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A nesting loggerhead with US National Park Service research volunteers at Buck Island Reef National Monument, St. Croix US Virgin Islands - see pp. 13-15 (photo: NPS-BIRNM).

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Editors:

Lisa M. Campbell
Nicholas School of the Environment
and Earth Sciences, Duke University
135 Duke Marine Lab Road
Beaufort, NC 28516 USA

E-mail: mtn@seaturtle.org
Fax: +1 252-504-7648

Matthew H. Godfrey
NC Sea Turtle Project
NC Wildlife Resources Commission
1507 Ann St.
Beaufort, NC 28516 USA

E-mail: mtn@seaturtle.org

Managing Editor:

Michael S. Coyne
SEATURTLE.ORG
1 Southampton Place
Durham, NC 27705, USA
Email: mcoyne@seaturtle.org

E-mail: mcoyne@seaturtle.org
Fax: +1 919 684-8741

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Editorial: The Continuing Shame of Orissa

Eric Hawk[1]
U.S. National Marine Fisheries Service, St. Petersburg, Florida (E-mail: eric.hawk@noaa.gov)

In February 2009 I was an invited speaker at the Dhamra Port Consultative Technical Workshop in Bhubaneswar, Orissa State, at the behest of the International Union for the Conservation of Nature. My topic was how to minimize sea turtle and dredging interactions during the ongoing Dhamra Port construction project in the Dhamra River estuary, on the Bay of Bengal, though I also spoke extensively on the required use of sea turtle excluder devices by shrimp trawlers in the United States. What puzzled me most were comments made by a few well-meaning attendees to the conference. Ostensibly in the spirit of protecting Orissa's famous Gahirmatha-nesting-beach olive ridley sea turtles, they seemed none-the-less to focus on the more insignificant aspects of Dhamra Port construction on sea turtles, such as channel dredging effects. Meanwhile, they overlooked the major ongoing slaughter of these same sea turtles by unsupervised shrimp trawling, and unregulated fishing by coastal gillnetters, in the (supposedly) "protected waters" off Gahirmatha Marine Sanctuary and the Bhitarkanika Sanctuary and National Park. Conservatively, over 100,000 observed, documented, and recorded sea turtle strandings—dead, bloated, rotting sea turtle carcasses—have been counted by Indian scientists on Orissa nesting beaches, including Gahirmatha, over the last 10 years, averaging over 10,000 turtles per year. Mortality rates may be significantly higher—ca. 15,000 per year (B. Mohanty pers. comm., in Shanker et al. 2003).

Unquestionably, the vast majority of these deaths were caused by "accidental" drowning from being caught in coastal gillnets and shrimp trawl nets (Shanker & Choudhury 2006). For example, on February 17, 2002, 205 dead olive ridleys entangled in a single section of gillnet were washed ashore at Gundalba Beach, Orissa (Wright and Mohanty 2002). Gopi et al. (2002) reported that mortality due to mechanized offshore fishing reached an "alarming number" of 14,000 turtles in 1998. During a study of sea turtles in Orissa, Pandav (2000) counted 46,200 stranded adult olive ridleys from 1993 to 1999. In the words of Gopi et al., "These 46,200 turtles were counted only in a stretch of 282 Kms out of the entire 480 Km coastal belt of Orissa. Hence, the actual number of dead turtles would relatively be much higher without any doubt."

But these turtle deaths, past and present, are not accidental. Much of that mortality could and should have been prevented using a two-decades-old existing and proven conservation-fishing technique (using turtle excluder devices—"TEDs") and simply enforcing existing fishing regulations. Years of studies by the U.S. National Marine Fisheries Service prove that TEDs are consistently 97%-98% effective at releasing trawl-caught turtles (J. Mitchell pers. comm.). Studies conducted by the Orissa Government Forest Department and the Wildlife Institute of India off Orissa beaches during high-turtle-density arribada months showed that TEDs worked very effectively there ("The Central Institute of Fisheries Technology - developed TED excluded 100% of turtles") and "catch loss (of shrimp and bycatch) was very minimal" (Gopi et al. 2002).

Ominously, the conservative estimate of 10,000 annual bleached and bloated carcasses on Orissa beaches represent just a fraction of the total number of sea turtles being killed by the shrimp and gillnet fisheries there (and probably elsewhere in India). A stranding study conducted off the United States' East Coast to estimate the quantity of sea turtles affected by the shrimp trawl fishery released dead, marked sea turtles at offshore, shrimp trawling grounds. Only 6 of 22 tagged loggerhead carcasses released at sea turned up as beach strandings (Murphy & Hopkins-Murphy 1989). Another study showed that marked turtles that ultimately stranded made up just 7% to 13% of the total marked turtles released (Epperly et al. 1996). The prevailing ocean currents and winds carried most of the bodies seaward, rather than shoreward where they could be observed and counted. So these, the majority of drowned turtles, are not seen or counted. In other words, those 100,000 observed carcasses on Orissa beaches are likely just the tip of the "mortality iceberg" caused by shrimp trawling and gillnetting. Scientists hate to speculate and surmise, but this is probably a very safe bet—a whole lot more turtles are drowning than are being counted.

This level of mortality over the long term on a population is simply unsustainable. Bad things are going to happen. We've seen it before (La Escobilla) and we're seeing it elsewhere as well (Terengganu). We all know that sea turtles take many years to reach sexual maturity (olive ridleys may take 10-18 years before they reproduce, according to a recent study (Zug et al. 2006); the range commonly given is 7-15 years), and produce just 110 to 330 eggs per nesting season. It is not known if they nest annually, but the number of "generic" sea turtle hatchlings that reach adulthood has been estimated by sea turtle scientists at about 1 in 500 hatchlings (U.S Fish and Wildlife Service Web site; R. Mast pers. comm.), though various sea turtle conservation Web site estimates range from 1 in 100 to 1 in 10,000 depending on your source. The 1 in 500 estimate is obliquely supported by the 1990 U.S. National Academy of Sciences' report (Decline of the Sea Turtles: Causes and Prevention) which stated that, for loggerheads, each individual breeder's reproductive value is estimated to be about 584 times greater than that of an egg or hatchling.

Already, warning signs are appearing in the Gahirmatha sea turtle population. The average size of stranded turtles and nesting females turtles has significantly decreased in recent years, according to scientists at the Wildlife Institute of India (S. Kumar pers. comm.) and other researchers (Shanker et al. 2003; Plotkin 2007). Could it be that the largest sea turtle size-class—the one longest exposed to trawlers and gillnet—has already been culled by drowning? (That is not untypical of collapsing fish populations—one of the first signs of trouble is that the larger fish have disappeared; they've all been caught.). As well, the number of dead sea turtles observed stranded on Gahirmatha beaches has been decreasing in each of the last (approximately half-dozen) years according to another noted Indian sea turtle biologist (C.S. Kar pers. comm.) of the Orissa

Government Forest Department—a possible indication that fewer turtles are being impacted by trawlers and gillnetters. This latter observation is chilling, since neither beach monitoring effort nor trawling or gillnetting efforts have decreased. In fact, reports suggest an increase in fishing intensity from less than 1,000 mechanized boats in the late 1980s to more than 4,000 boats by 1996 (Shanker et al. 2003). The conclusion? Fewer turtles are arriving offshore to mate and nest. No arribadas occurred in Gahirmatha in 1997, 1998, or 2002, "which is the highest incidence of failure in the documented history of this rookery" (Shanker et al. 2003), nor was there an arribada in 2008. Happily, it did occur this year, commencing on March 21st, and Orissa Government Forest Department's official nesting estimates are of 1.7 lakh (170,000 turtles) during the week that followed (B. Bhuta pers. comm.).

Some of the preceding observations may by themselves mean nothing: Arribadas may be cyclical and may be influenced by wind, tide, lunar phase, and other unknowns. Nesting beaches may be significantly affected by beach erosion (and beach accretion), and may wax and wane naturally over time. Certainly the size and availability of a suitable nesting beach plays a role in a sea turtle nesting (or not) at a particular site. Nayak (2003) opined that the primary reason for missed arribadas at Gahirmatha is beach erosion resulting from the geomorphological changes undergone by the Nasi Islands (where most nesting takes place). A study conducted by Prusty et al. (2006) to assess the factors leading to the non-occurrence of arribadas at the Gahirmatha site indicates that the nesting beaches in Gahirmatha are eroding at a faster rate over the years. A study by Choudhury et al. (2008) based on monitoring the changes in the Gahirmatha nesting beach profile from November 2007 to May 2008 reveals the changes in the beach profile as a very strong reason why arribadas may not be taking place there. Meanwhile, without evidence and because it is an easy target, some no-doubt-well-meaning conservationist fingers are being pointed at Dhamra Port dredging as the reason for Gahirmatha's beach erosion and reduced nesting, disregarding the fact that the dredging is a relatively recent phenomenon (it commenced in November 2007) and erosion of the Nasi Islands had been occurring for years before dredging commenced. Will dredging have some effect on erosion rates at Gahirmatha? Maybe. Probably it will affect the nearby mangroves. Will actual dredging kill turtles? Very few. The complete truth about dredging effects on the Gahirmatha rookery will be elusive and may be forever obscured in accusations and counter-charges, and even well-designed studies may prove inconclusive—but let's not disregard the basic known fact: A huge turtle toll is being continuously taken by local fisheries. This alone should loudly sound the alarm bells for Gahirmatha.

Shanker et al. (2003) concluded in 2002 that Gahirmatha has had no drastic decline in the nesting population over the last 25 years, but that the Orissa population is "clearly of imminent conservation concern." That conclusion is seven years old—seven years of unrelenting, day-in, day-out, fishing pressure on Gahirmatha's olive ridleys. Approximately 70,000 to 700,000 turtles have been drowned by Orissa fishers since then. To put it another way, that's about 30 to 300 turtles a day, every day, since 2002, using the irrefutable, minimum number of 10,000 known, observed strandings per year.

The scientific method is good: To our credit, most scientists adhere/cling scrupulously to it. We are prudent and cautious, analytical and measured. No one will ever accuse us of jumping to conclusions: It's what sets us apart. It's necessary to remain dispassionate, objective, unjaundiced, skeptical: Scientists generally cannot/should not get emotional, outraged, incensed, or vitriolic, for risk of appearing less-than-objective. However, sometimes our aloofness works to our detriment. Sometimes it's good—even necessary—to get mad, indignant, horrified, outraged. Certainly the carnage at Gahirmatha merits that reaction. It's time to blow the horn loudly for Orissa's sea turtles, but let's focus our anger and concern at the main threats, not the red herrings.

In the face of uncertain times and warning signs, even the public—the most common fellow on the street—is instinctively conservative. So where is our (the sea turtle scientific community) collective sense of outrage? Where is the Indian Government's (and State of Orissa's) sense of caution, prudence, conservatism, and responsibility? Where is law enforcement of existing TED regulations? There's a large military presence and Defense base (of the Indian Defense Research and Development Organization) on Outer Wheeler Island, just minutes away by boat from Gahirmatha Sanctuary and Bhitarkanika Sanctuary and National Park. There is also a Coast Guard Base at Paradip at the southern end of Gahirmatha. Can't the Defense Organization/Coast Guard patrol for TED compliance, and to keep gillnetters out of Sanctuary waters? Can the solution be so simple?

Someone in authority (i.e., State and Federal Government ministries) has got to get some courage and step to the plate. Maybe the United States and other signatories to international sea turtle conservation agreements should get together and apply diplomatic pressure. Meanwhile, a smart-looking, seaworthy patrol/research vessel of the Orissa Government Forest Department—aptly named Olive Ridley—lies mostly idle, tied up at its Dhamara Fishing Harbour mooring, while TED-less trawlers daily motor out past it, heading out to sea, where they continue to drown staggering numbers of sea turtles yearly. It simply cannot go on, biologically or morally. Sea turtles in India supposedly enjoy a "Schedule 1" protected status, the highest status/level of protection given by the Wild Life (Protection) Act of 1991. Where is public outcry? Surely, the situation is egregious, outrageous, and shameful. It smells, literally, of rotting sea turtles.

The Indian Government, at both a Federal and State level, can and must attempt to make significant progress towards halting the largely preventable slaughter of olive ridley sea turtles in Gahirmatha and other Orissa coastal waters. This should be done before India hosts the 30th Annual International Sea Turtle Symposium in Goa next February. That, more than anything, would truly send an international message of sea turtle conservation. To do otherwise would appear very irresponsible and two-faced, at least to the present writer, and perhaps to the world.

[1]The opinions presented herein are my own and not necessarily those of my employer.

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Editorial: A Little Learning … The Price of Ignoring Politics and History

Kartik Shanker[1,2,9], BC Choudhury[3], Ashish Fernandes[4], Sanjiv Gopal[4], Areeba Hamid[4], Chandrasekhar Kar[5], Suresh Kumar[3], Janaki Lenin[6], Biswajit Mohanty[7], Bivash Pandav[8], Sudarshan Rodriguez[9], Aarthi Sridhar[9], Wesley Sunderraj[10], Basudev Tripathy[3], Romulus Whitaker[6], Sejal Worah[11] & Belinda Wright[12]

[1]Centre for Ecological Sciences, Indian Institute of Science, Bangalore 560012, India (E-mail: kshanker@ces.iisc.ernet.in); [2]Ashoka Trust for Research in Ecology and the Environment, Bangalore, India; [3]Wildlife Institute of India, Dehradun 248001, India; [4]Greenpeace, India; [5]Forest Department, Government of Orissa, Bhubaneshwar, India; [6]Gharial Conservation Alliance, India; [7]Wildlife Society of Orissa, Cuttack, India; [8]Worldwide Fund for Nature-Nepal, Kathmandu, Nepal; [9]Dakshin Foundation, India; [10]Gujarat Institute of Desert Ecology, Bhuj, India; [11]Worldwide Fund for Nature-India, New Delhi, India; [12]Wildlife Protection Society of India, New Delhi, India

"A little learning is a dangerous thing; drink deep, or taste not the Pierian spring: there shallow draughts intoxicate the brain, and drinking largely sobers us again" – Alexander Pope

"The opposite of good is good intention" – Kurt Tucholsky

We would like to begin by acknowledging that Hawk's opinion piece (Hawk, this issue), though remarkably ill-informed, limited and naïve in its understanding of the issue of turtle conservation in Orissa, appears well intentioned. Hawk's facts about the ecology of sea turtles in Orissa are correct and indeed alarming, though ironically, he shores up his argument by extensively quoting the very individuals (many of them MTSG members) who have been opposed to the IUCN and MTSG's involvement in the Dhamra Port project. Mainly, however, Hawk appears to have very little idea of the history of conservation and its socio-political context in Orissa.

