

Conservation of sea turtles in Brazil: encouraging results obtained on nesting beaches

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Sea turtles are slow-maturing animals, requiring many years, in some cases three decades or possibly more, to reach reproductive age. This delayed reproduction affects the time scale for conservation, and consequently a relatively long period is generally necessary to assess the effects of conservation actions on sea turtle populations. Despite this comparatively extended time scale, some conservation programs around the world have already produced sufficiently long data time-series that indicate noteworthy increases in sea turtle nesting populations (Hays 2004).

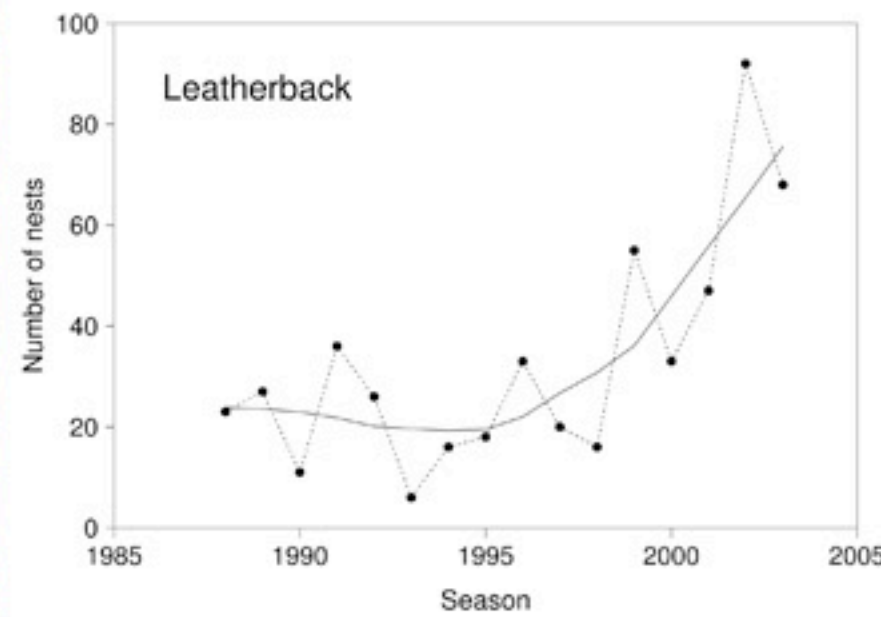
Here we present a compilation of data, including material published in 2007, revealing positive results of conservation actions carried out on nesting beaches in Brazil by the Projeto TAMAR, the national marine turtle conservation program. The results presented here stem from TAMAR's efforts carried out since 1982, with the support of the Brazilian society, in long-term partnership with the national government, a non-governmental organization, the private sector and local communities. To promote the protection of sea turtles along the coast, it was essential to incorporate human and social issues into all of the conservation initiatives. We believe that these results are significant not only for Brazil, but also internationally.

All sea turtle species found in Brazil (the four species discussed here, as well as the green turtle, *Chelonia mydas*) are included in the Brazilian government's official list of endangered species. All life history stages, including eggs and hatchlings, have been fully protected by law in Brazil since 1986. At present, sea turtle egg poaching in Brazil has been reduced to very low levels, and there is no subsistence hunting for sea turtles of any species. However, despite the encouraging results presented here, many threats still endanger sea turtles in Brazil. Therefore it remains necessary to continuously maintain and adapt a range of conservation actions to address ever-changing realities. Some of the main current challenges to sea turtle conservation in Brazil are: the alteration of the nesting habitat due to human activities, including the building of hotels and residences; the construction of ports and industrial installations close to the coastline and the subsequent marine pollution; and the incidental capture of sea turtles in coastal and high seas fisheries operating in national and international waters of the South Atlantic. It should be noted that the conservation of sea turtle populations is often not just a matter of local efforts, but also calls for international collaboration.



Leatherback (*Dermochelys coriacea*)

The only area in Brazil where there is known ongoing leatherback nesting is the northern coast of the state of Espírito Santo, around 19°S latitude. Between 1988/1989 and 2003/2004 the annual number of nests varied from 6 (in 1993/1994) to 92 (in 2002/2003). Between 1995/1996 and 2003/2004, the annual number of nests increased about 20.4% per year on average.

