

## EVIDENCE OF MIGRATORY MOVEMENTS OF OLIVE RIDLEY TURTLES (*Lepidochelys olivacea*) ALONG THE BRAZILIAN COAST

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Sea turtles have a long and complex life cycle involving transoceanic migrations and marked changes in diet and habitat. Juveniles are believed to spend their first few years drifting passively in ocean current systems or on floating sargassum rafts (CARR, 1986; BOLTEN et al., 1998). Advanced juveniles subsequently shift to coastal feeding habitats (CARR, 1987). After reaching sexual maturity, some 20 or 30 years later (FRAZER; EHRHART, 1985; KLINGER; MUSICK, 1995), adults undertake reproductive migrations that range from tens to thousands of kilometers (MEYLAN, 1982; MEYLAN et al., 1983; HUGHES, 1989; LIMPUS et al., 1992). Nesting usually occurs in spring and summer. Tagging data suggest that sea turtles show maternal philopatry to their natal site (BJORNDAL et al., 1983; BOWEN et al., 1993).

Five sea turtle species can be found in Brazil: *Caretta caretta*, *Chelonia mydas*, *Eretmochelys imbricata*, and *Lepidochelys olivacea* of the Cheloniidae family, and *Dermochelys coriacea* of the Dermochelyidae family (MARCOVALDI; MARCOVALDI, 1999). *L. olivacea* (Eschscholtz 1829), known as olive ridley turtle, shows a great concentration of nests in Sergipe and northern Bahia states, on the north-eastern Brazilian coast (DA SILVA et al., 2007). Also, based on incidental catch by the Brazilian pelagic longline fishery, Sales et al. (2008) have suggested that the offshore waters of the north-eastern Brazilian coast are a preferential habitat for olive ridley turtles. Under the International Union for Conservation of Nature criteria, this species is currently considered endangered (IUCN Red List of Threatened Species, available at <<http://www.iucnredlist.org/>>, December 2009). In addition, *L. olivacea* is listed in Appendix I of the Convention on International Trade in Endangered Species of Fauna and Flora (available at

<<http://www.cites.org/eng/app/appendices.shtml>>, December 2009).

Here we discuss the possible existence of a translocation pattern of olive ridleys along the Brazilian coast based on reports of specimens stranded along the central-north coast of Rio de Janeiro state since 2005. These reports include an olive ridley tagged by the TAMAR Project in Sergipe and found by our research group in Quissamã, northern Rio de Janeiro state.

Since 2005, GEMM-Lagos / Oceanites staff has been regularly monitoring beaches along the central-north coast of Rio de Janeiro state, from Saquarema (22°55'12''S - 42°30'37''W) to Quissamã (22°06'24''S - 41°28'20''W), recovering stranded marine mammals, sea turtles and wrecked seabirds. Monitoring is conducted by a car driven along the sandy beaches (at a speed of 20 km/h) at intervals of 20 days. When carcasses of sea turtles are found, species are identified based on morphological characteristics in accordance with the international standards described in Pritchard and Mortimer (1999). Curved carapace length (CCL) and width (CCW) are measured for individuals with complete carapace, as described in Reis et al. (2009). Maximum skull length (MSL) and width (MSW) are also measured. MSL is measured from the posterior tip of the supraoccipital crest to the anterior-most part of the head, and MSW, at the widest part of the head with the calipers perpendicular to the long axis of the skull (WYNEKEN, 2001). Specimens were categorized as juveniles or adults based on these measurements (see Márquez 1990 and TAMAR 2005 for reference values). Flippers were checked for tags, and the presence of tumor-like nodules reported, as well as signs of fishery interactions.

Of a total of 168 sea turtle carcasses recovered between August 2005 and November 2009, 23 specimens (13.7%) were *L. olivacea* (Fig. 1). Of

these, 17 (73.9%) were adults, and just one (4.4%) was a juvenile. Five individuals (21.7%) could not be classified due to the lack of complete skull or carapace. CCL and CCW, respectively, ranged from 33 to 72 cm with a mean of 54.4 cm, and from 31 to 72 cm with a mean of 60.7 cm. MSL and MSW, respectively, ranged from 14 to 18.5 cm with a mean of 16 cm, and from 9.7 to 12.5 cm with a mean of 10.8 cm. Occurrences of stranded olive ridleys do not present any tendency along the year (Fig. 2).

One of these records concerned a tagged olive ridley found in Barra do Furado, Quissamã, Rio de Janeiro (22°05'47''S - 41°08'13''W; Fig. 1) on 17

April 2009 (see Fig. 3). It had CCL of 71 cm, CCW of 72 cm, MSL of 18.5 cm and MSW of 12.5 cm. It was found in an advanced state of decomposition, but did not show papilomas or any obvious by-catch signs. This specimen was a female tagged on the front flippers by the TAMAR Project (tag numbers 59319/29320) in Pirambu, Sergipe (10°44'22''S - 36°51'11''W; Fig. 1) on 29 October 2008, during the 2008-2009 nesting season (Jaqueline Comin de Castilhos, TAMAR-ICMBio/Sergipe, April 2009, personal communication). That means that this specimen had traveled at least 1,300 kilometers (820 miles) in the previous six months (see Fig. 1).

