The continental IMOS Animal Tracking Network

Opportunities for monitoring Australian marine megafauna and interactions with Industry

Fabrice Jaine, Phil McDowall, Francisca Maron, Charlie Huveneers, Rob Harcourt

Fabrice Jaine
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sims
sydney institute of marine science

15 YEARS of IMOS

IMOS
Integrated **Marine Observing** System

The IMOS Acoustic Tracking Network

2007 - present

IMOS
Integrated **Marine Observing** System

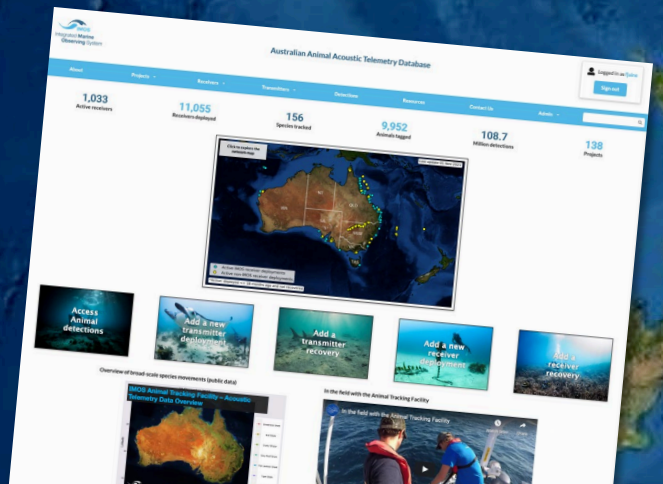
11,055 receiver deployments

>1,033 active receivers

Receiver deployments
- IMOS receivers
- Independent receivers

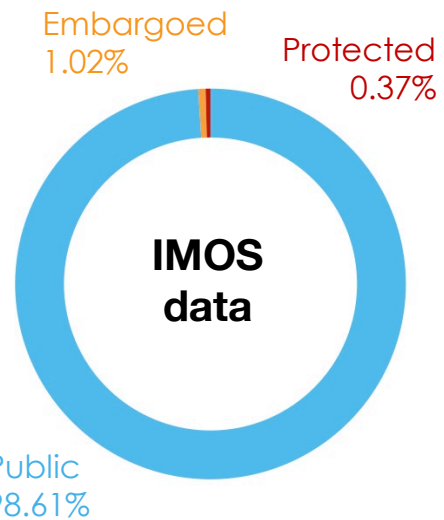
108.7 million detections

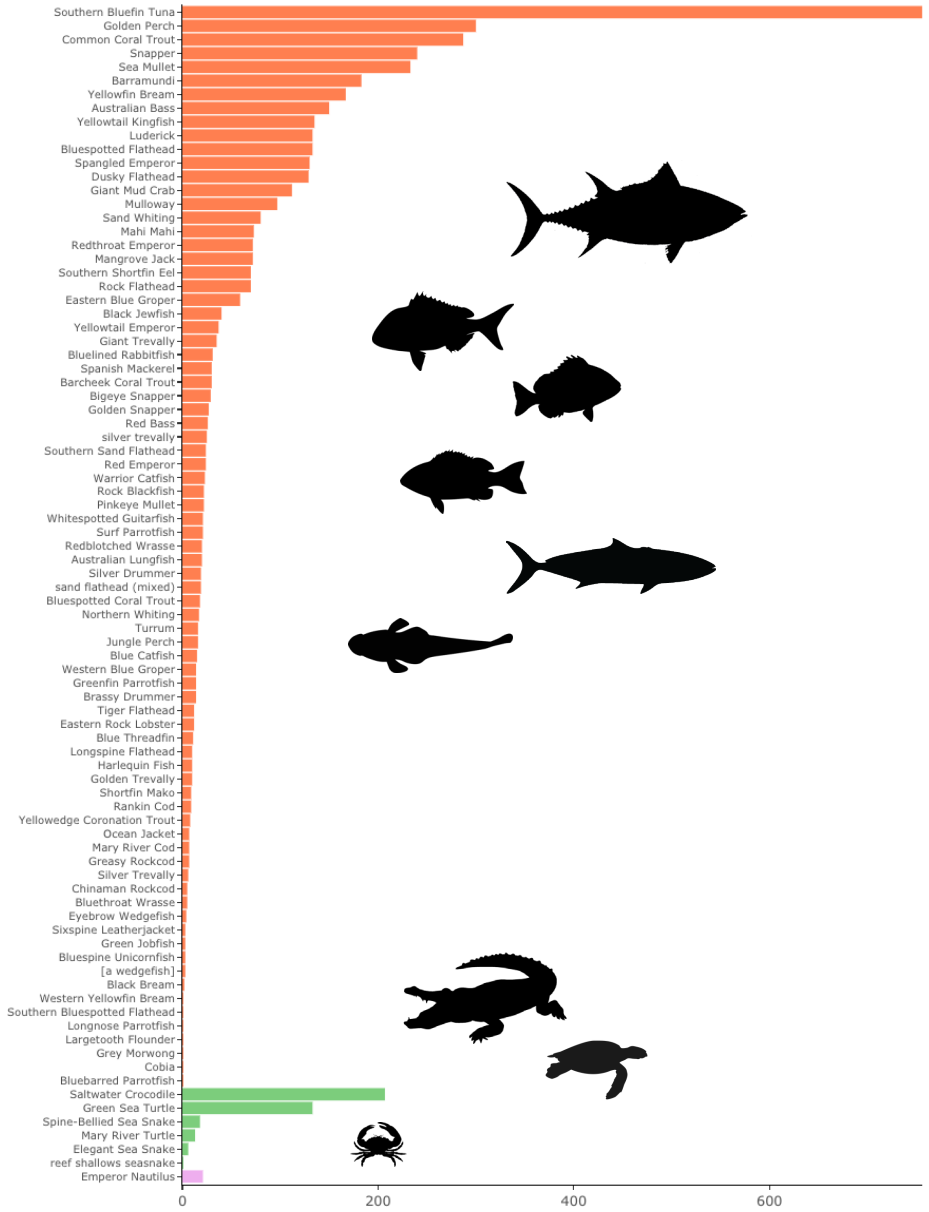
AODN
https://animaltracking.aodn.org.au/

