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Public release of a tagged loggerhead sea turtle in Libya - see pp. 7-9 (photo: A. Hamza).

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Flags Reduce Sea Turtle Nest Predation by Foxes in NE Brazil

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The north coast of Bahia state is one of the principle reproductive sites for loggerhead (*Caretta caretta*), hawksbill (*Eretmochelys imbricata*) and olive ridley (*Lepidochelys olivacea*) sea turtles in Brazil (Marcovaldi & Laurent 1996). In this region, nearly 200 km of beach from the city of Salvador to the border with Sergipe are patrolled by staff of Projeto TAMAR (Brazilian National Sea Turtle Conservation Program), resulting in the protection of all nests during egg incubation.

In Mangue Seco beach, starting in the 2005/2006 nesting season, emphasis has been placed on protecting nests in situ by leaving them in their original locations, rather than relocating most to open-air hatcheries, which had been the main strategy up until then. For in situ incubation, all freshly laid nests were verified and had wire panel grids (metal rounded by plastic) placed 5-10 cm below the surface of the sand and above the nest cavity. The mesh size was large enough to allow hatchlings to pass through it during their emergence from the nest (Marcovaldi & Laurent 1996; Marcovaldi & Marcovaldi 1999). However, starting in 2005/2006, there was a substantial increase in the predation rate of incubating eggs, despite the use of the wire panels. The main predator was identified as the crab-eating fox (*Cerdocyon thous*), based on direct observation, bibliographic research and foot-print identification (Fig. 1).

One of the different management actions to reduce nest predation that was considered is predator removal (Barthon & Roth 2006; Meier & Varnham 2004; O'Toole 2003; Ratnaswamy & Warren 1998; Woolard et al. 2004; Yerli et al. 1997; Zeppellini et al. 2007). However, given the possible cascade effects of removal or eradication programs, as well as ethical and legal implications, this option was not pursued. As an alternative, we investigated the use of flags over the nests as a possible deterrent to foxes. We used flags made from 1.20 m wooden sticks with 50 x 80 cm resistant textile. On some flags, we also attached a metal rattle, to check if adding sound to the flags would increase their predator avoidance effectiveness (Fig. 2).

Following an analysis of predation rates in different areas of Mangue Seco, we selected an extension of 19 km of beach to analyze nest predation events and to test the effectiveness of the flags to reduce predation rates. During the 2007/2008 nesting season, from September to March, the beach was patrolled daily and all nests were registered. The study area contains permanent post markers placed at 1 km intervals along the beach and were used to record nest site positions and to guide the flag use.

Three different treatments were used to protect the nests: grid (G), grid and flag (GF), grid and flag with rattle (GFR), and applied independently to nests laid between the kilometers, following this sequence described above. This standardized placement strategy helped avoid concentrating a particular treatment in particular areas of the study beach. Nests protected only with grids were considered as control nests in the study.

A total of 635 nests were recorded in the study area: 388 olive ridley nests, 97 loggerhead nests, 3 hawksbill nests, and 147 non-identified nests. Fox predation was observed in 145 nests (22.8%), of which 66 (45.5%) were olive ridley nests, 65 (44.8%) were non-identified nests, 13 (9.0%) were loggerhead nests and 1 hawksbill nest. Predation rates indicate no clear preference for nests of a particular sea turtle species, which is consistent with the opportunistic foraging behavior of crab-eating foxes (Berta 1982, Michalski et al. 2006).

Eighty-eight nests were predated before monitors could set protection of any kind, comprising 62.07% of all instances of nests with animal predation. Two nests were harvested for human consumption before protection, and were excluded from animal predation analyses (Table 1). Furthermore, of the 545 nests that received some kind of protection, 57 (10.4%) were predated, of which 44 (77.2%) were protected with only a grid (Table 1).

A significant difference was observed between the rate of predation of nests protected with grids alone vs. nests with grids

Figure 1. *Cerdocyon thous* footprints and one individual found as road-kill near the study area.

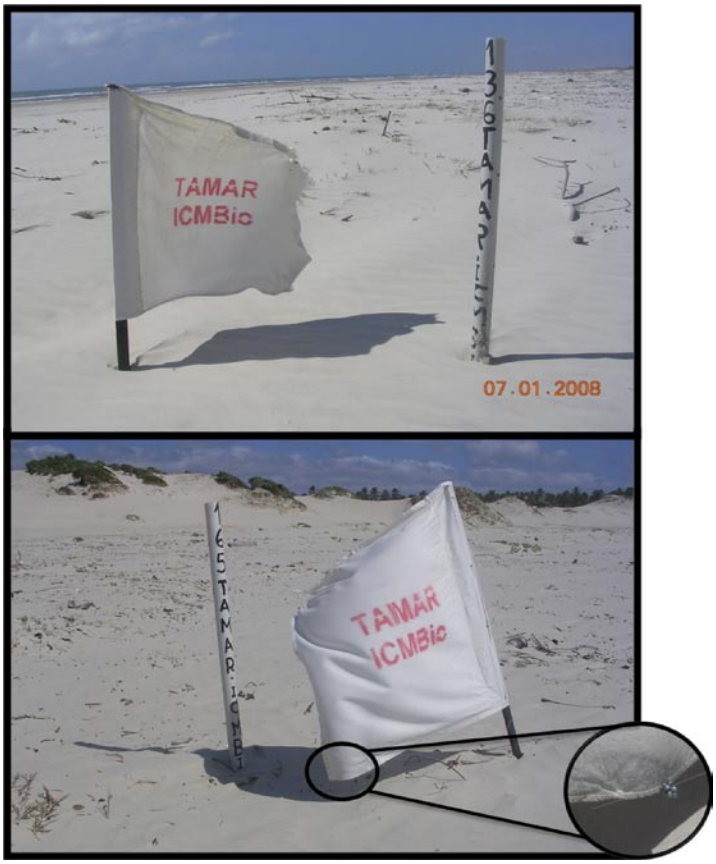

Figure 2. Flags used to reduce nest predation by wild dogs in northeastern Brazil. Upper flag does not contain rattles in contrast of the lower, in which the small circle indicates the rattles in detail.

Treatment	Successfully Hatched	Animal Predation	Other	Total
Grid	169 (78.2%)	44 (20.4%)	3	216
Grid/Flag (GF)	182 (94.3%)	7 (3.6%)	4	193
Grid/Flag/ Rattle (GFR)	129 (94.9%)	6 (4.4%)	1	136
Total	480 (88%)	57 (10.5%)	8	545
Flagged Nests (GF&GFR)	311 (94.5%)	13 (3.9%)	3	327
Predated before protection	n/a	88	2	90

Table 1. Nest protection strategies and numbers of nests predated and successfully hatched. Nests initially marked and subsequently lost (through tidal erosion, human predation, or other reasons) are grouped in the Other column.

and flags ($x^2 = 25.98$, d.f. = 1, $p < 0.001$), and also between nests protected by grid alone vs. those protected with grids and flags with a rattle ($x^2 = 17.65$, d.f. = 1, $p < 0.001$). This indicates the flag protection effectiveness as a good method to reduce nest predation when compared to the grid itself. However there was no significant difference in rate of predation between nests protected by flags with or without a rattle ($x^2 = 0.11$, d.f. = 1, $p > 0.05$). Thus, it appears that the rattle did not increase the efficiency of the flags to deter predation. Overall, 324 nests were protected with grids and flags (with or without rattle), and the rate of predation of this group was 3.95%, which was significantly lower than 24% predation rate for nests protected by grids alone ($x^2 = 37.52$, d.f. = 1, $p < 0.001$).

We suggest that flags are a simple and low cost solution to reduce sea turtle nest predation by foxes in northern Bahia. It may be the case that constant coastal winds, typical of northern Bahia, may contribute to the effectiveness of the flags, and flags may be less a less effective deterrent in other areas. There is also the possibility that over time, foxes may habituate to the flags and even begin to associate flags with a food source, as has been observed in the Mediterranean (Yerli et al. 1997). However, Tubberville & Burke (1994) tested whether flag markers attracted mammalian predators of fresh water turtle nests, and found that predators did not develop an association between flags and food availability. Tubberville & Burke (1994) also recommended alternating between different kinds of markers, to reduce the likelihood that mammalian predators may associate certain markers with turtle nests. Overall, we recommend that long term research is needed to properly address these issues.

Previously suggested methods for reducing mammalian predation of sea turtle nests include predator removal, either by trapping, using poisons or chemical repellents, and relocation of nests out of reach of predators. There are ethical and ecological implications associated with these strategies (Barthon & Roth 2006; Bouchard & Bjorndal 2000; O'Toole 2003; Ratnaswamy & Warren 1998), not to mention legal hurdles: the crab eating fox is a is a natural predator in northern Bahia, not an exotic or introduced predator; this would make it difficult to get legal permission to remove it from coastal habitats.

In terms of ecological implications of predator removal from our study area, the crab eating fox is a generalist and opportunistic hunter, preying specially on small mammals, birds, invertebrates and fruits (Berta 1982). Its removal may have various impacts on the local environment, including reduction of seed dispersion, changes in nutrient flux and also impacts on the abundance of other sea turtle predators, such as crabs (Ratnaswamy & Warren 1998). Also, information is lacking on the abundance trends of this fox and its population dynamics with our study area, thus complicating the design of an effective removal strategy that would not extirpate the local population.

In terms of using nest relocation to reduce predation rates, while the use of hatcheries is accepted as a positive conservation strategy in some cases, and can be an important tool for environmental education (Marcovaldi & Marcovaldi 1999), they can alter hatchling sex ratios, decrease nest hatch success, and reduce the transport of nutrients from natural sea turtle nests into sandy dune environments (Morreale et al. 1982, Bouchard & Bjorndal 2000).

Our results suggests that placing flags next to sea turtle nests helps reduce nest predation and obviates the need to use more drastic predator control measures. Indeed, using flags is simple and relatively economical. We plan to investigate in the near future whether it is necessary to use grids for sea turtle nest protection, or if flags are sufficient to keep foxes from damaging nests.

Acknowledgments: We thank the Projeto Tamar field team at Sítio do Conde station, especially: Pêta, Pépe, Raimundo, Carlinhos and Beca for daily surveys efforts and making the flags. Matthew H. Godfrey, Paulo Simões-Lopes, Juçara Wanderlinde and Tânia Castellani helped read earlier drafts. The idea to use flags to deter nest predators came from Pêta, one of Projeto Tamar's employees from the local community, and to whom we are grateful. Projeto TAMAR, a conservation program of the Brazilian Ministry of the Environment, is affiliated with ICMBio, is co-managed by Fundação Pró-TAMAR and officially sponsored by Petrobras.

BARTON, B. T. & J.D. ROTH, 2006. Racoon removal on sea turtles nesting beaches. Journal of Wildlife Management. 714: 1234-1237.

BERTA A. 1982. *Cerdocyon thous*. Mammalian Species 186: 1-4.

BOUCHARD, S.S. & K.A. BJORNDAL, 2000. Sea turtles as biological transporters of nutrients and Energy from marine to terrestrial ecosystems. Ecology 81: 2305-2313.

MARCOVALDI, M.Â. & A. LAURENT. 1996. A six season study of marine turtle nesting at Praia do Forte, Bahia, Brazil, with implications for conservation and management. Chelonian Conservation & Biology 2: 55-59.

MARCOVALDI, M. Â. & G.G. MARCOVALDI, 1999. Marine turtles of Brazil: the history and structure of Projeto TAMAR-IBAMA. Biological Conservation 91: 35-41.

MEIER, G.G. & K. VARNHAM, 2004. Rat eradication as part of a green turtle (*Chelonia mydas*) conservation programme in Indonesia. Marine Turtle Newsletter 106: 1-12.

MICHALSKI, F., P.G. CRAWSHAW, T.G. DE OLIVEIRA & M.E. FABIAN. 2006. Notes on home range and habitat use of three small carnivore species in a disturbed vegetation mosaic of southeastern Brazil. Mammalia 70: 52–57.

MORREALE, S.J., G.J. RUIZ, J.R. SPOTILA AND E.A. STANDORA.1982. Temperature dependent sex determination: current practices threaten conservation of sea turtles. Science 216:1245 1247.

O´TOOLE, T. 2003. Protecting sea turtle nests from raccoon depredation at Sebastian Inlet State Park. In: Pilcher, N.J. (Comp.). Proceedings of the 23rd Annual Symposium on Sea Turtle Biology & Conservation, NOAA Tech. Memo. NMFS-SEFSC-536, pp. 88-89.

RATNASWAMY, M.J. & R.J. WARREN. 1998. Removing raccoons to protect sea turtle nests: are there implications for ecosystem management? Wildlife Society Bulletin 26: 846-850.

TUBERVILLE, T.D. & V.J. BURKE. 1994. Do flag markers attract turtle nest predators? Journal of Herpetology 28: 514-516.

WOOLARD, J., R.M. ENGEMAN, H.T. SMITH & J. GRINER. 2004. Cheloniidae (Marine turtle) nest predation. Herpetological Review 35: 379-380.

YERLI, S., A.F. CANBOLAT, L.J. BROWN & D.W. MACDONALD. 1997. Mesh grids protect loggerhead turtle (*Caretta caretta*) nests from red fox (*Vulpes vulpes*) predation. Biological Conservation 82: 109-111.

ZEPPELINI, D., R. MASCARENHAS & G.G. MEIER. 2007. Rat eradication as part of a hawksbill turtle (*Eretmochelys imbricata*) conservation program in an urban area in Cabedelo, Paraíba State, Brazil. Marine Turtle Newsletter 117: 5-7.

Acclimating Captive Hawksbills to Sea Prior to Release

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Head-starting and introducing captive sea turtles into the sea in other contexts are widely practiced, but methods of doing this vary and have not been adequately evaluated (Mrosovsky 2007). I believe that sea turtles raised in captivity do not have the innate skills they need in order to prosper in the wild. On the island of Nevis, in the Caribbean, since 2002 I have been releasing turtles after acclimating them to the sea. These are animals that were brought to my sea life center because they had either wandered away from the sea after hatching or were at the bottom of the nest and too weak to get to the sea. Information for 3 turtles is presented in this note. Most of the records for the first 2 were lost, so the account for these is based largely on memory. Field notes for the third individual survived. The turtles were too small to sex from external characteristics.

In preparation for eventual release, the turtles were kept in a 2000 gallon aquarium which was 5 meters long to allow them to swim as much as possible in captivity. The tank was populated with fish and invertebrates and made to resemble the wild environment as much as possible. The turtles could forage, eat invertebrates and catch fish. They caught and ate lobsters and fish and ate colonial sea squirts and sea anemones on a regular basis. This diet was supplemented with fish, lettuce and turtle pellets. When the turtles reached 24-26 cm CCL, between 16 and 18 months old, they were taken for swims to slowly acclimate them to the wild and prepare them for eventual release. This size was chosen because it is the size of the smallest hawksbills seen nearshore.

A harness was made of neoprene (wherever it touched skin) and adjustable nylon straps, buckled at the widest part of the turtle and connected to a retractable dog leash (Fig. 1). There were no straps between the turtles' back flippers. Several days before their first swims they were introduced to the harness. Every day we would put the harness on the turtle. After awhile they would wear it for a short time in the tank. When they did not avoid being handled when the harness was put on them they were taken out to the sea. Once in the water the turtles were not restricted or guided in any way until it was time to get them back to shore. On their first forays into the sea all three turtles exhibited signs of stress, as described below,

Figure 1. A headstarted hawksbill turtle, fitted with a neoprene harness, being acclimatized to feeding in the wild.

including hyperventilation and disorientation. None of them behaved the way they did in the aquarium where they were accustomed to their environment. All of them at one time or another tried to crawl up onto the beach at least once.

Turtle 1, observed on its first swim in the sea in 2002, began by swimming slowly but kept changing directions after a few yards, then eventually swam to shore and tried to climb onto the beach. Turtle 2, studied in 2004, on its first swim initially floated at the surface for several minutes and hyperventilated. After approximately 4 minutes it swam to the bottom and sat there for another 2-3 minutes. Suddenly, it swam purposely and at a constant moderate speed in one direction. It stopped under the drain pipe where the water from its aquarium emptied into the sea. It did not move until I picked it up about one minute later and returned it to the aquarium. Turtle 3, studied in 2006, started its first acclimation swim by swimming full speed the moment it touched the water. The water was slightly murky. After 30 seconds of swimming away from shore under water it slowed and for the next 2-3 minutes swam in different directions approximately every 30 seconds. Then it came to the surface, took two deep breaths and swam to the bottom (1 meter deep) at a moderate pace. It swam in different directions and had no consistent course. This behavior was repeated until the turtle, appearing to be tired, floated at the surface and made no effort to avoid me when I picked it up. Time elapsed was ten minutes. When returned to its tank it sat on the bottom, face down in the corner and did not move for several hours. Fish was offered but only one small piece was taken. The next day it barely moved around the tank. My guess was that its muscles were sore. On Turtle 3's second swim we were filming and we took it to another location where the water was clear and calm. When placed in the water it swam to the bottom, approximately 7 meters down, and slowly cruised over the turtle grass. It looked at conch shells and sandy areas but did not explore them. It could have swum longer but after a half an hour we had to leave. Behavior was normal on return to the aquarium. The next time Turtle 3 was in the water was nine days later back at its home bay. The water was clear. It floated at the surface for awhile then swam to the bottom. It had some buoyancy issues and was struggling to reach the bottom. It took five big mouthfuls of sand and swallowed them. It stayed in the shallows and often swam to shore in just centimeters of water. It checked out the algae, especially the Mermaid's Shaving Brush, also the first thing investigated by Turtles 1 and 2, tasted a little and then swam on, zigzagging parallel to the shore, in about a meter of water. It swam slowly and examined its surroundings, coming to the surface only to take a breath. After 20 minutes it would take two breaths at the surface. By 30 minutes, it swam to shore and just floated on the surface. Upon return to the aquarium, it acted normally and ate a regular amount of fish.

