

# From satellites to cells: ecology of green turtles at Ningaloo

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Ningaloo Outlook – A partnership between BHP and CSIRO

#### www.csiro.au



Ningaloo Outlook is a BHP-CSIRO Industry-Science Marine Research Partnership investing A\$5.4 million over five years to gather new knowledge on the Ningaloo reef and its important ecological values



#### Questions

Status and trend

Population demographics

Key feeding and nesting areas

#### **Targeted research**

How many are there?

Where do they spend their time?

What food resources do they rely on?



Management Plan for the

Ningaloo Marine Park and Muiron Islands Marine Management Area

Management Plan No 52

#### **Estimating turtle abundance: drone surveys**



#### **Understanding turtle movement: satellites**





**Great Sandy Desert** 

Western Australia

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# **Resident turtles (n=16)**

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Western Australia



# **Resident turtles**



Western Australia

US Dept of State Geogr Image Landsat / Cope © 2018 Google Data SIO, NOAA, U.S. Navy, N

# Nesting turtles (n=13)

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Western Australia

bluemeo

# Nesting turtles

#### 10 of 13 left Ningaloo WHA



# Nesting females: 2016

**Great Sandy Desert** 

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Western Australia

# Nesting females: 2017-2018

**Great Sandy Desert** 

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Western Australia

# Nesting females: 2019

**Great Sandy Desert** 

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# **Closing the loop**





OUT BHP Probes C3.5-80R60-A16A 10:19:52



ningaloo



2017/09/17

Measuring Result:

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General	Obstetrics	Gynecology	Cardiology	Ongan	Urology
SetDefault	Ing. Save	Ing.Ngmt.	New Case	Body Mark	Report

General

FPS:

# 10-25 October 2018

Image Landsat / Copernicus



## 10 October 2018 – 23 January 2019

Image Landsat / Copernicus





#### 10 October 2018 – 30 January 2019

Image Landsat / Copernicus



#### **10 October 2018 – 22 February2019**

Image Landsat / Copernicus



# Feeding area: one individual, 8 months





# The diet landscape



# The isotope landscape





# The same thing, but with sulphur





# Now with turtles (red blood cell)





#### Variation can be explained by size



# Shifts in diet or area with age





# **Unanticipated benefits**





# The punchlines

- Restricted movement by resident green turtles...
  ... but varies among foraging grounds
- Patterns in nesting green turtles seem to vary among years... ... but few are resident within the Ningaloo WHA (3 of 13)
- 3 of 3 ultrasound-verified incipient nesters moved outside Ningaloo WHA to nest
- Diet changes with size...

... in a way that is consistent with movement into different habitats



# Acknowledgements

- BHP-CSIRO Ningaloo Outlook Marine Research Partnership
- Susie Bedford & Exmouth District High School
- Exmouth community volunteers too numerous to mention
- Peter Barnes, Dani Rob, and many DBCA staff
- The whole Ningaloo Outlook team!

