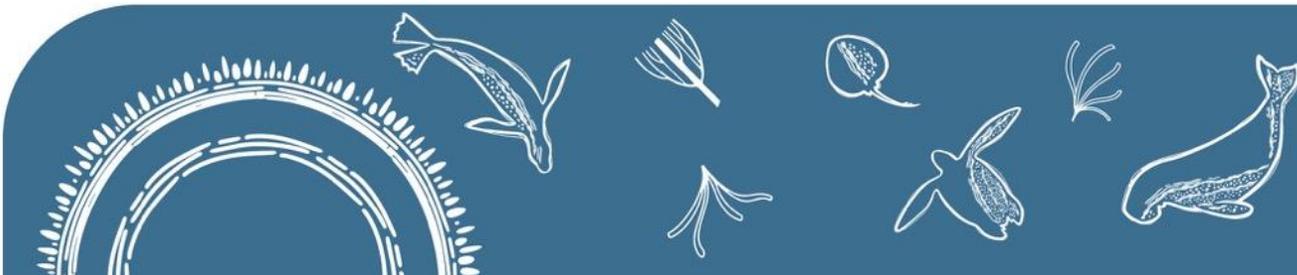
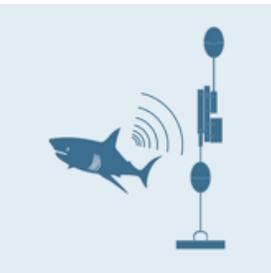




***Retrospective: Tracking marine animals for ocean observing***

**Acoustic Telemetry and Animal Tagging sub-Facilities**

**Rob Harcourt Facility Leader**



IMOS acknowledges the Traditional Custodians and Elders of the land and sea on which we work and observe, and recognise them as Australia's first marine scientists and carers of sea Country. We pay our respects to Aboriginal and Torres Strait Islander peoples past and present.

## Acoustic sub-facility



# I hear you: 20 years supporting acoustic tracking of marine animals in Australia by the IMOS Animal Tracking Facility

**Aim.** to support the research community to monitor the influence of climate change, provide indices of ecosystem change, understand trophic linkages and habitat selection, and assist in spatial conservation planning and fisheries management through collection and delivery of open-access animal tracking data.

### Authors:

Rob Harcourt, Yuri Niella, Emma Bowen, Adam Barnett, Stacy Bierwagen, Stephanie Brodie, Paul Butcher, Leanne Currey-Randall, Ross Dwyer, Luciana Ferreira, Adrian Gleiss, Belinda Goddard, Eva Cougnon, Michelle Heupel, Daniel Hewitt, Jenna Hounslow, Daniel Ierodiaconou, Fabrice Jaïne, Ian Jonsen, Elodie Ledee, Nicolas Lubitz, Jordan Matley, Phil McDowall, Mark Meekan, Victor Peddemors, Hugh Pederson, Colin Simpfendorfer, Matthew Taylor, Vinay Udyawer, Charlie Huveneers



# Acoustic sub-facility



## Goal:

Create and support a sustainable national network of animal telemetry researchers to facilitate research, foster collaboration and data sharing, build capacity, and promote best practice

## How:

- maintain and coordinate a national network of acoustic receivers
- foster collaboration, and support early-career and established marine scientists through workshops, training, technical support and the development of innovative data products
- serve as the central data repository for researchers and organisations across Australia and the broader Oceania region, ensuring adherence to best practices in data management and quality control;
- contribute to international efforts through collaboration with the global Ocean Tracking Network and similar initiatives.



IMOS/Vemco Acoustic Telemetry workshop 2007

# Acoustic sub-facility

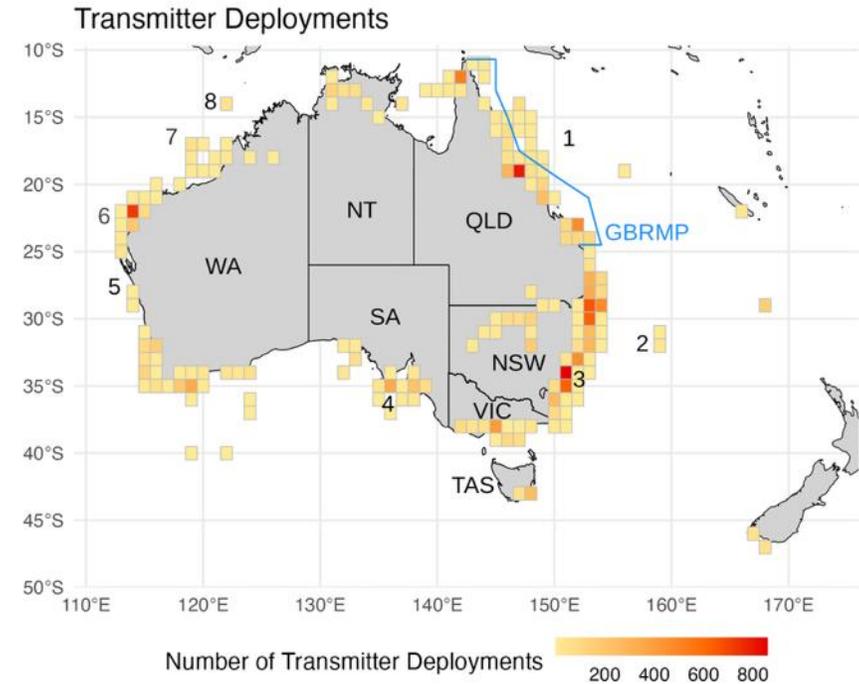
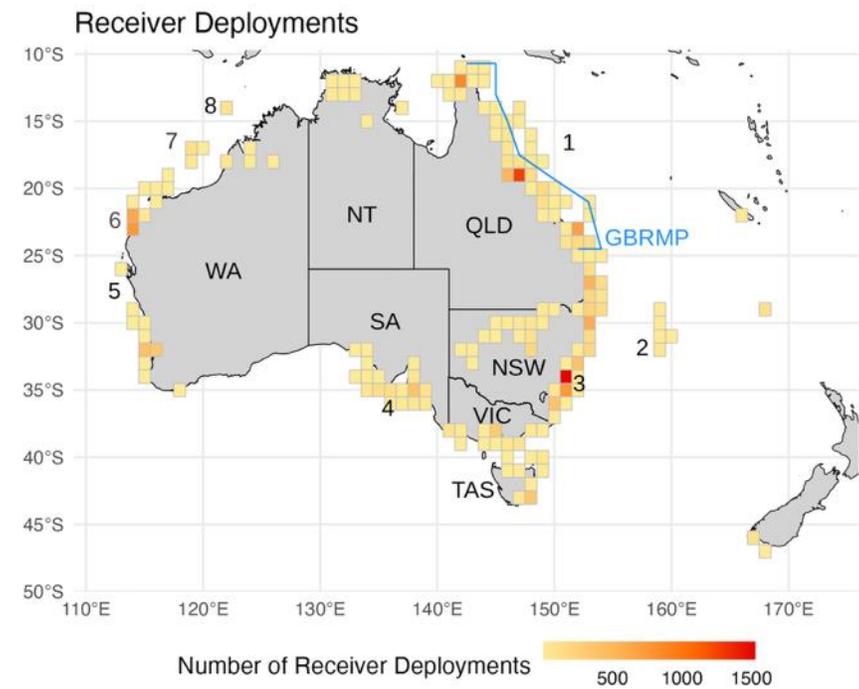
How: supporting and maintaining a network

15,629 receivers - August 2006 - December 2025

IMOS and Community Receivers

15,028 transmitters - January 2001\* - December 2025

\*some species in the database were tagged before the facility was created



# Acoustic sub-facility

How: supporting tagging and data sharing through a centralised database

15,028 individual animals from 180 species tagged with acoustic transmitters by research groups in the IMOS network January 2001\* - December 2025

\*some species in the database were tagged before the facility was created



VOL. 201, NO. 4 THE AMERICAN NATURALIST APRIL 2023

## Scaling of Activity Space in Marine Organisms across Latitudinal Gradients

Vinay Udayar,<sup>1,4\*</sup> Charlie Huveneers,<sup>2</sup> Fabrice Jaine,<sup>3,4</sup> Russell C. Babcock,<sup>5</sup> Stephanie Brodie,<sup>6</sup> Marie-Jeanne Buscot,<sup>7</sup> Hamish A. Campbell,<sup>8</sup> Robert G. Harcourt,<sup>2,4</sup> Xavier Hoener,<sup>9</sup> Elodie J. I. Lédée,<sup>10,11</sup> Colin A. Simpfendorfer,<sup>11</sup> Matthew D. Taylor,<sup>12</sup> Asia Armstrong,<sup>13</sup> Adam Barnett,<sup>14</sup> Culum Brown,<sup>4</sup> Barry Bruce,<sup>4</sup> Paul A. Butcher,<sup>15</sup> Gwenael Cadiou,<sup>12,14</sup> Lydie I. E. Couturier,<sup>17</sup> Leanne Curry-Randall,<sup>18</sup> Michael Drew,<sup>19,20</sup> Christine L. Dudgeon,<sup>21,22</sup> Ross G. Dwyer,<sup>23</sup> Mario Espinoza,<sup>24</sup> Luciana C. Ferreira,<sup>25</sup> Anthony Fowler,<sup>26</sup> David Harasti,<sup>12</sup> Alastair R. Harborne,<sup>28</sup> Nathan A. Knott,<sup>27</sup> Kate Lee,<sup>4,29</sup> Matt Lloyd,<sup>2</sup> Michael Lowry,<sup>12</sup> Teagan Marzullo,<sup>30</sup> Jordan Matley,<sup>30</sup> Jaime D. McAllister,<sup>31</sup> Rory McAuley,<sup>32</sup> Frazer McGregor,<sup>13</sup> Mark Meekan,<sup>23</sup> Kade Mills,<sup>14</sup> Bradley M. Norman,<sup>25,30</sup> Beverly Oh,<sup>25,30</sup> Nicholas L. Payne,<sup>29,30</sup> Vic Peddemors,<sup>29</sup> Toby Piddocke,<sup>30</sup> Richard D. Pillans,<sup>2</sup> Richard D. Reina,<sup>41</sup> Paul Rogers,<sup>29</sup> Jason M. Semmens,<sup>42</sup> Amy Smoothey,<sup>29</sup> Conrad W. Speed,<sup>29</sup> Dylan van der Meulen,<sup>29,43</sup> and Michelle R. Heupel<sup>11,13,44</sup>



Perspective  
The power of national acoustic tracking networks to assess the impacts of human activity on marine organisms during the COVID-19 pandemic

Charlie Huveneers<sup>1,2</sup>, Fabrice R.A. Jaine<sup>3,4</sup>, Adam Barnett<sup>5</sup>, Paul A. Butcher<sup>6</sup>, Thomas M. Clarke<sup>7</sup>, Leanne M. Curry-Randall<sup>8</sup>, Ross G. Dwyer<sup>9</sup>, Luciana C. Ferreira<sup>10</sup>, Adrian C. Gleis<sup>11</sup>, Xavier Hoener<sup>12</sup>, Daniel Ierodiakonou<sup>13</sup>, Elodie J.I. Lédée<sup>14</sup>, Mark G. Meekan<sup>15</sup>, Hugh Pederson<sup>16</sup>, Justin R. Rizzari<sup>17</sup>, Paul D. van Ruth<sup>18</sup>, Jayson M. Semmens<sup>19</sup>, Matthew D. Taylor<sup>20</sup>, Vinay Udayar<sup>21</sup>, Peter Walsh<sup>22</sup>, Michelle R. Heupel<sup>23</sup>, Robert Harcourt<sup>24,25</sup>