Science and technology are just tools whose efficacy is determined by the end-users. It has long been recognised the world over that social change (or altering human behaviour) is the engine that powers successful conservation, which requires understanding of history, society and politics. Therefore, we provide below a brief primer for his benefit.

History of sea turtle conservation in Orissa: Sea turtle conservation in Orissa has a storied past (see Shanker & Kutty 2005). From extensive egg collection to the take of adults, the population has been threatened by anthropogenic impacts before, and conservation measures have responded to these threats. First, the collection of eggs was prohibited in the 1970s. Following the introduction of mechanised boats, targeted take of turtles in offshore waters increased dramatically, and it is estimated that 50,000 to 80,000 turtles were taken each year in the late 1970s (Das 1985). The Government of Orissa enforced The Wild Life (Protection) Act with assistance from the Coast Guard, and over a few years in the early 1980s, this trade in turtles disappeared. Subsequently, the threat from incidental catch increased through the 1990s and numerous attempts have been made to address it, as we will detail below.

A few years ago, we wrote that the unpredictability in size and timing of arribadas, decline in size and huge mortality, was indicative of an impending decline in olive ridley populations in Orissa (Shanker et al. 2003). During this time, it has however, become clear that while changes in the geomorphology have led to the decline in nesting at Gahirmatha (Prusty & Dash 2006), nesting in Rushikulya appears to be increasing (Tripathy et al. 2008), and mass-nesting in the Devi region has completely stopped for more than a decade. The effects of loss of habitat at Gahirmatha are already evident; the failure of arribada in 2008 may be attributed to fragmentation of nesting beaches at Gahirmatha (Prusty & Dash 2006). Thus, any impact on this population should be governed by the precautionary principle. The Dhamra Port Project coming up in close proximity to the nesting beaches constitutes one such significant threat.

Second, it makes little conservation sense to compare threats such as direct mortality and loss of habitat. Mortality constitutes a somewhat reversible threat. Populations can recover, as they have done in La Escobilla (Marquez et al. 2002). However, loss of habitat is often permanent, and great caution (the basis of the Precautionary Principle) needs to be exercised when undertaking activities that could lead to the permanent loss of these nesting beaches. Hawk's suggestions and solutions focus only on threats and mortality due to fisheries which no doubt should be addressed. In fact, he downplays and trivializes the ports impacts, calling them "insignificant aspects of Dhamra Port construction on sea turtles, such as channel dredging effects." The issues of long term and perhaps permanent impacts such as erosion/shoreline changes on turtle nesting habitat (or the coastline in general) that the port can cause are ignored. Of course, this should have been addressed in the original Environment Impact Assessment (EIA). However, it is considered that the scientific and legal validity of the EIA and environment clearance for Dhamra port are highly questionable, given the change in scale and location of the project (Rodriguez & Sridhar). None of this is mentioned or addressed by Hawk or IUCN/MTSG.

Socio-political issues and recent conservation efforts: In the 1990s, the USA extended its domestic law requiring shrimp trawlers to use Turtle Excluder Devices, to all its trading partner countries. Following extensive protest and deliberation at the WTO (in which India was one of the complainants), the US position was upheld (Bache & Frazier 2006). In 1996, NOAA conducted a workshop in Orissa to promote the use of TEDs and a few years later, this was mandated through law in Orissa (Sridhar et al. 2005). However, few trawler owners were inclined to use it for a variety of reasons that have been detailed before (Shanker & Kutty 2005). As elsewhere, including the US, trawler owners protested that only one of the causes of turtle mortality was being targeted (Tucker et al. 1997). Ironically, Hawk's suggestion that one should ignore the threats of development and dredging as being "insignificant", while focusing on trawling justifies and mirrors the trawl owners complaints, i.e. that fishing is being restricted while other threats (development, pollution, etc.) are being encouraged or ignored.

A few years later, Operation Kachhapa began their conservation efforts, which included funding the Forest Department to hire a boat and patrol offshore waters, providing legal advice, and conducting education & outreach programmes (Shanker & Mohanty 1999). Over a few years, a large number of trawlers were apprehended, and some were tried in a court of law (Wright & Mohanty 2006). The targeting of trawlers created a vitiated atmosphere, in which most fishermen perceived conservation as anti-people (Shanker & Kutty 2005). During this time, laws have been passed restricting fishing, and the issue has been taken up by other agencies such as WWF and Greenpeace. All of these agencies, together with the State, have worked towards enforcing no-fishing zones (in Gahirmatha and to a lesser extent, Devi River mouth), while some of them such as WWF did and continue to promote the use of TEDs. Large sums of money have been spent in the last decade on doing exactly the things that Mr. Hawk suggests. They may be good suggestions, but in practice, they have largely failed.

Recognising the impasse between fishing communities and turtle conservation, in 2004, local and national conservation organizations and individuals, community organisations, and fishworker support organisations came together under the umbrella of the Orissa Marine Conservation Consortium (www.omrcc.org). This group has been attempting to promote the conservation of marine biodiversity, including turtles, along with the livelihoods of the poor artisanal fishermen. The laws are conducive to this as they mainly seek to prohibit mechanised fishing in nearshore waters, which is beneficial to turtles and traditional fishermen.

Despite all these efforts, thousands of turtles are still killed on the Orissa coast. What prevents the government from taking the apparently small amount of action required to protect turtles? Is it mere apathy as Hawk and many Indian conservationists suggest? Why have TEDs not been successfully implemented in so many parts of the developing world? How will the adoption of TEDs address the threats from coastal gill nets? Why has it been so hard to enforce the existing legislation on the use of TEDs? These issues are addressed elsewhere (Shanker & Kutty 2006; Bache & Frazier 2006).

It is instructive to examine how long it took a technologically advanced nation such as the US to implement the usage of TEDs. It took two decades in many places, while still being contested in some, and turtles continue to be killed in trawl nets, demonstrating that these problems are not easy to resolve. In developing nations such as India where resources are scarce, coastal livelihoods are risky and marginal and other priorities abound, the task becomes harder. In Orissa (and the rest of India), the lack of coordination between Forest and Fisheries Departments remains a significant obstacle. Additionally, the focus of fisheries and fisheries export departments remains on increasing yield rather than sustaining it, which bodes ill for both sea turtles and fisheries management. These are areas of bureaucratic, economical and political imperatives where conservation organizations have limited influence. Nevertheless, these issues remain on the radar for conservation organisations and individuals.

A little learning….. In summary, sea turtles have faced a variety of threats over the past four decades in Orissa. Most recently, incidental mortality in commercial fishery has posed the greatest direct threat to adult ridleys, while coastal development threatens to destroy most nesting habitat. In response, a variety of conservation measures have been instituted to address these threats, largely through top-down enforcement. In recent years, these efforts in Orissa have largely failed and in fact made the coast vulnerable to development related threats such as ports and related industry. Currently, there are 14 ports being developed/proposed along the Orissa coastline of 480

km, which is a port every 35 km, including ones at the other two important nesting sites near Devi and Rushikulya river mouths. Unfortunately, some conservationists as well as the administration have been using approaches that are isolated from the process of fisher organisation and empowerment, which has been taking place over the last three decades throughout the country.

Thus, we are likely best served by examining why past conservation measures have failed by critically analyzing them, rather than repeating these mistakes. One step forward is to analyse and acknowledge history. We work with and respect local opinions and communities, at every scale. We accept that social change is required and that it is necessarily slow in developing areas. Despite differences in philosophy, a number of local groups, conservationists and larger conservation organisations are in fact attempting to work together towards sea turtle conservation in Orissa, more than at any time in the last few decades. We recognize that conservation approaches need to be enshrined in participatory and consultative mechanisms which are inclusive of fishermen, particularly the traditional fisher sector, for any initiative to be effective. These ongoing attempts include:

i. Promoting an effective fisheries management plan, which exists on paper as the marine fishing regulations, but needs to be operationalised and implemented effectively. This would include the necessary resources (financial and infrastructural) being made available consistently. Recent reports indicate a per capita decline in fish catch in Orissa's territorial waters. Implementing a fisheries management programme with allied conservation motives, would also benefit turtles significantly.
ii. Addressing the issue of over-capacity while being sensitive to livelihood needs; additional and alternative income generation programmes need to be developed and implemented in partnership with traditional fisher communities and the mechanized fisheries sector.
iii. Empowering traditional fisher communities to co-manage marine resources, on the premise that they have a greater stake than any conservationist group in the health of the ecosystem. Since these communities have been marginalised by the state, this needs a substantial development effort in terms of additional income and livelihood measures to offset the impacts of conservation restrictions.
iv. Encouraging enforcement agencies to use science for fisheries and sea turtle management. For example, years of research have indicated that turtles congregate in small and specific offshore areas, but the management has failed to provide adequate protection to these offshore congregations.

Unfortunately, the IUCN and the MTSG have chosen to ignore this vast constituency, and done more to undermine ridley conservation than any good they may have done by saving a handful of turtles from a few port related threats such as lights and dredgers. This only demonstrates the importance of understanding history, and socio-political contexts, in order to be successful. With consultation and participatory decision making, not just with each other, but with local communities, conservation organisations (international ones in particular) can achieve a great deal more towards long term conservation. While MTSG and IUCN have failed on all these counts, it is still not too late. If the IUCN and MTSG try to understand the position of Indian conservationists and respect their contribution, a truly consultative dialogue can lead to a collaboration that will reflect the spirit of the international symposium in India.

Epilogue: We are delighted to report that an arribada took place during 21-25 March 2009 at Gahirmatha, Orissa. As sea turtle biologists repeat *ad nauseum*, sea turtles are slow growing, late maturing, long-lived vertebrates, and impacts of current actions will only be seen in a decade or later. Thus, while the recent arribada should give hope that Gahirmatha is still an important nesting beach, it sends a stronger signal than ever that we should protect these beaches and habitats from development related threats.

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The Marine Turtle Product Trade in Viet Nam

Daniel Stiles
PO Box 5159, Diani Beach, Kenya.(E-mail: kenyadan@kenyacoast.biz)

The Socialist Republic of Viet Nam has a coastline extending over 1600 km spanning roughly 15 degrees of latitude, bordered on the south by Cambodia and in the north by China. The Viet Nam coast has a diverse range of habitats such as mangroves, coral reefs, intertidal areas, sandy beaches, sea grass and seaweed beds, and lagoon systems. Five species of marine turtle reside in Viet Nam's waters (hawksbill, loggerhead, olive ridley, green and leatherback), and all but the loggerhead are thought to nest on Viet Nam's beaches. Concentrated nesting areas are found in the Gulf of Tonkin, central provinces and the islands in the southeastern waters and the Gulf of Thailand, though many are under severe pressure from human activities and some no longer exist (Hamann et al. 2006). Marine turtle nests are raided for eggs and to capture adults for consumption and trade (TRAFFIC 2004). The annual nesting population of marine turtles along Viet Nam's mainland coast is unknown with certainty; recent estimates suggest 250 to 300 female Green turtles, fewer than 100 Olive Ridleys, and fewer than 10 Leatherbacks and Hawksbills (Tran 2002; Hamann et al. 2006).

Previous studies demonstrated that the trade in marine turtle products in Viet Nam was threatening local populations (CRES 1994; Duc & Broad 1995; TRAFFIC 2004; van Dijk & Shepherd 2004). Hawksbill turtles, which comprise most of the illegal trade in Viet Nam, have traditionally been exploited primarily for their shell and there has never been a significant international trade in other products from this species. A market for tortoiseshell derived from the carapace and marginal scales (scutes) of hawksbill turtles has existed for many centuries. A single turtle yields between 0.75 and 1.5 kg of tortoiseshell in the form of 13 carapace scutes, with an average yield of around 780 g. The 27 small marginal scales are less in demand (Groombridge & Luxmoore 1989).

In the nineteenth and twentieth centuries, the main markets for hawksbill shell were in Europe and North America, where the shell was used for such items as combs, brushes, spectacle frames and luxury goods. Trade to Asian markets existed, primarily to Japan, but also to the Republic of Korea (South Korea) and Taiwan. With the advent of plastics, the need for tortoiseshell for utilitarian purposes declined, although it retained a place at the high end of the luxury market (Groombridge & Luxmoore 1989).

The first published survey of wildlife markets in Viet Nam made in 1990/91 that provided prices found that tortoiseshell was widely sold in Ho Chi Minh City (HCMC) and Vung Tau, though it was not mentioned as being found in Ha Noi (Martin 1992). In 1993 and 1995, TRAFFIC, in collaboration with CRES, undertook a study of the exploitation of hawksbill turtles in Viet Nam. The study found that hawksbill turtles were being extensively exploited in Viet Nam, through egg collection and the capture of both juveniles and adults. The turtles are killed for use largely in the production of jewellery, decorative curios, and for traditional medicine ingredients (Baird 1993; CRES 1994; Duc & Broad 1995; TRAFFIC 2004). This study aimed to determine the current status of sea turtle product trade in Viet Nam, particularly because the marine turtle trade studies prior to this investigation were conducted when trade in their products was legal. This is the first country-wide study carried out after trade was prohibited.

