

# Investigating 'Anchor Scour': collaborative partnerships and the applications of seabed mapping

allisonb@uow.edu.au

Allison Broad<sup>1</sup>

Matt Rees<sup>1,2</sup>

Tim Ingleton<sup>3</sup>

Andy Davis<sup>1</sup>



<sup>1</sup> School of Earth, Atmospheric and Life Sciences, University of Wollongong,

<sup>2</sup> NSW Department of Primary Industries, Marine Ecosystem Unit, Fisheries Research

<sup>3</sup> Waters, Wetlands and Coasts, NSW Office of Environment and Heritage,

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# What is 'Anchor Scour'?

Physical disturbance of seabed environments from the anchors and chains used to hold vessels



# Vessels routinely anchor & require 'good' holding ground



# The Blue Economy

## Did You Know?

# 90%

of global trade is carried by sea and will double by 2030

The blue economy promotes smart shipping and transportation to lessen the impacts on the environment. ■



# Increasing pressures on the marine environment

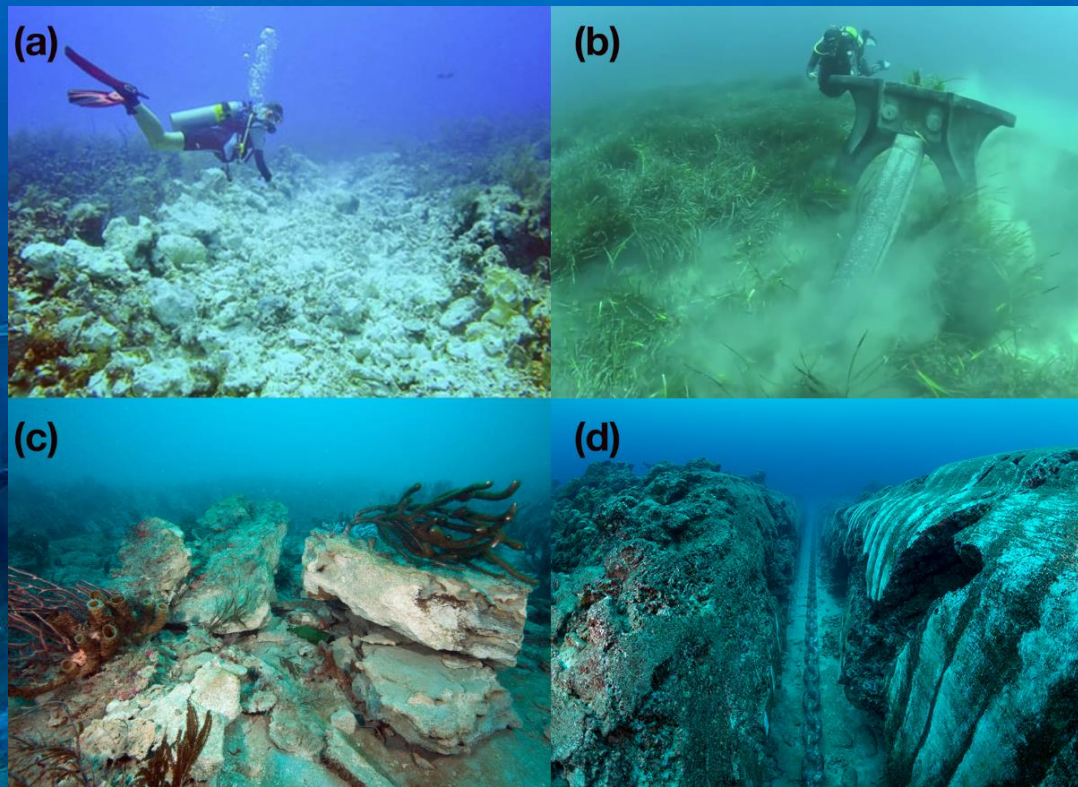
Merchant ship anchor scour:

“Examine ship anchoring activities and potential for physical disturbance to key habitats” (HMBA, 2015)

“Increasing pressure with uncertain impacts and this is not actively managed” (SOE, 2016)



# Anchor & chain scour



**Figure 2 in - Broad et al (2020) *Mar. Poll. Bull.* In press**

# Sound solutions require detailed knowledge



Case Study:  
Wollongong Region, NSW



# Aims & Disparate Objectives

ALL seeking to  
ID 'good'  
holding ground  
(soft sediments)

