

CAPTURE OF SEA TURTLES IN FISHERIES AROUND TANGIER, MOROCCO

Wafae Benhardouze¹, Manjula Tiwari², Mustapha Aksissou¹, and Matthew H. Godfrey³

¹ Dept. of Biology, Faculty of Science, Université Abdelmalek Essaâdi P.O. Box 2121, Tetouan 93002 Morocco

² Archie Carr Center for Sea Turtle Research, Dept. Zoology, P.O. Box 118525, University of Florida, Gainesville, FL 32611

³ SEATURTLE.ORG & North Carolina Wildlife Resources Commission, 1507 Ann Street, NC 28516, USA

INTRODUCTION:

Sea turtles regularly visit the coast of Morocco, increasing the risk of incidental capture with different fisheries operating in Moroccan waters. For example, at some times of year, loggerhead turtles are at high risk of incidental capture in the Moroccan driftnet fishery operating on the Mediterranean side of Tangiers (Tudela et al. 2005). In addition, between 1998 and 2001, 27 dead loggerhead turtles on average have been observed each year on the Mediterranean side of Morocco (Ocaña et al. 2002). In the present study, we conducted interviews with fishermen in order to obtain information on sea turtle bycatch in different fisheries working out of ports in and around Tangiers at the northern tip of Morocco.



Figure 1. Location of Tangier in northern Morocco. Note that the study area included both Atlantic and Mediterranean zones around Tangier.



Figure 2. Informal interviews being conducted with fishermen in Tangiers port in 2003

METHODS:

We visited boats and docks in 4 fishing ports in the wider Tangiers region: Asilah, Ksar Sghir, M'dig and Tangiers proper. Fifty fishermen were approached and asked to share information with us. Only 7 agreed to share detailed information. The surveys were informally structured, and revolved around what turtle species (if any) were seen during fishing trips, how many, and whether they were alive or dead when captured and released (Figure 2). They were also asked to provide details about their boats, equipment, trips, effort, and seasonality of incidental captures of turtles (if any). The fishermen agreed to keep a record of any incidental captures on future trips. We provided waterproof ID cards, tape measures, waterproof cameras (for species documentation), and field notebooks to be taken on trips

LITERATURE CITED:

- López-Jurado, L.F., Varo-Cruz, N. & López-Suárez, P. (2003). Incidental Capture of Loggerhead Turtles (*Caretta caretta*) on Boa Vista (Cape Verde Islands). *Marine Turtle Newsletter* 101: 14-16.
- Ocaña, O., de los Rios y los Huertos A.G. & Y. Saoud. 2002. Las poblaciones de tortugas marinas y cetáceos de la region de Ceuta y areas proximas. Instituto de Estudios Ceuties, 172p.
- Tudela, S., Kai Kai, A., Maynou, F., El Andalossi, M. & Guglielmi, P. (2005). Driftnet fishing and biodiversity conservation: the case study of the large-scale Moroccan driftnet fleet operating in the Alboran Sea (SW Mediterranean). *Biological Conservation* 121: 65-78.

RESULTS:

From June 2003 through September 2004, 21 incidental captures of sea turtles were recorded by fisherman on fishing trips leaving from ports in the Tangiers region (Table 1). All were alive at time of capture and release, although 2 were comatose and two had fresh injuries from the interaction. Except for one leatherback, all captures were loggerheads, with a mean size of 55.2 cm CCL (Figure 3). Most incidental captures were reported from September to January, although it is not clear whether this pattern is due to a bias in fishing and/or reporting effort.

Table 1. Incidentally captured sea turtles by fishermen working out of the Tangiers region. Cc = loggerhead, Dc = leatherback.

Port	Date	spp	CCL cm	CCW cm	Type of fishing equipment	Turtle status
Tangiers	28/06/03	Cc	45	42	Hook	Alive
Tangiers	08/10/03	Cc	63	61	Long line	Alive
Tangiers	12/10/03	Cc	54	52	Long line	Alive
Tangiers	15/10/03	Cc	49	48	Long line	Alive
Tangiers	28/10/03	Cc	55	52	Long line	Alive
Tangiers	03/11/03	Cc	43	40	Long line	Alive
Tangiers	11/11/03	Cc	60	58	Long line	Alive
Tangiers	14/11/03	Cc	51	50	Long line	Alive
Tangiers	05/12/03	Cc	69	67	Long line	Alive
Tangiers	08/12/03	Cc	50	47	Long line	Alive
Tangiers	14/12/03	Cc	46	45	Long line	Alive
Asilah	25/09/03	Cc	65	61	Hook	Alive
Asilah	25/09/03	Cc	55	52	Hook	Alive
Tangiers	02/01/04	Cc	45	42	Hook	Alive
Asilah	10/01/04	Cc	73	72	Seine net	Alive
M'diq	26/01/04	Cc	72	68	Seine net	Alive
Tangiers	08/09/04	Cc	70	68	Long line	Alive
Tangiers	09/09/04	Dc	100	n/a	Long line	Alive
Tangiers	?/05/04	Cc	35	33	Long line	Alive
Tangiers	02/09/04	Cc	58	57	Long line	Alive
Tangiers	14/09/04	Cc	50	47	Long line	Alive