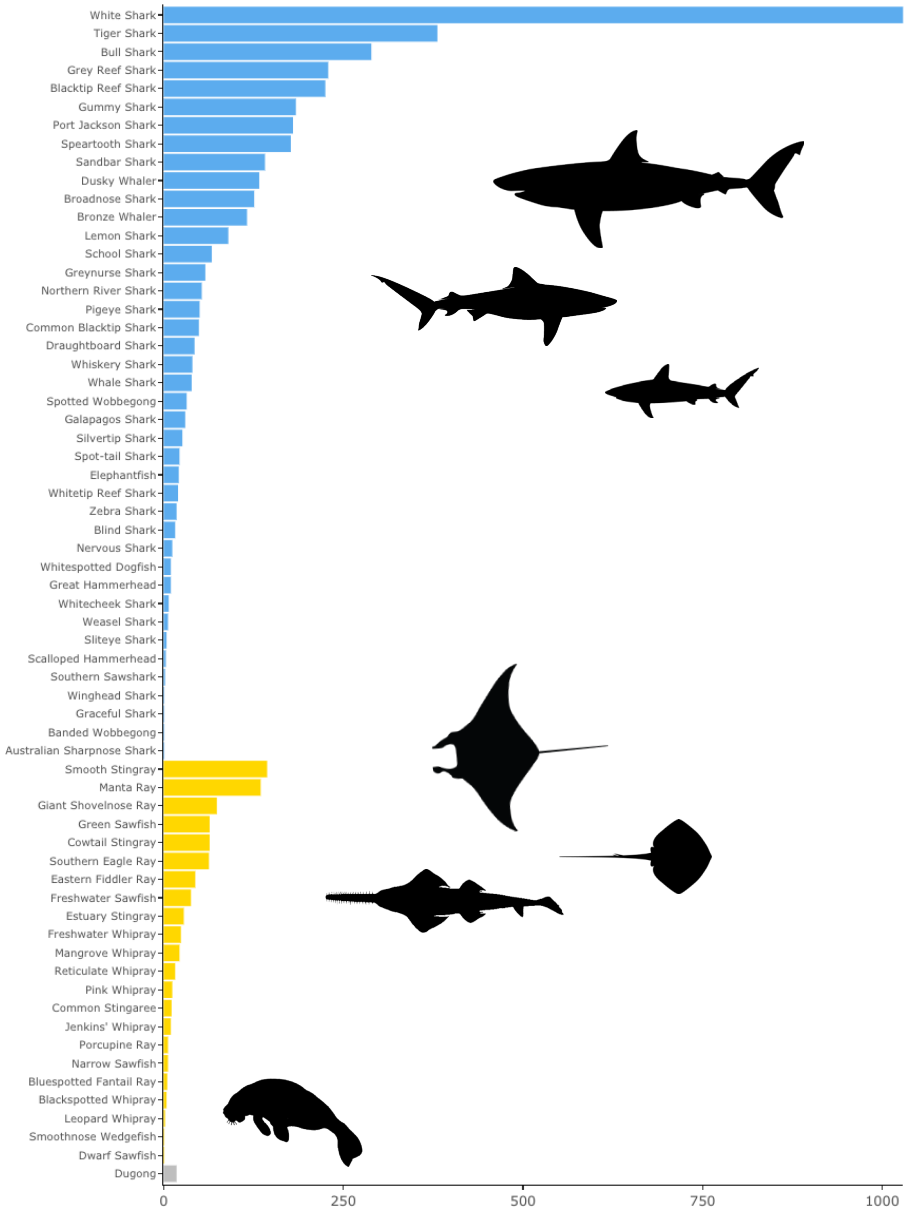


156 species
9,952 animals
tracked

IMOS Integrated Marine Observing System







IMOS Integrated Marine Observing System

Can IMOS help monitor ‘Priority Species’?

FRDC FISHERIES RESEARCH & DEVELOPMENT CORPORATION

FRDC project #2018-091

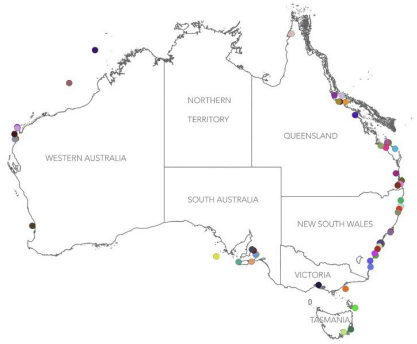
Received: 22 December 2020 | Revised: 18 March 2021 | Accepted: 29 March 2021
DOI: 10.1111/faf.12565

ORIGINAL ARTICLE

FISH and FISHERIES — WILEY

Continental-scale acoustic telemetry and network analysis reveal new insights into stock structure

Elodie J. I. Lédée[1] | Michelle R. Heupel[2] | Matthew D. Taylor[3] | Robert G. Harcourt[4,5] | Fabrice R. A. Jaine[4,5] | Charlie Huveneers[6] | Vinay Udyawer[7] | Hamish A. Campbell[8] | Russell C. Babcock[9] | Xavier Hoenner[10,11] | Adam Barnett[12] | Matias Braccini[13] | Stephanie Brodie[14] | Paul A. Butcher[15] | Gwenael Cadiou[3,16] | Ross G. Dwyer[17] | Mario Espinoza[18] | Luciana C. Ferreira[19] | Lachlan Fetterplace[20] | Anthony Fowler[21] | Alastair R. Harborne[22,23] | Nathan A. Knott[3] | Michael Lowry[3] | Jaime McAllister[24] | Rory McAuley[25] | Mark Meekan[26] | Kade Mills[27] | Victor M. Peddemors[28] | Richard Pillans[9] | Jayson Semmens[24] | Amy F. Smoothey[28] | Conrad Speed[26] | Kilian Stehfest[29] | Dylan van der Meulen[30] | Colin A. Simpfendorfer[31]



Primary objective:

Assess the efficacy of IMOS acoustic telemetry infrastructure and network analysis for defining stock structure of species of commercial, recreational or conservation importance

14 species (1,491 individuals):

Teleosts:		Sharks:	
Pink snapper *Chrysophrys auratus*	169	**White shark** *Carcharodon carcharias*	233
Yellowtail kingfish *Seriola lalandi*	44	**Tiger shark** *Galeocerdo cuvier*	48
Sand flathead *Platycephalus bassensis*	17	**Bull shark** *Carcharhinus leucas*	149
Bluespotted flathead *Platycephalus caeruleopunctatus*	61	**School shark** *Galeorhinus galeus*	29
Yellowfin bream *Acanthopagrus australis*	124	**Dusky shark** *Carcharhinus obscurus*	86
Luderick *Girella tricuspidata*	66	**Grey reef shark** *Carcharhinus amblyrhynchos*	183
Spangled emperor *Lethrinus nebulosus*	109	**Blacktip reef shark** *Carcharhinus melanopterus*	173

