

## PROJECT PROFILE:

### Projeto Tamar's Station in Florianópolis, State of Santa Catarina, Southern Brazil

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Projeto Tamar-ICMBio (Tamar), the Brazilian sea turtle conservation program, has been operating since 1982, first in nesting areas and later extending its activities to coastal foraging areas with high levels of incidental captures of sea turtles by artisanal fisheries. Tamar has also maintained a range of activities related to the incidental capture of sea turtles by open sea fisheries (Marcovaldi & Marcovaldi 1999; Marcovaldi *et al.* 2006).

In April 2005, a new Tamar station (27°34'19"S, 48°25'41"W) was inaugurated on Barra da Lagoa Beach (Praia da Barra da Lagoa), in Florianópolis, the capital of the state of Santa Catarina, in southern Brazil. The Santa Catarina coast is a foraging area for sea turtles; no regular nestings have been recorded there, although a small number of occasional nestings (by *Caretta caretta* and *Dermochelys coriacea*) have been observed in that region (Soto *et al.* 1997; Soto & Santos 2004). The main objective of the Florianópolis station, which is currently Tamar's southernmost station, is to reduce the number of incidental captures of sea turtles in coastal and open sea fisheries operating in the region. However, other threats to sea turtles, such as the ingestion of anthropogenic debris, have also captured this station's attention. The objective of this note is to make a short presentation of the conservation work done by the Florianópolis station.

The station's operating area is located between latitudes 27°19'S (Palmas Beach, Governador Celso Ramos city) and 27°53'S (Pinheira Beach, Palhoça city). This area, with a coastline about 240 km long, includes the entire Florianópolis Island (where the city of Florianópolis and the Tamar station are located) and part of the continental area close to the island. The station's activities include: (1) the monitoring of turtles found either alive or dead in the region, (2) veterinary treatment of turtles found in poor health, (3) the research of mitigation measures to reduce the impact of fisheries on sea turtles, (4) providing technical instruction on sea turtle conservation to students and professionals working in marine conservation in the region, (5) environmental education of coastal fishing communities, and also (6) the transmission of information on the conservation of the marine environment to schools and the general public.

From April 2005 to December 2009, a total of 385 stranded or incidentally captured turtles, with individuals of all sea turtle species found in Brazil (Marcovaldi & Marcovaldi 1999), were dealt with by Tamar in Santa Catarina: 373 *Chelonia mydas* (curved carapace length (CCL) between 19 and 109 cm, 67% found alive), 45 *C. caretta* (16–99 cm CCL, 29% alive), 8 *D. coriacea* (124–150 cm CCL, 13% alive), 6 *Eretmochelys imbricata* (31–41 cm CCL, 60% alive), 2 *Lepidochelys olivacea* (60 and 69 cm CCL, both of them dead), and 14 turtles of unidentified species (28% alive).

Sea turtles found alive and in need of veterinary treatment are taken to the Tamar station. Between April 2005 and December 2009, 69 turtles were treated: 63 *C. mydas*, 5 *C. caretta* and 1 *E.*

*imbricata*, and, of them, 22 *C. mydas*, 3 *C. caretta* and 1 *E. imbricata* were released alive, while the others did not survive. Most of the treatments were related to the ingestion of marine debris (see below). Small surgeries are sometimes performed to remove tumors; samples are sent to the University of São Paulo (São Paulo, Brazil) for histopathological analyses. Necropsies are performed on turtles either found dead on beaches or which died during treatment, in order to determine the cause of death.

Information on stranded or incidentally captured sea turtles arrives at the station mainly through phone calls by local residents, fishermen and sometimes even tourists. The station's phone number is widely advertised to local communities and also in touristic information locales. When information about a turtle is brought to Tamar's attention, a member of the Tamar staff immediately goes to the location to examine the animal and take proper action, which includes species identification, measuring the turtle (curved carapace length and width), flipper tagging live turtles, and either releasing on the spot turtles deemed to be in good health condition or bringing to the Tamar station those in need of rehabilitation.

In order to deal with sea turtle captures and strandings throughout the State of Santa Catarina coast outside the station operating area, Tamar has established a network of partner institutions, which includes: Environmental Protection Area of the Right Whale (APA da Baleia Franca), Marine Biological Reserve of Arvoredo, Santa Catarina Federal University (UFSC), Vale do Itajaí University (UNIVALI), Rio Grande Federal University (FURG), Joinville University (UNIVILLE), and the State of Santa Catarina Military Police (PM-SC). In order to improve response to calls, staff members of these institutions are trained by Tamar to identify species and to assess the turtle's body condition and the general health status of the animal. Turtles found alive by staff of the partner institutions for which veterinary treatment is not deemed necessary are released. When treatment is deemed necessary and the institution is not able to take the animal to the Tamar station, the animal is kept locally in a safe manner, following instructions provided by phone by Tamar, until someone of the Tamar staff goes to the locale to bring the turtle to the station. For turtles found dead, field data are collected by the partners and the animal is then buried.

