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## REVIEW OF ACTIONS BY BRAZIL IN MEETING THE BYC RECOMMENDATION 10-09 AND THE FAO GUIDELINES TO REDUCE SEA TURTLE MORTALITY IN FISHING OPERATIONS

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### SUMMARY

*Seeking to reduce the impact of fisheries on sea turtles, in 2001 TAMAR began the development of a set of actions with a main objective to reduce the capture and death of sea turtles by fisheries, as well as working with the monitoring, research, mitigation measures, support sustainable fisheries and participate in negotiations forums. Aiming to reduce the rates of incidental catch of sea turtles in oceanic fisheries and increase their survival post-capture, TAMAR has been adopting measures to implement the recommendations proposed in "ICCAT By-Catch Recommendation 10-09" and the "FAO Guidelines to Reduce Sea Turtle Mortality in Fishing Operations". This study presents the main recommendations proposed by these two documents and the actions that are being developed in Brazil to meet them, such as increase the number of longline trips covered by observers; divulge and implement circle hook and other mitigation measures in longline fleet; train captains and crewmembers to better manage sea turtles caught; continue work in partnership with fishermen and the local community and establishing partnerships with foreign institutions and other countries of the South Atlantic.*

### RÉSUMÉ

*En 2011, dans le but de réduire l'impact des pêcheries sur les tortues marines, Tamar a commencé à arrêter une série de mesures dont l'objectif principal consiste à réduire la capture et la mortalité des tortues marines causées par les pêcheries, à se consacrer au suivi, à la recherche, aux mesures d'atténuation, à soutenir les pêcheries durables et à participer aux forums de négociation. En vue de réduire les taux de prise accidentelle de tortues marines dans les pêcheries océaniques et d'augmenter la survie après la capture, Tamar a adopté des mesures visant à mettre en œuvre la Recommandation 10-09 de l'ICCAT et les Directives de la FAO visant à réduire la mortalité des tortues marines dans les opérations de pêche. Cette étude présente les principales recommandations proposées dans ces deux documents et les mesures qui sont réalisées au Brésil afin de les satisfaire, telles que l'augmentation du nombre de sorties des palangriers faisant l'objet d'une couverture d'observateurs à bord, la promotion et la mise en œuvre de l'utilisation d'hameçons circulaires ainsi que d'autres mesures d'atténuation à bord de la flottille palangrière, la formation des capitaines et de l'équipage afin de mieux manipuler les tortues marines ayant été capturées, la poursuite du partenariat avec les pêcheurs et les communautés locales et la coopération avec les institutions étrangères et d'autres pays dans l'Atlantique Sud.*

### RESUMEN

*Tratando de reducir el impacto de las pesquerías en las tortugas marinas, en 2001 TAMAR empezó a desarrollar diversas acciones con el objetivo principal de reducir la captura y muerte de las tortugas marinas a causa de las pesquerías, así como a trabajar en el seguimiento, la investigación y las medidas de mitigación y a respaldar las pesquerías sostenibles y participar en los foros de negociación. Con el fin de reducir las tasas de captura incidental de tortugas marinas en las pesquerías oceánicas y de aumentar su supervivencia tras la captura, el Proyecto TAMAR ha estado adoptando medidas para implementar la Recomendación 10-09 de*

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*ICCAT y las Directrices de la FAO para reducir la mortalidad de las tortugas marinas en las operaciones pesqueras. Este documento presenta las principales recomendaciones propuestas por estos dos documentos y las acciones que se están llevando a cabo en Brasil para cumplirlas, como el aumento en el número de mareas de palangre con observadores a bordo, el fomento y la implementación del uso de anzuelos circulares y otras medidas de mitigación en la flota de palangre, la formación de capitanes y miembros de las tripulaciones para que manipulen mejor las tortugas marinas que se capturan, la continuación de la asociación con los pescadores y las comunidades locales y la cooperación con instituciones extranjeras y con otros países en el Atlántico sur.*

#### KEYWORDS

*Tuna fisheries, longline, sea turtles, by-catch, mitigation measures, Brazil*

## 1. Introduction

In Brazil, the conservation of sea turtles has been held since 1980 by National Center for Conservation and Management of Marine Turtles (TAMAR Project), a conservation program of the Brazilian Ministry of the Environment, affiliated to the Chico Mendes Institute for Biodiversity Conservation (ICMBio), and co-managed by Pró-Tamar Foundation.

Seeking to reduce the impact of fisheries on sea turtles, in 2001, TAMAR began to develop several actions with the main objective of reducing the capture and death of sea turtles by various fisheries, including monitoring, research, development of mitigation measures, support to sustainable fisheries and participation in negotiation forums (Marcovaldi, *et al.* 2002).

