AFRICAN SEA TURTLE NEWSLETTER

Photo: Almokhtar Saied

The Libyan Sea Turtle Program created this turtle from plastic collected from the beach to raise awareness about the seriousness of plastics in the marine environment.

ISSN 2373-1575

No. 10 2018

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Potential Causes for an Important and Hopeful Increase in Sea Turtle Nesting in Cabo Verde in 2018

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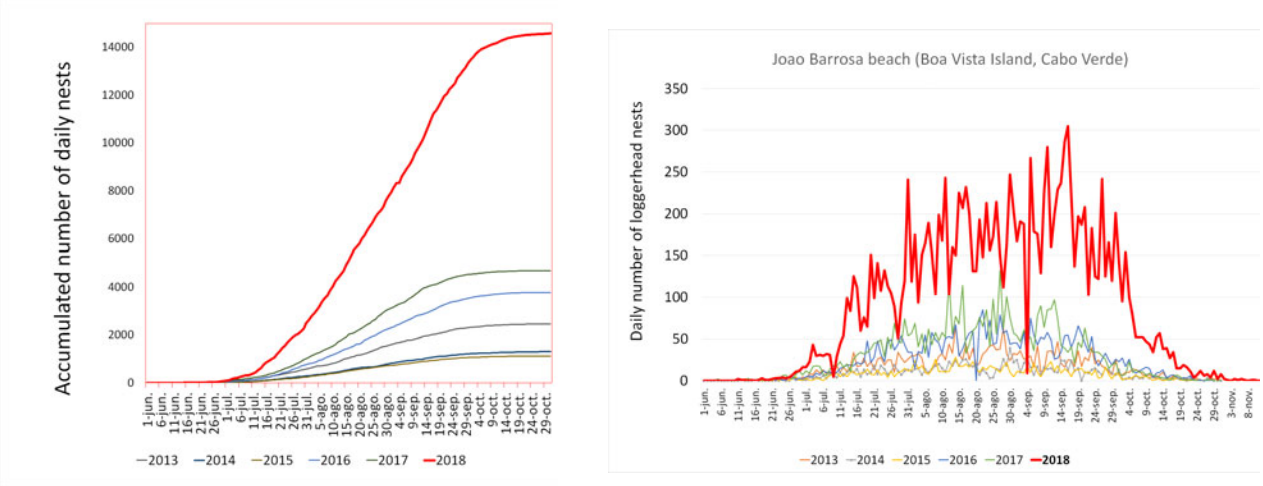
During the summer of 2018, the number of loggerhead turtle, *Caretta caretta*, nests in Cabo Verde approximately tripled with respect to the previously registered nesting record high, which was only the year before in 2017. Therefore, we could be facing the beginning of the long-awaited recovery of this threatened population.

Recently, the IUCN Red List updated its assessment of this species and considered that the population of Cabo Verde, unique throughout the eastern Atlantic, was in danger of extinction (Casale and Marco 2015), while the rest of the Atlantic populations were greatly improving in their conservation status (Casale and Tucker 2017). The Cabo Verde population was catalogued as one of the 11 most threatened in the world (Wallace *et al.* 2011). The last 20 years of conservation efforts seemed not to be paying off, however, the data from 2018 could indicate a very hopeful turning point in the future of this important rookery.

The number of nests on the beach is considered a reliable estimator of the total number of adult females in a population and, therefore, of their conservation status. A strong increase in the annual number of nests can be due to the fact that the number of adult females has increased. However, it can also be explained by other causes related to the complex reproductive strategy of sea turtles.



Accumulated daily nests (left) and number of daily nests (right) and at the beach of Joao Barrosa (Turtle Natural Reserve, Boa Vista Island, Cabo Verde) in 2018 compared to the six preceding years (data until 20 October 2018).

Each adult female rarely breeds in two consecutive seasons, and usually breeds between 2 and 5 years. Therefore, a very high synchronization of many females in the population in the same year could cause an increase in the number of nests without varying the total number of adult females in the population. However, during 2018 less than 0.5% of the adult female breeders had been identified in 2017. Therefore, no such synchronization seems to have occurred. In fact, it can be said that those 15,000-20000 females that may have nested this year in Cabo Verde must be added to the 6000-8000 that nested in 2017. This is excellent news, because about 10 years ago it was estimated that the total number of breeding females in the population could be between 8,000 and 10,000 individuals. Now we would have at least twice as much.

Another alternative could be related to a change in the annual number of nests laid per female. Each female nests several times during a season at intervals of 14 to 18 days. In Cabo Verde, it has been estimated that each female can lay between 4 and 6 nests per breeding year. We may think that this annual frequency of nests could have increased, explaining that increase in nests without changing in the number of females. A potential increase in food in the sea could have caused the accumulation of a very high level of fat reserves in the females that allow them to produce more nests per season. However, the start and end of this nesting season have been similar to all the previous years and, therefore, it seems highly unlikely that each female has had time to lay more than 7 consecutive nests. The temporal nesting pattern during 2018 is very similar to that of other years.

Very high density of loggerhead nesting activities (more than 50 nests per km per night) during 2018 on the Turtle Natural Reserve of Boa Vista Island, Cabo Verde (Photo: Adolfo Marco).

The most plausible explanation for this important increase in nests is that the number of adult females has really increased in the last two years. What could have happened to cause this important increase? The mortality of adult females could have been reduced significantly (Marco *et al.* 2012). However, the number of adult female remigrants has not been particularly high in 2018 or 2017. The mortality of females on beaches has been significantly reduced, but there is no evidence of any decrease in mortality at sea. In addition, the recapture rates of adult females remain very low, which indicates a high mortality, a very important weakness in the conservation of this population that we must keep trying to stop.