Eight days later, Turtle 3 appeared at ease when placed in the clear water. It immediately swam to the bottom and gulped a mouthful of sand. At first Turtle 3 stayed in the shallows, investigating the dead turtle grass that had washed in. It interacted briefly with a juvenile jack that circled and swam with it. After approximately 5 minutes it swam out to water 3 meters deep, staying at the bottom cruising over the turtle grass. When we had been in the water for a half an hour, this turtle swam to shore and remained still until picked up.

Turtle 3's next swim was three weeks later. The water in the bay was cloudy close to shore. When this turtle first got in the water its breathing was fast and it swam quickly in no particular direction. Its behavior was similar to that on its first time in the sea when the water was also cloudy. I led it to deeper, clearer water where its breathing slowed and it appeared to calm down. Eventually it swam to the bottom and began cruising slowly. The next behavior Turtle 3 displayed was a new one for me. It would cruise slowly along the bottom then sprint forward at top speed for about 15 seconds. This behavior seemed like an evasion technique. For the next 20 minutes it would cruise for a minute or two then dart forward for several seconds, then slow to a cruise and repeat. After 20 minutes it appeared tired, swam to shore and tried to crawl up onto the beach.

Turtle 3's next trip was two weeks later in clear, calm water. I had learned that when placed in the shallows, it would swim to shore. When I put it in water over 2 meters deep it would begin exploring. Turtle 3 always headed to the bottom after taking a breath and would stay there and average of three minutes. Often it would eat a mouthful of sand. On this particular trip Turtle 3 swam along the bottom over the turtle grass looking at everything it passed. There were various spots with soft corals and this dive was the first time it had ever seen a soft coral. It swam over to it and brushed against it as it swam past but displayed no negative or positive reaction. It saw its first sea cucumber and mouthed it but did not take a bite out of it. The swim lasted an hour and a half. The turtle cruised slowly for more than an hour over turtle grass and areas of sand and soft coral sea plumes. It checked out everything including a sea egg urchin and poisonous spiny black urchin slowing and looking closely but not biting, then moving on. The only time it had a startle reaction was when we were approximately 7 meters from a 1.5 meter sand covered square cement block mooring without a chain or rope attached. It saw it out of the corner of its eye and immediately darted away at about a 45% angle from its swim path. Nothing else seemed to bother it. Turtle 3 and I ended up out in 10 meters of water in the channel about 75 meters from shore. After one and a half hours swimming I had to take the turtle and swim him back to shore. Behavior in the tank was normal. It swam around the aquarium and ate a great deal of fish, appearing hungry after all the exercise. I thought its physical endurance had increased since the first foray into the ocean.

Turtle 3 was taken for swims every two weeks or less depending upon time available. It would swim for up to two hours – my limit in the sea. It spent all this time cruising and investigating the environment. Plastic cups and bags always attracted its attention and it would swim off its route to check them out. It mouthed them but did not try to eat them. When we went to rocky shore areas it would stop and nibble at things on or under the rocks. Sometimes it would scrape its beak under the rock ingesting whatever had been there. On some of the swims it would spend a few minutes cruising then sprinting for short distances as if exercising its muscles or practicing escape maneuvers. In December 2007 Turtle 3 was released near the shore and immediately swam out to sea. I have seen Turtle 3 four times since then, twice in 2008 and twice in 2009. It has very distinctive markings on its head and its shell was deformed in a unique way when it had been ill during captivity, making identification easy. Turtle 3 was most recently spotted on February 16, 2009, across the channel from Nevis in one of the bays.

Watching these three turtles has led me to believe that although other studies have reported captive-raised turtles surviving in the wild without special acclimatization (e.g. Nichols et al. 2000, Bell et al. 2005), a period of acclimation before releasing turtles raised in captivity will reduce stress at the final release and boost their chances of survival in the wild. During the acclimation period they can increase their muscle strength and adapt to a world without walls, predators or a ready supply of food. To assess the importance of such variables, the migratory movements and wellbeing of turtles acclimated to the marine environment should be compared to those of turtles released without acclimation.

BELL, C., J. PARSONS, T.J. AUSTIN, A.C. BRODERICK, G. EBANKS-PETRIE & B.J. GODLEY. 2005. Some of them came home: the Cayman Turtle Farm headstarting project for the green turtle *Chelonia mydas*. Oryx 39: 137-148.

MROSOVSKY, N. 2007. Translocating turtles: trials, tribulations and triumphs. In: López-Jurado, L.F. & A.L. Loza (Eds.). Marine Turtles: Recovery of Extinct Populations. Monographía del Instituto Canario de Ciencias Marinas. No.5, pp. 199-229.

NICHOLS, W.J., A. RESENDIZ, J.A. SEMINOFF & B. RESENDIZ. 2000. Transpacific migration of a loggerhead turtle monitored by satellite telemetry. Bulletin of Marine Science 67: 937-947

Inter-nesting Dive and Surface Behaviour of Green Turtles, *Chelonia mydas*, at Raine Island, Northern Great Barrier Reef

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The dive behaviour undertaken by gravid green turtles, *Chelonia mydas*, during a part of their inter-nesting period (11-14 d) while offshore from Raine Island, was investigated. Five Time Depth Recorders (TDRs) were deployed on turtles returning to the sea following either an unsuccessful or a successful nesting attempt. Because the fringing reef immediately adjacent to Raine Island slopes precipitously to meet the sea floor at depths of 200-300 m (Aus Chart 836), this cay presents an ideal location to investigate the dive behaviour of *C. mydas* in a deep-water inter-nesting habitat.

Raine Island (11° 35' S, 144° 02' E) is an elongate sand cay approximately 830m long and 430m wide at its widest point, and is the primary site for the largest nesting cohort of *C. mydas* in the world (Limpus 2003). Nightly nesting densities reach a peak in December, with several hundred to several thousand turtles coming ashore nightly (Limpus et al. 1993).

Devices were attached to one turtle that had successfully nested, and to five turtles that had 'false crawled' (attempted & failed nesting). Turtle selection commenced when sufficient tidal depth covered the reef flat to allow turtles beach access. Because *C. mydas* on Raine Island typically take three hours (Limpus et al. 2003) to complete the nesting process, turtles that were returning to the sea with their carapaces still damp with sea water were assumed to have been unsuccessful in their nesting attempt.

The TDRs (8 Bit Minilog, Vemco Pty Ltd., Nova Scotia, Canada) were pre-programmed to record depth (0.5 m - 900 m ± 0.4% of selected depth range). TDR attachment commenced immediately

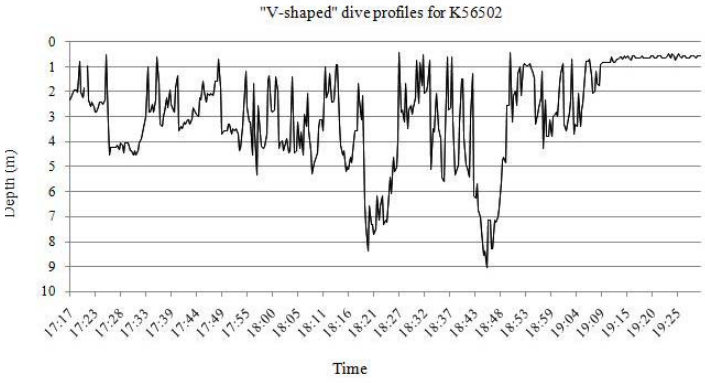

Figure 1. Dive profile for K56504 showing early morning shift from "U-shaped" dives to "slowly ascending" dive types.

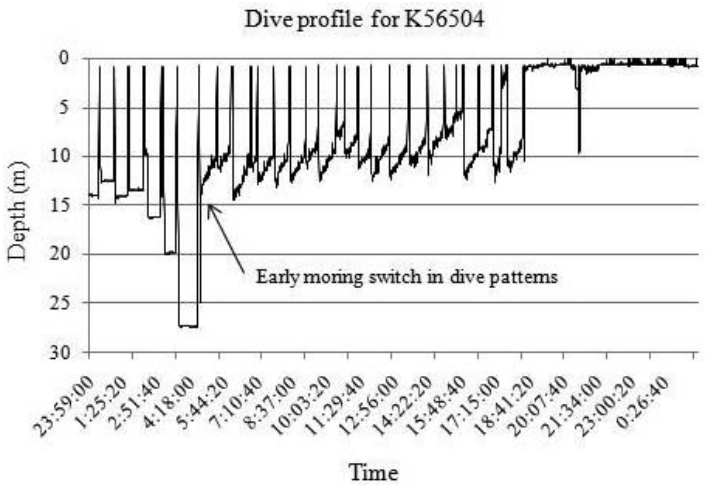

Figure 2. Dive profile for turtle K56502 showing "V-shaped" dive types.

following oviposition or as the turtle was heading back to the sea. Two small holes (≈1.5 mm) were drilled in each supracaudal scute and the TDR was secured in place using thin (0.5 mm) stainless steel wire.

The nesting beach was subsequently searched nightly for turtles which had been fitted with a TDR, and were attempting to nest. When a TDR-carrying turtle was recaptured, the data logger was removed entirely and the turtle was allowed to continue looking for a nest site or return to the sea.

To mitigate recording false dives due to wave action or submergence during repetitive breathing while at the surface, time spent above a threshold of one metre below the sea surface was classified as a surface interval. The six recovered TDRs yielded continuous data for between 17.2 and 174.4 h (Table 1).

While individual dive behaviour variations existed between turtles, the six turtles displayed generally similar dive patterns (Table 2). Average submergence times of 13.5 min (R: 0.3-68.5) were accompanied by unexpectedly long mean surface intervals of 2.5 min (R: 0.3 – 329.3). Extended surface intervals (392.3 min) might be explained by the fact that five of the six turtles returned to the sea without having successfully laid a clutch of eggs. These turtles may have attempted to re-nest on the same night, spending extended time on the beach and therefore skewing the surface interval.

While individual dive behaviour variations existed between turtles, the six turtles displayed generally similar dive patterns.

Turtle	Nest	CCL (cm)	TDR applied	TDR recovered	Deployment (hr)
K50875	No	111	3/12/02	4/12/02	22
K56502	No	107.5	6/12/02	8/12/02	43
K56503	No	100.4	6/12/02	9/12/02	66
K56504	No	113.4	6/12/02	7/12/02	19
K56505	No	93.2	7/12/06	7/12/02	17
K56501	Yes	108.7	5/12/02	12/12/02	176

Table 1. Tag numbers, curved carapace lengths, TDR deployment times for green turtles at Raine Island.

Turtle	Mean Dive Duration	Mean Surface Interval	Mean Depth	Dives
K50875	10±12.9 (0.3-45.7)	2.7±7.8 (0.3-12.0)	8.3±6.5 (0-30.0)	106
K56502	6.7±7.5 (0.3-36.7)	1.4±6.8 (0.3-83.0)	3.8±2.8 (0-17.5)	318
K56503	8±11.1 (0.3-58.3)	3.5±23.9 (0.3-329.3)	4.4±3.7 (0-31.7)	345
K56504	23.7±17.7 (0.3-52.3)	4.2±15.1 (0.3-100.7)	9.9±5.8 (0-27.5)	45
K56505	8.9±13.6 (0.3-43.0)	1.4±2.2 (0.3-14.0)	6.2±4.1 (0-14.8)	99
K56501	23.6±19.4 (0.5-68.5)	1.7±1.9 (0.5-18.0)	8±5.4 (0-43.0)	415
Grand mean	13.5	2.5	6.8	

Table 2. Mean, ±standard deviation and range (in parentheses) for dive duration (minutes), surface interval (minutes) and depth (meters) of TDR-fitted green turtles at Raine Island.

Average submergence times of 13.5 min (R: 0.3-68.5) were accompanied by unexpectedly long mean surface intervals of 2.5 min (R: 0.3 – 329.3). Extended surface intervals (392.3 min) might be explained by the fact that five of the six turtles returned to the sea without having successfully laid a clutch of eggs. These turtles may have attempted to re-nest on the same night, spending extended time on the beach and therefore skewing the surface interval.

Unlike other several other studies (Hays et al. 2001; Hochscheid et al. 1999; Starbird 1993; van Dam & Diez 1997) that reported five or six distinct dive profile types, Raine Island inter-nesting turtles typically only displayed three general dive profiles. At night turtles exhibited a flat-bottomed "U-shaped" dive profile (Figure 1). At approximately 06:00 turtles began swimming to a depth (usually the maximum for that dive), then slowly ascended over the remainder of the dive time until finally ascending directly to the surface (Figure 1). We called these "slowly ascending" dive types. The third dive type was a near vertical descent and ascent "V" shaped dive (Figure 2).

All turtles made occasional dives to depths greater than two standard deviations from their mean dive depth. Few (5%) of these deeper dives were undertaken during the daytime (08:00-15:00) with most (54%) occurring at night (18:00-06:00). The remainder took place at dawn (19%) and dusk (22%). The benefits of deep diving as an energy conservation strategy during inter-nesting periods are described elsewhere (see Hays et al. 1999; Hays et al. 2004). However this behaviour may also be related to predator avoidance, with shark attacks on nesting turtles being common at Raine Island, (Limpus et al. 2003) and documented at other nesting rookeries (Stancyk 1982; Fergusson et al. 2000).

These preliminary data suggest that at least some of Raine Island's inter-nesting turtles do not dive to the great depths available to them adjacent to the reef, but use shallow water habitat adjacent to the reef edge then return to refugia within reefal structure at night.

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AUS CHART 836 (Cape Weymouth to Olinda Entrance). Royal Australian Navy Hydrographic Service.

FERGUSSON, I.K. 2000. Predation by white sharks, *Carcharodon carcharias*, upon chelonians, with new records from the Mediterranean Sea and a first record of the ocean sunfish, *Mola mola*, as stomach contents. Environmental Biology of Fishes 58: 447-453.

HAYS, G.C., P. LUSCHI, F. PAPI, C. DEL SEPPIA & R. MARSH. 1999. Changes in behaviour during the inter-nesting period and post-nesting migration for Ascension Island green turtles. Marine Ecology Progress Series 189: 263-273.

HAYS, G.C., A.C. BRODERICK, F. GLEN, B.J. GODLEY & W.J. NICHOLS. 2001. The movements and submergence behaviour of male green turtles at Ascension Island. Marine Biology 139: 395-399.

HAYS, G.C., J.D. METCALFE & A.W. WALNE. 2004. The implications of lung-regulated buoyancy control for dive depth and duration. Ecology 85: 1135-1145.

HOCHSCHEID, S., B.J. GODLEY, A.C. BRODERICK, & R.P. WILSON. 1999. Reptilian diving: highly variable dive patterns in the green turtle *Chelonia mydas*. Marine Ecology Progress Series 185: 101-112.

LIMPUS, C.J., J.D. MILLER & C.J. PARMENTER. 1993. The Northern Great Barrier Reef green turtle, *Chelonia mydas*, breeding population. In: Smyth, A.K., K.H. Zevering & C.E. Evering (Eds.). Raine Island and Environs, Great Barrier Reef: Quest to preserve a fragile outpost of nature. Raine Island Corporation in cooperation with Great Barrier Reef Marine Park Authority, Townsville, Queensland, p. 47-50.

LIMPUS, C. J., J.D. MILLER, C.J. PARMENTER & D.J. LIMPUS. 2003. The green turtle, *Chelonia mydas*, population of Raine Island and the northern Great Barrier Reef: 1843-2001. Memoirs of the Queensland Museum 49: 349-440.

STANCYK, S.E. 1982. Non-human predators of sea turtles and their control. In: Bjorndal, K.A. (Ed.). Biology and Conservation of Sea Turtles. Smithsonian Institution Press, Washington D.C. pp. 139-152.

STARBIRD, C.H. 1993. Telemetry studies of the internesting movements and behavior of hawksbill sea turtles (*Eretmochelys imbricata*) around Buck Island Reef National Monument, St. Croix, U.S. Virgin Islands. MSc. Thesis, San Jose State University, San Jose.

VAN DAM, R.P. & C.E. DIEZ. 1997. Diving behavior of immature hawksbill turtles (*Eretmochelys imbricata*) in a Caribbean reef habitat. Coral Reefs 16: 133-138.