In the Southwestern Atlantic, *Caretta caretta* and *Dermochelys coriacea* have been reported to be the ones that show greater interaction with the longline fishery. Since 2003, when the Occidental South Atlantic Sea Turtles Specialists Group was created (ASO network), Brazil and Uruguay have adopted a “transboundary” approach in regard of sea turtle bycatch (Domingo *et al.*, 2006; Giffoni *et al.*, 2007; Lopez-Mendilaharsu *et al.*, 2007; Pons *et al.*, 2008).

Aiming at reducing the rates of incidental catch of sea turtles in oceanic fisheries and at increasing their survival post-capture, TAMAR has been adopting measures to implement the “ICCAT BYC 10-09 recommendation” and “FAO Guidelines to Reduce Sea Turtle Mortality in Fishing Operations”. This study presents the main recommendations proposed by these two documents and the actions that are being developed in Brazil to meet them.

## 2. Results and discussion

Sea turtle bycatch in longline fisheries has been monitored since 2001, with a view to understand why, where, when and how a specific fishery interact with different sea turtle species. Records of incidental catches were monitored between 2001-2010, in 15.437 longline sets, done during 714 fishing cruises, with a total effort of 21,388,213 hooks, in which 4,623 sea turtles were caught, pertaining to the following species: 2,461 Loggerheads (*Caretta caretta*), 1,012 Leatherbacks (*Dermochelys coriacea*), 593 Olive Ridley (*Lepidochelys olivacea*), 67 green (*Chelonia mydas*) and 490 unidentified.

The catch rates in the different areas of the Brazilian fishing ground per year are shown in **Table 1**. **Table 2** presents the main recommendations proposed by “BYC 10-09 recommendation” and “FAO Guidelines to Reduce Sea Turtle Mortality in Fishing Operations” and the actions that are being developed in Brazil to meet them.

The reduction of incidental capture and post-release mortality of sea turtles in the Brazilian pelagic longline fishery, operating in the Southwestern Atlantic Ocean, was investigated by comparing the performance of 18/0 10° offset circle hooks with 9/0 J-type (control) hooks. Hook selectivity experiments were performed between 2004 and 2008, in a total of 26 fishing trips, covering 229 sets and 145,828 hooks, and using mackerel (*Scomber japonicus*) as bait. The experimental design included alternating control and experimental hooks along sections

of the mainline. The results indicated a significant reduction of catch rate for both Loggerhead (- 55%) and Leatherback (- 65%) turtles with circle hooks. Circle hooks increased catch rates of most of the main target species, including tunas (bigeye *Thunnus obesus* and albacore *T. alalunga*), and sharks (blue *Prionace glauca* and requiem sharks of the genus *Carcharinus*), with no difference in the capture rates of yellowfin tuna (*T. albacares*), shortfin mako shark (*Isurus oxyrinchus*), hammerhead sharks (*Sphyrna lewini* and *S. zygaena*), and dolphinfish or mahi mahi (*Coryphaena hippurus*). On the other hand, a significant decrease in the capture rate of swordfish (*Xiphias gladius*) was detected when using circle hooks (Sales *et al.*, 2010).

The possible adoption of circle hooks by the national pelagic longline fleet, either by means of a mandatory rule or voluntarily, is being presently discussed in Brazilian national forums of fisheries management, including harmonization with other mitigating measures and monitoring routines to minimize those catches. Since the catch rates of marine turtles are worrying for the region studied, it is important to improve the search for information of other members operating in the SW Atlantic and to begin discussions on the most effective options for monitoring and mitigation of this phenomenon within ICCAT.

To meet the remaining recommendations of “ICCAT BYC 10-09” and “FAO Guidelines to Reduce Sea Turtle Mortality in Fishing Operations”, Brazil is planning to increase the number of longline trips covered by observers; to promote and implement the use of circle hook and other mitigation measures (de-hookers, scoop nets, cutting tools, etc.) in the longline fisheries; to train captains and crewmembers to better handle the sea turtles that are caught; to continue the partnership with fishermen and local communities and to cooperate with foreign institutions and other countries of the South Atlantic.

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**Table 1.** Sea turtle CPUE (x/1000 hooks) in the Brazilian longline fishery.