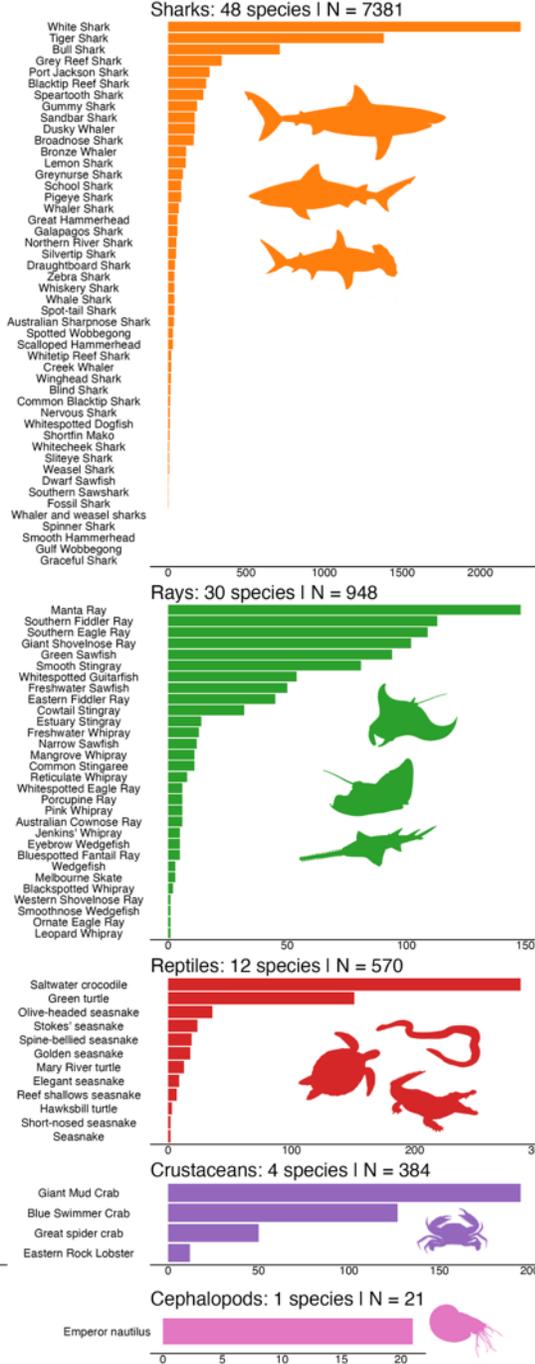
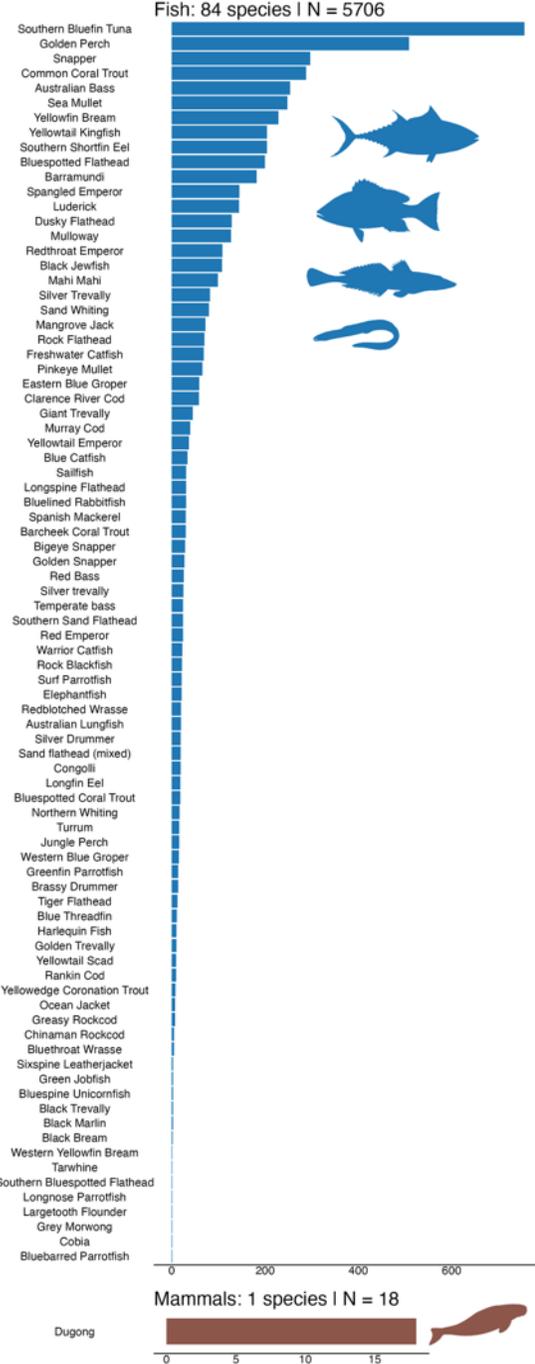
Bennett et al. *Movement Ecology* (2024) 12:31  
<https://doi.org/10.1186/s40462-024-00688-8>

RESEARCH Open Access

From little things big things grow: enhancement of an acoustic telemetry network to monitor broad-scale movements of marine species along Australia's east coast

Adam Barnett<sup>1,2</sup>, Fabrice R.A. Jaine<sup>3,4</sup>, Stacy L. Bierwagen<sup>5</sup>, Nicolas Lubitz<sup>6</sup>, Kátia Abrantes<sup>7</sup>, Michelle R. Heupel<sup>8,9</sup>, Rob Harcourt<sup>10</sup>, Charlie Huveneers<sup>11</sup>, Ross G. Dwyer<sup>12</sup>, Vinay Udayar<sup>13</sup>, Colin A. Simpfendorfer<sup>14,15</sup>, Ingo B. Miller<sup>16,17</sup>, Tracey Scott-Holland<sup>18</sup>, Carley S. Kilpatrick<sup>19</sup>, Samuel M. Williams<sup>20</sup>, Daniel Smetley<sup>21</sup>, Christine L. Dudgeon<sup>22</sup>, Andrew S. Hovey<sup>23</sup>, Richard Fitzpatrick<sup>24</sup>, Felicity E. Osborne<sup>25</sup>, Amy F. Smoothey<sup>26</sup>, Paul A. Butcher<sup>27</sup>, Marcus Sheaves<sup>28</sup>, Eric E. Fisher<sup>29</sup>, Mark Svavauskas<sup>30</sup>, Megan Ellis<sup>31</sup>, Shiori Kanno<sup>32</sup>, Benjamin J. Creswell<sup>33</sup>, Nicole Flint<sup>34</sup>, Asia D. Armstrong<sup>35</sup>, Kathy A. Townsend<sup>36</sup>, Jonathan D. Mitchell<sup>37</sup>, Matthew Campbell<sup>38</sup>, Victor M. Peddemors<sup>39</sup>, Johan A. Gustafsson<sup>40</sup> and Leanne M. Curry-Randall<sup>41</sup>

species common name



Number of animals tagged

Ecologia  
<https://doi.org/10.1007/s00442-021-05075-7>

POPULATION ECOLOGY – ORIGINAL RESEARCH

Forecasting intraspecific changes in distribution of a wide-ranging marine predator under climate change

Yuri Niella<sup>1</sup>, Paul Butcher<sup>2,3</sup>, Bonnie Holmes<sup>4,5</sup>, Adam Barnett<sup>6,7,8</sup>, Robert Harcourt<sup>1</sup>



# Acoustic sub-facility

How: supporting data sharing through automated quality control and encouraging open-access



## SCIENTIFIC DATA

**OPEN** Data Descriptor: Australia's continental-scale acoustic tracking database and its automated quality control process

Received: 21 August 2017  
Accepted: 7 December 2017  
Published: 30 January 2018

Simplendorfer et al. *Anim Biotelemetry* (2018) 3:55  
DOI 10.1186/s40317-018-0094-z

RESEARCH Open Access CrossMark

Ghosts in the data: false detections in VEMCO pulse position modulation acoustic telemetry monitoring equipment

Colin A. Simplendorfer<sup>1\*</sup>, Charlie Huveneers<sup>2</sup>, Andre Steckenreuter<sup>3</sup>, Katherine Tattersall<sup>4</sup>, Xavier Hoenner<sup>4</sup>, Rob Harcourt<sup>5</sup> and Michelle R. Heupel<sup>6</sup>

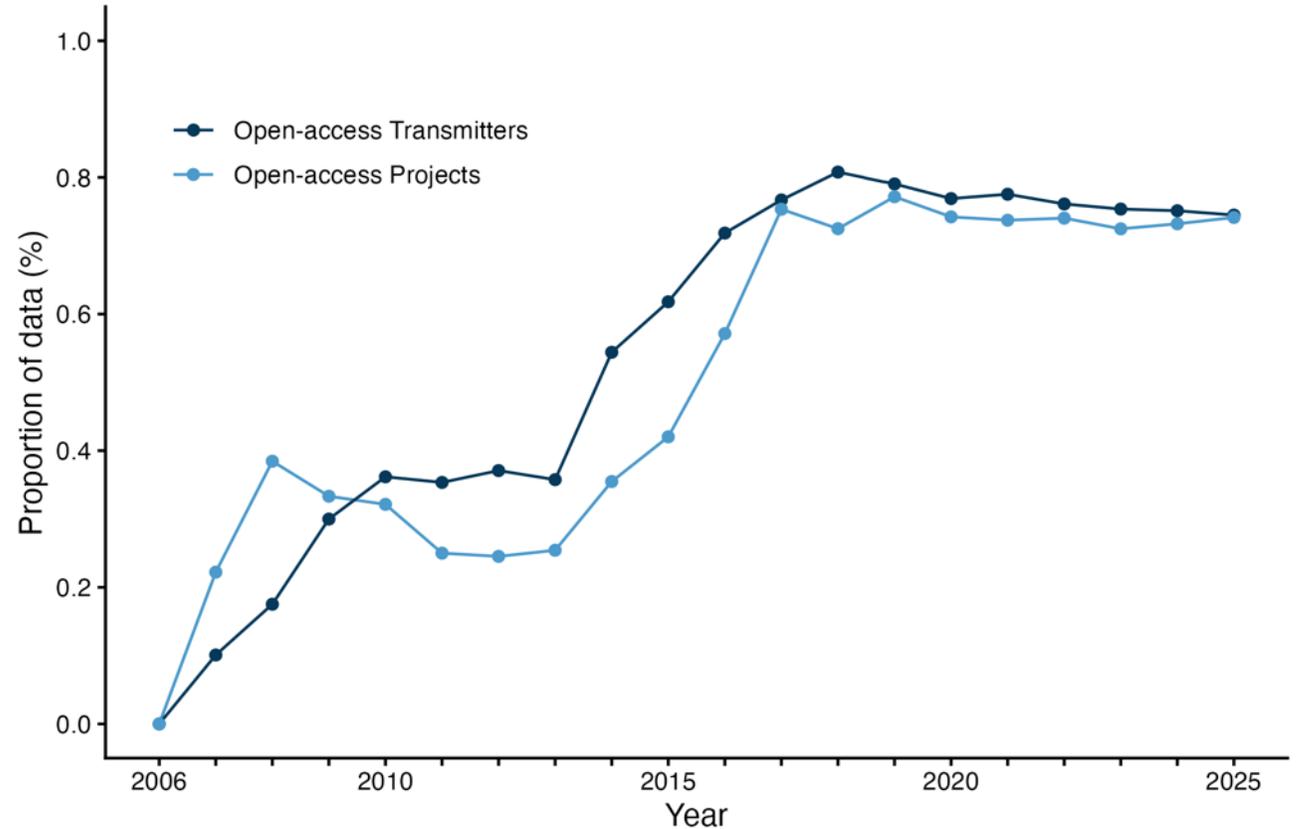
## SCIENTIFIC REPORTS

**OPEN** Continental-scale animal tracking reveals functional movement classes across marine taxa

Received: 16 June 2017  
Accepted: 13 February 2018  
Published online: 27 February 2018