Sea Turtles Tagging in Libya

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Nesting activity of loggerhead sea turtles (*Caretta caretta*) from different nesting sites in Libya has been reported by several authors (Haddoud & El Gomati 1996, Hamza & Elghmati 2006, Hamza 2007, Laurent *et al*. 1997; 1999, Saied *et al.* 2008, Schleich 1987). Tagging of loggerheads in Libya started in the mid 1990s, when blue plastic flipper tags (rototags), with the RAC/SPA return addresses, were placed on eight nesting loggerhead turtles during surveys in 1996 (Haddoud & El Gomati 1996). To date, none of these plastic tags have been reported as recovered after initial deployment.

Recent discussions in the literature about the need for standardized tagging techniques in the Mediterranean have highlighted the disadvantages of plastic tags, including shorter retention times and an increased likelihood of entanglement in nets (Margaritoulis *et al.* 2003, UNEP MAP RAC/SPA 2007). As a result, the Libyan Sea Turtle Program (a Libyan Initiative launched in 2005 to conserve sea turtles and their habitats) decided to tag with metal inconel tags, which are the most commonly recommended flipper tag. During the 2008 nesting season and part of 2009, we patrolled up to four nesting beaches either by foot or by 4x4 vehicles, between 21:00 and 04:30 to observe and tag nesting females. The beaches visited (Map 1) were Ain Al Ghazala, located 60 km east of Tobruk with two short sandy stretches of beach (1.2km and 0.8 km) intersected

Figure 1. Leatherback sea turtle incidentally captured and tagged before release near El Khowada beach SE of Misratah, Libya.

Date	Location	Time	Tag	CCL	CCW	Remarks
7/15/2008	Ain Al Ghazala	03:15	LY0002	73	69	Adult females, healthy, with several epizoitics on the carapaces
7/24/2008	El Arar	22:40	LY0012	75	68	
7/30/2008	Semida	23:45	LY0013	78	69	
7/30/2008	Semida	22:40	LY0014	73	69	
5/09/2008	Al Ghbeba	21:10	LY0025	43	38	Sub-adult entangled with fishing net, no trauma observed
6/07/2009	Al Ghbeba	23:30	LY0026	82	73	Old injury on front left side of the carapace (5cm crack)
6/09/2009	Al Ghbeba	21:45	LY0027-LY0028	84	73.5	Adult females, healthy, with several epizoitics on the carapaces
6/09/2009	Al Thalateen	23:15	LY0029-LY0030	75	67	
6/12/2009	Al Ghbeba	21:45	LY0031-LY0032	74	66	
6/13/2009	Al Ghbeba	01:10	LY0033-LY0034	77	68	
6/13/2009	Al Ghbeba	23:30	LY0035-LY0036	83	70	
6/14/2009	Al Ghbeba	21:30	LY0037-LY0038	80	73	
6/14/2009	Al Ghbeba	21:25	LY0039-LY0040	70	63	
6/14/2009	Al Ghbeba	22:49	LY0041-LY0042	82	69	
6/15/2009	Al Ghbeba	00:50	LY0043-LY0044	85	70	
6/15/2009	Al Ghbeba	01:35	LY0045-LY0046	76	67	
6/15/2009	Al Thalateen	19:15	LY0047-LY0048	76	66	
6/16/2009	Al Ghbeba	00:30	LY0049-LY0050	77	70	
5/27/2009	Al Khowada	15:30	LY0016-LY0017	122	88	Healthy leatherback turtle, no external injuries.

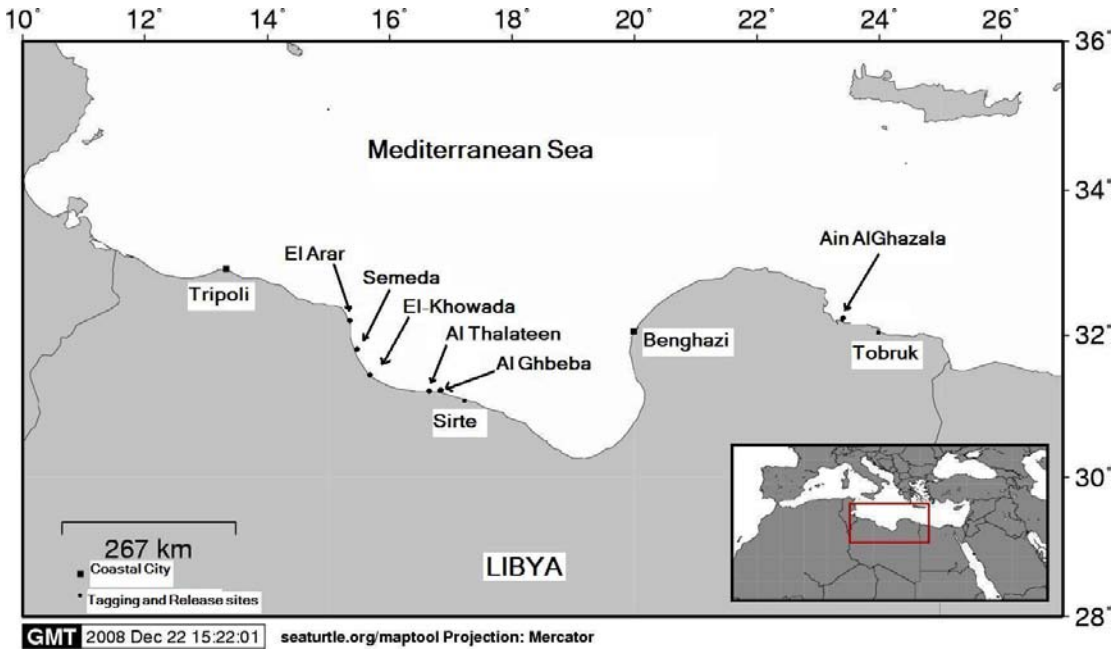
Table 1. Loggerhead turtles tagged on trailing edge of one front flipper in Libya in 2008. CCL = curved carapace length (cm), CCW = curved carapace width (cm). ARMSBY, J.K. 1980. Kouf National Park marine survey. Final Report: April-July 1980. ACSAD technical report.

by a rocky medium elevated coast; El Arar (6 km) and Semida (9.4 km), located in southeast Misratah province; Al Ghbeba (5.67 km), located 20 km west of Sirte; and El-Khowada (10.9 km), located about 80 Km SE Misratah city on the Gulf of Sirte. We also patrolled Benghazi's south beaches and those of Kouf National Park (Aljabal Alakhdar), but we failed to encounter any turtles; however, turtle beach tracks were found the following morning.

Once a nesting female was encountered, it was left to finalize the nesting process; then at its return to the water, the turtle was measured using the curved carapace width and length (notch to tip, Bolten 1999), and tagged with one (or two, in 2009) metal inconel tag (model 681, National Band & Tag Company, Kentucky, USA) on the trailing edge of a front flipper (Balazs 1999). Each tag has a unique serial number preceded by the prefix LY (indicating Libya), with contact details on the back.

Overall, we encountered 17 nesting loggerhead females and we also tagged other two entangled turtles in fishing nets: one juvenile near Al Ghbeba nesting site of Sirte, and more recently in May 2009 one leatherback sea turtle delivered by a local fisherman near El Khowada beach SE of Misratah (Figure 1, Table 1). All turtles were released after tagging, except for those from El Arar and Semida, which were retained until morning hours and released in the presence of beach visitors and local media, to raise awareness of sea turtles and their conservation in Libya. News about the tagging project was broadcast on national TV and in local and national newspapers.

Tagging of nesting females in Libya will continue in future nesting seasons, and we hope that data from tag recoveries will help elucidate post-nesting behavior of females from this rookery.



Map 1. Beach locations in Libya where tagging patrols monitored for nesting loggerheads. Map was made using Maptool (www.seaturtle.org/maptool/)

Together with satellite tracking of loggerheads in Libyan waters (Bentivegna et al. 2008); ongoing opportunistic tagging of incidentally captured turtles in Libyan waters will increase our understanding of spatial ecology of sea turtles that forage off the coast of Libya.

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BALAZS, G.H. 1999. Factors to consider in the tagging of sea turtles. In: Eckert, K.L., K.A. Bjorndal, F.A. Abreu-Grobois & M. Donnelly (Eds). Research and Management Techniques for the Conservation of Sea Turtles. IUCN/SSC Marine Turtle Specialist Group Publication No. 4, pp. 101-109.

BENTIVEGNA, F., F. VALENTINO, P. FALCO, E. ZAMBIANCHI & S. HOCHSCHEID. 2007. The relationship between loggerhead turtle (*Caretta caretta*) movement patterns and Mediterranean currents. Marine Biology 151: 1605-1614.

BOLTEN, A.B. 1999. Techniques for measuring sea turtles. In: Eckert, K.L., K.A. Bjorndal, F.A. Abreu-Grobois & M. Donnelly (Eds). Research and Management Techniques for the Conservation of Sea Turtles. IUCN/SSC Marine Turtle Specialist Group Publication No. 4, pp. 110-114.

HADOUD D.A. & H. EL GOMATI. 1996. The coastal survey of marine turtle activity along the coast of Libya. Phase 2: between Sirte and Misratah. MBRC Report. 22pp.

HAMZA A. & H. El GHMATI. 2006. Conservation of marine turtles nesting at three sites west of Sirte, Libya. Final report. The Regional Activity Centre for Specially Protected Areas (UNEP-MAP-RAC/SPA), Tunis. 35pp.

HAMZA, A. 2007. Marine turtle nesting activity and conservation, Sirte-Libyan Arab Jamahiriyah (2006 season). Final report. The Regional Activity Centre for Specially Protected Areas (UNEP-MAP-RAC/SPA), Tunis, Tunisia. 32 pp.

LAURENT, L., M.N. BRADAI, D.A. HADOUD & H.M. EL GOMATI. 1997. Assessment of sea turtle nesting activity in Libya. Marine Turtle Newsletter 76: 2-6.

LAURENT, L., M.N. BRADAI, D.A. HADOUD, H.M. EL GOMATI & A.A. HAMZA. 1999. Marine turtle nesting activity assessment on Libyan Coasts. Phase 3: Survey of the coast to the west of Misratah. Joint Project of: Marine Biology Research Centre (Tajura, Libya), MEDASSET, RAC/SPA (MAP-UNEP), TCEP (Tripoli), WWF International Mediterranean Programme. RAC/SPA, Tunis. 47 pp.

MARGARITOULIS, D., R. ARGANO, I. BARAN, F. BENTIVEGNA, M.N. BRADAI, J.A. CAMINAS, P. CASALE, G. DE METRIO, A. DEMETROPOULOS, G. GEROSA, B.J. GODLEY, D.A. HADDOUD, J. HOUGHTON, L. LAURENT & B. LAZAR. 2003. Loggerhead turtles in the Mediterranean Sea: present knowledge and conservation perspectives. In: Bolten AB & B.E. Witherington (Eds.) Loggerhead sea turtles. Smithsonian Institution Press, Washington, DC, p 175–198.

SAIED A., HAMZA A., BOURASS E., DERYAGH S., BOWENA E., ESHATER M., DOFANNI K. & BASHIYAH A., 2008. Nesting activity and conservation of marine turtles in three nesting sites west of Sirte (results of 2006-2007 seasons). Poster presentation. The third Mediterranean marine turtle Conference. 23-25 Oct. 2008, Hammamet. Tunisia.

SCHLEICH, H. 1987. Contributions to the herpetology of Kouf National Park (NE-Libya) and adjacent areas. Spixiana 10: 37-80.

UNEP MAP RAC/SPA. 2007. Action Plan for the Conservation of Mediterranean Marine Turtles. RAC/SPA, Tunis, Tunisia. 40pp.

Shifting Patterns of Nocturnal Emergence Events of Nesting Loggerhead Turtles (*Caretta caretta*)

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The reproductive biology of nesting female loggerhead turtles (*Caretta caretta*) is typically nocturnal but can be influenced by lunar phase, intertidal exposures from beach slopes and correlated tidal amplitudes, and responses to anthropogenic disturbances (Fritts & Hoffman 1982, Frazer 1983). The tendency of most larger-bodied forms of sea turtles to nest at night is linked to thermal tolerances and inertias correlated with large body size (Spotila & Standora 1985). However, the time domain of nocturnal nesting events and emergences receives scant attention within the literature, particularly the nocturnal times of emergence on the nesting beach. The perceived lack of analysis on turtle emergence events is puzzling since there is no paucity of data on this aspect. Data on temporal distribution of emergence events can have conservation and management value in determining the anthropogenic potential for disturbance of nesting females. New information on nesting emergences defines a scope for interaction with human activities that occur adjacent to beaches, or for beaches where beach or off-road driving is a legal or cultural norm.

This present note on emergence events reviews 21 seasons of nightly beach patrols for nesting loggerheads on the southern 6 km of Casey Key in Sarasota County, Florida (27.13N, -82.47W). The beach is not yet subject to beach nourishment (Rumbold et al. 2001) or ecotourism (Wilson & Tisdell 2001) as factors that might influence turtle nesting. Patrols by ATV occurred hourly from approximately 2000 hours to 0500 hours for the main nesting months of June and July. Time of each emergence event was recorded for 93.3% (2535/2717) of the turtles that were encountered. Each encounter was classed to the following categories: 1) Pre-Oviposition which included the following behaviors: beach approach, body pitting, nest cavity construction; 2) Oviposition; and 3) Post-Oviposition which included the following behaviors: covering/camouflaging, and leaving the nest.

The emergence events had a strongly bimodal pattern with an increase after dusk to a peak at 2300 hr, a drop for the 0000 hour, and a second peak at 0100 hr, then decreasing until dawn (Fig. 1). The timing of emergence events was significantly different from a normal distribution (Kolmogorov-Smirnov goodness of fit, D = 0.818). The behavioral activity when encountered was recorded for 52.6% (1334/2535) of the emergence events (Fig. 2) and the bimodality was found in all three of the defined nesting behaviors.

Both graphs (Figs. 1, 2) suggested that emergence events were comprised of two events, a first peak arriving around the 2200 and 2300 hours accounting for 44% of the nesting activity and a second smaller peak around the 0100 and 0200 hours representing 29% of the nesting activity. Overall, nesting activities were concentrated between 2200 to 0200 hr., with 81.9% of the defined activities. However, emergence events were still found, although in declining numbers, during the remaining hours of the nocturnal period. Interestingly, 1.4% of turtle encounters were around dusk (1900-2000 hrs), but there were no recorded observations of turtles arriving to nest during the dawn hours (0600-0700 hrs). These data for 6 km of Casey Key are supported by anecdotal observations for the 56 km of beach monitored daily at dawn by Mote Marine Laboratory

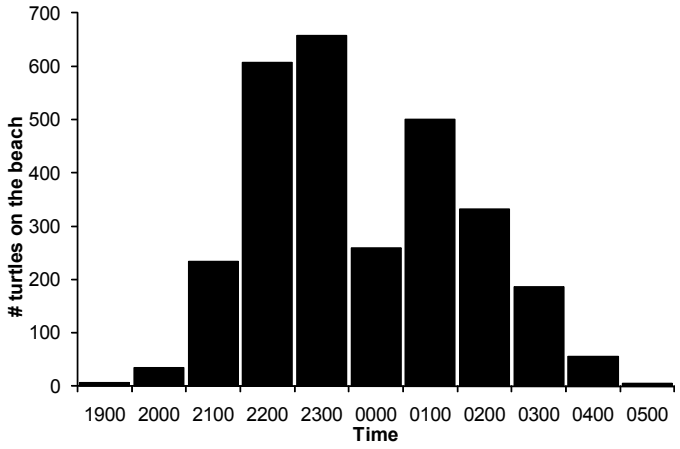

Figure 1. Distribution of loggerhead nesting activities by hourly categories on Casey Key, Florida.

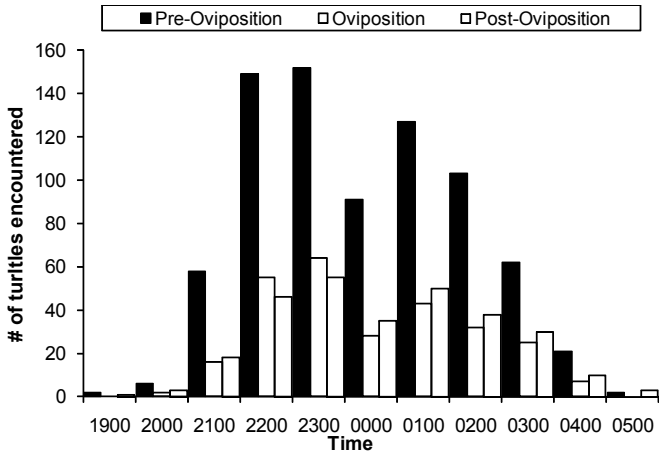

Figure 2. Categories for loggerhead activities by nocturnal hours on Casey Key, Florida.

