



Estimates of apparent survival probability and abundance for juvenile hawksbill turtles (*Eretmochelys imbricata*) in Fernando de Noronha, Brazil

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*Long-term growth and survival dynamics
of green turtles (Chelonia mydas) at an
isolated tropical archipelago in Brazil*

**Liliana P. Colman, Ana Rita C. Patrício,
Andrew McGowan, Armando
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Cláudio Bellini, et al.**

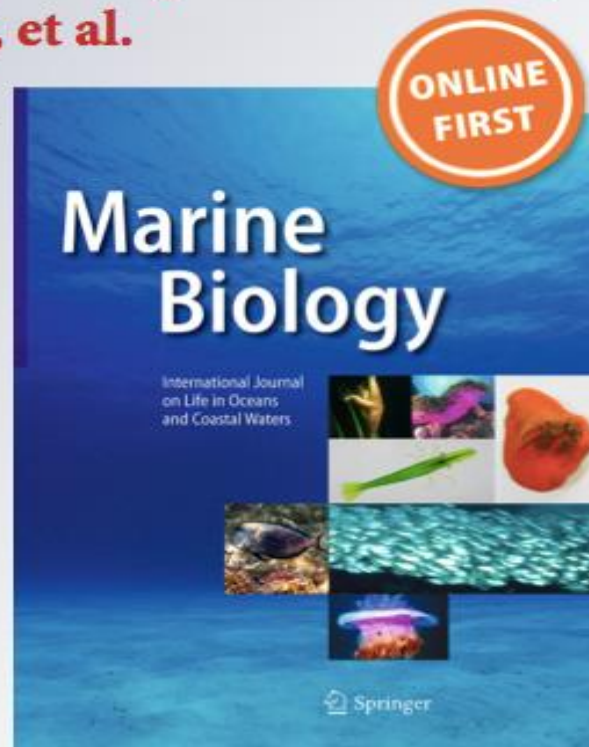
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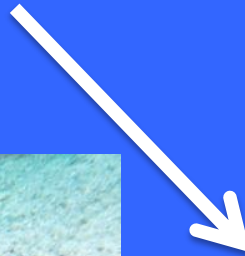


Context

Effective conservation



Demographic parameters such as survival and abundance



sea turtles:
long-term studies

Goals

Better understand the ecology of hawksbill turtles through a long-term tagging program.



Methods

Study area – Fernando de Noronha, Brazil

- World Natural Heritage Site (UNESCO).
- Forage site for hawksbill and green turtles (Sanches and Bellini 1999)
- Protected by Marine National Park
- Long term Capture-Mark-Recapture program (Marcovaldi and Marcovaldi, 1999)



Methods

Database analysis of the tagging program and recapture

Turtles previously:

Captured → snorkelling or scuba diving

Tags applied in both fore flippers

CCL using a flexible plastic tape
(**Marcovaldi and Marcovaldi 1999**)

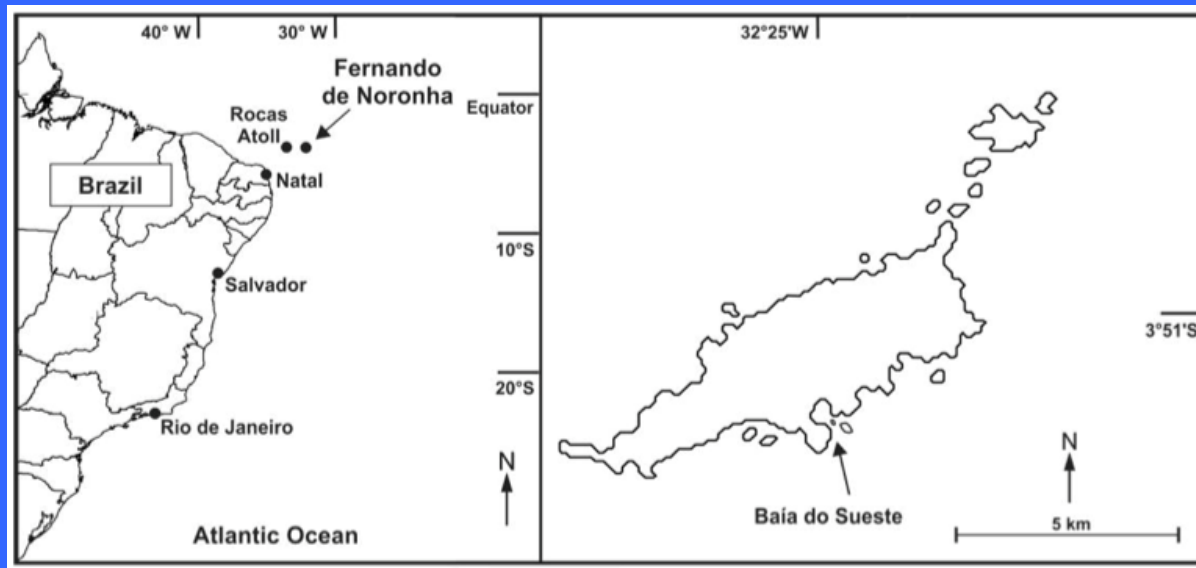


Methods

Dataset:

→ 1987 – 2012

→ The main capture site Sueste Bay



Analysis

Statistical analysis → R Software

Size distribution: function of CCL frequencies

Time of residency: time interval between the first and last captures

Survival: Cormack-Jolly-Seber approach using program MARK



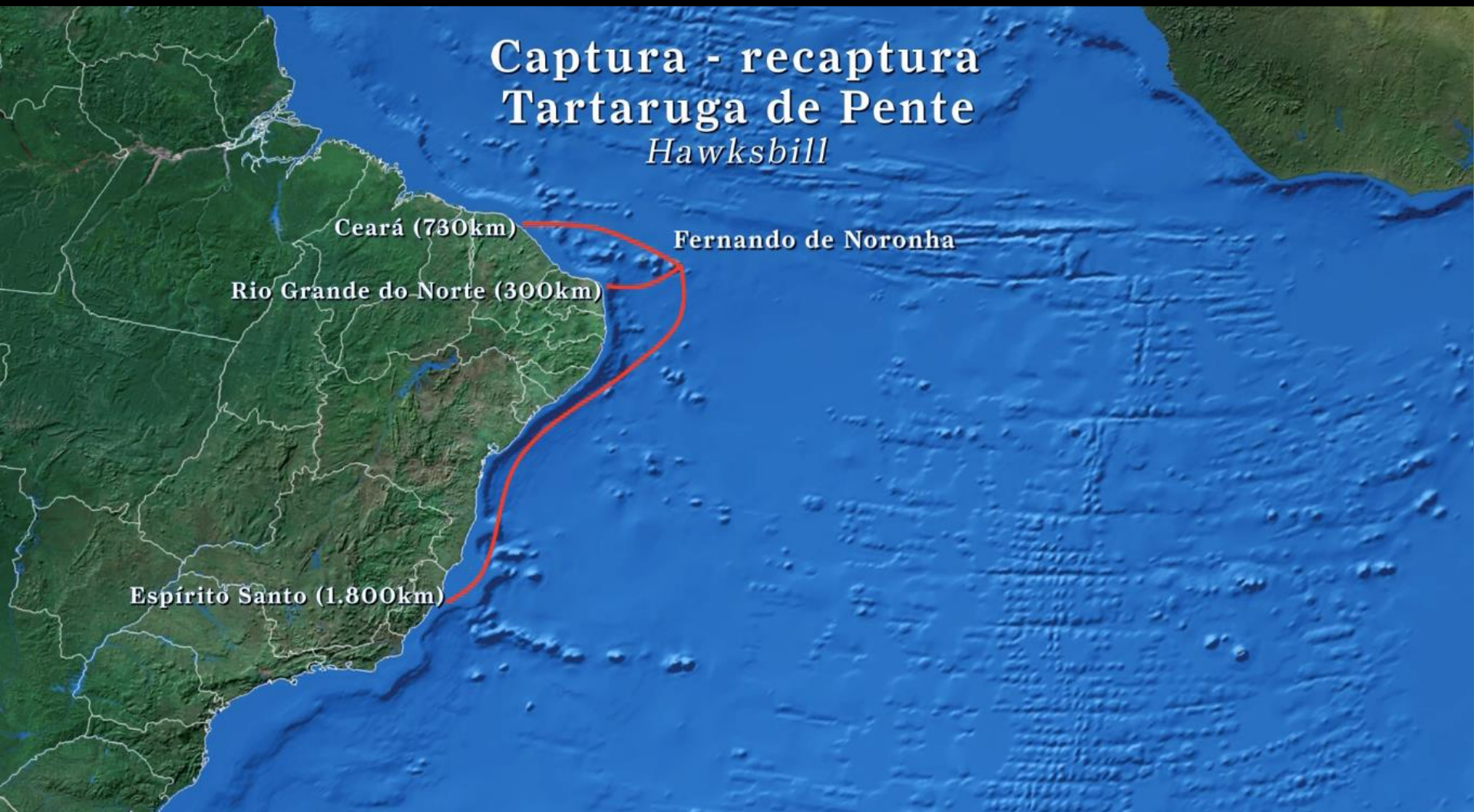
Results

Capture-Mark-Recapture Program:



- 2167 captures
 - 461 individual turtles tagged
 - 220 turtles captured more than once
-
- CCL on first capture ranged of 28 to 84 cm (mean \pm SD = 44.4 \pm 10.0, N = 451)
-
- Time of residency varied from two days to 12.5 years (average 3.8 years; N = 220)

Results



Three recaptures in the main land

Results



Two recaptures in Africa
(Equatorial Guinea and Gabon)

Results

Survival:

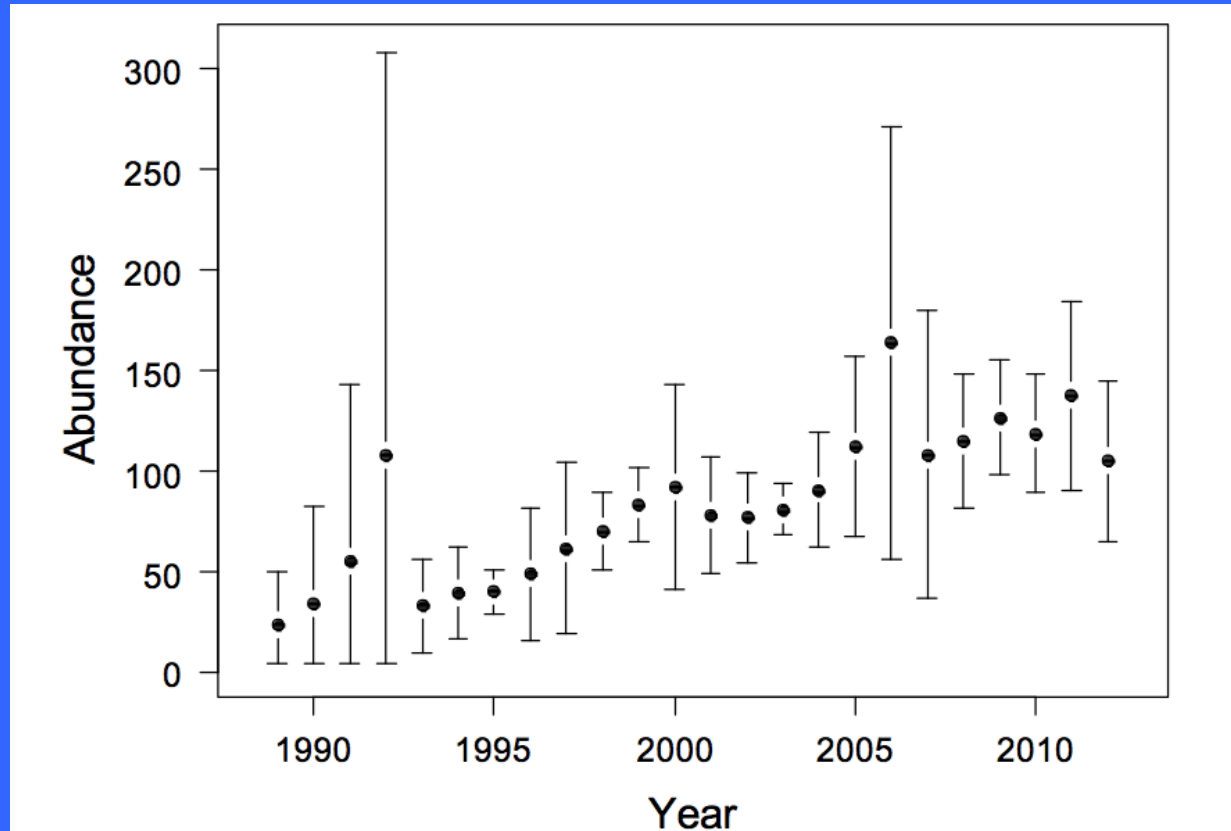
The population of juvenile hawksbills was estimated to have increased in 1989–2012 at around 6.8% per annum (95% CI: 4.8–8.9)

Annual recapture probability with best fit models varied from 0.13 to 0.88 (average 0.54)

Recapture probabilities were used to estimate abundance between 1989 and 2012

Results

Abundance:



The estimated annual abundance in 2010–2012 was in the range of 105–138 turtles

Discussion

- Development area for juveniles ($95\% < 64$ cm CCL)
- Estimates of annual apparent survival probability was relatively high when compared with other juvenile population of sea turtles (Bjorndal et al., 2003)
- Apparent survival probabilities confounds mortality and permanent emigration, being a limitation for real survival probabilities.
- The increasing trend must be interpreted with caution, as the population size is relatively small, suggesting that this population is only part of a bigger population with a wider distribution.

Thank you!



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