Acknowledgements:

We are grateful to cooperation of the fishermen in and around Tangiers. Financial support comes from the Chelonian Research Institute and the Rufford Small Grant for Nature Conservation.

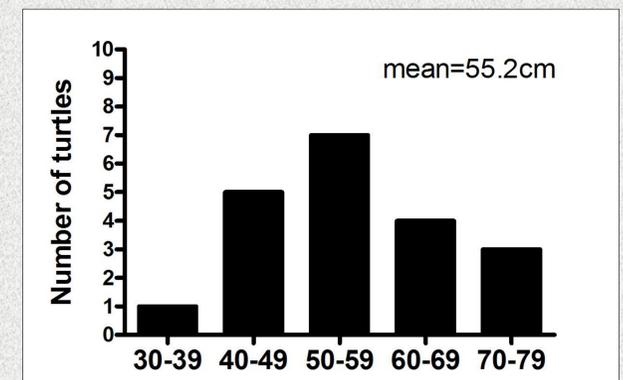


Figure 3. Distribution of size (CCL in cm) of loggerheads incidentally captured in Moroccan fisheries.

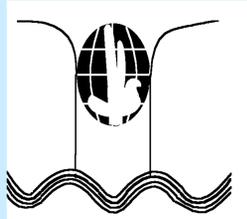
DISCUSSION:

This initial results reveal a potentially major source of mortality for loggerheads in the waters around NW Morocco. The majority of captures were loggerheads, consistent with other studies on bycatch in the area (e.g. Tudela et al. 2005). The size class suggests that most were juveniles, although nesting female loggerheads in Cabo Verde can be as small as 54.2cm CCL (López-Jurado et al. 2003). Capture-related mortality appears to be <40%, although more study on this is warranted (Figure 4). Future plans include further collaboration with and training of fishermen to minimize captures and/or mortality of sea turtles in Moroccan waters.



Figure 4. Juvenile loggerhead caught in a seine net around Tangiers, Morocco. The turtle was removed and released alive.

THE STATUS OF MARINE TURTLES IN ATLANTIC MOROCCO



Mustapha Aksisou¹, Manjula Tiwari², Wafae Benhardouze¹ and Matthew H. Godfrey³

¹ Department of Biology, Faculty of Science, PO Box 2121, Tetouan 93002, Morocco

² NOAA-NMFS, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive, La Jolla, CA 92037 USA

³ Sea Turtle Project, North Carolina Wildlife Resources Commission, 1507 Ann St., Beaufort, NC 28516 USA

INTRODUCTION

Sea turtles frequently occur in Morocco (Margaritoulis, 2003; Fretey, 2001). The Atlantic Moroccan coastline (Fig. 1) includes ~3000 km of coastline and more than 25 fishing ports where catch from ocean-based fisheries are landed. Sea turtles are known to be incidentally captured by fisheries in both Atlantic and Mediterranean waters (Laurent, 1990; Tiwari et al., 1999; Ocaña et al., 2002; Benhardouze, 2004; Benhardouze et al., 2004; Tudela et al., 2005), although to date studies have been largely descriptive. Traditionally, there has been a lack of logistic and institutional support for Moroccan researchers in the field of sea turtle conservation. However, the future appears promising in this regard, given the ongoing development of international collaborations on sea turtle research and conservation. The geographic position of Morocco makes this area of study even more important given that Morocco abuts the Straits of Gibraltar through which turtles must pass when migrating between the Mediterranean and the Atlantic. Here we provide an overview of the status of sea turtles in Morocco, focusing on bycatch and strandings.



Fig. 1: Atlantic coast of Morocco

METHODS

To date, we have worked towards recruiting local fishers in documenting and reporting incidental captures of marine turtles. For instance, a workshop was recently held in Tangier with >20 fishers (Figure 2; also see <http://www.seaturtle.org/blog/africa/000462.html> for more details). More workshops are planned in the future. We have initiated a loose stranding and salvage network in which partners (soldiers, gendarmes, construction workers, etc.) are urged to document and report strandings they observe along the Atlantic coastline. We also have surveyed local markets and artisanal shops to look for marine turtle carapaces and parts, to document the species, age class, and fisheries involved in bycatch of marine turtles.



