



ningaloo outlook



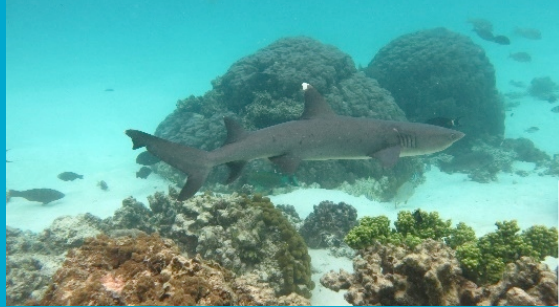
Ningaloo Outlook Symposium - 2016

Ningaloo Outlook – A partnership between BHP Billiton and CSIRO

WESTERN COASTAL/OCEAN & ATMOSPHERE

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ningaloo outlook



Theme 3: Tagging and Tracking

Mat Vanderklift, Richard Pillans, Jessica Stubbs, Fabio Boschetti, Toby Patterson, Russ Babcock, Damian Thomson, Mick Haywood, Sue Pillans, Tony Tucker



Research priorities for tagging & tracking

Priorities

Threatened and iconic species

Turtles

Sharks

Undertake research to better document shark/ray movement patterns and aggregations

Determine the location and relative significance of turtle aggregation sites

Targeted research

How many are there?

Where do they spend their time?

What food resources do they rely on?

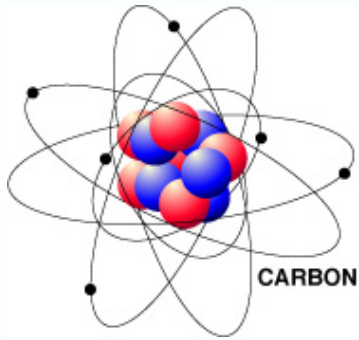
Objectives

Community engagement

- *Teaching the community important values and the role of science*
- *Giving them a sense of participation and ownership*



Stable isotopes

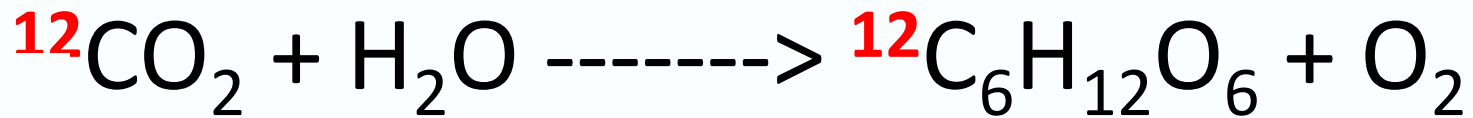
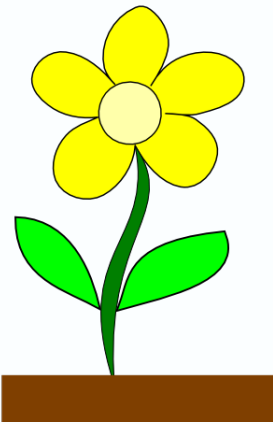


^{12}C

^{13}C

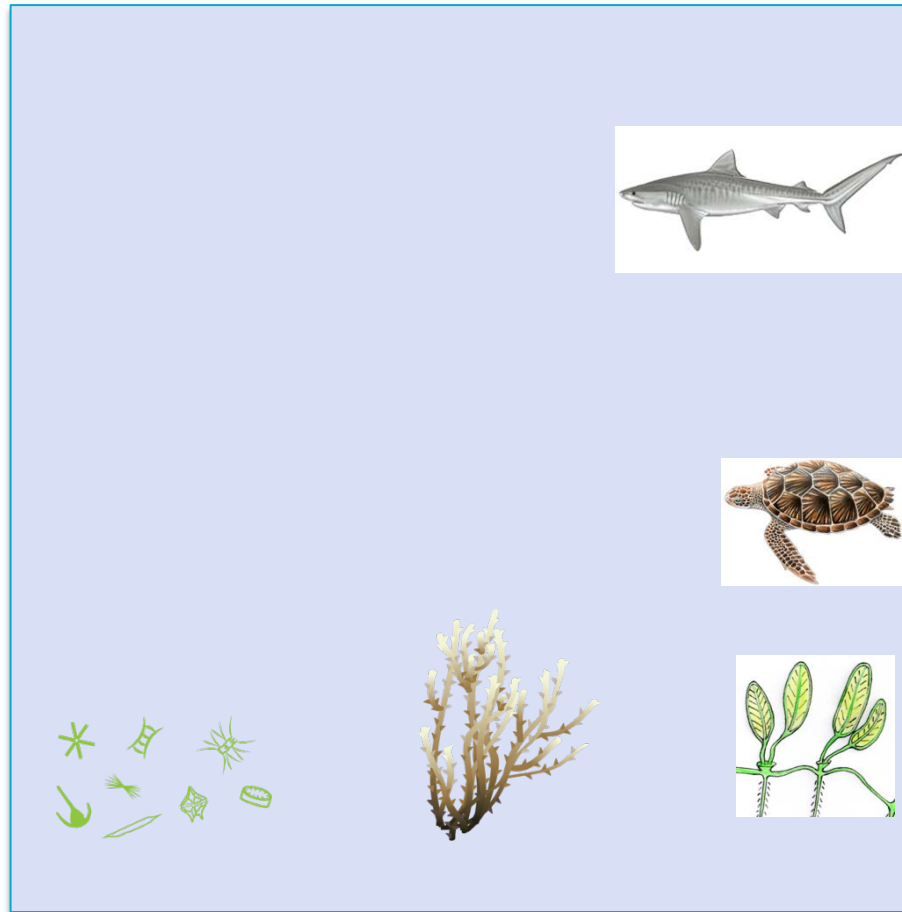


^{14}C



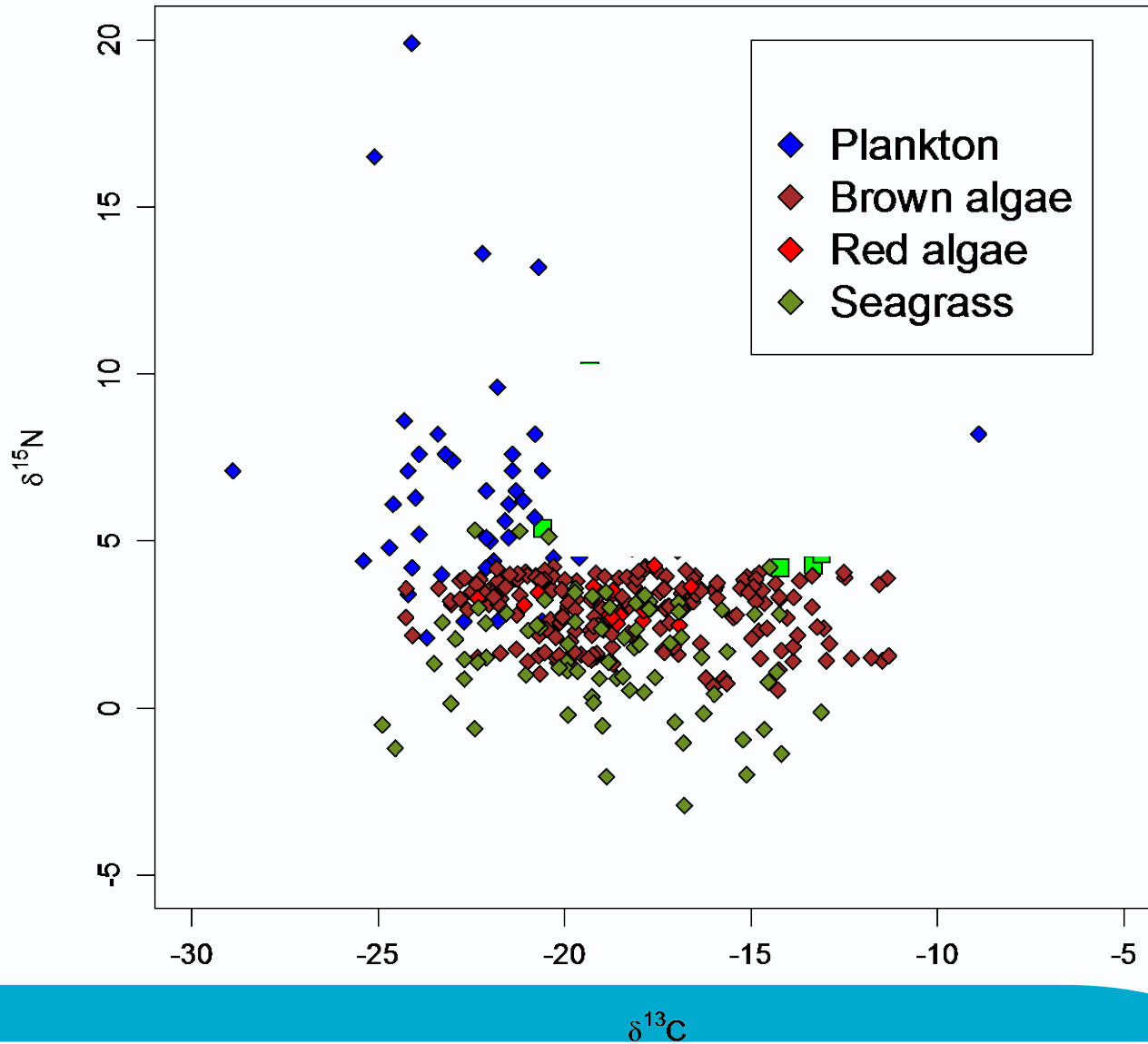
Stable isotopes

$^{15}\text{N} : ^{14}\text{N}$



$^{13}\text{C} : ^{12}\text{C}$

Stable isotopes



Satellite tagging

Here I will switch to Google Earth to show the most up to date track maps

Use of acoustic monitoring to investigate long term movement



Why study movement?

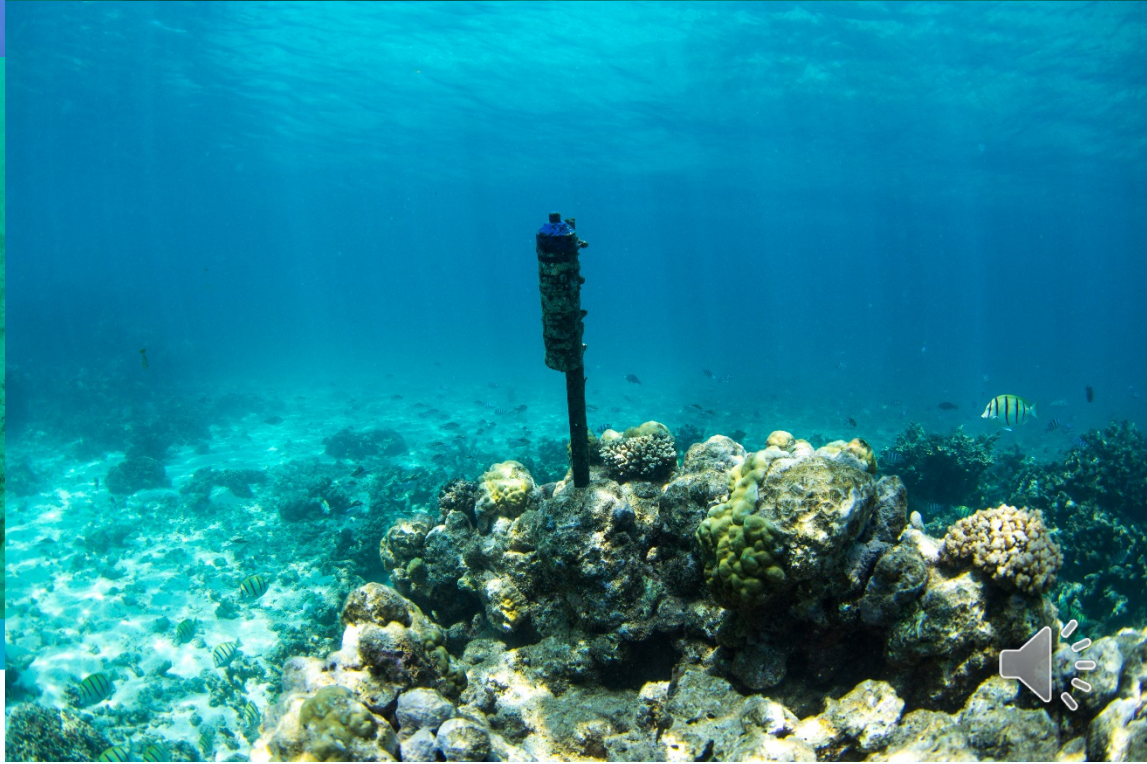
- Fundamental, yet poorly understood component of ecology
- Management and conservation of populations are heavily reliant on movement data
- How big sanctuary zones should be, how effective they are, how and where development will impact populations
- Baseline data extremely useful for investigating impacts of disturbance



