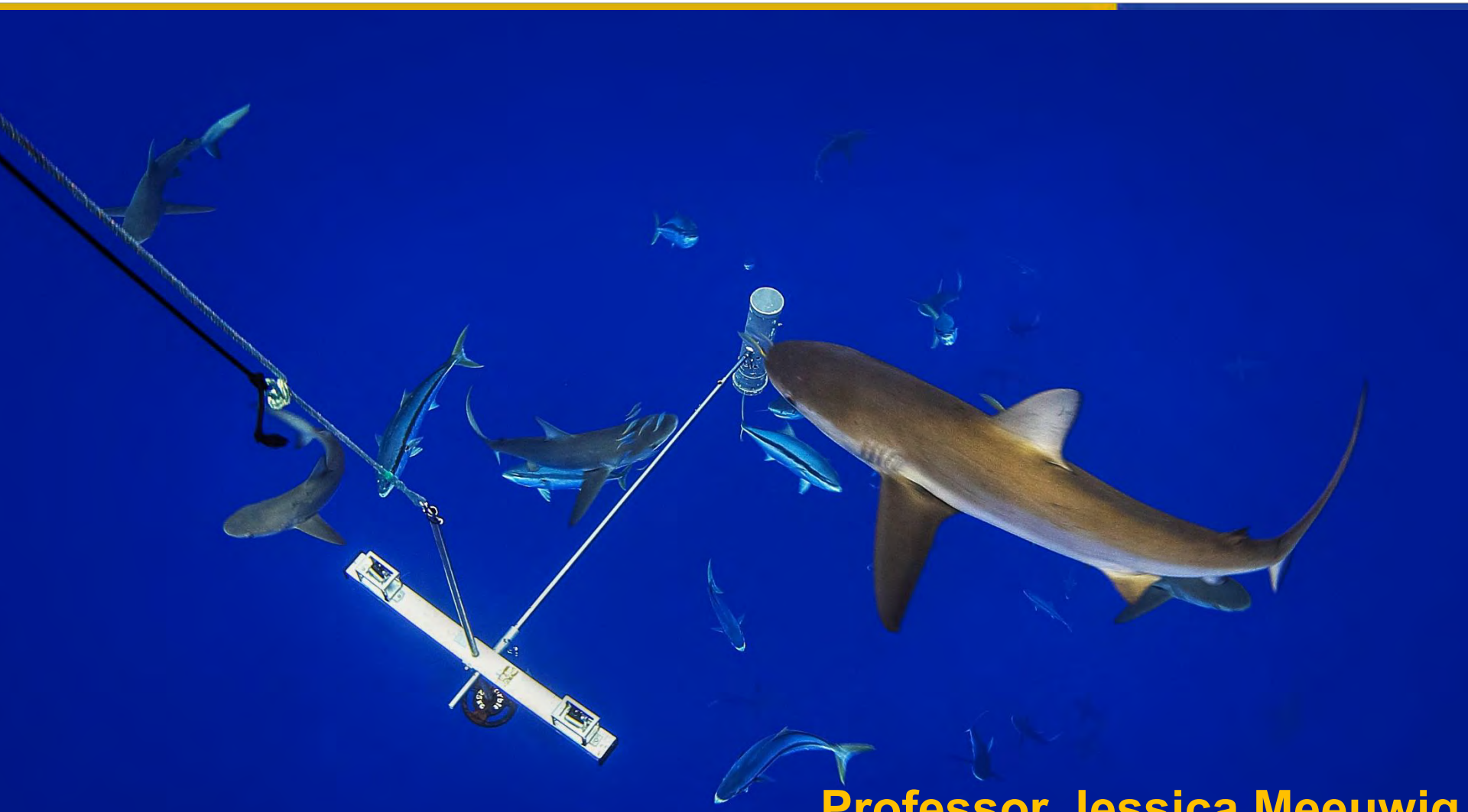
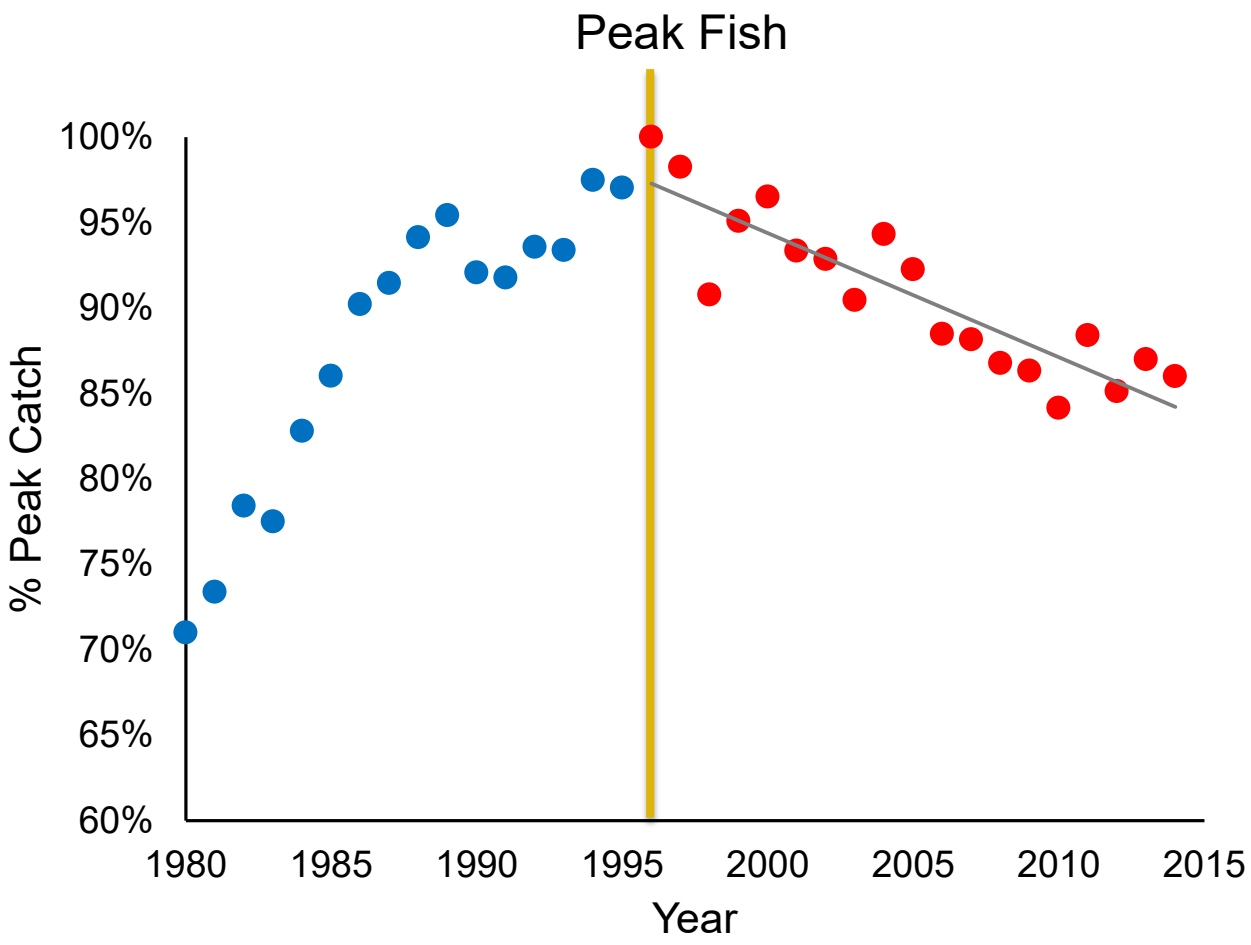
Status of oceanic wildlife



Professor Jessica Meeuwig
University of Western Australia
www.meeuwig.org

Credit: Manu San Felix / Pristine Seas

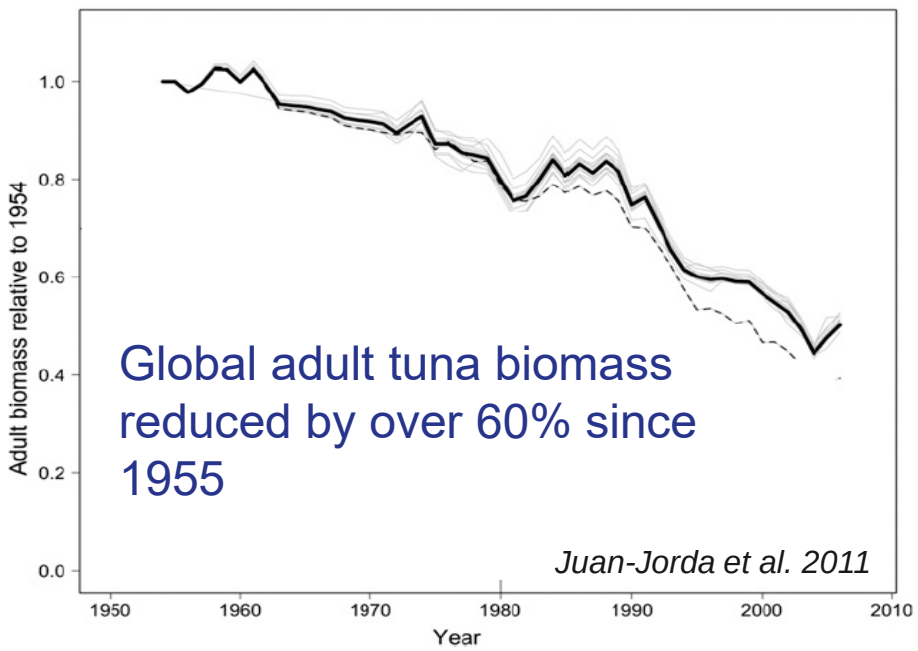
Global fisheries in decline



- 1980 onwards => industrial fishing accelerates
- 1996 – we hit peak fish
- 33% of fisheries are unsustainable
- Catch decreases **1 billion kg** per year between 1996 - 2014
- 10s of billions lost to national economies