Fig. 2: Training workshop for fishermen at Tangier port (November 2005)

RESULTS

To date, we have found that juvenile loggerheads are the most common species and age class to be incidentally captured, found stranded, or offered for sale in markets in NW Morocco (Fig. 3). Leatherback and greens turtles were reported more rarely.

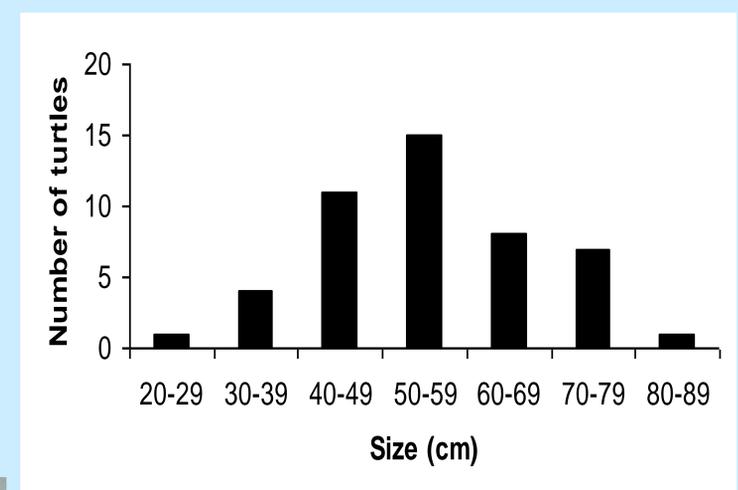


Fig. 3: Distribution of size (CCL in cm) of loggerheads (n=49) noted in NW Morocco (2003-2005)

DISCUSSION AND CONCLUSION

We have found no evidence to confirm that nesting occurs in southern beach of Plage Blanche, as reported by Pasteur & Bons (1960). The occurrence of juvenile and subadult loggerhead turtles suggests that Moroccan waters are an important foraging and/or migration areas for this species. Morocco is a signatory (since 2002) of the Memorandum of Understanding for marine turtle conservation in Atlantic Africa, and as such should begin to enact legislation to protect marine turtles in its waters. We expect a ban on the use of drift gill nets in Moroccan waters in the next few years, which should reduce rates of accidental capture of loggerheads and other species.

Acknowledgements:

Our thanks to Amina Moumni, Tabit, the National Institute for Fisheries Research, and local fishers for their participation and enthusiasm. Funding in part came from the Chelonian Research Institute and the Ruffords Small Grants Program

LITERATURE CITED:

- Benhardouze, W., M. Tiwari, M. Aksissou, B. Viseux B & M. H. Godfrey. 2004. Notes from preliminary market surveys in Morocco. *Marine Turtle Newsletter*, 104, 8-9.
- Benhardouze W. 2004. Sea turtles *Caretta caretta* (interaction with fisheries, strandings and market surveys) in NW Morocco. Master Thesis, Univ. Abdelmalek Essaadi, Tetouan (Morocco), 87p.
- Fretey, J. 2001. Biogéographie et conservation des tortues marines de la côte atlantique de l'Afrique. *CMS Technical Series Publication* No 6, 429 p.
- Laurent, L. 1990. Les tortues marines en Algérie et au Maroc (Méditerranée). *Bull. Soc. Fr.*, 55: 1-23.
- Margaritoulis D. 2003. The status of marine turtles in the Mediterranean. Pages 51-61 in Proceedings of the First Mediterranean Conference on Marine Turtles (editors: D. Margaritoulis, A. Demetropoulos). Barcelona Convention - Bern Convention - Bonn Convention (CMS). Nicosia, Cyprus.
- Ocaña, O., de los Rios y los Huertos A. G. and Y. Saoud. 2002. Las poblaciones de tortugas marinas y cetáceos de la region de Ceuta y areas proximas. Instituto de Estudios Ceuties, 172p.
- Pasteur G. and J. Bons. 1960. Catalogue des reptiles actuels du Maroc. Révision de formes d'Afrique, d'Europe et d'Asie. *Travaux de l'institut Scientifique Chérifien Série Zoologique* n° 21.
- Tiwari, M., A. Moumni, H. Chfiri, H. El habouz. 1999. A report on sea turtle nesting activity in the kingdom of Morocco and Western Sahara. *B.C.G Testudo* vol 5, No.3, 71-77.
- Tudela, S., Kai Kai, A., Maynou, F., El Andalossi, M. & Guglielmi, P. (2005). Driftnet fishing and biodiversity conservation: the case study of the large-scale Moroccan driftnet fleet operating in the Alboran Sea (SW Mediterranean). *Biological Conservation* 121: 65-78.