The surveillance of nesting beaches reduces female poaching and permits the rescue of disoriented females that become stranded in coastal wetlands or rocky areas. However, the poaching or bycatch at sea could still be a severe threat to adults of this population (Photo: Adolfo Marco).

Another explanation for the increase in adult females may be a very important reduction in the juvenile mortality of this population in their feeding areas, or a significant increase in the abundance of that number due to an increase in the productivity of nests in the last 30 years. The high number of neophyte females, that arrived in 2017 and especially in 2018 for the first time to breed in Cabo Verde, seems to support this hypothesis. Thousands of young females have joined the breeding population for the first time, which may explain this important increase in the number of nests.

This last explanation may make sense on the 20th anniversary of the start of turtle nesting protection in Cabo Verde. Twenty years is the estimated age when the sexual maturation of this species takes place. In 1998, the effective protection of the most important nesting beaches of Cabo Verde began, allowing many females to safely nest on these beaches after many decades of strong hunting pressure (Marco *et al.* 2011). An increase in the productivity of

these important beaches from 1998 onwards could favor a much greater abundance of Cabo Verde juveniles and an increase in their recruitment to the beaches of Cabo Verde after their maturation 20 years later.

An increase in the production of females in the nests, associated with global warming could also be contributing to a higher number of females on the beaches (Abella *et al.* 2016). Sea turtles have environmental sex determination during embryonic development based on the incubation temperature. Higher temperatures produce more females. During the past decades, the climate has possibly been warming at most of the sea turtle rookeries including Cabo Verde. This global change can be very detrimental to turtle populations if there is a lack of male production. However, in the short term, moderate increases of sand temperature can cause an increase in the number of females, and thus, an increase in the reproductive success at the population level.

We will have to be patient to see if these positive figures are maintained in the near future. If the most probable or relevant hypothesis to explain this increase is true, the prediction for the coming years is a continuous increase in the recruitment of new breeding females.
It will be important to maintain the conservation effort, so that an increase in the impact of other threats that are still present does not slow or revert this hopeful recovery trend that seems to be starting now. For this, the reduction in turtle hunting on the beaches is also really important. In 2018 the number of turtle hunters and the sale of turtle meat on the island seems to have decreased significantly compared to previous years.

Hatching success is very low on many important nesting beaches of Cabo Verde, mainly due to ghost crab predation (Marco et al., 2015) and beach flooding. Beach hatcheries for controlled incubation of threatened nests could significantly contribute to the increase in productivity of the population and the consequent increase in young females that recruit to the nesting population in Cabo Verde (Photo: Adolfo Marco).

The implementation of the new law in 2018 that protects turtles and penalizes their hunting much more effectively could be bearing fruit. The renewed efforts of sustainable development and environmental education programs on Boa Vista Island could also be having results. There is also a rumor that the beginning of the use of a drone with a thermal camera on the beaches to improve surveillance is having a very important deterrent effect on the turtle hunters on the island.

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Drones for Turtles: Controlling Poaching of Nesting Loggerhead Sea Turtles with Night Vision Unmanned Aerial Vehicles on Boavista Island, Cabo Verde

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Nearly all the nesting of the North East Atlantic subpopulation of the loggerhead sea turtle, *Caretta caretta*, occurs in the Cabo Verde Archipelago, where it forms the world's third largest nesting population of this species (López Jurado *et al.* 2007). According to recent reports by local NGOs, about two-thirds of this population nest on the island of Boavista. However, this subpopulation is ranked among the 11 most threatened populations in the world (Wallace *et al.* 2011) and is also rated by the IUCN Red List as "endangered". The main reason is rampant poaching of nesting females, albeit multiple anthropogenic influences such as incidental bycatch or direct poaching at sea take their toll too. In 2007 alone about 1,200 turtles were killed on the beaches of Boavista (Marco *et al.* 2012). Now, four NGOs on the island are currently actively protecting sea turtles, mainly by night time beach patrols, social and educational activities among the local population, and advocacy. Nocturnal patrols on the nesting beaches with mixed groups of rangers and international volunteers were initially successful, reducing documented poaching incidences by 90–100%, compared to the situation in 2007, on most of the approximately 55 km of beach that could be monitored regularly.

However, poaching has increased again in recent years as poachers have learned the working scheme of the beach patrols, and again more patrol groups have been added in response to this increase in poaching incidents. However, it turned out that a continuous increase in patrol groups to prevent poaching on over 50 km of nesting beach will be too expensive and therefore, not sustainable in the long run.

In order to increase the effectiveness of nesting beach protection on Boavista, the Turtle Foundation in collaboration with the Government of Cabo Verde and local NGOs developed two new protection techniques: one based on conservation dogs and the other on night vision drones. Both projects are designed to deliver technical and logistical support to the local police for the enforcement of a new law that has made the offense of killing, trade and consumption of sea turtles a criminal act, and which obliges judicial authorities and the police to prosecute offenders. These projects are part of a new anti-poaching strategy aimed to replace the prevention-oriented method, of keeping poachers away from the beaches by just the presence of patrols, with a three-step approach of detection, intervention, and prosecution of poaching activity.

In the course of major technological advances in the recent years, unmanned aerial vehicles (UAVs) or drones are being increasingly adopted as a cost-efficient method for conservation activities – not only for research and conservation-relevant data, but also for direct monitoring and protection activities (for sea turtle conservation, see Rees *et al.* 2018). During the 2018

turtle nesting season, a task force was established consisting of two local drone operators and two policemen. The team was equipped with a commercial long-range quadrocopter (DJI Inspire 1 V2.0) carrying a bolometric infrared camera (Zenmuse XT 640) detecting the thermal radiation of objects.

Training of the drone operators at the beach of Boa Esperança under daytime conditions.

