ningaloo outlook

BHP

CSIRO

Shallow reefs

Damian Thomson, Mick Haywood, Melanie Trapon, Anna Cresswell, Emma Westlake

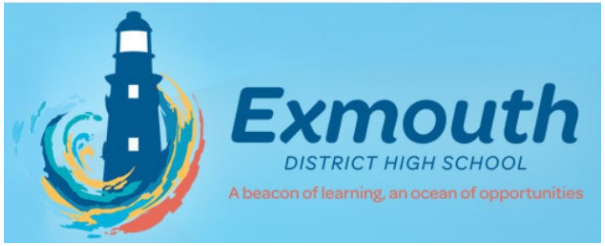
Ningaloo Outlook – A partnership between BHP and CSIRO

WESTERN COASTAL/OCEAN & ATMOSPHERE
www.csiro.au

CSIRO

Ningaloo Outlook is a BHP-CSIRO Industry-Science Marine Research Partnership investing A$5.4 million over five years to gather new knowledge on the Ningaloo reef and its important ecological values

Partners



Shallow reefs

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Overall objectives

- Provide annual assessment of the status of key ecological values at Ningaloo i.e. corals, fish, debris

- Engage the local community

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- Provide annual assessment of the status of key ecological values at Ningaloo i.e. corals, fish, debris

- Engage the local community

  "I'm sure this project is the reason Susie Bedford continues teaching" *Ray Denham ESHS Principal*

  "If plastic is so bad for the ocean, why are all our prizes made of plastic?" *Yr 5 ESHS*

Why are Ningaloo shallow reefs important?

Cultural

Beachside camping

Fishing

Science

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Last 12 months

1) Reefs: fish, corals, macrodebris

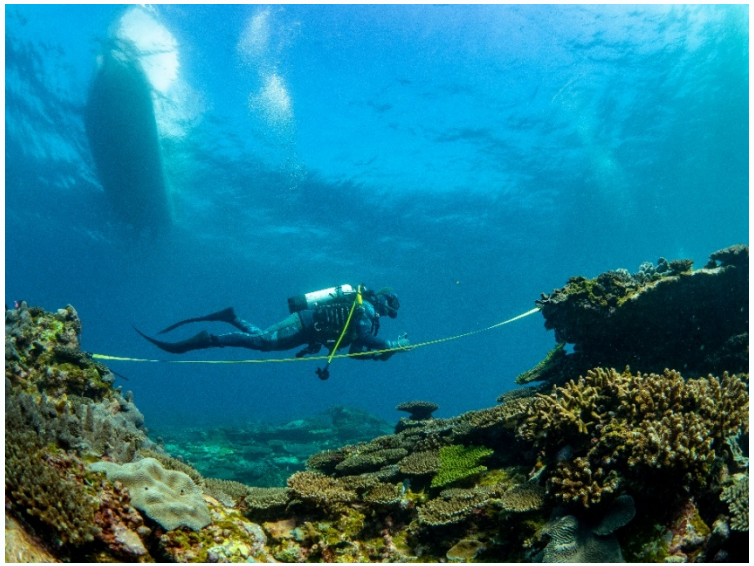
2) Improve estimates of rates of reef growth and bio-erosion

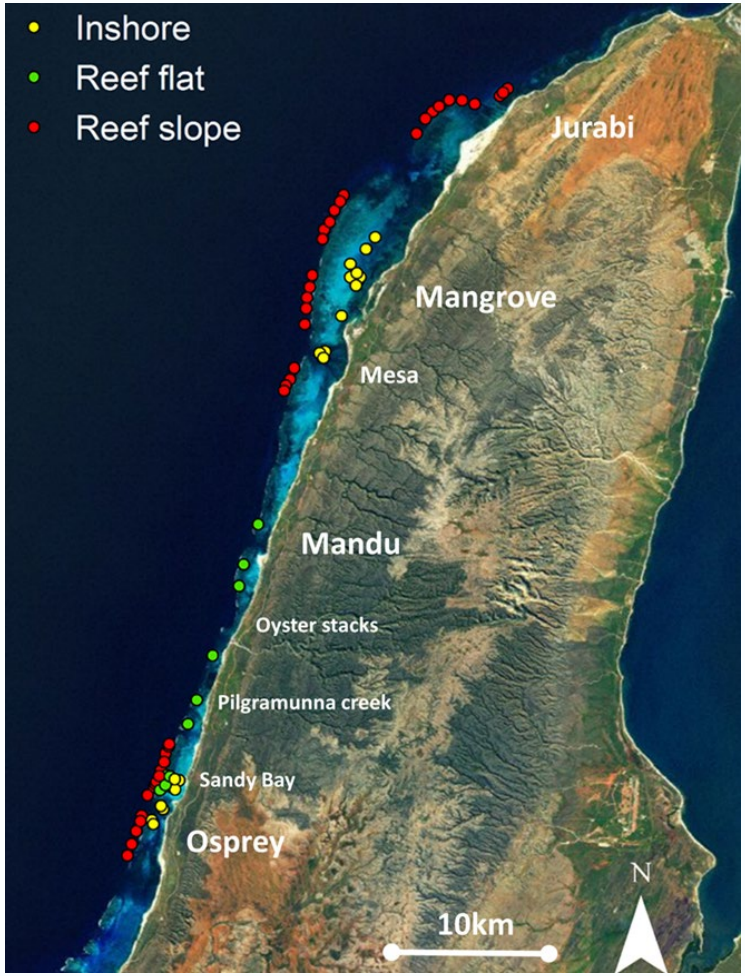
3) Investigate fine-scale hydrodynamics

4) Community engagement

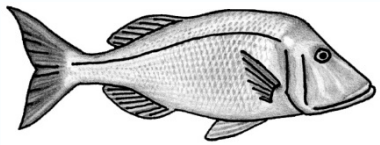
1) Reefs

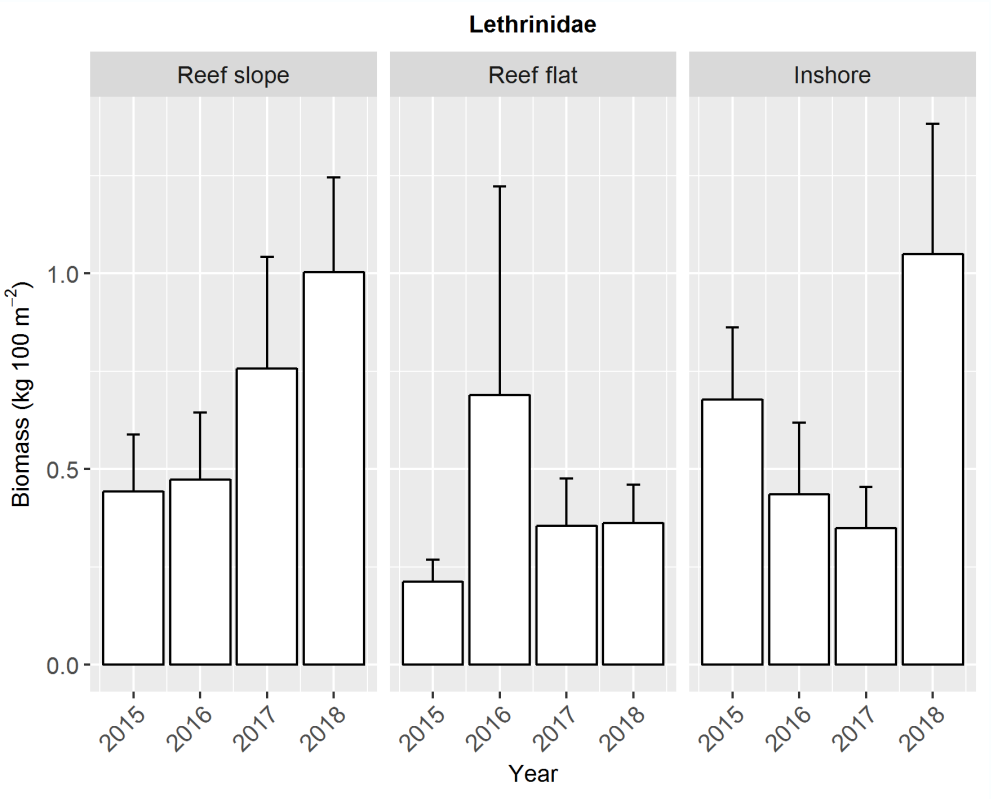
- Annual surveys
- 70-75 sites
- Underwater Visual Census (UVC)
- 25 & 100 m transects
- 3D habitat models