Stephanie Brodie<sup>1,2\*</sup>, Elodie J. L. Lédée<sup>3,4,5</sup>, Michelle R. Heupel<sup>6</sup>, Russell C. Babcock<sup>6</sup>, Hamish A. Campbell<sup>7</sup>, Daniel C. Gleith<sup>8</sup>, Xavier Hoenner<sup>9</sup>, Charlie Huveneers<sup>10</sup>, Fabrice R. A. Jaïn<sup>11</sup>, Colin A. Simplendorfer<sup>12</sup>, Matthew D. Taylor<sup>13</sup>, Vinay Udayawar<sup>14</sup> & Robert G. Harcourt<sup>15</sup>

## IMOS Acoustic Task-Team



Proportion of projects and transmitters in the Database with open-access data 2006 - 2025



# Acoustic sub-facility

## How: refining network design and evolution of technology

CSIRO PUBLISHING

Marine and Freshwater Research  
<http://dx.doi.org/10.1071/MF16126>

### Optimising the design of large-scale acoustic telemetry curtains

Andre Steckenreuter<sup>A,1</sup>, Xavier Hoenner<sup>B</sup>, Charlie Huveneers<sup>C</sup>,  
 Colin Simpfordorfer<sup>D</sup>, Marie J. Buscot<sup>E</sup>, Katherine Tattersall<sup>B</sup>,  
 Russell Babcock<sup>F</sup>, Michelle Heupel<sup>G</sup>, Mark Meekan<sup>G</sup>, James van den Broek<sup>A</sup>,  
 Phillip McDowall<sup>A</sup>, Vic Peddemors<sup>H</sup> and Robert Harcourt<sup>A,1</sup>

### Methods in Ecology and Evolution

Methods in Ecology and Evolution 2016, 7, 825–835

doi: 10.1111/2041-210X.12520

### The influence of environmental parameters on the performance and detection range of acoustic receivers

Charlie Huveneers<sup>1\*</sup>, Colin A. Simpfordorfer<sup>2</sup>, Susan Kim<sup>3</sup>, Jayson M. Semmens<sup>4</sup>,  
 Alistair J. Hobday<sup>5</sup>, Hugh Pederson<sup>6</sup>, Thomas Stieglitz<sup>7</sup>, Richard Vallee<sup>8</sup>, Dale Webber<sup>9</sup>,  
 Michelle R. Heupel<sup>9</sup>, Vic Peddemors<sup>9</sup> and Robert G. Harcourt<sup>10</sup>

### Methods in Ecology and Evolution

Methods in Ecology and Evolution 2017

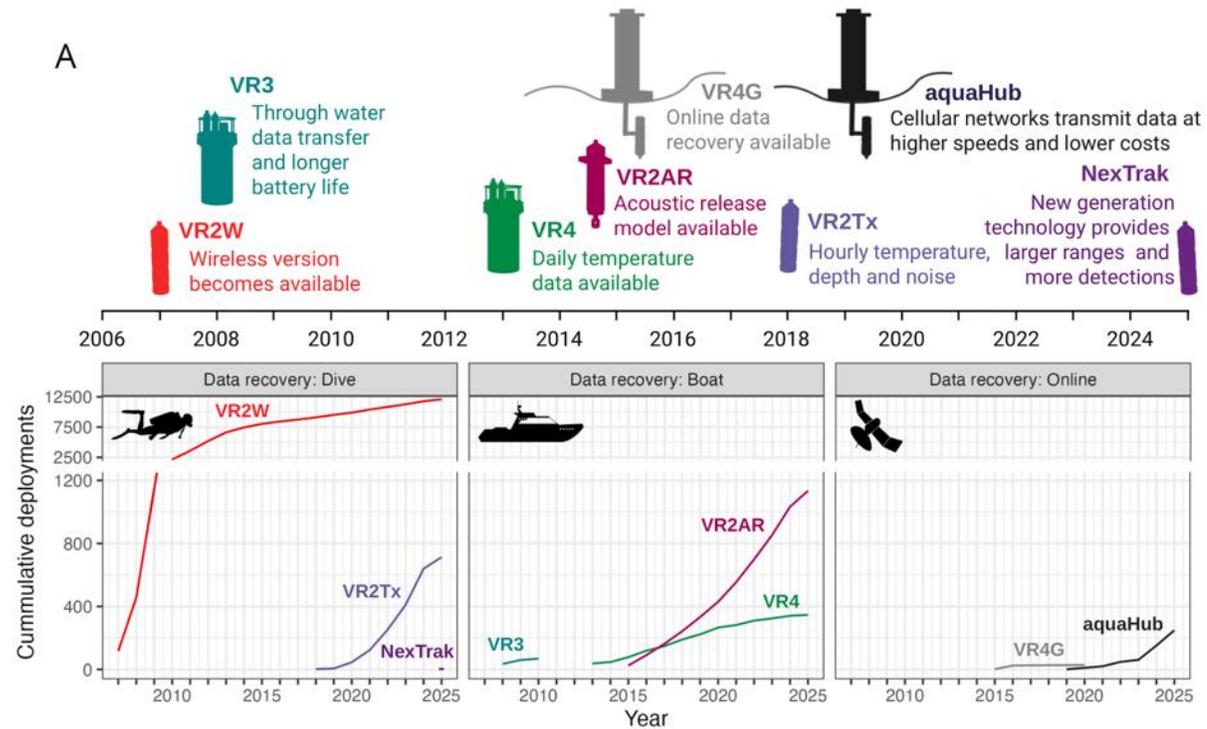
doi: 10.1111/2041-210X.12806

FORUM

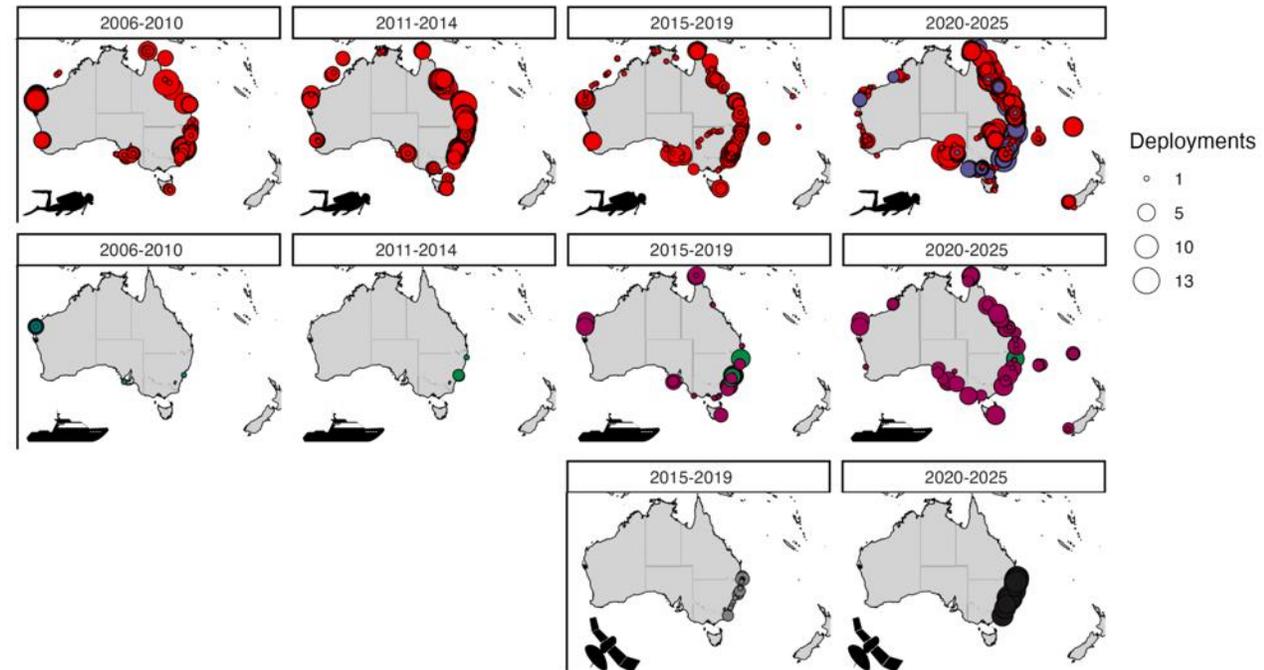
### Application of the Acoustic Propagation Model to a deep-water cross-shelf curtain

Charlie Huveneers<sup>1\*</sup>, Kilian M. Stehfest<sup>2</sup>, Colin A. Simpfordorfer<sup>1</sup>, Jayson Semmens<sup>2</sup>,  
 Alistair J. Hobday<sup>4</sup>, Hugh Pederson<sup>5</sup>, Thomas Stieglitz<sup>6</sup>, Richard Vallee<sup>5</sup>, Dale Webber<sup>5</sup>,  
 Michelle R. Heupel<sup>7</sup> and Robert Harcourt<sup>8</sup>