During the 2018 nesting season, the drone task force regularly operated on those beaches especially threatened by poaching due to their proximity to local villages, accessibility, and high nesting numbers. Drone missions were planned and carried out taking into account various local and temporal conditions as well as strategic aspects. For each mission, a target area was randomly selected and adjacent beaches were covered by repeated, several kilometres-long surveillance flights during the night. The policemen were on standby to intervene immediately if suspicious activity was detected.

Between the beginning of August and end of October 2018, more than 70 missions with around 400 individual drone flights were carried out while managing various environmental, technical, and logistical challenges that came along with this new technique. No poachers could be caught, but poaching rates dropped considerably compared to the previous years despite unusually high nesting activity in 2018. We attribute this to the combined effect of the new law increasing the local protection status of sea turtles and the publicly known, but unpredictable, presence of the drone task force and its police officers.

Preparation for a night mission at dawn at Ponta de Roque at the eastern end of Boavista. The tarp in front of the car serves as take-off and landing pad for the drone. Landing the drone on the tarp at night, guided only by the thermal image of the drone's infrared camera, is particularly challenging and required extensive training. To enable a clandestine operation of the drone team, the use of light during night operations was avoided as much as possible, and also the position lights of the drone were covered to make it invisible.

Setting up the drone for a night operation that started near Turtle Foundation's field station at Cruz do Morto Beach.

However, the pure deterrent effect might not be sustainable in the long run if persistent poachers are not captured and prosecuted. Therefore, the method is now being evaluated and will be adapted accordingly so that it develops into an efficient supplement or even an alternative to conventional beach patrolling in the future. To our knowledge, this is the first application of thermal night vision drones in an anti-poaching strategy for the protection of sea turtles.

Thermal drone image showing two rangers of the NGO Cabo Verde Natura 2000 measuring and tagging a nesting loggerhead turtle at Praiona beach. More nesting turtles are indicated by arrows. Drone height was approximately 60 m above the ground. During surveillance operations, people on the beach could be recognised from distances of several 100 m while the drone remained unnoticed.

Thermal drone image: The drone returns to the home base at Ponta de Roque (arrow). The landing tarp (front) and the car are clearly distinguishable; distance approximately 400 m.

Acknowledgements: This project is carried out in collaboration with and under permission of the following Cabo Verdean governmental institutions: Direcção Geral do Ambiente, Policia Nacional Verde, and Agência de Aviação Civil. It is funded by MAVA Fondation pour la Nature and other donors of Turtle Foundation; their contribution is extremely appreciated. We are very grateful to Owen McAree from ConservationDrones.org for technical advice. Special thanks go to the drone pilots, whose tireless, regular night work made the success of the project possible.

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Interaction Entre les Pêcheries et les Tortues Marines dans la Région de M'diq-Martil au Nord-ouest du Maroc

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Abstract: Incidental capture of sea turtles by fishing gear is one of the most urgent problems to solve in order to conserve and protect sea turtles worldwide. This study presents estimates of sea turtle bycatch in the Martil-M'diq region in 2016. These estimates were obtained by analyzing information on the interactions between turtles and fisheries using an integrated approach based on interviews. The responses of 43 fishermen allowed us to identify the impact of each type of fishing gear on sea turtles in this region. A total of 46 turtles were estimated to be captured in 2016 by these fishermen, of which 95.6% (n = 44) were loggerheads and 4.4% (n = 2) were green turtles. Results indicate that 21 loggerheads were caught by purse seine, 17 loggerheads by longline, 5 turtles (3 loggerheads and 2 green turtles) by trawl, and 3 loggerheads by trammel net; none were captured by beach seine nets.

Les grands vertébrés marins les plus affectés par les effets négatifs des prises accessoires sont les tortues marines, les requins et les cétacés (Lucchetti *et al*. 2017). Les interactions entre ces taxons et les engins de pêche entraînent la capture, les blessures et même la mortalité (Moore *et al*. 2009 **;** Bourjea *et al.* 2014)**.** L'impact des prises accessoires sur la survie de ces taxons dépend de leurs paramètres biologiques, notamment la longévité, les faibles taux de reproduction et la maturité tardive. Pour ces raisons biologiques, ces animaux sont particulièrement vulnérables (Moore *et al*. 2010; Lewison *et al*. 2004 ; Lucchetti *et al*. 2017). Le risque de ces interactions, augmente par le chevauchement spatio-temporel entre les zones de pêche et les habitats de la mégafaune marine, y compris les tortues marines (Wallace *et al*. 2010). Le déclin des tortues marines dans le monde, en particulier en Méditerranée, est principalement lié aux captures accidentelles dans les engins de pêche et autres activités humaines (par exemple, la dégradation de leur habitat et la pollution marine) (Benhardouze *et al*. 2012 ; Lucchetti *et al*. 2016). Dans ce contexte, la pêche accidentelle ou "bycatch" d'espèces non ciblées par les engins de pêche est un défi commun de toutes les pêcheries dans le monde entier (Moore *et al*. 2009), qui touche la gestion et la conservation de la pêche (Hall *et al*. 2000; Tomás *et al*. 2008)**.** En Méditerranée, trois espèces de tortues marines menacées sont présentes: la tortue verte (*Chelonia mydas*), la tortue luth (*Dermochelys coriacea*) et la tortue caouanne (*Caretta caretta*) (Casale 2011). Dans cette région, les tortues marines sont capturées principalement par le chalut, la palangre et les filets fixes (Lucchetti *et* Sala 2010; Casale 2011). Plus de 132 000 captures se font annuellement, avec plus de 44 000 décès accidentels par an ont été estimées en Méditerranée (Casale 2011). Les tortues vertes et les tortues caouannes sont les plus touchées. Le Maroc est classé parmi les pays de la Méditerranée ayant un nombre annuel de captures supérieur à 10 000 tortues (Casale 2011). L'objectif de cette étude est d'évaluer à travers des questionnaires, les interactions entre les tortues marines et les engins de pêche utilisés par les bateaux au port de M'diq et le point de débarquement aménagé (PDA) de Martil (Nord-Ouest du Maroc).

