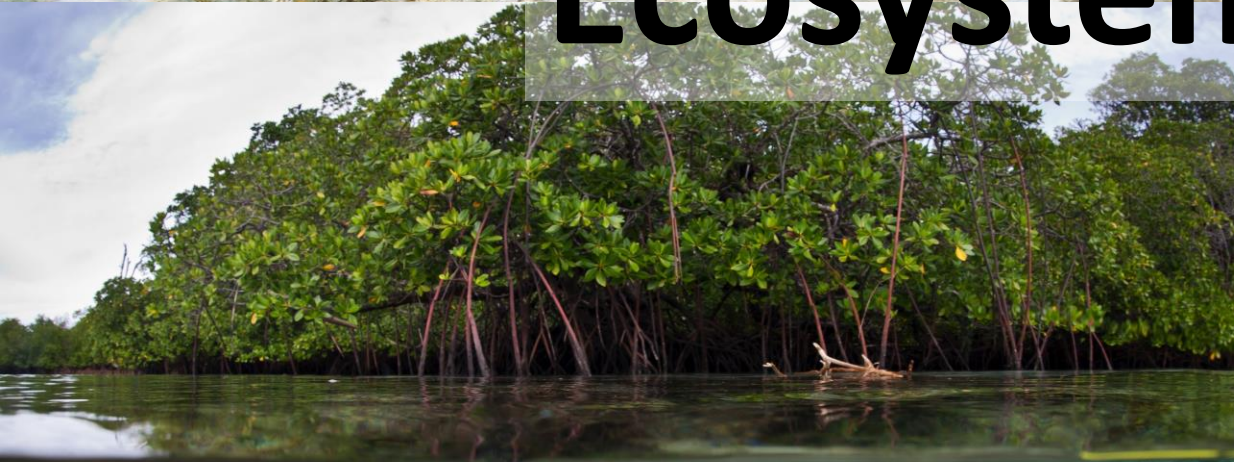
[ahnavarr@deakin.edu.au](mailto:ahnavarr@deakin.edu.au)