A



B



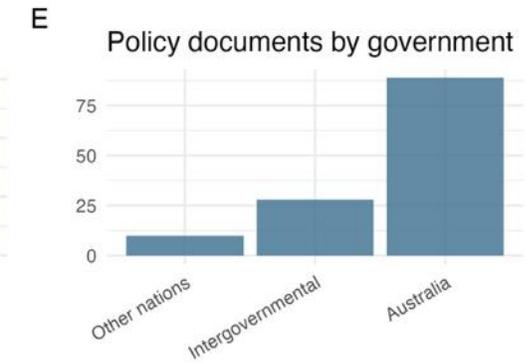
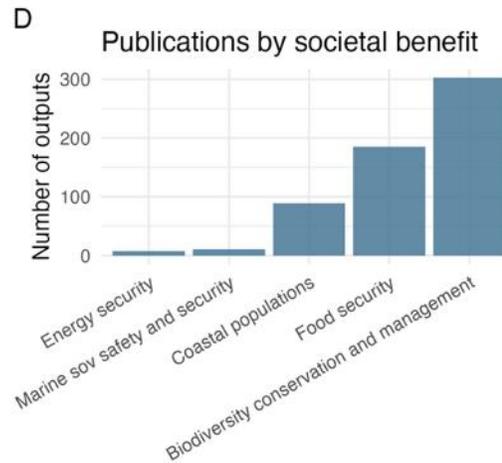
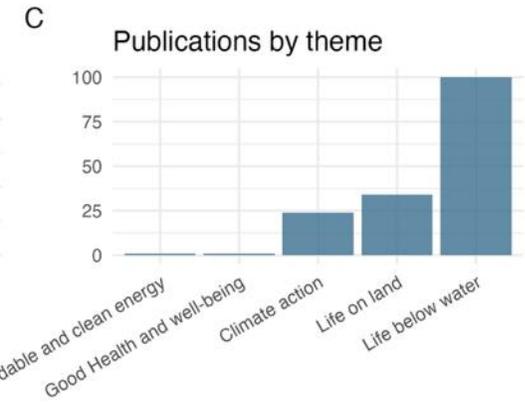
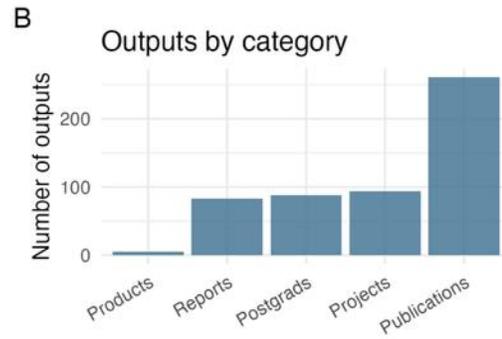
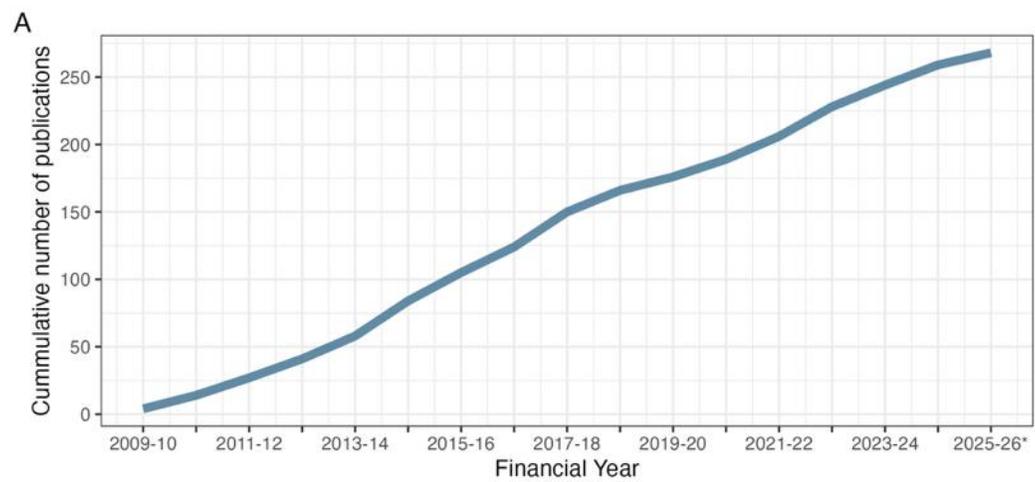
# Acoustic sub-facility

## Impact:

over 20 years

~300 researchers from 45 institutions  
collected and shared ~210 million  
detections

supported 268 scientific publications,  
88 postgraduate theses  
6 data products.



Open Access

**RESEARCH**

**A standardised framework for analysing animal detections from automated tracking arrays**

Vinay Udayakar<sup>1,2</sup>, Ross G. Dwyer<sup>1</sup>, Xavier Hoemmer<sup>1</sup>, Russell C. Babcock<sup>3</sup>, Stephanie Brodie<sup>1,2</sup>, Hamish A. Campbell<sup>1</sup>, Robert G. Harcourt<sup>1,2</sup>, Charlie Huveneers<sup>1</sup>, Fabrice R. A. Jane<sup>1,2</sup>, Colin A. Simpfendorfer<sup>1</sup>, Matthew D. Taylor<sup>1,2</sup> and Michelle R. Heupel<sup>1,2</sup>

Received 4 May 2020 | Accepted 28 August 2020  
DOI: 10.1038/s41598-020-62088-7

**APPLICATION**

**Refined Shortest Paths (RSP): Incorporation of topography in space use estimation from node-based telemetry data**

Yuri Niella<sup>1</sup> | Hugo Flávio<sup>2</sup> | Amy F. Smoothey<sup>3</sup> | Kim Aarestrup<sup>2</sup> | Matthew D. Taylor<sup>1</sup> | Victor M. Peddemors<sup>2</sup> | Robert Harcourt<sup>1,2</sup>

Open Access

**REVIEW**

**Translating Marine Animal Tracking Data into Conservation Policy and Management**

Grainne C. Hays<sup>1,4</sup>, Helen Bailey<sup>2</sup>, Steven J. Bograd<sup>3</sup>, W. Don Bowen<sup>4</sup>, Claudio Campagna<sup>5</sup>, Ruth H. Carmichael<sup>6,7</sup>, Paolo Casale<sup>8</sup>, Andre Chiarada<sup>11</sup>, Daniel P. Costa<sup>10</sup>, Eduardo Cuevas<sup>11,12</sup>, P.J. Nico de Bruyn<sup>13</sup>, Maria P. Dias<sup>14,15</sup>, Carlos M. Duarte<sup>16</sup>, Daniel C. Dunn<sup>17</sup>, Peter H. Dutton<sup>18</sup>, Nicole Eustace<sup>19</sup>, Ari Friedlander<sup>20,21</sup>, Jennifer T. Goetz<sup>22</sup>, Brendan J. Godley<sup>23</sup>, Patrick N. Halpin<sup>17</sup>, Mark Hamann<sup>24</sup>, Neil Hammerschlag<sup>24</sup>, Robert Harcourt<sup>25</sup>, Autumn-Lynn Harrison<sup>26</sup>, Elliott L. Hazen<sup>2</sup>, Michelle R. Heupel<sup>27</sup>, Erich Hoyt<sup>28,29</sup>, Nicolas E. Humphries<sup>29</sup>, Connie Y. Koz<sup>17</sup>, James S.E. Lea<sup>30</sup>, Helene March<sup>31</sup>, Soga M. Mawardi<sup>32</sup>, Craig R. McIvor<sup>33,34</sup>, Giuseppe Nellesenardo di Soriano<sup>24,35</sup>, Daniel M. Palacios<sup>36</sup>, Richard A. Phillips<sup>37</sup>, David Righton<sup>38,39</sup>, Gail Schofield<sup>40</sup>, Jeffrey A. Semmens<sup>41</sup>, Colin A. Simpfendorfer<sup>23</sup>, David W. Sims<sup>29,42,43</sup>, Akinori Takahashi<sup>44</sup>, Michael J. Tatley<sup>25</sup>, Michele Thums<sup>45</sup>, Philip N. Trathan<sup>46</sup>, Stella Villegas-Ambrosini<sup>47</sup>, Ranzall S. Wells<sup>48</sup>, Scott D. Whiting<sup>49</sup>, Natalie E. Wildermann<sup>50</sup> and Ana M.M. Siqueira<sup>51</sup>

**RESEARCH**

**Marine predator movements create seascape connectivity in remote coral reef ecosystems**

Luciana C. Ferreira<sup>1</sup>, Ronen Galadik<sup>1</sup>, Ben Radford<sup>1</sup>, Vinay Udayakar<sup>1,2</sup>, Mark Meekan<sup>1,4</sup>, Michele Thums<sup>1</sup>, Rob Harcourt<sup>1,2</sup>, Kate A. Lee<sup>1,2</sup> and Eric A. Teneil<sup>1</sup>



## Animal tagging sub-facility

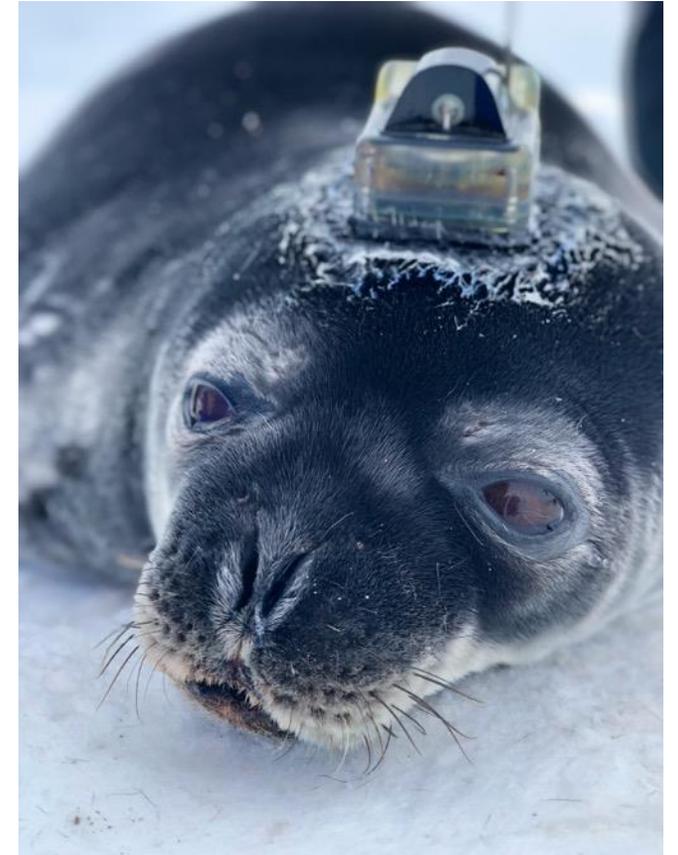


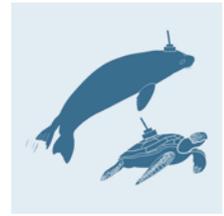
### Will work for sardines: 20 years of animal-borne ocean observing by IMOS Animal Tagging

**Aim.** The world's ocean plays a central role in the global climate with approximately 90% of the excess heat energy due to anthropogenic global warming stored in the ocean. Wide-ranging, deep diving, seals and turtles can provide important complementary observing capacity from poorly observed and remote regions to the ocean operational and climate research communities

#### Authors:

Rob Harcourt, Clive McMahon, Ian Jonsen, Mark Hindell, Christophe Guinet, Sophie Bestley, Christopher Chapman, J-B Charassin, Luciana Ferreira, Dahlia Foo, Kim Goetz, Simon Goldsworthy, David Green, Rachel Holser, Sara Labrousse, Isobel Lerpiniere, Baptiste Picard, Natalia Ribeiro, Steve Rintoul, Fabien Roquet, Michele Thums, Mike Fedak





# Animal tagging sub-facility

## Goal:

provide key observations that can; (i) assist operational oceanography and improve mitigation of threats in a system changing at unprecedented rates, (ii) detect emerging climate-driven shifts and improve ocean and climate models (iii) enhance decision making to address conservation needs.