The capture of sea turtles and commercial use of the products were legal in Viet Nam prior to 22 April 2002. Since then sea turtles have been a protected species and regulated by the following laws: *Government Decree 48/2002/ND* and *Circular 02/2006/TT-BTS dated 20 March 2006 of Ministry of Fisheries*, which supplements *Government Decree 59/2005/ND-CP* of 4 May 2005 that outlines management and controls on marine resources. All but the loggerhead turtle are contained in Appendix 5 of this circular, which lists those marine species that are prohibited from commercial exploitation. All species of marine turtles are listed on Appendix I (no international trade allowed) of the Convention in International Trade of Endangered Species (CITES, www.cites.org). In Viet Nam, the chief agency responsible for implementing and enforcing the Convention is the CITES Management Authority, which is the Forest Protection Department, under the Ministry of Agriculture and Rural Development. Table 1 presents the conservation status and levels of protection afforded to the five sea turtle species found in Viet Nam.

The aim of the investigation was to gather as much quantitative data as possible on indicators that reveal the scale and nature of the sea turtle trading system and degree of local demand for sea turtle products. The indicators used were prices of whole turtles and raw and worked tortoiseshell (bekko), number of craftsmen engaged in processing sea turtles, and numbers of retail outlets and worked sea turtle items for sale in the outlets. In addition, the size and type of sea turtle items for sale was recorded and qualitative information about the sources of sea turtle products, transport destinations and methods, and buyers was collected.

Scientific name	Vietnamese name	VN Red Data Book	IUCN Red List
Eretmochelys imbricata	Doi moi	EN	CR
Dermochelys coriacea	Rùa da	EN	CR
Chelonia mydas	Vich	EN	EN
Lepidochelys olivacea	Doi moi dua	VU	VU
Caretta caretta	Rua bien dau to	Unlisted	EN

Table 1. Conservation status of marine turtle species in Viet Nam. Source: TRAFFIC 2008; IUCN 2008. CR = Critically Endangered, EN = Endangered, VU = Vulnerable.

Location	Workshops	Workers
HCMC	3	6
Ha Tien	2	5
Phu Quoc	1	1
My Xuan	1	10
Nha Trang	2	4
Total	9	26

Table 2. Bekko workshops in Viet Nam, 2008

Methods consisted of visiting locations where sea turtles were known or thought to be processed and/or sold. Native Vietnamese speakers accompanied the investigator on some of the surveys to act as guide and interpreter. Vendors were interviewed to ascertain from where they obtained the sea turtle products, how well they were selling in order to assess turnover, who the main buyers were and if they knew where any sea turtle workshops were located. They provided useful information as to the whereabouts of craftsmen, which in turn resulted in details about the source and prices of sea turtle products. Some vendors were uncooperative and did not wish to share information. All vendors seemed aware that it was illegal to sell sea turtle products, and many warned the investigator that it would be difficult to take items back to the home country.

Sea turtle workshops that could be located were visited and craftsmen interviewed in an attempt to find out where they obtained their raw material, what prices they paid and where they sold their products. They were also asked if they exported their products anywhere or if they sold on the Internet. Photographs were taken whenever possible; in most retail outlets and workshops this proved to be possible. Digital photographs of displays helped considerably in determining counts of items, especially when these proved too numerous to record on site. The data were analyzed and the counts, types and prices of sea turtle items were broken down for display in tables to allow for standardized comparisons of the indicators between place and time. The retail prices used are the asking prices. The exchange rate used in this report is 16,100 VND = 1 USD (May 2008). The following locations were surveyed between 4 April and 4 May, 2008: HCMC, Vung Tau, Phu Quoc island, Ha Tien, Nha Trang, Hué, Ha Noi and Ha Long City.

Sources and prices of unworked sea turtle products. Up to the 1980s Viet Nam was probably able to supply its sea turtle product industry with domestic turtles, but by the 1990s some hawksbill turtles were being imported from Cambodia (Duc & Broad 1995). By the early 2000s Vietnamese fishermen were buying whole hawksbills originating in Malaysia and Indonesia from foreign fishing vessels out at sea, and scutes from Indonesia and Singapore were being imported (TRAFFIC 2004). This investigation found that small (16-30 cm) whole green and hawksbill turtles that are sold dried and stuffed originated in Viet Nam, but that some larger whole turtles and most raw scutes came from Malaysia and Indonesia.

Dealers would not state how much they paid fishermen for whole turtles, as they were aware that it was illegal to engage in this activity. In one bekko workshop in Ha Tien, however, the craftsmen said they paid USD150/kg for raw scutes from Malaysia and Indonesia. A bekko workshop owner in HCMC said she paid up to USD700/kg for scutes from Indonesia and Malaysia. A Marine Programme officer in TRAFFIC's Ha Noi office said that she had found that scutes from Indonesia sold for USD200/kg. Duc & Broad (1995) and TRAFFIC (2004) both found that scutes varied greatly in price with quality and location, thus USD150-700 probably represents the range in prices seen in Viet Nam in 2008.

Place	Outlets surveyed	Outlets with products	Items
HCMC	251	22	1,938
Vung Tau	17	12	165
Ha Tien	33	10	1,995
Phu Quoc	26	5	835
Nha Trang	27	14	492
Hué	59	3	117
Ha Noi	227	8	42
Ha Long City	129	10	270
Total	769	84	5,854

Table 3. Numbers of outlets and items of sea turtle products by location, 2008.

Workshops. All of the currently operating sea turtle product workshops are located in the southern part of the country. Table 2 summarizes their locations and presents estimates of their number and the number of craftsmen in each. No bekko was being worked in Vung Tau, but an informant said there was a bekko factory employing about 10 craftsmen in the town of My Xuan, about 40 km from Vung Tau.

Worked sea turtle products. A total of 5,854 marine turtle products were found in 84 retail outlets in the eight localities surveyed (Table 3). A total of 769 souvenir and antique shops were visited, including markets, hotels and department stores, and about 11% contained sea turtle products, a relatively high percentage considering that the material is illegal to sell.

The most numerous items were jewellery (Figure 1), especially bangles (2,274) and rings (1,000), followed by hair clips, pins and bands (987). Seventy-one whole, stuffed green turtles and 108 whole, stuffed hawksbill turtles were seen. Most of the stuffed turtles ranged in lateral diameter 20-40 cm and many, particularly the hawksbills, were young individuals when they were killed. Vendors said it was rare these days to find a new sea turtle to stuff. Vung Tau had the most with 76, followed by Ha Tien (58) and HCMC (35). No stuffed turtles were found in Hué, Ha Noi and Ha Long City.

*Retail prices***.** Overall, prices were highest in HCMC and lowest in Ha Tien. The single most expensive item found was a giant stuffed green turtle in Vung Tau, measuring about 70 cm in diameter, priced at USD 621. A 56 cm diameter hawksbill in HCMC was selling for USD 485. Discounts of 20-30% could be obtained on most items with very little bargaining. The prices of whole, stuffed sea turtles varied considerably, depending on species, size and where sold. The price of whole turtles was based on the maximum carapace diameter. The hawksbill was more expensive than the green for comparable sizes. The cheapest prices for hawksbill stuffed turtles were seen in Vung Tau, where small individuals were USD 20-36. Other locations had similar prices for small hawksbills at USD 59-100.

Locality	Outlets		Items	
	2002	2008	2002	2008
HCMC	36	22	13,365	1,938
Vung Tau	11	12	3,177	165
Ha Tien	13	10	5,304	1,995
Phu Quoc	2	5	530	835
Nha Trang	25	14	4,204	492
Hue	2	3	143	117
Ha Noi	22	8	1,149	42
Ha Long City	5	10	187	270
Total	116	84	22,225	5,854

Table 4. Numbers of outlets and sea turtle products in 2002 and 2008.

Category	1992	2002	2008
Outlets	99	36	22
Bangles	10,291	3,421	812
Boxes/purses	547	162	31
Combs	1,262	302	76
Fans	188	111	6
Hair pins	5,056	1,088	128
Lighters/holders	803	194	25
Spectacle frames	2,433	476	120
Stuffed turtles	99	59	35
Total	21,366	6,174	1,267

Table 5. Number of outlets and items in 1992, 2002 and 2008 in HCMC (historical data from Baird 1993).

Buyers. The two most common bekko buyers identified by retail shopowners/vendors were Taiwanese and Chinese, followed by local and US-based Vietnamese. Japanese, French, Russians and Australians were also mentioned as bekko buyers. The only outlets that admitted they shipped sea turtle products to overseas buyers were found in the An Dong Market in HCMC. They said they exported to China, Hong Kong, Singapore, Europe and the USA. One shop vendor, which displayed 27 stuffed sea turtles, said they sold 10-15 stuffed sea turtles a month, many to Taiwanese.

Turnover. Turnover of jewellery, hair clips and combs appeared to be quite high, according to informants. These items had to be ordered every month or so. More expensive items, such as larger stuffed turtles, handbags and fans had a low turnover rate, and Europeans most often bought the last two types of products.

Bekko is much more popular in the south of the country than in the north, and turnover from Nha Trang south is much higher than for Hué and Ha Noi. Ha Long City reported fairly high turnover, particularly during national holidays when Vietnamese flocked there, but sales still seemed slower than in the south. In general, there were a greater number and variety of bekko items in the southern localities than in the northern.

Numbers of outlets and items. Table 4 presents a comparison of the numbers of outlets and sea turtle products for sale in the eight localities surveyed in both 2002 and 2008. Readers should remember that in 2002 sale of marine turtle products was legal. There has been a reduction of about 28% overall of outlets selling sea turtle products, most pronounced in HCMC, Nha Trang and Ha Noi. The reduction in the number of items seen for sale is much greater, 74%. Quite dramatic decreases were seen in HCMC, Vung Tau, Nha Trang, Ha Tien and Ha Noi. Phu Quoc Island and Ha Long City, however, have doubled the number of known outlets selling sea turtle products with a corresponding increase of almost 58% more pieces in Phu Quoc and 44% in Ha Long City between 2002 and 2008. There has also been an increase in the number of outlets selling sea turtle products at Mui Nai Beach, part of Ha Tien, from three to seven.

In 2002, 446 sea turtles were seen for sale in shops in the eight localities (280 hawksbill and 186 green). In 2008 only 179 stuffed sea turtles were found, 108 hawksbill and 71 green, a decrease of nearly 62%. This reduction unfortunately reflects the fact that there are fewer sea turtles in Vietnamese waters, and probably does not indicate a drop in demand. The reduction in outlets and items was even greater between 1992 and 2008 in HCMC (Table 5).

Numbers of workshops and craftsmen. In 2002 TRAFFIC (2004) found 9-11 workshops with a minimum of 27 craftsmen in HCMC, Ha Tien, Nha Trang and maybe one workshop in Vung Tau. In 2008 seven workshops with 15 craftsmen were found in the first three localities, with none in Vung Tau. However, a large workshop with 10-15 workers was identified by an informant who said it was in My Xuan, near Vung Tau. If this workshop does indeed manufacture sea turtle products there would be little difference between 2002 and 2008.

Prices of sea turtle products. TRAFFIC (2004) presented stuffed sea turtle prices based on 10-cm units of the carapace maximum diameter. The minimum price for small Hawksbills per 10 cm has gone up by 24% in HCMC (USD 20 to USD 26.20) and 440% in Nha Trang (USD 6.65 to USD 29.50), but has gone down by 34% in Vung Tau (USD 14.65 to USD 11.10). The increase in prices of small green turtles is quite modest and in line with inflation (USD 6.65 to USD 9.70), which averaged about 5% annually between 2000 and May 2008 (IndexMundi 2008). CRES (1994) reported that small hawksbills were selling in the Ha Tien area for USD 10-15 per 10 cm, which is less than the 2008 prices.

Raw scutes were for sale in Ha Tien in 1993 for USD 150-350/kg, depending on quality (Duc & Broad, 1995). In 2002 only one price was reported in Ha Tien, of USD 133.35/kg, and in HCMC of USD 100-400/kg (TRAFFIC, 2004). In 2008 the price was still USD 150/kg in Ha Tien. There was an apparent large price rise in HCMC to USD 700/kg, but since only one price was obtained it may not be representative. Also, the Ha Tien price was buying directly from fishermen, while the HCMC price was buying from middlemen. In early 1991 Martin (1992) found in Vung Tau that raw scutes, originating mainly in Viet Nam and Singapore, were selling for USD 132/kg.

There is still some overlap in prices for many of the jewellery pieces from 1993-2008, though in general prices have gone up due to inflation. The prices have gone up the most for those items using pure tortoiseshell, such as bead jewellery, boxes, fans and ladies' handbags. Those categories in which plastic and bekko are sometimes mixed show price overlap between 1993 and 2008.

The continuing trade in sea turtle products has contributed

Figure 1. Bangles and bead bracelets are a popular bekko item for sale in Viet Nam.

significantly to the great decline in numbers and size of sea turtles seen in Vietnamese waters. Sea turtles have almost disappeared from southern Viet Nam and parts of the Gulf of Tonkin (Hamann et al. 2005, 2006). Government regulations outlawing the catching of sea turtles and possessing and trading their products has apparently substantially helped in reducing the scale of the sea turtle market in most places in Viet Nam, but the smaller market scale is probably due in part to the great reduction of sea turtles surviving in Vietnamese waters. Informants in all coastal localities reported that it was becoming rare to catch local sea turtles, especially hawksbills, and large sea turtles were virtually absent, except for Green turtles in the Con Dao Islands.

In 2002 TRAFFIC found a considerable amount of large-scale wholesale sea turtle trading to foreign dealers (TRAFFIC 2004). Hundreds of stuffed sea turtles in Ha Tien and Nha Trang were exported annually. This level of trade was unsustainable and a regular wholesale export trade seems to be a thing of the past, though foreign visitors still buy a high proportion of the sea turtle products.

Demand seemed to be at about the same level as in 2002 based on the number of craftsmen still employed in processing and on the prices of raw scutes and bekko items, though demand is perhaps lower than in 1990. The number of craftsmen may have dropped somewhat in 2008 from levels seen in 2002, but that may have been due to a lack of raw material. The prices have not gone up for raw scutes in Ha Tien, but they have almost doubled in HCMC, and have gone up everywhere for retail processed bekko. With such a significant drop in supply, this price rise would be expected with demand remaining stable. There is no strong evidence from the quantitative indicators that demand has dropped significantly, and vendors reported good sales for the products. If sea turtles are to survive and recover in Viet Nam, the government will have to begin vigorously enforcing national laws and CITES regulations that protect sea turtles.