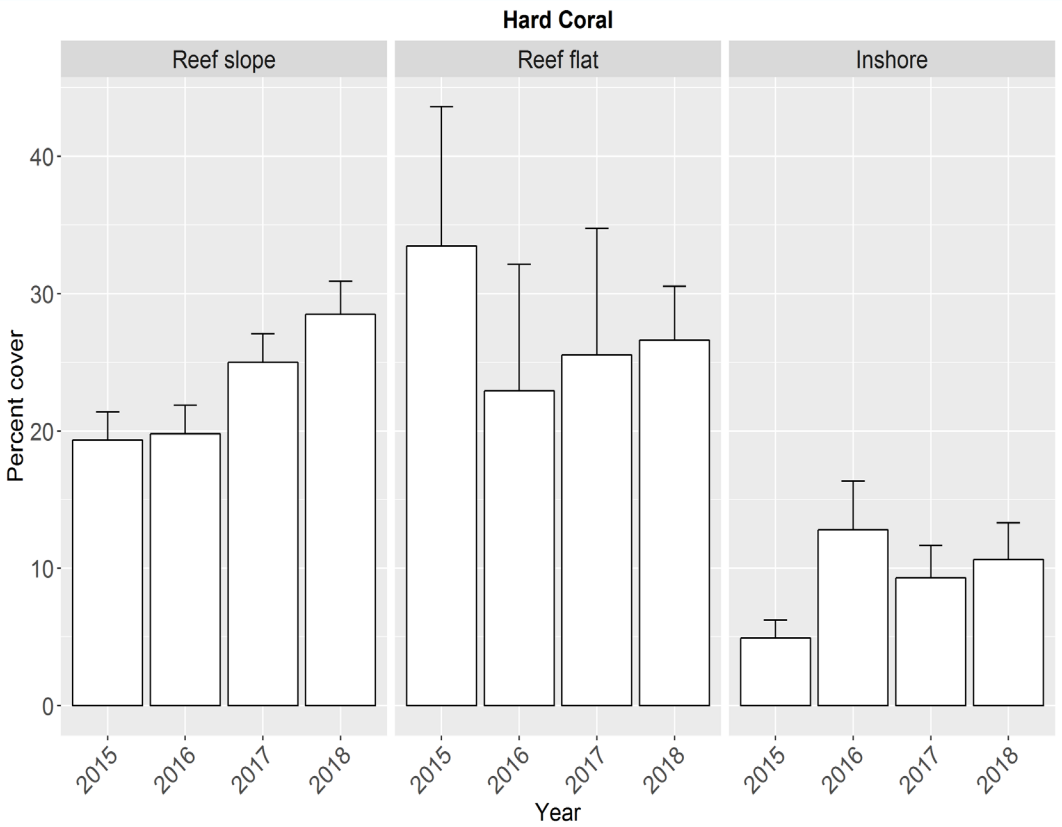
1) Reefs: fish





https://research.csiro.au/ningaloo/outlook/research-outputs/

1) Reefs: corals



1) Reefs - macrodebris

Waste free: protecting pristine Ningaloo reef

A CSIRO study into rubbish at Ningaloo has revealed the World Heritage-listed area is living up to its pristine reputation.

by Damian Thomson and Peter Barnes

Landscope summer edition 2018

Top Fishing line and sinkers were two of the most commonly collected items.

Above A suspected vessel fender was also found.

Above right Researchers established 25 by five-metre transects.
Photos – Damian Thomson/CSIRO

Below right Whale sharks frequent Ningaloo Marine Park.
Photo – Tourism WA

"A recent national CSIRO study estimated there are more than five pieces of litter along the coastline for every person living in Australia."

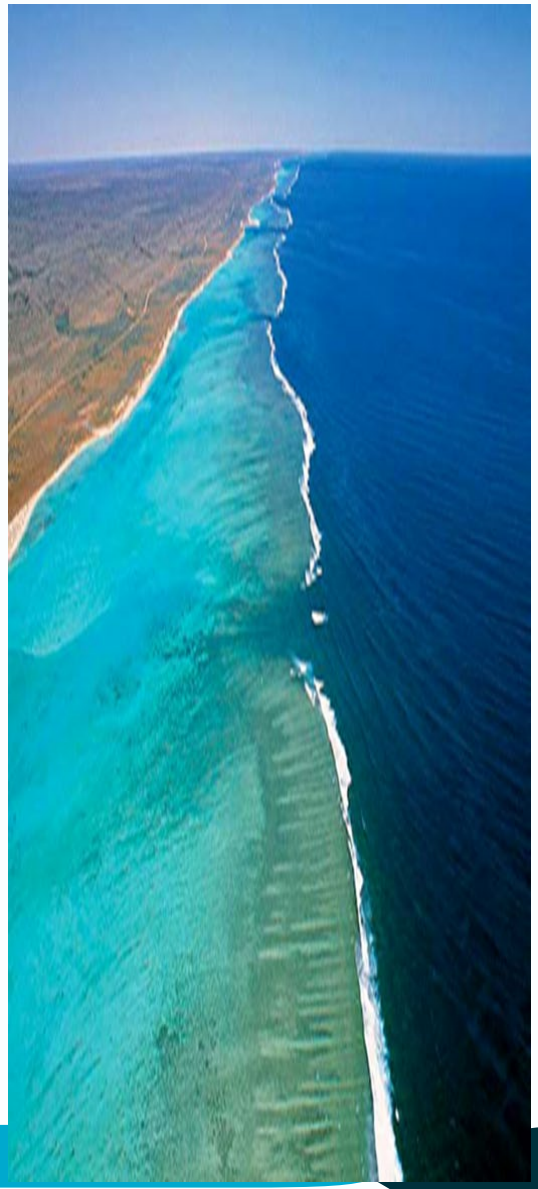
Ningaloo shoreline was incredibly low, particularly when compared to other Australian beaches. And the amount of marine debris on the reef was well below those recorded for many coral reefs worldwide.

COMMUNITY SPIRIT

On the whole, the residents of Exmouth have a strong desire to keep their local beaches and reefs clean and clear of rubbish and debris. It is a cultural habit that locals collect rubbish they

2) Improved estimates reef growth and erosion

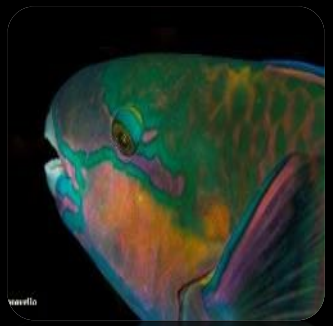
- Climate change on coral reefs a fundamental research priority *(Simpson et al. 2014)*
- Positive carbonate budgets essential to keep pace with sea-level rise
- Prolonged negative budgets linked to declines in coral cover, structural complexity and fish abundance *(Gardner et al. 2006 Nature, Paddack et al. 2009 Cur. Biol., Graham et al. 2012 Coral Reefs)*



2) Improved estimates of reef growth and erosion

Reef growth

Erosion



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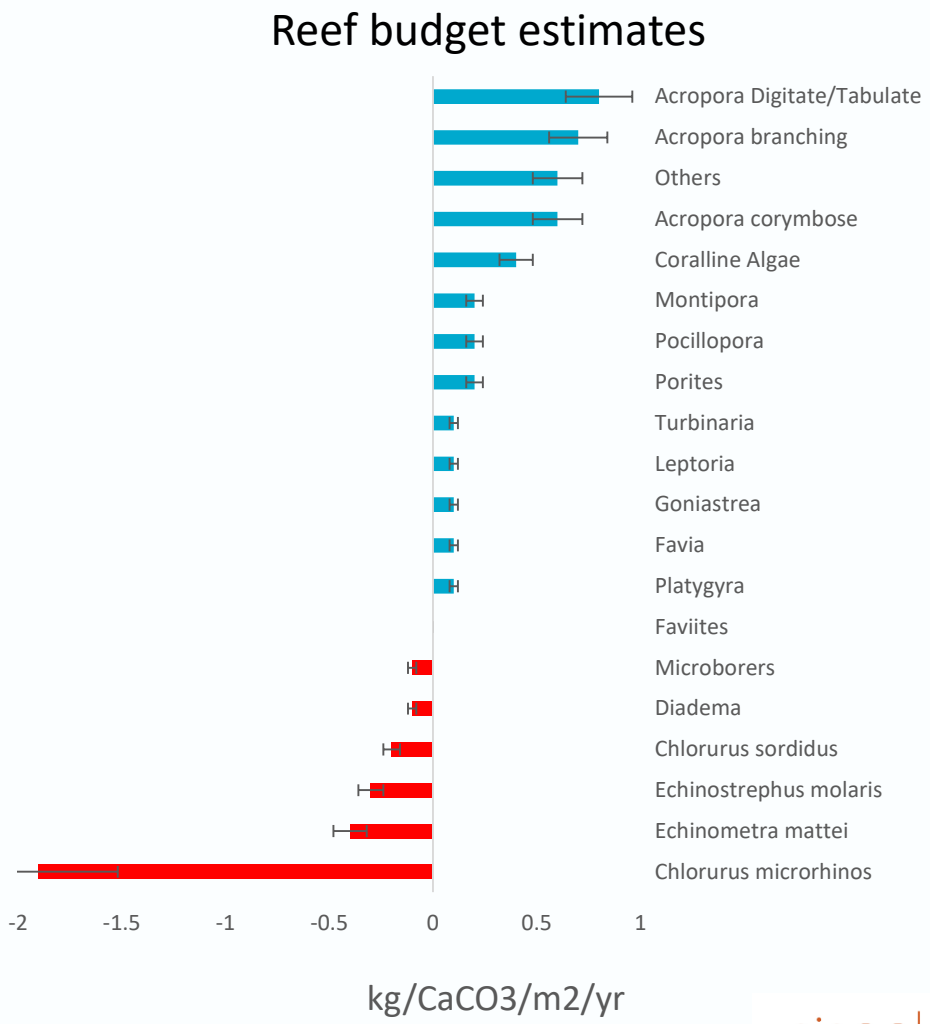
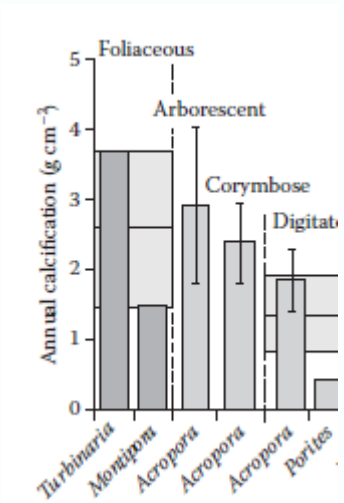