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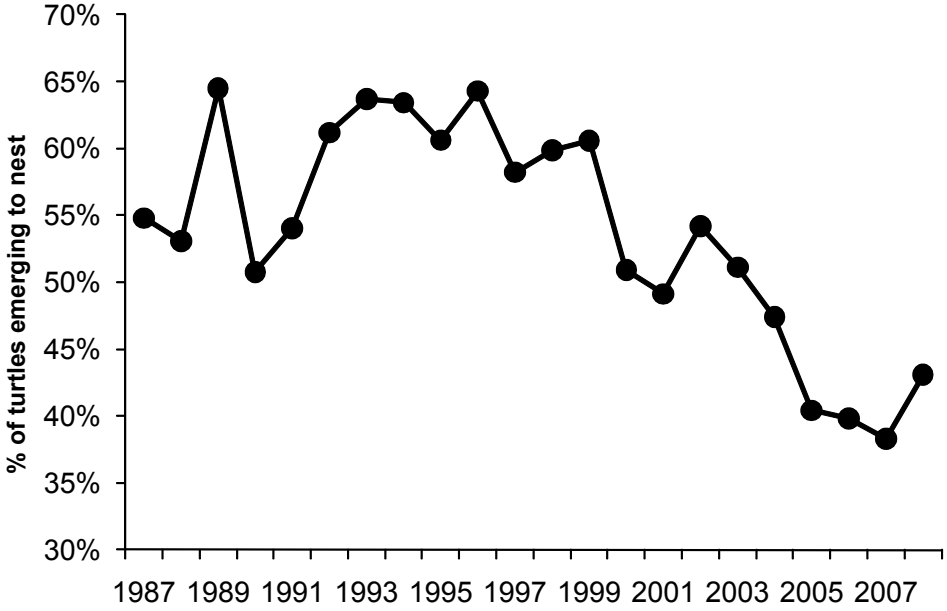

Figure 3. Percents of all loggerhead turtle emergences before midnight at Casey Key, Florida

staff and volunteers that document about one loggerhead nest per year during the post-dawn hours.

Taking the same data from a different perspective produced a temporal contrast of nesting behavior across years, as we compared the percents of females arriving before and after midnight (Fig. 3). From 1987-2000 the females typically emerged before midnight (2400 hr), which contrasted with a change in 2003 as females shifted to nesting predominantly after midnight.

Our results for a peak of emergence activity from 2200 to 2300 hr confirm earlier findings from Sanibel Island, Florida (LeBuff 1990). However, a notable difference is a secondary peak of activity on Casey Key that was absent in Sanibel loggerheads. Casey Key has people present on the beach most nights, particularly on weekends near public access areas in contrast with the Sanibel Island studies that were conducted over 30 years ago on a relatively remote beach. One might suspect a difference in patrol coverage if monitoring patrols were concluded earlier on Sanibel and so did not detect a secondary peak, but accounts in Lebuff (1998) appear to rule that out. A more plausible scenario may be of altered turtle behavior with the secondary peak on Casey Key as a possible behavioral artifact, resulting from a non-nesting emergence early in the evening and a postponed return of the same turtle.

Tidal influences can be discounted as a determinant in determining female emergence times, in the manner explored by other papers (Fritts & Hoffman 1982, Frazer 1983, Azanza et al. 2003) because, Casey Key generally has tides of less than 1 meter. It remains unclear what factors may be associated with a behavioral shift that began around 2003 for females emerging later at night than in previous years (Fig. 3). Some factors can be discounted, such as usage of ATVs for night patrols, as this patrol method without lights has occurred throughout the study (J. Foote, pers. comm.).

Nevertheless, there is an unquestionable increase in coastal development and human use on beaches over the time frame of monitoring. Consequently, a shift in emergence times may be associated with more people on the beaches especially during the hours of dusk, in which sunset watching and continued use is a popular activity on the western coast of Florida. This is a pragmatic hypothesis, but at the present time there are no corresponding data on human activity to test that premise. A need exists for further studies to understand if behavioral shifts of emergence timing are related to human activities on the beach.

In conclusion, a peak of nesting female emergence activity occurs in the 2300 hour with sea turtle activity occurring through the night though rarely before dusk or after dawn. For beaches where there are potentials for overlap of human activities and nesting turtles, new studies should evaluate the potential for anthropogenic disturbance to females approaching the nesting beaches (Waayers et. al. 2006). For beaches hosting traffic by foot or vehicle, the form of distribution of nesting emergences may offer new data to test the hypothesis of anthropogenic disturbance. Although we presented no data here on hatchling emergence times (however, see Witherington et. al. 1990), such data may also be critical for better informed management decisions relating to human activity on the beaches (Lamont et al. 2002).

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AZANZA, R.J., M.E. IBARRA, G. ESPINOSA, R. DIAZ & G. GONZALEX-SANSON. 2003. Nesting behaviour of green turtles (*Chelonia mydas*) in Antonio and Caleta de los Piojos beaches from Guanahacabibes Peninsula, Pinar del Rio, Cuba. Revista de Investigaciones Marinas 24: 231-240.

FRAZER, N. 1983. Effect of tidal cycles on loggerhead sea turtles (*Caretta caretta*) emerging from the sea. Copeia 2:516-519.

FRITTS, T.H & W. HOFFMAN. 1982. Diurnal nesting of marine turtles in southern Brevard County, Florida. Journal of Herpetology 16:84-86.

LAMONT, M.M., H. F. PERCIVAL & S.V. COLWELL. 2002. Influence of vehicle tracks on loggerhead hatchling seaward movement along a northwest Florida beach. Florida Field Naturalist 30: 77-82.

LEBUFF, Jr., C. 1990. The loggerhead turtle in the eastern Gulf of Mexico. Caretta Research, Inc., Sanibel Island, FL.

LEBUFF, C. 1998. Sanybel Light: an historical autobiography. Amber Publishing, Sanibel, FL.

RUMBOLD, D.G., P.W. DAVIS & C. PERRETTA. 2001. Estimating the effect of beach nourishment on *Caretta caretta* (loggerhead sea turtle) nesting. Restoration Ecology 9: 304-310.

SPOTILA, J.R. & E.A. STANDORA. 1985. Environmental constraints on the thermal energetics of sea turtles. Copeia 3:694-702.

WAAYERS, D., D. NEWSOME & D. LEE. 2006. Observations of non-compliance behaviour by tourists to a voluntary code of conduct: a pilot study of turtle tourism in the Exmouth region, Western Australia Journal of Ecotourism 5: 211-222.

WILSON, C. & C. TISDELL. 2001. Sea turtles as a non-consumptive tourism resource especially in Australia. Tourism Management 22: 279-288.

WITHERINGTON, B.E, K. A. BJORNDAL & C. M. MCCABE. 1990. Temporal pattern of nocturnal emergence of loggerhead turtle hatchlings from natural nests. Copeia 1990: 1165-1168.

Foraging by a Gravid Green Turtle During the Internesting Interval in Guadeloupe, French West Indies

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A female green turtle (*Chelonia mydas*) was found dead stranded on the outskirts of the town of Gosier, on the southern end of the island of Grande-Terre in Guadeloupe, French West Indies (16.205122, -61.49564), on 01 November 2009. The carcass appeared to be 3-4 days post-mortem, thus we extrapolated date of death being 28-29 October 2009. The turtle measured 111.5 cm curved carapace length and 101 cm curved carapace width, and bore an inconel tag on the trailing edge of each of her front flippers (Numbers FWI 3079/FWI 2659) that had been placed there on 20 August 2008 by volunteers patrolling Les Galets beach on the island of Marie Galante, about 40 km southeast from where the stranding was observed. After being tagged, this turtle was observed nesting again on 01 September and 14 September 2008, on the same nesting beach. A 12-13 day internesting interval is common to other green turtle nesting sites (Miller 1997).

We necropsied the turtle, but found no gross signs of injury, lesion or illness. Her body condition was good, and her gastro-intestinal tract was full of sea grasses, primarily *Syringodium filiforme*, which is a primary food source for green turtles (Mortimer 1981, 1982). Given that she appeared healthy and was eating just prior to death, we assume that the cause of death was drowning due to accidental capture in a submerged fishing net. Each year, incidental capture in fishing gear in Guadeloupe causes the death of 800 – 1000 marine turtles (Delcroix unpub data).

This turtle also had 30-40 unshelled eggs in her oviduct, which suggests that she had been foraging during the nesting season. These unshelled eggs likely would have been part of a final nest that she would have laid, although it is also possible that the eggs may have been in the process of being resorbed. Green turtles can lay between 1 and 8 nests in a single nesting season (Alvarado-Diaz et al. 2003), and in the case of the stranded green turtle, if her first nest was indeed 20 August and she maintained a 12-13 days internesting interval, the eggs remaining in the turtle's oviduct may represent the 6th or 7th nest of the season. Also, green turtles are commonly observed to migrate long distances between nesting and foraging grounds (Solé 1994, Hirth 1997, Harrsion 2006). This has also been the case for post-nesting green turtles tracked using satellite tags: two green turtles from Les Galets beach moved between 144 and 200 km at the end of the nesting season (Delcroix et al. 2008). This stranded green turtle was found <40 km from its nesting beach, and possibly died even closer but floated away during the 3-4 days before it was found.

The question of foraging by green turtles during the nesting season remains unresolved. In Ascension Island, Hays et al. (2002) found

no evidence of foraging by gravid females, while in Raine Island, Tucker and Read (2001) found that >40% of examined green turtles with developing follicles also had food in their digestive tracts. Balazs (1980) reported that both reproductive males and female green turtles were foraging during the breeding season in French Frigate Shoals, Hawaii, and suggested that breeding green turtles in other rookeries had not been observed foraging because of a lack of available food sources near the nesting beaches. In the case of Guadeloupe, there are numerous seagrass beds available for foraging by breeding green turtles during the nesting season. Thus, it may be the case that green turtles in Guadeloupe commonly consume seagrasses during the internesting interval. However, should this be the case, it does raise the question of why post-nesting females would migrate to other islands in the Caribbean after the nesting season rather than settle in nearby abundant seagrass beds near their nesting beaches.

Acknowledgements: We thank all the members of the Réseau Tortues Marines Guadeloupe for their continued investment in the conservation of marine turtles in Guadeloupe. Financial support for the program come from DIREN Guadeloupe and the Conseil Régional Guadeloupe.

ALVARADO-DÍAZ, J., E. ARIAS-COYOTL & C. DELGADO-TREJO. 2003. Clutch frequency of the Michoacàn green sea turtle. Journal of Herpetology 37: 183-185.

BALAZS, G.H. 1980. Synopsis of biological data on the green turtle in the Hawaiian Islands. NOAA Tech. Mem. NOAA-NMFS-SWFC-7.

DELCROIX E., M.H. GODFREY & F. MAZEAS. 2008. Post-nesting migrations of green turtles (*Chelonia mydas*) from the archipelago of Guadeloupe (FWI) revealed by satellite tracking. In: Rees, A.F., M. Frick, A. Panagopoulou & K. Williams (Comps.). Proceedings of the 27th Annual Symposium on Sea Turtle Biology and Conservation.. NOAA Tech Memo NMFS-SEFSC-569, pp. 38-39.

HARRISON E. 2006. Activity report on the Dutch Caribbean Nature Alliance Sea Turtle Satellite Tracking Project. www.statiapark.org/downloads/downloads/Satellite%20Tracking%20Activity%20Report%202006.pdf

HAYS, G.C., A.C. BRODERICK, F. GLEN & B.J. GODLEY. 2002. Change in body mass associated with long-term fasting in a marine reptile: the case of green turtles (*Chelonia mydas*) at Ascension Island. Canadian Journal of Zoology 80: 1299–1302.

HIRTH, H.F. 1997. Synopsis of the biological data on the green turtle *Chelonia mydas* (Linnaeus 1758) . US Fish & Wildlife Service Biological Report 97(1), 120pp.

MILLER, J.D. 1997. Reproduction in sea turtles. In : Lutz P.L. & J.A. Musick (Eds.) The Biology of Sea Turtles. CRC Press, Boca Raton, FL. pp. 51-82.

MORTIMER, J.A. 1981 . The feeding ecology of the West Caribbean green turtle (*Chelonia mydas*) in Nicaragua. Biotropica 13: 49-58.

MORTIMER, J.A. 1982 . Feeding ecology of sea turtles. In Bjorndal, K.A. (Ed.). Biology and Conservation of Sea Turtles. Smithsonian Institute Press, Washington, D.C. pp. 103-109.

SOLE, G. 1994. Migration of the *Chelonia mydas* population from Aves Island. In: Bjorndal, K.A., A.B. Bolten, D.A. Johnson & P.J. Eliazar (Comps.). Proceedings of the 14th Annual Symposium on Sea Turtle Biology and Conservation. NOAA Tech. Memo. NMFS-SEFSC-351, pp. 283-286.

TUCKER, A.D. & M.A. READ. 2001. Frequency of foraging by gravid green turtles (*Chelonia mydas*) at Raine Island, Great Barrier Reef. Journal of Herpetology 35: 500-503.

A Leatherback Turtle Encountered in El Nido, Palawan, Philippines

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[2]El Nido-Taytay Managed Resource Protected Area, Palawan, Philippines

A leatherback turtle (*Dermochelys coriacea*) was caught entangled in a drift net, locally called "*pamo*," in Dipnay Bay, San Fernando, El Nido, Palawan, Philippines (11.322517° N, 119.562667° E) on 19 November 2005. The local fisher folks found a harness, which seemed too tight for the large turtle, across the leatherback's body, and some of the harness appeared already embedded in the turtle's flesh. Fearing the survival of the leatherback, the locals removed the harness, as well as the small rectangular box/gadget found on top of the turtle. The fisher folks and local officials eventually released the turtle back in the sea, only to find it dead after three days, along the same coast on November 22, 2005.

Examination of the carcass revealed that the turtle had fresh wounds on the shoulder and base of the fore flippers which could have been caused by the tight harness. The leatherback turtle, locally called "*balimbingon*," had a curved carapace length of 201 cm and a curved carapace width of 158 cm. Because of the remoteness of the area and because the local community was not familiar with the conduct of a post-mortem examination of a marine turtle, they decided to simply bury the turtle.

Meanwhile, the local fisher folks who acquired the small box broke it into small pieces thinking there was gold or something profitable in it. Not finding anything beneficial, they threw it away.

However, a concerned and knowledgeable manger (the Protected Area Superintendent) retrieved the box as well as the harness attached to the turtle (Fig. 1). Scrutinizing the gadgets, the straps and harness had the inscriptions **KURITEC BY KURIYAMA** and **NSF-51 CANADA K30324**, both of which appeared to be specifications of the materials. The small, rectangular silver box, which appeared to be a transmitter, had the inscriptions **SEIMAC WILD CAT 16051**. Any information pertaining to the origin of this turtle would be greatly appreciated by the authors.

Figure 1. Transmitter and harness found attached to a leatherback turtle in El Nido, Palawan, Philippines in 2005.

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IUCN-SSC Marine Turtle Specialist Group Quarterly Update

Brian J. Hutchinson[1], Roderic B. Mast[1] & Nicolas J. Pilcher[2]

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Update on MTSG Reappointment

As mentioned in our last quarterly update, the MTSG's quadrennial reappointment process is now underway and we have nearly completed the reappointment of all Regional Vice Chairs. The past four years have given us ample opportunity to test and refine the MTSG regional structure, and we have settled on 10 regions that will be used as the basis for the MTSG leadership and membership structures. As in the past, each region will have an appointed Vice Chair (or Chairs) who oversee the regional membership and serves as an important conduit of information between the MTSG members and the Co-Chairs. Listed below are the ten MTSG regions and their Regional Vice Chair or Chairs for the coming quadrennium.

We would also like to take this opportunity to highlight the important work of two of the past Regional Vice Chairs who will not be continuing in these roles: Dimitris Margaritoulis and J Nichols. We both thank and commend Dimitris for his many years of leadership of the MTSG Mediterranean Region. Dimitris has been an invaluable asset to the MTSG, and has been critical in unifying this diverse region and creating one of the best examples of MTSG regional membership. We are confident that Dimitris' successor, and former Co-Chair, Paolo Casale, will carry on this excellent work as the sole Vice Chair for the Mediterranean. Although Dimitris will no longer serve as Regional Vice Chair, he will be continuing as an MTSG member and intends to stay fully engaged in MTSG issues.

We would also like to take this opportunity to thank J Nichols for his years of work as the MTSG Regional Vice Co-Chair for the East Pacific region. J has been an important leader throughout the East Pacific region, and has had a tremendous impact in building capacity of turtle researchers and conservationists throughout the region. J has also been a valuable asset to the MTSG's global efforts, as a knowledgeable spokesperson for the East Pacific region in various global forums. Although leaving the Vice Chair role, J will continue on as an active MTSG member.

MTSG Regions and Regional Vice Chairs (July 2009)

Australasia:	*pending*
East Pacific:	Diego Amorocho, Raquel Briseño, Bryan Wallace
East Africa / West Indian Ocean:	Jerome Bourjea, Ronel Nel
Mediterranean:	Paolo Casale
North Atlantic:	Blair Witherington
Pacific Islands:	Milani Chaloupka
South Asia:	B.C. Choudhury
Southwest Atlantic:	Alejandro Fallabrino, Neca Marcovaldi, Joca Thome
Wider Caribbean:	*pending*
West Africa/ East Atlantic:	*pending*

Over the coming weeks, the Co-Chairs will review membership recommendations in conjunction with the newly-appointed Regional Vice Chairs, and general member invites will be sent out prior to the end of August.