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Sea turtles on Clipperton Island (Eastern Tropical Pacific)

Olivier Lorvelec[1], Michel Pascal[1] & Jacques Fretey[2]

[1]INRA (Institut National de la Recherche Agronomique), UMR 985 Ecology and Ecosystems Health, Ecology of Biological Invasions Team, Campus de Beaulieu, 35042 Rennes Cedex, France (E-mail:olivier.lorvelec@rennes.inra.fr, Michel.Pascal@rennes.inra.fr); [2]IUCN - France, Muséum National d'Histoire Naturelle, 26, rue Geoffroy Saint-Hilaire, 75005 Paris, France (E-mail: jfretey@imatech.fr)

Clipperton Island (10° 17' N, 109° 12' W; Fig. 1) is located between the tip of Baja California and the Equator, in the Eastern Tropical Pacific. The closest other land masses are the Revillagigedo Islands, 950 km to the north, and Manzanillo on the coast of Colima, Mexico, 1000 km to the northeast. The 3-4 km wide atoll (Fig. 2) has a complete land ring, 40-360 m wide and 1.7 km^2 in area, which encloses a 7.2 km^2 lagoon (Jost 2003). The depth of 200 m is reached between 300 and 700 m from the seashore. Except for an isolated volcanic rock 29 m above sea level, the highest elevation is 4 m. The soil, of coral rubble and sand, is covered with guano. Apart from introduced coconut palms, the woody vegetation is absent, and the herbaceous vegetation is scarce (Lorvelec *et al*. 2006). Before 1839, two channels connected the lagoon with the open sea, the first located in the southeast of the atoll, close to the volcanic rock, the second in the northeast. Sometime between 1839 and 1858, thanks to hurricane effects, the lagoon was isolated from the ocean, and became a brackish ecosystem (Sachet 1960).

Travel accounts (Sachet 1960) showed that the island was discovered by two French vessels on April 3, 1711, which was a Good Friday, known in French as "Passion Friday". Hence, the former name of this island was "*île de la Passion*". It has also been suggested, without evidence, that the island had been know previously by Magellan in 1521 (Nunn 1934), followed by Spanish sailors, and finally by the English pirate John Clippington, *i.e.* Clipperton, in 1705. The French Navy officially took possession of the island in 1858. Later, there was a conflict between France and Mexico over sovereignty of the island, but an international arbitrage was pronounced in 1931 to the benefit of France. Today, status of this island is special: recent French legislation (February 21, 2007) puts Clipperton Island under the direct authority of the government, which had delegated administration aspects to the French Polynesia government commissioner (February 3, 2008).

The first landing on Clipperton Island is supposed to have been made by the U.S. sailor Benjamin Morrell in 1825 (Sachet 1960). Since the 1890s, despite geographic isolation, human activities have deeply altered this insular ecosystem. Intensive human impact began with the extraction of phosphates by an American company between 1893 and 1914, followed by the activities of a Mexican settlement and garrison between 1906 and 1917, and then short stays by the armed forces of the United States (1945) and France (between 1966 and 1969). Clipperton Island is currently uninhabited but remains of temporary encampments testify that it is used for short visits, probably by crews of fishing boats and few tourists.

Since the natural history observations and collections reported by John Arundel in 1897 (Sachet 1960), several scientific expeditions have studied flora and fauna of the land, the lagoon and the surrounding marine environment of Clipperton Island. A comprehensive study of the history and ecological functioning of this island was carried out by Sachet (1960, 1962a, b, c, 1963). A recent expedition organised by Dr Jean-Louis Étienne took place between December 2004 and April 2005, and included scientists from agencies of several countries. One of its major goals was to update the inventories of flora and fauna. Within this expedition, the authors (OL & MP) carried out an inventory of terrestrial vertebrates (Lorvelec & Pascal 2006, in press). These authors, as well as Pitman *et al*. (2005), have proposed conservation measures that contrasted with previous proposals of economic development suggested by Jost (2003, 2005).

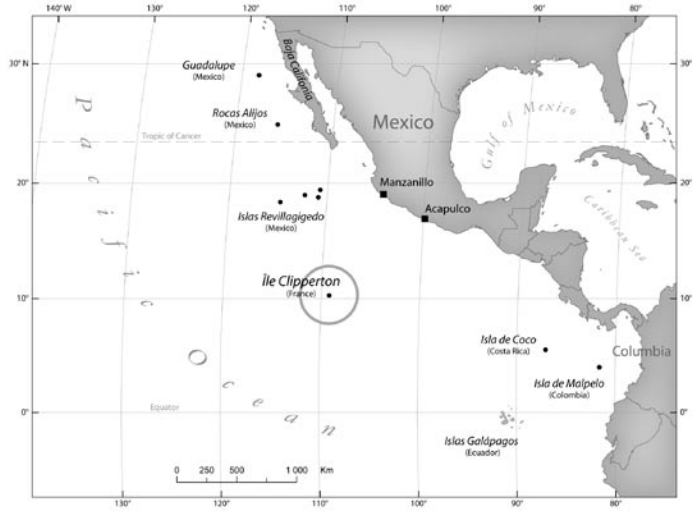

Figure 1. Clipperton Island in the Eastern Tropical Pacific.

Figure 2. Map of Clipperton Island.

Turtle	Date	Stage, sex	CCL	CCW	PL	CoS	InS	Sp	Observations
T1	Dec. 10	?	-	-	-	-	-	?	Remains, some bones
T2	Dec. 21	?	-	-	37.5	-	-	?	Remains, some bone
T3	Dec. 27	Juvenile	51.5	55.5	30.5	5-May	4+p.	Lo	Dead, intact, b., freshly stranded, Fig. 3
T4	Jan. 1	?	-	-	44	-	-	Lo?	Start of decay, carapace broken, no head
T5	Jan. 1	Mature, male	63	71	44.5	6-Jun	4+p.	Lo	Desiccated, trapped in fishing line
T6	Jan. 1	Juvenile	-	-	-	-	-	?	Dead, partly buried
T7	Jan. 1	Juvenile	52.5	58	35	6-Jun	4+p.	Lo	Dead, intact, freshly stranded
T8	Jan. 2	Mature, male?	65	71	45	5-May	4+p.	Lo	Moribund, b.
T9	Jan. 2	?	-	-	-	-	-	?	Dead, partly buried

Table 1. Sea turtle strandings recorded on Clipperton Island between December 8, 2004 and January 4, 2005. CCL: curved carapace length; CCW: curved carapace width; PL: plastron length; CoS: costal scutes (on the left / on the right); InS: pairs of inframarginal scutes; p.: presence of pore in each inframarginal; Sp: species; Lo: Lepidochelys olivacea; b.: presence of barnacles on the carapace.

Since its discovery, man introduced two mammal species in Clipperton Island. The pig (*Sus scrofa*), which was introduced to Clipperton in 1897, built up a population of 58 feral animals in 1958. Its detrimental impact on the masked booby (*Sula dactylatra*), the brown booby (*Sula leucogaster*), and several other breeding seabird species led the U.S. scientist Kenneth Stager to eradicate the pigs in 1958 (Stager 1959, 1964). This eradication induced the recovery of sea bird breeding populations, which presently include the masked booby's largest breeding colony and the brown booby's second largest one in the world (Pitman *et al*. 2005). The ship rat (*Rattus rattus*) was introduced to Clipperton between September 1998 and November 1999 as a consequence of a ship wreck (Pitman *et al*. 2005). Presently, rats have colonised all the terrestrial habitats of the atoll (Lorvelec & Pascal 2006).

Benjamin Morrell is the only person who has mentioned sea turtle nesting on Clipperton Island. On August 17, 1825 he wrote: "*... The whole island is literally covered with sea-birds, such as gulls, whale-birds, gannets, and the booby. There are also a few small land-birds, which were probably blown from the American coast during the hurricane months. Fur-seal and sea-elephant resort here in small numbers in the proper seasons, and green turtle come hither to deposite their eggs... After taking what few fur-seal could be found about the island, we got underway and sailed for the Gallapagos Islands...*" (Morrell 1832: 219).

Figure 3. Olive ridley stranded on Clipperton Island (December 2004).

Although there are no other records of sea turtle nesting on Clipperton Island, Morrell's quote was cited by Sachet (1962a, b) as evidence of nesting. Nevertheless, even if Morrell does record sea turtle nesting, he does not specify if he personally observed such nesting, and the species identification is questionable because of a lack of description (Lorvelec & Pascal 2006).

On the western coasts of America, the green turtle (*Chelonia mydas*) exhibits a particular form ("*agassizii"*), the names is black turtle or East Pacific green turtle, which was sometimes ranked at the level of subspecies or species by some authors. It is speculated that the sea turtle recorded as the "*green turtle*" in Morrell's text may have been this form, which, according to Marquez (1990), currently nests from Jalisco, Mexico, to Manta, Ecuador, as well as on oceanic islands such as the Galapagos and the Revillagigedo (Fig. 1). According to this author, Juarez-Ceron *et al*. (2002) and Seminoff (2004), the major nesting grounds are located on these oceanic islands, on the coast of Michoacán, Mexico, and on several places of Central America. Clipperton Island is located between the Galapagos and the Revillagigedo islands, so it is possible that this turtle was nesting on this atoll during the 19th century. As the nesting season of this turtle changes with latitude (Marquez 1990) and covers more or less the total year, a full year survey would be required to fix nesting events, if they currently exist, on Clipperton Island.

Clipperton beaches presently consist of sand mixed with coral debris and they are largely flooded during high tides. Access to the island is difficult and dangerous because of fringing reefs and breakers, as described by Sachet who visited the atoll in 1958 (1962a). Lorvelec & Pascal (2006) have suggested that Clipperton beaches are presently unsuitable for sea turtle nesting, but, hypothetically, the hawksbill (*Eretmochelys imbricata*), and perhaps other species, might nest in these conditions on the highest part of some beaches. There is no information on the quality of the beaches when Morrell landed on Clipperton, but as the lagoon was connected to the sea during his visit, the island may have hosted suitable nesting beaches for sea turtles inside the lagoon (Lorvelec & Pascal 2006).

However, during the period of guano exploitation between 1893 and 1917, it is likely that egg and adult exploitation by humans as well as nest destruction by pigs during the first half of the 20th

century, could have contributed to the disappearance of the nesting population (Lorvelec & Pascal 2006). For the record, pigs, like rats, are known to prey on eggs of *Chelonia* on beaches close to Mexican villages (Pacific Sea Turtle Recovery Team 1998).

During our stay on the island, between December 8, 2004 and January 4, 2005, we did not check specifically for evidence of nests or turtle nesting. However, nine stranded sea turtles were discovered during sorties to various parts of the atoll devoted to different terrestrial studies, and during two complete explorations of the seashore (Fig. 3; Tab. 1). Seven of nine carcases were found on the eastern side, but we have no explanation about this distribution pattern. Where possible, carapace and plastron measurements, costal and inframarginal scutes counts, sex, and observations on body condition were recorded. Four animals were confirmed to be *Lepidochelys olivacea*, the olive ridley (presence of four pairs of inframarginal scutes, each bearing one pore), a fifth, headless animal with a broken carapace, was also thought to be olive ridley, and four cadavers were so badly decomposed that it was not possible to determine the species. Two carcasses were reduced to just long bones and carapace bones, and had evidently stranded weeks or perhaps months before they were found in December (T1, T2). The seven remaining animals, all with severe injuries, had recently stranded, between December 27 and January 2; six were dead and the last was moribund (T8). Unfortunately, no bones or tissues were collected from additional individuals that were recorded stranded after our departure.

The degree of body damage (T4 lacked the head and flippers, and the carapace was badly broken), or entangling in long line (T5; picture at www.seaturtle.org/imagelib) indicate that at least some of the strandings derive from mortality in fisheries activities. During the month of January 2005, after our departure, purse seine tuna boats anchored off Clipperton Island. We suggest that the nine stranded turtles we recorded were a small percentage of animals that were injured and killed by Eastern Tropical Pacific fishing activities, certainly by long liners and perhaps by purse seine tuna boats.

On the western coasts of America, the olive ridley regularly nests from Baja California to Columbia (Fritts *et al*. 1982; López Castro 1999) and sporadically in mainland Ecuador (Alava *et al.* 2007) and Peru (Brown & Brown 1982). In some places, this species constitutes large massed nesting populations ("arribadas"), and the most important breeding grounds are the central coast of Mexico and several places of Central America (Marquez, 1990). Moreover, Eguchi *et al*. (2007) show that observations at sea of this species are currently frequent in the Eastern Tropical Pacific, and satellite tracking of male, female and juvenile olive ridleys, demonstrated that they can undertake long journeys (Parker *et al*. 2003). Hence, the olive ridleys that strand on Clipperton Island could come from any number of nesting populations.

Large numbers of olive ridleys occurring on the high seas in Eastern Tropical Pacific could be the result of the efficient conservation programs undertaken by Mexico and Costa Rica since the early 1990s. Nevertheless, by-catch mortality remains important, and our observations confirm this threat for the species.

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Unexpected Visitors to the Eastern Caribbean: Loggerheads Nest at Buck Island Reef National Monument

Clayton Pollock[1,2], Ian Lundgren[2], Lindsay Albright[2], Amber Avestruz[2], Julia Polan[2] & Zandy Hillis-Starr[2]

[1]101 Bokum Rd. Deep River, Ct. 06417 (E-mail: cpollock101@gmail.com);

[2]National Park Service. Buck Island Reef National Monument. 2100 Church St. #100. Christiansted, USVI 00820

Loggerheads have a large range in the Atlantic Ocean, with nesting occurring in tropical, subtropical and temperate beaches (Dodd 1988). In the western Atlantic, they exhibit a measure of natal homing and nest site fidelity (Reece et al. 2005). The majority of loggerhead nesting in the NW Atlantic occurs in six Florida counties on the US eastern seaboard (Witherington et al. 2009). Recent analyses of nesting data indicate that the loggerhead population in Florida is declining due to continued coastal development, coastal recreation, incidental capture in fishing gear, pollution and climate change (Witherington et al. 2009). The eastern Caribbean is not considered typical nesting habitat for this species (Ehrhart et al. 2003), although climatic depression may have at one time confined loggerhead nesting to southern Florida, the Caribbean and near equatorial regions (Reece et al. 2005).