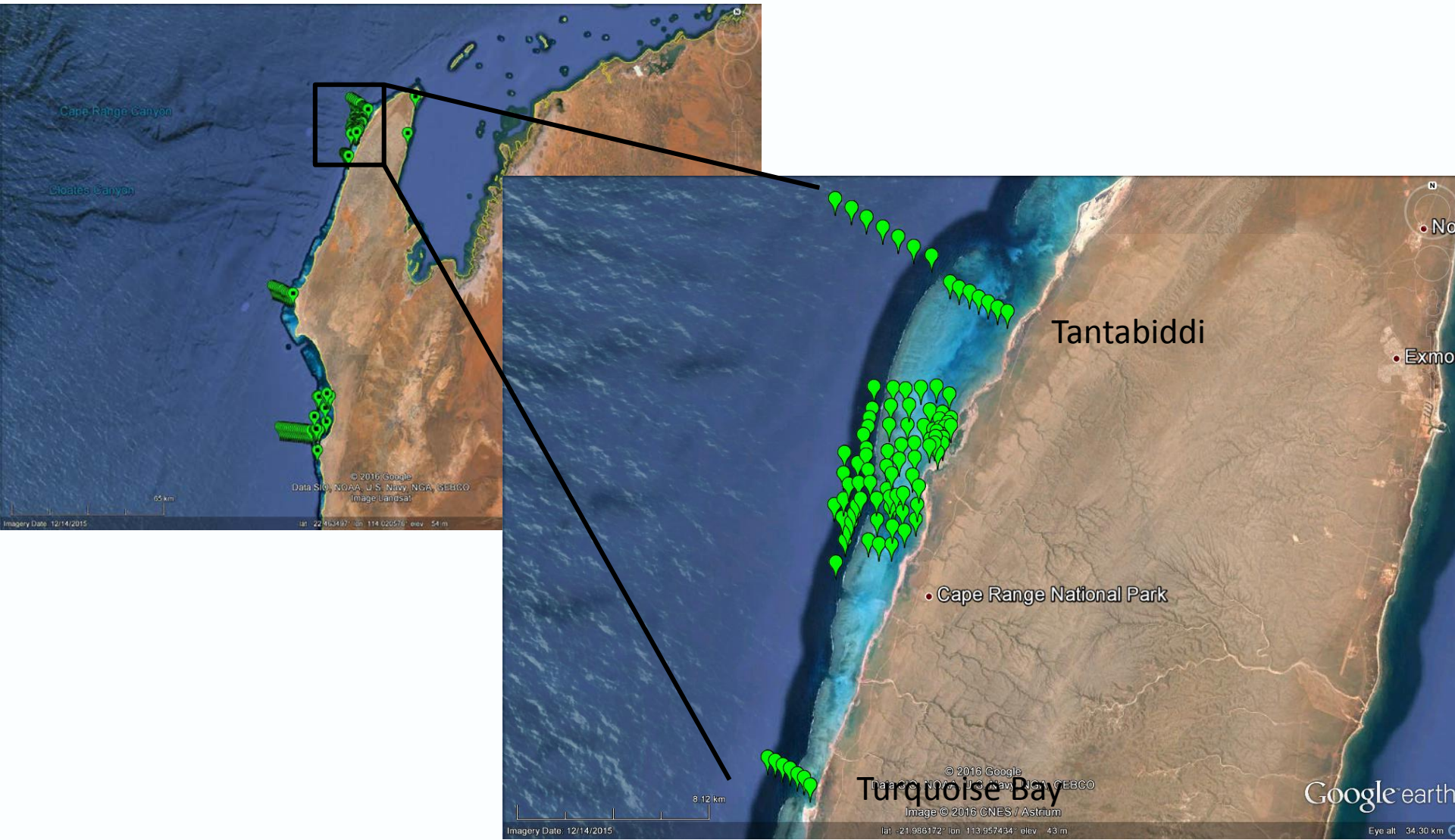
Turtle capture and tagging



Acoustic telemetry



Ningaloo Reef acoustic array design



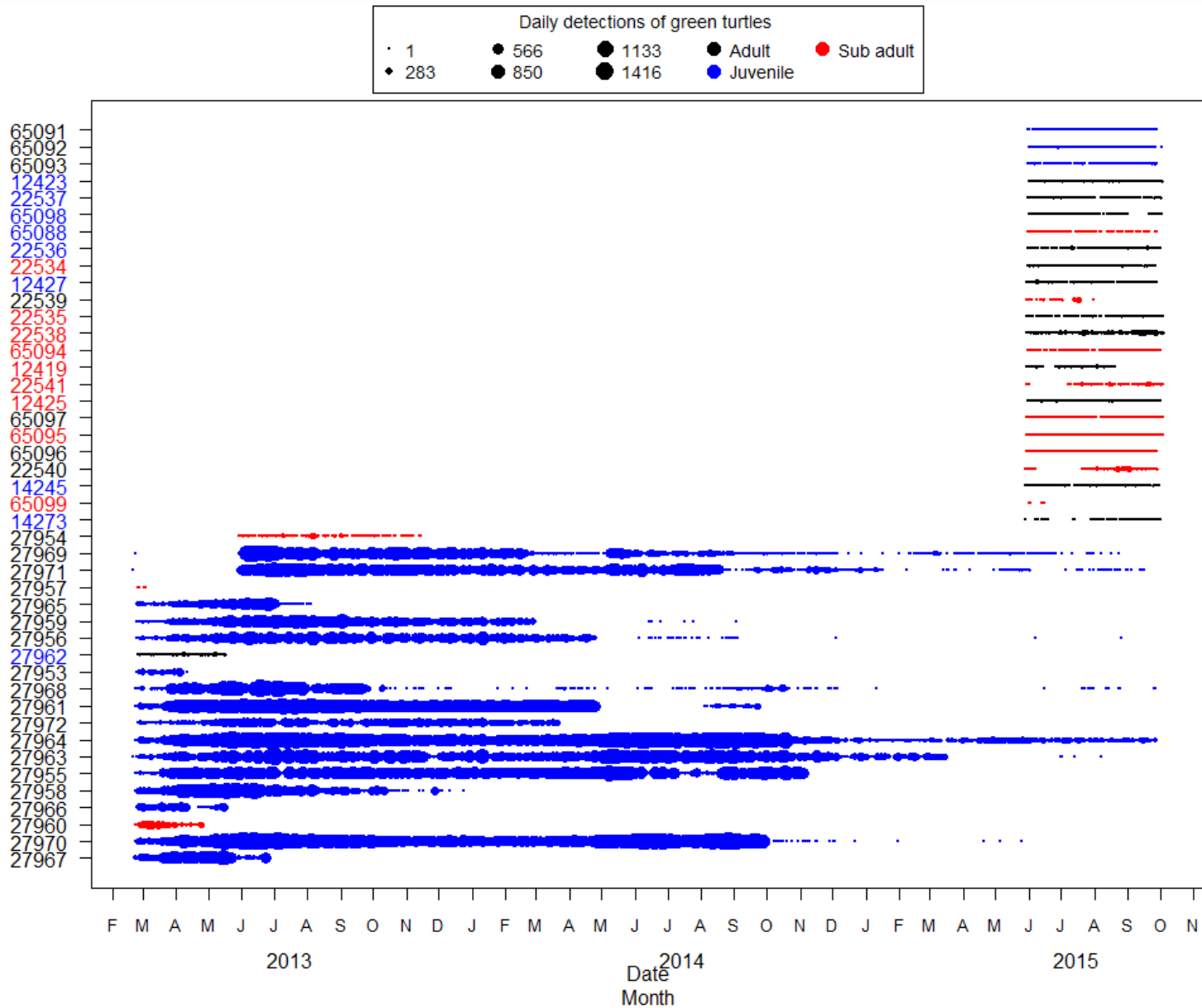
Results: Individuals tagged with acoustic tags

Species	Ningaloo Outlook	CFOC* (2013)	TOTAL
Green Turtle	24	20	44
Grey Reef Shark	3	24	27
Blacktip Reef Shark	2	21	23
Lemon Shark	12	19	31
Australian Blacktip		7	7
Whitetip Reef Shark		2	2
Tiger Shark	1	3	4
Whale Shark	6		6

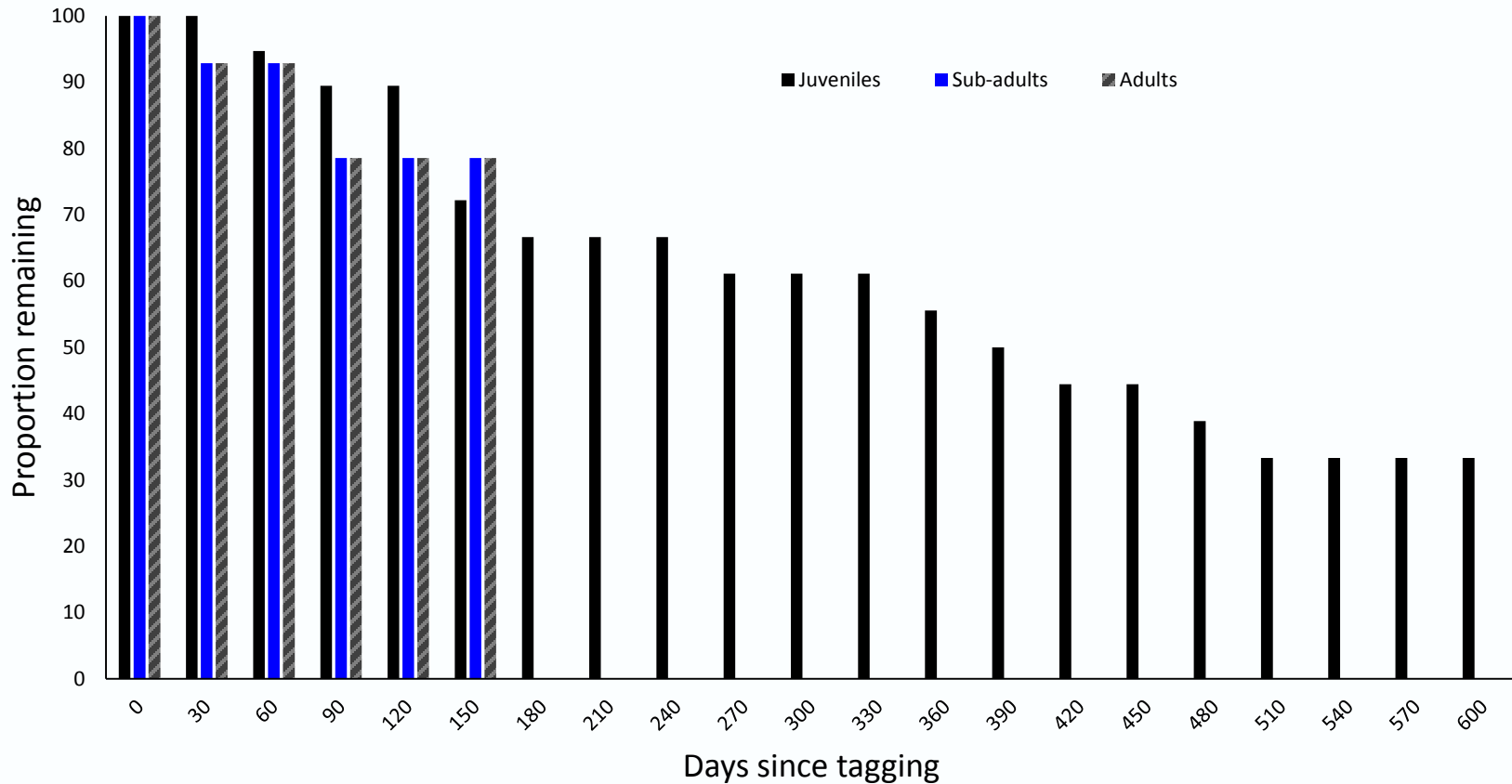
* Caring for Country project (2012/2013)