adapted from Pauly and Zeller 2016 *Nature Communications*

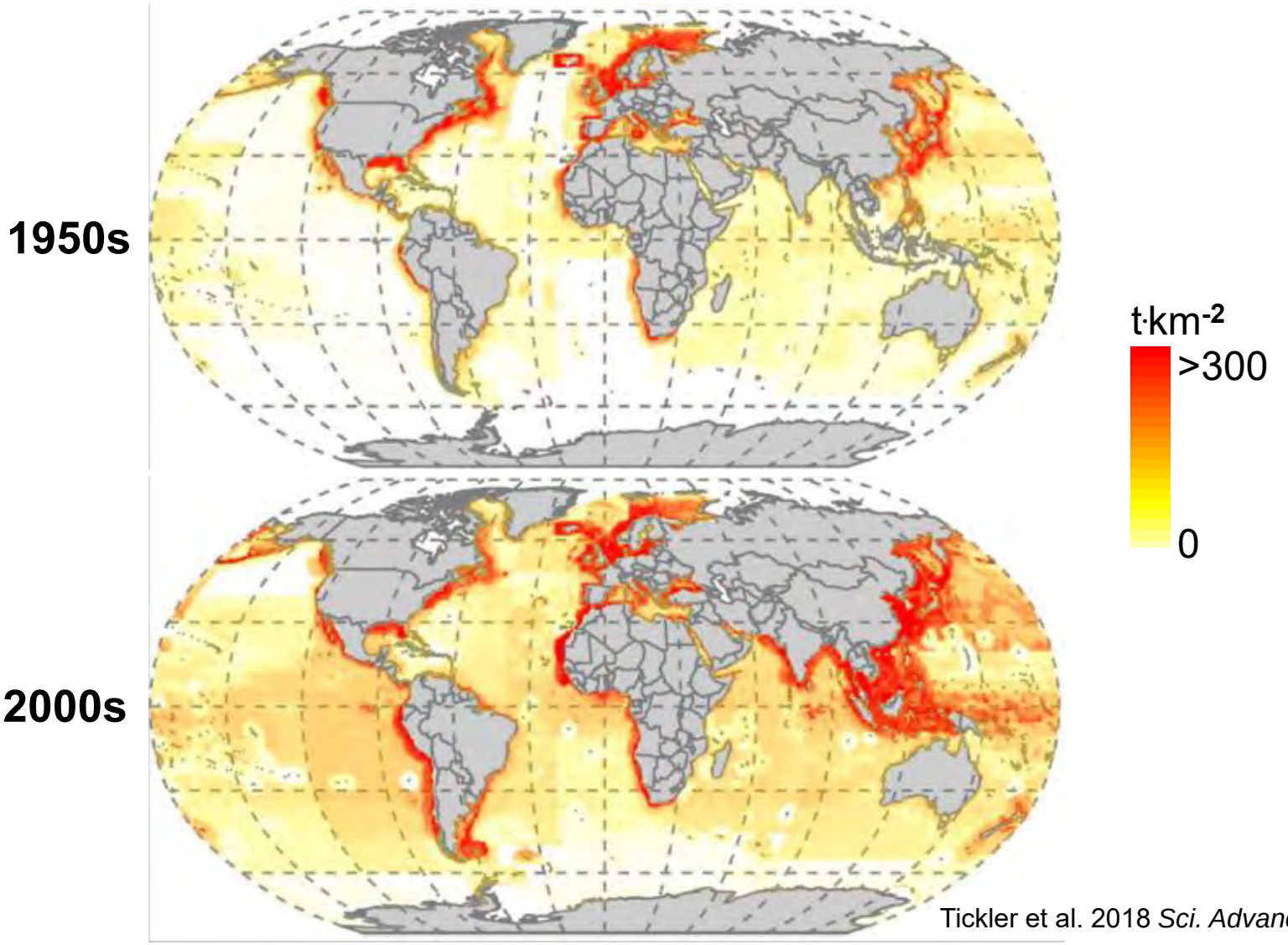
Tuna as well …



Global adult tuna biomass reduced by over 60% since 1955

Juan-Jorda et al. 2011

Nowhere to hide



Tickler et al. 2018 *Sci. Advances*

Wildlife declines

- 25% – Striped marlin
- 33% – Yellowfin tuna
- 40% – Shortfin mako
- 63% – Whale shark
- 60% – Blue shark
- 89% – Hammerhead shark
- 95% – Turtles







So what about Australia …

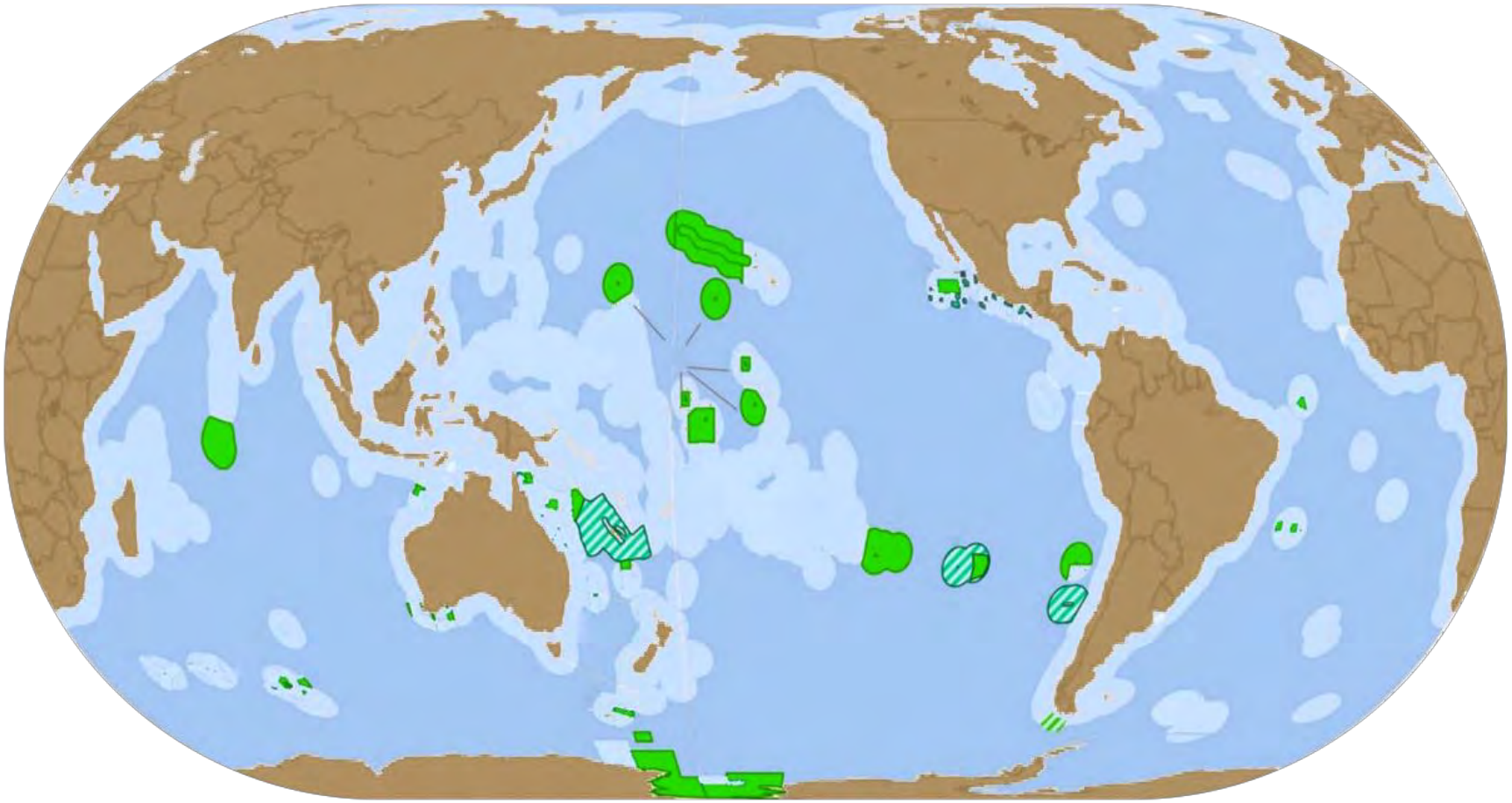
30% of Australia's large fish are gone … in a decade[1]