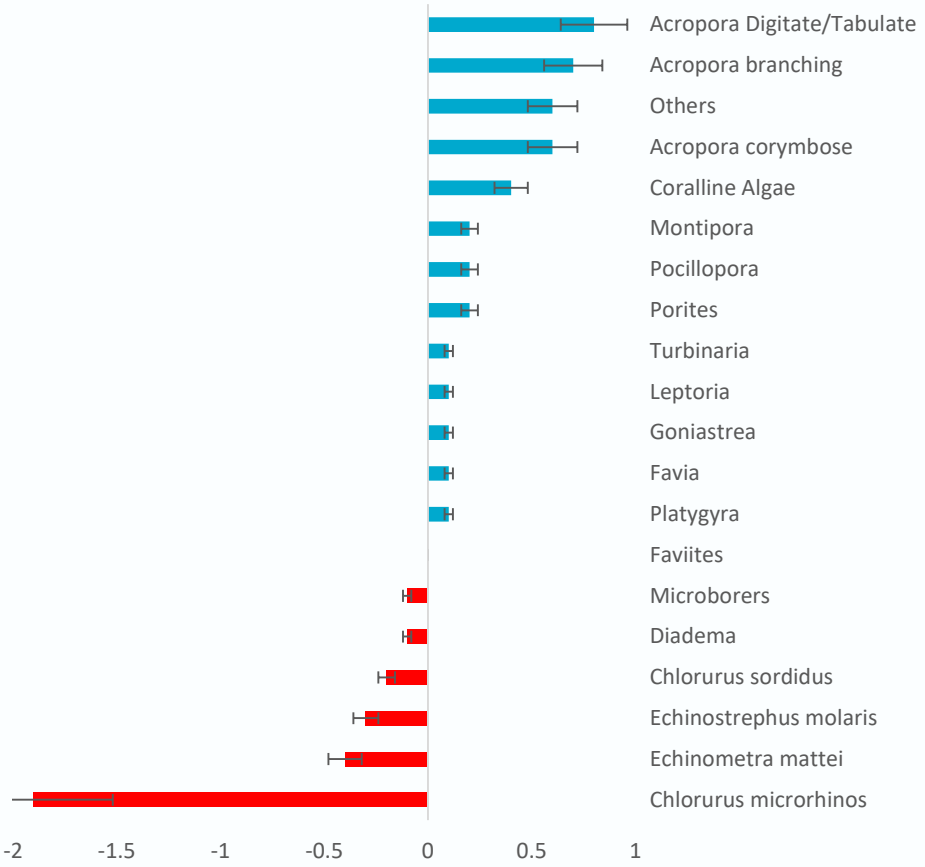
2) Improved estimates of reef growth and erosion

- Acropora



Pratchett et al. 2015

Reef budget estimates

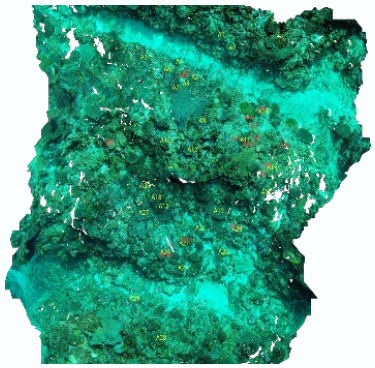


kg/CaCO3/m2/yr

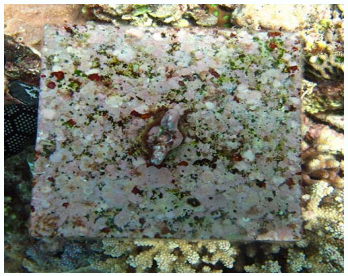
2) Improved estimates of reef growth and erosion

1) Tagged corals
n= 178

2) Habitat meshes
n = 485



3) CCA growth
n= 120



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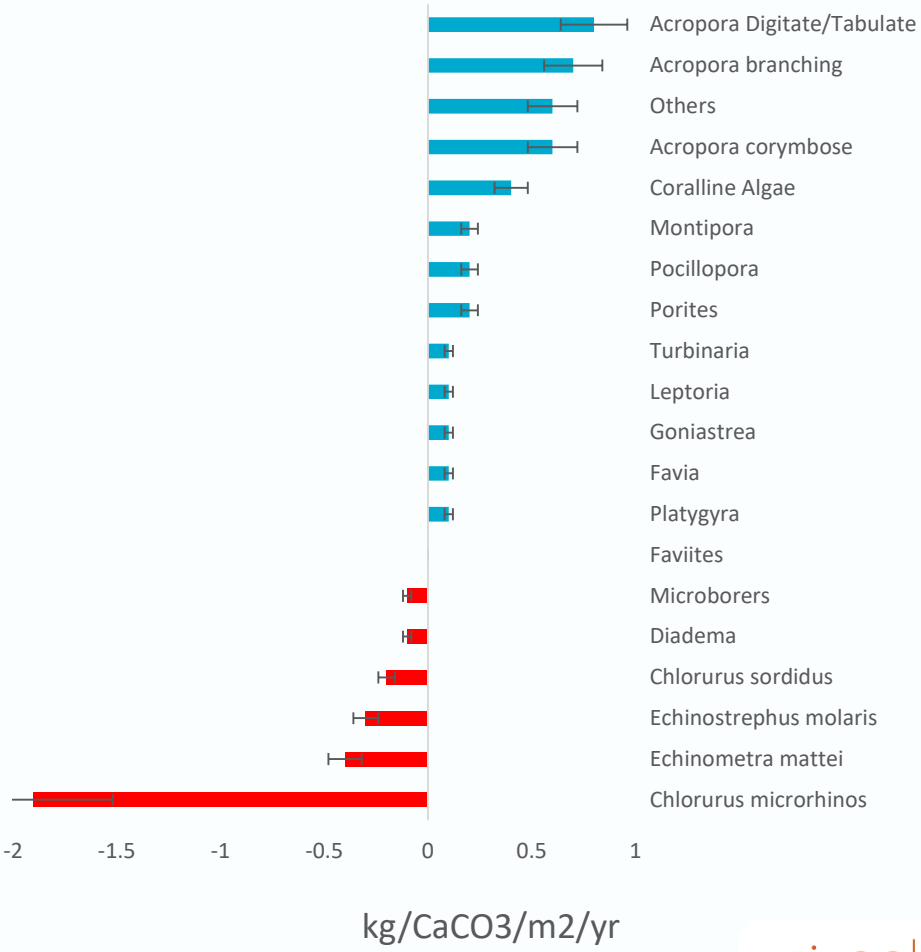
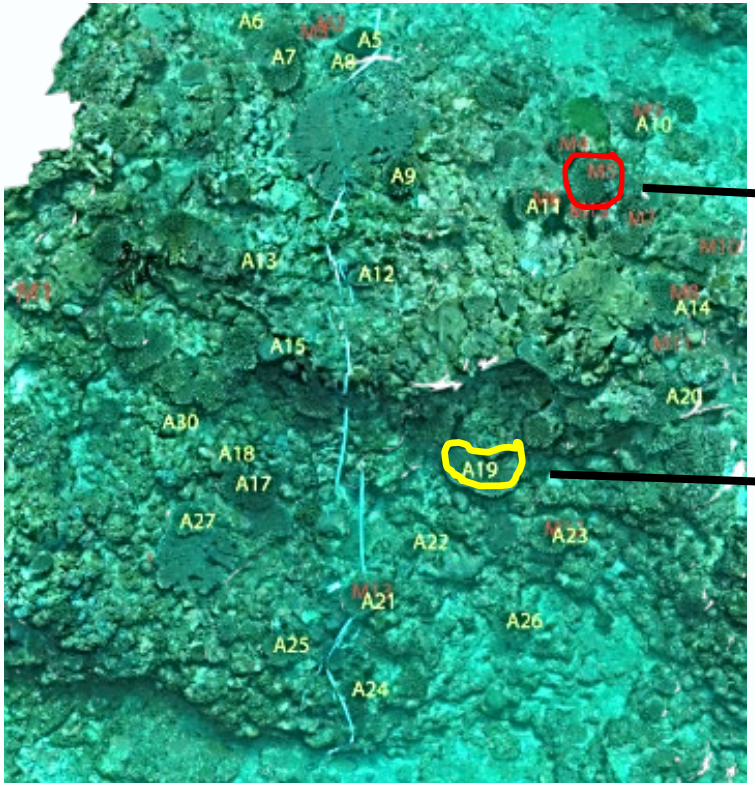


