New conservation challenges in Brazil: Satellite tracking reveals new foraging grounds for loggerhead turtles.

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Introduction

The northeast state of Bahia, Brazil hosts the largest loggerhead *Caretta caretta* sea turtle rookery in the Southwest Atlantic Ocean where ~ 6300 nests each season are recorded along 214 km of beaches by Projeto TAMAR. This telemetry study started in 2014 in order to expand our knowledge about turtles' post nesting movements and foraging grounds. This work adds to a similar study conducted in 2001 (Marcovaldi et al., 2010).

Material and methods

We deployed 13 satellite tags on loggerhead turtles from 2013/14 to 2014/15 nesting season at Praia do Forte beach. In this study we tracked loggerhead females that arrived early in the nesting season, as opposed to the first study where the turtles tracked were late-nesters. Additionally, two re-migrant turtles, one tracked at 2013/14 season and another tracked in 2014/2015, had new tags installed in 2017 to assess the degree of fidelity to foraging areas.

Location data provided by ARGOS were analyzed using the satellite tracking and analysis tool (STAT) and a geographic information systems software (ArcGis 9.1 ESRI). We calculated fixed kernel home ranges using Hawth´s analysis tools for ArcGis in order to identify turtles' foraging areas.

Results

Ten females migrated to neritic foraging areas located throughout the northeastern and southeastern coast of Brazil (Fig. 1). The post-nesting migration ranged from 225 to 3057 km lasting from 8 to 22 days (see Table 1 for details). There was a variation in the area of the 50% core Kernel Home Rage Estimate (KHRE) of 43 up to 28199 km² (Table 1 and Fig 2 A, B, C, D).

The two turtles that were tracked for the second time showed high-site fidelity to the foraging areas, with great overlapping among the core areas used in 2014 and 2017 (Fig. 2).

Discussion

These results increase our knowledge about the foraging areas used by this population, which were widely distributed along the Brazilian continental shelf from the south to north, which differs from earlier work that identified a foraging area restricted along the northern Brazilian shelf (Marcovaldi et al., 2010). In addition, this highlights the importance of research designs aimed to detect the foraging strategies of a sea turtle nesting population.

Understanding the areas of use of loggerhead turtles is of great importance in determining threats and inform future management actions to protect this species. Integrative studies that combine satellite tracking with stable isotope analysis will be used to determine their differential habitat use.

Table 1. *Caretta caretta* deployment information, tracking period, time of post-nesting migration, speed, foraging ground location, time tracked at foraging ground, 50% KHRE and deep range at foraging ground.

Turtle	Deploy date	Days traked	Posnesting Migration to For. Ground (d)	Distance to for. Groung (km)	Speed (km/h)	Foraging ground location	Residency (d)	Area KHRE 50% core (km²)	Depth Range (m)
T 01	19/10/13	104	8	723	3,8	Bahia	24	85	50 - 600
T 02	22/10/13	444	39	3057	3,3	São Paulo/Paraná	95	28199	50 - 250
T 03	02/11/13	431	20	1204	2,5	Rio Grande do Norte	219	80	25
T 04	07/11/13	324	21	1427	2,8	Rio de Janeiro	110	779	25 - 50
T 05	17/11/14	82	18	1678	3,9	Pernambuco	17	135	25
T 06	27/11/14	292	4	225	2,3	Sergipe	66	43	25 - 500
T 07	28/11/14	149	12	887	3,1	Espírito Santo	57	149	25
T 08	15/12/14	100	33	1503	1,9	Rio Grande do Norte	24	698	25
T 09	24/12/14	192	21	1330	2,6	Rio Grande do Norte	37	69	50 - 250
T 10	22/01/15	209	22	1371	2,6	Rio Grande do Norte	22	131	25 - 550

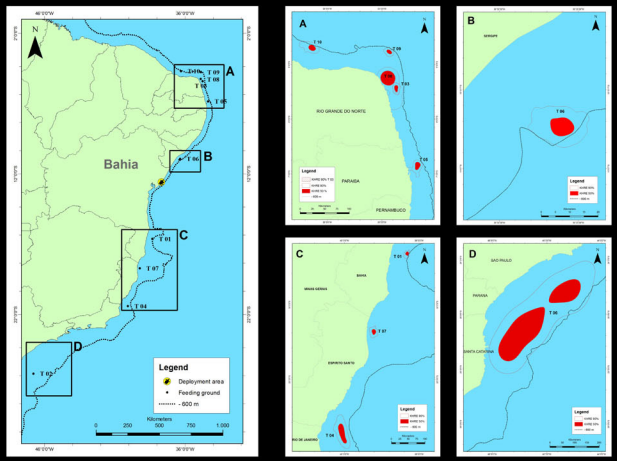

Fig. 1: *Caretta caretta* foraging grounds located along Brazilian coast. See maps A, B, C and D for details of the KHRE 50% and 90 % distributions.

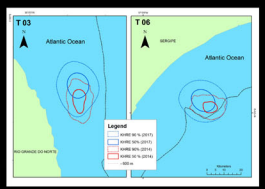

Fig. 2: KRHE 50% in continuous line and KHRE 90% in dotted line. In red density contours from 2014 and in blue density contours from 2017.

Bibliography

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