> 20% of fish populations managed by the Australian Government are overfished, subject to overfishing or uncertain[2]

74-92% of some Queensland sharks …. gone over 5 decades[3]

[1] Edgar et al. (2018) *Aquatic Conservation*
[2] ABARES (2018) Fisheries Status Reports.
[3] Roff et al. (2019) *Communications Biology*

The global rise of marine parks



IUCN I and II Proposed EEZ

Coastal MPAs: the evidence is in

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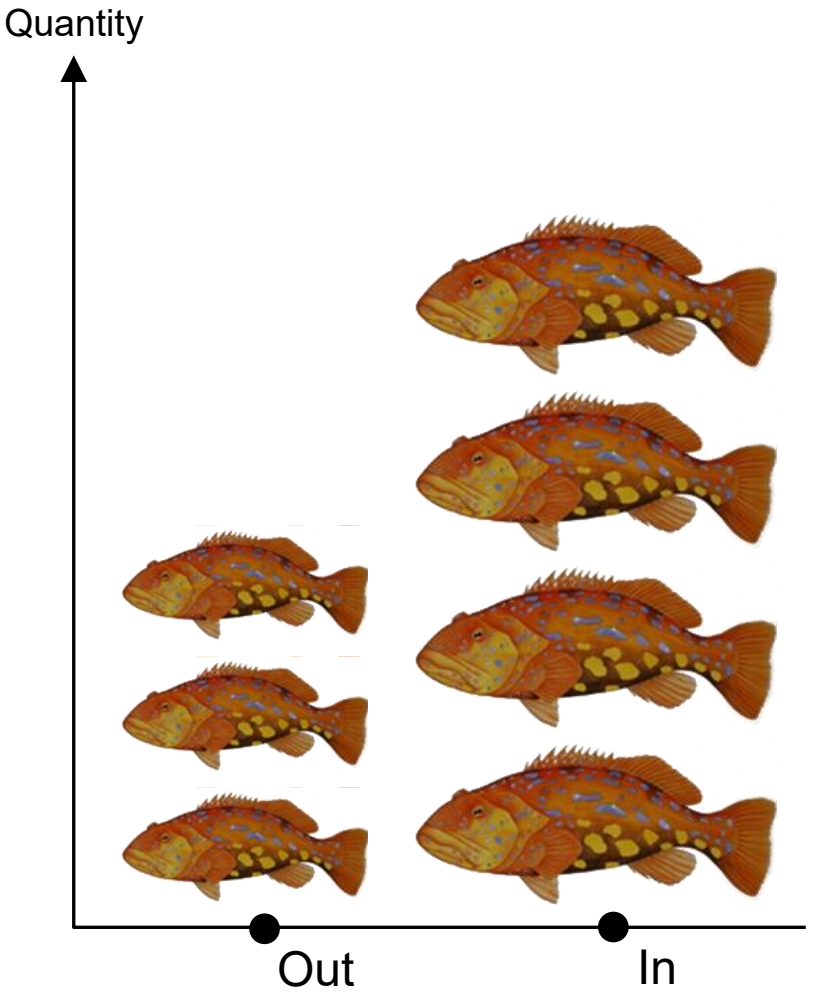
21% Higher diversity