Buck Island is an uninhabited 176-acre island 2.4 km off the north coast of St. Croix, US Virgin Islands (17º 47' N, 64º 37' W). The island is part of Buck Island Reef National Monument (BIRNM) which includes an additional 18,839 acres of submerged land and coral reef habitats. Annually, ~1500 m of beaches on Buck Island are monitored for turtles emerging to lay eggs from approximately 1900 h to 0430 h each night between July and October. As part of a saturation tagging project, each intercepted turtle is tagged on the front and rear flippers with NMFS Inconel tags and PIT tags are injected into the right shoulder. (Phillips & Hillis-Starr 2002). Additionally, tissue samples are collected and preserved in DMSO solution, and individual turtles are photographed and cataloged. Nests in erosion prone areas were relocated. Since 1988, nesting hawksbills (*Eretmochelys imbricata*), green turtles (*Chelonia mydas*), and leatherbacks (*Dermochelys coriacea*) have been documented at BIRNM (Phillips & Hillis-Starr 2002). Loggerhead (*Caretta caretta*) activity within the BIRNM has been considered transitory (Phillips & Hillis-Starr 2002).

Since 2003, 13 loggerhead nests, laid by two individual females, have been observed on Buck Island beaches. Females were identified as loggerheads based on the size of the head, prefrontal scutes (5), lack of imbricated carapace scutes, and large epibiota communities found on the carapace. Each individual was assigned a primary tag number, measured and photographed. Each female returned to the island for three nesting cycles. After the initial nesting seasons both females returned three seasons later to nest. One individual was observed nesting in consecutive seasons; all other inter-season nesting intervals have been 2-3 seasons. The average clutch size was 127 eggs (Table 1). Excluding the interval (39 days) between the two nesting activities observed in 2004, the average inter-nesting interval was 12 days. The average incubation period for eight nests was 53 days. The average hatch success of each nest varied and was different for each individual (Table 1). Six nests were relocated to sites less susceptible to erosion. Additionally, eight excavated nests that were laid prior to the start of seasonal monitoring in 2006-2008 were deemed loggerhead based on examination of the hatchlings. It is unknown if these nests were all laid by either of the same two females previously tagged.

Infrequent loggerhead nesting in the eastern Caribbean has been documented on the British Virgin Islands, Saint Eustatius and Montserrat (Dow et al. 2007). Our report documents the first observed loggerhead nesting and subsequent hatching success

Individual	Date	Eggs laid	Undevloped	Mid-term	Full-term	Piplings	Dead	Hatched	Hatch success
1	7/28/2003	98	5	5	8	20	1	60	61%
1*	8/9/2003	116	33	4	2	2	0	75	65%
1	8/21/2003	E	E	E	E	E	E	E	0%
1*	7/7/2006	137	23	3	3	5	2	103	75%
1*	7/19/2006	138	29	3	1	0	0	109	79%
1*	8/1/2008	145	7	2	2	1	0	133	92%
1*	8/12/2008	n/a	n/a	n/a	n/a	n/a	n/a	n/a	?
1*	8/24/2008	n/a	n/a	n/a	n/a	n/a	n/a	n/a	?
2*	7/7/2004	146	94	14	31	0	0	7	5%
2	8/15/2004	87	55	7	5	0	0	23	26%
2	7/1/2007	136	89	13	22	6	1	6	4%
2*	7/13/2007	135	90	10	15	0	1	20	15%
2*	7/24/2008	n/a	n/a	n/a	n/a	n/a	n/a	n/a	?

Table 1. Hatching results for nine loggerhead nests laid on Buck Island, St. Croix. Nests that were inundated or unobserved are not shown. * = relocated nests. E = nest lost to erosion. n/a = nest markers were lost after Hurricane Omar.

under recent climatic conditions on Buck Island, US Virgin Islands. Limited nesting of loggerheads in the eastern Caribbean is similar to other small aggregations or individuals nesting in expanded ranges (Soto et al. 1997; Tomas et al. 2008). Similar information concerning sea turtle abundance and habitat should be consolidated to establish conservation and management priorities. Towards this end, a database of different nesting beaches and nesting beach activity in the Caribbean, archived and displayed online by OBIS-SEAMAP (http://seamap.env.duke.edu/), has been created to inform and improve policy at national and regional levels (Dow et al. 2007). Small nesting aggregations documented on Cay Sal Bank, Bahamas (US Fish & Wildlife 2008) and on beaches like Curação (Debrot & Pors 1995) support the idea that small, scattered nesting aggregations contribute to regional population dynamics (Debrot et al. 2005).

Evaluating how sea turtles spatially use transitional nesting resources such as along a thermal gradient is important to conservation management. Spatially diverse nesting may result in more male hatchlings that will keep the primary sex ratio in loggerhead populations from becoming radically female biased in the future (Hawkes et al. 2007). Thermal monitoring of loggerhead nests at BIRNM by deploying data loggers in new and relocated nests may reveal greater fertility and hatch success for those individuals nesting in cooler microclimates, such as in shaded areas, in nests closer to the sea (Hawkes et al. 2007) or in sand that is light in color (Hays et al 2001). Techniques such as nest relocation into cooler microclimates and/or covering dark soils with light to lower nest temperatures may be able to reduce hatchling variability and prevent radically female primary sex ratios (Foley et al 2006; Hays et al 2001). If highly skewed sex ratios persist on tropical and subtropical loggerhead nesting beaches like BIRNM, these subpopulations may rely on rookeries that are not dominantly female biased, such as North Carolina in the USA, Heron Island in Australia and Espírito Santo in Brazil to provide males essential to producing hatchlings (Hawkes et al. 2007). For example, males from these sites could provide semen (Tanasanti et al 2007) or serve as parental breeding stock (Bell et al 2005). Despite concerns over headstarting and captive breeding, this strategy may be important to sea turtle conservation and management in the future (Bell et al 2005; Godfrey & Pedrono 2002).

One possibility is that the loggerheads nesting in BINRM may be hybrid animals. Hybrid turtles have been documented establishing home ranges within non-typical habitats. A post-first generation hybrid between loggerhead and hawksbill was documented during multiple recaptures in the Ten Thousand Islands, Florida. The turtle had the outward appearance of a hawksbill but was apparently establishing residency in habitat characteristic of a loggerhead (Witzell & Schmid 2003). A juvenile green turtle x loggerhead hybrid was collected in Nova Scotia, Canada. It had the outward appearance of a green turtle but was confirmed genetically to be a hybrid. It was hypothesized that the loggerhead component of its genotype influenced its foraging behavior in higher latitudes, in waters typically below the normal thermal tolerance of green turtles (James et al. 2004). Overlapping ranges and proximity with hawksbill males during the nesting season may increase the chance for a hybridization event. Genetic samples from loggerheads nesting at BIRNM and their clutches should be analyzed to determine if they are hybrids.

Loggerhead individuals nesting at BIRNM may have incurred significant energetic costs while initially migrating to the island; each female waited three nesting seasons to return and nest on the island after her first documented nesting activity. One individual then returned in consecutive seasons to nest, indicating the energetic cost of migrating may be too great and/or that suitable foraging grounds are available closer to the BIRNM nesting beaches. Anthropogenic pressures may increase energetic losses during nesting migrations and alter patterns of vitellogenesis, potentially constraining the timing of migration and breeding (Hawkes et al. 2007). This may explain loggerhead nesting documented along the northwestern

coast of Spain (Tomas et al. 2008) and in the eastern Caribbean. By telemetering postnesting loggerheads individuals at BIRNM, a preliminary assessment can be made about where these individuals forage. In combination with genetic analysis, these studies may generate more complex conservation possibilities. For example, if nesting beaches in Florida or elsewhere have become unavailable or unattractive to loggerheads and the eastern Caribbean is suitable, perhaps some consideration should be given to translocation of individuals to BIRNM (Bell et al. 2005; Godrey & Pedrono 2002). Although there is no guarantee that translocated individuals would remain, this type of effort may improve population dynamics related to genetic fitness of the small loggerheads population in the eastern Caribbean and perhaps alleviate competition for resources in resource-poor regions.

We hypothesize that anthropogenic factors are contributing to these unique nesting phenomena on BIRNM. Future investigations should focus on exploring migratory patterns, internesting movements and nesting strategies.

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Eight Nests Recorded for a Loggerhead Turtle Within One Season

Anton D. Tucker
Mote Marine Laboratory, Sarasota, Florida 34236 USA (E-mail: tucker@mote.org)

One of the objectives of monitoring sea turtle nesting beaches is to calculate the number of reproductive females nesting in a given year. Difficulties inherent in adequately calculating this value include tag loss, incomplete capture-recapture records, variation in remigration schedules, variable female reproductive output, and especially unrecorded nesting events occurring outside the sampling area. To overcome many of these acknowledged problems, a more rigorous determination of within season clutch frequency can be derived by deploying satellite tags to track nesting females. This approach requires that female sea turtles be instrumented at their first nesting and followed through all inter-nesting intervals until a final nest is laid and then observe a post-reproductive migration.

A study of clutch frequency was conducted at a loggerhead turtle rookery on Casey Key, Florida (27.1 N, -82.5 W) during 2006-2008. Female loggerhead turtles (Caretta caretta) were approached after nesting for attachment of satellite tags (Sirtrack Kiwisat 101 or Wildlife Computers SPOT-5) to the carapace along with standard Inconel flipper tags and PIT tags. Clutch frequency and site fidelity were subsequently derived from characteristics of the tracking histories.

Movements were reconstructed from fixes of Location Classes 3, 2, 1, 0, or A (and omitted Location Classes of B or Z). Location data were preprocessed in Satellite Tracking and Analysis Tool (STAT: Coyne & Godley 2005) to filter locations for depth > 0.5m, speed > 4 km/hr, locations < 4hr apart, or for angles < 15 degrees. The filter process discarded errant points far inland, for improbable speeds, or excluded obvious outlier points from the vector of the movement path. Multiple criteria were then applied to identify each presumed emergence: (1) emergences were only considered within the expected inter-nesting intervals for loggerheads (9-15d), (2) emergence locations were associated with depths of -0.5 to 0.5, (3) when the turtle movements were directed onshore followed by an immediate offshore vector, (4) an improvement in location classes such as multiple LC 2 or 3 within a short time span, (5) evidence of an increased surface interval in the PTT data, (6) verification by nocturnal patrols if the female emerged on the same beach as the patrols (7) or verification by parental assignment using DNA microsatellite markers (B. Shamblin, unpubl. data).

Among the loggerheads tracked during the 2008 season was a female (102.9 cm curved carapace length) that established a new record of clutch frequency that was determined empirically by a combination of the satellite tracking history (ARGOS ID 72441) combined with periodic verification by nocturnal tagging personnel or molecular techniques of matching DNA samples from the first and last nests. The female's annual reproductive output of eight nests (Table 1) was readily determined by the displacement and daily movements relative to shore (Fig. 1) during each internesting interval. Site fidelity was to the same regional rookery, though not specifically to the same beach, with all eight nests deposited within 15.9 km measured between the most distant nests (measured in Google Earth). A distinctive behavioral trait of the tracked female contributed to clarity in verifying all nests: her displacement distance perpendicular to shore across the inter-nesting periods illustrated a pattern of directed movements toward shore followed

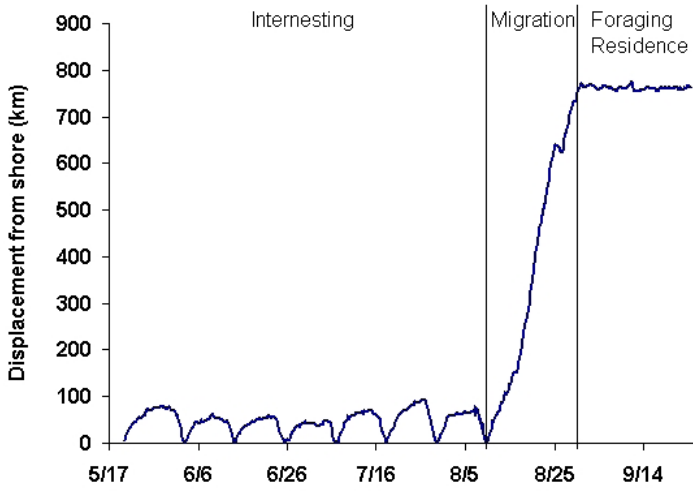

Figure 1. Displacement from shore by loggerhead 72441 as it leaves and returns from first nest at May 20 to the eighth nest on August 9. During a post nesting migration the turtle swam steadily toward a distant foraging residency on the Yucatan Banks, Mexico.

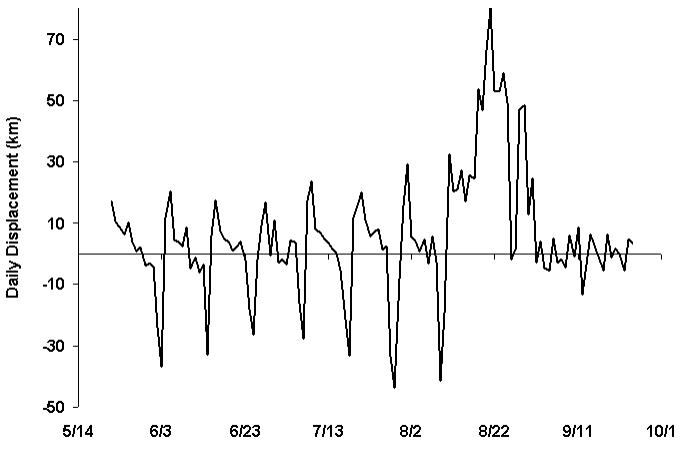

Figure 2. Daily movement vectors to and from each nesting event (N). Since the female was tagged at the first nest, movements preceding that cannot be indicated. Positive values indicate the turtle moving away from the release site or negative when moving towards the release site.