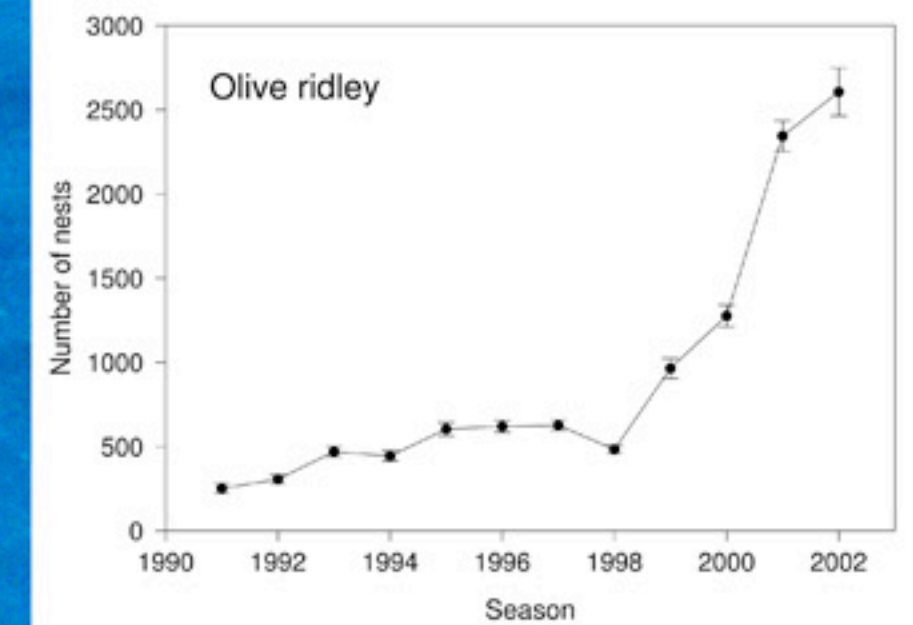


Number of leatherback nests per season, in the state of Espírito Santo, Brazil, from 1988/1989 to 2003/2004 (n = 527). The first year of each season is shown on the horizontal axis, e.g., 1995 = 1995/1996. The dots show the actual data; the solid curve, a loess regression, indicates the trend in the number of nests.

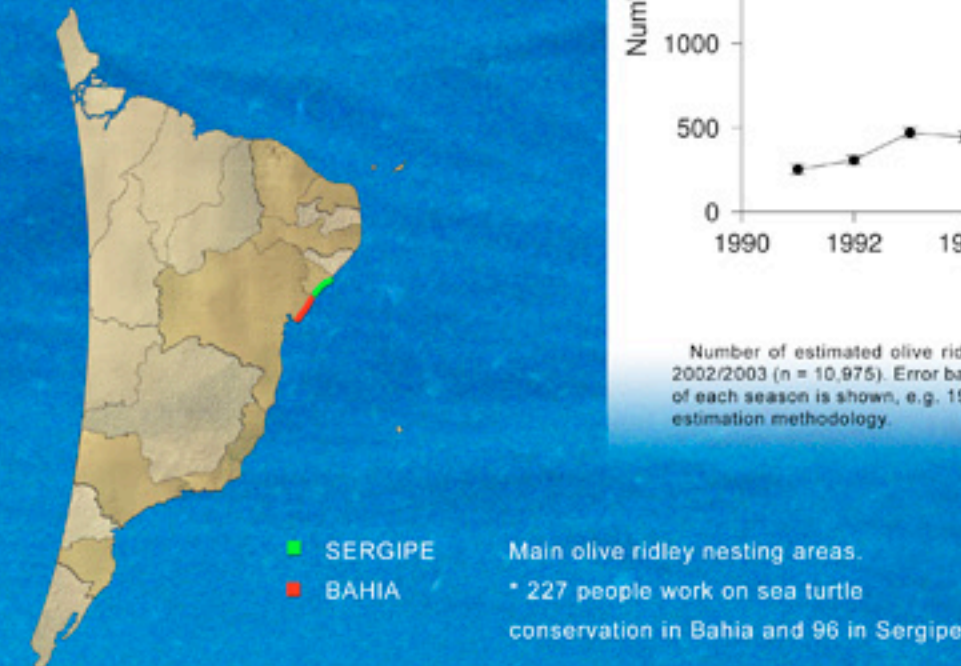


Olive ridley (*Lepidochelys olivacea*)

In Brazil, olive ridley nesting occurs almost completely in the state of Sergipe and the northern section of the state of Bahia. The estimated number of olive ridley nests in this region ranged from 252 in 1991/1992 to 2,606 in 2002/2003, an approximately 10-fold increase in 11 years (Da Silva et al. 2007). This increase is of local as well as regional significance.



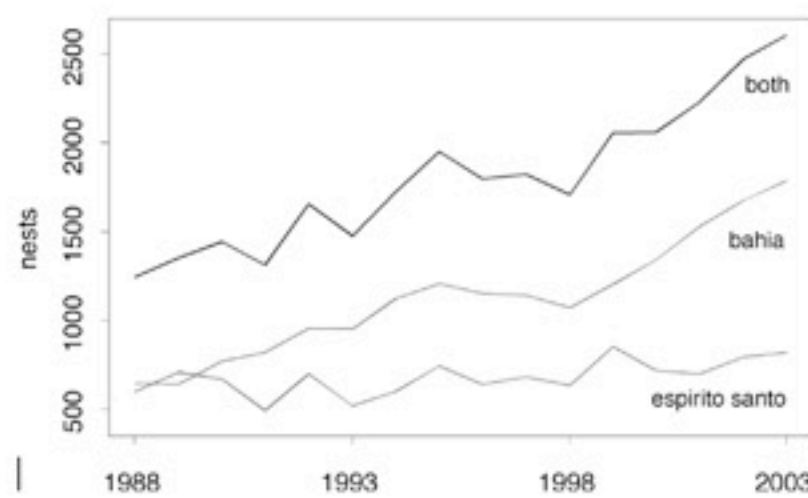
Number of estimated olive ridley nests in the states of Sergipe and Bahia, 1991/1992 to 2002/2003 (n = 10,975). Error bars indicate 95% pointwise confidence intervals. The first year of each season is shown, e.g., 1992 = 1992/1993. See Da Silva et al. (2007) for details on the estimation methodology.