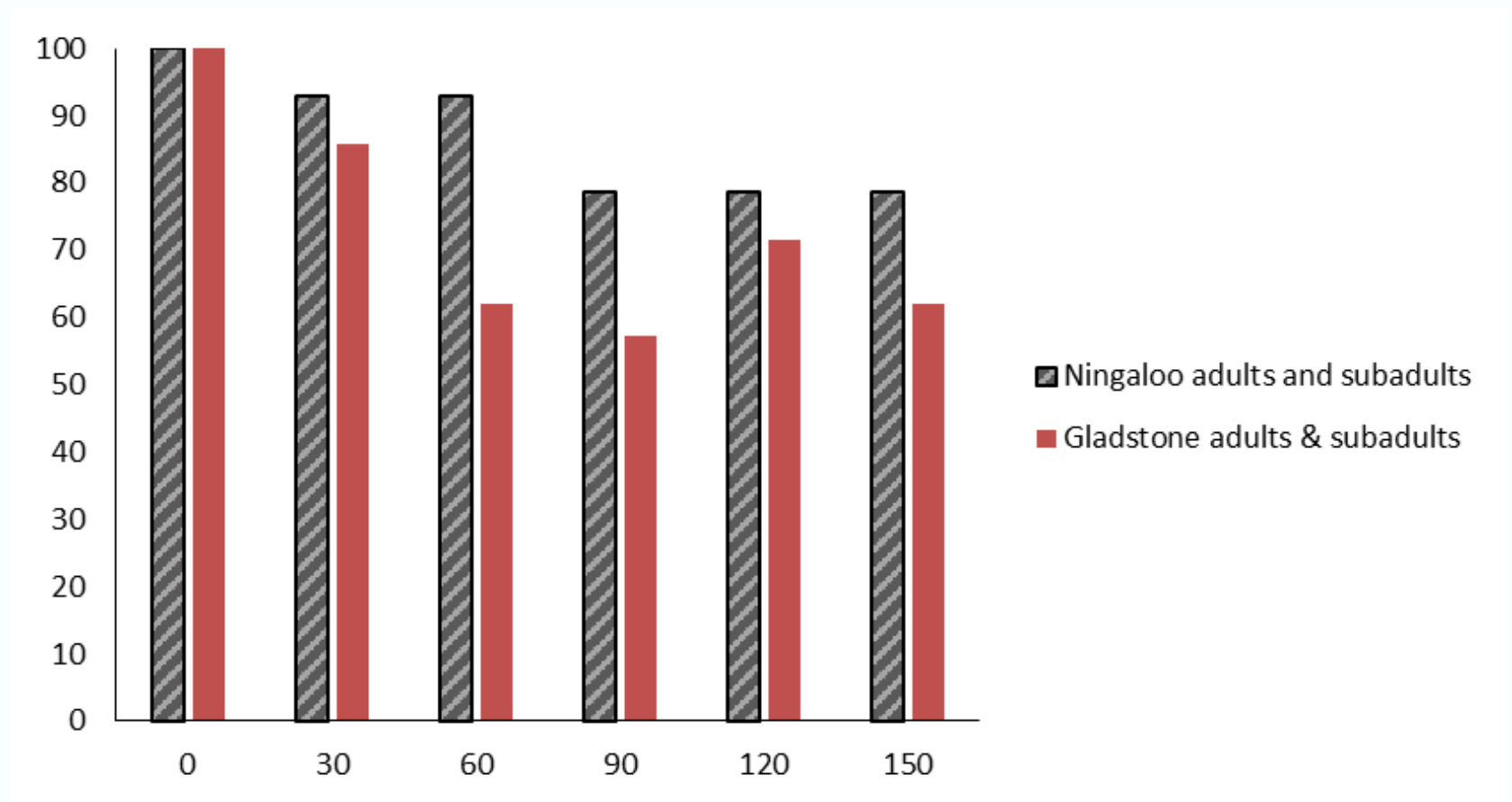
Results: Turtle detection history



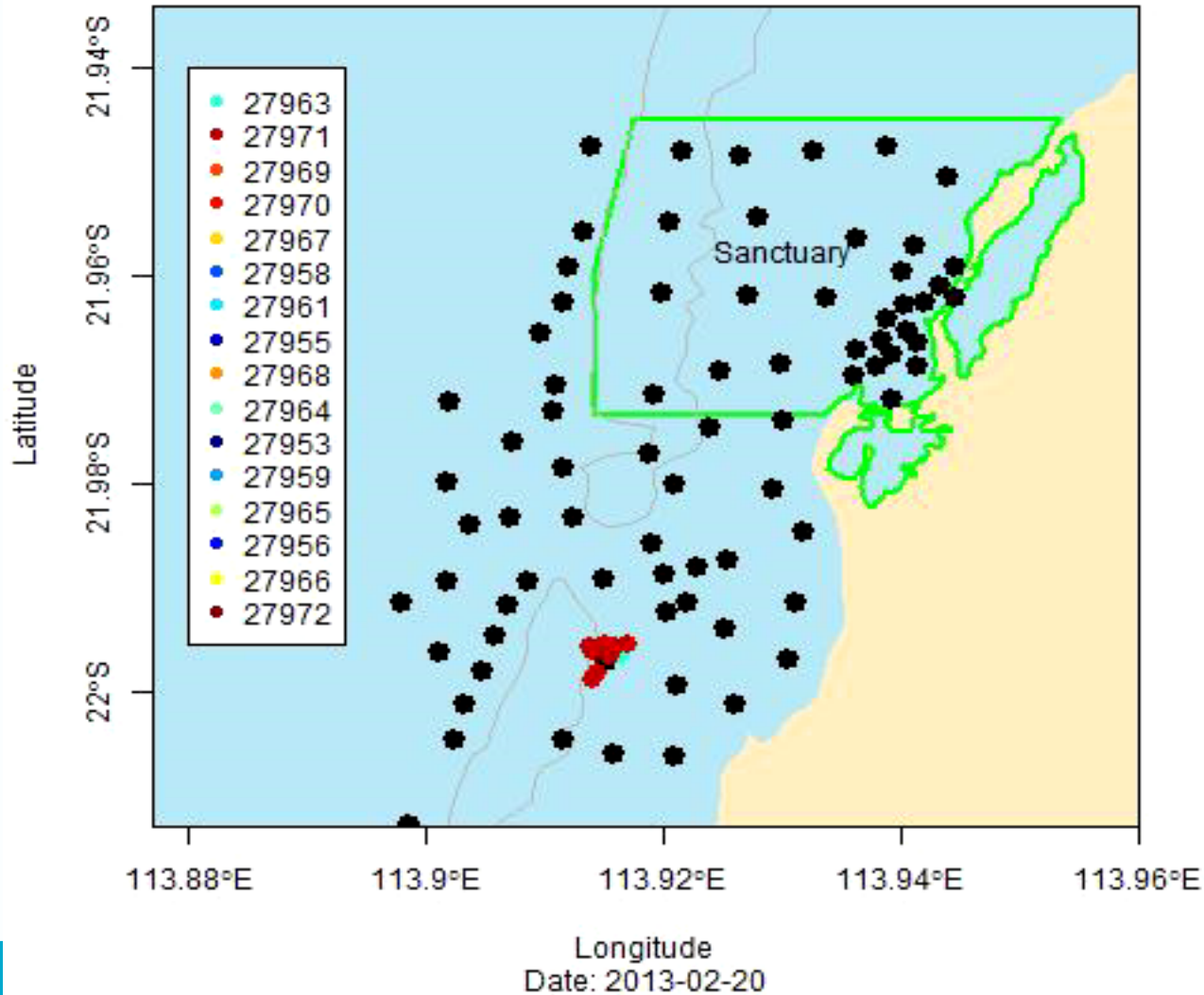
Results: Turtle long term residency



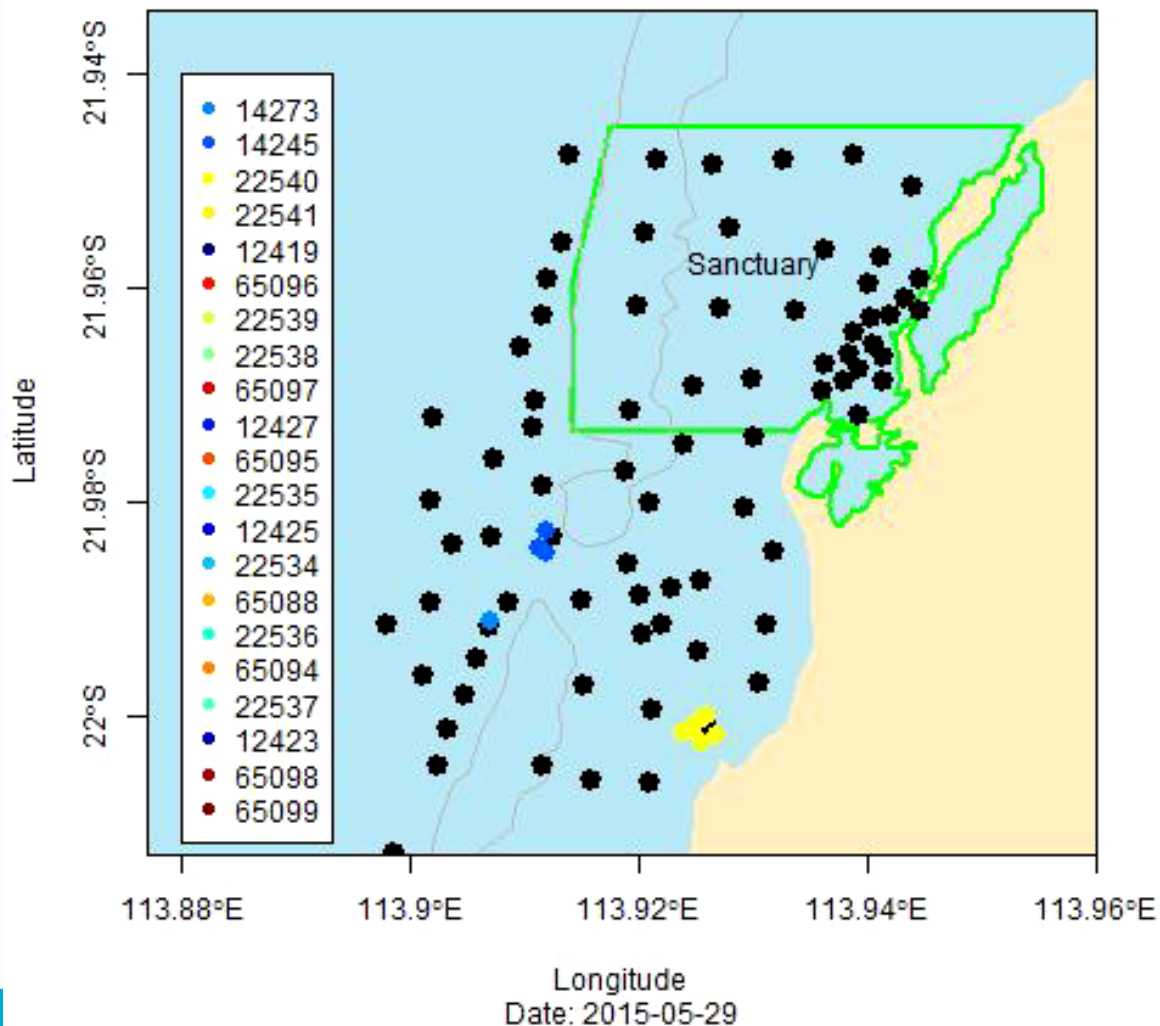
Results: Turtle detection history

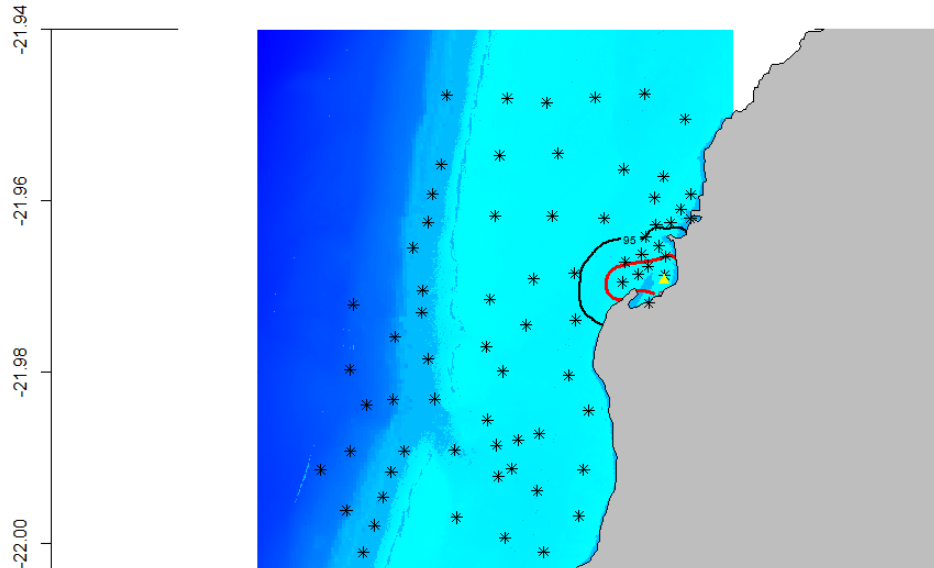


