

AN OVERVIEW OF PROJETO TAMAR-IBAMA'S ACTIVITIES IN RELATION TO THE INCIDENTAL CAPTURE OF SEA TURTLES IN THE BRAZILIAN FISHERIES

J.C.A. Thomé¹, M.A. Marcovaldi², G.G. dei Marcovaldi¹, C. Bellini¹, B.M.G. Gallo², E.H.S.M. Lima¹, A.C.C.D da Silva¹, G. Sales¹, P.C.R. Barata³

¹ Projeto TAMAR-IBAMA, Avenida Paulino Muller 1111, Vitória, ES, 29042-571 Brazil. E-mail: joca@tamar.org.br.

² Fundação Pró-TAMAR, Caixa Postal 2219, Rio Vermelho, Salvador, BA, 40210-970 Brazil

³ Fundação Oswaldo Cruz, Rua Leopoldo Bulhões 1480, Rio de Janeiro, RJ, 21041-210 Brazil

Projeto TAMAR-IBAMA, the Brazilian Sea Turtle Conservation Program, is a network of 20 conservation stations that together protect over 1,000 km of Brazilian coastline on the mainland and on three oceanic islands. TAMAR was created in 1980, and initially focused its efforts on nesting beaches. Since 1990, a significant proportion of TAMAR's field activities have been focused on sea turtle feeding areas.

Five species of sea turtles are found and nest in Brazil: the green turtle (*Chelonia mydas*, CM), the loggerhead (*Caretta caretta*, CC), the hawksbill (*Eretmochelys imbricata*, EI), the olive ridley (*Lepidochelys olivacea*, LO) and the leatherback (*Dermochelys coriacea*, DC). Several nesting beaches and feeding areas are located near important fishing and/or shrimping grounds, where sizeable industrial fishing fleets operate. Moreover, artisanal fishing is a key livelihood for many coastal communities. Therefore, there is significant interaction between sea turtles and fishing gear around those areas, and the successful conservation of sea turtles by TAMAR must also involve actions to reduce incidental captures of sea turtles in fishing activities. Furthermore, since 1998 TAMAR has been collecting data on the level of sea turtle capture by the pelagic longline fishery off the Brazilian coast, which is a new frontier for conservation activities. Different actions have been implemented by TAMAR in each region in Brazil, depending on local conditions and available funds. Here, we present an overview of TAMAR's activities regarding the incidental capture of sea turtles by Brazilian fisheries.

Community involvement / educational activities

The involvement of local people into the conservation program and environmental educational activities have long been hallmarks of TAMAR. Close, frequent personal contacts with local communities and educational campaigns make possible to present to local people different aspects of sea turtle conservation and of marine conservation in general. This way, the incidental capture of sea turtles in local fisheries has been dealt with by TAMAR in several forms:

(1) Educational campaigns, like the one "Not everything caught in nets is fish", presents to local fishermen procedures for the rehabilitation of turtles incidentally caught in fishing nets. (2) Environmental education in a broad sense is also carried out at all TAMAR stations, by means of lectures to school students and groups of local residents, participation in local meetings, exhibition of videos, etc. (3) Development of alternative sources of income for fishermen. TAMAR looks for activities that, besides allowing the fishermen to earn money, have a low or null impact on sea turtles: mussel and oyster cultures, fish industrialization, analysis of adequate locations for setting gill nets, etc. (4) Development of alternative sources of income for the fishermen's families. This has the effect of lowering the local communities' dependence on fishing: craftsmanship, sewing, embroidery, paper recycling, etc.

Direct actions

Incidental captures of sea turtles are greatly reduced through TAMAR's direct actions at all stations. For example, in São Paulo (a feeding area), TAMAR works closely with artisanal fishermen who employ mainly floating weirs and gill nets. In the past, most turtles captured in São Paulo were consumed, but nowadays they are usually released alive and in good health back to the sea. In Ceará (another feeding area), fishermen employ mainly weirs and gill nets (targeting either fish or lobsters). Turtles captured in weirs are always released alive back to the sea, but those captured in gill nets still undergo a significant mortality. Both in São Paulo and Ceará TAMAR maintains tanks for the rehabilitation of turtles that have undergone forced submergence, or are diseased or wounded. In other stations located in nesting areas, TAMAR has worked mainly with local fishermen who operate near the nesting beaches, with the aim of suggesting proper locations for setting the nets and other measures to reduce the incidental capture of sea turtles.