## How:

- collect and make freely available a unified, quality-controlled, database of oceanographic profiles using animal-borne sensors
- To serve the marine and climate research community with free and timely access to quality assured observational data.
- playing a key leadership role in development and coordination of a global animal borne instrumentation observing network
- developing significant national and international and research collaborations

**frontiers**  
in Marine Science

OPEN ACCESS

**Animal-Borne Telemetry: An Integral Component of the Ocean Observing Toolkit**

Clive R. McMahon<sup>1\*</sup>, Fabien Roguet<sup>2</sup>, Sophie Baudou<sup>3</sup>, Mathieu Beboch<sup>4</sup>, Sophie Bestley<sup>4</sup>, Clive Brier<sup>5</sup>, Lara Buvens<sup>6</sup>, Fiona Carter<sup>7</sup>, Denis P. Costa<sup>8</sup>, Michael A. Fedak<sup>9</sup>, Christophe Guinet<sup>10</sup>, Robert Harcourt<sup>11</sup>, Emma Heslop<sup>12</sup>, Mark A. Hindell<sup>13</sup>, Xavier Inchausti<sup>14</sup>, Kim Hindle<sup>15</sup>, Melinda Hollander<sup>16</sup>, Matthew Malsos<sup>17</sup>, Megan K. McKinlay<sup>18</sup>, Mircea M. C. Muelbert<sup>19</sup>, Kevin O'Brien<sup>20</sup>, Leanne Phillips<sup>21</sup>, Esther Portner<sup>22</sup>, Jonathan Pryor<sup>23</sup>, Stephen Ripstein<sup>24</sup>, Katsuhiko Sato<sup>25</sup>, Ana M. M. Sepúlveda<sup>26</sup>, Genowatch E. Simonsen<sup>27</sup>, Václav M. Tjipontso<sup>28</sup>, Victor Tupov<sup>29</sup>, Emma van Wijk<sup>30</sup>, Danny Iy<sup>31</sup>, Mike Heupel<sup>32</sup>, Frederick Gilbert Whitehead<sup>33</sup>, Kenway Wilson<sup>34</sup> and Bill Woodward<sup>35</sup>

**ELEMENTA**  
Division of the Australian Academy of Science

McMahon, CR, et al. 2025. An enduring, 20-year, multidisciplinary seal-borne ocean sensor research collaboration in the Southern Ocean. *Elem Sci Anth*, 13: 1. DOI: <https://doi.org/10.1525/elementa.2024.00071>

**REVIEW**

**An enduring, 20-year, multidisciplinary seal-borne ocean sensor research collaboration in the Southern Ocean**

Clive R. McMahon<sup>1,\*</sup>, Fabien Roguet<sup>2</sup>, Christophe Guinet<sup>3</sup>, Mark A. Hindell<sup>4</sup>, Rob Harcourt<sup>1,5</sup>, Jean-Benoit Charrassin<sup>6</sup>, Sara Labrousse<sup>6</sup>, Ian Jonsen<sup>1,5,7</sup>, Baptiste Picard<sup>3</sup>, Sophie Bestley<sup>4</sup>, Vincent Doriot<sup>2</sup>, and Mike Fedak<sup>8</sup>

**frontiers**  
in Marine Science

OPEN ACCESS

**Animal Borne Ocean Sensors – AniBOS – An Essential Component of the Global Ocean Observing System**

Clive R. McMahon<sup>1\*</sup>, Fabien Roguet<sup>2</sup>, Sophie Baudou<sup>3</sup>, Mathieu Beboch<sup>4</sup>, Sophie Bestley<sup>4</sup>, Clive Brier<sup>5</sup>, Lara Buvens<sup>6</sup>, Fiona Carter<sup>7</sup>, Denis P. Costa<sup>8</sup>, Michael A. Fedak<sup>9</sup>, Christophe Guinet<sup>10</sup>, Robert Harcourt<sup>11</sup>, Emma Heslop<sup>12</sup>, Mark A. Hindell<sup>13</sup>, Xavier Inchausti<sup>14</sup>, Kim Hindle<sup>15</sup>, Melinda Hollander<sup>16</sup>, Matthew Malsos<sup>17</sup>, Megan K. McKinlay<sup>18</sup>, Mircea M. C. Muelbert<sup>19</sup>, Kevin O'Brien<sup>20</sup>, Leanne Phillips<sup>21</sup>, Esther Portner<sup>22</sup>, Jonathan Pryor<sup>23</sup>, Stephen Ripstein<sup>24</sup>, Katsuhiko Sato<sup>25</sup>, Ana M. M. Sepúlveda<sup>26</sup>, Genowatch E. Simonsen<sup>27</sup>, Václav M. Tjipontso<sup>28</sup>, Victor Tupov<sup>29</sup>, Emma van Wijk<sup>30</sup>, Danny Iy<sup>31</sup>, Mike Heupel<sup>32</sup>, Frederick Gilbert Whitehead<sup>33</sup>, Kenway Wilson<sup>34</sup> and Bill Woodward<sup>35</sup>

**nature**  
COMMUNICATIONS

**ARTICLE**

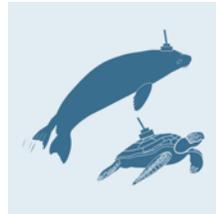
Received 2 Oct 2015 | Accepted 14 Jul 2016 | Published 23 Aug 2016

**The suppression of Antarctic bottom water formation by melting ice shelves in Prydz Bay**

G.D. Williams<sup>1,2</sup>, L. Herraiz-Borreguero<sup>3</sup>, F. Roguet<sup>4</sup>, T. Tamura<sup>2,5,6</sup>, K.I. Otshima<sup>7</sup>, Y. Fukumachi<sup>7</sup>, A.D. Fraser<sup>2,7</sup>, L. Gao<sup>8</sup>, H. Chen<sup>9</sup>, C.R. McMahon<sup>9</sup>, R. Harcourt<sup>9,10</sup> & M. Hindell<sup>11</sup>



# Animal tagging sub-facility



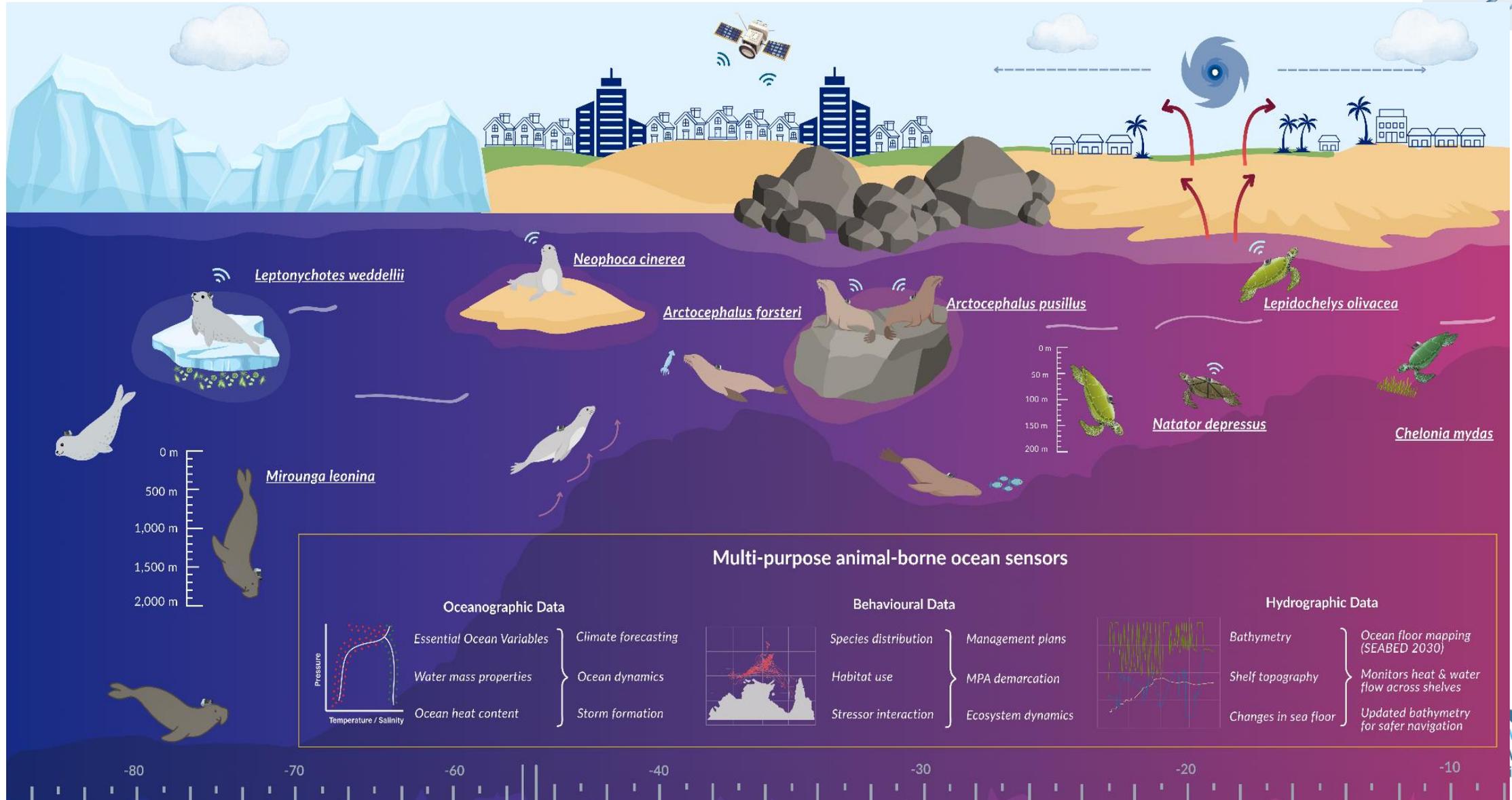
Deployed 1,023 tags on southern elephant (n = 746) and Weddell seals (n = 125), Australian sea lions (n = 50), Australian (n=8) and New Zealand (n = 24) fur seals; olive ridley (n = 44), green (n = 10), and flatback turtles (n = 16)  
420,000+ vertical profiles



A) Southern elephant seal (*Mirounga leonina*); B) Weddell seal (*Leptonychotes weddellii*); C) New Zealand fur seal (*Arctocephalus forsteri*); D) Australian fur seal (*Arctocephalus pusillus*); E) Australian sea lion (*Neophoca cinerea*); F) Green turtle (*Chelonia mydas*); G) Flatback turtle (*Natator depressus*); H) Olive Ridley turtle (*Lepidochelys olivacea*).