Méthodologie

Les enquêtes ont eu lieu entre mars et juin 2017 au niveau du port de M'diq et le point de débarquement aménagé (PDA) de Martil (Fig.1).

Nous avons mené des interviews avec 43 pêcheurs, en utilisant un seul questionnaire pour toutes les pêcheries. Ce questionnaire a été utilisé pour identifier et quantifier les interactions entre les engins de pêche et les tortues marines dans cette zone. Cependant, un seul pêcheur a été interrogé par bateau pour éviter la redondance. Le questionnaire comprend une combinaison de questions à choix multiple explorant l'opinion des pêcheurs avec une grande liberté de réponses.

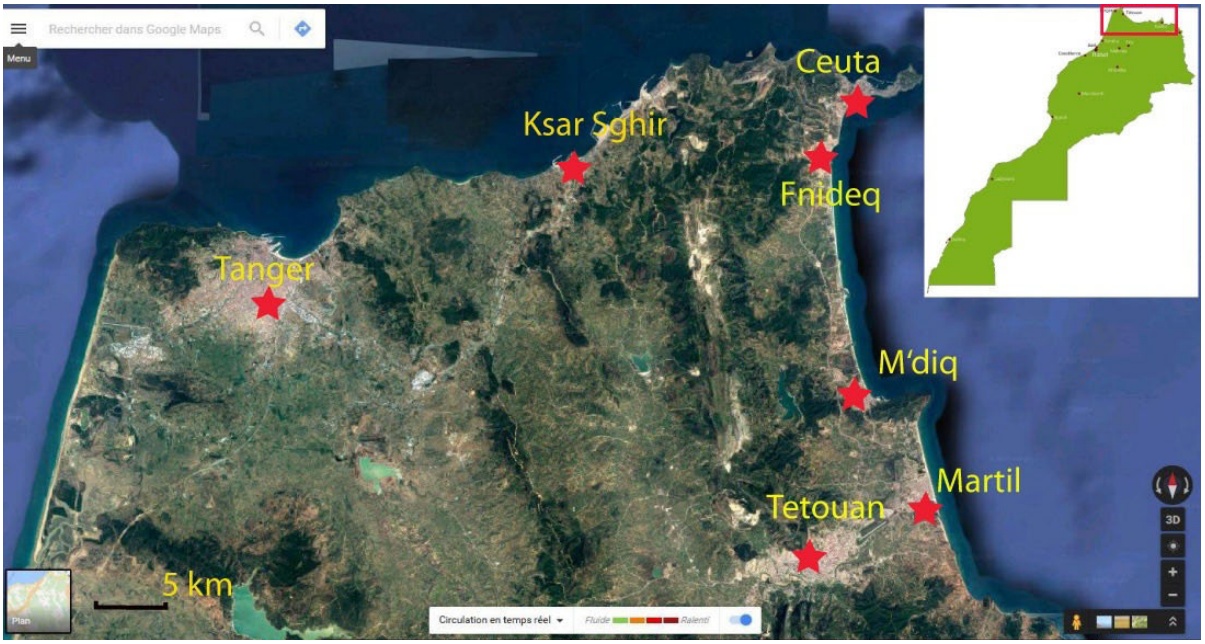

Figure 1. Carte de la zone d'étude.

Nous avons posé une série de questions concernant principalement :

- Les aspects socio-économiques : âge, profession, etc.
- Les captures accidentelles de tortues dans la région : espèces, zone, période et nombre de captures. On a demandé aux pêcheurs de préciser le nombre exacte de tortue capturée et l'engin impliqué
- Les caractéristiques techniques des bateaux et engins de pêche utilisés : le type d'engin, saisons d'utilisation, la longueur du bateau, la puissance du moteur, l'équipage.

Nous avons distribué les photos de différentes espèces de tortues marines pour aider les pêcheurs à identifier les espèces qui entrent en interaction avec leurs engins de pêche. Les estimations des prises accessoires dans cette étude sont exprimées par le nombre de tortues capturées par l'engin de pêche par an selon les pêcheurs avec des estimations séparées pour chaque espèce de tortue marine. Le but de l'étude et la confidentialité des données recueillies ont été signalés au début des entretiens aux pêcheurs interrogés.

Résultats

Au total, 43 pêcheurs (20 au point de débarquement aménagé de Martil-PDA et 23 au port de M'diq) ont été interrogé (Tableau 1). Tous sont des hommes, avec un âge moyen de 48 ans (19-68 ans, n = 43, s = 11,32). La majorité des pêcheurs sont âgés de 36 ans ou plus (86.05%, n = 37) et seulement 13.95.% (n = 6) ont un âge entre 19 et 32 ans. Ces caractéristiques démographiques montrent un manque de recrutement de jeunes dans la profession. Presque la totalité des pêcheurs (90.70%, n = 39) ont déclaré que la pêche est la principale source de vie; les autres ont dit que l'agriculture est une source secondaire qui complète leurs revenus.

Tableau 1. Caractéristiques socio-économiques des pêcheurs interrogés.

	Nombre de pêcheurs interrogés	Position sur le bateau	%	La pêche	%	Années actives en tant que pêcheur professionnel	%	Age (années)	%
PDA de Martil	20	Capitaine	100	la seule façon de gagner la vie	85	5 à 30	50	19-32	20
						31-40	35	36-40	5
				Autres sources	15	>40	15	42-50	30
								51-68	45
M'diq	23	Capitaine	52,17	la seule façon de gagner la vie	95,65	5 à 30	65,21	19-32	8,7
		Membre d'équipe	47,83			31-40	30,43	36-40	8,7
						>40	4,36	42-50	30,43
				Autres sources	4,35			51-68	52,17

La longueur moyenne des bateaux concernés dans cette étude est 10,39 m (5 – 24 m, n = 43) et la puissance motrice moyenne est de 174 CV(cheval-vapeur) (15 –540 CV, n = 43).