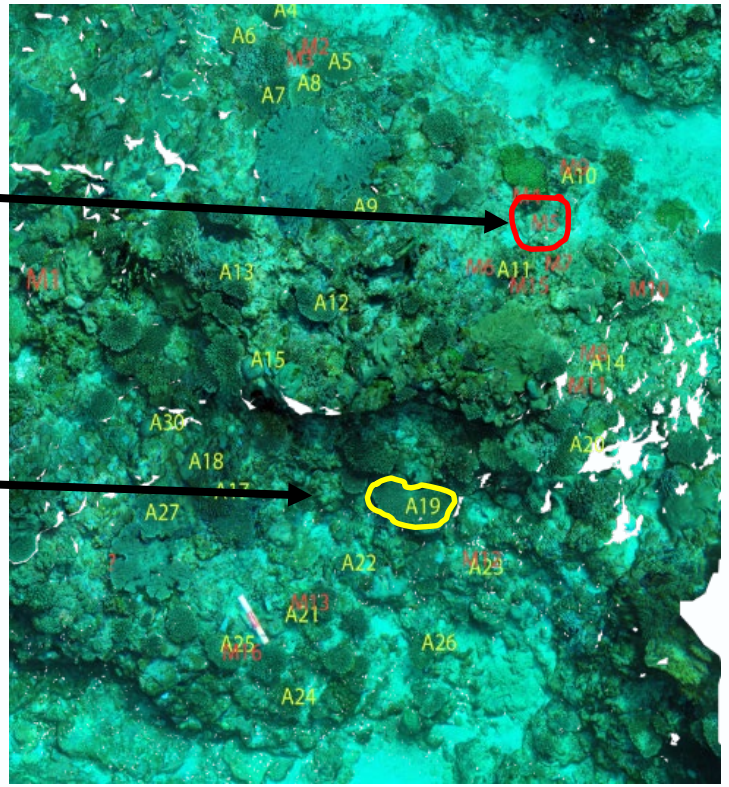
2) Improved estimates of reef growth and erosion

Growth Death / mortality

2017



2018



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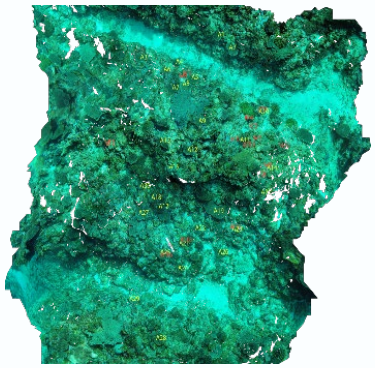

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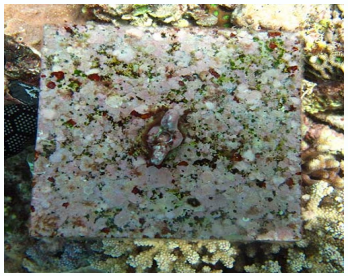

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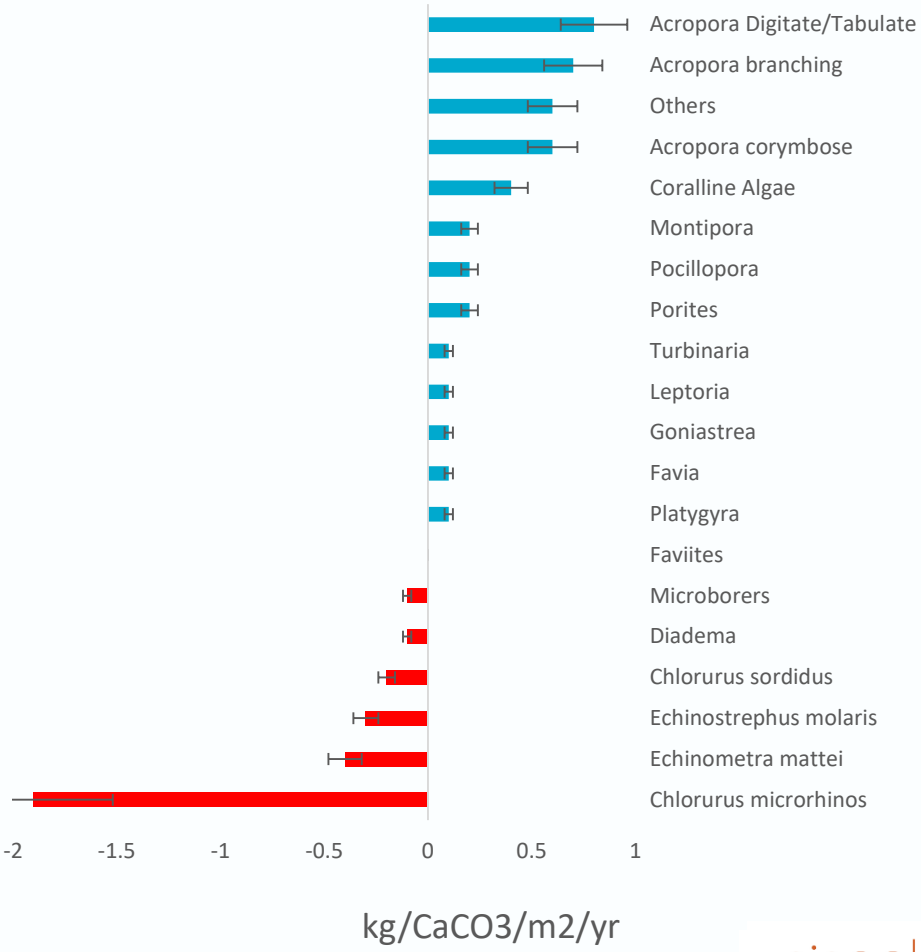

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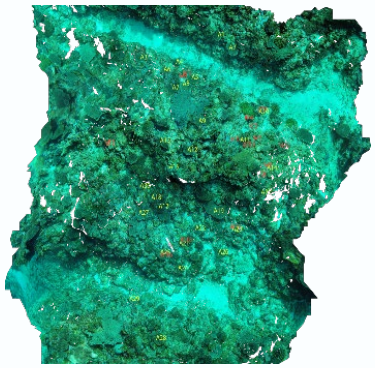

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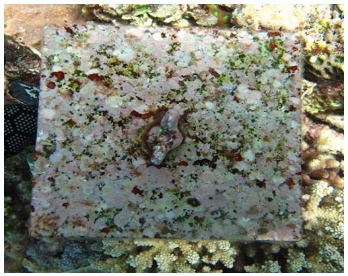