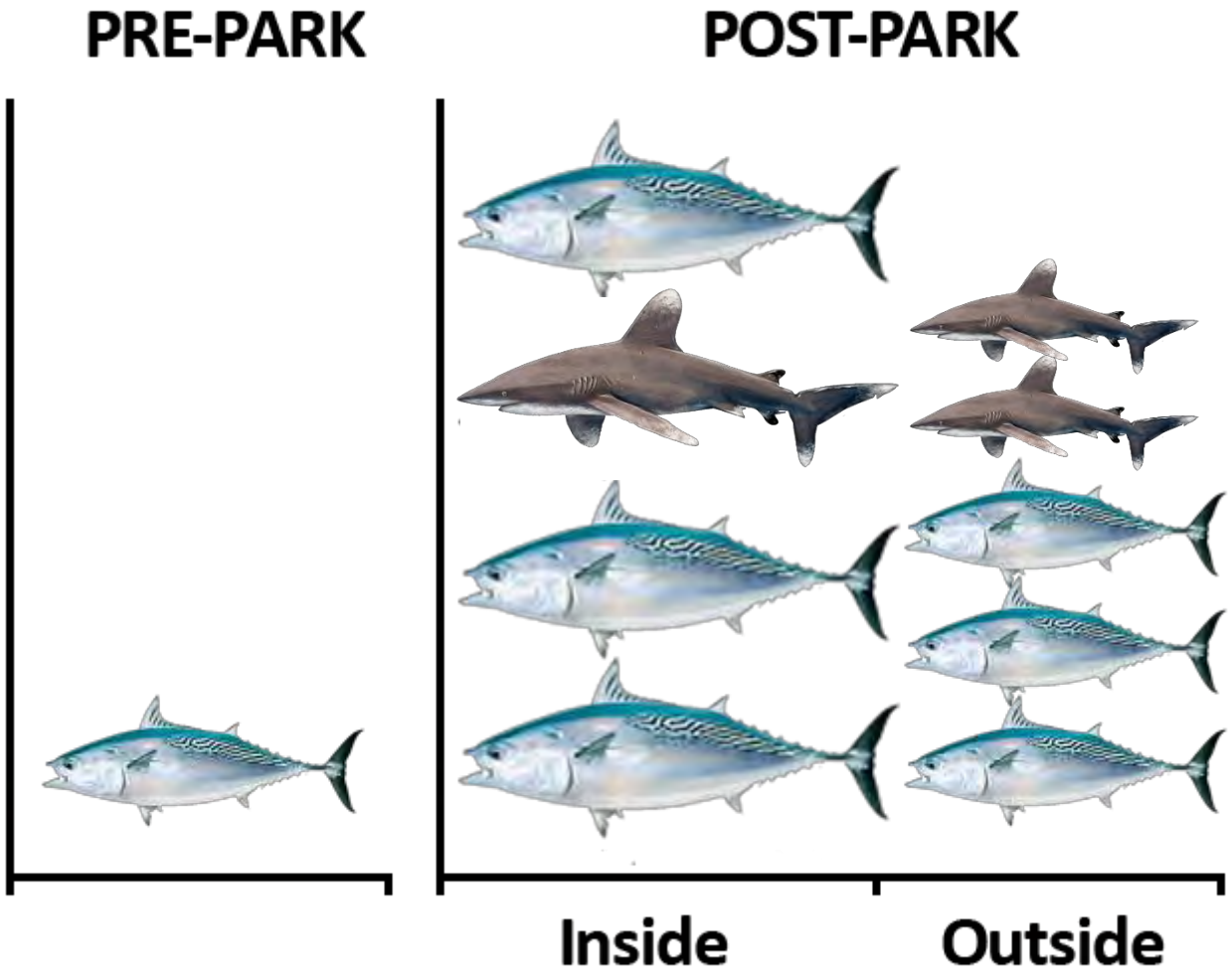
166% More fish

466% Bigger fish

- Spill-over and fisheries benefits
- Resilience and recovery

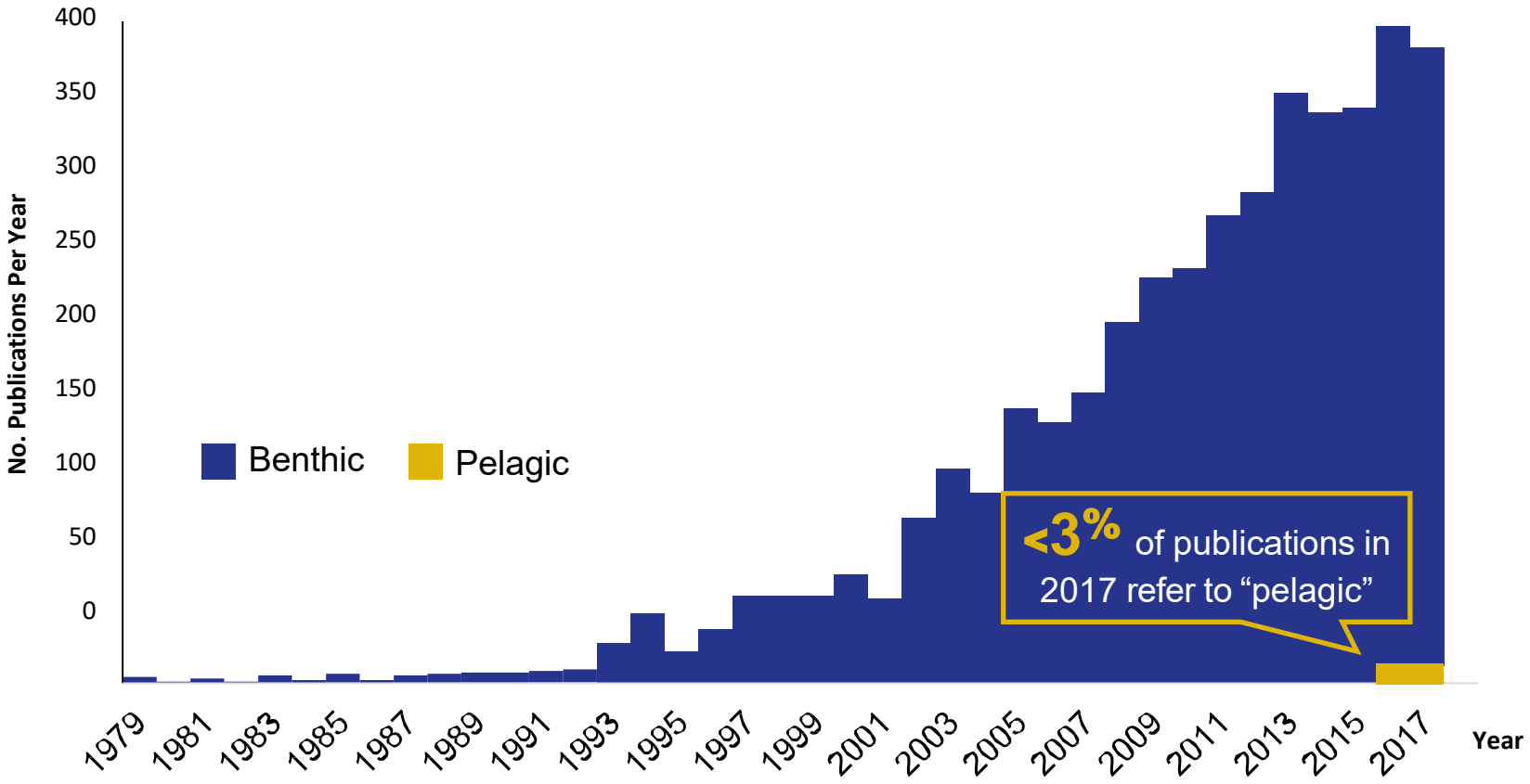


The big question for the Big Blue

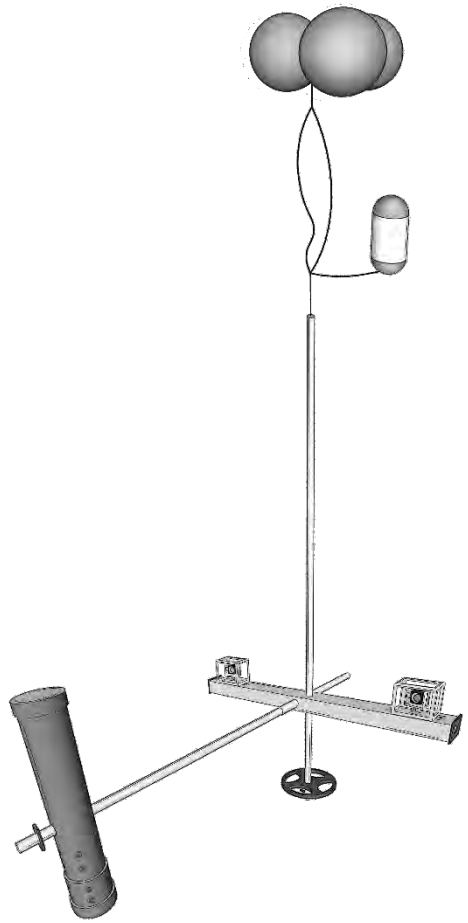


Pelagic marine parks under-researched

- Web of Knowledge search on “marine protected area” or “marine reserve” or “MPA” or “marine park”



The tool



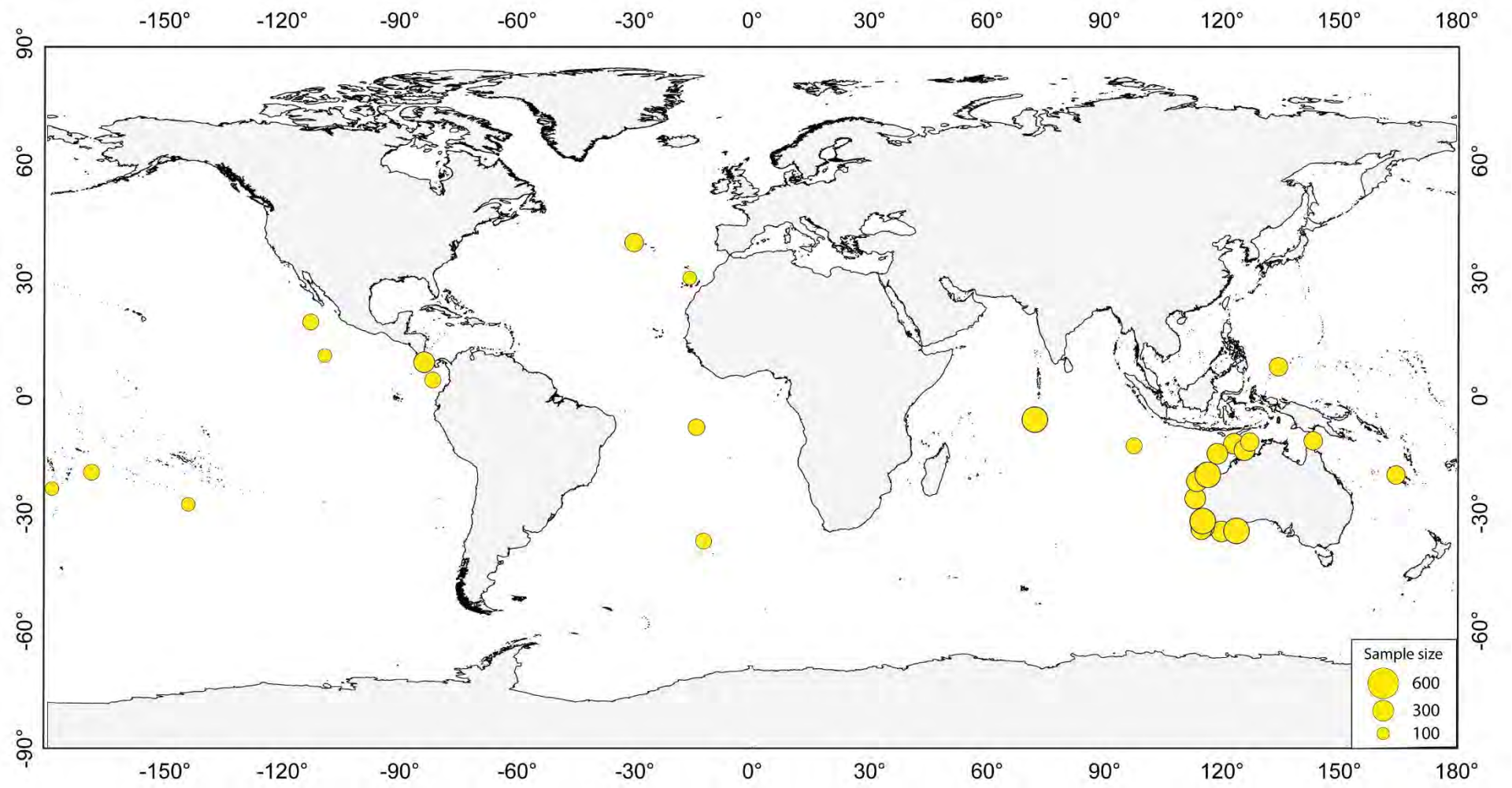
- Gear:
  - 2 Go Pros on a stick
  - Cheap and easy
- Processing:
  - cost-effective options available
  - automation around the corner
- Standarised method that allows for comparisons in space and time