Results: Juvenile movement (Feb to Sep 2013)

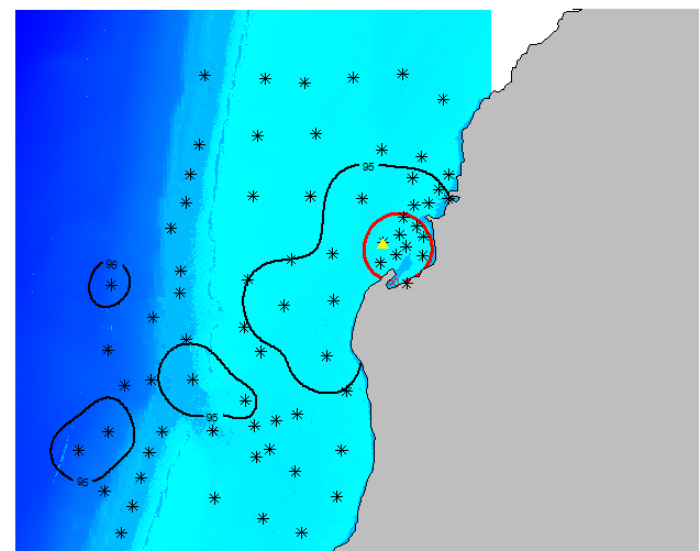
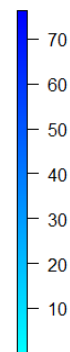


Results: Adult & Subadult movement (May to Nov 2015)

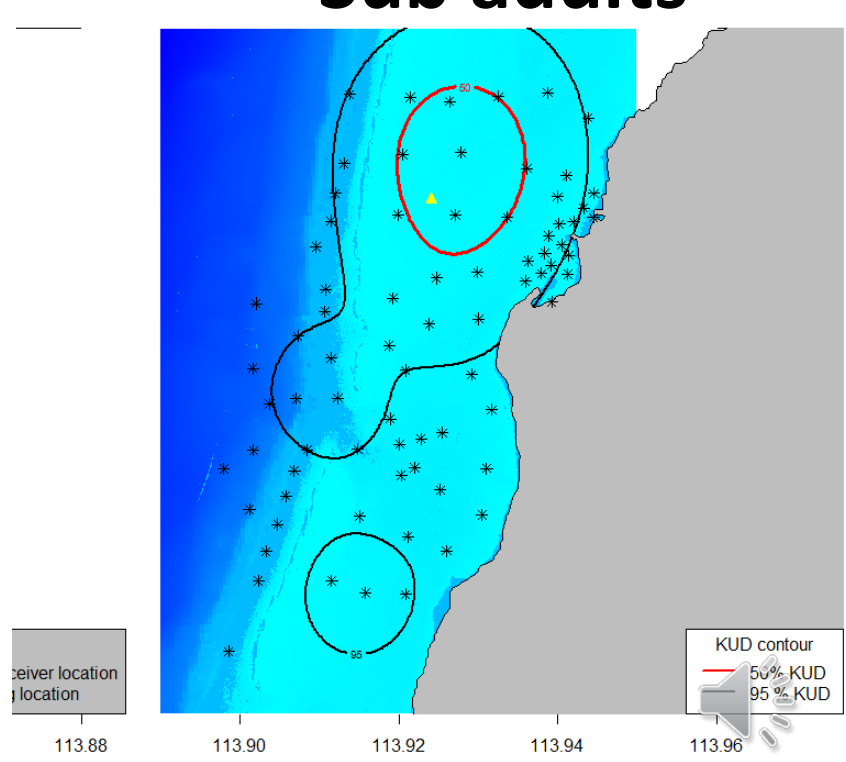
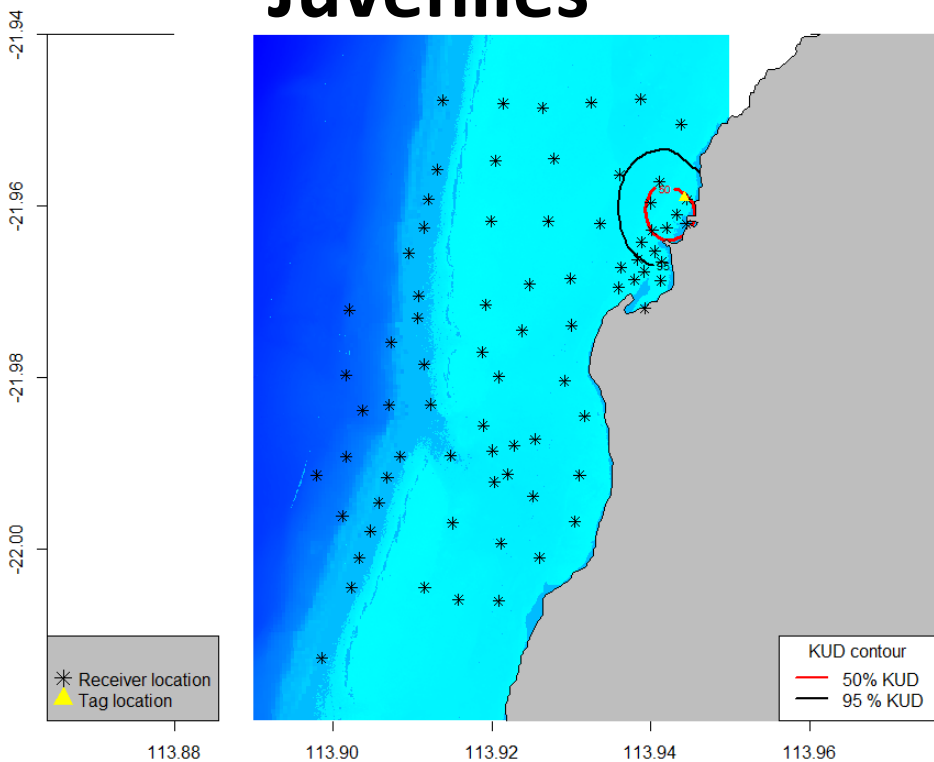
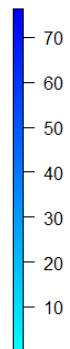