Les pêcheurs utilisent 5 types d'engins de pêche:

- la palangre : pêche par des hameçons fixés sur ligne principale
- le chalut : pêche par un filet de fond sous forme d'un entonnoir
- la senne tournante : pêche de petits pélagiques utilisant un filet de surface sous forme circulaire
- la senne de plage : pêche de poissons par un filet tiré par les pêcheurs au niveau de la plage
- le trémail : pêche par filet déposé au fond à l'aide de supports métalliques

Ils peuvent utiliser à la fois deux ou trois engins de pêche, mais chaque pêcheur utilise normalement des engins et des techniques de pêche en fonction des espèces ciblées, la période de l'année et la zone de pêche (Tableau. 2).

Tableau 2. Nombre de différents types d'engins de pêche utilisés par les pêcheurs interrogés.

	Pêcheurs interviewés		
Engin de pêche	M'diq	Martil	total
Palangre	5	8	13
Chalut	7	0	6
Senne tournante	10	0	10
Trémail	0	9	10
Senne de plage	1	3	4

La majorité des pêcheurs actifs depuis plus de dix ans (83.72%, n = 36) ont déclaré que le nombre de captures des tortues marines a diminué par rapport au passé. La minorité a déclaré que les prises accessoires des tortues marines a augmenté (4.65%, n = 2 ; Fig. 2). Tous les pêcheurs qui sont actifs depuis plus de 10 ans (n = 39) ont signalé des changements dans le nombre des tortues marines observées. La majorité des pêcheurs (72.09%, n = 31) ont déclaré que le nombre des tortues marines observées a diminué par rapport au passé. Peu de pêcheurs ont signalé que cette observation des tortues marines est toujours la même (4.65%, n = 2 ; Fig. 2).

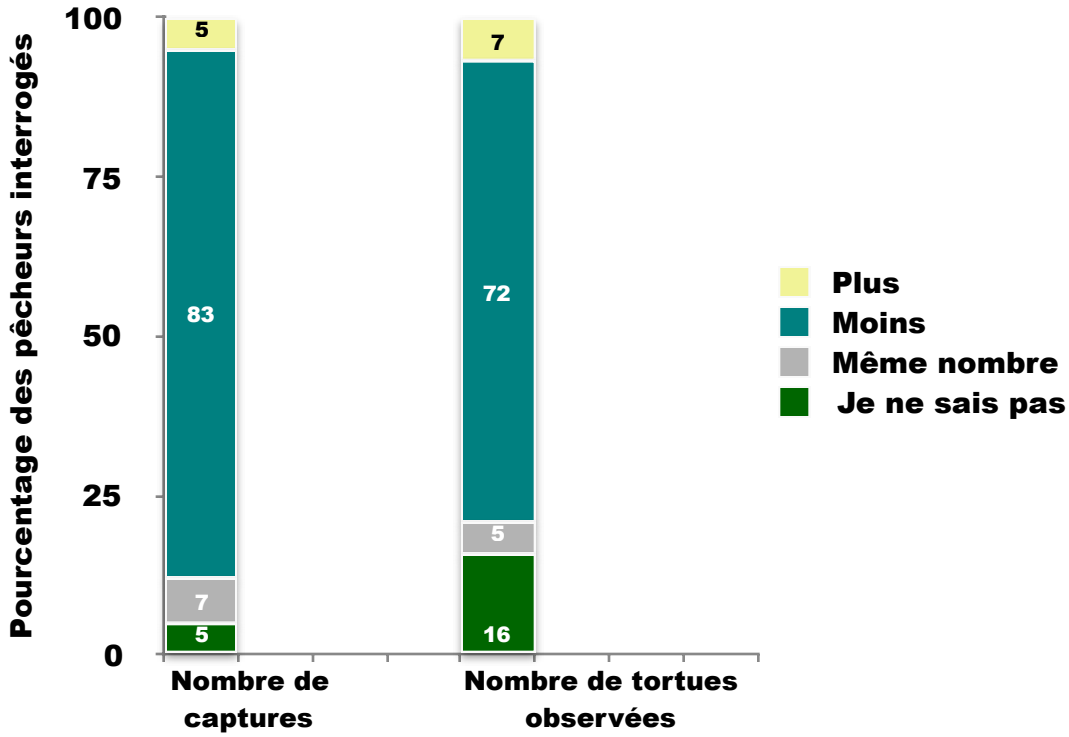

Figure 2. L'impression des pêcheurs sur l'évolution de la capture et l'observation des tortues marines (Plus = plus que dans le passé, Moins = moins que dans le passé, Même nombre = même nombre que dans le passé, Je ne sais pas= aucune idée).

Au total, 46 tortues marines (44 tortues caouannes et 2 tortues vertes) ont été capturées accidentellement en 2016, par 43 bateaux selon les enquêtes au port de M'diq et le point de débarquement aménagé de Martil. Selon les déclarations des pêcheurs, toutes les tortues caouannes et vertes ont été capturées vivantes. La senne tournante est l'engin de pêche le plus menaçant pour les tortues marines dans cette zone selon les pêcheurs: 21 caouannes sur 46 tortues marines au total sont capturées dans leurs filets. La palangre vient en deuxième position dans les captures des tortues marines (17 tortues caouannes) dans cette pêcherie. Pour le chalut , il y a 5 captures avec 3 caouannes et 2 tortues vertes. Le trémail vient en dernière position avec 3 caouannes (Fig. 3).