Marine surveys

TAMAR is conducting marine surveys at several areas in order to obtain data on the main types of fishing gear operating in each region, the size of fishing fleets, the different kinds of boats, the areas and periods of the year where the boats operate, and to assess the magnitude of incidental captures of sea turtles. These surveys are carried out by means of interviews with local fishermen, through the use of on-board observers on fishing boats and through boat trips by TAMAR personnel. Data obtained from governmental agencies are also being used to assess the level of incidental captures in those regions. In Bahia (a fishing area) and Sergipe (a shrimping area), sizeable fleets operate and a significant (if not yet adequately evaluated) mortality of sea turtles is known to occur. In São Paulo, a survey is being carried out regarding the capture of turtles in trawl nets - although these nets are a potential threat to sea turtles, the actual risk posed by them in São Paulo is as yet unknown.

Protected areas / Law enforcement / Orientation to fishermen

Protected areas, maintained by the federal government or by state governments, are located in many of the regions where TAMAR operates. These areas - a National Marine Park, Biological Reserves and Environmental Protection Areas - provide protection to sea turtles from fishing activities, although law enforcement is often lacking. In Bahia, boat trips, in cooperation with local governmental authorities, have been undertaken to verify reports of illegal captures of sea turtles or illegal fisheries. In Sergipe and Espírito Santo, boat trips around the state coasts have been undertaken by TAMAR personnel to orient trawl boats to operate outside 3 nautical mile exclusion zones around nesting beaches, in order to lower the impact of trawlers on sea turtles. In Sergipe and Espírito Santo, governmental legislation has established a minimum 3 nm distance from the coastline for the operation of trawl boats, as a means to protect local ecosystems and local artisanal fishing.

The open sea

Since 1998, TAMAR has obtained data on the capture of sea turtles by longline fisheries in the open sea. There are records of juvenile loggerheads and adult or subadult leatherbacks incidentally captured by longliners targeting tunas and sharks, both within Brazil's 200 mi Exclusive Economic Zone in the southern part of the country and in neighboring international waters. There are also some records of leatherbacks incidentally captured in drift nets targeting sharks around the coast of the state of São Paulo. The incidental capture of sea turtles in longlines and drift nets is a growing international concern. TAMAR has made agreements with universities and governmental agencies working on fishery matters, to obtain better data in order to assess the situation in the open sea.

A National Plan / Local x Global actions in Brazil

While many successful results with regard to the incidental capture of sea turtles in fishing gear have been achieved in different Brazilian states, many specific questions remain in certain regions. Furthermore, it has been increasingly clear that, previously, the problem of incidental capture was not well evaluated in Brazil as a whole. Thus, TAMAR's National Coordination has sought to integrate regional activities on a national scale, in order to better assess the overall situation. At the end of 2001, TAMAR began to develop a group of strategies to deal with the incidental captures, thus forming the "Action Plan for the Reduction of Incidental Sea Turtle Capture in Fisheries" (Marcovaldi et al., 2002, Brazilian plan for reduction of incidental sea turtle capture in fisheries, Marine Turtle Newsletter 96: 24-25).

The main objective of this action plan is the reduction of incidental captures of sea turtles in Brazil. The action plan includes the creation of a Coordination to deal specifically with that subject, and recognizes that achievements will only come as a result of the establishment of partnerships with several institutions, including governmental agencies, universities, NGOs, museums dedicated to marine research and the national fishery sector.

A summary of the situation in the areas where TAMAR operates

Ceará. 40 km of coastline. 1 TAMAR station in the area. Artisanal fishing: weirs, gill nets for fish and lobsters. There are captures of sea turtles, a great proportion of the turtles are found dead (mostly juvenile and adult CM). DC have been captured in weirs. Before TAMAR operated in the area, dozens of sea turtles, whenever captured in weirs, were consumed by local fishermen. Nowadays, all turtles captured in weirs are released alive back to the sea, but there is significant mortality in gill nets.