Lots of Go Pros

Have boat ? Can deploy

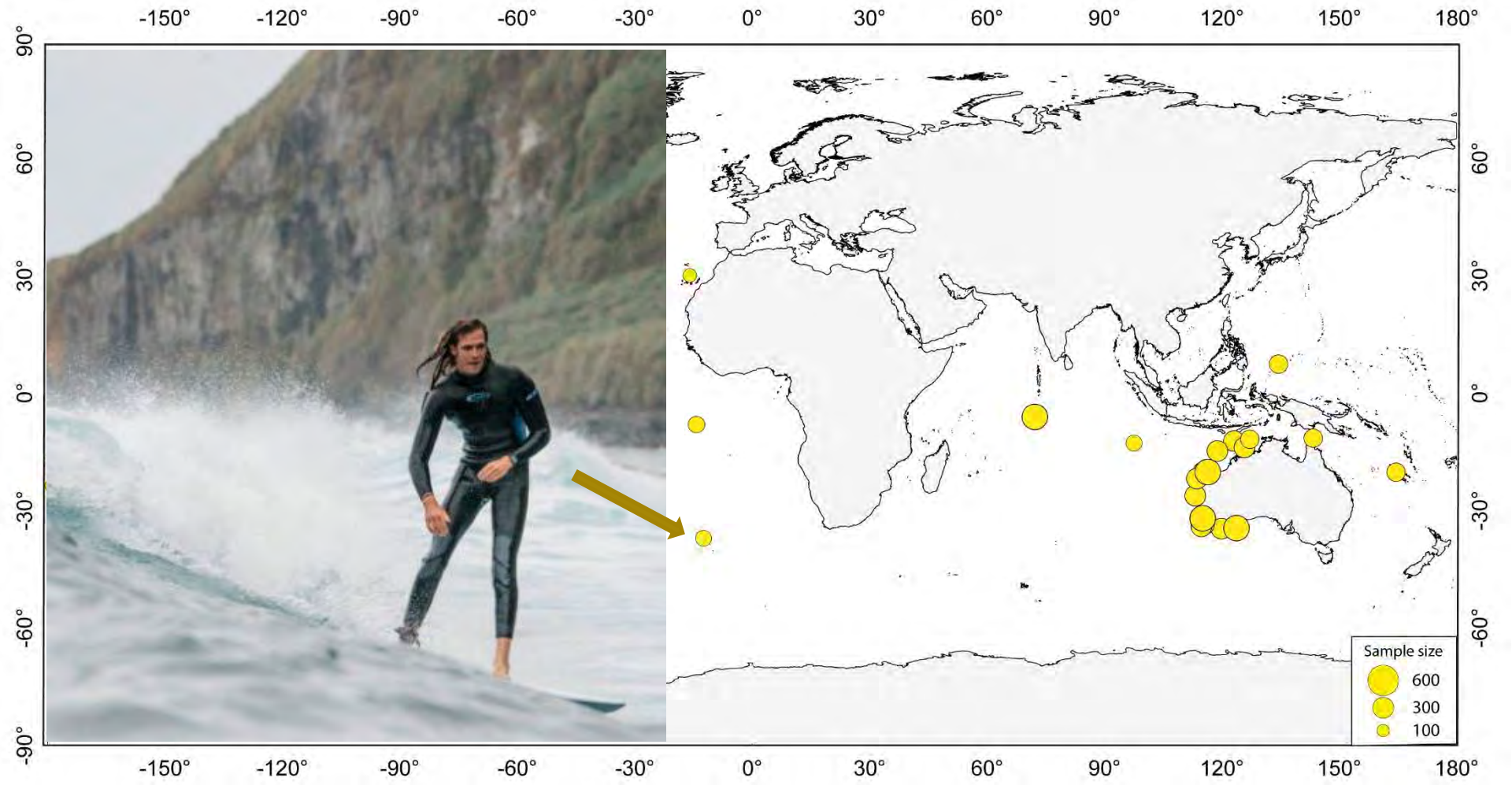
Day in the life video

Global BRUVing since 2014



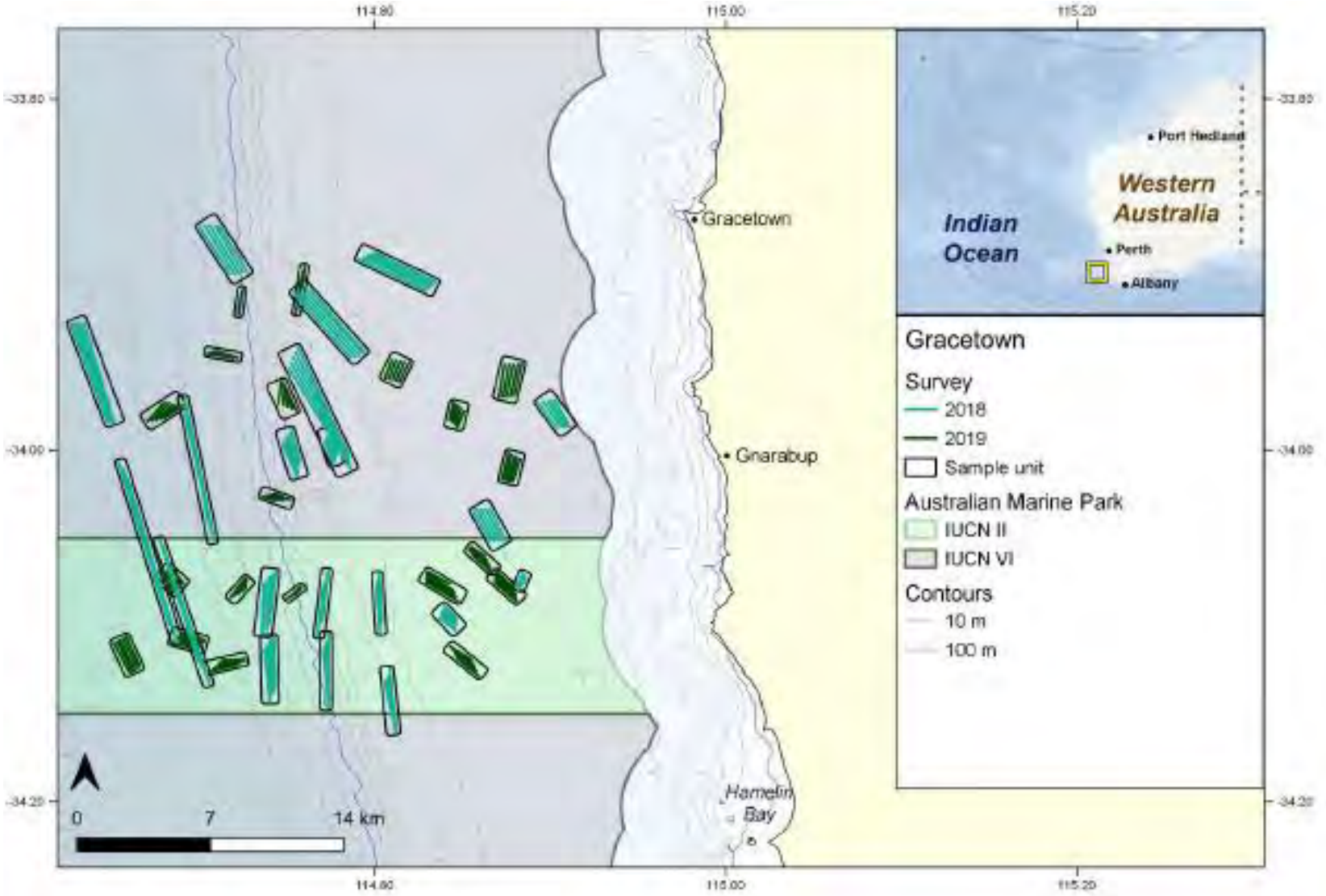
33 locations based on 52 expeditions, 6 international partners, 5,923 samples, and 103,123 animals counted

Global BRUVing since 2014



33 locations based on 52 expeditions, 6 international partners, 5,923 samples, and 103,123 animals counted

Example sampling plan



Identify, count and measure

DATA:

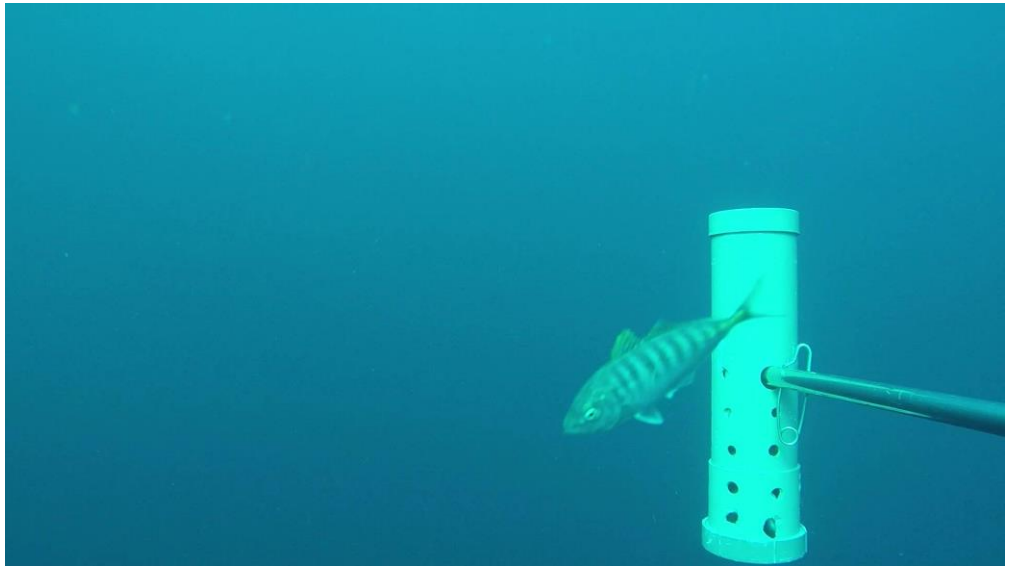
Family	:	Carangidae
Genus	:	Decapterus
Species	:	SP
MaxN	:	164

Details:

Length	:	75.3cm
Distance	:	3.1m away

Who's who in the big blue

- 74 families; 199 taxa
- 102,718 individuals
- Range in size from 1 cm juveniles to 10.2 m humpback whale
- 16% of taxa observed only once
- 26% of all observations are *Decapterus*