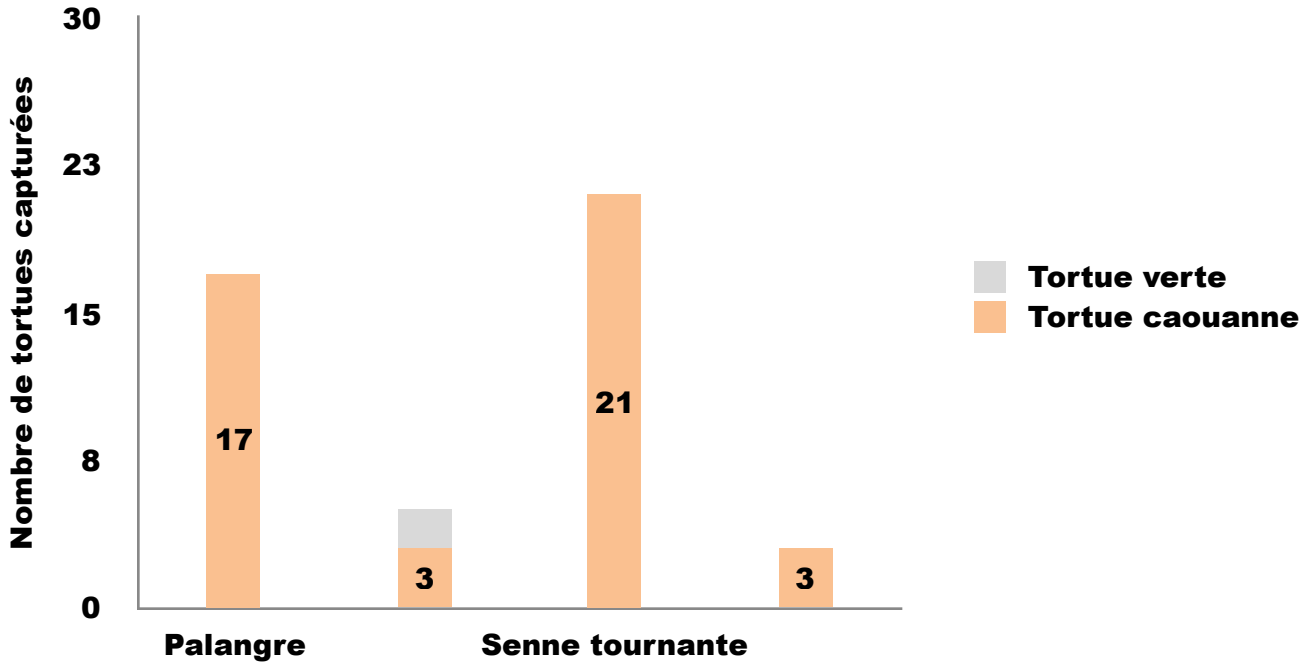

Figure 3. Nombre des tortues capturées par chaque engin de pêche en 2016.

Discussion

La plupart des engins de pêche interagissent avec les tortues marines et engendrent des prises accessoires (Godley *et al*. 1998; Hall et Roman 2013). Ces interactions se produisent où les engins de pêche chevauchent leurs habitats (Lucchetti *et al*. 2016). Cette étude fait partie des contributions du bycatch dans les eaux marines du Maroc et spécialement par les engins de pêche opérant dans le port de M'diq et le point débarquement aménagé de Martil.

Nos résultats indiquent que 46 tortues marines (44 caouannes et 2 tortues vertes) sont capturées en 2016 par 43 bateaux. Dans cette étude la tortue caouanne est la plus capturée par les différents engins de pêche opérant dans cette région. Des résultats similaires ont été signalés dans la région de Tanger (Benhardouze *et al*. 2012), ainsi que dans la mer Méditerranée (Casale 2011). Le même constat a été mentionné par Jribi *et al.* (2007) dans le golfe de Gabès et Casale *et al.* (2007) en Méditerranée centrale. Cependant, dans notre étude et selon les déclarations des pêcheurs, la tortue verte est rarement capturée, seulement 2 tortues ont été capturées par la pêche au chalut en 2016. Ce résultat est cohérent avec celui de Laurent *et al.* (2001) qui ont également signalé une seule tortue verte a été capturée par cette méthode de pêche en Italie et en Grèce.

Dans cette étude, la palangre et la senne tournante sont considérées les engins de pêche les plus menaçants pour les tortues marines, surtout la tortue caouanne dans cette région en 2016 en terme de nombre annuel de captures accidentelle. La pêche à la palangre est une menace pour les tortues marines en Méditerranée (Deflorio *et al*. 2005 ; Casale 2011). En raison de l'impact négatif de cette pêcherie, plusieurs études sont menées: par exemple, au Maroc (Benherdouze *et al*. 2012), dans le golfe de Gabès (Jribi *et al*. 2008), dans la mer Ionienne (Deflorio et *al*. 2005). Dans la présente étude, la senne tournante a un impact régional élevé sur les tortues marines. Par contre au niveau des océans (Atlantique et Indien), Bourjea *et al.* (2014) sur la base des données recueillies par des programmes d'observateurs durant une période de 16 ans (1995 à 2011) ont constaté que les senneurs européens ont un impact très faible sur les tortues marines.

Nous avons utilisé une approche basée sur des questionnaires avec les pêcheurs, pour estimer les prises accessoires des tortues marines. Cette approche utilisée pour estimer le nombre annuel minimal des prises accessoires, pour identifier les engins, les saisons et les zones à risque élevé, afin de mettre en œuvre des mesures de gestion adéquates.