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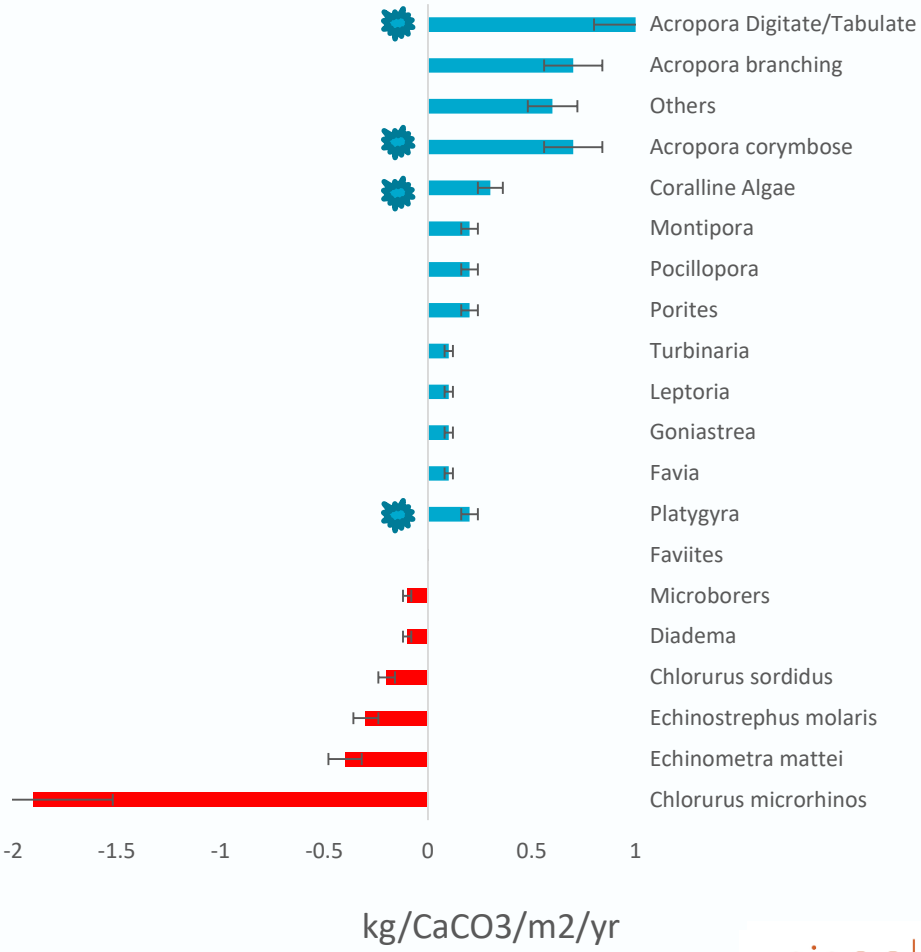
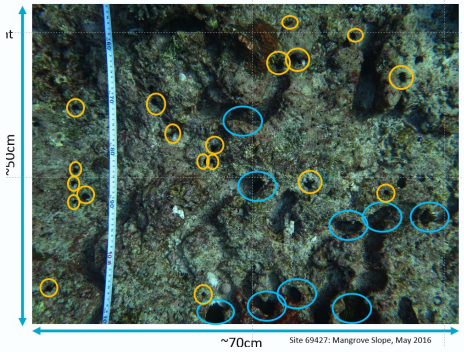


2) Improved estimates of reef growth and erosion

1) Parrotfish
n = 108

2) Urchins
n = 2100



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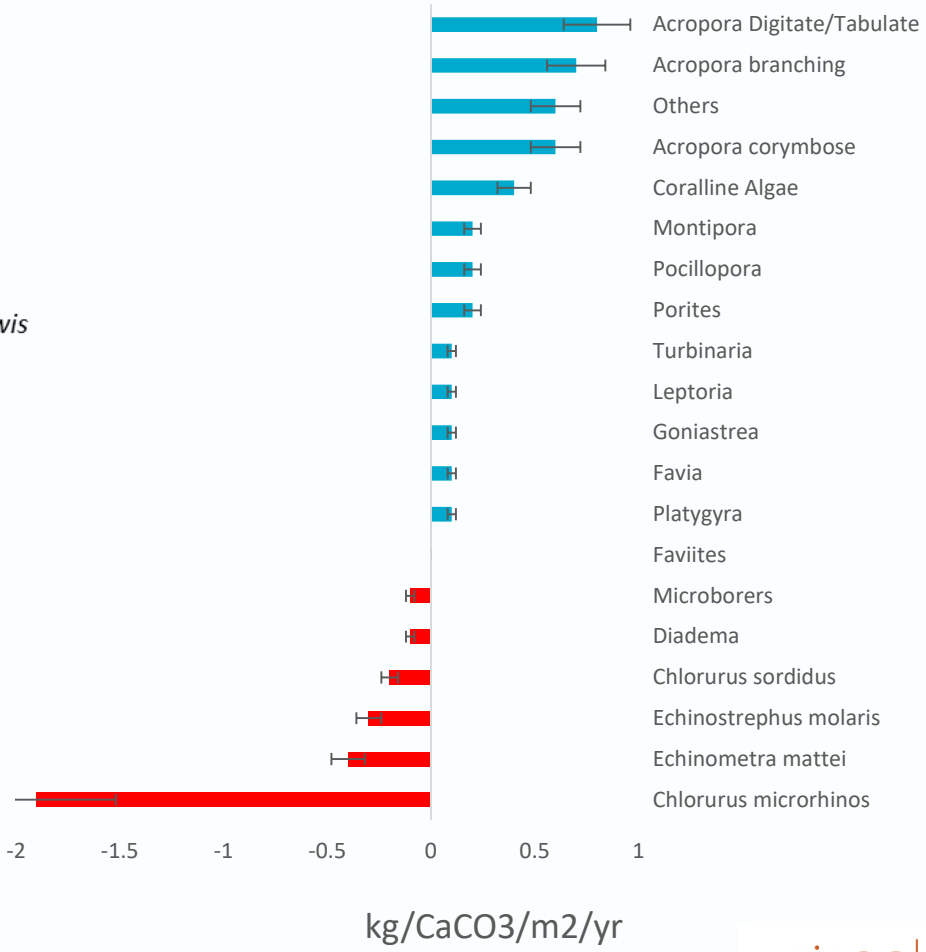

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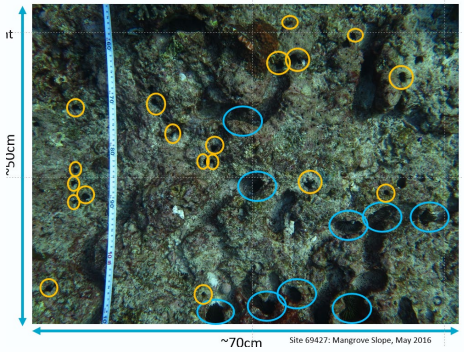

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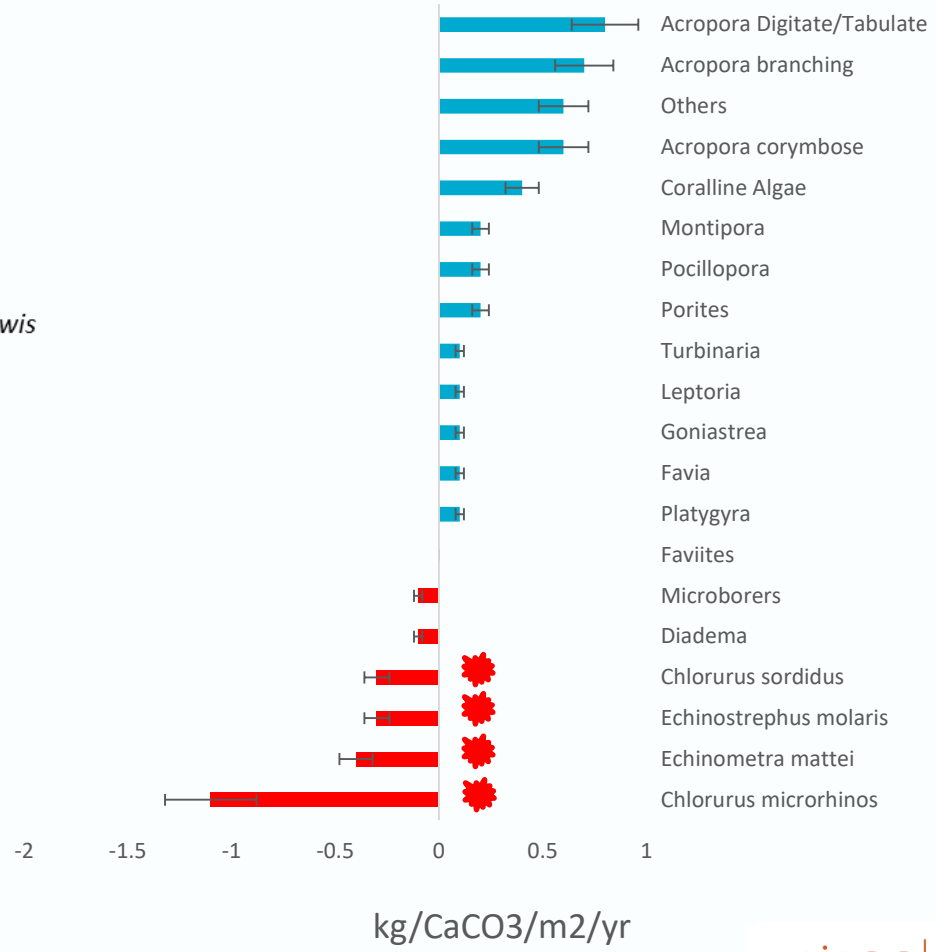