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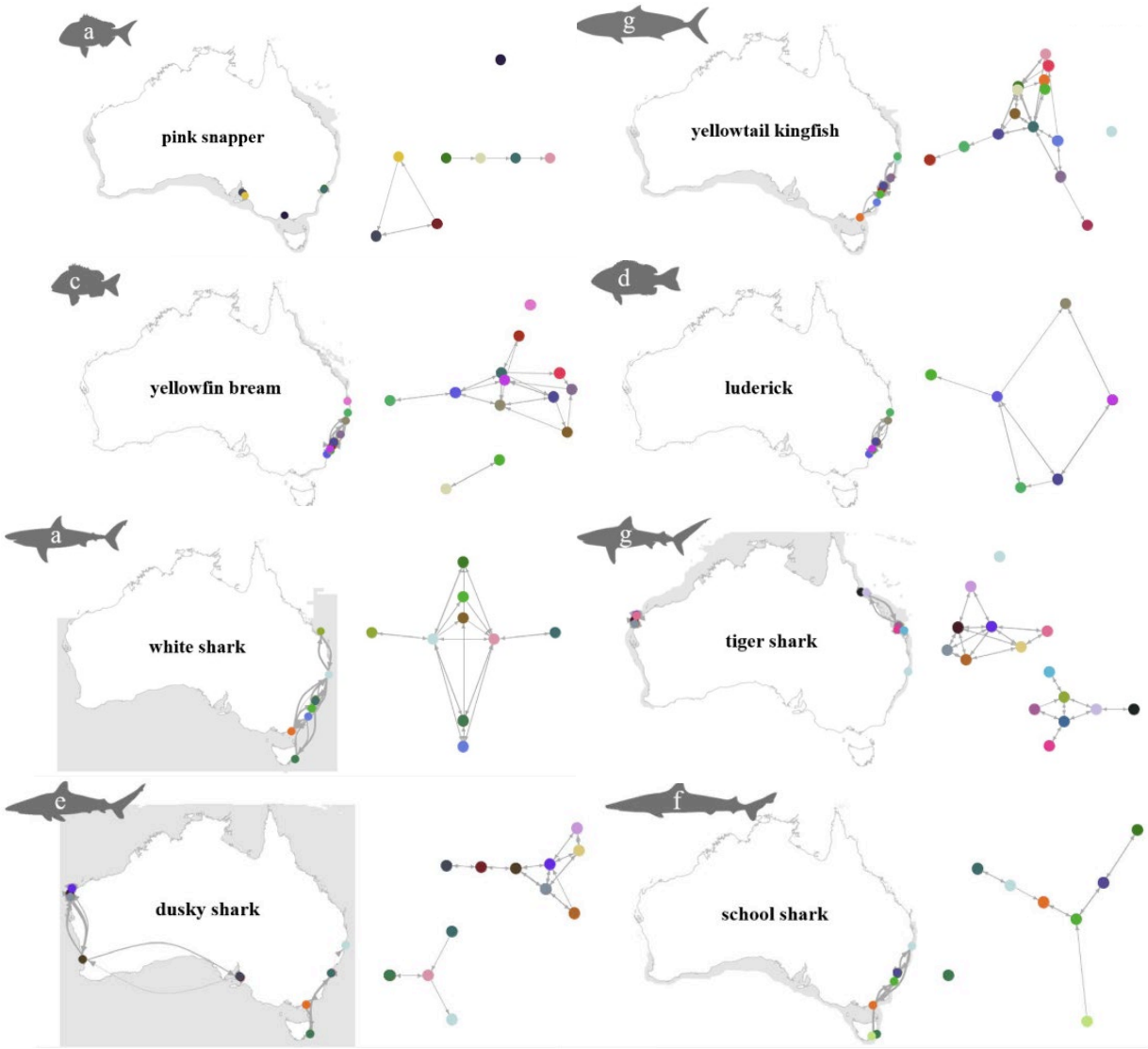


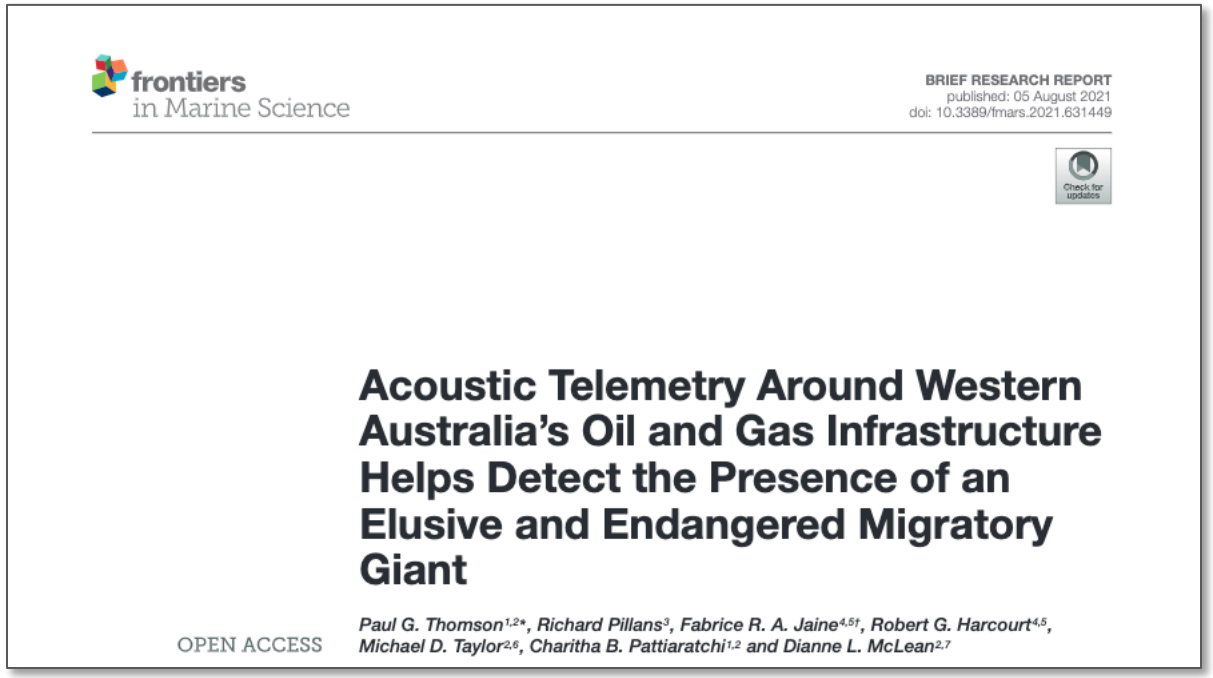
Key conclusion:

The IMOS acoustic telemetry network provides valuable information for defining species population structure at ecologically-relevant time scales

Oil and Gas infrastructure opportunities

NEXT SPEAKER:
Paul Thomson "Whale shark interactions with oil platforms"