L'estimation de l'impact des engins de pêche opérant dans la Méditerranée marocaine sur les tortues marines, nécessite des informations fiables et complètes sur les prises accessoires, l'effort de pêche et la taille de la flotte à grande échelle temporelle. Dans ce contexte, l'intégration des pêcheurs à travers les compagnes de sensibilisation et les ateliers de formation sur les méthodes et les techniques de sauvetage des tortues marines est la meilleure façon de protéger ces créatures en voie de disparition.

Remerciements: Les auteurs remercient l'Office Nationale de Pêche à M'diq pour la mise à notre disposition des données de la fiche technique du port. Nous remercions tous les pêcheurs qui ont répondu aux questionnaires. Nous remercions aussi tous les étudiants qui ont accepté de remplir les questionnaires.

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Cas de Tortues Caouannes, *Caretta caretta,* Echouées au Large du Maroc Atlantique entre Azemmour et Bouznika

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Abstract: We report 2 loggerhead strandings observed in Morocco: the first loggerhead stranded on Daya Mansouria Beach in March 2009 and had a curved carapace length of 70 cm, and the second stranding observed in August/September 2018 was in an advanced state of decomposition and had a curved carapace length of 73 cm. The reason for death is not known, but the impact of fisheries is a very serious threat in the region.

Pour l'Atlantique, nous avons peu de données concernant le taux d'échouage surtout dans certaines régions. Au Maroc, la tortue Caouanne, *Caretta caretta*, est signalée dans plusieurs régions (Bons et Geniez 1996; Aksissou *et al*. 2006; Benhardouze *et al*. 2005). La caouanne représente 95%, la luth, *Dermochelys coriacea,* 4% et la tortue verte, *Chelonia mydas,* 1% des statistiques des captures accidentelles et des échouages de la population des tortues marines du Maroc (Benhardouze 2009; Benhardouze *et al*. 2018). Dans notre cas, nous présentons deux observations d'individus échoués sur la côte atlantique :

1er cas : une tortue caouanne vient d'échouer sur la plage de Daya à Mansouria (Fig. 1-2) au Nord de Mohammedia (33°45'38,60"N, 7°17'26,30"W) quelques jours avant le 21 mars 2009. Au début, la tortue n'était pas putréfiée (mort récente) et la taille de la carapace était de l'ordre de 70 cm de longueur courbure. Lors des premières observations, l'animal ne portait pas de blessures, ni sur la carapace ni sur la tête et les membres.

Figure 1. Tortue caouanne échouée sur la plage de Daya à Mansouria (Photo: A. Rihane).

Figure 2. Plage de Daya à Mansouria (NE de Mohammedia) lieu d'échouage de la tortue caouanne en mars 2009.

2ème cas : une autre tortue caouanne a échoué sur la plage de Bir Retma (33°26'58,3" N, 8°02'02,4" W) au Nord de Bir Jdid (Fig. 3-4). L'échouage s'est produit entre le 31 août et 1 septembre 2018. Le cadavre était dans un état avancé de décomposition. La carapace de cette tortue mesurait environ 73 cm de longueur courbure.

Figure 3. Tortue caouanne échouée sur la plage de Bir Retma (Photo : E. Asri et E. Rihane).

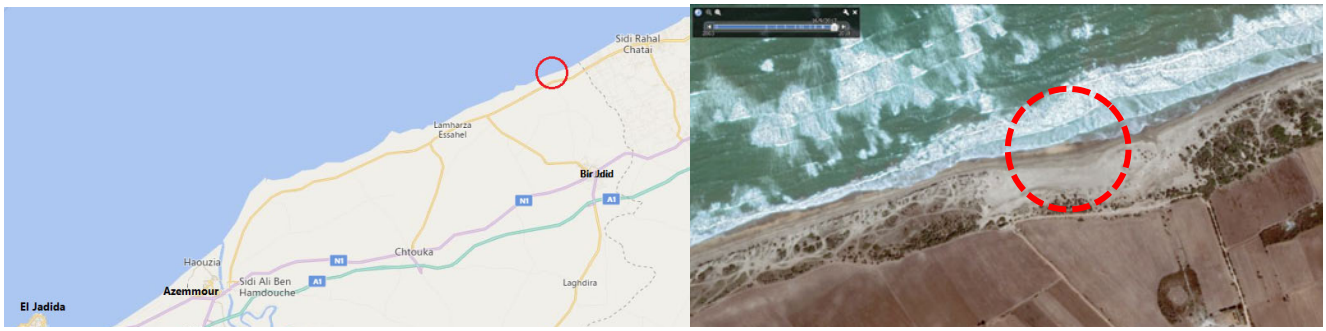

Figure 4. Plage Bir Retma (Nord de Bir Jdid) lieu d'échouage de la tortue caouanne en 2018.

Nous ne connaissons pas la raison de la mort de ces tortues, mais l'impact des prises accidentelles par la pêche sur les populations des tortues marines est un problème majeur à résoudre et une menace très grave à la survie de ces espèces dans le monde entier (Gerosa et Casale 1999; Casale *et al.* 2004). Dans certains cas, la cause peut être la pollution par les carburants (Aksissou *et al*. 2006) ou la capture accidentelle par des filets, voire même les blessures par les hélices des bateaux (Benhardouze *et al*. 2005).

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Marine Wildlife Roadshow Challenges Attitudes Towards Sea Turtle Poaching

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In September 2018, Sea Sense conducted a marine wildlife roadshow in Mafia Island, Tanzania's most important marine biodiversity hotspot. It is home to the largest population of nesting green turtles *(Chelonia mydas)* in Tanzania, as well as the only resident population of whale sharks (*Rhincodon typus*) and a small population of dugongs (*Dugong dugon*).