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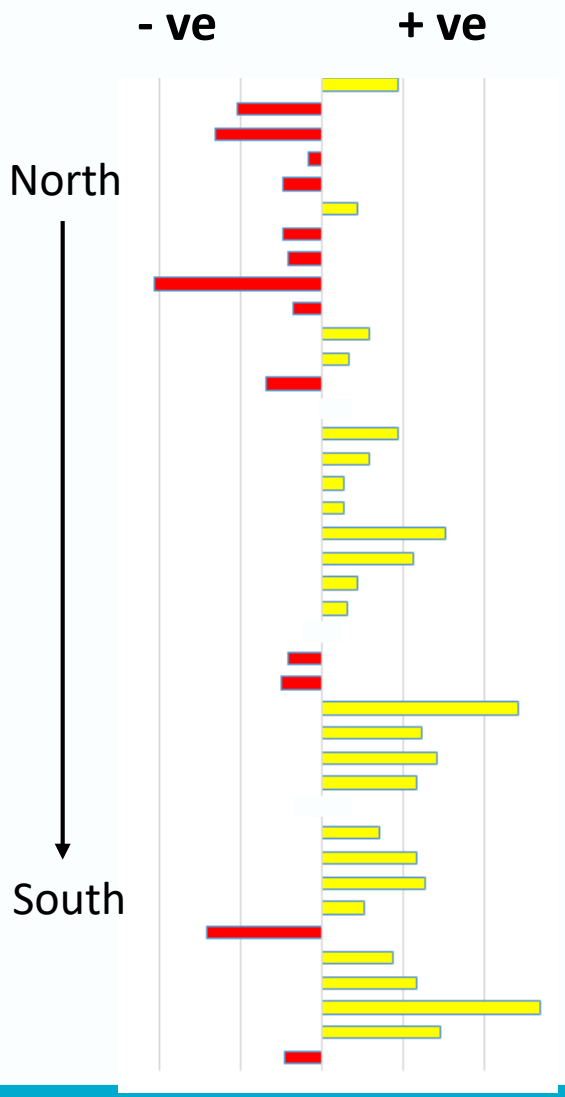
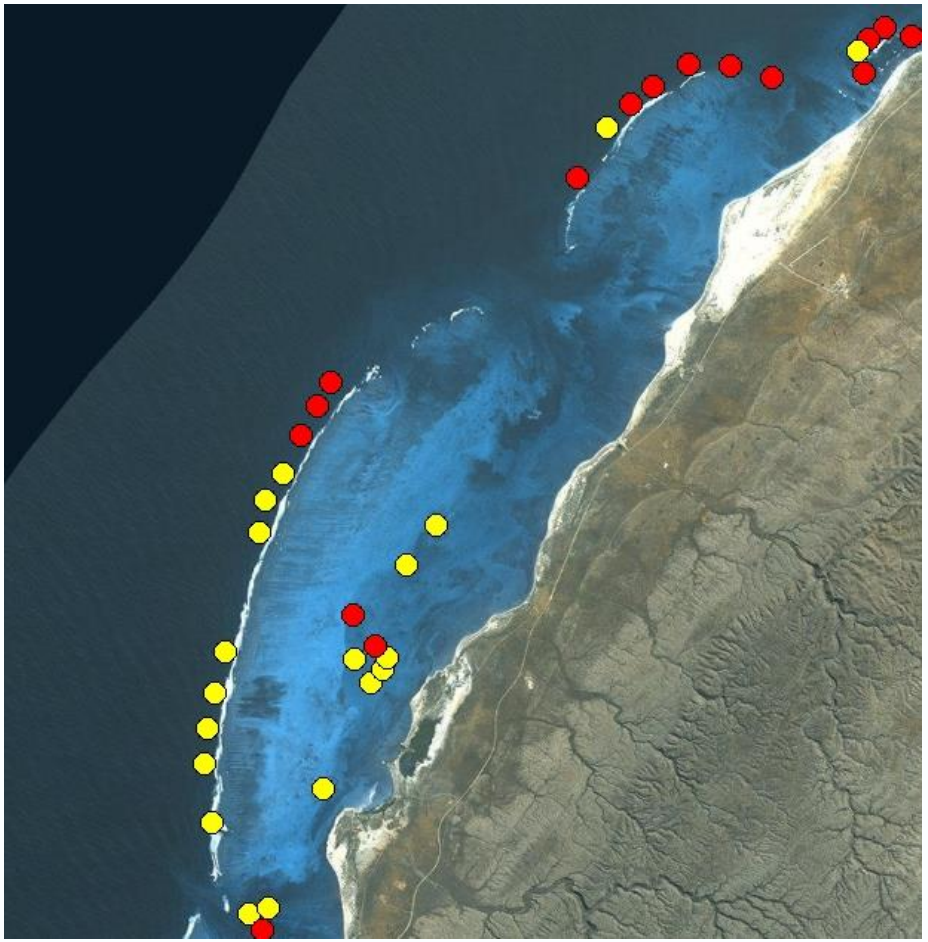
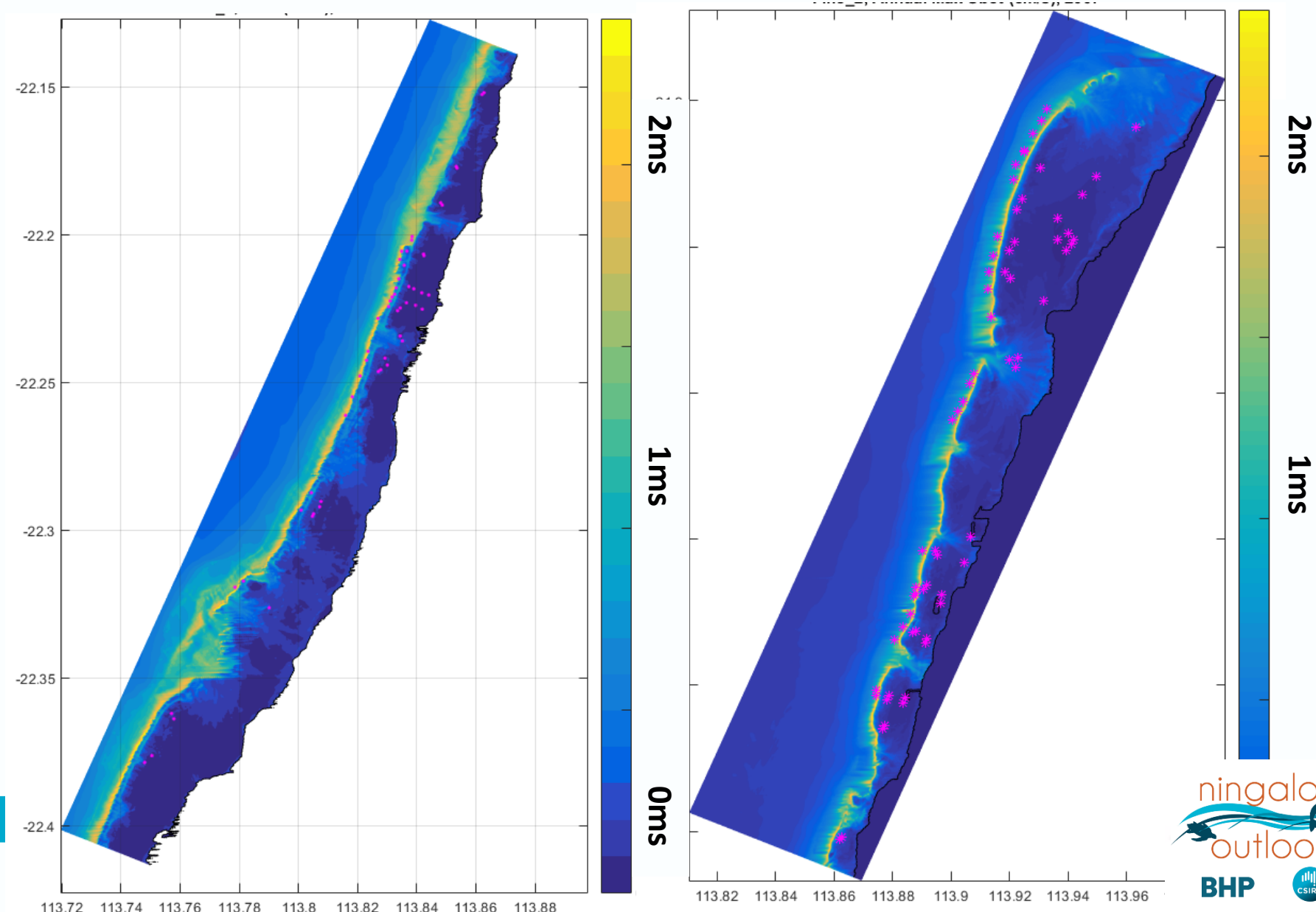