Between September 2007 and September 2008 a survey was carried out by Tamar at the fishing colony of Barra da Lagoa Beach, the largest fishing colony in Florianópolis (Stahelin *et al.* 2009). The survey's objective was to gain some understanding on the use of gill nets and their impact on sea turtles. A questionnaire was administered to masters of vessels employing gill nets, asking them about vessels and nets characteristics, fishing areas, seasonality of the fishery and number of fishermen involved. The questionnaire was patterned after a set of criteria developed by Tamar to characterize fisheries in ecological and operational terms and to assess their impact on sea turtles (Marcovaldi *et al.* 2006). On the basis of the

answers provided by the masters, Tamar decided to monitor a few gill net vessels, to obtain a better assessment of the effects of gill nets on sea turtles. After adequate training, some vessels' masters are given a data sheet to be filled in with information on fishing areas, target species, net characteristics and captured turtles (number, species, alive or dead at capture), and are also provided with a photographic camera, which makes possible the confirmation of the turtle's species. The data sheets are collected daily by Tamar upon the return of the vessels. This data gathering, performed voluntarily by the masters, is still being carried out.

In addition to fisheries interactions, the ingestion of anthropogenic debris is also a big threat to sea turtles around Florianópolis. Plastics and other kinds of anthropogenic debris were found in the stomachs of 9 out of 11 stranded *C. mydas* (CCL between 30 and 50 cm) necropsied between September 2008 and July 2009 (Araújo *et al.* 2009). Tamar has conducted a number of actions aimed at reducing the impact of anthropogenic marine debris on sea turtle populations. Since 2007 a clean-up day is carried out annually on Barra da Lagoa Beach and also in Barra da Lagoa Channel (Canal da Barra da Lagoa), which serves as a harbor for fishing and recreational vessels and around which inns and summer houses are concentrated. The clean-up is performed in partnership with Florianópolis' Municipal Foundation for the Environment (Fundação Municipal de Meio Ambiente de Florianópolis) and Barra da Lagoa Neighborhood Association (Associação de Moradores da Barra da Lagoa).

A visitor's center with area of about 5000 m<sup>2</sup>, where environmental education activities are carried out, is located at the station. It hosts a permanent exhibit on sea turtle biology, fisheries that interact with sea turtles, the effects of anthropogenic debris on the marine ecosystem and, in a general way, about the conservation work performed by Tamar. The visitor's center also includes a video room and pools with four species of sea turtles (*C. mydas*, *C. caretta*, *E. imbricata* and *L. olivacea*), and real size replicas of sea turtles and marine fishes can be found there. A special program is maintained for receiving students from public and private schools (from nursery schools up to universities). Between April 2005 and December 2009 approximately 190,000 people visited the center, including 30,000 students from 1100 schools. Additionally, whenever requested Tamar organizes exhibits with sea turtle replicas and lectures at public events, schools and universities. An internship program is offered to students of biology, veterinary science, oceanography and related disciplines, by means of which they can gain hands-on experience on sea turtle biology and conservation.

The Tamar station in Florianópolis has been strengthening its relationship with fishermen, local communities and schools over the years. It is our view that sea turtle conservation will only succeed

by combining direct actions, like those aimed at the reduction of incidental captures in fisheries, with actions of an educational character, which could help people (both fishermen and the general public) to develop a broader ecological conscience and allow them to place the current environmental situation in the wider context of the society we live in.

**Acknowledgements:** We thank all the fishermen and partners who have collaborated with Tamar in Santa Catarina, especially the local communities of Barra da Lagoa, Ingleses, Armação and Pântano do Sul, and also Florianópolis' Municipal Foundation for the Environment, Florianópolis' Municipal City Hall, Santa Catarina's Environment Foundation and Santa Catarina's Government. We thank Paulo Barata for critical reading of the manuscript, and two anonymous reviewers for suggestions which have improved it. Projeto Tamar, a conservation program of the Brazilian Ministry of the Environment (MMA), is affiliated with the Chico Mendes Institute for Biodiversity Conservation (ICMbio/MMA), is co-managed by Fundação Pró-Tamar and is officially sponsored by Petrobras. In Santa Catarina, Tamar is supported by Arcor.

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