Loggerhead (*Caretta caretta*)

The loggerhead is the species most commonly found nesting along mainland Brazil. Loggerheads nest from the state of Sergipe to the northern part of the state of Rio de Janeiro. Marcovaldi and Chaloupka (2007) presented data obtained between 1988/1989 and 2003/2004 for two of the main loggerhead nesting areas: Espírito Santo and northern Bahia. These two states account for about 75% of the loggerhead nests in Brazil.

In Bahia, the number of nests increased from approximately 700 in 1988/1989 to approximately 1,700 in 2003/2004, a 2.4-fold increase. In Espírito Santo, the number of nests increased at a slower pace, from about 650 in 1988/1989 to approximately 800 in 2003/2004.



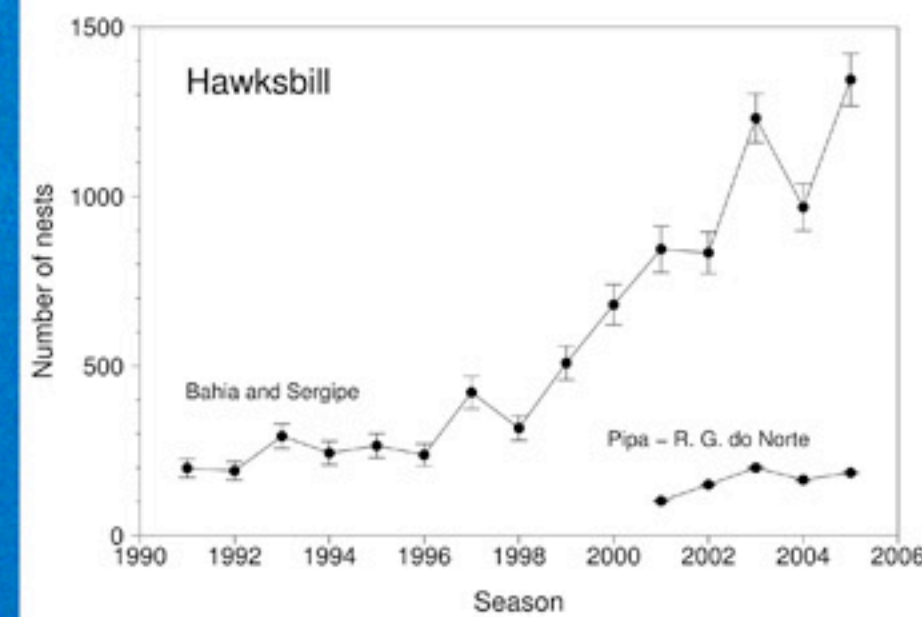
Estimated annual number of loggerhead nests in the states of Bahia and Espírito Santo between 1988/1989 and 2003/2004 (Marcovaldi and Chaloupka 2007).



Hawksbill (*Eretmochelys imbricata*)

In Brazil, hawksbills nest mainly on the northern coast of the state of Bahia and in the neighboring state of Sergipe (Fig. 1). Another important area has recently been recognized in the eastern part of the state of Rio Grande do Norte (Fig. 1). There are also other relatively minor hawksbill nesting sites in the country (see Marcovaldi et al. 2007).

In northern Bahia and Sergipe, the estimated number of hawksbill nests laid each year increased from 199 in the 1991/1992 season to 1,345 in the 2005/2006 season, a nearly 7-fold increase. In Rio Grande do Norte, the estimated number of nests laid in the 2005/2006 season was in the range of 185-475 (see Marcovaldi et al. 2007 for methodological details). Adding these results, we estimate that the number of hawksbill nests laid at the two main Brazilian nesting grounds in 2005/2006 was between 1,530 and 1,820. These results place the Brazilian hawksbill nesting population among the largest populations in the Western Atlantic.



Estimated number of hawksbill nests by season. Upper curve: estimated number of nests in the states of Bahia and Sergipe, 1991/1992 to 2005/2006 (n = 8,582). Lower curve: estimated number of nests in the region of Pipa, Rio Grande do Norte, 2001/2001 to 2005/2006 (n = 802). The first year of each season is shown, e.g., 1992 = 1992/1993. Error bars indicate 95% pointwise confidence intervals (note that the error bars for Pipa are very close to the estimated points). See Marcovaldi et al. 2007 for details on the estimation methodology.



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