Workshop on Sea Turtle Take in Southeast Asia

From 1st to 3rd June 2009, MTSG members in SE Asia (Nick Pilcher, Chan Eng Heng, Kevin Hiew and Romy Trono) co-hosted a meeting in Kuala Terengganu, Malaysia, to start addressing the direct capture of turtles in the region. As reported at the last two MTSG meetings, critically endangered marine turtles from South East Asia are being targeted by foreign vessels originating from Hainan, China, and (to a lesser degree) from Vietnam. These boats leave port with the express purpose of catching marine turtles, a practice which is illegal both in their home country and in the waters of countries in which they fish. The last half a decade has seen such a noteworthy increase that we need to look much more closely to determine the severity of this practice. How much poaching goes unrecorded or undetected? How severe are the impacts to turtle populations? What drives this trade, and how can it be curtailed?

Given the need to make significant and urgent inroads into curbing this illegal trade, the MTSG felt it proper to support the workshop, which, with the help of Prof. Shi Haitao from Hainan and China MTSG member Wang Yamin, brought together key players from Hainan along with key conservationists and government agencies from Indonesia, Malaysia, and the Philippines (the countries most targeted by the direct capture industry). The meeting was co-sponsored by the MTSG, Universiti Terengganu Malaysia, the Terengganu State Government, CI Philippines and the WWF Coral Triangle Initiative.

The workshop set out to document in a collective manner the cases of apprehensions of foreign vessels and fishermen involved in the illegal direct capture of marine turtles in South East Asian waters, and to document the cases of apprehensions of vessels and fishermen in their home countries. The scene was set through presentations on biology of marine turtles to demonstrate that direct capture of adult and subadult marine turtles can cause a rapid collapse of turtle populations in SE Asia, and on the declining trend of marine turtles in the region and the efforts undertaken to arrest the decline. Of interest were all the presentations by the Hainanese participants, which highlighted laws and regulations pertaining to sea turtles in China, conservation efforts by local NGOs, public awareness programmes and status of sea turtle populations. Ensuing discussion sessions focused on enforcement issues, market drivers and trends, and fishery community participation. A final set of recommendations on moving forward from here was put together, and a follow-up trip to Hainan is already on the cards for Nick, Chan, Kevin and Romy. The formal workshop report will be released shortly and we will keep MTSG informed of actions and progress.

ANNOUNCEMENTS

Call for Abstracts on Sea Turtle Headstarting Projects

Russell Burke

Department of Biology, 114 Hofstra University, Hempstead, NY 11549 USA (E-mail: russell.l.burke@hofstra.edu)

I'm trying to locate potential participants in a symposium called "Headstarting Turtles-Learning from Experience" to be held at the Joint meetings of the Herpetologists League, the Society for the Study of Amphibians and Reptiles, and the Association of Ichthyologists and Herpetologists in Providence, Rhode Island, 7-12 July 2010. At this point I am interested in people with direct, long-term experience with turtle head starting programs who would be willing to present papers on their work. I already have a large number of excellent participants, but we are unfortunately lacking in talks concerning sea turtles.

My goals are to encourage people involving in turtle head-starting projects to address academic concerns concerning hard-starting, to compare a series of examples of serious head-starting projects using a common set of criteria for success, to learn which, if any, conservation practices are more likely to lead to success. It is not the goal of this symposium to present head-starting as the solution to all turtle conservation problems, or even to promote head-starting itself. I specifically intend to invite some critics of head-starting to speak, in addtion to head-starting practitioners, in an effort to promote dialogue.

Head-starting is sometimes a controversial topic in turtle conservation that has received little serious academic examination. Here I am focusing on head-starting itself, that is, the release of captive -raised hatchlings for conservation purposes. I am distinguishing head-starting from translocation generally, which can also include releases of wild-caught adults.

Please let me know if you would like to join very diverse team of professionals from around the world in discussing this important topic. Of course there will be many other papers on turtles and turtle conservation at the JMIH meetings, so this should be fun and educational for all. I expect to publish either a multi-authored book or that we will publish the papers as a group in a journal.

2nd Announcement: 30th Annual Symposium on Sea Turtle Biology & Conservation, 27th – 29th April, 2010 in Goa, India

Kartik Shanker
President, International Sea Turtle Society and
Centre for Ecological Sciences, Indian Institute of Science, Bangalore 560012, India (E-mail: kshanker@ces.iisc.ernet.in)
Symposium website: india.seaturtle.org/symposium2010

The annual sea turtle symposium, organized by the International Sea Turtle Society (ISTS), will be coming to South Asia for the first time. It will be held in Goa, India between the 27th and 29th of April, 2010. Regional and pre-symposium meetings will be held between the 24th and 26th of April, 2010. Details of these meetings and post-symposium activities will be provided on our website.

The event will be jointly hosted and organized by sea turtle conservation groups and research organizations as well as institutions that work on marine environment issues across India and South Asia. Based on previous Annual Symposia of the ISTS, we are expecting up to 700 participants, from as many as half the nations on the planet. The ISTS Annual Symposium is truly unique, drawing an enormous number and diversity of people interested in these intriguing animals.

Dates:
24–26 April 2010: Regional and Pre-symposium meetings
27-29 April 2010: Symposium
From April 30, 2010: Post-symposium workshops and tours

Venue:
Regional and Pre-symposium meetings: The Marriott, Panaji, Goa (www.marriott.com/hotels/travel/goimc-goa-marriott-resort)
Symposium: Kala Academy, Panaji, Goa

Theme: *The World of Turtles*
Sea turtles inhabit the land and the sea. They connect the shallow nearshore waters to the open sea, cold temperate to warm tropical waters. They migrate across ocean basins. And through several thousands of years, they have connected us ecologically and culturally to the sea. The 30th annual symposium on sea turtle biology and conservation will seek to explore these connections and focus on the world they live in. The world of coral reefs, seagrass meadows, open seas and sandy beaches. The world of people, living and working on the coast or at sea; of fishing cultures and livelihoods. All connected by sea turtles and by us.
The 30th symposium will also draw attention to the concerns of fishing communities, especially those across the South Asian region, within the conservation paradigm and will address how marine conservation issues can be approached without jeopardizing - but rather by enhancing - the livelihoods of communities that depend on these resources and the same environments that are needed by the turtles. In this context, discussions will also focus on traditional fishing communities, whose practices have often been questioned by the conservation community, but whose contributions to maintaining and ensuring the "health" of the marine ecosystems must be acknowledged and addressed.

Registration (*deadline: 31st October 2009)*
To attend or participate in the symposium, you must register, preferably in advance. The registration process will commence by 01 September 2009. The early registration deadline is 31 October 2009. You can register at iconferences.seaturtle.org. Early registration fees are as follows:

High income registration: 195 USD
Regular registration: 125 USD
Student / Low income registration: INR 1000 / USD 25

Registration remains open until the symposium, but you will incur a higher registration fee past the early registration deadline (31 October 2009). Hence, we encourage you to register well in advance, which will then allow you to submit your abstracts and applications for travel grants. This will also give us adequate time to make preparations for the many programmatic, lodging, social event related, travel, and other activities that need to be dealt with in an event as large and complex as this.

If you are unable to pay online for registration, contact your

regional travel chair (see below), or one of the local organizers if you are from South Asia (see below); the registration fee for travel grant applicants may be deferred until you arrive in Goa.
If you are attending the symposium for the first time, it is important to point out that by registering for the 2010 symposium, you automatically become a member of the International Sea Turtle Society. You can then receive updates about the symposium, and other events from the ISTS, through seaturtle.org.

Travel grant applications *(deadline: 31st October 2009)*
You may apply for a travel grant to help finance your travel to the symposium In the least, a travel grant also ensures you accommodation for the duration of the symposium. Travel grant applications are submitted to regional travel chairs for consideration. Please note that you can submit a travel grant application only after registration; however, you can submit a travel grant application prior to payment of the registration fee.

Abstract submission (*deadline: 31st October 2009)*
Abstracts should be submitted online at iconferences.seaturtle.org. To submit an abstract, you must first register and make a payment. However, under special circumstances, travel grant applicants can have the payment deferred by contacting their travel chair; this will enable you to submit your abstract without paying before hand, but you must still submit the abstract before the deadline. Your abstracts will be reviewed by the Programme Committee and a notification of whether or not your abstract has been accepted will be sent to you by January, 2010. You may choose your preference of oral, speed and/or poster presentation. Instructions and more details are available on the symposium website.

Programme
The symposium will be held at the Kala Academy, Goa. In keeping with the theme of the symposium, the sessions proposed to be held during the main days of the symposium (27 – 29 April 2010) include standard symposium as well as special sessions, including Ecosystem function, Resource dependent livelihoods, Environmental impacts and others. Further details will be announced on our website soon. Several workshops have been planned and will also be announced shortly.

Pre-symposium meetings (24-26 April 2010) will be held at the Marriott, Goa. The proposed meetings include the IUCN MTSG meeting, Freshwater Turtles meeting, and regional meetings.

Sponsors
An event of this magnitude and complexity requires the support and participation of many key/active partners and sponsors. Support for the 2010 symposium is solicited from all quarters. If you would like to contribute by way of sponsorship, or help us locate potential sponsors, towards organizing and conducting the symposium, we'd be grateful for any help.

Volunteer!
A dedicated team of local and international volunteers is helping organize the many facets of the symposium. We will however, need plenty more help leading up to, and during the days of the symposium. If you would like to volunteer your time and effort towards organizing this event, do write to us (Supraja Dharini – International Volunteers Coordinator at treefoundation2002@gmail.com or Seema Shenoy – Symposium Coordinator (India) at seemashenoy83@gmail.com).

Location: Goa
Goa was chosen as the ideal location to host the symposium for a variety of reasons. It has long been a favoured destination for tourists from around the world and has the necessary facilities and infrastructure to cater to a very large and diverse group of visitors. Being on the coast, Goa offers symposium participants the opportunity to explore its unique shores, its rich tropical forests and mountains, and diverse cultural and historical heritage sites. Information about Goa will be provided on our symposium page.

Travel to India / Goa
Many international flights ply to major Indian cities on a regular basis. Mumbai (Bombay), situated 600 km to the north of Goa, is one of the primary ports of entry. Trains, buses and taxis frequently ply between Mumbai and Panaji, the capital of Goa and the location of the symposium. From all other major cities in India, low cost airlines, trains and buses provide easy and reasonably priced transportation to Goa. Goa also has an international airport located 30km from Panaji. You can contact the event manager (Host India Events) or official travel agency (Integrated Conference or Event Management – ICE India) for help with your bookings. Contact details and other information are available on the symposium website.

We strongly recommend applying for visas to India well in advance. Specific information related to visa applications and travel options will be available on our website. Useful visa and travel related information is also available at www.visatoindia.com and www.tourism.gov.in. You can write to ICE India (www.iceindia.in) for any further information or assistance you may need.

We encourage you to arrive early, or stay on after the symposium. Traveling within India is easy on the pocket, and there is a lot to explore. Low budget airlines and an extensive road and rail network connect all corners of the country. Tour packages are also on offer from ICE India. Visit our website to learn more.

Accommodation
A wide range of accommodation options is available in Goa. You can book rooms through the symposium website or can make bookings on your own. Booking rooms through our website will give you the added benefits of reduced rates, special offers and the option of choosing a hotel that is best suited to your budget and other preferences.

More information
For more details, visit india.seaturtle.org/symposium2010 or iconferences.seaturtle.org. Visit these sites regularly for the latest updates. By registering for the symposium, you could also choose to have the latest updates reach you by email. For any additional information, queries, inputs and suggestions, do contact us:

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USA and Canada: Bryan Wallace (b.wallace@conservation.org)

Regional partners
We cordially invite other regional organizations to collaborate. Our current partners include:

Bangladesh
Centre for Advanced Research in Natural Resources & Management (CARINAM), Bangladesh
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Marine Life Alliance, Bangladesh
Contact: Zahirul Islam: marinelife_al@yahoo.com
Maldives
Marine Research Centre, Maldives
Contact: Shiham Adam (Exec. Dir.): msadam@mrc.gov.mv
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Pakistan
WWF – Pakistan
Contact: Ahmad Khan: akhan@wwf.org.pk

Sri Lanka
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South Asia Cooperative Environment Programme (SACEP), South Asia
Contact: Jacintha Tissera (Director General): sacep@eol.lk
Dr. Venkatesan (Regional Coordinator): dr.r.venkatesan@gmail.com

India partners
Several more partners are expected to come on board in the next few weeks, including from the government. Two major networks, the Turtle Action Group, a newly formed national network of small non-government organizations working on sea turtles on the coast of India, and the Orissa Marine Resources Conservation Consortium, an alliance of fisher groups and conservationists in Orissa, are also partnering in the symposium.

Bombay Natural History Society (BNHS), Mumbai
Centre for Ecological Sciences (CES), Indian Institute of Science, Bangalore
Dakshin Foundation (DF), Bangalore
Gujarat Institute for Desert Ecology (GUIDE), Bhuj
Madras Crocodile Bank Trust, Mamallapuram
Orissa Marine Resources Conservation Consortium (OMRCC), Orissa
Turtle Action Group (TAG), India
Wildlife Protection Society of India (WPSI), New Delhi
Wildlife Information Liaison Development (WILD), Coimbatore
WWF – India, New Delhi
Zoo Outreach Organization (ZOO), Coimbatore

BOOK REVIEW

Title: Cleopatra the Turtle Girl
Year: 2006
Editor: Peter C.H. Pritchard
Publisher: The Guyana Book Foundation
ISBN: 9789768212061
Pages: 34pp (paperback)
Price: unknown
To order: http:// www.gbf.org.gy

Cleopatra the Turtle Girl is an homage to the turtles of Guyana told with tremendous enthusiasm by Peter Pritchard. The book, published by The Guyana Book Foundation, tells the story of Cleopatra, a young Guyanese girl, and the turtle species she encounters on a series of trips with her Uncle Jeffrey, who handily finances them through his career in the gold mines.

As one expects from Pritchard, information on the turtles is thorough. It is accompanied by beautiful species illustrations by Giorgio Voltolina, repurposed from Pritchard and Pedro Trebbau's Turtles of Venezuela (Society for the Study of Amphibians and Reptiles, 1984). Children, who like Cleopatra are turtophiles, will be fascinated by the descriptions of the animals and charmed by Pritchard's obviously loving attention to detail in them.

The book's limitations become clear when considering its possible appeal for children who are not already very interested in turtles. Cleopatra's fascination with the animals serves as a framework for delivering information on turtles, and lacks narrative depth otherwise.

Although there are interesting anecdotes about such things as the local market, travelling in Guyana, and family life, Cleopatra's character is not well developed. She is kept at a distance from the reader both because she rarely speaks herself, and because when she does, it is in a patois that jars with the narrative voice.

Pritchard is a good writer, and for the most part, his text flows effortlessly. However, in this case, the story he tells is too long to support the picture book this resembles. The book, which would better suit a trade paperback size, is text heavy as a result, a fact further emphasized by its large font.

In many ways, Cleopatra the Turtle Girl is a story from a different era in environmental writing for children. Despite Pritchard's obvious affection for Guyana, his narrator's point of view is clearly that of someone from outside of the community about which he writes. The book also includes incidents that would not have raised an eyebrow in earlier days, but which are not normally included in current texts.

Cleopatra the Turtle Girl ends, for example, with Cleopatra enterprisingly selling tickets to her friends to see her newly acquired matamata feeding. She collected the turtle from the wild on one of her trips with Uncle Jeffrey. Although the scores of turtle scientists who grew up nourishing their interest by watching turtles for hours in zoos, pet stores, or in tanks at home can no doubt understand her instinct to keep the turtle, the incident will inevitably spark debate.

Debate about how best to nurture young turtle lovers is not necessarily a bad thing, however. And it is those children—who will carry the mantle of turtle science and conservation into the future—who will love and appreciate this book.

Reviewed by: **Kathleen Martin**, Canadian Sea Turtle Network, 2070 Oxford Street, Suite 110, Halifax, Nova Scotia, B3L 2T2 Canada (E-mail: kmartin@seaturtle.ca)

NEWS AND LEGAL BRIEFS

This section is compiled by seaturtle.org. You can submit news items at any time online at <http://www.seaturtle.org/news/>, via e-mail to news@seaturtle.org, or by regular mail to the Editors. Many of these news items and more can be found at http://www.seaturtle.org/news/, where you can also sign up for news updates by E-mail. Note that News Items are taken directly from various media sources and do not necessarily reflect the views or opinions of the editorial members of the MTN.

ASIA

Turtle Lands in Patong, Then Vanishes

A large sea turtle made its way to shore in Patong today, much to the surprise of an early-rising beach boy who discovered the creature on the sand, close to Loma Park. As with so many Patong stories, there was a happy beginning, hope for a fresh start, followed by a sad ending. Word quickly spread. There was some elation at the news that a turtle had been found in Patong, so often criticised for the quality of its water and the way some visitors are treated. The sad ending eventually caught up with the happy beginning, but only after the turtle was mistakenly carted away as trash. For sometime after she arrived on Patong's shores, the turtle had died. Jaruj Seriruk of the Marine Animal Rescue service eventually tracked down the creature and claimed her body for research, with the prospect of the turtle having at least a little dignity in death. The tanu turtle is an Andaman species and it's entirely possible that she was driven by instinct to return to a place which she had once been familiar. Has she deposited eggs on a Phuket beach in her 20 years? Were there close calls over time with fishing trawlers and human predators? Nobody can say. What's known is that she was large and beautiful, measuring 77 centimetres from head to tail and with a shell that was 73 centimetres broad. Along the shore, conveying the impression that turtles are regular guests at Patong beach, are replica turtles similar in size to the one that came ashore today. Source: *Phuket Wan*, 31 July 2009.