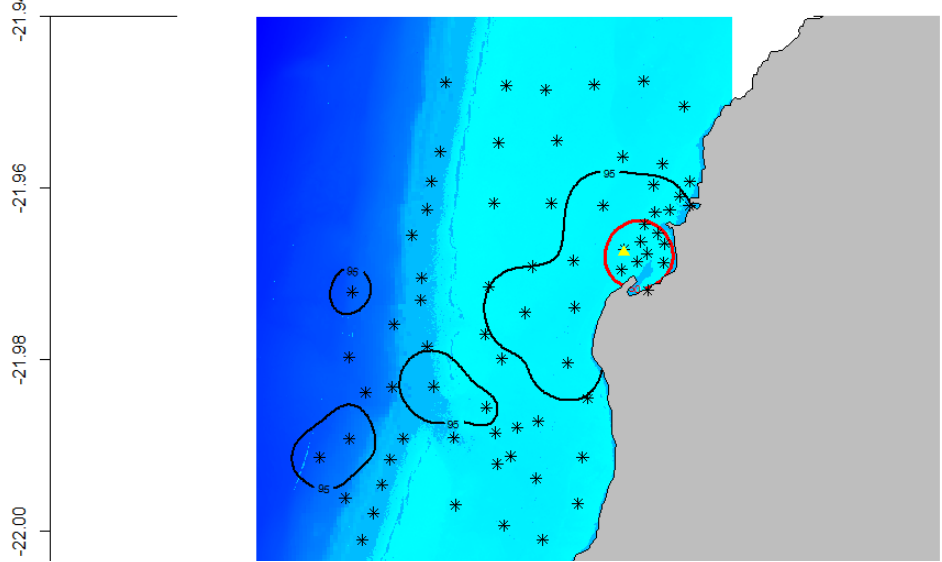


Juveniles

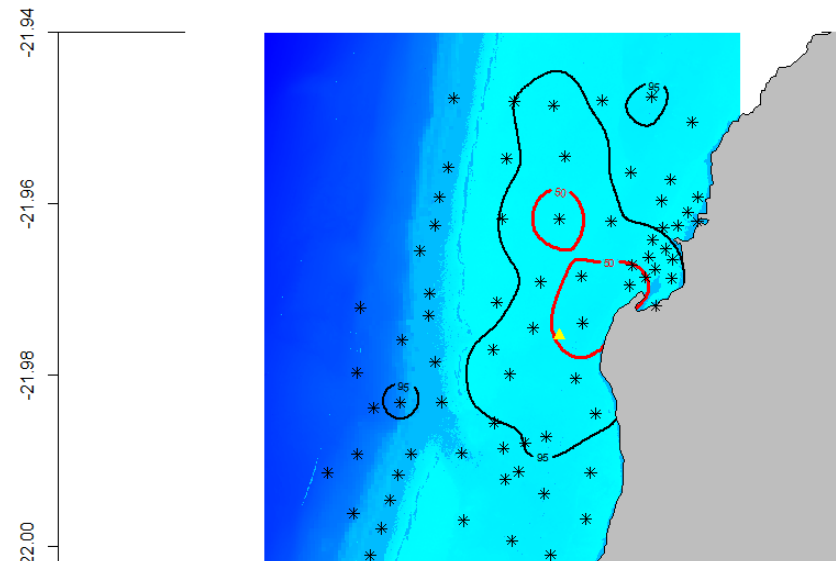


Sub adults

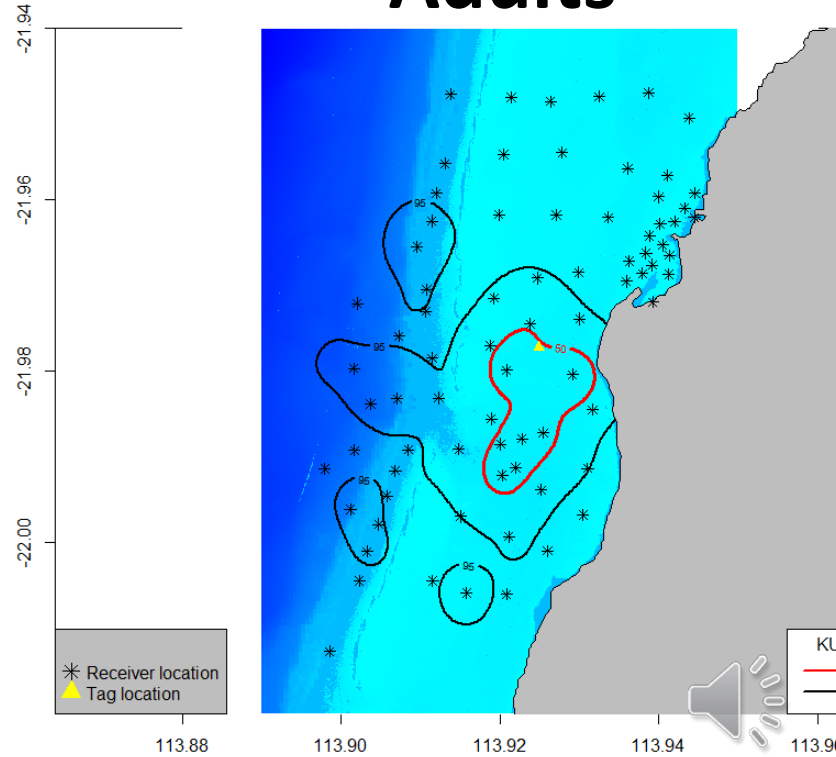
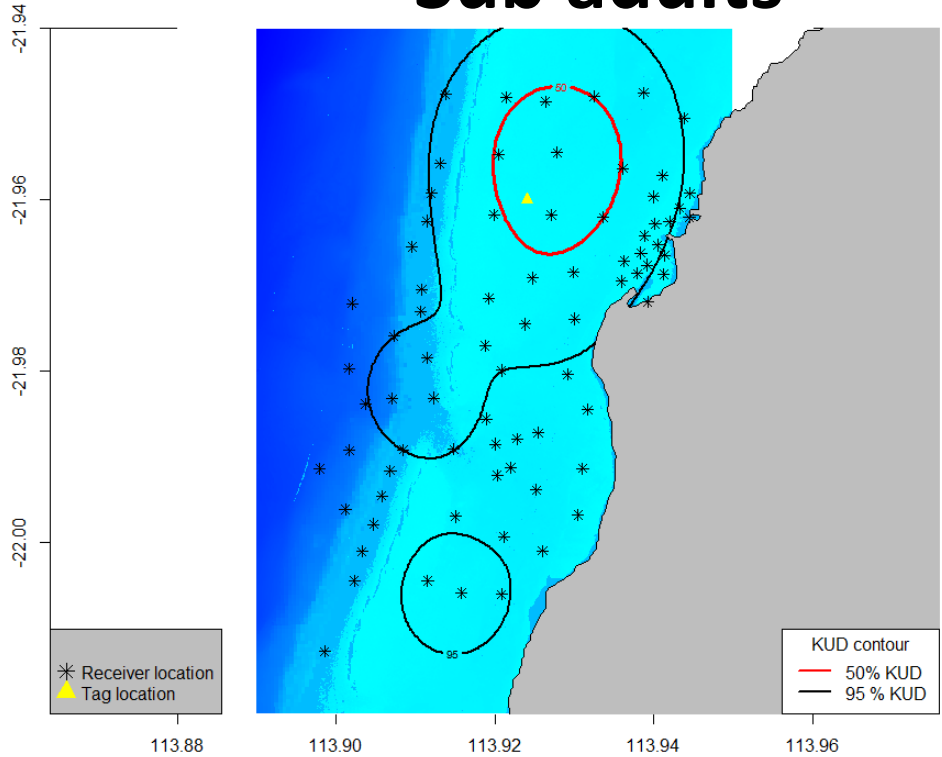