Nest	Date	Ver	Beach	Lat.	Long	Distance and direction from previous nest location (km)	Inter-netsing interval (days)	Displacement from shore (km)	Maximum depth (m)	Km travelled
1	5/20/2008	NP, G	Casey	27.144	-82.478			77.7	27	194
2	6/03/2008	NP	Casey	27.149	-82.481	0.63 N	14	61.7	32	153
3	6/14/2008	NP, G	Casey	27.139	-82.476	1.22 S	11	54.9	28	134
4	6/26/2008	G	Venice	27.09	-82.458	5.71S	12	47.3	28	131
5	7/07/2008	G	Casey	27.139	-82.476	5.71N	11	70.4	31	188
6	7/18/2008	NP	Casey	27.127	-82.472	1.40 S	11	92.1	32	195
7	7/29/2008	*	Siesta Key	27.213	-82.514	10.39 N	11	70.5	29	201
8	8/10/2008	G	Venice	27.079	-82.453	15.98 S	12	-	-	-

Table 1. Dates of nesting for loggerhead 72441 tracked by Argos satellites. Abbreviations in the verified column (Ver) are NP = verified by night patrols, G = verified genetically, * = nest was unverified because raccoons destroyed all eggs that same night before nest was discovered. Distances between nests were determined in Google Earth.

by a distant offshore movement after nesting (Fig. 2) accounting for the movement sequence in Fig. 1.

The present account establishes a new maximum clutch frequency of eight nests for loggerhead turtles of the Western Atlantic compared to a previous record of seven clutches documented for Georgia loggerheads (Lenarz et al. 1981). We note that an earlier study had suggested the potential for eight nests in southwest Florida loggerheads, based on internesting intervals (Addison 1991). Our approach differed from Sato et al. (1998) who used archival time depth data loggers to determine nesting activity of females by verifying nesting emergences. However logistically speaking, satellite transmitters seem better suited than archival data loggers to illuminate the entire nesting season profile of animals since they do not have to be recovered.

The marine turtle community has expressed skepticism as to whether the uncertainty errors in ARGOS satellite tracking (contrasted with the higher frequency and accuracy of locations with GPS tags) allow locations to be recorded with sufficient precision to document nesting emergences. This study demonstrates that a combination of data filtering and multiple criteria matching can afford reliability in detecting loggerhead emergences, whether nesting or false crawls, provided that individual turtles have a distinctive pattern of inshore-offshore directed movements. Related studies for other turtle species are now required to more extensively test this method of estimating clutch frequency. In particular, species or individuals that linger near shore during an inter-nesting period may be more problematic to interpret a movement pattern than was illustrated by this loggerhead female (cf. Fig. 1 and 2).

Acknowledgments: The study was partly supported by grant 08-019R from the Florida Sea Turtle Grants Program (www.helpingseaturtles.org) which is funded by sales of the Florida Sea Turtle License Plate. Animals were handled in accordance with IACUC permit 08-04-AT1 and Marine Turtle Permit #126 from the Florida Fish and Wildlife Conservation Commission. Location data were filtered and analyzed in STAT developed by seaturtle.org We thank staff and interns of the Sea Turtle Conservation and Research Program for dawn patrols and L. Flynn, A. Oeding, and K. Martin for nocturnal patrols. B. Shamblin conducted the genetic testing.

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MEETING REPORT

Report From The Workshop on Marine Turtle Conservation For The Gulf And Guadeloupe, Barr Al-Jissah, Oman, 1-3 December 2008

Nancy Papathanasopoulou
Masirah Turtle Conservation Project and Kuwait Turtle Conservation Project (E-mail: nancyktcp@gmail.com)

The Arabian Peninsula and surrounding countries host a large number of nesting and foraging turtles. Most countries in the region host populations of two or three sea turtle species. Perhaps the best known nesting area in the region is Masirah Island, in the Sultanate of Oman, where hawksbills, olive ridleys and green turtles, in addition to the >30,000 loggerhead turtles, come to nest each summer. In conjunction with the Ministry of Environment of Oman, TOTAL Foundation and TOTAL S.A. – Muscat Branch have been working for four years on a sea turtle conservation project on Masirah Island. The Foundation recently sponsored a second sea turtle conservation project in Kuwait, with the aim of studying and protecting green and hawksbill turtle populations on the atolls of Qaru, Kubbar and Umm Al-Maradim. In cooperation with public and private authorities in the French Antilles, TOTAL Foundation co-sponsors another conservation project in Guadeloupe, coordinated by the NGO Kap-Natirel.

In early December, 2008, the TOTAL Foundation held a 3 day workshop in Bar Al-Jissah, Oman, inviting turtle experts from the Gulf region, representing not only all three TOTAL sponsored turtle projects but also other turtle conservation efforts in nearby countries. The Guadeloupe sea turtle project, now active for more than 10 years, was there not just to present itself, but also to exchange ideas with other projects and share information and experience with them.

The first day of the workshop began with opening speeches by Jean-Claude Farina, TOTAL Group representative in Oman, Alain Langlois, TOTAL group representative in Kuwait, Guy Sallavuard, Vice-President of TOTAL Foundation and Ali Al-Kiyumi, Director-General of Nature Conservation at the Ministry of Environment and Climate Affairs of the Sultanate of Oman. His Excellency the Undersecretary of the Ministry was present for the opening of the workshop, thus stressing the importance attached to it by the Omani government. All three turtle projects sponsored by TOTAL presented their work and successes. Highlights from the presentation on the Masirah project included the proposal of a general management plan based on sustainable development for Masirah Island; the creation of an Environmental Information Center; and the satellite tracking results demonstrating migratory behavior of post-nesting turtles from Masirah. The highlights from the Kuwait presentation included cooperative efforts between with public authorities and the country's Scientific Center to establish the Kuwait Turtle Project; results from initial data from nest surveys on Qaru and Umm Al-Maradim islands; and plans for future research. The presentation on the Guadeloupe turtle project focused on its monitoring work in multiple islets including nesting populations of leatherback, green and hawksbill turtles. Environmental education and communication has been highly developed in this project, along with satellite tracking activities, monitoring of nesting and foraging populations in addition to working closely with local fishermen for the reduction of sea turtle capture as bycatch.

Policy makers, researchers and heads of NGOs from surrounding countries presented more subjects regarding sea turtles. Ali Amer Al-Kiyumi, Director-General of Biodiversity at the Ministry for Environment and Climate Affairs, held a presentation about Oman, reporting on efforts and legislation on the Ras Al-Hadd turtle beach, which hosts over 20,000 green turtle, nests every year. A national long-term strategy for sea turtle conservation is currently planned for the next ten years in cooperation with academic circles and local NGOs. Khawla Al-Muhannadi, president of the Friends of the Environment in Bahrain, expressed concern about the lack of organized turtle research in the rapidly developing country, where many beach areas already have been reclaimed for construction. Iran presented results of long-term monitoring and research. Asghar Mobaraki from the Environment Department in Iran reported that green and hawksbill turtles nest on Iranian beaches and the olive ridley turtle has repeatedly been seen foraging in Iranian waters. Recent genetic analyses have revealed 11 mtDNA haplotypes in the hawksbill population. The Abu Dhabi Emirate (part of the United Arab Emirates) with Dr Thabit Abdesalaam from the Environmental Agency of Abu Dhabi, presented a long-term strategy for sea turtle conservation, including protected areas, zoning policies and sustainable development measures. David Robinson, assistant curator of the Burj Al-Arab Aquarium in the Emirate of Dubai (also part of the United Arab Emirates) presented information on the only turtle rehabilitation center in the Gulf and Red Sea region, run by the Dubai Wildlife protection office. This presentation highlighted the need for more turtle rescue centers the region, given the tension between marine life and intense commercial sea traffic on a daily basis. The presentation from Pakistan, given by Asghar Shah, District coordinator of IUCNP-BPSD District Gwadar, summarized the work by WWF and IUCN on sea turtle conservation issues in that country, including efforts to supplement good national legislation protecting sea turtles in the country with improved enforcement, raised awareness, and increased capacity. It was noted that this was the first regional meeting on sea turtles that Pakistan had the opportunity to attend.

The second day of the workshop began with an excursion in glass-bottom boats, which allowed participants to better appreciate the coastal environment in Oman. In the afternoon, there were several presentations by invited international researchers. Brendan Godley gave an overview about the use of satellite tracking for monitoring sea turtles migrations and its contributions to knowledge

and conservation. Matthew Godfrey spoke of the applied uses of satellite telemetry, including as a tool to evaluate the fate of rehabilitated or bycaught sea turtles. Alan Rees presented the results from TOTAL-sponsored telemetry research on loggerheads, olive ridleys and green turtles nesting on Masirah Island, emphasizing the diversity of behavior seen to date. Nancy Papathanasopoulou gave a synthesis on the principal legal instruments of sea turtle conservation in the Gulf and the Red Sea region, followed by a discussion about the challenges of enforcement and adapting instruments to local conditions. Marc Girondot led a round table discussion on common methodologies used in sea turtle research and conservation that may have limited scientific value or even possibly negative impacts on turtles.

The third day was dedicated to communication and education tools. Michael Coyne gave an overview of www.seaturtle.org: its contents, tools, its efficiency for both communication and education worldwide and ultimately its contribution to sea turtle research and conservation. The benefits of the available tools to regional groups, in terms of creating networks and facilitating efficient cooperation, were explained. Participants of the meeting subsequently divided into separate groups to discuss those tools offered by the website that could be adopted to facilitate better cooperation on sea turtle conservation in the Gulf and Red Sea area, with the participation of the Guadeloupe sea turtle project. The groups decided to use the tools to establish a website, a mailing list and a newsletter. The Kuwait Turtle Conservation Project volunteered to be coordinator of these communication efforts and Michael Coyne offered to help setting it up and running. The website, www.salahif.org, is now up and running and in the process of including as many participants in sea turtle work in the region and as many news of their projects as possible. Anyone who wishes to be part of it please contact Nancy Papathanasopoulou at nancyktcp@gmail.com or ALan Rees at arees@seaturtle.org.

In conclusion, participants expressed their satisfaction with this meeting as well as their will to continue working closely together on sea turtle conservation. Proceedings of the workshop shall be edited and published by TOTAL Foundation in due course.

Acknowledgments: The workshop was organized and sponsored by TOTAL Foundation and TOTAL S.A.-Muscat branch. Without the commitment, determination and enthusiasm of all organizers, this event would not have been possible.

THE BARR AL-JISSAH DECLARATION ON MARINE TURTLE CONSERVATION IN THE GULF AND GUADELOUPE (3 December 2008)

A workshop on the Conservation of Marine Turtles in Gulf and Guadeloupe was held from the 1st to the 3d of December in Barr Al-Jissah, Oman, and was attended by more than forty resource managers, scientists and conservationists from several countries such as Bahrain, Kuwait, Oman, United Arab Emirates, Iran, Pakistan, Greece, United Kingdom and USA.

The meeting had as its major objectives: To stimulate the development of expertise in marine turtle conservation, To increase awareness about marine turtles and their conservation issues, and To gather people from several countries in order to form acquaintances and cooperation on sea turtle conservation in the Gulf and Guadeloupe.

The participants of this meeting have produced this declaration, to provide recommendations on the conservation of marine turtles and their habitats in the Gulf and Guadeloupe for consideration by governments, international organizations, non-governmental organizations, academic institutions, private companies and other sectors of society.

Observing that "marine turtle" refers to any stage in the life cycle of any of the five species found in the Gulf and Guadeloupe: *Caretta caretta*, *Chelonia mydas, Dermochelys coriacea, Eretmochelys imbricata* and *Lepidochelys olivacea ;*

Recognizing that marine turtles comprise a unique part of the biological diversity of the oceans, as well as integral and irreplaceable components of the cultural, economic, historic, social, and spiritual aspects of the societies found therein;

Considering that all marine turtle species of the region are characterized by singular biological characteristics, including slow growth, late maturity, potentially long life and high reproductive potential, and high rate of mortality during the early life stages, and that conservation actions, whether focused on protection or use, must deal adequately with these non-negotiable biological characteristics;

Affirming that marine turtles have complex life cycles, which depend directly on diversity of environments, including beach (terrestrial), open ocean (pelagic) and near shore (benthic, neritic), in which the animals live during certain phases;

Recognizing that several species of marine turtles are unique components of a variety of marine ecosystems, essential to the ecological structuring and function of these ecosystems;

Noting that the peoples, societies and nations value marine turtles for many diverse reasons;

Considering that the life cycles of all species of marine turtles involve dispersal and migration over vast distances, which take each individual turtle out to the high seas and through the waters under the jurisdiction of different States;

Affirming that throughout the world's oceans marine turtle populations have declined or disappeared, as indicated by historic and other evidence, while at the same time threats to both marine turtles and their habitats have increased;

Recognizing that for the basic needs of conservation there is still insufficient scientific information, especially from long-term monitoring of marine turtle populations, migrations and habitats;

Acknowledging that States have national legislation providing for certain levels of protection for marine turtles, illustrating recognition of the need for special attention to conservation activities for these animals and their habitats;

Considering that all species of marine turtles are specifically included under special categories of conservation in diverse international agreements);

Aware that six species of marine turtles are listed as vulnerable, endangered or critically endangered on the IUCN (The World Conservation Union) Red List of Threatened Species;

Confirming that the precautionary principle in fisheries management is a central component in these international accords and codes and also in the conservation of marine turtles and their habitats;

Recognizing that the nations, societies, and people have great

environmental, historical, cultural, linguistic, social, economic and political diversity;

Noting that numerous human activities may threaten marine turtle populations directly or indirectly from activities which include harvesting of eggs and turtles, inappropriate hatchery operations, destruction or modification of habitats, coastal development, pollution, fishing activities, mariculture and tourism;

Acknowledging that despite limited resources, governmental agencies, international organizations, non-governmental organizations, private companies such as TOTAL and other stakeholders have advanced to varying degrees the conservation of marine turtles and their habitats at local, national and regional levels;

Given these considerations:

This Workshop developed a framework of elements fundamental to the conservation of marine turtles and their habitats under the following headings: Research and monitoring, Proposals for institutions, Legislation and policy, Funding, Capacity building, Environmental Information and Awareness, Regional cooperation and Community participation (Annex 1);

The Workshop developed the components of a regional programme to identify and monitor work on marine turtle populations (Annex 2);

While acknowledging the existence of other regional initiatives to foster coordination and enhance cooperation on marine turtle conservation, the Workshop identified the need for more coordination particularly within and among the scientific community and non-governmental organizations working on marine turtle research and conservation within the region and globally;

Accordingly, therefore, the workshop calls for the formation of a network for coordination and information exchange on marine turtle research and conservation. It is further recommended that the Kuwait Turtle Conservation Project serve as focal point for this initiative and that Dareen Almojil and Nancy Papathanasopoulou of the project act as moderators for the initiative.