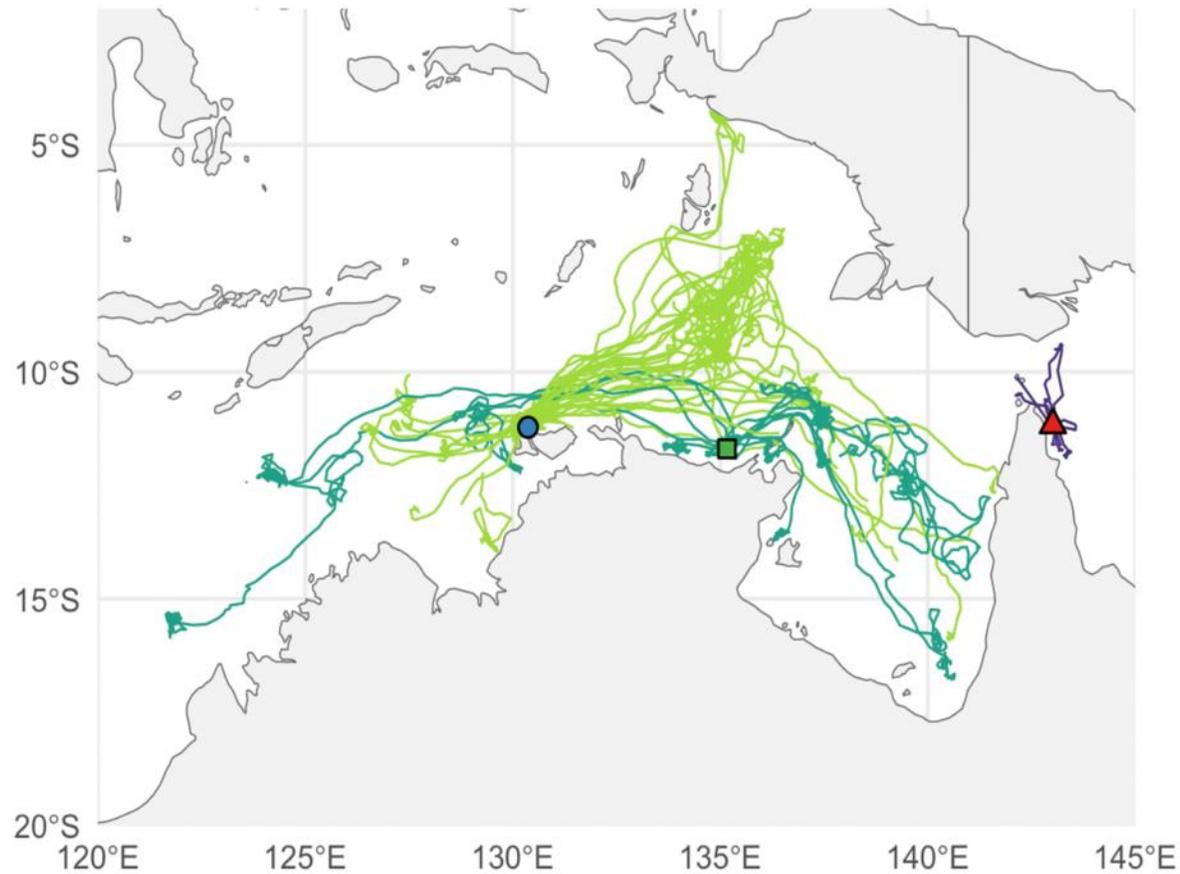
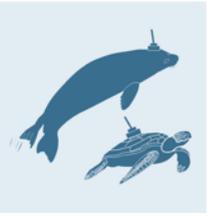


# Animal tagging sub-facility



# Animal tagging sub-facility

## Turtles



### Species

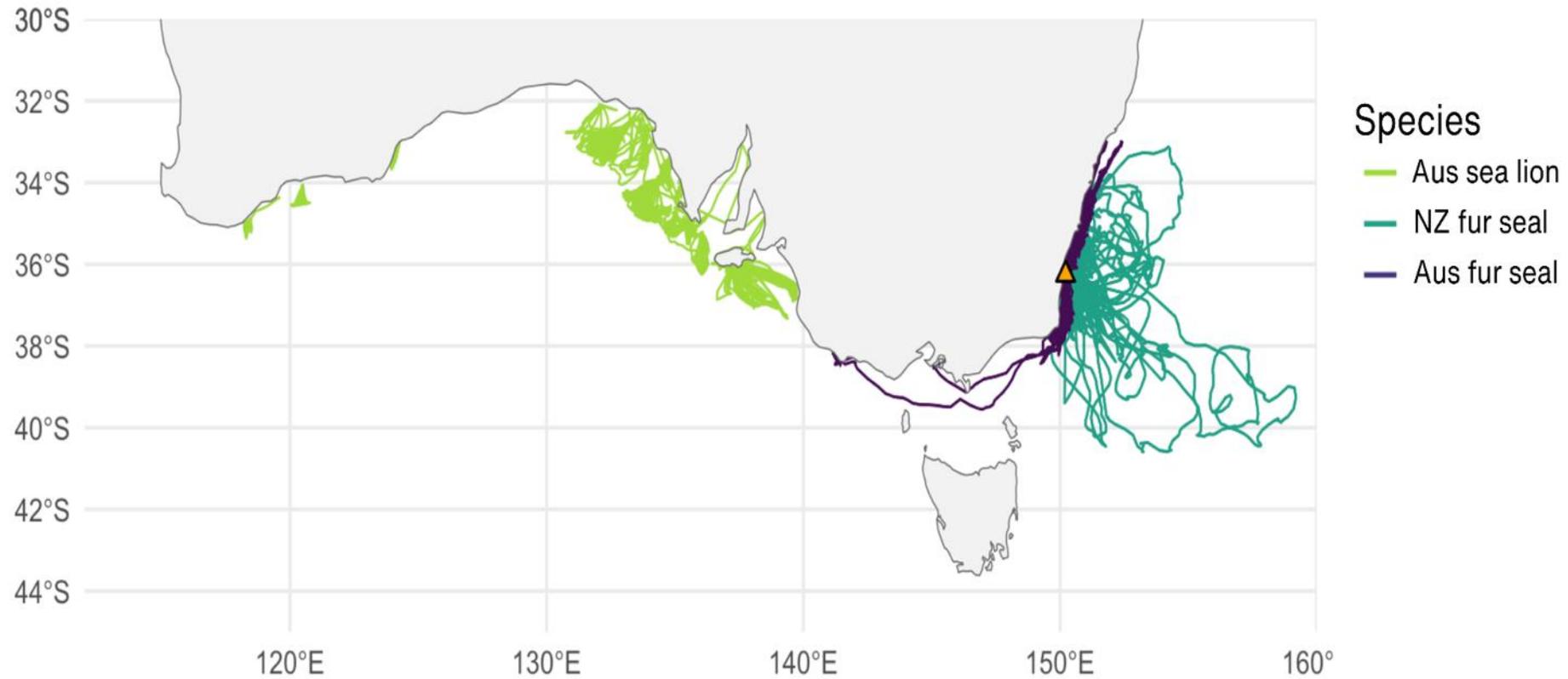
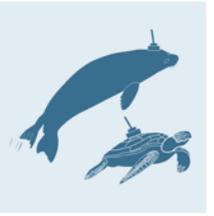
- Olive ridley turtle
- Flatback turtle
- Green turtle