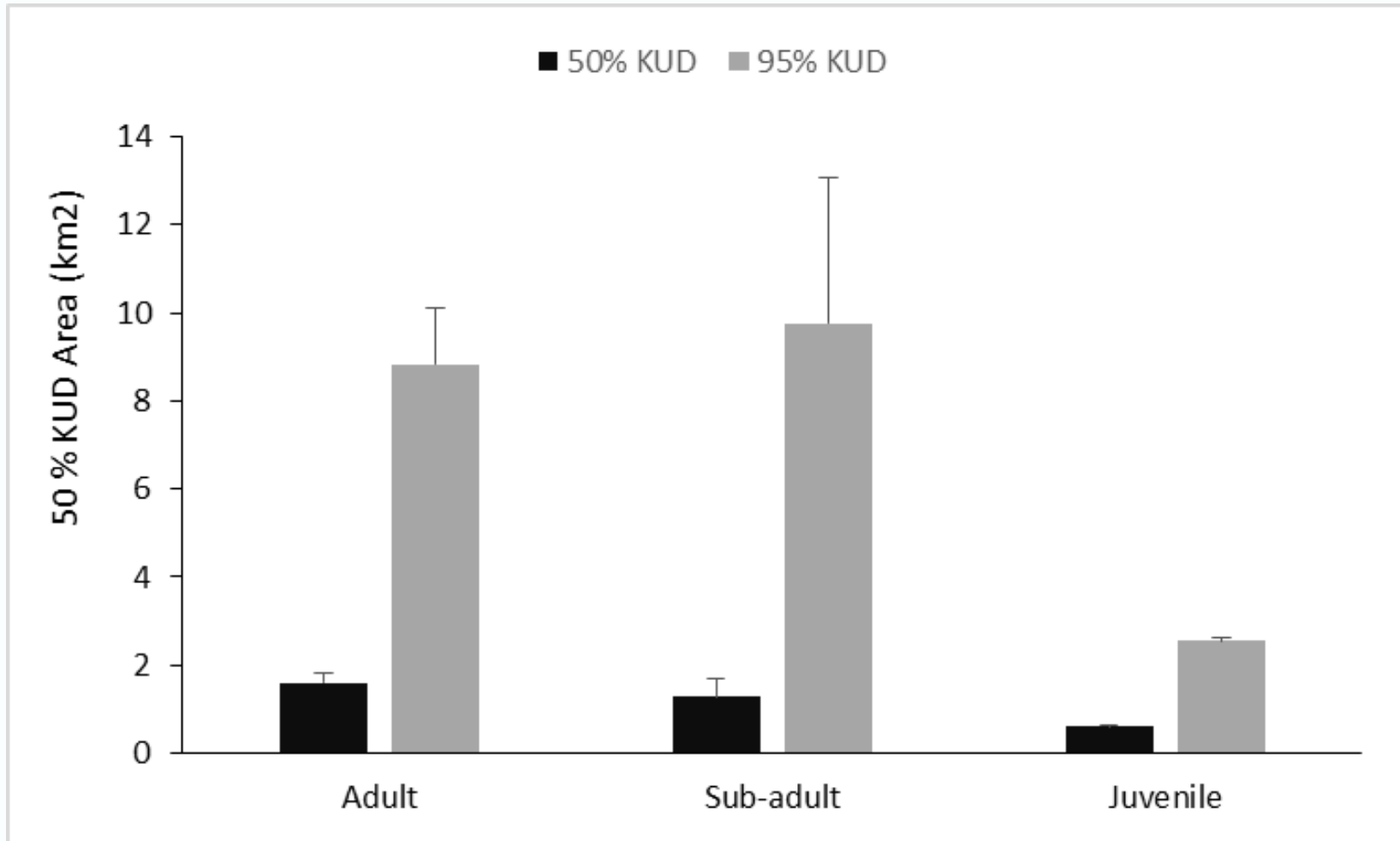
Sub adults



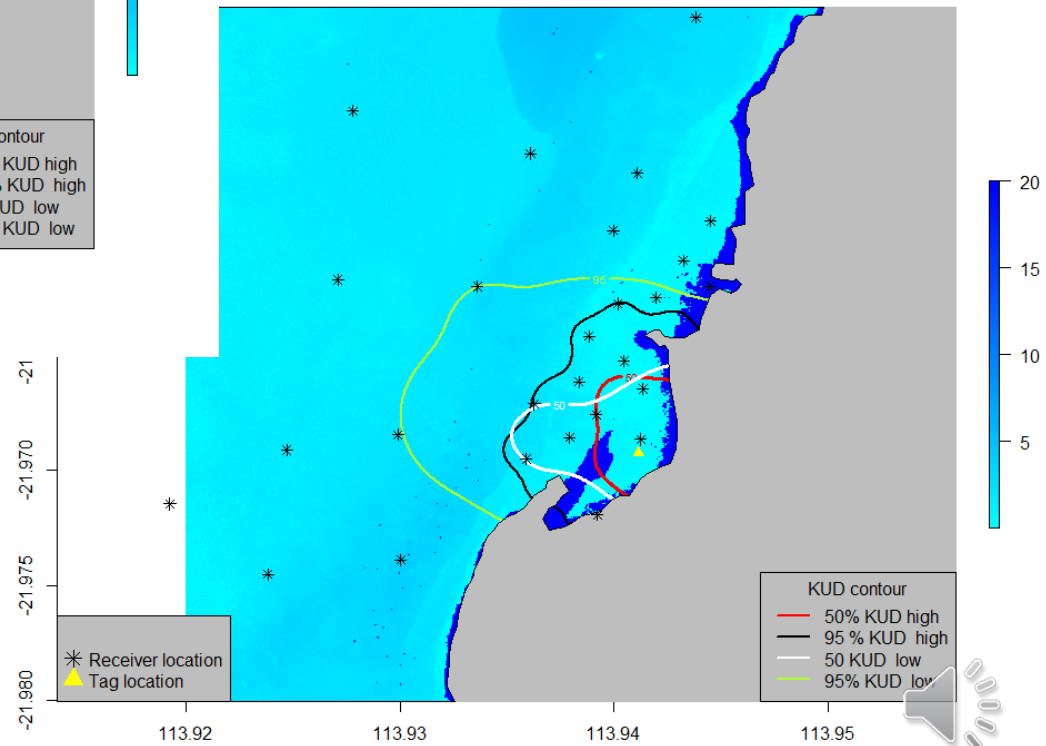
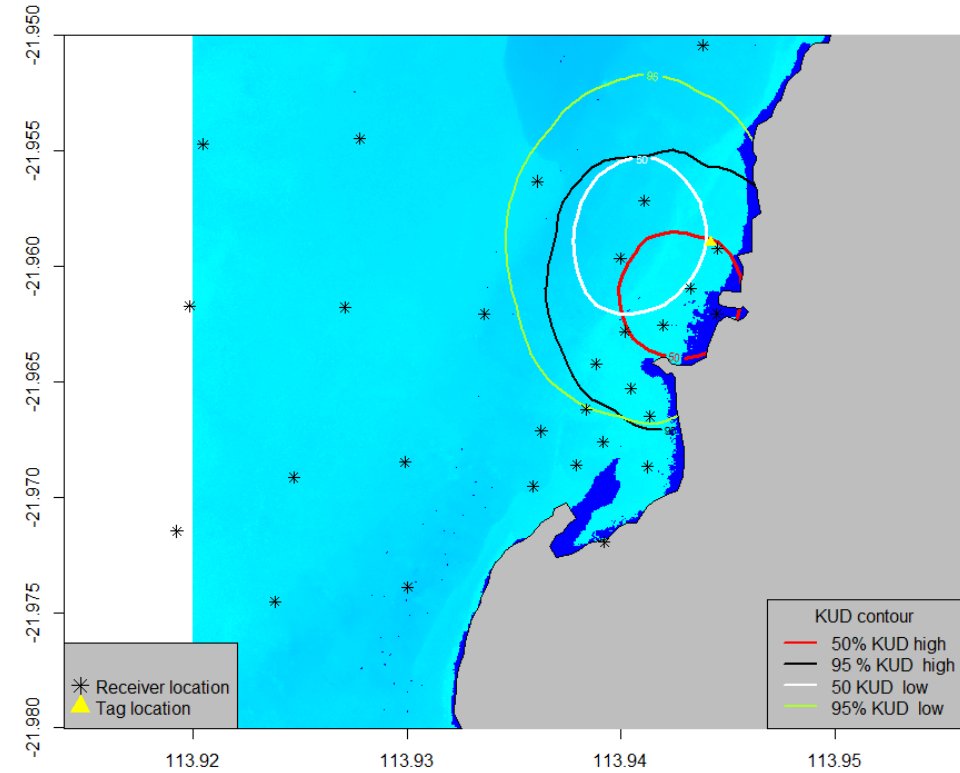
Adults



Results: Average turtle home range size

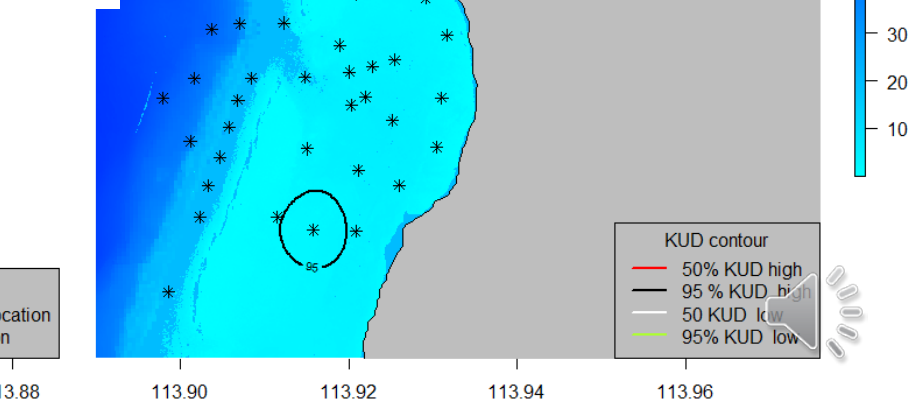
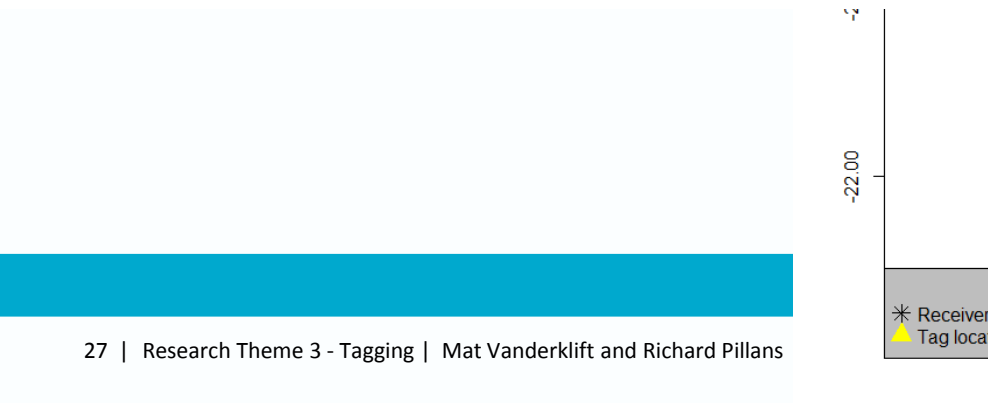
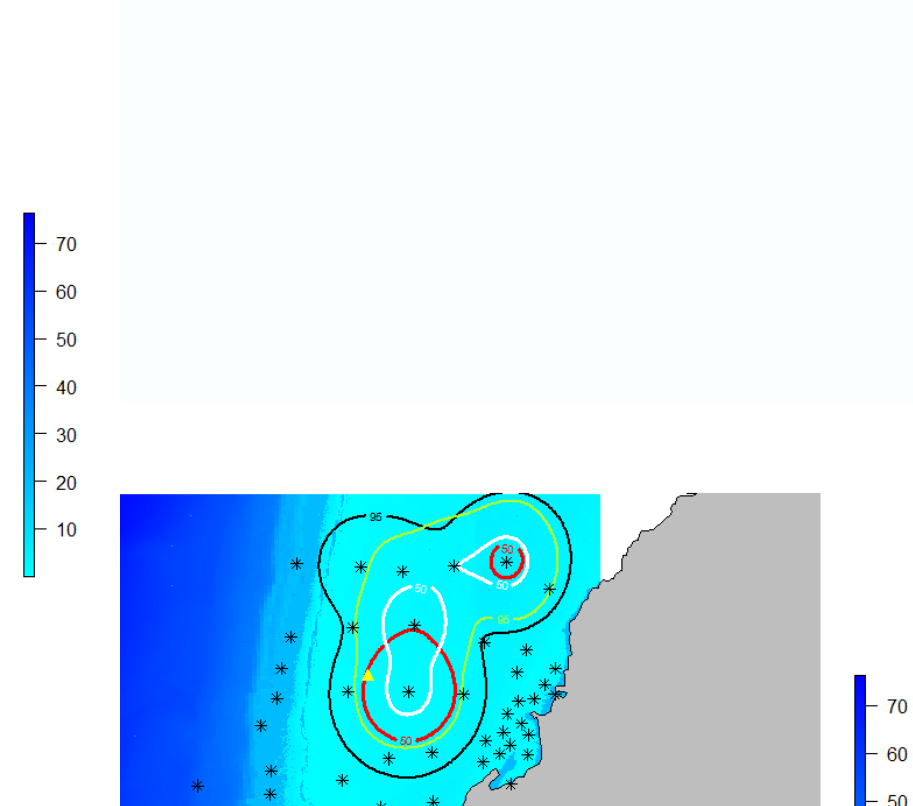
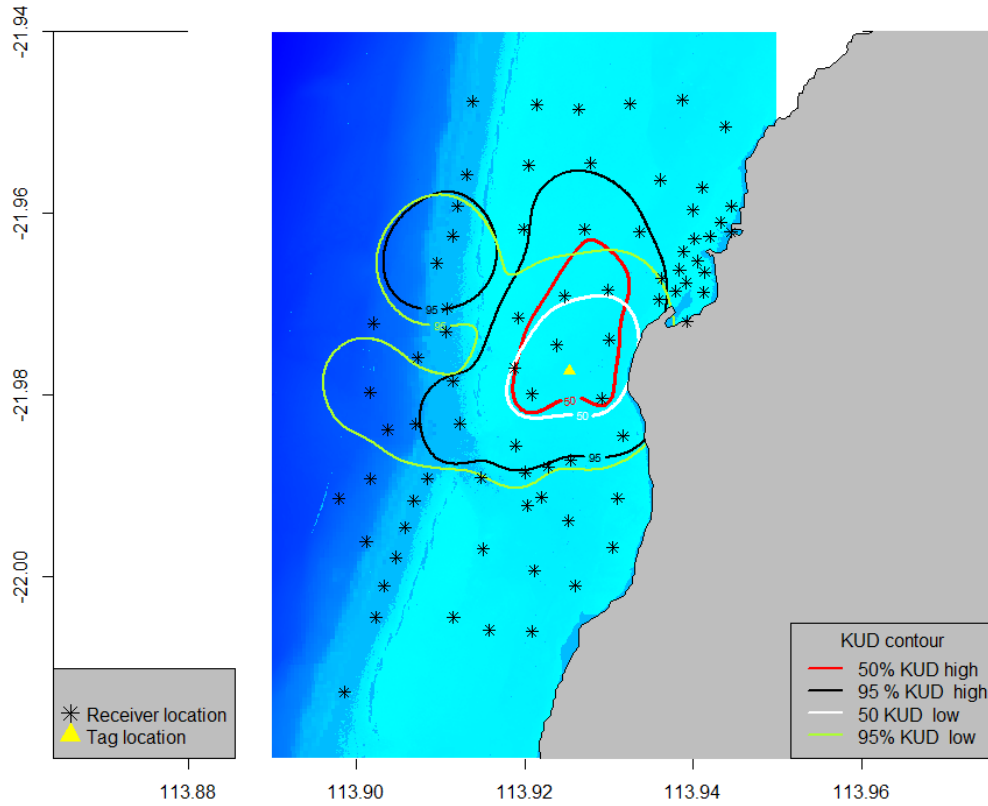


Results: Influence of tide (juveniles)

