



# Movement Patterns of Male Loggerhead Sea Turtles (*Caretta caretta*) in the Eastern Indian Ocean



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## Research Questions



- ❖ What is the spatial scale of the areas used by male loggerhead turtles in Shark Bay, Western Australia?
- ❖ Are there seasonal differences in movement patterns?

## Methods

### Satellite Telemetry

#### Quantitative Component

- 9 male loggerhead turtles tracked using Argos system
- Kernel Density Estimation to determine Home Range



### Traditional Knowledge

#### Qualitative Component

- Semi-directed interviews with 6 local Aboriginal fishermen and Aboriginal and non-Aboriginal ecotourism operators.
- Documented knowledge about turtle movement and habitat use.



## Background

- Loggerhead sea turtles are listed as “Endangered” by the IUCN.
- Little is known about the movements of males in the population of loggerhead sea turtles in Shark Bay, Western Australia.
- Understanding movement patterns is vital for endangered species conservation management.



## Predictions

- Male loggerhead turtles will travel north of Shark Bay and exhibit home ranges in the thousands of kilometers squared.
- Male loggerhead turtles will exhibit different movement patterns seasonally.

## Results

#### Quantitative Component

- Turtles have not left the World Heritage Area.
- No seasonal differences have been observed.
- With predicted home ranges in the order of thousands, observed home ranges in the order of hundreds is much smaller than was expected.

#### Qualitative Component

Common themes from interviewees:

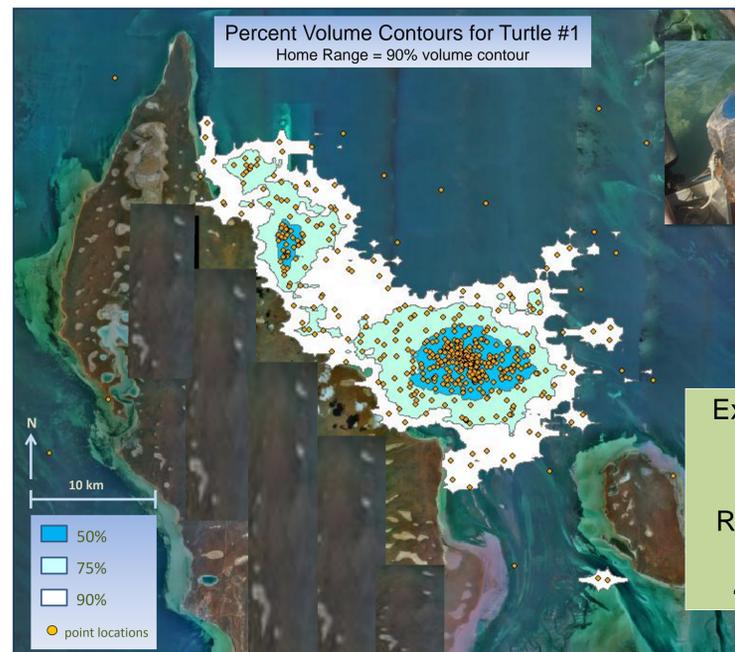
- Loggerhead turtles are resident to small areas.

“you see the same one there every day for twenty years”

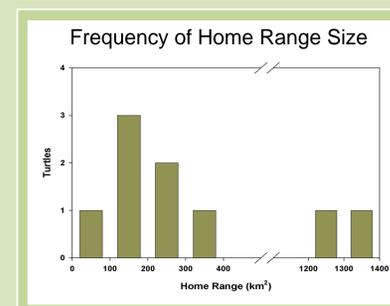
- Loggerheads choose areas for food availability.

Differing responses:

- Whether turtle populations in Shark Bay are stable or declining.
- Main threat facing loggerhead turtles, ranging from ecotourism, to fishing, to climate change.



Expected average home range: 5,000+ km<sup>2</sup>  
Realized average home range : 451 165 km<sup>2</sup>



## Study Site: Shark Bay, Western Australia

- World Heritage Property
- Relatively pristine seagrass community
- Home to the 3<sup>rd</sup> largest breeding population of loggerhead sea turtles in the world (Wirsing *et al.* 2004).
- Research conducted in the eastern gulf.



## Conclusions and Implications

Male loggerheads turtles exhibit smaller than expected home ranges. Locals discussed observing this behavior as well, showing corroboration between scientific findings and traditional ecological knowledge. Shark Bay has been deemed a hot spot for loggerhead turtle conservation. Residence of male loggerheads in Shark Bay suggest localized conservation planning.