Bali Water Police Release Protected Sea Turtles

"Go! Go! Go!" screamed a bunch of kids and teens at four green sea turtles as the protected animals were released by Bali Water

Police officers back into the sea Sunday afternoon at Kuta. "Yes, kids! Help me encourage these big turtles to swim away!" said one of the officers, while his friends carried two huge turtles. One has a carapace length of 1 meter and the other 1.5 meters. The sea turtles were seized Saturday afternoon during a raid at a house belonging to a suspected turtle trader in South Kuta. During the raid the police arrested an alleged trader and the skipper of a boat transporting the protected species. The police moved on after receiving a tip from Tanjung Benoa residents about possible smuggling activities. The water police immediately sent a patrol boat to monitor the waters around Kedonganan and Tanjung Benoa. The officers identified one suspicious boat and tailed it closely. "The suspicious boat moved to Nusa Dua waters. As we could not reach Nusa Dua waters due to big waves, we waited for the suspects to drop off the rare wildlife onto land," said chief of operations at the Bali Water Police, Comr. I Putu S. Dinata. "We captured them the suspect's house." Dinata added his team had found six green turtles, but only four were released into the sea Sunday because the other two would be kept as evidence for the suspects' trial. Bali Police spokesman Sr. Comr. I Gede Sugianyar said the suspects might face a maximum of five years imprisonment as they have allegedly violated Government Regulation No. 21/1999 concerning the conservation of natural resources. "The turtles were poached in the waters off Java and will be sold here." "The small ones command a price around Rp 1.5 million (US$145.70) while the big ones are worth up to Rp 5 million. The Balinese usually buy turtles for consumption. "We intentionally release the turtles in the crowded Kuta beach, because we also want to give a public education that green turtle is facing extinction. Especially for Bali residents, who we are hope will reduce their consumption of turtles." During the release, some foreign tourists took photos and also encouraged the newly free turtles to swim back into the ocean. Source: *Jakarta Post*, 01 June 2009.

WWF Wants Turtle Eggs Off Malaysian menus

WWF on Wednesday launched a campaign to stop Malaysians eating turtle eggs, in a bid to help save the marine creatures from extinction. Turtle eggs are openly sold in markets in parts of Malaysia. Turtles once arrived in their thousands to lay eggs on Malaysian beaches, but are now increasingly rare thanks to poaching and coastal development. The five-month online campaign aims to collect 40,000 signatures from Malaysians pledging to stop consuming the eggs and halt the trade in turtles and their parts. A spokesperson said that some 10,000 leatherback turtles nested in northeastern Terengganu state every year in the 1950s but that this had been reduced to just 10 a year at present. Malaysian authorities said last year that they are carrying out night patrols near endangered hawksbill turtle nesting sites in southern Malacca state after 4,000 eggs were stolen. Under Malaysian law, it is illegal to collect turtle eggs without a permit from the fisheries department, but steady demand for turtle products and eggs in Southeast Asia continues to drive the illegal trade. Source: *Economic Times*, 22 April 2009.

AMERICAS

Belize barrier reef and Los Katios park in danger

The Belize Barrier Reef System and Los Katios National Park in Colombia are the two natural sites added to the List of World Heritage in Danger, following the advice of IUCN. Composed of seven protected areas, many small mangrove islands and coastal lagoons, the Belize Barrier Reef System is home to a number of threatened species, including marine turtles and the American crocodile. A series of technical assessments and a joint IUCN/UNESCO monitoring mission to Belize in March 2009 revealed alarming developments such as extensive mangrove cutting and sale of mangrove islands. The Belize Barrier Reef, the largest in the Northern Hemisphere, is also the country´s top tourist destination. Los Katios National Park was added to the World Heritage List in 1994 because of the exceptional diversity of flora and fauna in the area, consisting of low hills, tropical rainforests and wetlands. Illegal logging, security concerns, overfishing and potential road construction are all recognised threats to the outstanding value of the site. "Los Katios National Park needs a high level of protection, one that must involve not only the national authorities but the international community as well. IUCN commends the State Party for its proposal to put the site on the danger list. Critical conservation threats call for global action and the danger list is the mechanism we have at our disposal to help countries protect the world heritage." says Pedro Rosabal, IUCN´s Senior Programme Officer on Protected Areas. Source: *The World Sentinel*, 01 July 2009.

Diplomatic Crisis Averted: Willy The Sea Turtle Safe

Consider the tale of Willy, an errant Kemp's Ridley sea turtle who's back in her native warm waters off the US East Coast – thanks to a US diplomat in London who got Willy a one-way ticket home. Willy's tale is also a reminder that not all of the nation's diplomatic business is about international conflict, or terrorism, or belligerent regimes posing nuclear threats. Sometimes a diplomat's work is about addressing the needs of marooned American citizens – and in this case that "citizen" happened to be a rare turtle. Just how Willy survived a transatlantic swim is unclear, but somehow she washed up on the beach in Devon in southern England in January 2007, cold and nearly dead. Some pitying beachcombers alerted the nearby Sea Life Center in Weymouth, which took her in and nursed her back to health. But the center's marine biologists thought the turtle, by now christened "Willy," should be returned home. The center contacted John "Jock" Whittlesey, the regional environment, science, technology and health counselor at the US Embassy in London. Willy being a Kemp's Ridley turtle – and thus included on the Convention on International Trade in Endangered Species list – she would require special documents to travel to the US. Mr. Whittlesey gave Willy's case top billing, and by November she had her travel papers. Still, Willy had to wait for warmer weather to return home. Anyway, by then it was pretty clear Willy was not destined to cross the Atlantic in coach. On April 23, a special American Airlines flight – with a BBC camera crew in tow – transported Willy directly from London to North Carolina's Raleigh-Durham airport. From there, she rode to Topsail Island, part of the state's Outer Banks barrier reef, where the Karen Beasley Sea Turtle Rescue and Rehabilitation Center welcomed her, deemed her fit for a return to her natural habitat, and released her to the familiar waters off the southeastern US. It may have taken a while, but this July 4 Willy is once again swimming in American waters. Source: *Christian Science Monitor*, 01 July 2009.

Long-line Fishermen: New Rules Are 'Draconian'

Local fisherman are calling newly proposed fishing regulations

"draconian" and say they could cripple the long-line fishing industry. "These could end long-line fishing altogether," said one long-line fisherman during a meeting with Gulf of Mexico Fishery Management Council officials last week. Gulf of Mexico long-line fisherman are facing new regulatory proposals after a consortium of environmental groups filed a lawsuit against the Gulf of Mexico Fishery Management Council. The council is being sued after 21 loggerhead sea turtles were observed "affected" by long-line fishing equipment over an 18-month period beginning in July 2007 by the Southeast Fisheries Science Center. Of the 21 affected, seven were confirmed killed. Sea-turtles are protected by the Endangered Species Act, a federal law requiring the conservation of species endangered or threatened by extinction. The Magnuson-Stevenson Fisher Conservation and Management Act also requires the National Marine Fisheries Service to minimize bycatch, or the unintentional taking of unwanted marine creatures. GMFMC officials told a handful of local fisherman at the Hilton Garden Inn last week the GMFMC has only a small window of time to create new regulations, which are being considered in a proposal titled, Amendment 31. The fisherman were not impressed with the options being considered in the Amendment, particularly proposals that would restrict long-line fishing in waters less than 50 fathoms from the coast or reduce the number of permits by requiring fisherman to have 40,000 pounds of catch to receive a permit. Fishermen said the former proposal would crush the industry, while the latter, which is a stated preferred measure by GMFMC, would eliminate permits for 75 percent of long-line fisherman, by their own estimates. Long-line fishing is responsible for nearly 70 percent of all red grouper caught in the Gulf of Mexico by commercial vessels, according to GMFMC statistician Steven Atran. Fishermen said the economic impact of losing all or a large percentage of long-line vessels would go beyond themselves. "The restaurants and fish houses won't be able to take it," said Bart "Buster" Niquet, a local long-line fisherman who expressed fears of being put out of business. Most fishermen present preferred the option of restricting long-lines to less than four miles in length, reducing the number of hooks per line or restricting certain types of bait. These options would protect sea turtles while putting fewer fishermen out of business, they said. FWC officials said these measures still were under consideration, but added the regulations would be difficult to enforce and were not the preferred options of law enforcement agencies. Some of the fisherman expressed frustration over the "slow creep" of government regulation that has forced them out of other types of commercial fishing, such as trapping and vertical-line fishing. Some fishermen argued long-line fishing accounted for only a fraction of loggerhead deaths and the industry was being unfairly targeted, saying the number of loggerheads killed by plastic bags (often mistaken for jelly fish prey), boat propellers and the millions of unobserved recreational commercial fisherman, kill exponentially more sea turtles than the approximately 260 long-line fisherman operating out of the Gulf of Mexico. Atran said it is impossible to determine the percentage of loggerhead turtles taken in the Gulf of Mexico by long-lining. While admitting the sample size was small, he said even very low confidence interval estimates have the number of sea turtles affected in the 400 range, well above the 113 anticipated. "We don't have to reduce an exact number (of unintentional takings)," Atran said. "But it must be reduced by a practicable level." Source: *Panama City News Herald*, 01 June 2009

Scientists Study the Riches of the Mexican Pacific

Mexico's Pacific coast, one of the world's richest seaboards in terms of biodiversity, has been the focus of very few scientific studies. A new observatory aims to fill that void. The Jacques Cousteau Observatory will explore the physical, chemical, biological, climate and socioeconomic characteristics of the area, which will serve as the basis for diagnosis and policies for sustainable management. The Observatory, the product of scientific cooperation between Mexico and France, was inaugurated Jun. 23 and will involve some 30 scientists in its operations. The Northwest Centre for Biological Research, which is part of the National Science and Technology Council's system, serves as its initial headquarters. Located in La Paz, in the state of Baja California Sur, it was chosen for its ongoing academic exchanges with scientific institutions in France. The Observatory was named in honour of the famous French sea explorer Cousteau (1910-1997), who referred to the Gulf of California (also known as the Sea of Cortez) - the waters between the Baja peninsula and the Mexican mainland - as the world's aquarium. Eleven of the world's 232 marine eco-regions are found in Mexico. Of those, eight are located along the Pacific coast. The government's National Commission for Knowledge and Use of Biodiversity established around 30 priority marine areas along the seaboard from the southern state of Chiapas to the U.S. border. "That area has great environmental value. In states like Guerrero and Oaxaca there are internationally important beaches for some species of sea turtle, like the leatherback," biologist Ana Barragán, a specialist with the national sea turtle programme of Mexico's National Commission for Protected Areas, told Tierramérica. Mexico has six native sea turtle species, with three found along the Pacific: the black (*Chelonia agassizii*), leatherback (*Dermochelys coriacea*) and Olive Ridley (*Lepidochelys olivacea*) turtles. Today, the population of female leatherbacks is believed to be just 2,000. The area is home to 39 endangered marine species, according to the International Union for the Conservation of Nature's Red List. Mexico's mangroves cover about 800,000 hectares (62 percent on the Atlantic coast and the rest on the Pacific coast). Some 10,000 hectares of mangroves - a forest ecosystem typical to coastal wetlands - disappear each year, according to official figures. A 2008 study of Gulf of California mangroves by Mexican, U.S. and Spanish scientists concluded that the destruction of this ecosystem was causing serious harm to local fishing industries. According to the report, more than 26 fisheries of high economic value, which provide annual benefits of about 700,000 dollars per hectare, are sustained by the Gulf's mangroves. The area "is a huge cradle of biodiversity," said Barragán. Environmental groups warn that the states of Baja California, Chiapas and Jalisco, along the Pacific, are among the most vulnerable areas to the effects of climate change in Mexico. Source: *Tierramérica*, 02 July 2009.

Ridley Nests on Corpus Christi Beach

It's not every day a birth becomes a public spectacle. But when a mother chooses Corpus Christi Beach to bring 85 babies into the world, there's bound to be some spectators. In this case, about 20 people watched Monday as a Kemp's ridley sea turtle laid her eggs. But the location was just strange even for a sea turtle, said Donna Shaver, director of the National Seashore's turtle recovery program. "I would even call it abnormal," Shaver said. "It's not the typical behavior and not really a desirable location." The nesting is the first

reported on the bay since Padre Island National Seashore experts started recording Texas Coast nestings in 1980, she said. The bay isn't an ideal place for turtles to lay eggs because the clearer water and lack of vegetation make any hatchlings susceptible to potential predators. Kemp's ridley sea turtles, which typically nest on the coast of the Gulf of Mexico, have been tracked or sometimes stranded in the bay but none until Monday have nested there, Shaver said. Shaver said she planned to look at some pictures taken by a bystander to determine if the nesting turtle was part of a head start program from 1978 to 1988. The program involved releasing Kemp's ridley sea turtle hatchlings from Padre Island and some from Nueces and Corpus Christi bays to encourage turtle nesting in the area. But she said she doubted she would be able to see any identifying spots or tags on the turtle because she had heard from bystanders it may have had algae on its shell. As of Monday, 156 nests have been found on the Texas coast this nesting season, which runs through mid-July. A record 195 Kemp's ridley sea turtle nests were found on the Texas coast last year. The turtle, estimated at 80 pounds, was seen about 8:30 a.m. along Corpus Christi Beach by beachgoer Maribel Perez who said the turtle was tucking eggs under the sand. The turtle stayed in one spot for a while, kicking sand with her flippers and even spinning around at one point. Perez said she thought the turtle was hurt, but she quickly realized it was nesting. Bystanders marked off the area with sticks as others shooed off threatening seagulls. The turtle swam into the bay shortly afterward, bystanders said. Perez, of San Antonio, who was on her second visit to Corpus Christi, had no idea of the rarity of the event. Source: *Caller-Times*, 02 June 2009.

EUROPE

Turtles return to the sea

Eleven marine turtles that were nursed back to health at the San Lucjan Centre for Fisheries Science in Marsaxlokk, Malta, returned yesterday to their natural habitat during a release event in Golden Bay. Children from the EkoSkola programme attended the event, some holding posters carrying messages for people to dispose wisely of plastic bags. Plastic bags are a particular problem as turtles mistake them for jellyfish and swallow them. The bags get caught in the digestive tract and cause the turtles to starve. Some of the turtles released yesterday, rescued by fishermen and NGOs have been undergoing rehabilitation for more than a year. Injured turtles would need to be treated for fractured shells, or after having swallowed plastic bags or other inert objects. Locally, the last recorded nesting by a turtle on one of our beaches was in 1960 at Golden Bay. Emblematic of the gulf between yesteryear's and today's conservation ethics, the hapless loggerhead was consumed, along with its eggs, on that occasion by those observing its ordeal – marine turtle flesh could easily be purchased on markets for use in soups up to 10 to 15 years ago. Marine turtles need to lay their eggs on land. Global warming, through projected rises in sea level, could further erode remaining beach havens for the turtles. The distribution of loggerheads girdles the globe, being found in all tropical and temperate seas of the world and rare only in the eastern and central Pacific Ocean. Despite this, genetic studies have stressed the fact that turtles from different nesting areas differ genetically – this suggests that female turtles return to the same nesting beaches on which they hatched. Source: *Malta Independent*, 01 July 2009.

Wales on Course for Shopping Bag Charges

Wales is on course to be the first nation in the UK to introduce a charge on shopping bags. Environment Minister Jane Davidson put forward the radical proposal as a way of cutting down on free, single-use carrier bags at shops across the country. Ms Davidson proposes that customers will pay between 5p and 15p for bags at the tills of all retail outlets. Retailers will have to keep records about their charges, the number of single-use carrier bags sold, the gross amount received by a seller and where the net proceeds have gone per tax year. Retailers may also have to supply their records to Welsh ministers, trading standards and members of the public. Supermarket members of the British Retail Consortium (BRC) have already voluntarily agreed to reduce the amount of single-use carrier bags they give out by 50% by this year, and latest figures show they are close to achieving it having reduced handouts by 49%. "I support the voluntary agreement but I want to make more of a difference in Wales," Ms Davidson said. "An estimated 480 million plastic bags are used in Wales each year. It takes between 500 and 1,000 years for these bags to biodegrade and this cannot continue. "By reusing bags, not only will we reduce litter, but we will also help cut our global footprint. "This voluntary agreement does not cover all retailers and means that half of all plastic bags are still used for one shopping trip only. "I want to look at how we can further reduce the amount of single-use carrier bags and how we can encourage more people to reuse bags," said the minister. The problems caused by the 480 million plastic bags Welsh shoppers get through every year was highlighted in April by the Marine Conservation Society, which said many of them end up as litter on the beaches of Wales. The society warned that 170 species of wildlife, including seabirds, whales and the rare leatherback turtle that travels 10,000 miles from Mexico to Wales to feed on jellyfish, all mistake the plastic bags for food, resulting in starvation and poisoning. Source: *Wales Online*, 20 July 2009.