### Deployment Location

- Crocodile Islands
- Melville Island
- ▲ Milman Islet

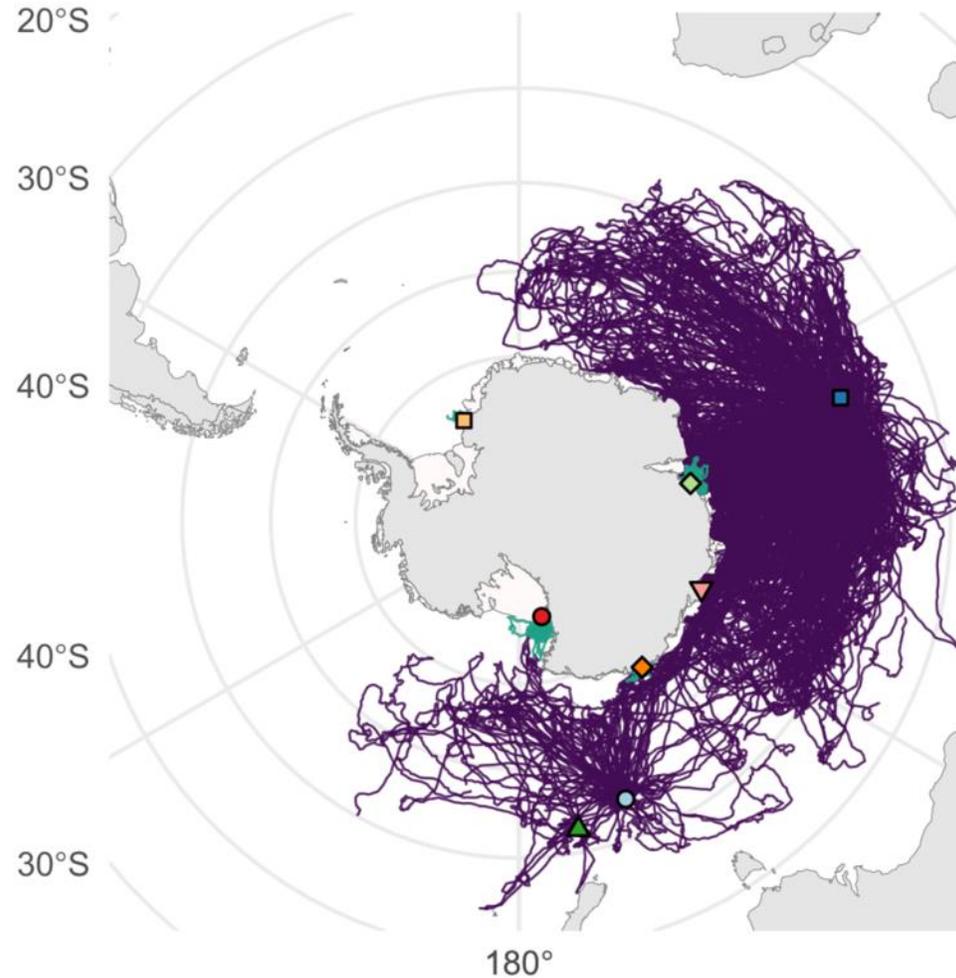
# Animal tagging sub-facility

## Fur seals and sea lions



# Animal tagging sub-facility

## Southern elephant seals and Weddell seals



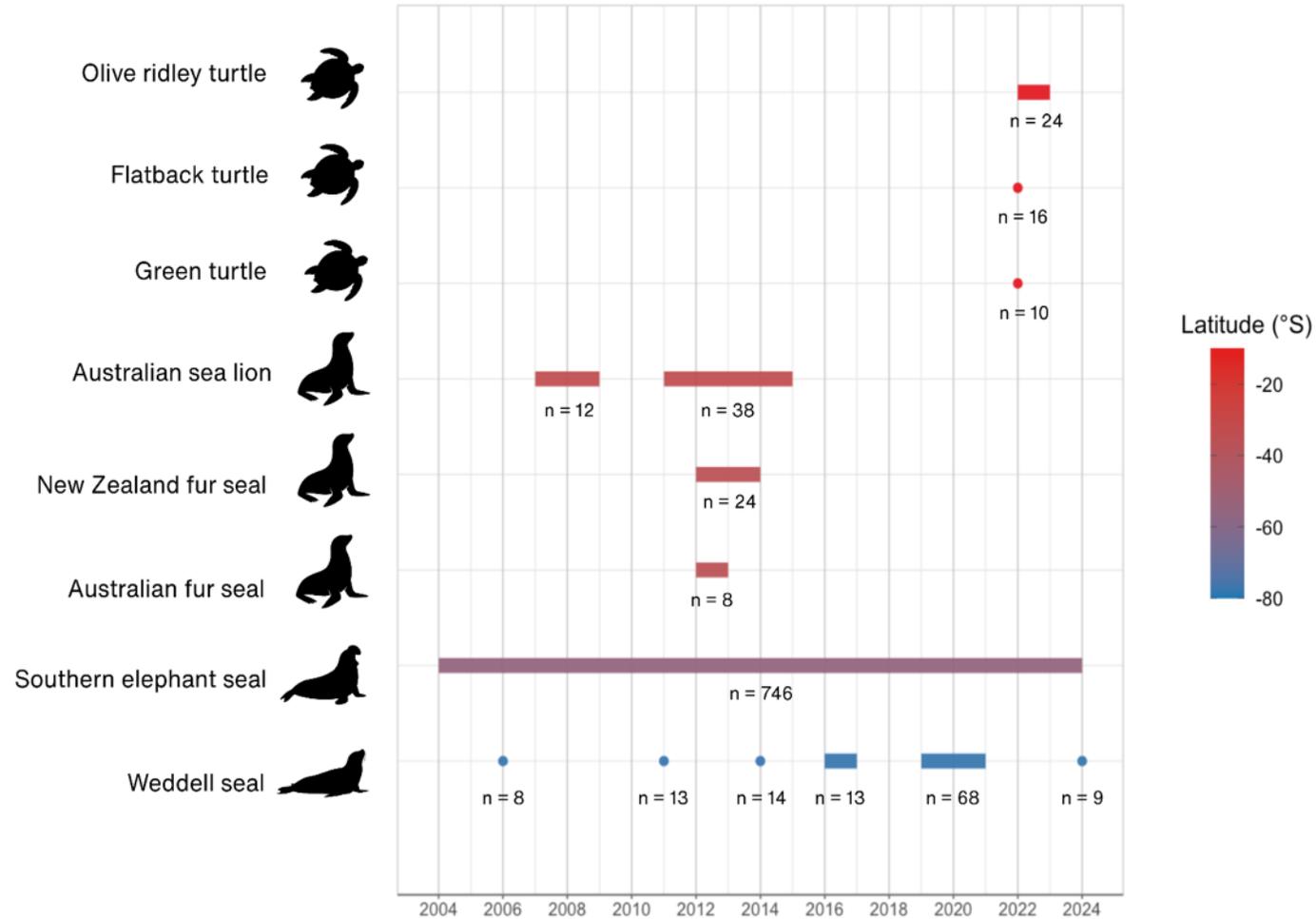
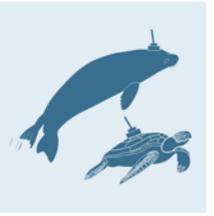
### Species

- Weddell seal
- Southern elephant seal

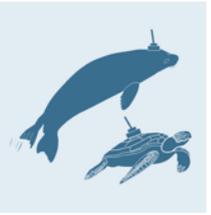
### Deployment Location

- ▲ Campbell Island
- ▼ Casey
- ◇ Davis
- ◇ Dumont d'Urville
- Iles Kerguelen
- Macquarie Island
- Scott Base
- Weddell Sea

# Animal tagging sub-facility Deployment timelines

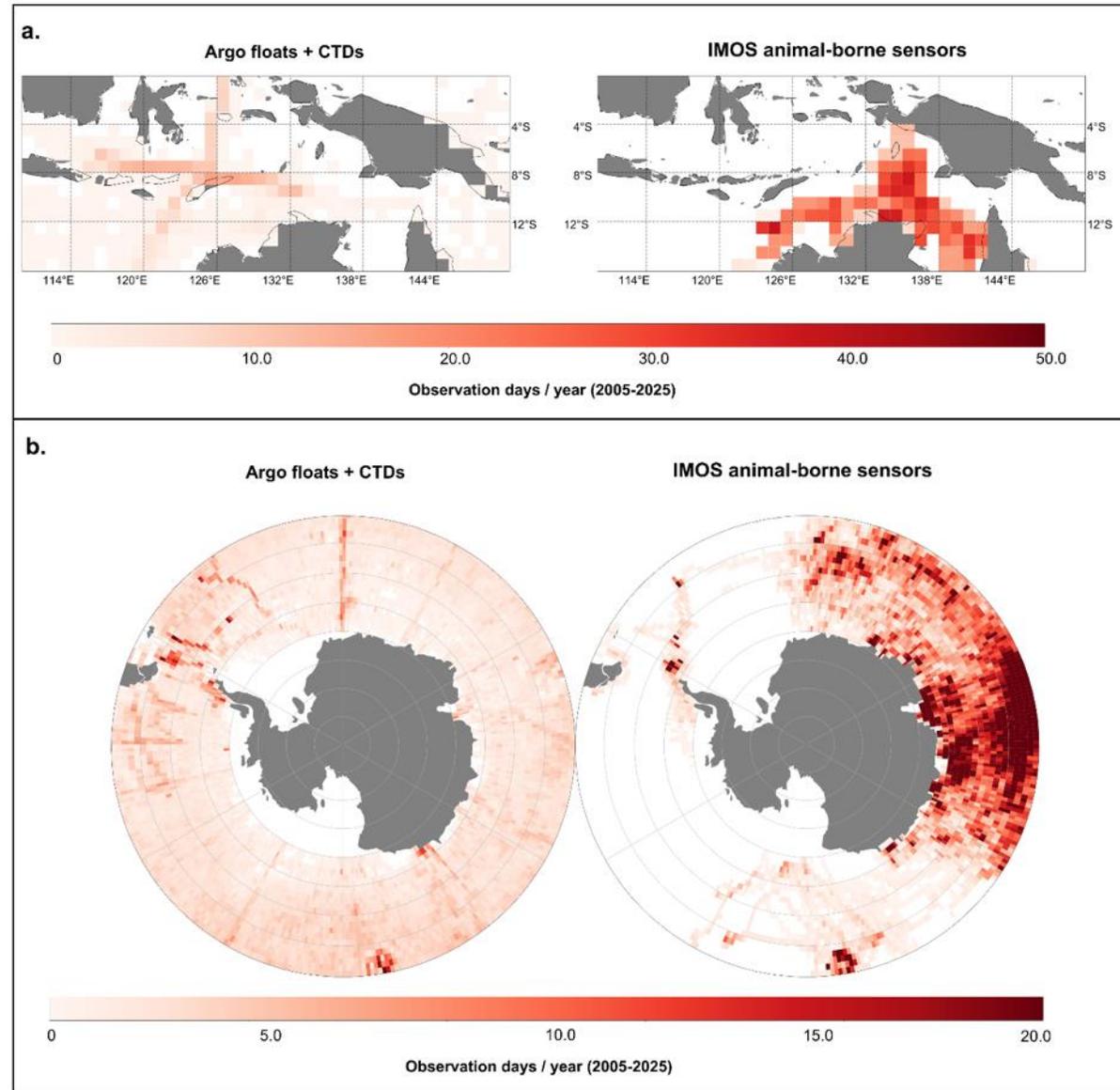


# Animal tagging sub-facility



Spatial distribution of data-days\* per year from Argo floats and ship-based CTD profiles (Argo floats + CTDs; left) compared with instrumented marine turtles (IMOS; right, top) and seals, (right bottom)

\*The data-days metric reflects the number of days in a year for which at least one profile is recorded within each 1° × 1° grid cell



## SCIENTIFIC DATA

**OPEN** A Southern Indian Ocean database of hydrographic profiles obtained with instrumented elephant seals

**SUBJECT CATEGORIES**  
 • Physical oceanography  
 • Marine biology

Fabien Roquet<sup>1</sup>, Guy Williams<sup>1,3</sup>, Mark A. Hindell<sup>1,3</sup>, Rob Harcourt<sup>2</sup>, Clive McMahon<sup>1</sup>, Christophe Guinet<sup>1</sup>, Jean-Benoit Charrassin<sup>1</sup>, Gilles Reverdin<sup>1</sup>, Lars Boehme<sup>4</sup>, Phil Lovell<sup>5</sup> & Mike Fedak<sup>6</sup>

Received: 23 May 2024

June 2024

**Animal Tracking**

**Best Practice Manual for SMRU CTD Satellite Relay Data Loggers: Instrument Calibration, Near Real-Time and Delayed Mode Data QA/QC**

Version 1.0

# Animal tagging sub-facility



## Selected key applications of animal-borne sensors for Antarctic ocean research

(i) Identification of regions of Dense Shelf Water in Antarctica (salinity  $\geq 34.4$ ;  $\rho_n \geq 28.27 \text{ kg m}^{-3}$ ;  $\theta \leq -1.8 \text{ }^\circ\text{C}$ ) from seal profile data 2011 to 2012.

Williams *et al.* (2016).

(ii) Revelation of new bathymetry - differences between seal dive depths and IBCSO v2 bathymetry.

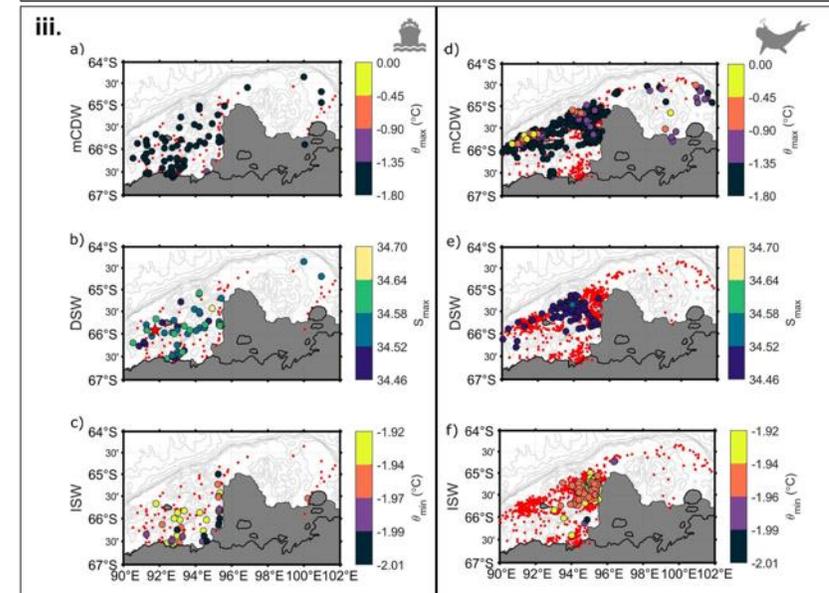
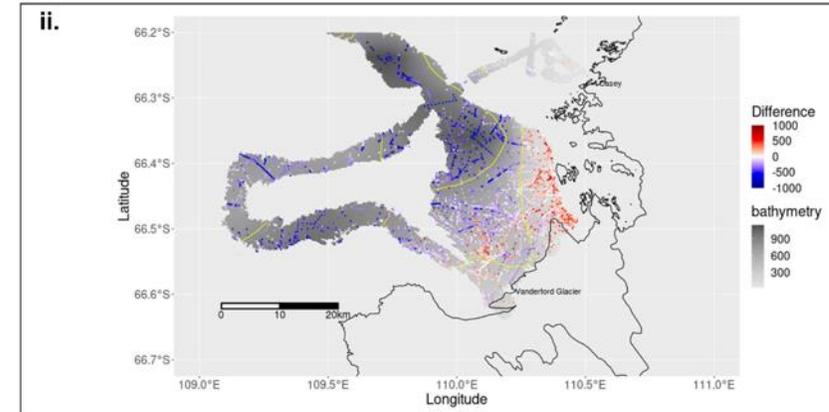
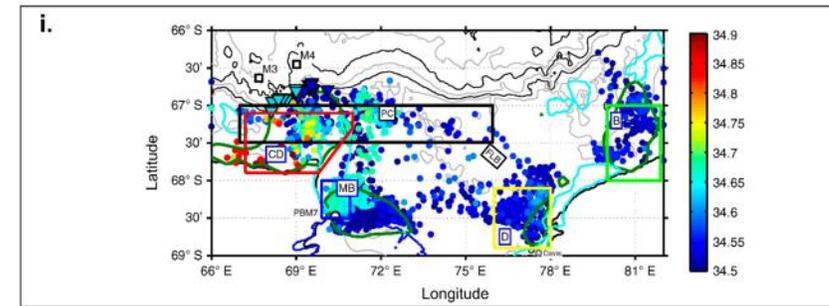
Red = dives deeper than the mapped seafloor.