- Subsea infrastructure in remote places and commercial fish species as well as megafauna are known to pass by on their migrations, and may even be attracted
- Opportunities exist to understand interactions between marine commercial infrastructure and marine megafauna



frontiers in Marine Science

BRIEF RESEARCH REPORT
published: 05 August 2021
doi: 10.3389/fmars.2021.631449

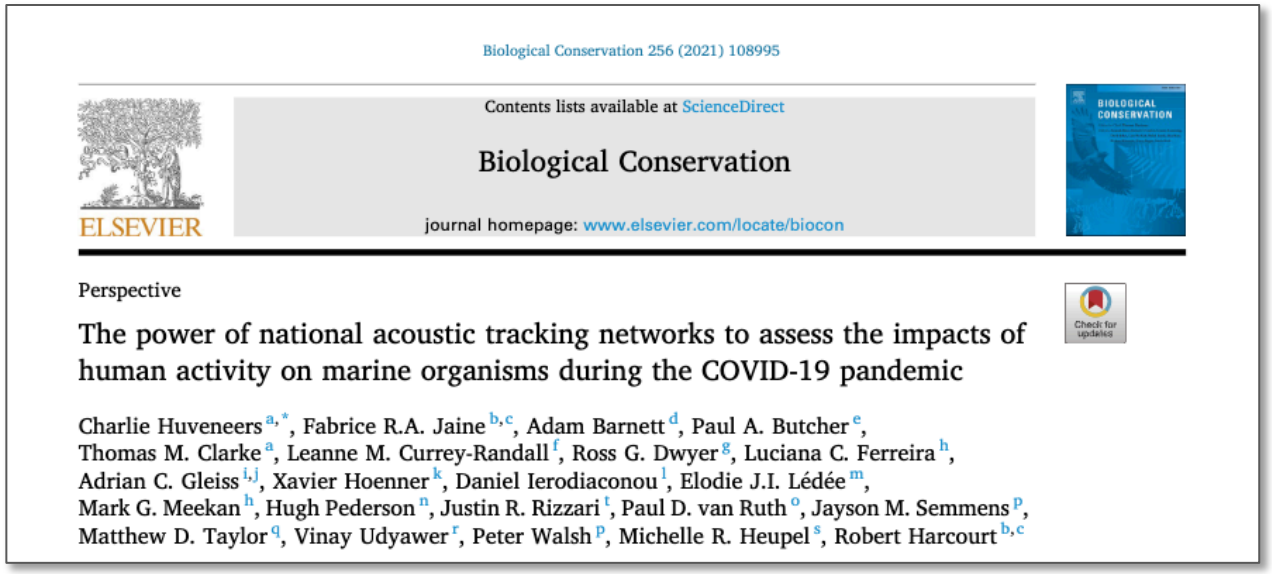
Check for updates

Acoustic Telemetry Around Western Australia's Oil and Gas Infrastructure Helps Detect the Presence of an Elusive and Endangered Migratory Giant

OPEN ACCESS

Paul G. Thomson[1,2], Richard Pillans[3], Fabrice R. A. Jaine[4,5†], Robert G. Harcourt[4,5], Michael D. Taylor[2,6], Charitha B. Pattiaratchi[1,2] and Dianne L. McLean[2,7]*

Impacts of the COVID-19 pandemic



Biological Conservation 256 (2021) 108995

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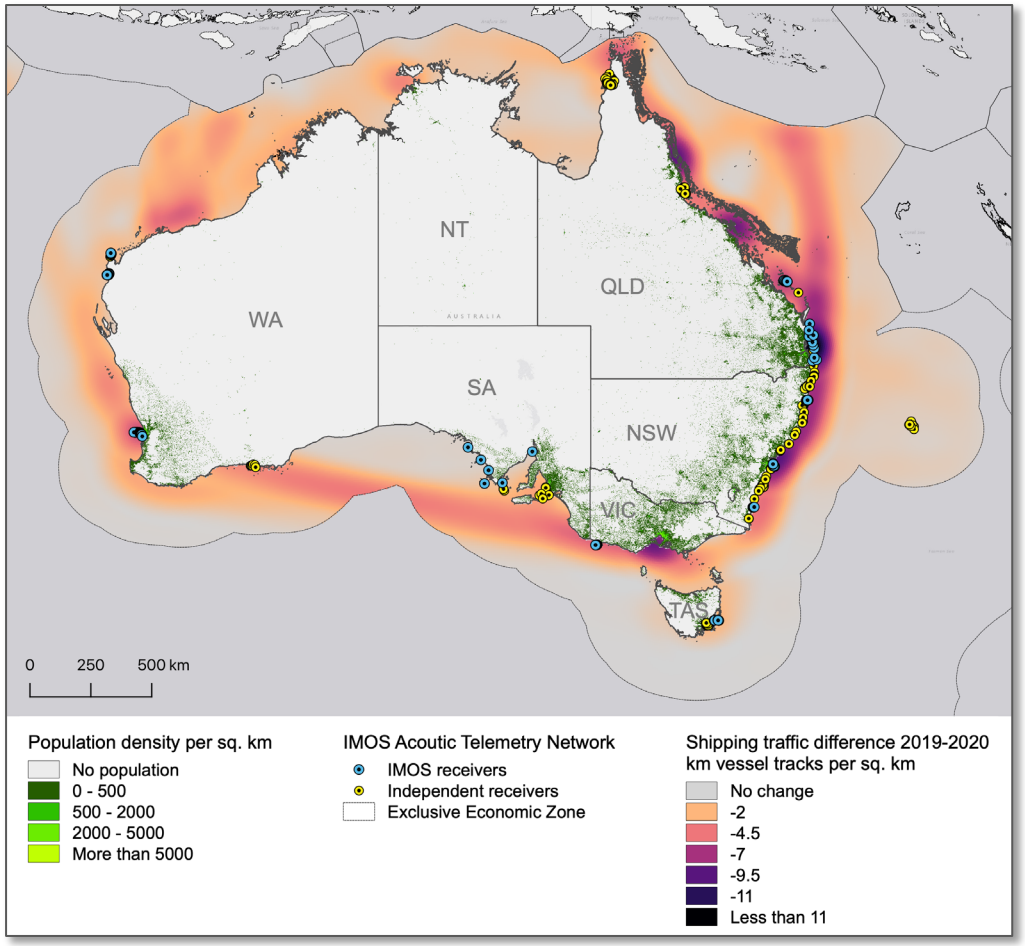

- Opportunity to assess the effects of human activity on marine animal behaviour and habitat use

  1. Reduction in economy and trade changing shipping traffic
  2. Changes in export markets affecting commercial fisheries
  3. Alterations in recreational activities
  4. Decline in tourism