AFRICA

Largest Leatherback Turtle Nesting Area Found

The world's largest nesting population of leatherback sea turtles has been identified in Africa. Land and aerial surveys indicate a population of between 15,730 and 41,373 female turtles use the nesting beaches in Gabon, West Africa. Leatherbacks are of intense conservation concern around the world after populations in the Indo-Pacific crashed by more than 90 percent in the 1980s and 1990s. The International Union for Conservation of Nature (IUCN) lists leatherback turtles as critically endangered globally, but detailed population assessments in much of the Atlantic, especially Africa, are lacking. The research was led by the University of Exeter working in collaboration with the Wildlife Conservation Society (WCS) which spearheads the Gabon Sea Turtle Partnership, a network of organizations concerned with the protection of marine turtles in Gabon. During three nesting seasons between 2002 and 2007, the team's members carried out a comprehensive survey of marine turtles in Gabon. This involved aerial surveys along Gabon's 372 mile (600 kilometer) coast, using video to capture footage for evaluation, and detailed ground-based monitoring. By covering the entire coastline, the team was not only able to estimate the number of nests and nesting females, but also to identify the key sites for leatherback nesting, data which are crucial to developing

conservation management plans for the species. Leatherbacks were first described nesting in Gabon in 1984. The new finding on the turtle population was published in the May issue of the journal Biological Conservation. "We knew that Gabon was an important nesting site for leatherback turtles but until now had little idea of the size of the population or its global ranking, said Matthew Witt of the University of Exeter, lead author of the research paper. "We are now focusing our efforts on working with local agencies to coordinate conservation efforts to ensure this population is protected against the threats from illegal fisheries, nest poaching, pollution and habitat disturbance, and climate change." The study also revealed that around 79 percent of the turtles' nesting occurs within National Parks and other protected areas. "These findings show the critical importance of protected areas to maintain populations of sea turtles," said Angela Formia of the Wildlife Conservation Society, a co-author of the paper. "Gabon should be commended for creating a network of National Parks in 2002 that have provided a sanctuary for this endangered species as well as other rare wildlife." Source: *MSNBC*, 18 May 2009.

Fishers, Ecosystem Among the Losers in Proposed Projects

Apart from the fear that the proposed Lamu port and refinery in Kenya could lead to the displacement of 6,000 people, there are concerns that the project could cause serious damage to the delicate marine ecosystem. It will involve mass uprooting of mangrove trees that act as breeding ground for rare fish. It will also cause water pollution due to possible oil spillage from the refinery. Lamu is known worldwide for its biodiversity and as a breeding ground for exotic fish species for the entire East African coastline from Somali to Mozambique while the Kiunga Marine National Reserve is part of the Manda Bay buffer zone. Kenya Marine Forum Lamu branch chairman Kohamed Athman is concerned that the destruction of mangrove trees will disturb the ecosystem and endanger the livelihood of hundreds of fishermen. Mr Athman said his organisation is lobbying for the projects to be shelved for the sake of the environment, despite the expected benefits. According to Athman, the environmental impact alone and the effects on local subsistence fishermen and local farmers could overshadow the benefits. Research shows that the East African coast loses about 3,000 acres per year and massive development will only make it worse. The bay around Manda Island is known to support corals, sea grass beds and lush stands of mangrove, while marine turtles use these areas regularly in the winter as feeding grounds. Also likely to be endangered is the Dugong fish , commonly known as the seacow, which is unique to Lamu. These creatures depend on shallow sea grass beds exclusively for their survival and the cutting of the mangrove trees would have an impact on one of Kenya's most threatened fish species. In 1980, 60,000 hectares off the coast north of Lamu was designated a Biosphere Reserve under UNESCO's Man and the Biosphere Project in recognition of the international conservation importance of the north eastern coastal region. Environmental experts say that interference with the environment, such as the massive destruction of mangroves, will endanger this fragile ecosystem and reduce its capacity to mitigate climate change effects. In order to prevent the negative impacts of uncoordinated and piecemeal development of the country's shorelines, Kenyan regulators recognise the need to develop a strategy for shoreline management in support of overall coastal zone. However, despite the acknowledged environmental importance of the area, the Kenyan government also knows the construction of Lamu port is likely to result in considerable economic benefits to the country. Source: *The East African*, 27 July 2009.

Saving Turtles by Fitting Satellite Trackers

Endangered leatherback turtles are being "hammered" worldwide with massive reductions of up to 90 percent in some populations, but South Africa's conservation efforts appear to be paying off and the local leatherback populations are stable. While they are stable they are, however, not growing, unlike the local loggerhead turtles whose nesting populations have "rocketed", according to marine scientist Ronel Nel of the Nelson Mandela Metropolitan University. Nel's research is trying to find out why. One of the reasons could be an imbalance of the leatherback sex ratio. Normally a population would have around a 50:50 ratio between males and females, but an analysis of leatherbacks trapped in shark nets off the coast of KwaZulu-Natal suggests that their sex ratio is in fact two males to one female. Nel said generally the temperature of the sand in which the eggs were incubated determined the sex of the turtle, with cooler temperatures producing males and warmer temperatures producing females. Those hatched in warmer Mozambique were more likely to be females, with the southern populations in cooler South Africa more likely to be males. While South Africa's strict conservation laws and enforcement practices protected the local turtle populations reasonably well, the leatherbacks in Mozambique were being "hammered" on an unsustainable basis, Nel said. Although the meat was generally not eaten, the leatherback flesh was sought after for its high oil content. Leatherbacks are known to swim many thousands of kilometres. Part of Nel's research is to track the migrations of those that nest on our shores. "They go all over the place. Apart from one near Knysna at the moment, there is another one we're tracking that is about 1 500km south east of Port Elizabeth. The furthest north we've tracked one is Angola." In the Pacific, the leatherback populations have declined by 90 percent in the past 20 years. "They are in serious trouble there. They're also declining in Indonesia and Thailand." Major threats are longline fishing, especially the swordfish industry in the western Indian Ocean, the slaughter of the animals for meat and unsustainable harvesting of their eggs. Plastic is also a turtle killer as turtles mistake plastic floating in the ocean for jellyfish, swallow it and die. Source: *The Mercury* (South Africa), 15 June 2009.

RECENT PUBLICATIONS

This section is compiled by the Archie Carr Center for Sea Turtle Research (ACCSTR), University of Florida. The ACCSTR maintains the Sea Turtle On-line Bibliography: (http://accstr.ufl.edu/biblio.html).

Included in this section are publications that have been pre-published online prior to the hardcopy publication. These citations are included because of the frequent delay in hardcopy publication and the importance of keeping everyone informed of the latest research accomplishments. Please email us <ACCSTR@zoology.ufl.edu> when your papers are published online. Check the online bibliography for final citation, including volume and page numbers.

It is requested that a copy of all publications (including technical reports and non-refereed journal articles) be sent to both:

1) The ACCSTR for inclusion in both the on-line bibliography and the MTN. Address: Archie Carr Center for Sea Turtle Research, University of Florida, PO Box 118525, Gainesville, FL 32611, USA.
2) The editors of the Marine Turtle Newsletter to facilitate the transmission of information to colleagues submitting articles who may not have access to on-line literature reviewing services.

RECENT PAPERS

ANDREWS, H., B. C. CHOUDHURY, K. SHANKER, W. SUNDERRAJ, B. TRIPATHY, R. WHITAKER, BOMBAY NATURAL HISTORY SOCIETY, FOUNDATION FOR ECOLOGICAL SECURITY, GUJARAT INSTITUTE OF DESERT ECOLOGY, INDIAN NATIONAL TRUST FOR ART & CULTURAL HERITAGE, SALIM ALI CENTRE FOR ORNITHOLOGY & NATURAL HISTORY & WILDLIFE PROTECTION SOCIETY OF INDIA. 2008. Letter to IUCN from conservationists and NGOs in India. Indian Ocean Turtle Newsletter No. 8: 3-4. Available at http://www.seaturtle.org/iotn

BEVERLY, S., D. CURRAN, M. MUSYL & B. MOLONY. 2009. Effects of eliminating shallow hooks from tuna longline sets on target and non-target species in the Hawaii-based pelagic tuna fishery. Fisheries Research 96: 281-288. M. Musyl, Univ Hawaii, Joint Inst Marine and Atmospher Res, Kewalo Res Facil, NOAA, 1125B Ala Moana Blvd, Honolulu, HI 96814, USA. (E-mail: Michael.Musyl@noaa.gov)

BLUMENTHAL, J.M., T.J. AUSTIN, J.B. BOTHWELL, A.C. BRODERICK, G. EBANKS-PETRIE, J.R. OLYNIK, M.F. ORR, J.L. SOLOMON, M.J. WITT & B. J. GODLEY. 2009. Diving behavior and movements of juvenile hawksbill turtles *Eretmochelys imbricata* on a Caribbean coral reef. Coral Reefs 28: 55-65. J. Blumenthal, Dept. of Environment, Cayman Islands Government, P.O. Box 486, Grand Cayman KY1-1106, Cayman Islands. (E-mail: JBlumenthal@seaturtle.org)

BROCK, K.A., J.S. REECE & L.M. EHRHART. 2009. The effects of artificial beach nourishment on marine turtles: differences between loggerhead and green turtles. Restoration Ecology 17: 297-307. K. Brock, Dept of Biology, University of Central Florida, 4000 Central Florida Boulevard, Orlando, FL 32816, USA. (E-mail: kkbrock@wavecable.com)

DEEM, S.L., T.M. NORTON, M. MITCHELL, A. SEGARS, A.R. ALLEMAN, C. CRAY, R. H. POPPENGA, M. DODD & W.B. KARESH. 2009. Comparison of blood values in foraging, nesting, and stranded loggerhead turtles (*Caretta caretta*) along the coast of Georgia, USA. Journal of Wildlife Diseases 45: 41-56. S.L. Deem, Dept of Animal Health, Smithsonian National Zoological Park, 3001 Connecticut Ave. NW, Washington, DC 20008, USA. (E-mail: deem@stlzoo.org)

DUBLIN, H.T. 2008. The Dhamra Port issue: some views from the Chair of the IUCN SSC. Indian Ocean Turtle Newsletter No. 8: 25-27. Available at http://www.seaturtle.org/iotn

DUTTA, A. 2008. Dhamra Port: the other perspective. Indian Ocean Turtle Newsletter No. 8: 27-28. Available at http://www.seaturtle.org/iotn

DUTTON, P.H. & A. FREY. 2009. Characterization of polymorphic microsatellite markers for the green turtle (*Chelonia mydas*). Molecular Ecology Resources 9: 354-356. P.H. Dutton, NOAA SW Fisheries Science Center, 8604 La Jolla Shores Dr, La Jolla, CA 92037 USA. (E-mail: peter.dutton@noaa.gov)

FERNANDES, A. 2008. IUCN-Tata partnership - undermining conservation. Indian Ocean Turtle Newsletter No. 8: 17-18. Available at http://www.seaturtle.org/iotn

FRAZIER, J.G. 2008. Why do they do that? Ruminations on the Dhamra drama. Indian Ocean Turtle Newsletter No. 8: 29-37. Available at http://www.seaturtle.org/iotn

FUENTES, M.M. P.B. & M. HAMANN. 2008. Comment: A rebuttal to the claim natural beaches confer fitness benefits to nesting marine turtles. Biology Letters 5: 266-267. M.M.P.B. Fuentes, Sch. Earth and Environ. Sci., James Cook Univ., Townsville, Qld 4811 Australia. (E-mail: mariana.fuentes@jcu.edu.au)

GAMEZ VIVALDO, S., L.J. GARCIA MARQUEZ, D. OSORIO SARABIA, J.L. VAZQUEZ GARCIA & F. CONSTANTINO CASAS. 2009. Pathology in the olive ridley turtles (*Lepidochelys olivacea*) that arrived to the shores of Cuyutlan, Colima, Mexico. Veterinaria Mexico 40: 69-78. S.G. Vivaldo, Ctr Ecol El Tortugario, Av Adolfo Lopez Mateos,Sin 4 Km Poblado de Cuyutl, Cuyutlan 28300, Colima, Mexico. (E-mail: suskabel@hotmail.com)

GELLI, D., V. FERRARI, A. ZANELLA, P. ARENA, L. POZZI, S. NANNARELLI, C. VACCARO, D. BERNARDINI & S. ROMAGNOLI. 2009. Establishing physiological blood parameters in the loggerhead sea turtle (*Caretta caretta*). European Journal of Wildlife Research 55: 59-63. D. Gelli, Univ Padua, Dept Vet Clin Sci, Viale Univ 16, I-35020 Legnaro, Padua, Italy. (E-mail: donatella.gelli@unipd.it)

GROSSMAN, A., C. SAZIMA & I. SAZIMA. 2009. Rub and move: barracudas (*Sphyraena barracuda*) use swimming turtles as scraping surfaces in the South-western Atlantic. JMBA2 - Biodiversity Records: 1-3. Published on-line. I. Sazima, Museu de Zoologia, Universidade Estadual de Campinas, 13083-970 Campinas, Sao Paulo, Brazil. (E-mail: isazima@gmail.com)

HAYS, G.C., M.R. FARQUHAR, P. LUSCHI, S.L.H. TEO & T.M. THYS. 2009. Vertical niche overlap by two ocean giants with similar diets: oceanic sunfish and leatherback turtles. Journal of Experimental Marine Biology and Ecology (Online Prepublication: doi:10.1016/j.Jembe.2008.12.009).

HAZEL, J., I. LAWLER & M. HAMANN. 2009. Diving at the shallow end: Green turtle behaviour in near shore foraging habitat. Journal of Experimental Marine Biology and Ecology 371: 84-92. J. Hazel, School of Earth and Environmental Sciences, and School of Marine and Tropical Biology, James Cook University, Townsville, Queensland 4811, Australia. (E-mail: julia.hazel@jcu.edu.au)

HEITHAUS, M.R., A.J. WIRSING, D. BURKHOLDER, J. THOMSON & L.M. DILL. 2009. Towards a predictive framework for predator risk effects: the interaction of landscape features and prey escape tactics. Journal of Animal Ecology 78: 556-562. M.R. Heithaus, Florida Int Univ, Dept Biol Sci, 3000 NE 151 St, N Miami, FL 33181, USA. (E-mail: heithaus@fiu.edu)

HORCH, K.W. & M. SALMON. 2009. Frequency response characteristics of isolated retinas from hatchling leatherback (*Dermochelys coriacea* L.) and loggerhead (*Caretta caretta* L.) sea turtles. Journal of Neuroscience Methods 178: 276-283. K.W. Horch, Dept of Bioengineering, Univ. of Utah, 50 S. Central Campus Dr., Salt Lake City, UT 84112, USA. (E-mail: k.horch@utah.edu)

HYKLE, D. 2008. India's Dhamra Port controversy heats up again. Indian Ocean Turtle Newsletter No. 8: 2-3. Available at http://www.seaturtle.org/iotn

IUCN. 2008. Response from IUCN: Dhamra Port project: the role of the International Union for Conservation of Nature. Indian Ocean Turtle Newsletter No. 8: 5. Available at http://www.seaturtle.org/iotn

KAWAMURA, G., T. NAOHARA, Y. TANAKA, T. NISHI & K. ANRAKU. 2009. Near-ultraviolet radiation guides the emerged hatchlings of loggerhead turtles *Caretta caretta* (Linnaeus) from a nesting beach to the sea at night. Marine and Freshwater Behaviour and Physiology 42: 19-30. G. Kawamura, Kagoshima Univ, Fac Fisheries, Kagoshima 8900056, Japan. (E-mail: kawamura@fish.kagoshima-u.ac.jp)

LAZAR, B., G. LACKOVIC, P. CASALE, D. FREGGI & N. TVRTKOVIC. 2008. Histological validation of gonad gross morphology to sex juvenile loggerhead sea turtles (*Caretta caretta*). Herpetological Journal 18: 137-140. B. Lazar, Dept. of Zoology, Croatian Natural History Museum, Demetrova 1, HR-10000 Zagreb, Croatia. (E-mail: Bojan.Lazar@hpm.hr)

LAZAR, B., L. LIPEJ, D. HOLCER, V. ONOFRI, V. ZIZA, P. TUTMAN, E. MARCELJA & N. TVRTKOVIC. 2008. New data on the occurrence of leatherback turtles D*e*rmochelys *coriacea* in the eastern Adriatic Sea. Vie et Milieu 58: 237-241. (Address same as above)

LENIN, J. & R. WHITAKER. 2008. Membership Excluder Devices. Indian Ocean Turtle Newsletter No. 8: 15-17. Available at http://www.seaturtle.org/iotn

LOPEZ-MENDILAHARSU, M. & C.F.D. ROCHA. 2009. Comportamento de movimentacao horizontal e vertical da tartaruga-de-couro *Dermochelys coriacea*. Oecologia Brasiliensis 13: 99-114. Portugese. M. Lopez-Mendilaharsu, Programa de Pos-Graduacao em Ecologia e Evolucao, Departamento de Ecologia, IBRAG, Universidade do Estado do Rio de Janeiro, Rua Sao Francisco Xavier 524, 20550-013, Maracana, RJ, Brasil. (E-mail: milagroslm@gmail.com)