Fernando de Noronha and Atol das Rocas. 2 TAMAR stations in the area. In Fernando de Noronha, hook and line. In oceanic waters around the archipelago, there are reports of drift nets, associated with longlines, but there has been no monitoring in the open sea. In Atol das Rocas, fishing is not allowed officially; clandestine fishing for lobsters occurs via diving and traps. In Fernando de Noronha, fishing is mainly for the local market, and does not pose a threat for sea turtles there. The existence of TAMAR and the existence of protected areas in/around the oceanic islands have kept sea turtles in the area safe from interactions with fishing gear.

Pernambuco and Rio Grande do Norte. 150 km of coastline. Pernambuco: gill nets, beach seines and weirs. Rio Grande do Norte: gill nets, hook and line, diving and fishing for lobsters. In Pernambuco, TAMAR does not operate directly. Information about turtles found dead comes mainly from institutional partners. In Rio Grande do Norte: there are large fishing communities, sea turtles are occasionally captured. However, fishing does not seem to pose a definite threat to sea turtles in those areas.

Sergipe. 125 km of coastline. 3 TAMAR stations in the area. Artisanal fishing: beach seines and fixed gill nets. Medium-scale commercial fishing: trawl nets, targeting shrimp. Mortality of adult LO; also some adult CC. Some mortality of juvenile CM. Juveniles are found stranded (dead) during the whole year. Adult turtles are usually found stranded, generally during the reproductive period (September-March), when trawl boats operate at less than 3 nm from the coastline.

Northern Bahia. 200 km of coastline. 5 TAMAR stations in the area. Artisanal fishing close to the coast, using boats without engines (canoes, sailboats, rafts); industrial fishing in deeper waters,

targeting pelagic fish and lobsters; main fishing methods: gill nets, seines, longlines, hook and line, free diving and trawl nets (shrimping). Fishing is one of the main causes of sea turtle mortality in the area, mostly CM, but also CC and EI, mostly juveniles. Generally, records of deaths coincide with the presence of trawlers or gill nets operating at less than 3 nm from the coast.

Espírito Santo. 276 km of coastline. 6 TAMAR stations in the area. Artisanal fishing: gill nets, hook and line. Medium-scale commercial fishing: trawl nets, drift nets, bottom gill nets, hook and line. Large-scale commercial fishing: trawl nets, longlines, bottom gill nets. Some mortality of juvenile CM, throughout the year. Adult CC are usually found stranded, often during the reproductive period (September-March). DC have been captured in gill nets. Trawl boats from other Brazilian regions come to operate in the area; this causes an increased fishing effort in the area.

Trindade Island. Oceanic island, 1,100 km (600 nm) from the mainland; 1 TAMAR station there. Longline and hook and line fishing are known to occur in oceanic waters around the island, but there has been no monitoring there.

Rio de Janeiro. 140 km of coastline. 1 TAMAR station in the area. Artisanal and medium-scale commercial fishing. Gill nets, trawl nets, longlines. Some mortality of juvenile CM, mainly in gill nests. The impact of fishing on sea turtles in the area is not well understood.

São Paulo. 100 km of coastline. 1 TAMAR station in the area. Mostly artisanal fishing. There is a small-scale commercial trawling fleet, targeting shrimp. Main fishing methods that have captured sea turtles: floating weirs, fixed gill nets, bottom otter trawls, encircling gill nets. Main fishing method monitored by TAMAR: floating weirs, which capture mostly juvenile CM. Relatively low mortality in floating weirs, due to TAMAR's actions. Mortality in gill nets and trawl nets at a level not well understood.

Conclusions

TAMAR has already started work on many of the topics presented above, and gradually data are being gathered. However, conservation actions related to the incidental capture of sea turtles in the Brazilian fisheries is no simple task. Brazil has over 8,000 km (5,000 mi) of coastline, and the country has a 200 mi Exclusive Economic Zone. Furthermore, fishing is widespread, both in artisanal and industrial forms, and sea turtles abound in Brazil. So, there is a great deal of interaction between sea turtles and fisheries in Brazil, often in faraway locations, and often in the open sea. Passing the conservation message on to fishermen and other parties has taken (and will continue to take) a lot of work. We are confident that the actions now being implemented signal a brighter future for sea turtles regarding their incidental capture in the Brazilian fisheries. Through the actions herein described, we hope to further contribute to international efforts regarding sea turtle conservation.

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