3) Fine scale hydrodynamics

- Reef crest/slope dissipate >97% wave energy *Ferrario et al. (2014)*
- Narrow continental shelf < 10km
- Steep velocity gradients important for structuring benthic communities

3) Fine scale hydrodynamics



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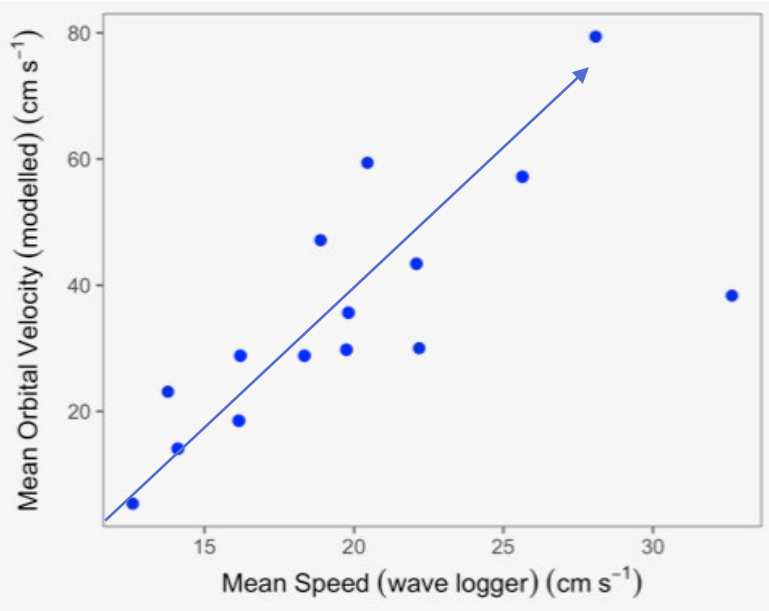

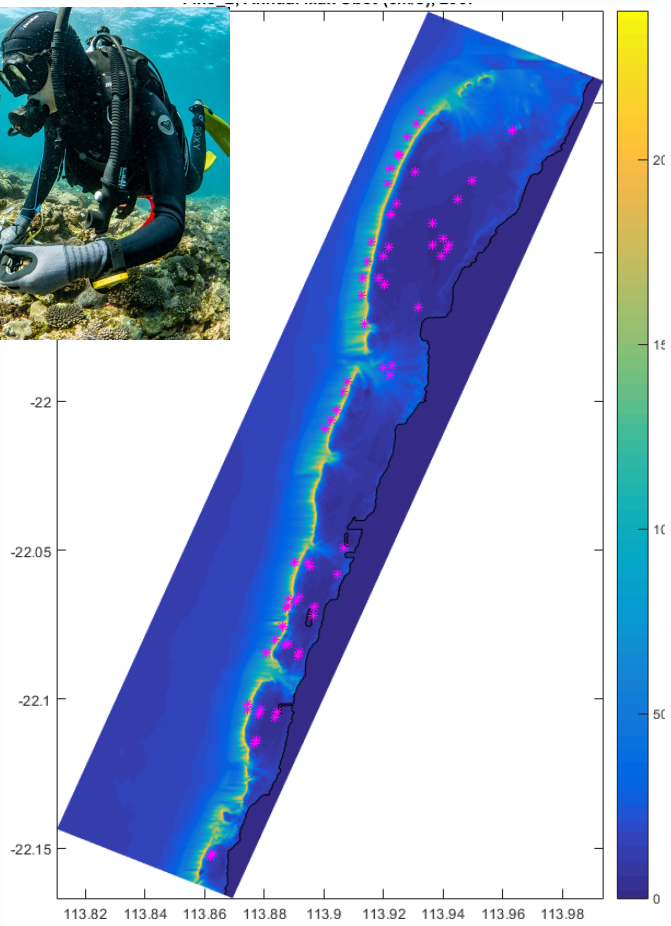

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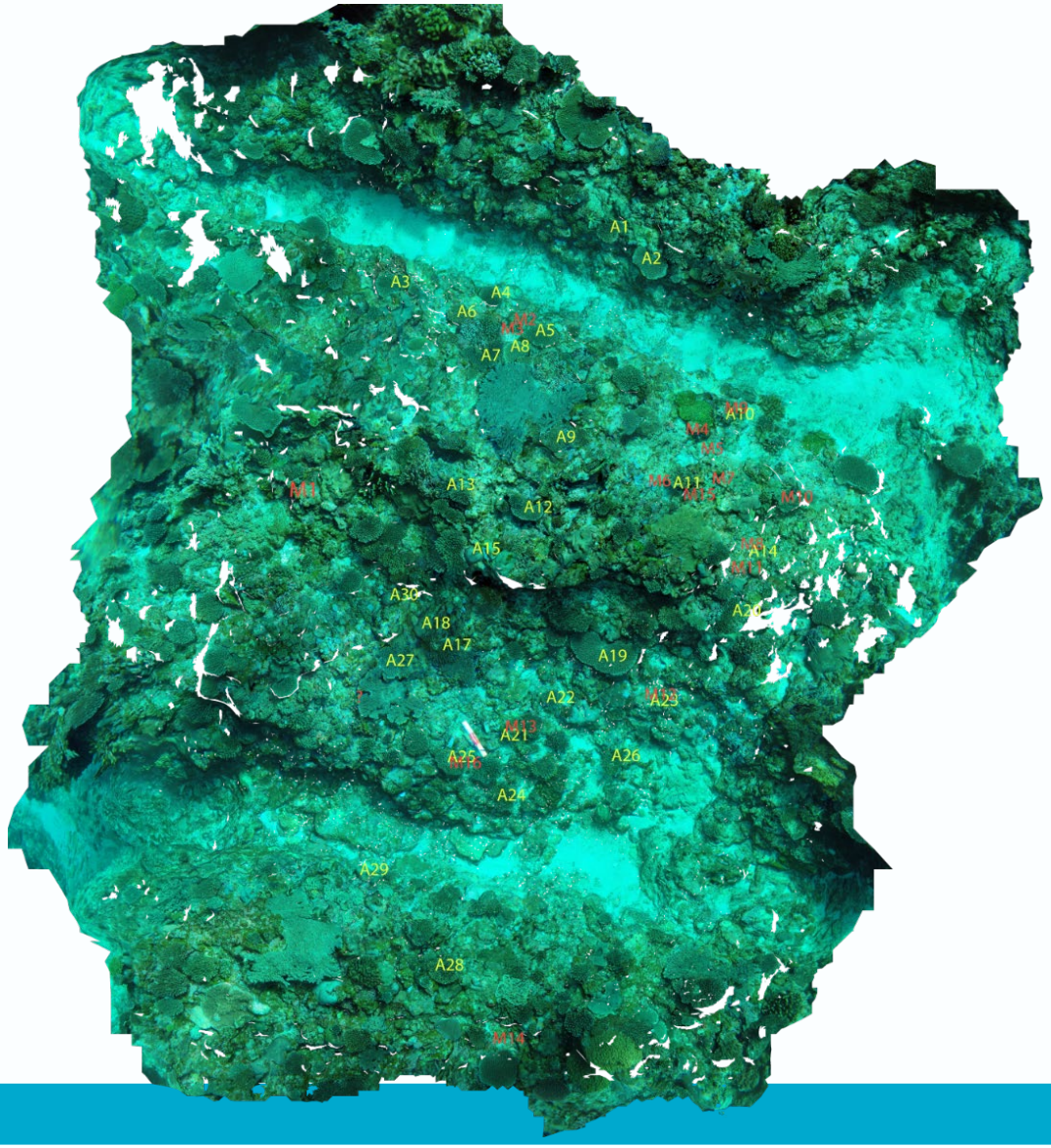