McMahon *et al.* (2023).

(iii) Identification of water-mass properties derived from hydrographic profiles: historical (boat symbol 1956–1996) vs seal (2004–2016)

modified Circumpolar Deep Water (mCDW), maximum salinity of Dense Shelf Water (DSW), minimum potential temperature of Ice Shelf Water (ISW)

Ribeiro *et al.* (2023).

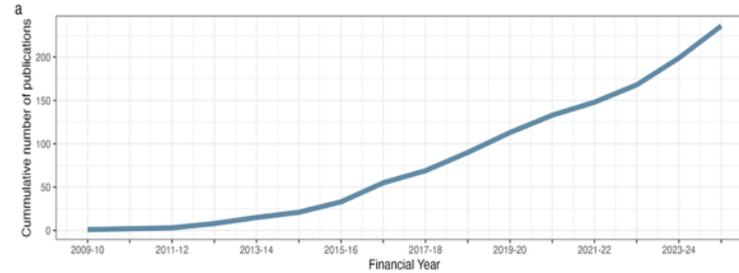


# Animal tagging sub-facility

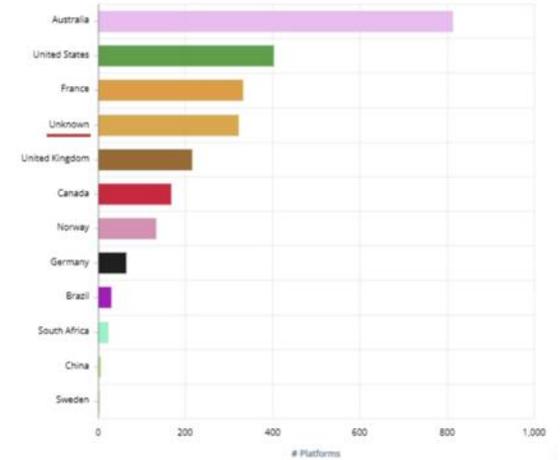


## Impact:

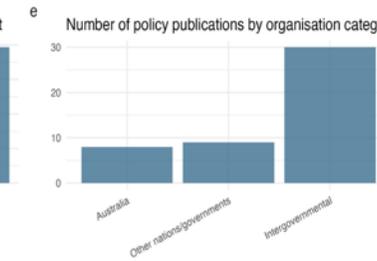
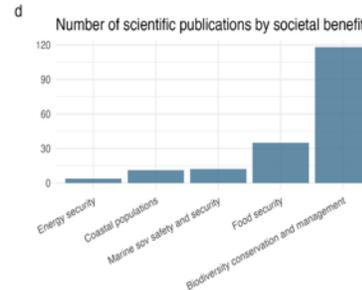
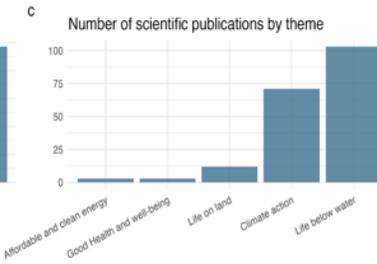
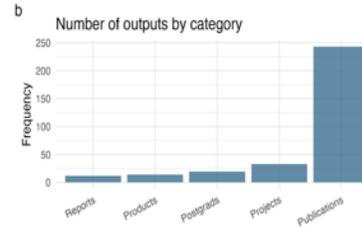
over 20 years  
 1,023 deployments  
 420,000+ profiles  
 supported 243 scientific publications, 11 articles in *Nature*, 2 in *Science*  
 58 of these publications have been used by 84 national and international agencies to develop policy documents  
 3 data products.



## AniBOS implementation status



National contribution to AniBOS 2004 - 2026



### Article

#### Tracking of marine predators to protect Southern Ocean ecosystems

<https://doi.org/10.1098/rstb.2020.0126> Mark A. Hindell<sup>1,2,3\*</sup>, Ryan R. Reisinger<sup>4,5,6</sup>, Jean-Benoit Charrassin<sup>7,8</sup>, Louis A. Hindell<sup>9,10</sup>, Philip N. Trathan<sup>11</sup>, Marc Bertram<sup>12</sup>, Jean-Benoit Charrassin<sup>7,8</sup>, Steven L. Chou<sup>13</sup>, David R. Cavan<sup>14</sup>, Simon D. Donner<sup>15</sup>, Mary-Jane Lea<sup>16</sup>, David Thompson<sup>17</sup>, Leigh-Ann Torres<sup>18</sup>, Anton P. Van de Putte<sup>19</sup>, Richard Alderman<sup>20</sup>, Virginia Andrews-Croft<sup>21</sup>, Ben Arbur<sup>22</sup>, David Ball<sup>23</sup>, John Burgess<sup>24</sup>, Martin B. Coates<sup>25</sup>, Anouk Schreiner<sup>26</sup>, Lars Brostrom<sup>27</sup>, Charles-Anne Bour<sup>28</sup>, Peter Brasseur<sup>29</sup>, James Clouston<sup>30</sup>, Rochelle Constantine<sup>31</sup>, Stuart Cooper<sup>32</sup>, Robert J. M. Crone<sup>33</sup>, Luciano Dalla Rosa<sup>34</sup>, J. J. Menni-Brown<sup>35</sup>, Kerrie Dunbar<sup>36</sup>, Sebastian Engemann<sup>37</sup>, Mike Douglas<sup>38</sup>, Louise Engemann<sup>39</sup>, Mike Field<sup>40</sup>, Ari Friedlander<sup>41</sup>, Nick Galois<sup>42</sup>, Michael E. Goebel<sup>43</sup>, Kimberly T. Goetz<sup>44</sup>, Christophe Guinet<sup>45</sup>, Simon D. Donner<sup>15</sup>, Bob Harcourt<sup>46</sup>, Johannes T. Heide<sup>47</sup>, Kerstin Jensen<sup>48</sup>, Akiba Katz<sup>49</sup>, Kowalen E. Kerr<sup>50</sup>, Roger Kirkwood<sup>51</sup>, Donald L. Kramer<sup>52</sup>, M. M. Kruse<sup>53</sup>, Robert Leaper<sup>54</sup>, Andrew D. Lindley<sup>55</sup>, Christian Luchessa<sup>56</sup>, Phil D. Lyver<sup>57</sup>, Arntsen B. Malmheden<sup>58</sup>, Maria E. J. Marques<sup>59</sup>, Brigitte I. McDonald<sup>60</sup>, Clive R. McMahon<sup>61</sup>, Nicolas Mollereux<sup>62</sup>, Donald McPherson<sup>63</sup>, Akiba Katz<sup>49</sup>, William H. Roedel<sup>64</sup>, Silvia Orsi<sup>65</sup>, Richard A. Phillips<sup>66</sup>, Pierre Pistorius<sup>67</sup>, Jonathan Piter<sup>68</sup>, Klemens Plat<sup>69</sup>, Marianne Riedel<sup>70</sup>, Peter G. Ryan<sup>71</sup>, Marianne Sævi<sup>72</sup>, Cédric Scahill<sup>73</sup>, Ian Stansfeld<sup>74</sup>, Akira Takahashi<sup>75</sup>, Arnaud Tarnoux<sup>76</sup>, Wayne Travesio<sup>77</sup>, Evan Walcott<sup>78</sup>, Helen Whitham<sup>79</sup>, Barbara Whittaker<sup>80</sup>, Jack C. Xavier<sup>81</sup>, Simon Whitham<sup>82</sup>, Ian D. Jansen<sup>83</sup> & Ben Raymond<sup>84</sup>

### communications

#### earth & environment

ARTICLE  
<https://doi.org/10.1038/s41566-023-00919-8> OPEN  
 Southern Ocean pinnipeds provide bathymetric insights on the East Antarctic continental shelf  
 Clive R. McMahon<sup>1,2,3,4,5\*</sup>, Mark A. Hindell<sup>2,4,6</sup>, Jean-Benoit Charrassin<sup>5</sup>, Richard Coleman<sup>2,4,6</sup>, Christophe Guinet<sup>7</sup>, Robert Harcourt<sup>8</sup>, Sara Labrousse<sup>9</sup>, Benjamin Raymond<sup>1,9</sup>, Michael Sumner<sup>2,8</sup> & Natalia Ribeiro<sup>2</sup>

Jensen et al. *Movement Ecology* (2020) 8:31  
<https://doi.org/10.1186/s40463-020-00217-7> Movement Ecology

METHODOLOGY ARTICLE Open Access

A continuous-time state-space model for rapid quality control of argos locations from animal-borne tags

Ian D. Jansen<sup>1\*</sup>, Toby A. Patterson<sup>2</sup>, Daniel P. Costa<sup>3</sup>, Philip D. Doherty<sup>4</sup>, Brendan J. Godley<sup>5</sup>, W. James Grecian<sup>6</sup>, Christophe Guinet<sup>7</sup>, Xavier Hoennner<sup>8</sup>, Sarah S. Kienle<sup>9</sup>, Patrick W. Robinson<sup>10</sup>, Stephen C. Votaw<sup>11</sup>, Scott Whiting<sup>12</sup>, Matthew J. Witt<sup>13</sup>, Mark A. Hindell<sup>14</sup>, Robert G. Harcourt<sup>15</sup> and Clive R. McMahon<sup>9</sup>

BRITISH ECOLOGICAL SOCIETY Methods in Ecology and Evolution

aniMotum, an R package for animal movement data: Rapid quality control, behavioural estimation and simulation  
 Ian D. Jansen<sup>1</sup>, W. James Grecian<sup>2</sup>, Lachlan Phillips<sup>3</sup>, Gemma Carroll<sup>4</sup>, Clive McMahon<sup>5</sup>, Robert G. Harcourt<sup>6</sup>, Mark A. Hindell<sup>7</sup>, Toby A. Patterson<sup>8</sup>





Australia's Integrated Marine Observing System 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.

### PRINCIPAL PARTICIPANTS



SIMS is a partnership involving four universities

### ASSOCIATE PARTICIPANTS



IMOS thanks the many other organisations who partner with IMOS, providing co-investment, funding and operational support, including investment from the Tasmanian and Western Australian Governments.