The Workshop applauded the efforts of those States, organizations, private companies and individuals who have promoted and supported the actions and measures furthering the conservation of marine turtles and their habitats;

The Workshop also acknowledged with appreciation the financial, administrative, and technical support provided by TOTAL Foundation and TOTAL S.A.-Muscat Branch both for sponsoring turtle conservation projects and for the present meeting.

Annex I Elements of Enhancing Regional Cooperation on Marine Turtles.

The following framework of elements have been developed by the participants in the workshop "Marine Turtle Conservation Workshop for the Gulf and Guadeloupe" with the objective of promoting the conservation of marine turtles and their habitats in the aforementioned areas. This framework is offered as a series of possible options, to be employed as appropriate.

A. Research & Monitoring

1. Identify threats and their causes, magnitude and possible solutions;
2. Modernize and standardize techniques for research and monitoring (long-term studies);
3. Implement research and monitoring;
4. Carry out baseline studies on nesting and foraging sites;
5. Develop and implement a coordinated regional tagging programme;
a) Carry out research on turtle migrations;
b) Carry out DNA sampling and stock assessment;
6. Revive / utilize traditional knowledge;
7. Facilitate information exchange among individuals and nations;

B. Institutional Arrangements

1. Identify / confirm a focal point agency within each country;
2. Identify individuals to be responsible for follow-up and reporting;
3. Participants of this workshop to act as interim focal points and national promoters of the Action Plan;
4. Form a National committee, where necessary, encompassing Government agencies, NGOs, Universities, private sector etc., to facilitate activities and avoid duplication of effort;

C. Legislation and Policy

1. Enact / strengthen and enforce legislation pertinent to marine turtles and their habitats;
2. Ensure that measures proposed are consistent with national and international obligations;
3. Produce case examples of legislation / technical guidelines to assist countries to develop their own legislation;
4. Establish protected areas associated with marine turtles;
5. Integrate marine turtle issues into Coastal Zone Management Plans;
6. Develop / update existing National Action Plans;
7. Develop rescue and rehabilitation guidelines and procedures;

D. Funding

1. Develop fundraising taskforce;
2. Allocate available funding to priority actions;

E. Capacity Building

1. Assess capacity building needs;
2. Improve individual and institutional capacity for research, monitoring and conservation, including staff training;
3. Preferentially use regional expertise (institutions, individuals, etc.);
4. Make list of recommended literature, including that from regional sources, and distribute among country focal points;
5. Develop exchange programmes;
6. Compile an inventory of regional experts in sea turtle research and conservation;

F. Environmental Information and Awareness

1. Improve public awareness of sea turtles and their habitats;
2. Improve awareness among the sectors responsible for causing and / or mitigating threats;
3. Educate fishermen on turtles, their habitats and needs;
4. Incorporate marine turtles and other conservation issues into school curricula;

5. Demonstrate values / benefits of marine turtles;
6. Encourage use of traditional knowledge and technologies in developing awareness;
7. Involve the media and press in education / awareness campaigns;

G. Regional Cooperation (KTCP initiative)

a) Link the Gulf and Guadeloupe with other sub-regions and global initiatives;
b) Improve communication and share knowledge;
c) Produce regular newsletter / publication / website;

H. Community Participation

1. Investigate incentive schemes and alternative livelihood for fishermen;
2. Develop environmentally-friendly ecotourism activities where appropriate;
3. Recognize traditional values and incorporate traditional knowledge in conservation programmes;
4. Involve schools and coastal communities in turtle conservation activities

Annex II: Components of a Regional Programme to Identify and Monitor Marine Turtle Populations and their Migrations

Objective: To provide a scientific / biological basis for regional cooperation and collaboration

1. Identify funding sources;
2. Procure funding for turtle studies;
3. Identify rookeries and foraging sites;
4. Select lesser-studied areas for initial surveys;
5. Prioritize where research and monitoring is realistic and appropriate at the regional and national levels;
6. Establish national databases to be communicated to KTCP focal point;
7. Promote exchange of information regarding data collection, sampling and tagging programmes within the region;
8. Ensure national involvement in project design, fieldwork, data collection, analysis and publication;
9. Establish an appropriate system to reward tag returns (letters, certificates, etc.);
10. Promote awareness of tagging programmes among individuals likely to encounter tagged turtles;
11. Assess approximate population sizes in feeding and nesting sites in order to decide how many tags to distribute;
12. Coordinate tag series use;
13. Conduct workshops to train fieldworkers with best known practices including the design of studies that will determine tag loss, collection of tissue samples, and database management;
14. Obtain appropriate CITES permits for tissue import and export for genetic analysis;
15. Supply equipment (e.g. tags, applicators, etc.);
16. Commit staff and resources (e.g. vehicles, boats, tags, applicators, salaries, etc.) to turtle monitoring and research;
17. Involve volunteers and local communities in data gathering;
18. Carry out fieldwork
19. Identify species,
20. Tag turtles on nesting and feeding grounds,
21. Sample tissues on nesting and feeding grounds,
22. Measure turtles on nesting and feeding grounds,
23. Analyze data;
24. Report regularly to the coordinating bodies on activities and general findings;
25. Publish / disseminate results promptly.

IUCN-SSC Marine Turtle Specialist Group Quarterly Update

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

[1]*IUCN/SSC Marine Turtle Specialist Group, Conservation International, Center for Applied Biodiversity Science, 2011 Crystal Drive, Suite 500, Arlington, VA 22202 USA (E-mail: bhutchinson@conservation.org, r.mast@conservation.org);*
[2]*Marine Research Foundation, 136 Lorong Pokok Seraya 2, Taman Khidmat, 88450 Kota Kinabalu, Sabah, Malaysia (E-mail: npilcher@mrf-asia.org)*

2009 Annual General Meeting

The MTSG Annual General Meeting was held on the mornings of February 15 and 16, 2009 at the start of the 29th Annual Sea Turtle Symposium in Brisbane, Australia. The session on February 15 consisted of regional and thematic updates by the MTSG co-chairs and regional vice chairs, while the session on February 16 featured one additional regional presentation as well as thematic discussions led by Milani Chaloupka, Bryan Wallace, Yamin Wang and Nicolas Pilcher.

Presentations were given on February 15 by Roderic Mast and Nicolas Pilcher (Global), Paolo Casale (Mediterranean), Milani Chaloupka (Pacific Islands), Mark Hamann (Australasia), Ronel Nel (East Africa), Bryan Wallace (East Pacific), and Manjula Tiwari (West Africa / East Atlantic). On February 16, Neca Marcovaldi and Milagros Lopez provided one additional regional update (Southwest Atlantic), followed by an update and discussion on Red Listing led by Milani Chaloupka, a presentation and discussion of the MTSG Burning Issues process and recent progress led by Bryan Wallace, an overview of recent events and discussion regarding transborder direct take of sea turtles throughout South East Asia led by Yamin Wang and Nicolas Pilcher, and an update on the Dhamra Port project and discussion led by Nicolas Pilcher.

Full meeting minutes and copies of all presentations are in preparation and will be posted to the MTSG website (www.iucn-mtsg.org) in early May. MTSG members will be notified as these materials are available via the MTSG email listserv.

Dhamra Port Stakeholders Workshop

A workshop was held in Bhubaneshwar, India from 24-25 February. Hosted by the IUCN Asia Regional Office, the workshop brought together a mix of more than 60 representatives from government, the private sector, local and international scientists, technical experts, academics and local community representatives. Following the meetings, a field trip to view the Dhamra Port construction site was undertaken. Among those present were MTSG Co-Chair, Rod Mast, and members C.S. Kar, B.C. Choudhury, and Erik Martin.

Participants discussed and debated scientific information and development agendas with the aim to ensure long-term security for olive ridley turtles and the ecosystems on which they depend. As has been presented in prior issues of MTN, several major recommendations of IUCN are currently being implemented by the Dhamra Port Company, including use of turtle protective deflectors on dredgers and lighting techniques to reduce light pollution. The most serious threat to turtle populations was identified as trawler fishing, which can be dramatically reduced by use of Turtle Excluder Devices, but much more work is needed to introduce the practice in the area. Further research was recommended to better understand olive ridley nesting and migration patterns, and these and other recommendations from the workshop will be integrated into a comprehensive Environmental Management Plan for the port.

Additional materials from the workshop will be posted to the MTSG website (www.iucn-mtsg.org) in early May, including a full list of meeting participants and a document entitled Compilation of Research Information on Biological and Behavioural Aspects of Olive Ridley Turtles along the Orissa Coast of India – A Bibliographical Review for Identifying Gap Areas of Research.

Workshop on addressing Direct Trade and Poaching of Turtles Southeast Asia

At the MTSG AGM in Brisbane and also in Loreto, Nick Pilcher raised concern over the many apprehensions recorded in SE Asia of fishing boats originating primarily from Hainan, China, and also to a lesser degree from Vietnam, which leave port with the explicit intention of poaching turtles in SE Asian countries, principally Malaysia, Indonesia and the Philippines. In 2002 a Chinese vessel was found with more than 100 sea turtles within the Philippines Turtle Islands Wildlife Sanctuary. In 2003, Bali police arrested five suspected turtle poachers and rescued 120 green turtles in a boat raid. In 2004, Malaysian authorities apprehended twelve Chinese nationals in Malaysian waters with 160 dead turtles. In 2005, researchers discovered a hidden turtle net with almost 150 turtles entangled and drowned. In 2006, marine police in Bali again seized a boat loaded with 158 green turtles after being alerted by local fishermen. In 2007 Malaysian authorities seized a Chinese trawler in waters off the Sabah with more than 200 protected green and hawksbill turtles, of which only 20 were still alive. Also in 2007 newspapers reported shocking news of 397 dead turtles discovered by Indonesian authorities aboard a Chinese vessel in Derawan. Disturbingly, authorities believe that the boat crew purchased the turtles from local fishermen, suggesting the trade has diversified. The trade continues.

To start to address this major issue, in conjunction with MTSG members in the region (Nick Pilcher, Chan Eng Heng and Kevin Hiew in Malaysia, Yamin Wang in China and Romy Trono in the Philippines), the MTSG will co-host a workshop to be held in Malaysia from June 1-3, 2009 to address the poaching problem and investigate solutions. The workshop will have the following objectives:

1. 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.
2. To document the cases of apprehensions of vessels and fishermen mentioned above in their home countries, i.e. Hainan, China and Vietnam.
3. To present information on the declining trend of marine turtles in the region and the efforts undertaken to arrest the decline.
4. To present biological information on marine turtles to demonstrate that direct capture of adult and subadult marine turtles will very rapidly cause a collapse of turtle populations in the South East Asian Region.
5. To present information on how and where the turtles and their products are being processed and marketed.
6. To present information on the community/ies whose livelihoods are dependent on the direct capture of marine turtles, the processing of the products and the sale and export of such products and how alternative livelihoods can be introduced to such communities.

The workshop will also have brainstorming sessions to seek solutions to the direct capture of sea turtles. It is expected that a follow-up meeting will be held in Hainan later in the year.

MTSG Member Reappointment

Every four years, following the IUCN World Conservation Congress, the entire IUCN Species Survival Commission (SSC) is dissolved and subsequently re-appointed on an as needed basis at the discretion of the SSC Chair. During this time, some Specialist Groups and Task Forces are disbanded or combined, while others are maintained. We are pleased to say that the current SSC Chair, Simon Stuart, has invited Roderic Mast and Nicolas Pilcher to re-constitute and continue to lead the Marine Turtle Specialist Group as Co-Chairs.

Following their reappointment, Rod and Nick invited Milani Chaloupka to continue in the role of Marine Turtle Red List Authority Focal Point, and he has agreed to do so; he will oversee the MTSG Assessment Steering Committee. Brian Hutchinson will also continue to serve as the group's Program Officer.

Rod, Nick and Brian are in the process of appointing (in many cases reappointing) the MTSG Regional Vice Chairs, and with their support will be carefully reviewing the MTSG member list over the coming month. We anticipate that the membership review will be completed by the end of May, and that invitations to individual MTSG members will be sent out (via email) at that time. Current members should please stay tuned to the MTSG email list for further instructions, and be on the lookout for an email from the co-chairs in May or early June. Prospective new members may contact Brian Hutchinson (contact information above) for information regarding the member appointment process.

BOOK REVIEWS

Title: Biology and Conservation of Ridley Sea Turtles
Year: 2007
Editor: Pamela T. Plotkin
Publisher: The John Hopkins University Press
ISBN: 9780801886119
Pages: 356pp (hardback)
Price: $60 USD
To order: http://www.press.jhu.edu/

There is always a sense of relief when a one-stop, up-to-date reference summarizing research, conservation, ideas, gaps, questions, concerns, and/or opinions by the experts about a specialized topic (e.g. Lutz & Musick 1997; Lutz et al. 2003), a geographic area (e.g. Fretey 2001), a species (e.g. Bolten & Witherington 2003), or a debatable issue (e.g. Bowen & Karl 1999, Karl & Bowen 1999, Pritchard 1999) appears on the book shelf. Joining this valuable series of encyclopedic references from sea turtle experts is the recent Biology and Conservation of Ridley Sea Turtles edited by Pamela Plotkin and published by the John Hopkins University Press. This book is a compilation of 15 chapters by an impressive list of 32 contributors, interspersed with striking black and white photographs of ridleys, and book ended by the editor with an introduction that establishes the fascination with and the enigma of the ridleys (a theme that resonates in several chapters that follow) and an epilogue that summarizes the challenges and realities facing the two ridley species today and the questions that remain unanswered. The chapters cover a wide range of topics from skeletochronology to revolutionary experiments in head starting. The majority of the chapters address both species, but one chapter is dedicated solely to the olive ridley and 4 chapters to the Kemp's ridley.