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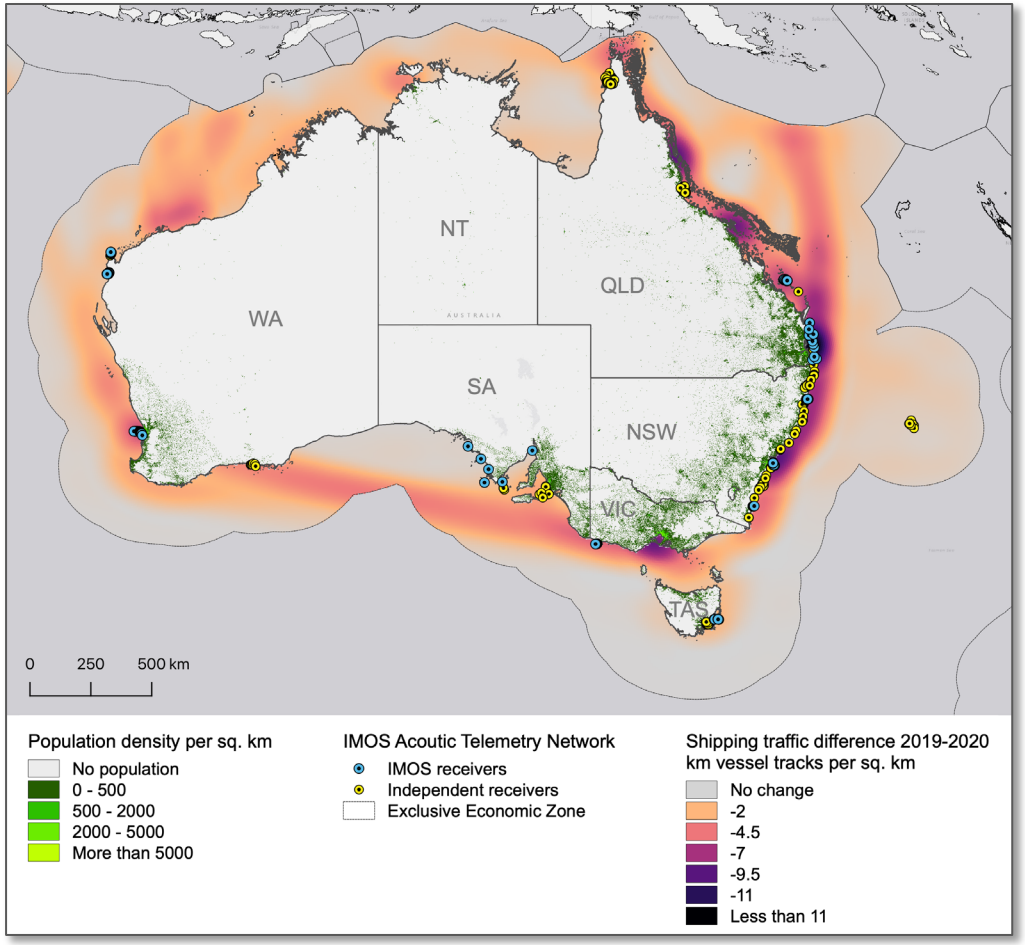

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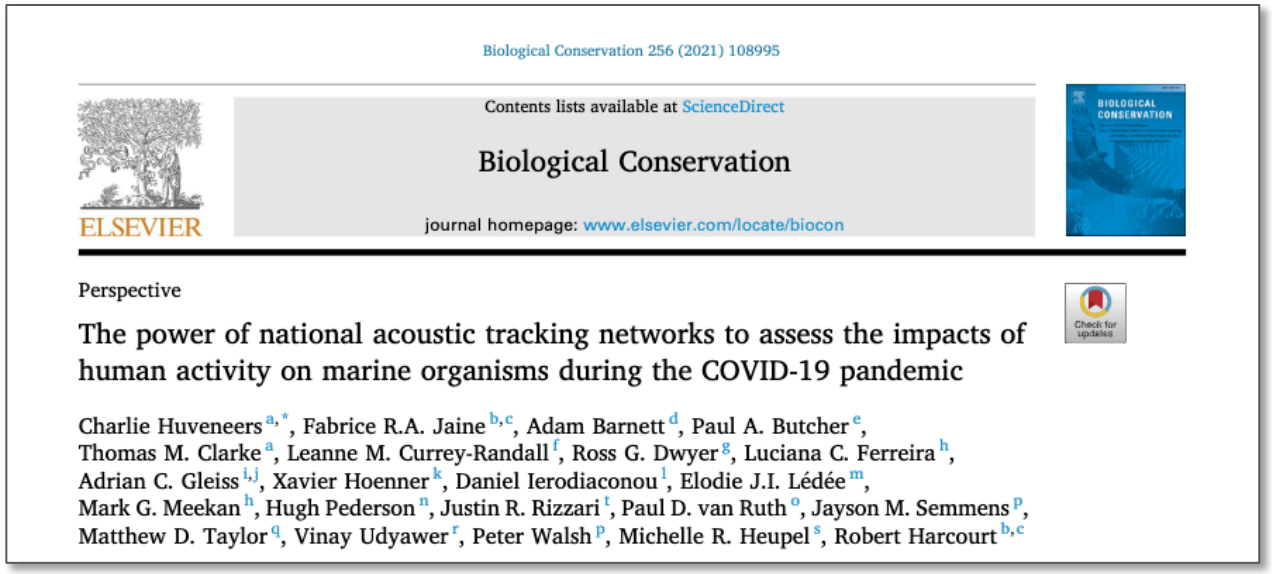

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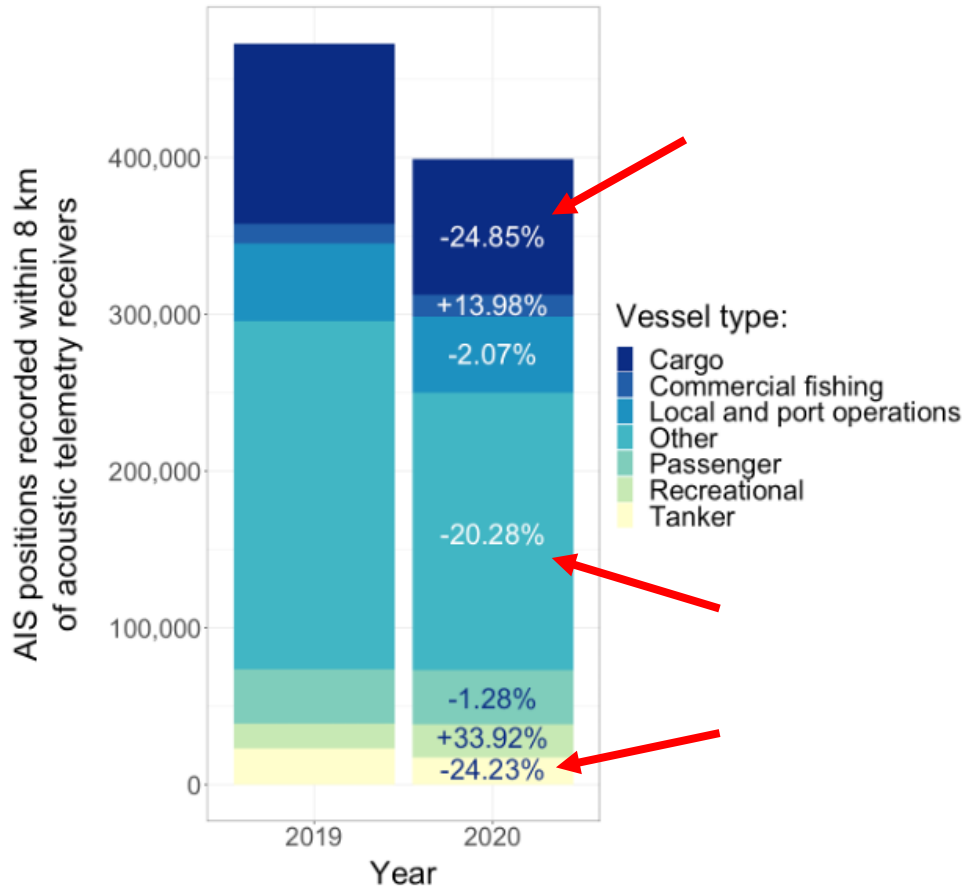
- Between 2019-2020:
  1. The intensity of marine traffic in the vicinity of acoustic tracking infrastructure decreased
  2. 16% reduction in AIS detections observed within 8 km of acoustic receivers – effect of vessel noise disturbance on cetacean behaviour (Cominelli et al. 2020)