*NSW Ports*

=

Safety for  
Vessels

*Research Team*

=

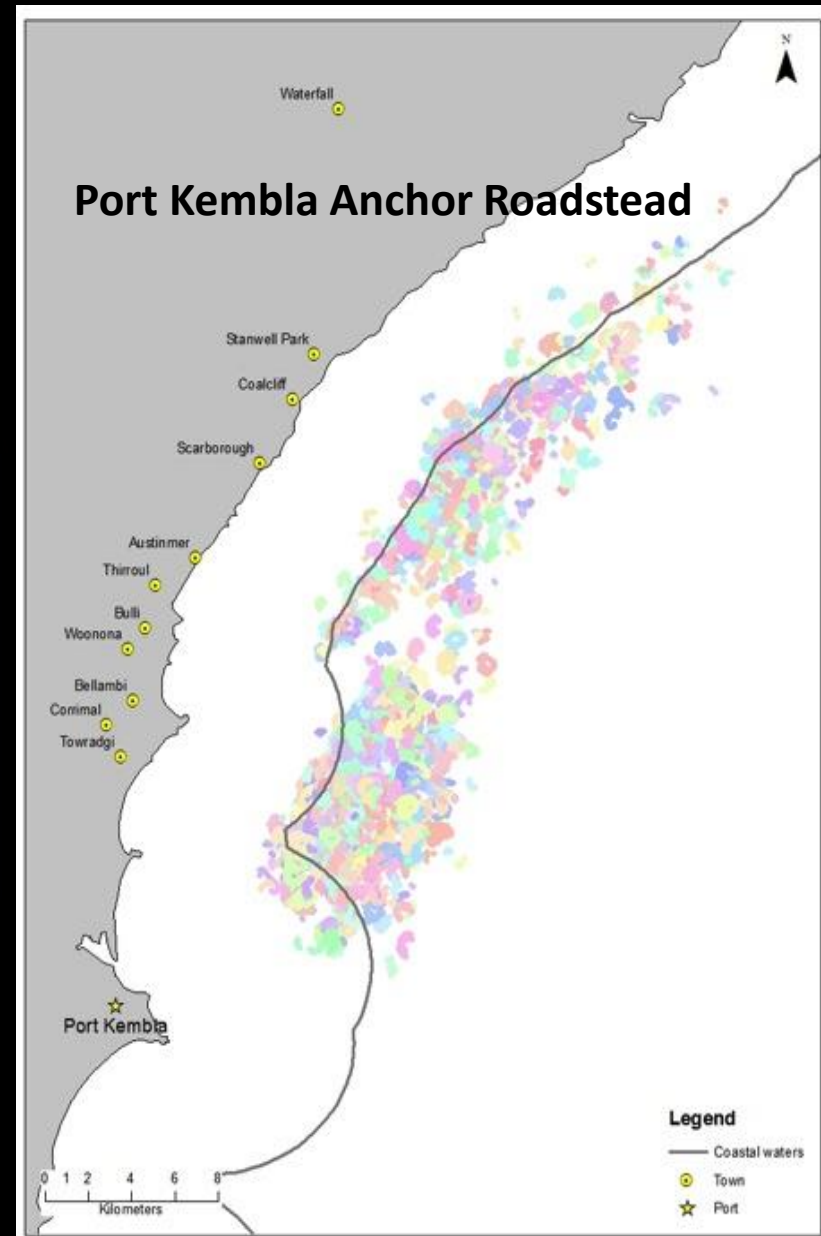
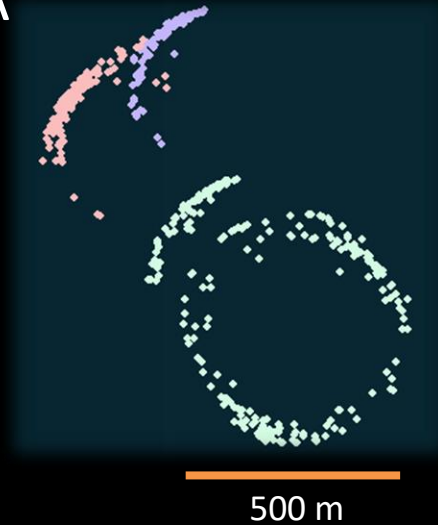
Characterise  
'Anchor Scour' &  
Benthic habitats

WIN FOR ALL!