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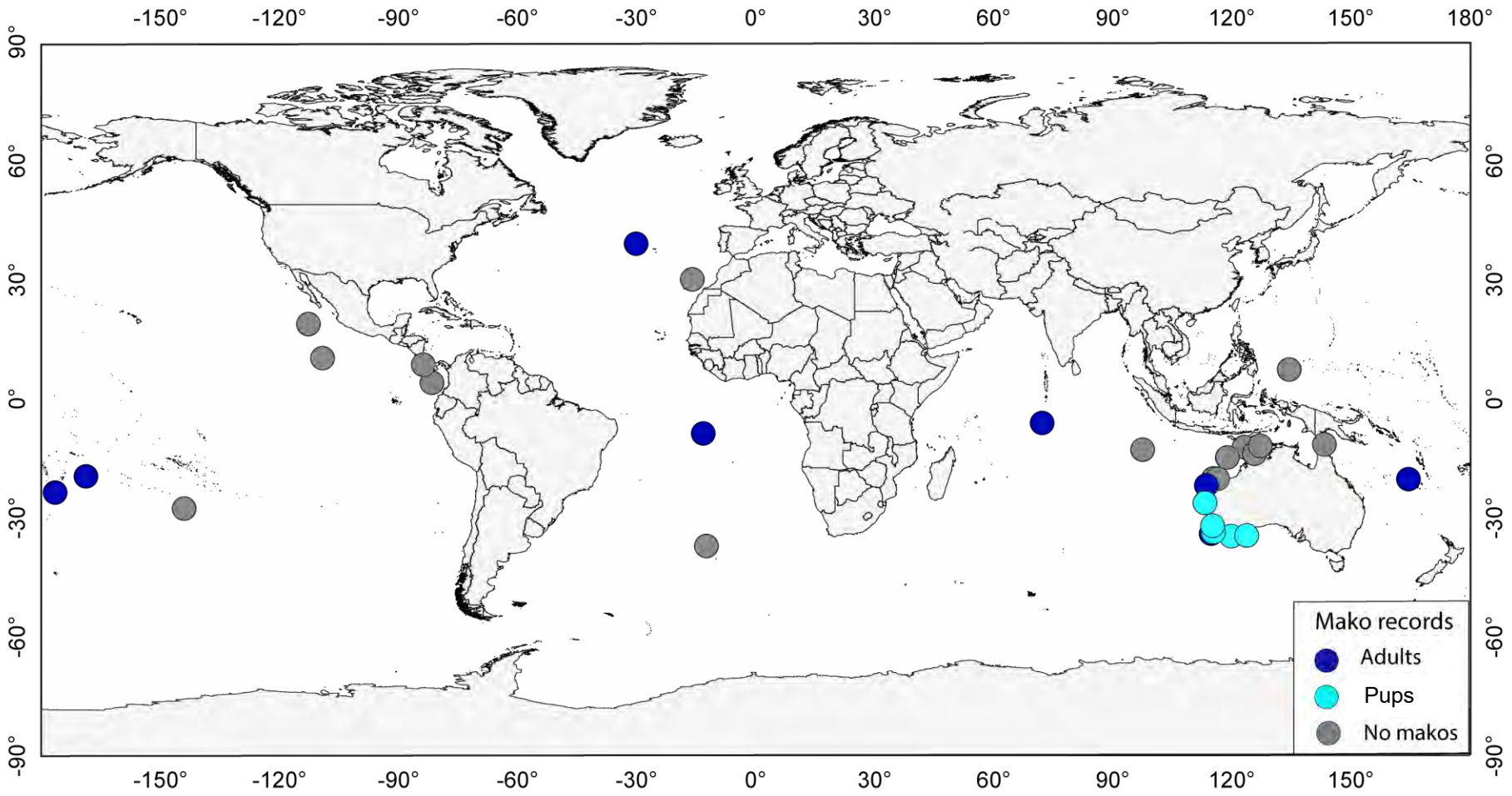
A peek into the life of the shortfin mako *Isurus oxyrinchus*

Francine – 60.2 cm; less than 1 month old

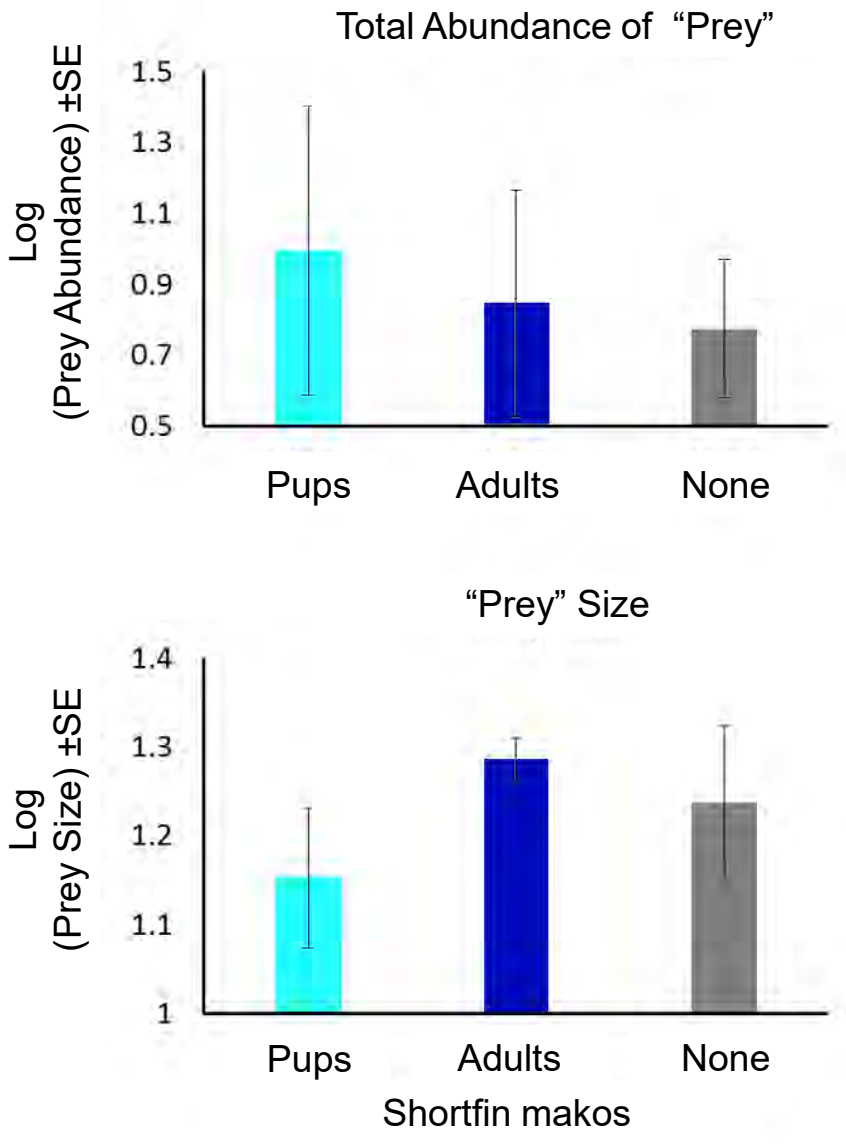
Global distribution of mako adults and pups



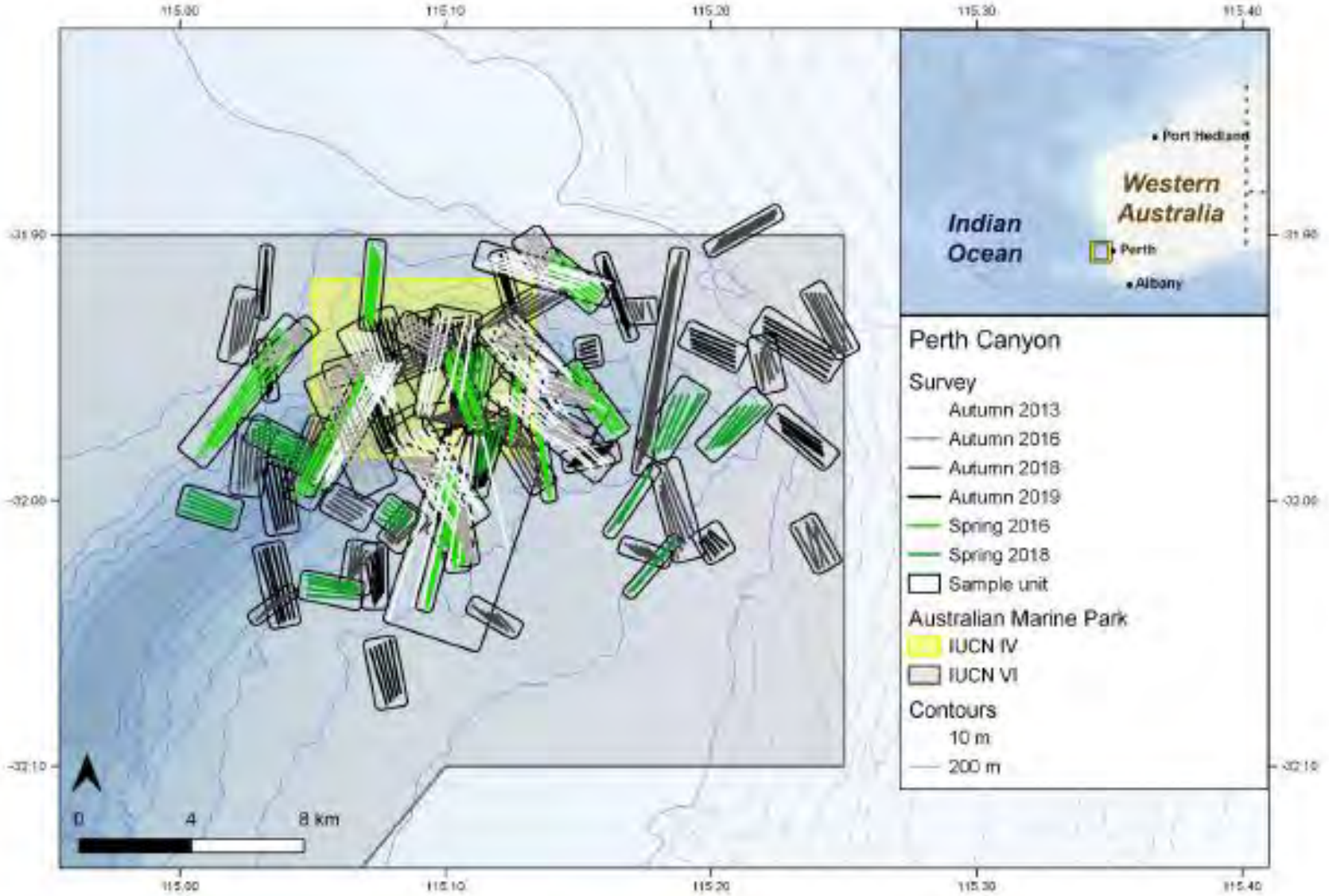
32 locations, 59 surveys, 35 shortfin makos including 9 pups from 5 locations