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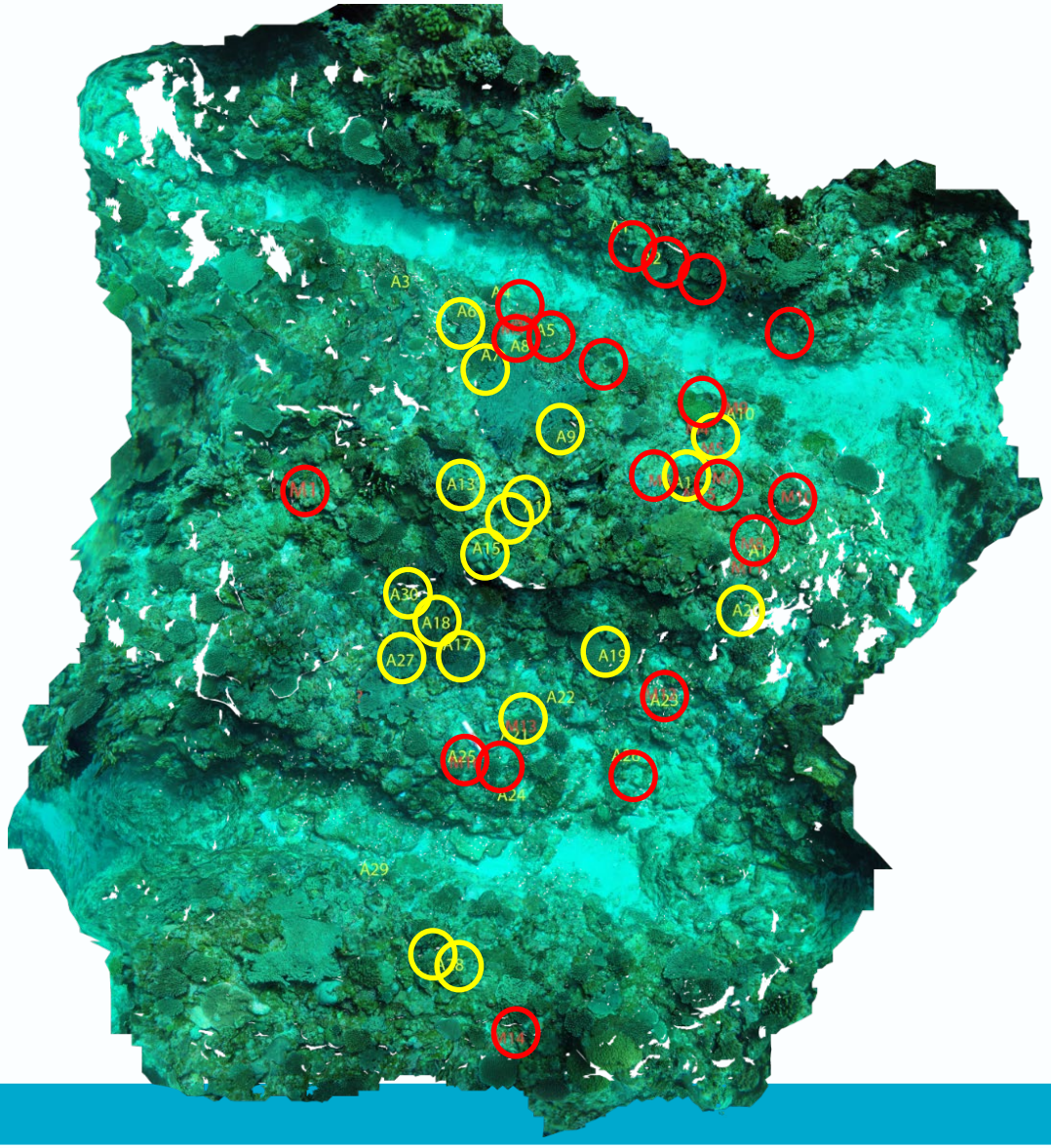
3) Fine scale hydrodynamics



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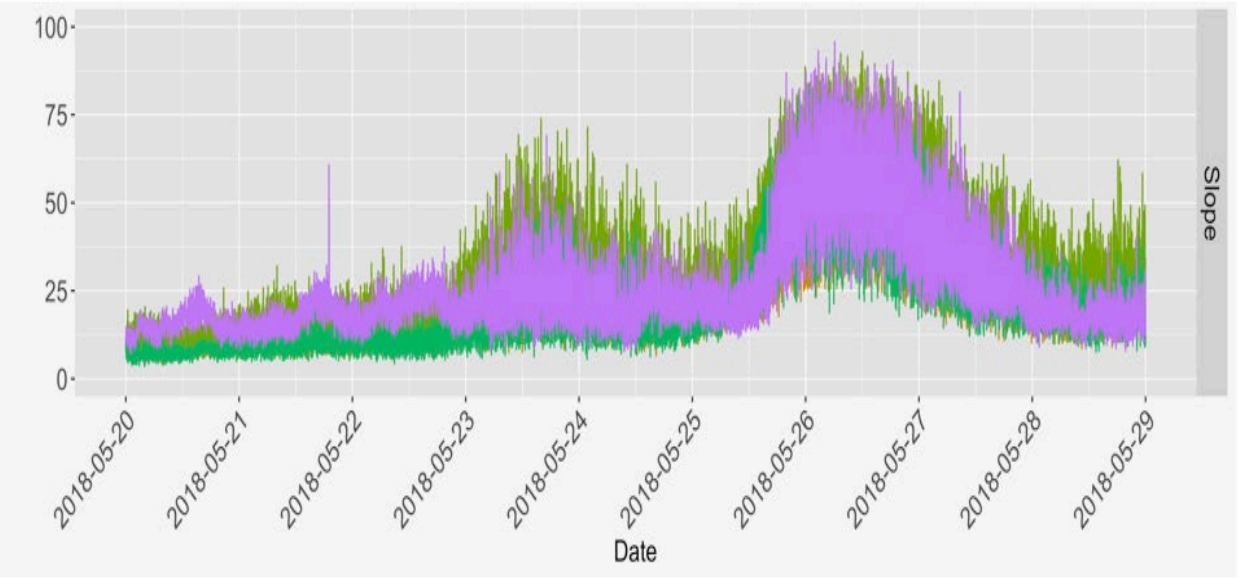

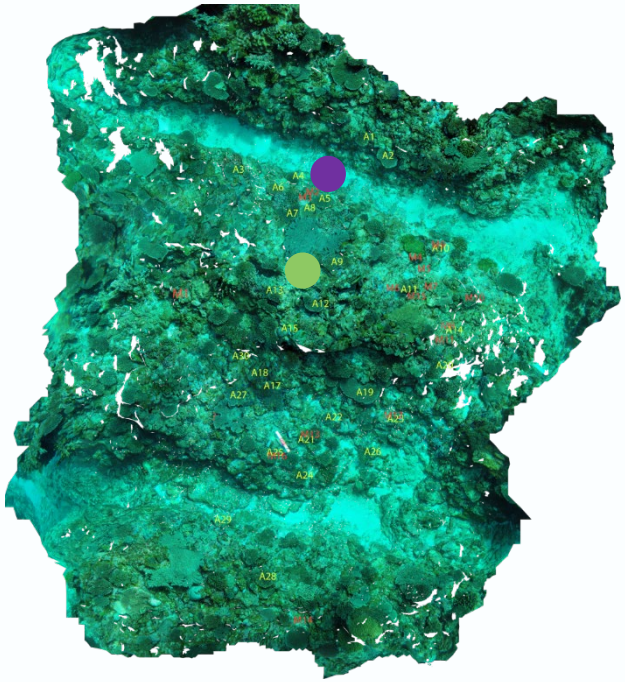

4) Community engagement

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Department of Biodiversity, Conservation and Attractions

Exmouth DISTRICT HIGH SCHOOL
A beacon of learning, an ocean of opportunities

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CALTEX

POTSHOT HOTEL • RESORT

Shallow reefs

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BHP CSIRO

Hertz

TACKLE WORLD

NGT LOGISTICS

Exmouth Pharmacy & Photographics

IGA

EXMOUTH BOAT HIRE
BOAT & KAYAK HIRE, CAR HIRE & FISHING CHARTERS IN EXMOUTH
DELIVERING TO CORAL BAY, ONSLOW, KARRATHA

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Conclusions

1) Extending datasets fish, corals, debris

2) Improve estimates of rates of reef growth and bio-erosion

3) Investigate fine-scale hydrodynamics

4) Community engagement

Thank you!

Acknowledgements

- BHP-CSIRO Ningaloo Outlook Partnership
- Exmouth school
- DBCA staff in Perth and Exmouth
- Reef check team, Susie Bedford, CCG members
- Margaret Miller for data wrangling
- Jim Gunson for wave model
- C. Perry, S. Wilson and M.0'Leary
- The Outlook team

Damian.Thomson@csiro.au

https://research.csiro.au/ningaloo/outlook/research-outputs/