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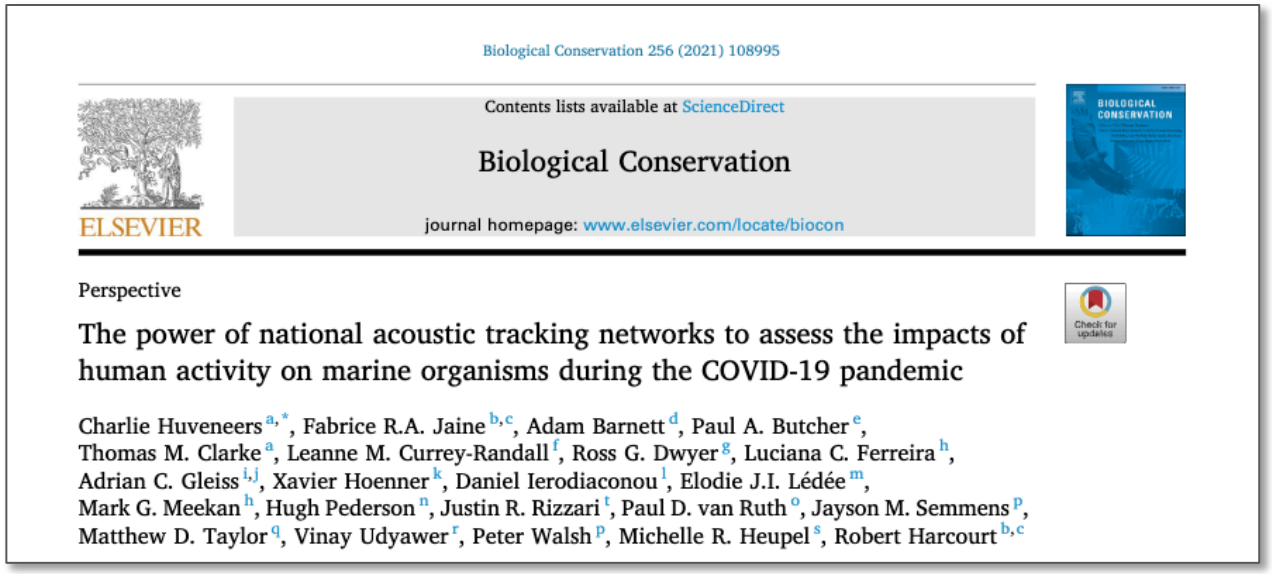

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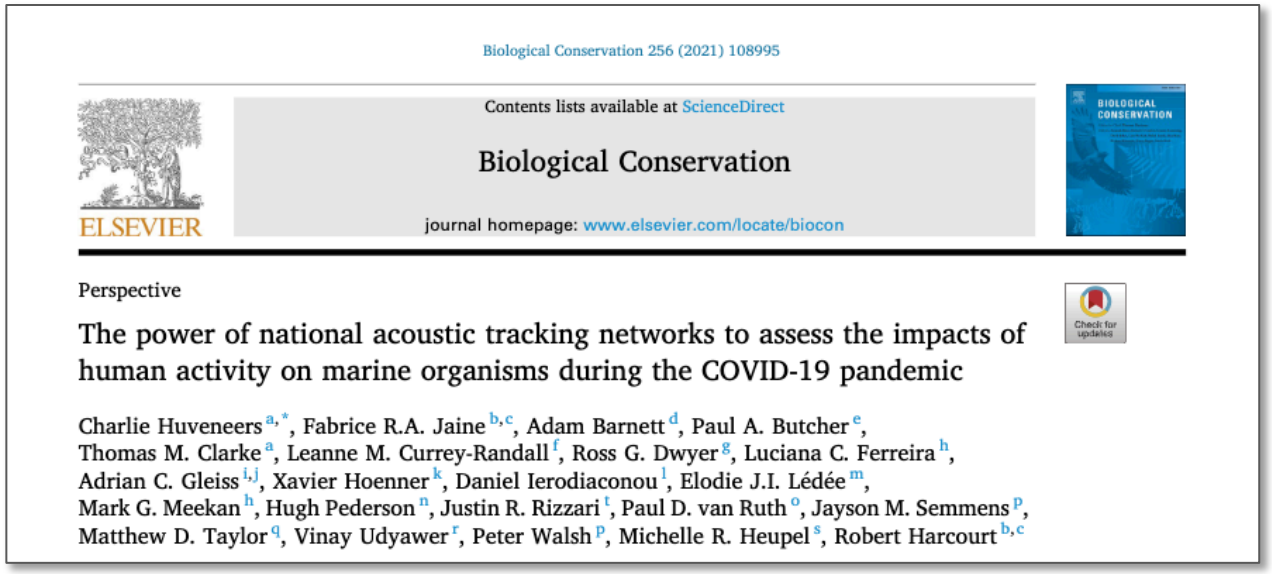
- Between 2019-2020:
  1. The intensity of marine traffic in the vicinity of acoustic tracking infrastructure decreased, esp. E and S coasts
  2. 16% reduction in AIS detections observed within 8 km of acoustic
  3. Tourism decreased considerably across most sectors

- 99.7% less travelers (Tourism Australia, 2020)
- 80-100% reduction in visitors on the GBR
- 40% reduction in whale watching tours