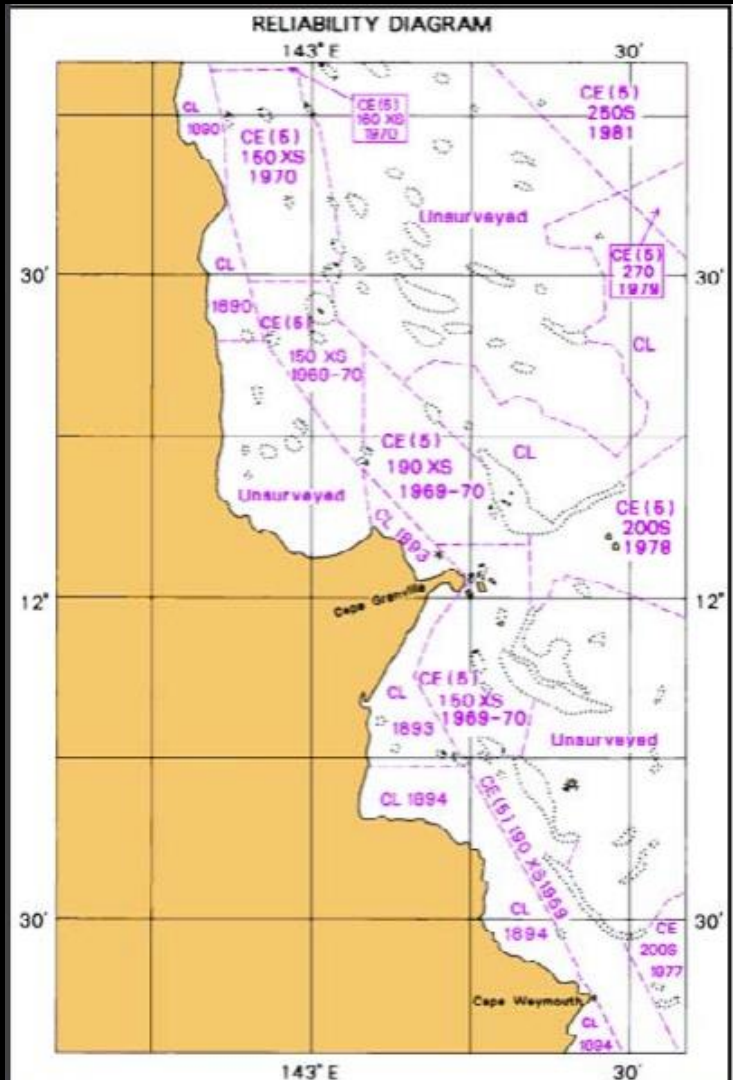


# 1. Spatial scale of anchoring

- AIS Data from AMSA (Sept 2012 – June 2015)
- Apply filters (<1 kn)