# Ecosystem services





# Blue Carbon

Carbon that is captured and stored by the oceans

## Major players

Seagrass meadows



Tidal marshes

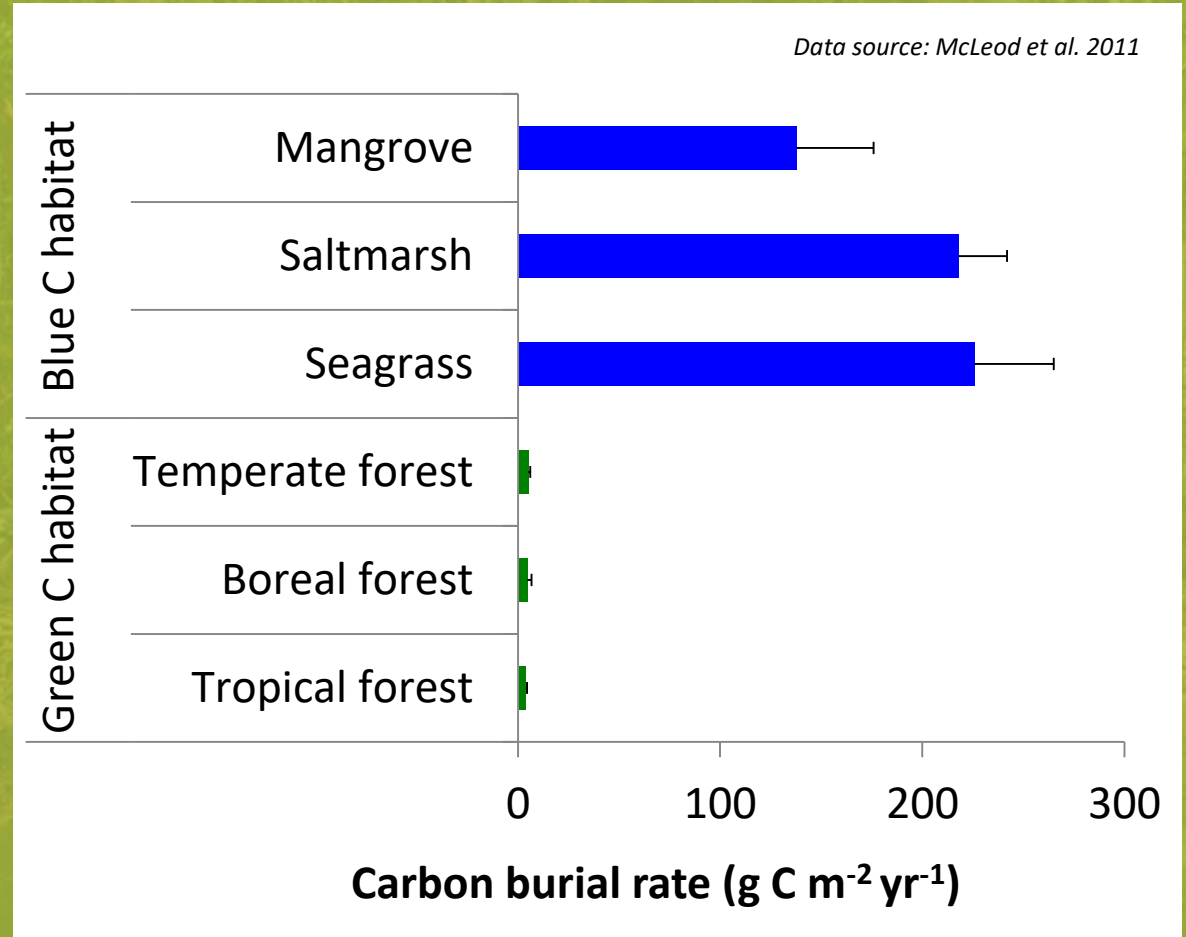


Mangrove forests



# Blue Carbon

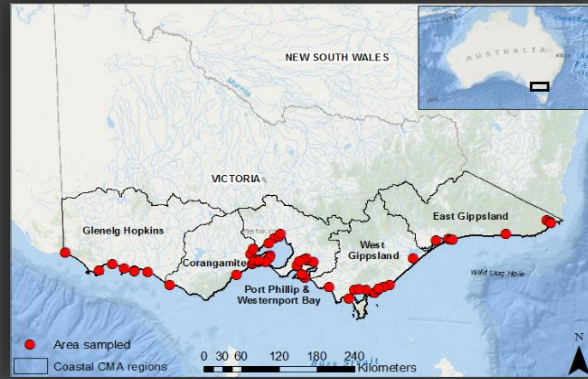
What's all the fuss about?



# Blue Carbon Distribution, Drivers, & Disturbance

Blue carbon stock  
assessment of Victoria

Ewers Lewis et al. 2017  
*Ecosystems*



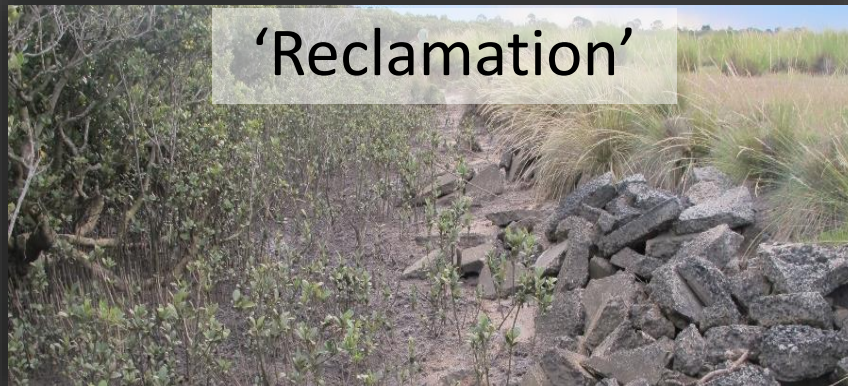
Modelling drivers of  
carbon stock variability

- improved mapping
- maximizing carbon gains  
through targeted  
restoration



Carolyn J. Ewers Lewis, M.S.  
PhD Candidate

## Impacts of disturbance on blue carbon stocks



What is the fate of carbon stocks in sediments that are drained or eroded?