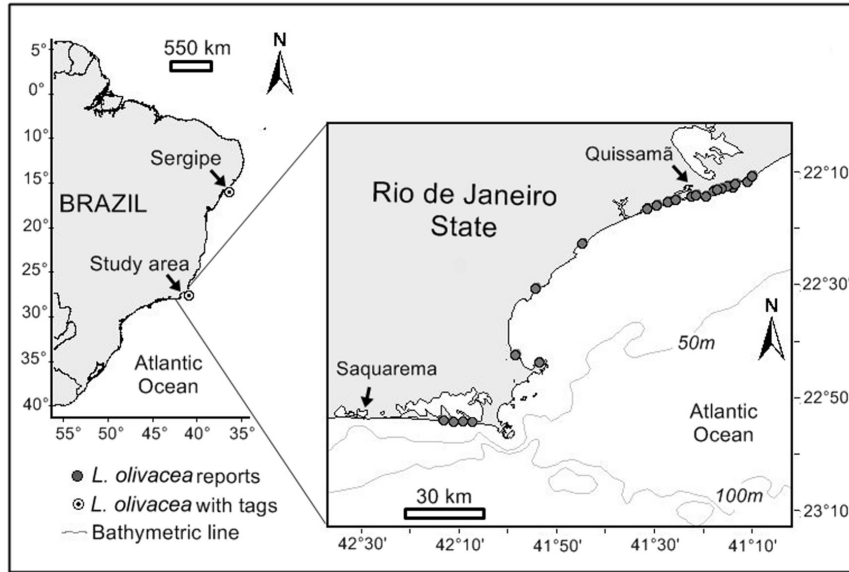


Fig. 1. Compiled records of olive ridleys (*Lepidochelys olivacea*) stranded along the coast of Rio de Janeiro state from August 2005 to November 2009, and sites where the tagged olive ridley had previously been marked (Pirambu, Sergipe) and where its carcass has been found (Quissamã, Rio de Janeiro).

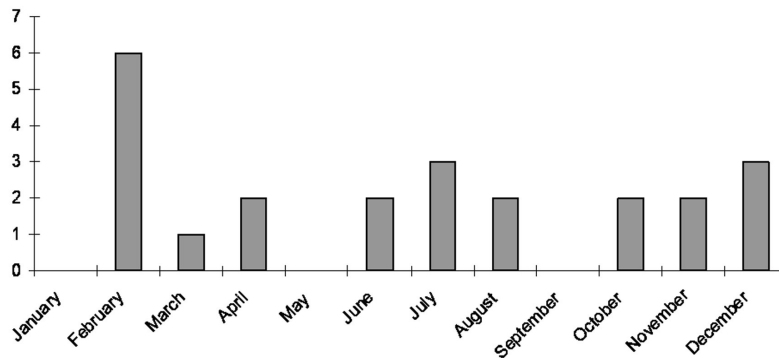


Fig. 2. Number of stranded olive ridleys (*Lepidochelys olivacea*) recovered per month along the coast of Rio de Janeiro state from August 2005 to November 2009.



Fig. 3. Olive ridley (*Lepidochelys olivacea*) carcass found in Quissamã, Rio de Janeiro state, on 17 April 2009. In detail, one of the tags on the front flippers may be seen. Photo by Luciano M. Lima.

Although olive ridley turtles are less abundant along the Brazilian southeast coast (DA SILVA et al., 2007; SALES et al., 2008), they are commonly found stranded along the coast of Rio de Janeiro state (REIS et al., 2009). These facts, together with the present report, have led us to believe that *L. olivacea* could be regularly migrating to the north-eastern coast of Rio de Janeiro state, probably using this area as a feeding ground since the northeasterly winds prevailing during the spring-summer generate coastal upwelling (COSTA; FERNANDES, 1993; VALENTIN, 2001). Upwelling areas are often important as sea turtle feeding grounds (POLOVINA et al., 2004; JAMES et al., 2005; AMOROCHO; REINA, 2007). Also, the input of organic matter from the Paraíba do Sul River (21°36'57''S - 41°00'50''W) could contribute to make the north-eastern coast of Rio de Janeiro state an important foraging ground for sea turtles.

Olive ridley turtles could be migrating to more southern feeding areas. Data on recaptures of tagged sea turtles compiled by the TAMAR Project (available at <http://www.tamar.org.br/download/mapa.htm>, December 2009) show the existence of a female marked in Sergipe and recaptured in Santa Catarina state. Marcovaldi and Chaloupka (2007) suggested that some of the main foraging grounds for Brazilian loggerheads are located in southern Brazilian waters and that mature females then migrate seasonally northward to nesting grounds. As loggerheads and olive ridleys have the same preference for food

resources (BJORNDAL, 1996), the southern Brazilian waters could also be an important feeding ground for this species. In fact, Pinedo and Polacheck (2004), analyzing a total of 12,870 hooks on 41 pelagic longlines set off southern Brazil; have registered 10.53% of *L. olivacea* by-catches. Those previous observations could either explain the reports of the tagged *L. olivacea* females in Quissamã (present study) and in Santa Catarina (data from the TAMAR Project).

Olive ridleys have been recorded making extended post-nesting migrations in India (PANDAV; CHOUDHURY, 1998) and in the eastern Pacific (PLOTKIN et al., 1996). Whiting et al. (2007) have studied migration routes and foraging behavior of olive ridleys in northern Australia through satellite tracking. Their results indicated that, once nesting was completed for the season, all turtles traveled between 180 and 1,050 km to different foraging areas and used habitats on the coast, as well as on the continental shelf and slope. They also showed that several turtles may have foraged during their migration before they reached their foraging grounds.

Taking this into account and considering the presence of olive ridleys in the area, we suggest that this species might be using the north-eastern coast of Rio de Janeiro state for feeding purposes or as part of its route to more southern foraging zones. Information on all the steps of its lifecycle is essential for the effective management of this endangered species, including the use of inter-nesting habitats, migration routes and foraging areas. We expect that genetic

analysis and telemetry will help us in the future to elucidate the origin (nesting areas) and migratory patterns of *L. olivacea* along the Brazilian coast.

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