The event aimed to raise awareness about the plight of marine wildlife in Tanzania. In Mafia, consumption of sea turtle meat is widespread and their foraging and breeding habitats are being degraded by illegal and destructive fishing practices (use of beach seine nets and explosives). Sea Sense used a range of visual materials including sea turtle carapaces, artificial turtle eggs, and a life-size model of a dugong to sensitize the public about marine wildlife biology, life history, status and threats to their survival.

Marine wildlife roadshow in Mafia Island.

The roadshow passed through 10 villages in Mafia and reached more than 10,000 people including fisher families, school pupils, and local leaders who were able to see and touch the turtle carapaces and models, and direct questions to the Sea Sense team. For many people, it was the first time to access such information and it helped them to understand the ecosystem roles of sea turtles, dugongs and whale sharks, and the linkages between healthy marine ecosystems, productive fisheries and local food security. With a new understanding of the economic importance of marine wildlife, the roadshow participants engaged in long debates about the right to eat sea turtle and dugong meat.

One of the roadshow participants in Jimbo village, Mwanasia Khatib, admitted that her family consumed sea turtle meat regularly. *"I used to think that consumption of sea turtle meat is a normal thing, but today this event has opened our minds and educated us on the biology of sea turtles and their ecosystem roles".*

Community debate about the right to eat sea turtle meat.

Mwanasia Khatib shares her experiences of eating sea turtle meat.

Mwanasia was also unaware that the meat of some sea turtles can be toxic to humans. *"From now onwards I'm not going to cook sea turtle meat because it can kill. My children often suffer from diarrhea after consuming turtle meat. I'm so happy about this roadshow because it has saved our lives, especially my fellow women and our children".*

Kombo Nyimwimba, a fisher from Bweni village explained the importance of education in reducing sea turtle poaching. *"This roadshow has come at the right time to Bweni because there has been severe turtle poaching in our village, but I'm sure people have understood just like me and they will join together and be against the people who are destroying our resources. This will enable us to restore sea turtle populations to what they were in the past and secure our livelihoods and our individual household income, so as to decrease the number of poor people in our country".*

The marine wildlife roadshow was funded by the USAID PROTECT project, which supports innovative communications initiatives to raise awareness amongst community and national level decision-makers about the importance of biodiversity conservation.

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Scaling Up a Successful Community-Based Model for Sea Turtle Conservation into Northeastern Tanzania

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Within a small coastal fishery-dependent village called Boma Subutuni in northeastern Tanzania, people have been living alongside sea turtles for generations. Local fishers trade sea turtles caught as bycatch and consume eggs of nesting females; some of them believe that sea turtle meat and eggs cure asthma and increase sexual desire. In addition to the poaching of sea turtles and their eggs, illegal and destructive fishing practices have caused serious damage to sea turtle foraging and breeding habitats.

Over the past year and a half, Sea Sense has scaled up an existing community-based sea turtle conservation and education programme into Tanga Region to address threats to sea turtles in villages like Boma Subutuni. Sea Sense expanded an existing community Conservation Officer network and recruited Khatibu Juma (42), a local fisher from Boma Subutuni. Khatibu was already an active member of a local fisheries management association (Beach Management Unit) so he had a good understanding of the importance of conserving and protecting marine and coastal resources. Sea Sense provided practical training to Khatibu so that he could identify sea turtle nests, locate the egg chamber, relocate eggs to safer places, and conduct post hatching excavations to calculate hatching success.

Khatibu (back left) and the new team of community Conservation Officers in Tanga Region.

Khatibu has now identified 11 green turtle (*Chelonia mydas)* nests on the beach that he patrols each day and all 11 nests hatched successfully with 1,520 hatchlings safely reaching the sea. This is a big success for Khatibu because females were routinely slaughtered on the beaches in Boma Subutuni and nests were always poached. *“Being able to monitor 11 nests and*

witness 1,520 sea turtle hatchlings successfully reach the ocean shocked me, our village leaders, the community and the District Authorities. They appreciate the impact that this project has brought. In the past it wasn't easy to observe sea turtle hatchlings reaching the ocean safely because poaching was so widespread. It is my privilege to be a Sea Sense Conservation Officer and I feel lucky to be involved in this conservation mission."

Sea turtle poaching is widespread in Tanga.

A vital part of the role of a Conservation Officer is the sensitization of his/her community on the importance of sea turtle conservation and protection. Khatibu has also observed that the project has changed attitudes amongst village leaders in Boma Subutuni. *"Village leaders sensitized the community through a general assembly meeting and urged them to take responsibility for our marine resources by reporting illegal fishing, sea turtles nests and sea turtle mortalities. As a result, local fishers always give me full support by notifying me of sea turtle mortalities as well as new nests so that I can quickly relocate them to a safe place. Illegal fishers have also been reported to the village authority through the Beach Management Unit. Currently, we are looking forward to the establishment of an ecotourism center for earning income and educating more people about sea turtle conservation"*.

The project was funded by the European Union via the Indian Ocean Commission.

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This newsletter is supported by
Ocean Ecology Network, Inc. and John Dutton Productions

INSTRUCTIONS FOR AUTHORS

The African Sea Turtle Newsletter (ASTN) is a free, bi-annual international electronic publication about the biology and conservation of sea turtles in Africa, and the stories of people who work with sea turtles on this vast and diverse continent and its offshore islands. This publication hopes to increase communication and collaborations among all those working with sea turtles in Africa –scientists, conservationists, policy-makers, project managers, community members, students, professors, everyone!—as well as share news with the international sea turtle community.

Contributions can range from original scientific papers and natural history observations to opinions, anecdotes, local myths, taboos, pharmacopeia, and legends, as well as field experiences, workshops, education and awareness activities, and announcements. We will accept and publish contributions in English, French, Spanish, and Portuguese so that everyone can express themselves in the language they most feel comfortable.

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