Blue Carbon Lab  
A DEAKIN IDEA

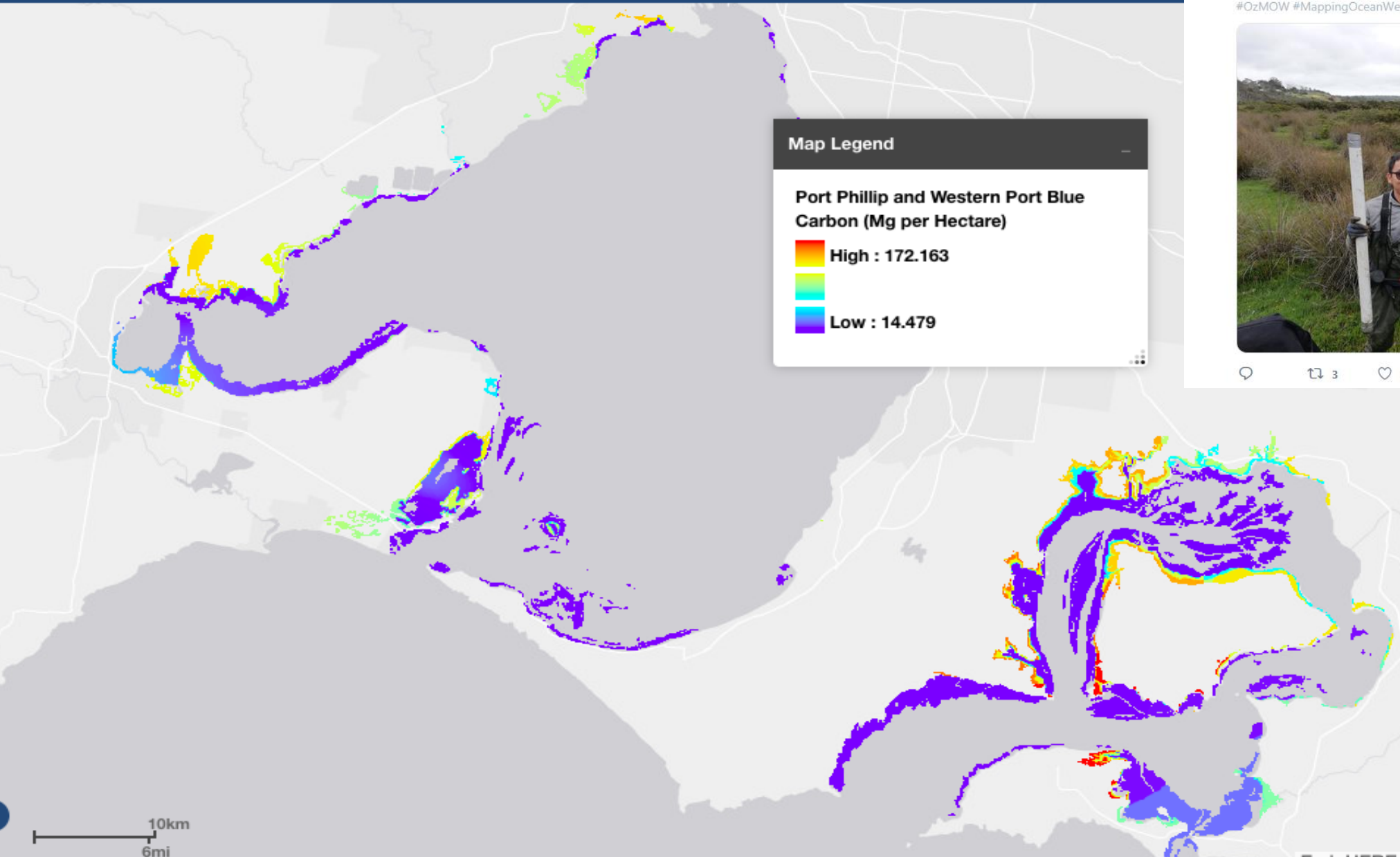


**Australian Research Council Linkage Grant**  
**Optimal management of coastal ecosystems**  
**for blue carbon sequestration**



# Atlas of Ocean Wealth Mapping Ocean Ecosystem Services

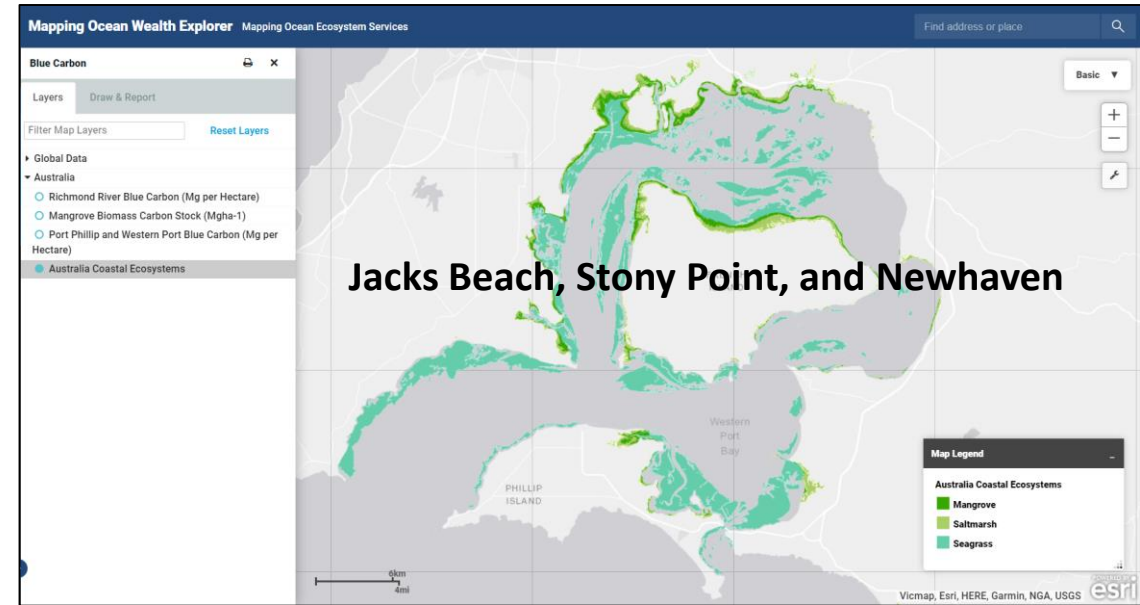
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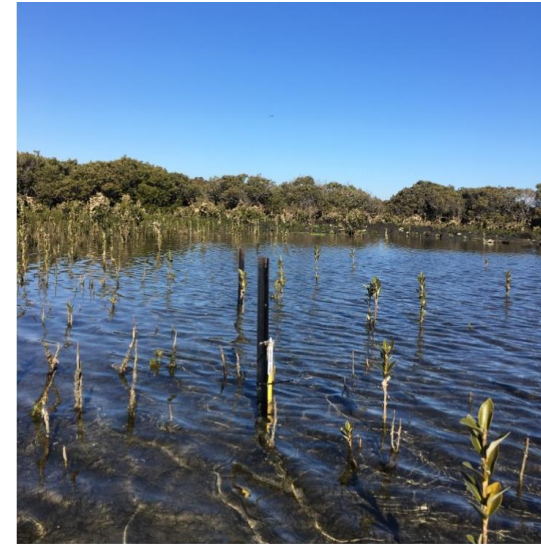
# Coastal protection