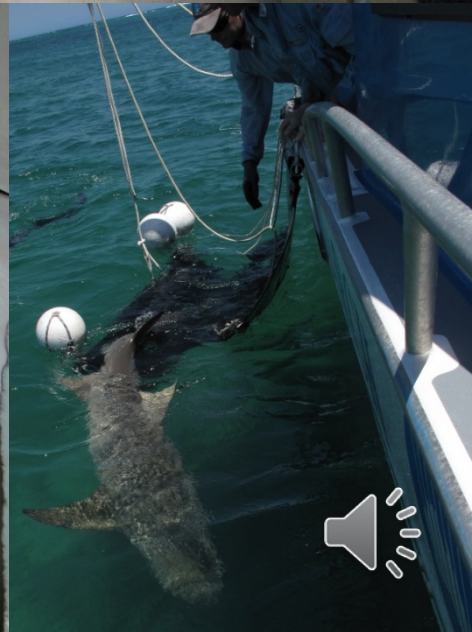


- Closer to shore at high tide

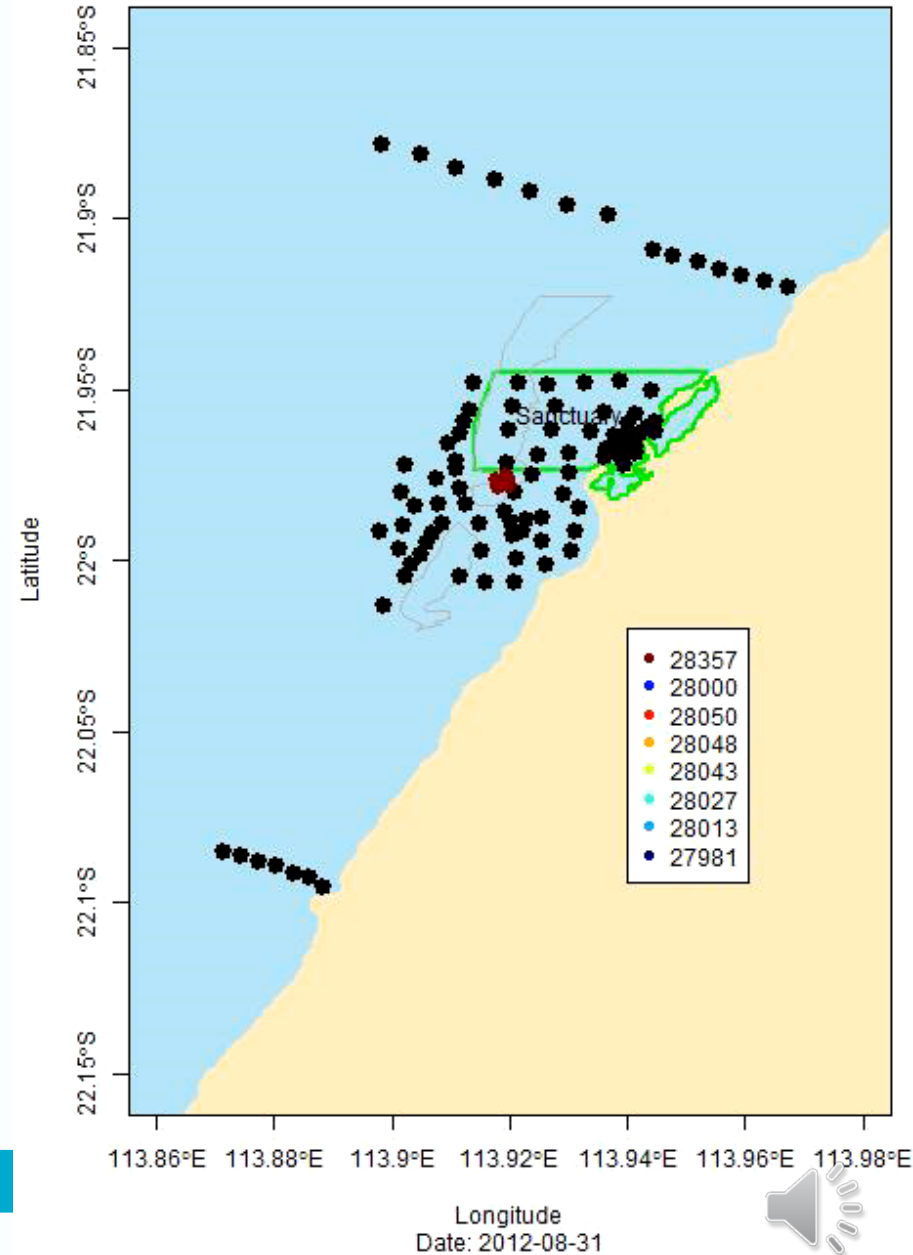
Results: Influence of tide (Adults & Subadults)



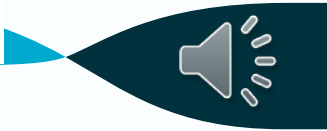
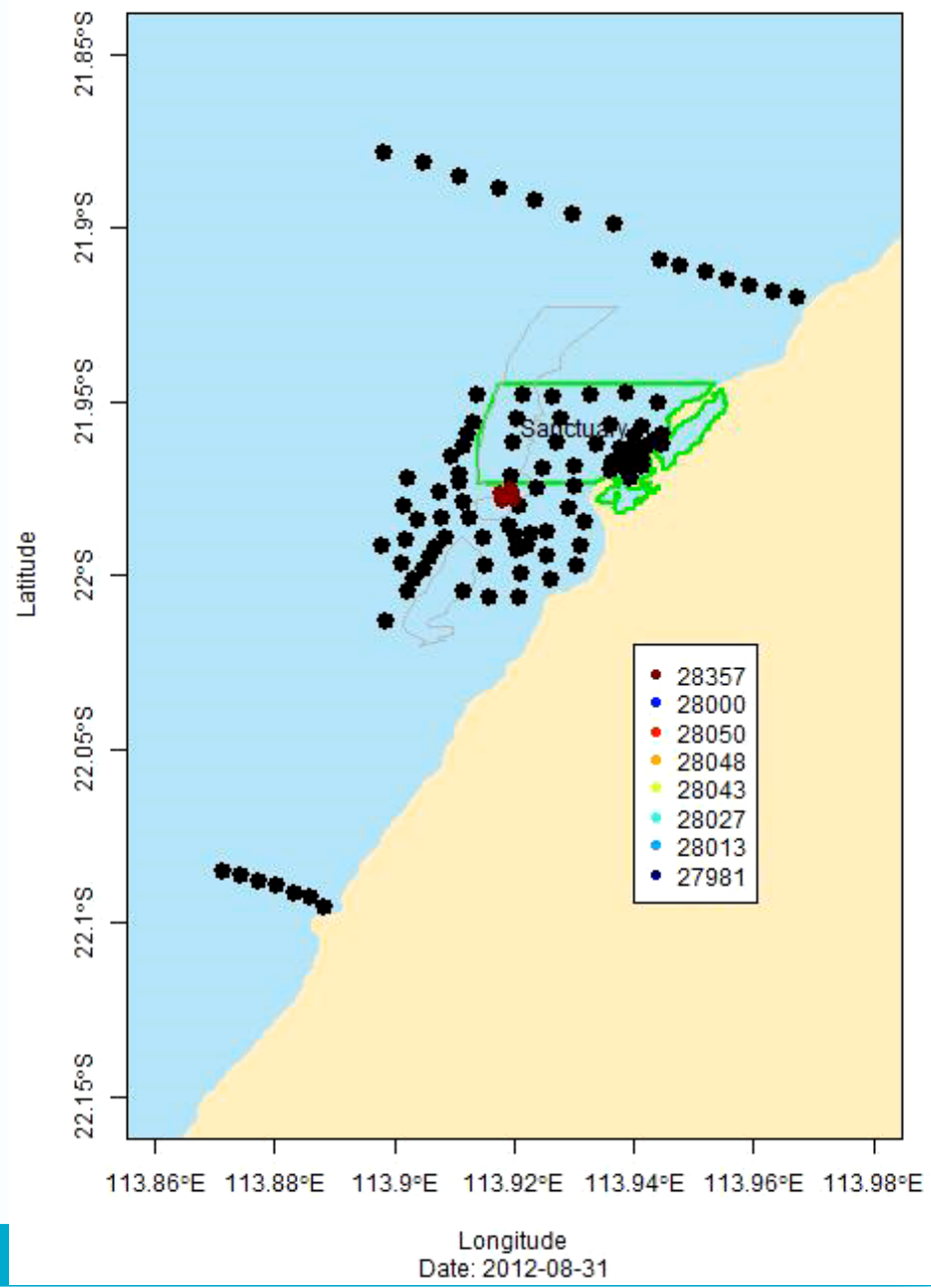
Shark tagging

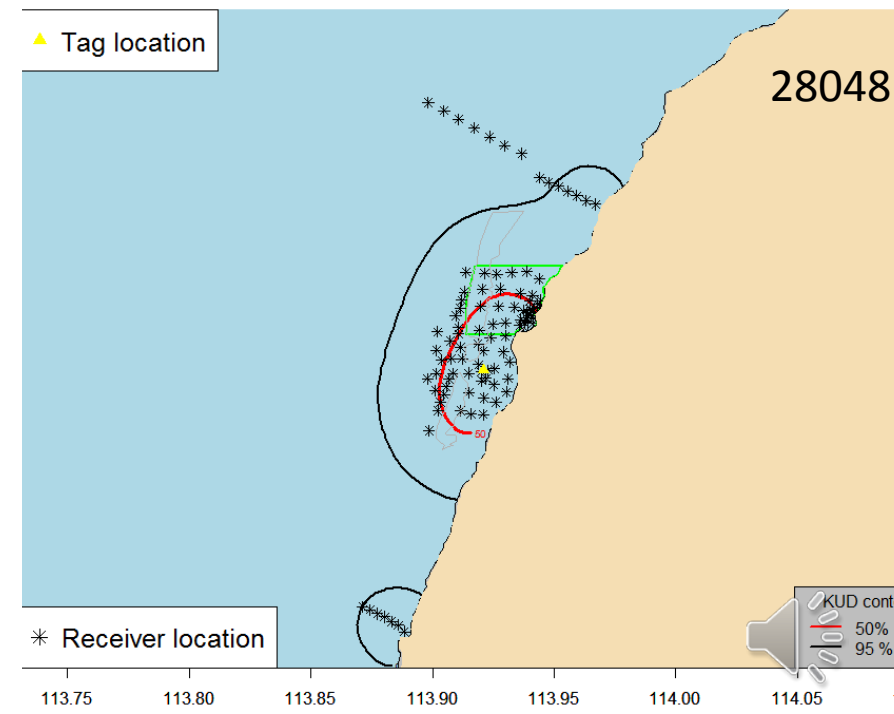
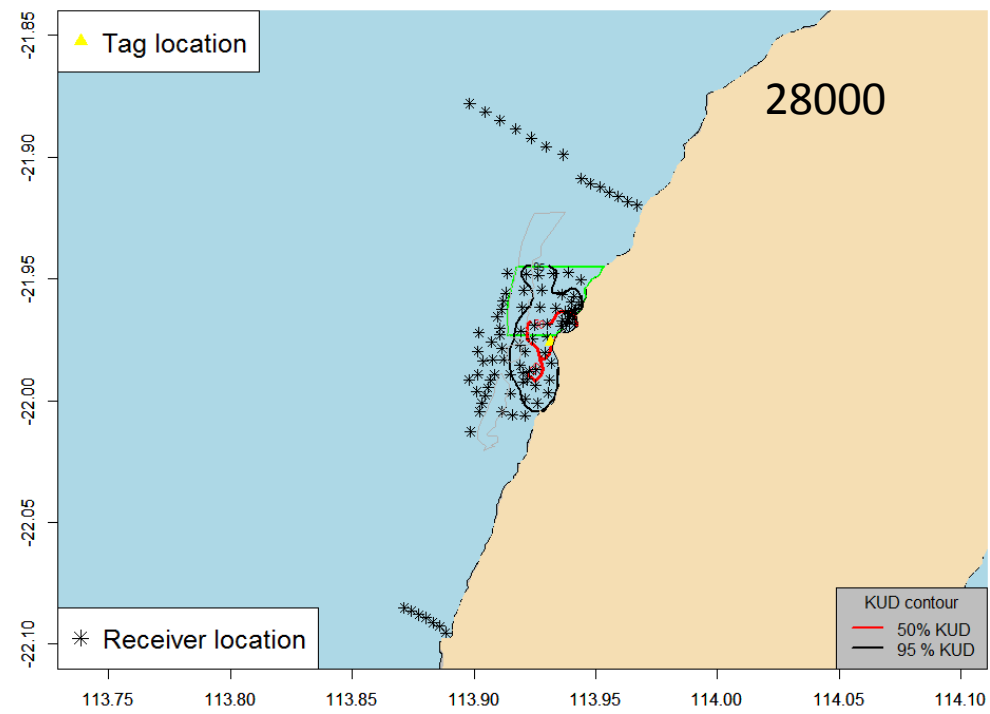
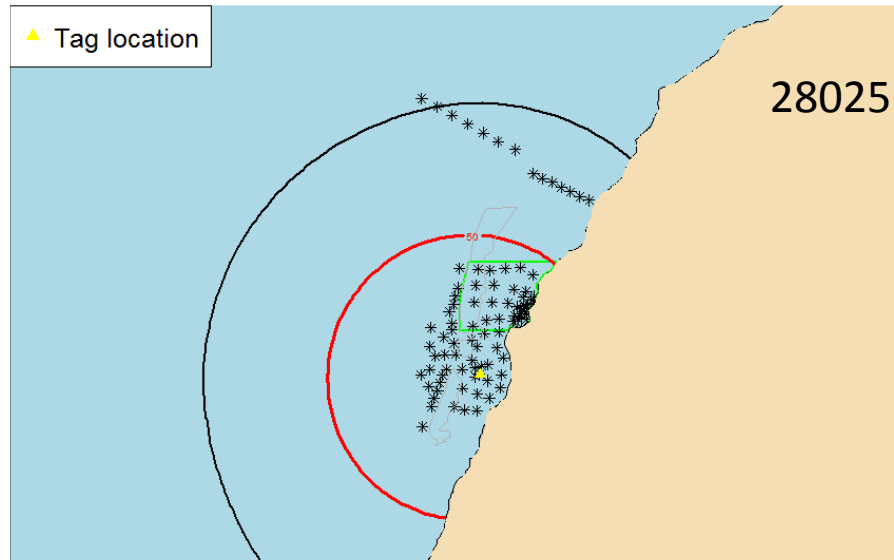
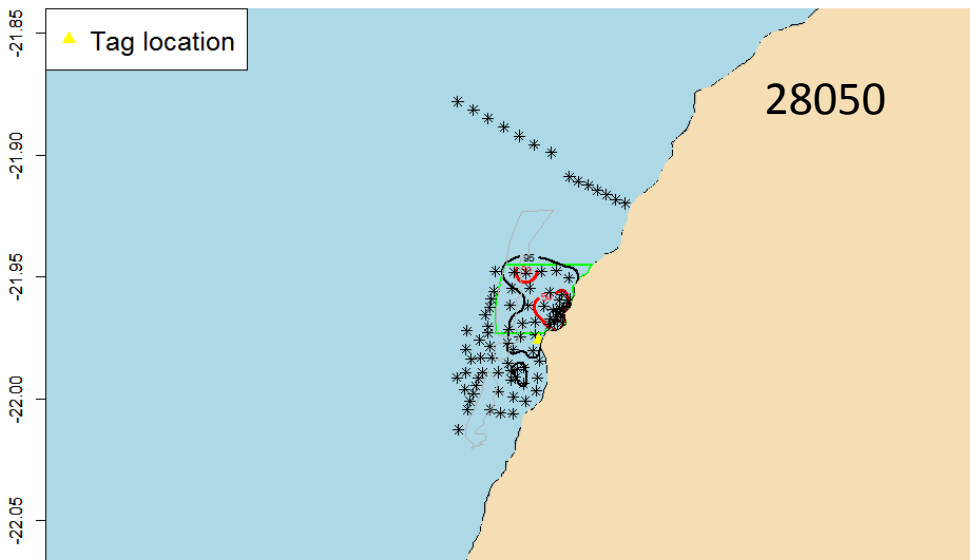