A nursery for shortfin mako pups: the criteria

- Individuals under size of maturity (100 cm for shortfin makos)
- Multiple observations of Young-of-the-Month and Young-of-the-Year (pups)
- Female philopatry
- Safety – segregation of adults and pups
- Abundant and small prey to support fast growth
- Multi-year observations – ongoing research

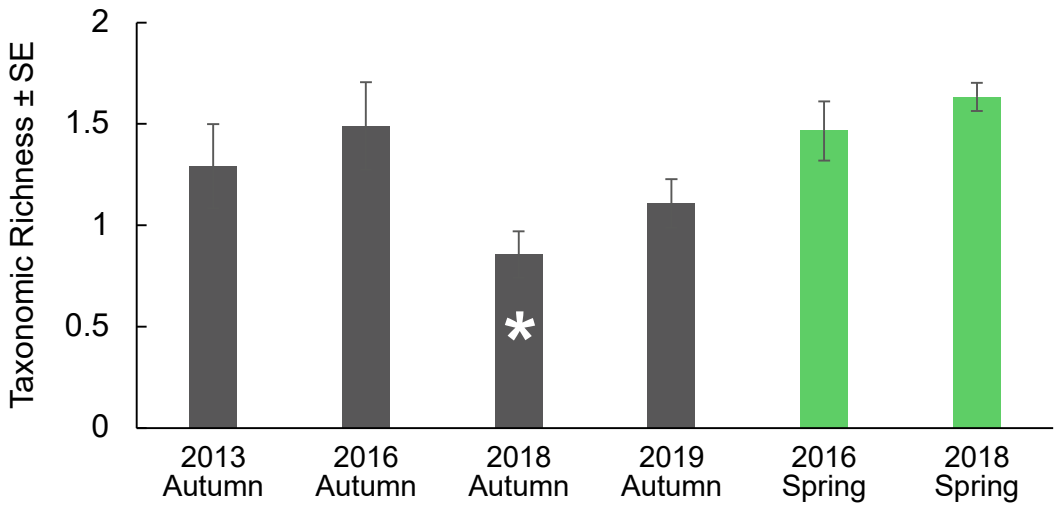


Perth Canyon Sampling

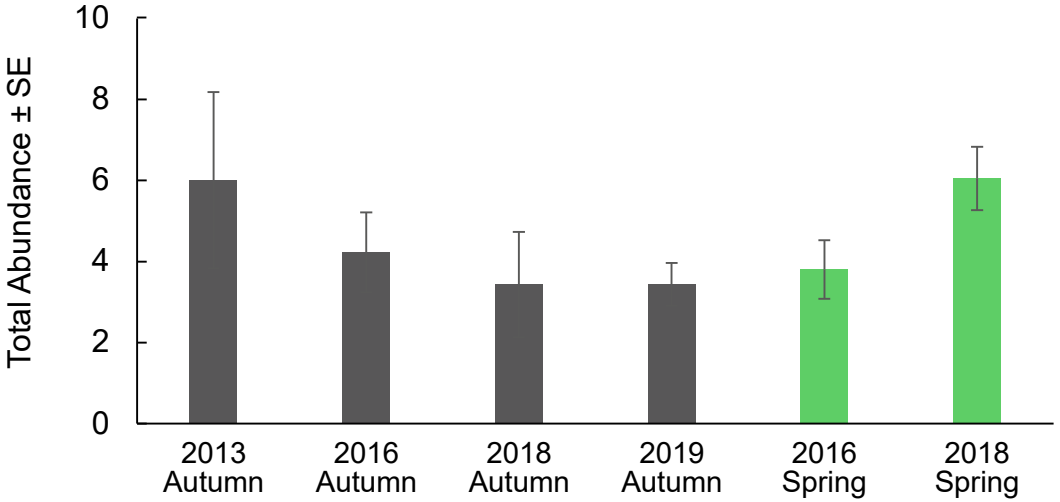


Stability between years and seasons

- **Taxonomic richness:**
- Significant effect of survey (p=0.002) driven by 2018