**Objective:** estimate the economic values provided by ecosystems by protecting coastal areas from flooding and erosion



<http://maps.oceanwealth.org/>



*Wave logger deployments*





# TeaComposition H<sub>2</sub>O

Global Wetland Decomposition Initiative



#TeaCompositionH2O



**>300 sites, 100 Groups, 32 Countries  
Freshwater & Marine**



← Rhyll!



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# Victorian Wetland Restoration Program

## 1. Restoration Action Plan for the Avalon Coastal Reserve



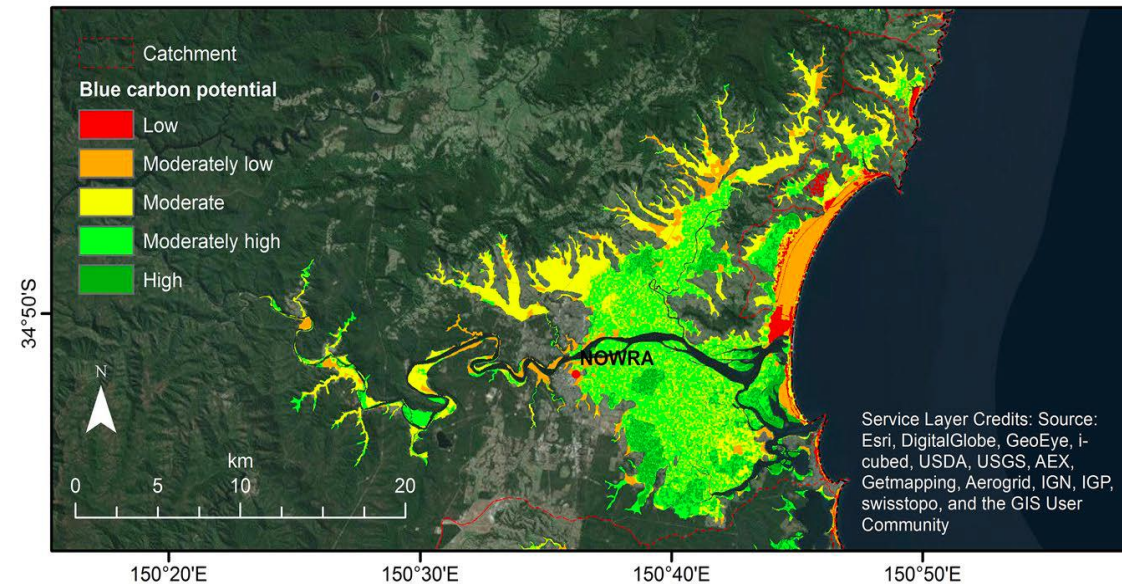
## 3) Remedial work with Traditional Owners at 16 coastal sites



## 2) On-ground restoration of coastal saltmarsh/mangrove around Vic (incl. Bass River!)



# Avoiding emissions and increasing sequestration



Kerrylee R, Macreadie P, Kelleway J, Saintilan N (2018) Blue carbon in coastal landscapes: a spatial framework for assessment of stocks and additionality. *Sustainability Science* <https://doi.org/10.1007/s11625-018-0575-0>.



Australian Government  
Australian Research Council



Local Land  
Services  
Murray

# Thank you



[www.bluecarbonlab.org](http://www.bluecarbonlab.org)