Impacts of the COVID-19 pandemic



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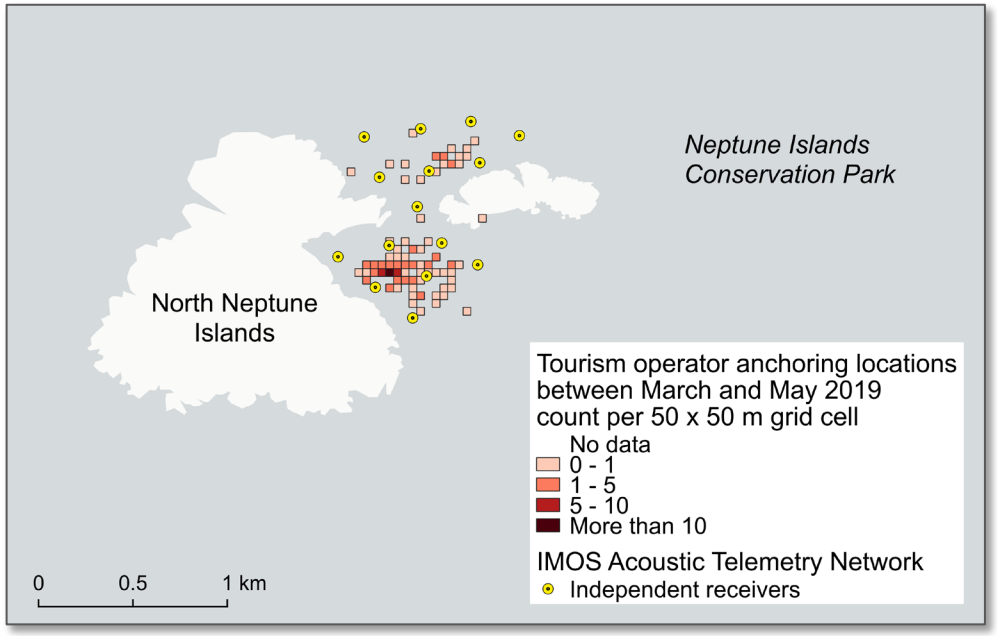
- Neptune Islands, SA
  - White shark tourism stopped for 51 days



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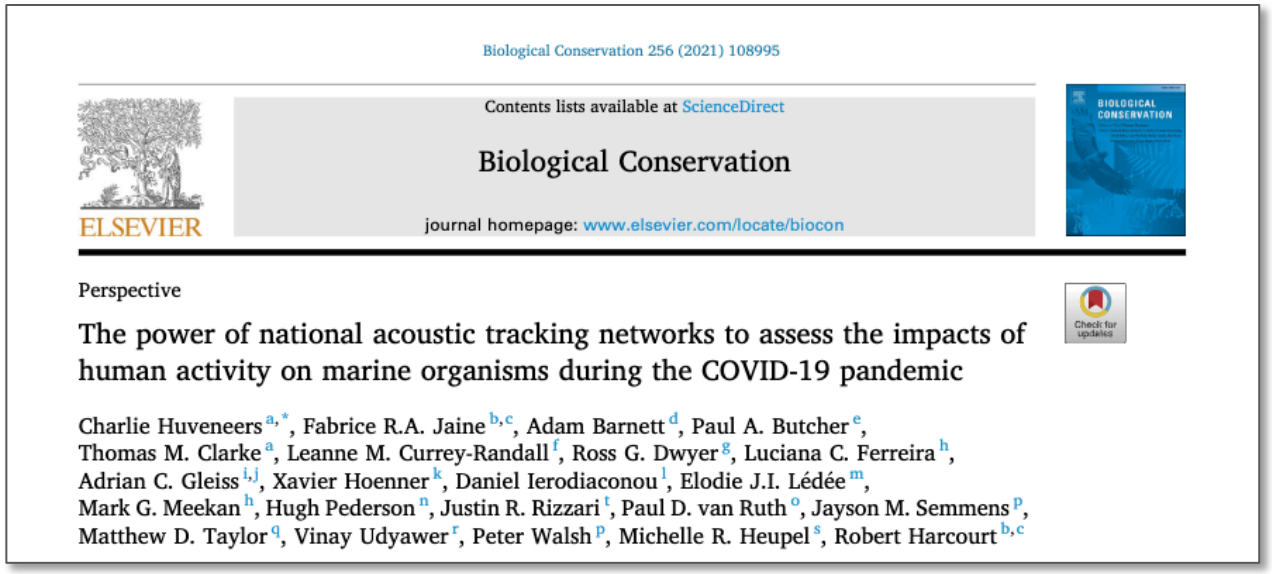

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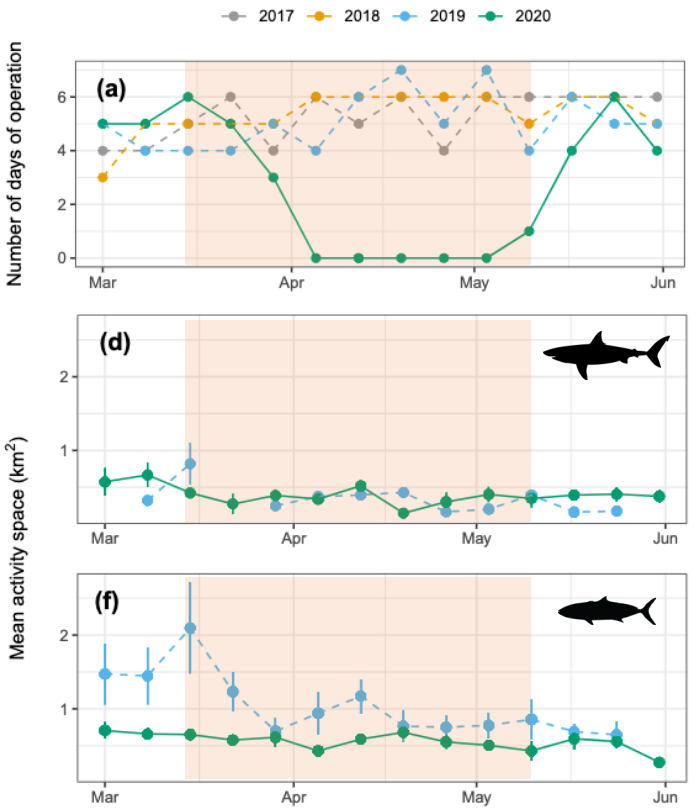
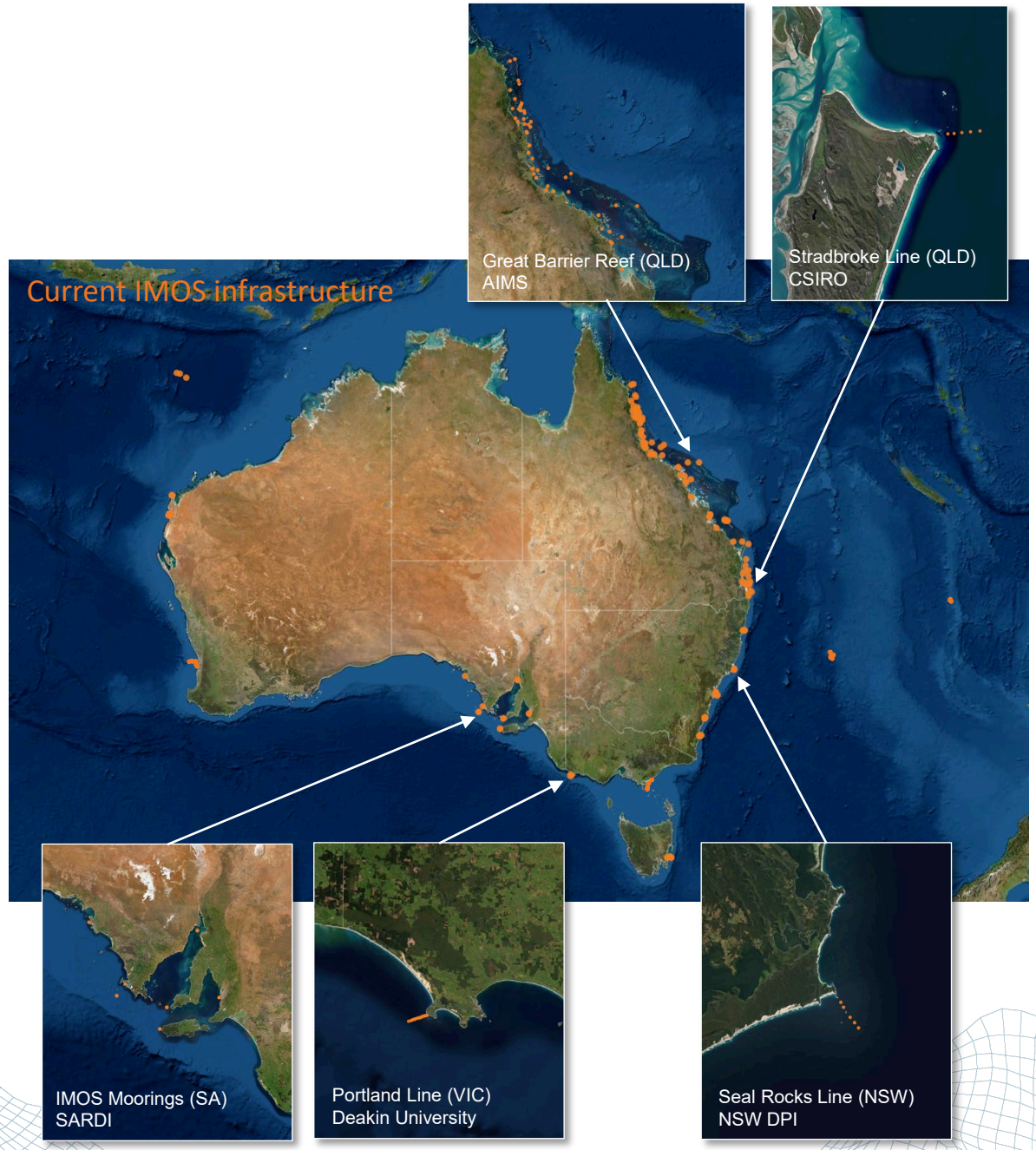
- Neptune Islands, SA
  - White shark tourism stopped for 51 days
  - Residency of tagged white sharks not measurably affected but activity space of kingfish decreased