# SETS MONITORED = 15.648								
# hooks = 21.588.591								
<i>Year</i>	(n) <i>C. caretta</i>	CPUE <i>C. caretta</i>	(n) <i>C. mydas</i>	CPUE <i>C. mydas</i>	(n) <i>D. coriacea</i>	CPUE <i>D. coriacea</i>	(n) <i>L. olivacea</i>	CPUE <i>L. olivacea</i>
2001	10	0.078	7	0.055	37	0.288	0	0
2002	196	1.119	0	0	11	0.063	1	0.006
2003	154	0.718	1	0.005	43	0.201	1	0.005
2004	227	0.050	34	0.008	96	0.021	35	0.008
2005	288	0.038	11	0.001	169	0.022	50	0.007
2006	522	0.129	12	0.003	274	0.068	144	0.036
2007	749	0.302	3	0.001	248	0.100	125	0.050
2008	109	0.080	0	0	80	0.059	161	0.118
2009	175	0.177	0	0	57	0.058	84	0.085
2010	60	0.573	0	0	11	0.105	0	0
Total	2490		68		1026		601	

**Table 2.** Brazil's actions in meeting the ICCAT By-Catch Recommendation 10-09 and the FAO Guidelines to reduce sea turtle mortality in fishing operations.

<i>Recommendation</i>	<i>Fulfillment</i>	<i>Actions</i>	<i>Future actions</i>	<i>Comments</i>
BYC 10-09 - Report to ICCAT no later than 2012 information on the interactions of its fleet with sea turtles in ICCAT fisheries by gear type. FAO-GRSMFO - Research, monitoring and sharing of information	Yes.	Data on the interaction between sea turtles and longline fleet has been reported to ICCAT annually.	Expansion of the coverage for longline fleets, especially small-scale boats, and of the on-board observer program.	
BYC 10-09 and FAO-GRSMFO - purse seine vessels operating in the Convention area avoid encircling sea turtles to the extent practicable, release encircled or entangled sea turtles	-			Brazil does not currently have this type of fishery for tuna species.
BYC 10-09 and FAO-GRSMFO - pelagic longline vessels operating in the Convention area carry on board safe-handling, disentanglement and release equipment capable of releasing sea turtles in a manner that maximizes the probability of their survival. Fishermen on pelagic longline vessels are trained to maximize the probability of sea turtle survival and in safe-handling and release techniques	No.	Actions are being promoted for the dissemination of these instruments with national longline fleet, but there is no compulsory measure in this regard as yet.	Expand actions for dissemination and establish a rule that regulates the presence of these instruments on board the vessels.	Dissemination actions are being carried out in order to enable the fishermen to use those measures. In March 2011 one of these actions was carried out with Brazilian small-scale fleet.
FAO-GRSMFO – development and implementation of appropriate combinations of hook design, type of bait, depth, gear specifications and fishing practices in order to minimize bycatch or incidental catch and mortality of sea turtles.	Partially.	Experiments were performed to test the circle hooks (18/0, 10° offset) with significant results in reducing the incidental catch of marine turtles. Actions to promote the use of circle hooks by the fleets have been performed but there is no compulsory measure in this regard as yet.	Expand the actions to promote the use of circle hooks and establish a rule that regulates the use of circle hooks on board vessels.	The experimental results showed an increase or little reduction in the capture of the main target species, but there was an increase in the capture of some species of tunas and sharks. Spreading the use of circle hooks by fishermen is the actual challenge. The measure was well accepted in some industrial longline fleets, but still needs to be better adapted to the small-scale fleet, particularly to the small boats that catch dolphin fish (Sales <i>et al.</i> , 2010).

FAO-GRSMFO - Spatial and temporal control of fishing, especially in locations and during periods of high concentration of sea turtles.	No.			Some data indicate areas of sea turtles concentration in some parts of the South Atlantic, but further studies must be carried out for that kind of measure can be implemented.
BYC 10-09 and FAO-GRSMFO - As appropriate, the Commission and its CPCs should, individually and collectively, engage in capacity building efforts and other cooperative activities to support the effective implementation of this recommendation, including entering into cooperative arrangements with other appropriate international bodies	Yes.	Monitoring, research, development, testing and dissemination of mitigation measures have been carried out in collaboration with NOAA and in partnership with Uruguay. The results of those actions have been presented at ICCAT meetings and other international forums.	Strengthen cooperation with foreign institutions and partnerships with countries of the South Atlantic (in South America and Africa).	
BYC 10-09 and FAO-GRSMFO - In their Annual Reports to ICCAT, CPCs shall report on the implementation of this Recommendation. In addition, CPCs should report on other relevant actions taken to implement FAO's Guidelines to Reduce Sea Turtle Mortality in Fishing Operations with respect to ICCAT fisheries in their Annual Reports	Yes.	This document is already a summary report on the implementation of these recommendations.	Data on Brazilian efforts to fulfill the recommendations will continue to be reported to ICCAT.	