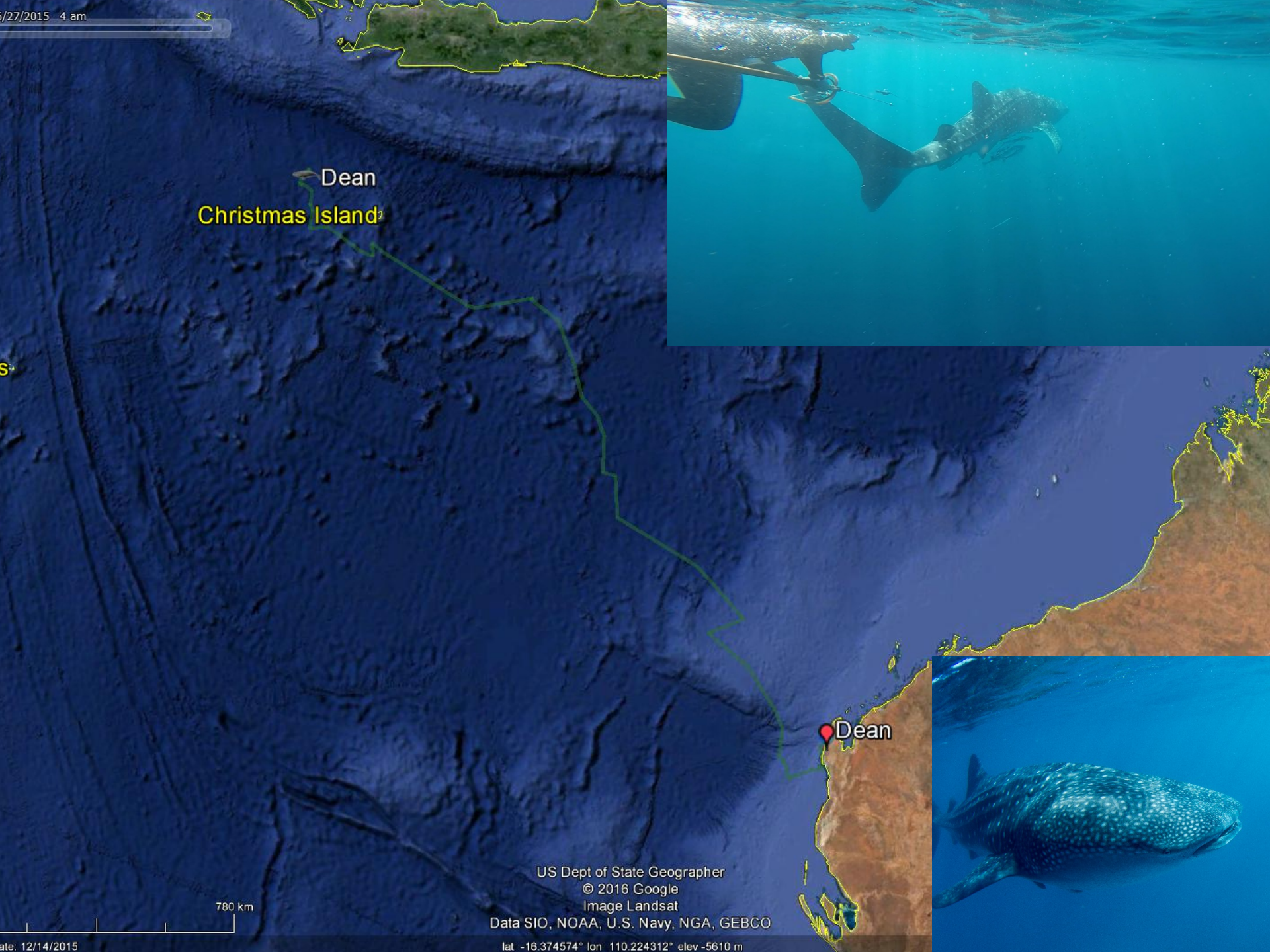
Lemon Shark Movement



Lemon Shark Movement







Dean
Christmas Island

Dean

780 km

2016 and beyond

- Installation of MOTE (satellite receiving station)
- Tag 5 turtles with satellite tags
- Tag additional turtles with acoustic tags to address specific questions
- Tag 10 Whale Sharks with satellite & acoustic tags
- Tag male lemon, grey reef and blacktip reef sharks
- Tag 10 tiger sharks with acoustic tags
- Continued analysis and interpretation of movement data



Acknowledgements

- DPAW Exmouth Office
 - Peter Barnes, Dani Rob, Keely Markovina
- BHP Turtle volunteers
- Cape Conservation Group
- AATAMS
- Northwest Air
- Dwayne George (Bardi Jawi Rangers)



Thank-you



Theme 3 Contacts:

Richard Pillans
Email: Richard.Pillans@csiro.au

Mat Vanderklift
Email: mat.vanderklift@csiro.au



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PhD: Ecology of Turtles in the Ningaloo Coast World Heritage Area

Jessica Stubbs

Supervisors: Dr Nicola Mitchell (UWA), Dr Mat Vanderklift (CSIRO), Dr Sabrina Fossette-Halot (UWA/DPaW)

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About Me

- Interest in marine creatures and ecosystems
- BSc (Hons) - Marine Science and Zoology at UWA
- Volunteering and casual work on a variety of species
 - Manta rays, northern quoll, turtles



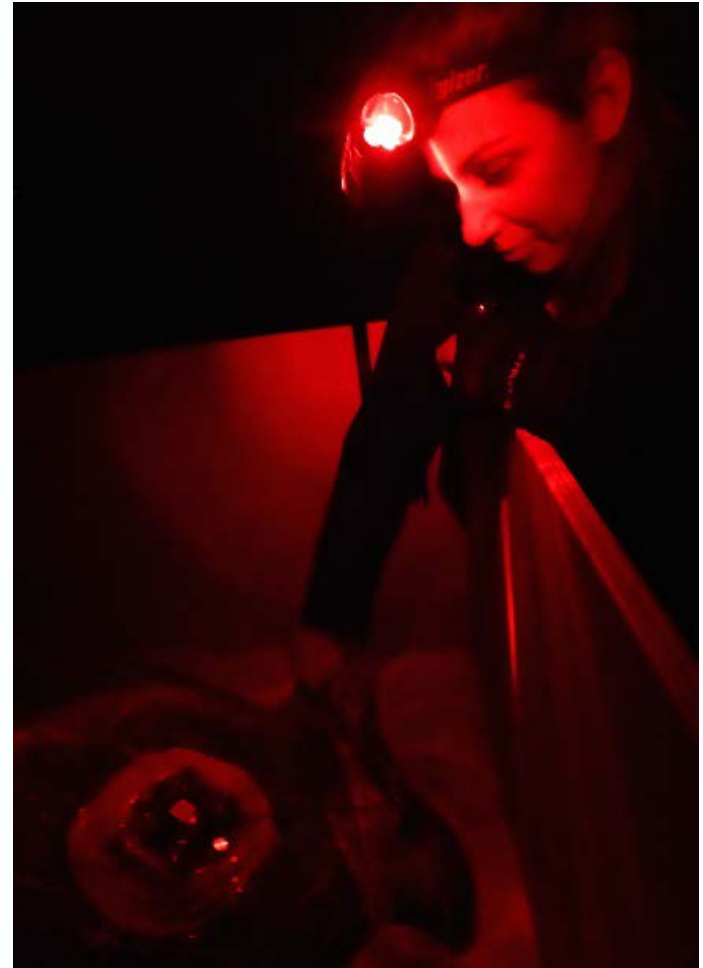
Relevant Experience

- Honours project on flatback turtles at Cape Domett
 - Estimating thermosensitive period
 - Modelling past and future sand temperatures
- Further work on other populations of marine turtles in Western Australia



PhD – Ecology of Ningaloo Turtles

- Foraging Ecology
- What are Ningaloo turtles eating?
- Where are Ningaloo green turtles going?
- What risks do Ningaloo turtles face across their lives and in future scenarios?



CONTACT DETAILS:

Jessica Stubbs
PhD Candidate

Email: jessica.stubbs@research.uwa.edu.au

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