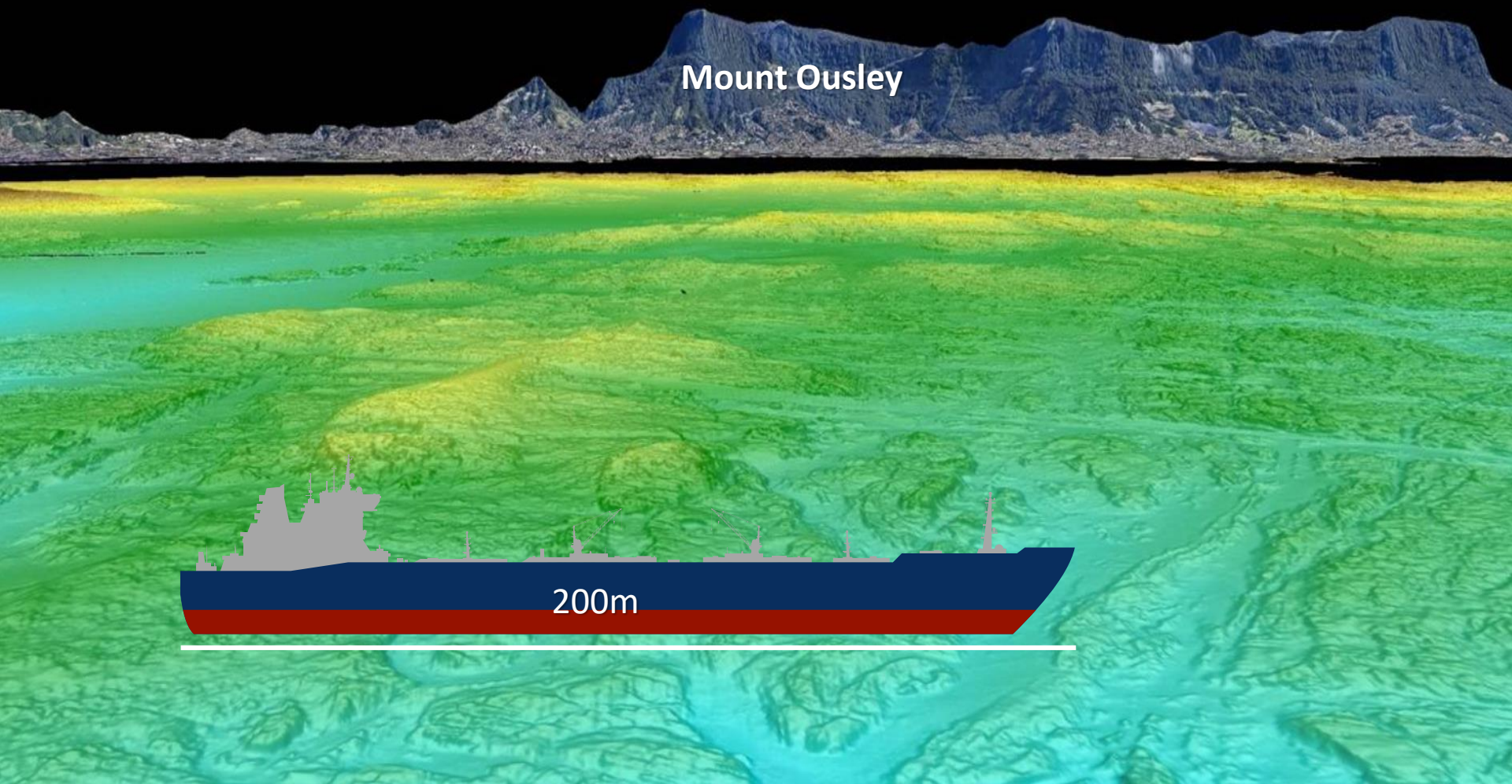


## 2. Habitats affected; historical maps can be patchy

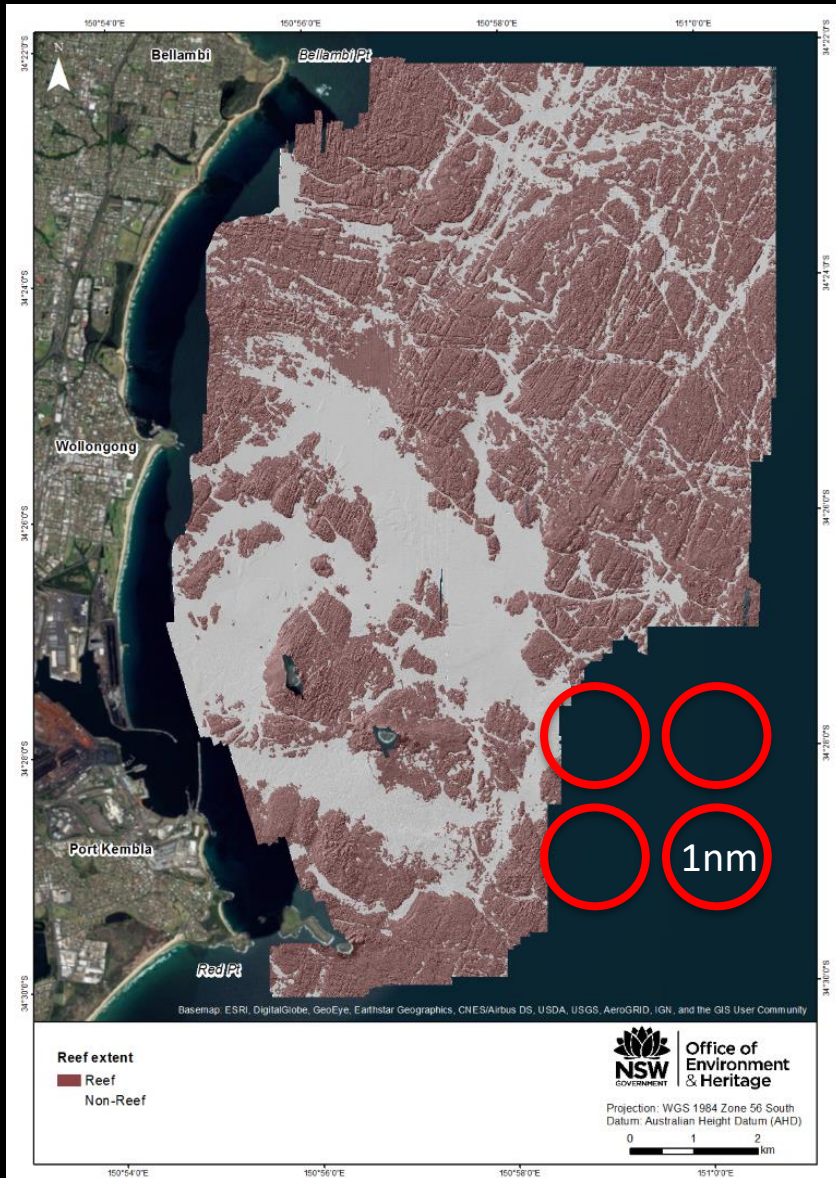


Source: AHO

## 2. Habitats affected

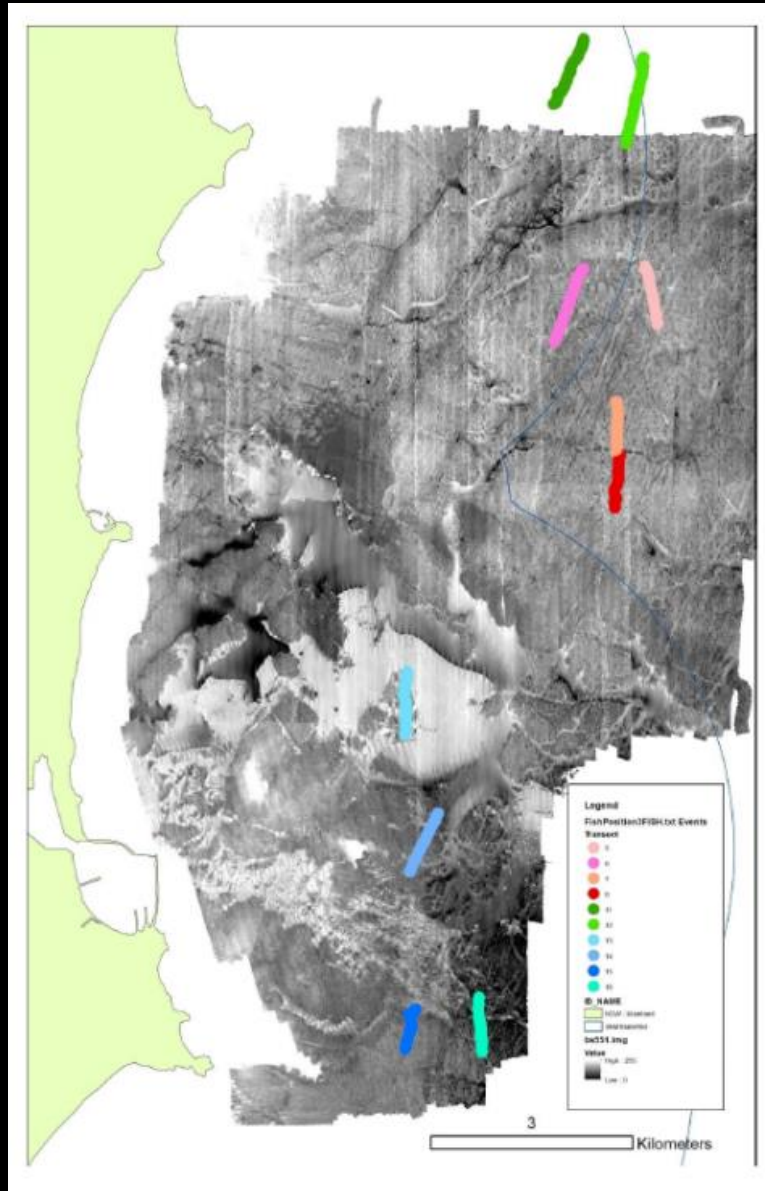


# 3. Identification of 'good holding ground'



- ...A work in progress
- Reef  $\neq$  secure holding for vessels
- Limited sufficient area of continuous soft sediments for anchoring
- ~1nm swing circle for each ship within an anchorage