LYSON, T. & S.F. GILBERT. 2009. Turtles all the way down: loggerheads at the root of the chelonian tree. Evolution & Development 11: 133-135. S. F. Gilbert, Swarthmore College, Dept Biol, 500 Coll Ave, Swarthmore, PA 19081, USA. (E-mail: sgilber1@swarthmore.edu)

MAZARIS, A.D., G. MATSINOS & J.D. PANTIS. 2009. Evaluating the impacts of coastal squeeze on sea turtle nesting. Ocean & Coastal Management 52: 139-145. A.D. Mazaris, Aristotle Univ Thessaloniki, Sch Biol, Dept Ecol, UPB 119, Thessaloniki 54124, Greece. (E-mail: amazaris@bio.auth.gr)

MOORE, J.E., B.P. WALLACE, R.L. LEWISON, R. ZYDELIS, T.M. COX & L. B. CROWDER. 2009. A review of marine mammal, sea turtle, and seabird bycatch in USA fisheries and the role of policy in shaping management. Marine Policy 33: 435-451. J.E. Moore, Nicholas School of the Environment, Duke University Marine Lab, 135 Duke Marine Lab Road, Beaufort, NC 28516, USA. (E-mail: jemoore@duke.edu)

MROSOVSKY, N. 2008. Continuing controversy over ridleys in Orissa: *cui bono*? Indian Ocean Turtle Newsletter No. 8: 6-9. Available at http://www.seaturtle.org/iotn

MROSOVSKY, N., G.D. RYAN & M.C. JAMES. 2009. Leatherback turtles: the menace of plastic. Marine Pollution Bulletin 58: 287-289. N. Mrosovsky, Dept. of Ecology and Evolutionary Biology, University of Toronto, 25 Harbord St., Toronto, ON M5S 3G5, Canada. (E-mail: nicholas.mrosovsky@utoronto.ca)

NG, T.F.F., C. MANIRE, K. BORROWMAN, T. LANGER, L. EHRHART & M. BREITBART. 2009. Discovery of a novel single-stranded DNA virus from a sea turtle fibropapilloma by using viral metagenomics. Journal of Virology 83: 2500-2509. M. Breitbart, Univ South Florida, College Marine Science, 140 7th Ave S, St Petersburg, FL 33701 USA. (E-mail: mya@marine.usf.edu)

OROS, J., O.M. GONZALEZ-DIAZ & P. MONAGAS. 2009. High levels of polychlorinated biphenyls in tissues of Atlantic turtles stranded in the Canary Islands, Spain. Chemosphere 74: 473-478. J. Oros, Univ Las Palmas Gran Canaria, Fac Vet, Trasmontana S-N, Arucas 35413, Las Palmas, Spain. (E-mail: joros@dmor.ulpgc.es)

PIKE, D.A. 2009. Natural beaches produce more hatchling marine turtles than developed beaches, despite regional differences in hatching success. Biology Letters 5: 268-269. Univ Sydney, Sch Biol Sci A08, Sydney, NSW 2006 Australia. (E-mail: david.pike@bio.usyd.edu.au)

PILCHER, N.J. 2008. The MTSG and its involvement in the Dhamra Port, Orissa, India. Indian Ocean Turtle Newsletter No. 8: 24-25. Available at http://www.seaturtle.org/iotn

REIS, E.C., R.M. ALBANO, A.C.V. BONDIOLI, L.S. SOARES & G. LOBO-HAJDU. 2009. Detection of polymorphisms of the mtDNA control region of *Caretta caretta* (Testudines: Cheloniidae) by PCR-SSCP. Genetics and Molecular Research 8: 215-222. E.C. Reis, Departamento de Genetica, Universidade do Estado do Rio de Janeiro, Rio de Janeiro, RJ, Brazil. (E-mail: est.cardinot@gmail.com)

RODRIGUEZ, S. & A. SRIDHAR. 2008. Dhamra Port: how environmental regulatory failure fuels corporate irreverence. Indian Ocean Turtle Newsletter No. 8: 19-23. Available at http://www.seaturtle.org/iotn

RUSSELL, D.J. & G.H. BALAZS. 2009. Dietary shifts by green turtles (*Chelonia mydas*) in Kane'ohe Bay region of the Hawaiian Islands: a 28-year study. Pacific Science 63: 181-192. D. J. Russell, Dept. of Biology, Chemistry and Environmental Sciences, American University of Sharjah, P.O. Box 26666, Sharjah, United Arab Emirates. (E-mail: drussell@aus.edu)

SANTORO, M. & S. MATTIUCCI. 2009. Sea Turtle Parasites. Eds. I.S. Wehrtmann & J. Cortes. Monographiae Biologicae: 507-519. M. Santoro, Univ Nacl, Escuela Med Vet, Dept Patol, POB 86, Heredia 3000, Costa Rica. (E-mail: marisant@libero.it)

SASA, M., G.A. CHAVES & L.D. PATRICK. 2009. Marine Reptiles and Amphibians. Eds. I.S. Wehrtmann & J. Cortes. Monographiae Biologicae: 459-68. M. Sasa, Univ Costa Rica, Inst Clodomiro Picado, San Jose, Costa Rica. (E-mail: msasamarin@gmail.com)

SCHOFIELD, G., M.K.S. LILLEY, C.M. BISHOP, P. BROWN, K.A. KATSELIDIS, P. DIMOPOULOS, J.D. PANTIS & G.C. HAYS. 2009. Conservation hotspots: intense spatial use by breeding male and female loggerheads at the Mediterranean's largest rookery. Endangered Species Research (Online Prepublication: doi:10.3354/Esr00137).

SHANKER, K. 2008. My way or the highway!!! Where corporations and conservationists meet. Indian Ocean Turtle Newsletter No. 8: 10-14. Available at http://www.seaturtle.org/iotn

SHEPARD, E.L.C., R.P. WILSON, L.G. HALSEY, F. QUINTANA, A. GOMEZ LAICH, A.C. GLEISS, N. LIEBSCH, A.E. MYERS & B. NORMAN. 2009. Derivation of body motion via appropriate smoothing of acceleration data. Aquatic Biology 4: 235-241. E.L.C. Shepard, Univ College Swansea, Inst Environmental Sustainability, Swansea SA2 8PP, W Glam, UK. (E-mail: 381601@swansea.ac.uk)

SNOVER, M.L. & S.S. HEPPELL. 2009. Application of diffusion approximation for risk assessments of sea turtle populations. Ecological Applications 19: 774-785. M. L. Snover, NOAA, NMFS, Pacific Islands Fisheries Science Center, 2570 Dole St, Honolulu, HI 96822 USA. (E-mail: melissa.snover@gmail.com)

SUAREZ-MORALES, E. & E. A. LAZO-WASEM. 2009. On the morphology of *Balaenophilus manatorum* (Ortiz, Lalana, and Torres) (Copepoda: Harpacticoida) from sea turtles of the Mexican Pacific with notes on intraspecific variation. Comparative Parasitology 76: 84-92. E. Suarez-Morales, El Colegio Frontera Sur, Unidad Chetumal, Ave Centenario Km 5-5, Chetumal, Quintana Roo, Mexico. (E-mail: esuarez@ecosur.mx)

THEISSINGER, K., N.N. FITZSIMMONS, C.J. LIMPUS, C.J. PARMENTER & A.D. PHILLOTT. 2009. Mating system, multiple paternity and effective population size in the endemic flatback turtle (*Natator depressus*) in Australia. Conservation Genetics 10: 329-346. K. Theissinger, Johannes Gutenberg Univ Mainz, Inst Mol Ecol, Mainz, Germany. (E-mail: ktheissinger@senchenberg.de)

VALENTE, A.L., C. DELGADO, C. MOREIRA, S. FERREIRA, T. DELLINGER, M.A.A. PINHEIRO DE CARVALHO & G. COSTA. 2009. Helminth component community of the loggerhead sea turtle, *Caretta caretta*, from Madeira Archipelago, Portugal. Journal of Parasitology 95: 249-252. A.L. Valente, Univ Fed Pelotas, Dept Morfol, Inst Biol, Campus Univ S-N,Caixa Postal 354, BR-96010900 Pelotas, Rio Grande Sul, Brazil (E-mail: schifinoval@hotmail.com)

VAN DE MERWE, J.P., M. HODGE, J.M. WHITTIER & S.Y. LEE. 2009. Analysing persistent organic pollutants in eggs, blood and tissue of the green sea turtle (*Chelonia mydas*) using gas chromatography with tandem mass spectrometry (GC-MS/MS). Analytical and Bioanalytical Chemistry 393: 1719-1731. J.P. van de Merwe, Griffith Univ., Griffith School Environment, Gold Coast Campus, Gold Coast, Qld 4222 Australia. (E-mail: j.vandemerwe@griffith.edu.au)

WALLACE, B.P., L. AVENS, J. BRAUN-MCNEILL & C.M. MCCLELLAN. 2009. The diet composition of immature loggerheads: insights on trophic niche, growth rates, and fisheries interactions. Journal of Experimental Marine Biology and Ecology 373: 50-57. B.P. Wallace, Center for Applied Biodiversity Science, Conservation International, 2011 Crystal Drive, Suite 500, Arlington, VA 22202, USA. (E-mail: b.wallace@conservation.org)

WALLACE, B.P. & V.S. SABA. 2009. Environmental and anthropogenic impacts on intra-specific variation in leatherback turtles: opportunities for targeted research and conservation. Endangered Species Research 7: 11-21. B. P. Wallace, Duke Univ. Marine Lab, 135 Duke Univ Marine Lab Road, Beaufort, NC 28516 USA. (E-mail: b.wallace@conservation.org)

WHITING, A.U., A. THOMSON, M. CHALOUPKA & C.J. LIMPUS. 2008. Seasonality, abundance and breeding biology of one of the largest populations of nesting flatback turtles, *Natator depressus*: Cape Domett, Western Australia. Australian Journal of Zoology 56: 297-303. A.U. Whiting, School of Environmental and Life Sciences, Charles Darwin University, Northern Territory 0909, Australia. (E-mail: au.whiting@gmail.com)

WITHERINGTON, B.E., P. KUBILIS, B. BROST & A. MEYLAN. 2009. Decreasing annual nest counts in a globally important loggerhead sea turtle population. Ecological Applications 19: 30-54. B. Witherington, Florida FWCC - Florida FWRI, 9700 South A1A, Melbourne Beach, FL 32951, USA. (E-mail: witherington@cfl.rr.com)

TECHNICAL REPORTS

KATAOKA, K., J. OKUYAMA, M. KOBAYASHI, O. ABE, K. YOSEDA, T. YASUDA & N. ARAI. 2009. Comparison of the activity budget between wild and reared juvenile hawksbill turtles. In: N. Arai (Ed.). Proceedings of 4th International Symposium on Seastar 2000 and Asian Bio-Logging Science, December 15-17, 2007, Royal Phuket City Hotel, Phuket, Thailand. Published by Kyoto University, Kyoto, Japan: 19-22. T. Yasuda, Graduate School of Informatics, Kyoto University, 606-8501 Kyoto, Japan. (E-mail: tohya@bre.soc.i.kyoto-u.ac.jp)

LWIN, M. M. 2009. Tagging activities of olive ridley turtle at Gadongalay and Gayetgyi Islands, Bogalay Township in Ayeyarwady Division, Myanmar. In: N. Arai (Ed.). Proceedings of 4th International Symposium on Seastar 2000 and Asian Bio-Logging Science, December 15-17, 2007, Royal Phuket City Hotel, Phuket, Thailand. Published by Kyoto University, Kyoto, Japan: 3-6. Environment and Endangered Aquatic Animals Conservation Unit, Dept. of Fisheries, Myanmar. (E-mail: fisheries@myanmar.com.mm, akthar10160@gmail.com)

MARCO, A. 2008. Crisis de la anidacion de la tortuga boba en el Atlantico oriental. VIII Conferencia Atlantica de Medio Ambiente. II Taller Sobre Conservacion de la Tortuga Boba. Fuerteventura, 24-26 Abril 2008.

MURUGAN, A. 2009. Conservation efforts of sea turtles in India: Socio-economics and the need for a comprehensive action plan. In: N. Arai (Ed.). Proceedings of 4th International Symposium on Seastar 2000 and Asian Bio-Logging Science, December 15-17, 2007, Royal Phuket City Hotel, Phuket, Thailand. Published by Kyoto University, Kyoto, Japan: 7-9. Suganthi Devadason Marine Research Institute, 44-Beach Road, Tuticorin-628 001, Tamil Nadu, India. (E-mail: muruganrsa@yahoo.co.in)

NATIONAL MARINE FISHERIES SERVICE & U.S. FISH AND WILDLIFE SERVICE. 2008. Recovery plan for the northwest Atlantic population of the loggerhead sea turtle (*Caretta caretta*), Second Revision. National Marine Fisheries Service, Silver Spring, MD: 323 pp. Recovery plan can be downloaded from http://www.nmfs.noaa.gov/pr/recovery/plans.htm#turtles.

NISHIZAWA, H., J. OKUYAMA, O. ABE, M. KOBAYASHI, K. YOSEDA & N. ARAI. 2009. Genetic diversity of the green turtle nesting populations in Yaeyama Archipelago, Japan. In: N. Arai (Ed.). Proceedings of 4th International Symposium on Seastar 2000 and Asian Bio-Logging Science, December 15-17, 2007, Royal Phuket City Hotel, Phuket, Thailand. Published by Kyoto University, Kyoto, Japan: 15-17. H. Nishizawa, Graduate School of Informatics, Kyoto University, 606-8501 Kyoto, Japan. (E-mail: nishiza@bre.soc.i.kyoto-u.ac.jp)

OKUYAMA, J., H. NISHIZAWA, O. ABE, M. KOBAYASHI, K. YOSEDA & N. ARAI. 2009. Preliminary result of ontogenetic change wave orientation of green turtles in the initial growth stages. In: N. Arai (Ed.). Proceedings of 4th International Symposium on Seastar 2000 and Asian Bio-Logging Science, December 15-17, 2007, Royal Phuket City Hotel, Phuket, Thailand. Published by Kyoto University, Kyoto, Japan: 23-27. J. Okuyama, Graduate School of Informatics, Kyoto University, 606-8501 Kyoto, Japan. (E-mail: okuyama@bre.soc.i.kyoto-u.ac.jp)

TANASANTI, M., C. SUJARITTHANYATRAKUL, K. DHANARUN, K. SAHATRAKUL, P. SAKORNCHAROUN, S. MANAWATTHANA, P. SANYATHITISEREE & K. SIRINARUMITTR. 2009. Electroejaculation and semen evaluation in olive ridley turtle (*Lepidochelys olivacea*) and hawksbill turtle (*Eretmochelys imbricata*) in Thailand. In: N. Arai (Ed.). Proceedings of 4th International Symposium on Seastar 2000 and Asian Bio-Logging Science, December 15-17, 2007, Royal Phuket City Hotel, Phuket, Thailand. Published by Kyoto University, Kyoto, Japan: 29-32. (E-mail: fvetkns@ku.ac.th)

VIDEIRA, E.J.S., M.A.M. PEREIRA, C.M.M. LOURO & D.A. NARANE. 2008. Monitoring, tagging and conservation of marine

turtles in Mozambique: historical data and annual report 2007/08. Mozambique Marine Turtle Working Group: 85 pp. (E-mail: marcospereira@gmx.net)

WHITE, M., I. HAXHIU, E. SACDANAKU, L. PETRITAJ, M. RUMANO, F. OSMANI, B. VRENOZI, P. ROBINSON, S. KOURIS, L. BOURA & L. VENIZELOS. 2009. Monitoring and Conservation of Important Sea Turtle Feeding Grounds in the Patok Area of Albania. 2008 Annual Report. Joint Project of MEDASSET; GEF/SGP; RAC/SPA (UNEP/MAP); Ministry of Environment, Albania; Natural History Museum, Albania; H.A.S., Albania; University of Tirana; ECAT, Albania. 91 pp. M. White, c/o Centro Recupero Tartarughe Marine-WWF, 92010 Lampedusa (AG), Italy. (E-mail: michael.white@univ.bangor.ac.uk)

WIADNYANA, N. N. 2009. Assessment of incidental catch of sea turtles in relation to the fishing practice in Indonesia. In: N. Arai (Ed.). Proceedings of 4th International Symposium on Seastar 2000 and Asian Bio-Logging Science, December 15-17, 2007, Royal Phuket City Hotel, Phuket, Thailand. Published by Kyoto University, Kyoto, Japan: 11-14. Research Center for Capture Fisheries, Agency for Marine and Fisheries Research - Ministry of Marine Affairs and Fisheries Jl. Pasir Putih I, Ancol Timur Jakarta 14430 Indonesia. (E-mail: ngurah_prpt@indo.net.id)

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MROSOVSKY, N. 1983. Conserving Sea Turtles. British Herpetological Society, London. 177pp.

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