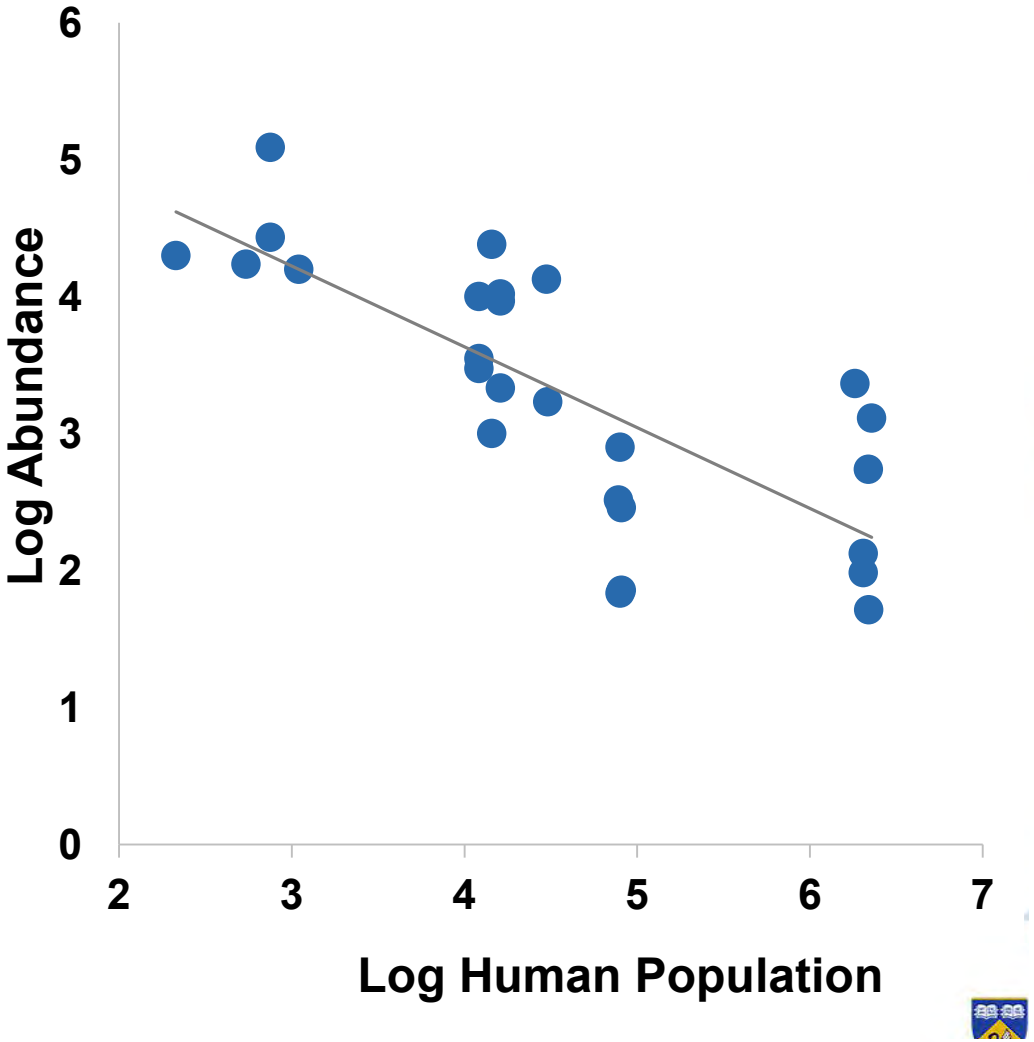


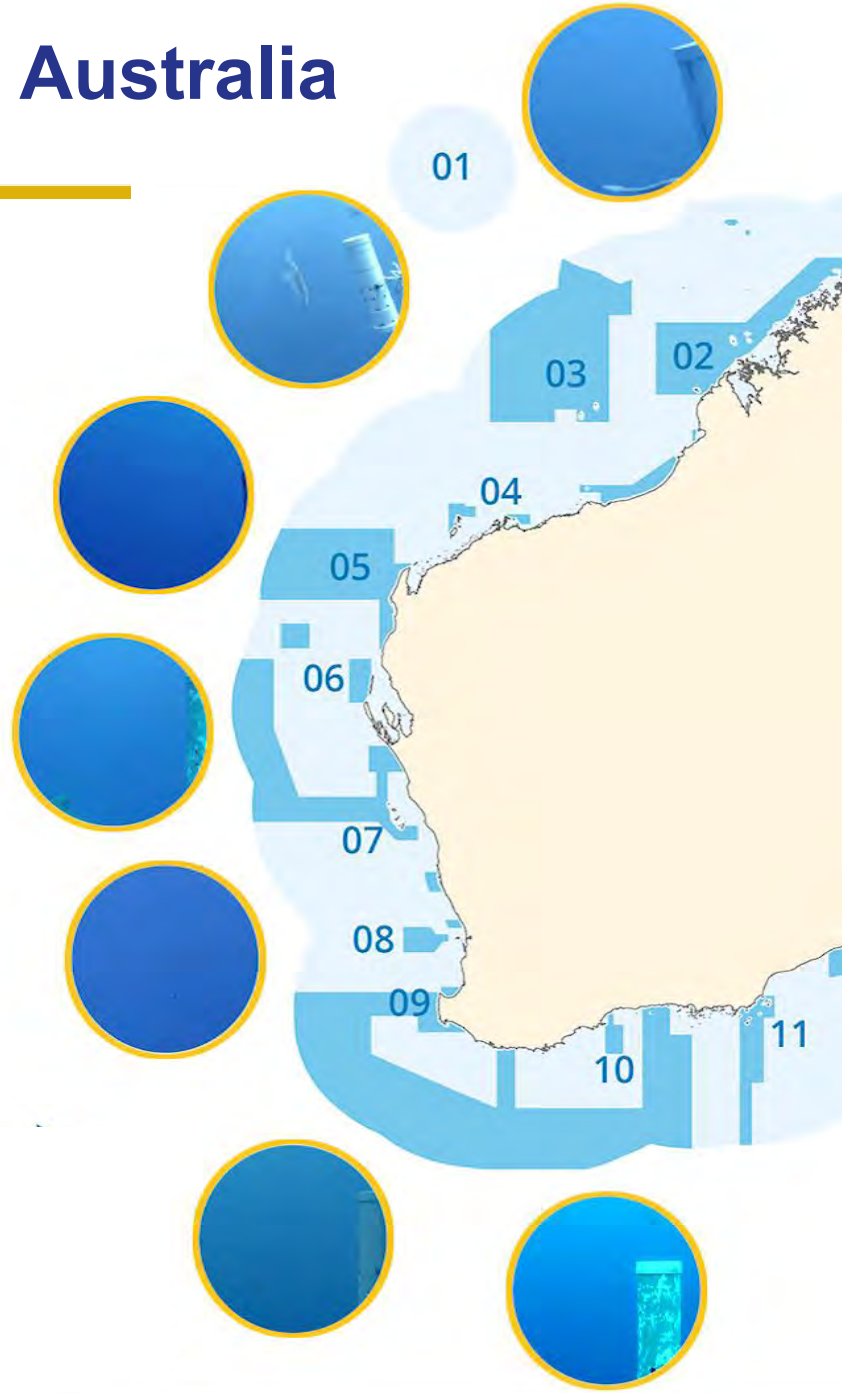
- **Total abundance:**
- No significant difference across all 6 surveys (p=0.32)
- No effect of season



* Indicates significant difference (p<0.05)

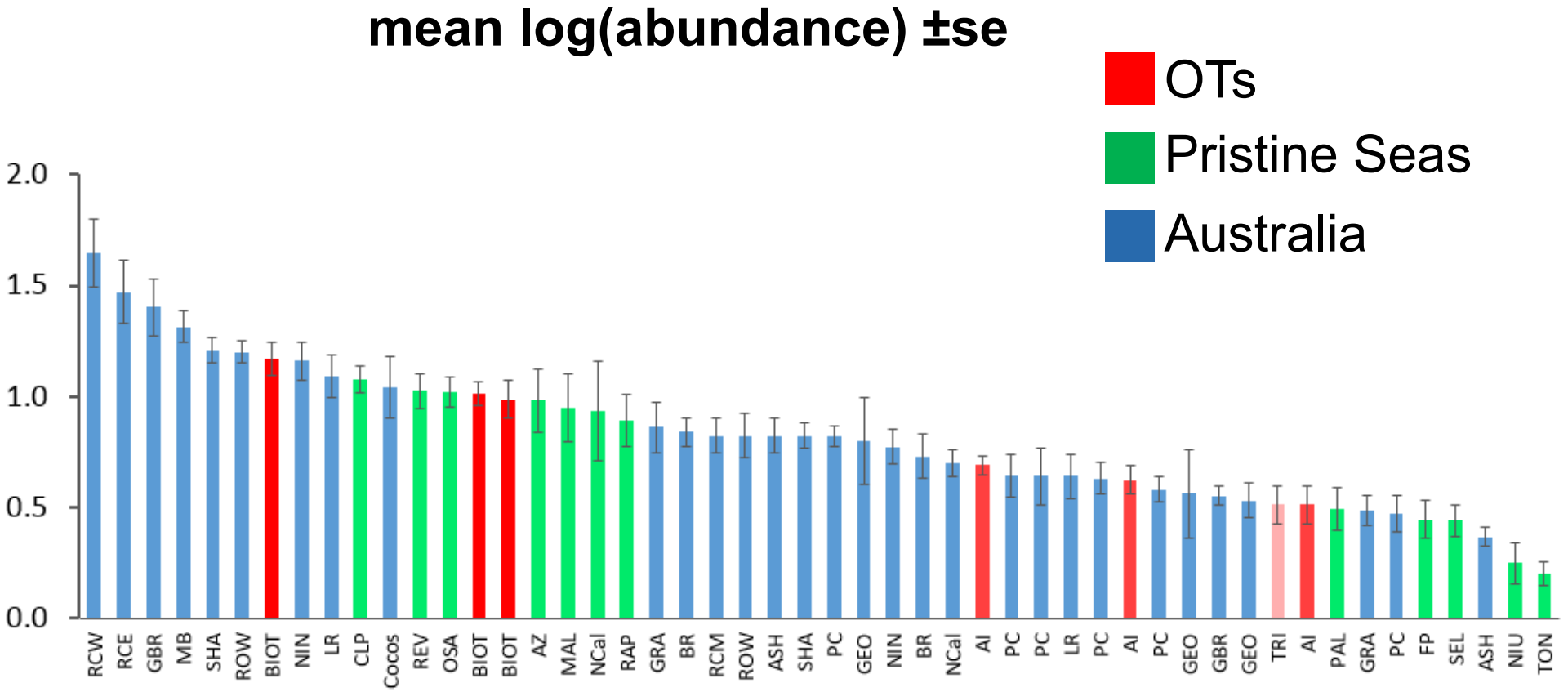
Baselines for Western Australia





Forrest et al. 2019.

International baselines



Effective MPAs are:

- No-take
- Well enforced
- Old (>10 years)
- Large (>100 km^2)
- Isolated
- Comprehensive, Adequate Representative
- Cover > 30% of bioregions

LETTER

doi:10.1038/nature13022

Global conservation outcomes depend on marine protected areas with five key features

Graham J. Edgar[1], Rick D. Stuart-Smith[1], Trevor J. Willis[2], Stuart Kininmonth[1,3], Susan C. Baker[4], Stuart Banks[5], Neville S. Barrett[1], Mikel A. Becerro[6], Anthony T. F. Bernard[7], Just Berkhout[1], Colin D. Buxton[1], Stuart J. Campbell[8], Antonia T. Cooper[1], Marlene Davey[1], Sophie C. Edgar[9], Günter Försterra[10], David E. Galván[11], Alejo J. Irigoyen[11], David J. Kushner[12], Rodrigo Moura[13], P. Ed Parnell[14], Nick T. Shears[15], German Soler[1], Elisabeth M. A. Strain[16] & Russell J. Thomson[1]

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Are outcomes matching policy commitments in Australian marine conservation planning?

Lissa M. Barr *, Hugh P. Possingham

Centre of Excellence in Environmental Decisions, School of Biological Sciences, University of Queensland, Brisbane, QLD 4067, Australia

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LETTER

Effective Coverage Targets for Ocean Protection

Bethan C. O'Leary[1], Marit Winther-Janson[1,2], John M. Bainbridge[1], Jemma Aitken[1], Julie P. Hawkins[1], & Callum M. Roberts[1]

Cultural change needed

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