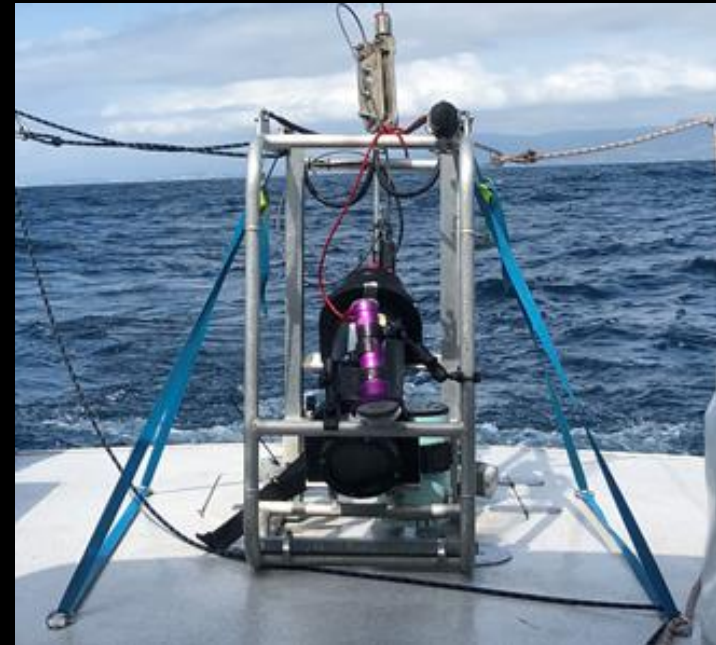
## 4. Identify areas of high conservation value



## Towed Underwater Video (TUV)

Anchored / Anchor-free sites

~16 Lineal Km's of seabed examined



## 4. Identify areas of high conservation value

3426.6152S15057.24302E4

DATE: 15/08/20  
TIME: 02:06:23



# Sponge collections using Remotely Operated Vehicle (ROV)

- Sponge collections (n=15)
- 6 new species  
~ 1 in 3 'new' species
- 1 new genus

NSW Temp. East ~ sponge biodiversity hotspot  
(Van soest et al. 2012)



# Take home messages

- Seabed mapping ~ essential to inform ALL managers of the marine estate
- Although stakeholder aims may differ – common goals achieved
- Crucial for;
  - Safe & effective expansion of marine infrastructure
  - Identification of high conservation value habitats





# Next step in the partnership?

## Federal Partners;

- Prioritise seabed-mapping in Federal waters near ports
- Locate good holding ground to designate safe & sustainable anchorages



Logistically difficult & expensive to assess

# Thanks to.....

# RE: THINK

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Royal Zoological Society  
of New South Wales

*Paddy Pallin*  
Foundation

# NSW Ports



NSW  
GOVERNMENT

Planning,  
Industry &  
Environment

Centre for Sustainable Ecosystem  
Solutions

## References

- Broad A, Rees MJ, Davis AR (2020) Anchor and chain scour as disturbance agents in benthic environments: trends in the literature and charting a course to more sustainable boating and shipping. *Mar. Poll. Bull.* **In press**
- BMT WBM. (2015) Hawkesbury Shelf Marine Bioregion Threat and Risk Assessment Report. BMT WBM Pty Ltd, Brisbane.
- Evans K, Bax NJ, Smith DC (2016). Marine environment: Marine environment. In: Australia state of the environment 2016, Australian Government Department of the Environment and Energy, Canberra.
- Van Soest RWM, Boury-Esnault N, Vacelet J, Dohrmann M, Erpenbeck D, De Voogd NJ, et al. (2012) Global Diversity of Sponges (Porifera). *PLoS ONE* 7(4): e35105.