IMOS Network Expansion

- 2019 IMOS capital investment to optimise acoustic tracking network
  - 5 new receiver installations deployed at strategic locations in QLD, NSW, VIC, SA (WA pending)
  - Ongoing servicing by co-investment partners
- Enhanced IMOS network ready to service the needs of fisheries agencies
- Looking for opportunities to collaborate and enhance the network



HOT OFF THE PRESS!

RELEASED TODAY

R Toolkit to facilitate understanding of environmental variability on marine species

remora: Rapid Extraction of Marine Observations for Roving Animals

https://github.com/IMOS-AnimalTracking/remora

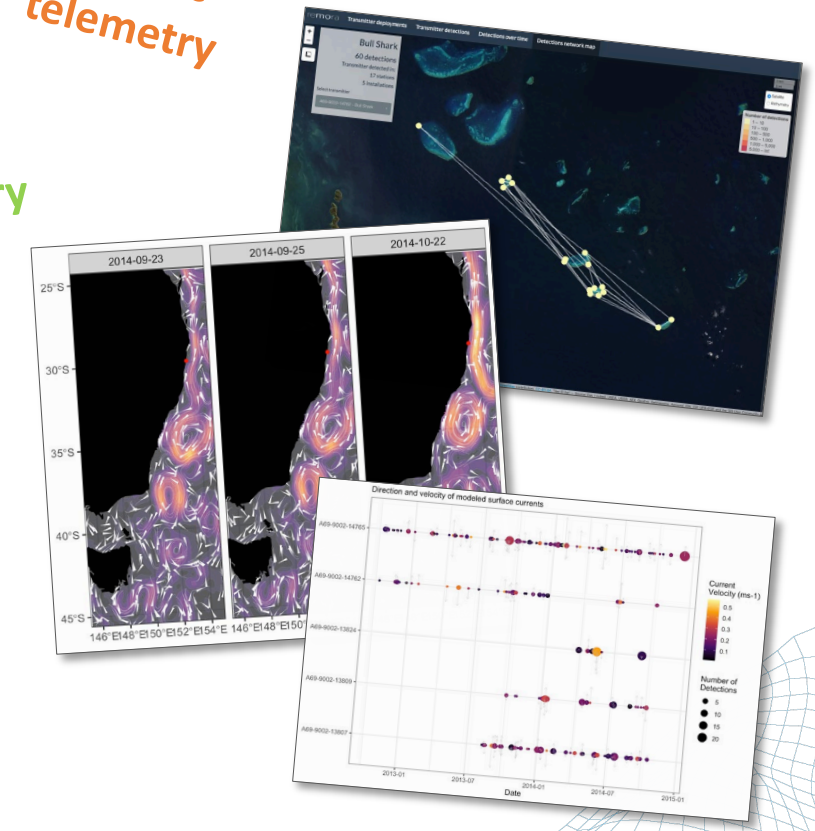
remora enables the integration of animal occurrence data with oceanographic observations collected by IMOS

passive acoustic telemetry

satellite telemetry

species sightings

fisheries catch



IMOS Integrated Marine Observing System

sims sydney institute of marine science

NSW GOVERNMENT Planning, Industry & Environment

NCRIS
National Research Infrastructure for Australia
An Australian Government Initiative

Australia's Integrated Marine Observing System (IMOS) is enabled by the National Collaborative Research Infrastructure Strategy (NCRIS). It is operated by a consortium of institutions as an unincorporated joint venture, with the University of Tasmania as Lead Agent. **www.imos.org.au**

PRINCIPAL PARTICIPANTS

University of Tasmania (Lead Agent)

Australian Government

Australian Institute of Marine Science

Australian Government Bureau of Meteorology

CSIRO

Government of South Australia

SARDI South Australian Research and Development Institute

The University of Western Australia

sims sydney institute of marine science

UTS

The University of Sydney

Macquarie University

UNSW Sydney

SIMS is a partnership involving four universities.

ASSOCIATE PARTICIPANTS

Curtin University

Australian Government Department of Agriculture, Water and the Environment Australian Antarctic Division

Australian Antarctic Program

Deakin University

The University of Melbourne

Acknowledgements:

FRDC Fisheries Research & Development Corporation

NSW Government Planning, Industry & Environment

- Fisheries & Aquaculture Research Providers Network
- State fisheries agencies
- Woodside
- IMOS Animal Tracking data contributors & collaborators
- Operational partners

INNOVASEA

OCEAN TRACKING NETWORK