The book opens with a delightful and thought-provoking chapter by Peter Pritchard –delightful in its Pritchardian humor and nostalgia of bygone pioneering, adventurous days of sea turtle research, and thought provoking in its discussion of the elusiveness of the shifting baseline concept for ridley populations and the significance, history and challenges of arribada management. This is followed by the only chapter dedicated to olive ridleys, where Campbell (Chapter 2) provides some incredibly detailed and fascinatingly complex case studies of socioeconomic use of olive ridleys in 5 Latin American countries. Pritchard has another contribution on the evolution, osteology, morphology and zoogeography of ridleys (Chapter 3)—without supporting figures, the osteology and morphology section is for the advanced reader familiar with the terminology and for the curious who are willing to tackle the text with a supporting guide. Chapter 4 by Bernado and Plotkin is a good follow-up to Pritchard's zoogeography section. In addition to summarizing the distribution of ridleys in tables and maps, the chapter provides insights into the formation of arribadas and the fascinating solitary vs. arribada reproductive behavior of ridleys; it accomplishes what it sets out to do and that is to provide questions for future research. Holder and Holder (Chapter 6) delve into the phylogeography, genetics, and mating systems of ridleys, and are followed by an in-depth chapter by Valverde et al. (Chapter 7) on some key respiratory and physiology work done with captive Kemp's ridleys, their role in TED experiments, and on ridley endocrinology. Continuing the physiology theme is Chapter 8 by Rostal on reproductive physiology highlighting some fascinating research with Kemp's ridleys in captivity. Wibbels (Chapter 9) then launches into what is known about TSD and sex ratios in both ridleys and ends with a critical management question "what sex ratios are optimal for the recovery of an endangered sea turtle?" This theme is picked up by Coyne and Landry (Chapter 10) with Kemp's ridley population models. Morreale et al. (Chapter 11) compare the migrations of olive ridleys and Kemp's ridleys, and the series of chapters that address both ridley species concludes with two comprehensive and fascinating chapters on human and turtle interactions on land (Chapter 12: Cornelius et al.) and at sea (Chapter 13: Frazier et al.).

Four of the 15 chapters are dedicated to Kemp's ridleys and some of the key research and management questions that have been directed to this species. Coyne and Landry (Chapter 10) have been mentioned above, but among the other 3 chapters, Snover et al. (Chapter 5) provide a complete discussion on age and growth in Kemp's ridleys through mark-recapture studies and skeletochronology highlighting the role of conservation efforts namely head starting in estimating age and growth. The head starting theme is picked up by Shaver and Wibbels (Chapter 14)—they provide a comprehensive overview of the history, the outcomes, and the controversy surrounding the revolutionary head starting experiment with Kemp's ridleys. The recovery of Kemp's ridleys is revisited in the final chapter by Heppell et al. (Chapter 15)—Heppell and colleagues describe the multi-faceted recovery efforts of the USA and Mexico to save the Kemp's ridley and they conclude the chapter series on an optimistic note with the encouraging trend observed in Kemp's ridleys, a species that a few decades ago was considered to be on the brink of extinction.

A small intriguing detail that is missing from the book is the background/speculation on the etymology of the name 'ridley' -- this common name is strikingly different and more obscure than names given to all the other sea turtles. However, this personal reflection in no way diminishes this book's extraordinary contribution to sea turtle literature. The value of this book lies in the fact that "…much of what we know about ridleys is summarized in the chapters herein…," as stated by the editor, and I echo her hopes that this book will stimulate some much needed research on ridleys.

BOWEN, B.W. & S.A. KARL. 1999. In war, truth is the first casualty. Conservation Biology 13: 1013-1016

FRETEY, J. 2001. Biogeography and Conservation of Marine Turtles of the Atlantic Coast of Africa. CMS Technical Series No. 6. UNEP/CMS Secretariat, Bonn, Germany. 429pp.

KARL, S.A. & B.W. BOWEN. 1999. Evolutionary significant units versus geopolitical taxonomy: molecular systematics of an endangered sea turtle (genus Chelonia). Conservation Biology 13: 990-999.

LUTZ, P.L. & J.A. MUSICK. 1997. The Biology of Sea Turtles. CRC Press, Boca Raton, Florida. 432pp.

LUTZ, P.L., J.A. MUSICK & J. WYNEKEN. 2003. The Biology of Sea Turtles. Vol. II. CRC Press, Boca Raton, FL. 455p.

PRITCHARD, P.C.H. 1999. Status of the black turtle. Biological Conservation 13:1000-1003

Reviewed by: **Manjula Tiwari**, NOAA-National Marine Fisheries Service, 8604 La Jolla Shores Drive, La Jolla, CA 92037 (E-mail: manjula.tiwari@noaa.gov)

Title: Caretta The Top Turtle
Year: 2008
Publisher: Top Turtle Press
ISBN: 0977469808
Pages: 46pp (hardback)
Price: $18 USD
To order: http://www.ggtoptrtle.com/

Gloria Glenn's book, Caretta the Top Turtle, is a solid introduction to the biology of loggerhead turtles for young people. Glenn, who is also publisher of the title through Top Turtle Press, has managed the tricky task of translating her love for sea turtles into an accurate and engaging non-fiction book.

The book follows the development of Caretta, the loggerhead, from inside the egg until she lays her first clutch. It is anthropomorphic, but not unreasonably so. The book details each stage of the turtle's life, answering a lot of popular kid questions along the way, such as why do turtles cry on shore, and how do hatchlings know how to find the sea?

Glenn's background as an educator no doubt contributes to her fine ability to target kids' interests and to keep her language level and explanations appropriate to her reader. Caretta the Top Turtle will appeal to children in the eight-to-twelve-year-old age group.

In an attempt to show all facets of the loggerhead world, however, Glenn does lead Caretta into every sort of threatening situation, with other loggerheads around her dying in droves due to predation and human interaction. It is the one place where the scientific information presented in this narrative feels awkward.

The book's main challenge, however, may fall in its layout. Children from countries in which bookstores are well stocked with full-color, fast-paced, non-fiction titles will not likely take immediately to Glenn's text-heavy book with its soft, black-and-white drawings. Teachers and sea turtle educators would do well to hard sell the title or to use it as a read aloud to catch children's interest so they don't miss this story.

Reviewed by: **Kathleen Martin**, Canadian Sea Turtle Network, Halifax, Nova Scotia, Canada (E-mail: kmartin@seaturtle.ca)

ANNOUNCEMENT

30th Annual Symposium on Sea Turtle Biology and Conservation Goa, India 27th – 29th April, 2010

Kartik Shanker
Centre for Ecological Sciences, Indian Institute of Science, Bangalore 560012. India (E-mail: kshanker@ces.iisc.ernet.in)

The Annual Symposium on Sea Turtle Biology & Conservation will be coming to south Asia for the first time in the 30 years that it has been held. Different countries, cultures, coasts comprise this region but sea turtles respect few of these boundaries. Olive ridley turtles nesting in Orissa feed in the Gulf of Mannar shared by India and Sri Lanka. Green turtles share nesting beaches on the west coast in India and Pakistan. Turtles feed and nest together in the sunderbans shared by India and Bangladesh.

In keeping with their philosophy, the 30th symposium seeks to break down barriers and boundaries between people, their countries and cultures in order to achieve marine conservation through its most global flagship, the sea turtle. The symposium will bring together people in the region to host the wider global movement under the umbrella of sea turtle conservation.

When and where?
Symposium dates: 27th – 29th April, 2010

Venue: Panaji, Goa, India
Goa, India's emerald of the west, is situated on the western coast of India. It is a melting pot of cultures from around the world. It is this atmosphere that makes it the ideal location to host the Sea Turtle Symposium, bringing together a diversity of people, cultures and ideas.

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 thirtieth annual symposium on sea turtle biology and conservation will seek to explore these connections. To blur the turtle for a moment and focus on the world they live in. The world of coral reefs, seagrass meadows, open seas and sandy beaches. The world of fishing cultures and livelihoods. All connected by sea turtles and by us.

Travel to India
International flights ply to all major Indian cities on a regular basis. Goa has an international airport located 30km from Panaji, the capital of Goa and the location of the symposium. Travelling within India is easy on the pocket. Low budget airlines and an extensive road and rail network connect all corners of the country. We recommend applying for visas to India well in advance. A dedicated team will help with details of the procedure to apply for visas and documents needed. This information will be up on our website soon.

Online information
Information about the 2010 symposium including registration,

submission of abstracts, travel grant applications, etc will be available online at iconferences.seaturtle.org. For more information about the South Asia symposium, log on to india.seaturtle.org.

Contacts

ISTS President: Kartik Shanker (E-mail: kshanker@ces.iisc.ernet.in)

Program Co-Chairs: B.C. Choudhury & Jack Frazier

Programme Coordinators: Dubose Griffin and Naveen Namboothri (E-mails: griffind@dnr.sc.gov; naveen.namboo@gmail.com)

Regional Coordinators: Ahmed Khan (E-mail: akhan@wwf.org.pk); Zahirul Islam (E-mail: marinelife_al@yahoo.com); Thushan Kapurusinghe and Lalith Ekanayake (E-mails: turtle@sltnet.lk; lalitheml@yahoo.com)

Symposium Coordinator: Seema Shenoy (E-mail: seemashenoy83@gmail.com)

Volunteer coordinator: Supraja Dharini (E-mail: treefoundation2002@gmail.com)

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

Sea Turtles Washed Ashore Dead

Hundreds of dead turtles are being washed ashore from Cox's Bazar to St Martin's island with bruises all over their bodies. Over 400 female dead turtles have floated ashore over the last two weeks alone, locals claim. Experts say that these turtles meet their death as they travel the stretch of nearly 120 kilometres from Sonadia Island in Cox's Bazar to St Martin's island to lay eggs on the shore. The turtles get entangled in the fine fishing nets used indiscriminately by fishing trawlers. The fishermen, instead of releasing them back to the sea, beat them to death with sticks and dump their bodies in the sea, experts allege. Their bodies are then washed ashore by the tide. Some fishermen from Sonadia, preferring anonymity, has confirmed this saying it's a hazardous task to release the turtles back into the waters. Dead turtles are also being washed up to the shore at Sonadia, St Martins, Teknaf and Shah Parir Dwip coasts. Two government and non-government organisations, working with sea turtles, have recovered 62 carcasses from Cox's bazaar area over the past week. They have expressed concern about the situation and also the environmental pollution caused by such large number of carcasses. At present dogs and jackals are feasting on the dead bodies. Some locals have been burying the carcasses because of the foul odour. Biologist Zahirul Islam said each year at least 1,000 sea turtles get killed when they come to Cox's Bazar beach to lay eggs. The turtles get entangled in trawlers in deep sea who use "current" or "Bihingi" nets to catch shrimps. Most turtles found in this area are olive ridleys. Each turtle weighs between 10 - 20 kg, are 63 - 70 cm in length and 60 - 67 cm in breadth. The experts warn of an impending environmental disaster that could be caused by the large-scale deaths of turtles and subsequent imbalance in the local ecology. Source: *Daily Star (Dhaka)*, 10 February 2009.

Artificial Limbs for Amputee Sea Turtle

A nonprofit group is leading attempts to develop artificial limbs for a loggerhead sea turtle. The 68-kg turtle, named Yu-chan, is believed to be female and around 20 years old. When it was found trapped last June in a fishing net in the Kii Channel between Honshu and Shikoku, it was missing half of its left forelimb and one-third of its right forelimb, with shark teeth marks all over its body. Yu-chan was taken to the Hiwasa Chelonian Museum in Minami, Tokushima Prefecture, where it has been looked after. Because the turtle can only swim at about 60 percent of its original ability, the Sea Turtle Association of Japan came up with the idea of giving it artificial limbs to help it survive once it is released back into the wild. The group knows it will be a challenge: there is no known successful case of artificial limbs being attached to sea turtles, which have fragile bones and use their limbs differently in water and on land. According to the plan, the turtle will be moved in May from the town of Minami to a man-made saltwater pond on reclaimed land in Kobe. In the meantime, Kawamura Gishi Co., a prosthetics maker based in Daito, Osaka Prefecture, will start making artificial fins with advice from veterinarians, taking advantage of its experience making artificial legs for dogs. Source: *Japan Times*, 16 February 2009.

More Leatherback Turtle Landings

There has been an increase in leatherback turtle landings in Terengganu, especially at Rantau Abang in Dungun, with nine landings detected on its shores last year. From the landings, 511 eggs were produced, of which 419 were incubated at the Turtle Information Centre in Rantau Abang. Terengganu Turtle Sanctuary chairperson Datuk Mokhtar Nong said however, that the incubated eggs did not result in baby turtles. "The eggs did not hatch, as it was believed to have been created by the female turtle without the male," he said. Mokhtar, who is also state secretary, said that two years ago, no leatherback turtles could be found nesting or landing in the area. Besides leatherback turtles, he said there were 2,023 other turtle landings, of which there were hawksbill turtles (four) and painted terrapins (245). Source: *Nut Graph News*, 11 February 2009.

OCEANIA

Good Year for Turtles

It was a record year for successful turtle nests in 2008. The turtles,

both hawksbills and greens, arrived early and stayed late. So late, that in November, personnel of the Department of Land and Natural Resources had to dig up a green sea turtle's nest at Spreckelsville to save the hatchlings from high surf. If he hadn't moved the eggs in a bucket, they most likely would have been swept away. Altogether, Maui's turtle watchers and helpers rescued 140 hawksbill and 122 green turtle babies who would most likely not have made it on their own. The hawksbill nest monitoring group Dawn Patrol thanked the more than 160 volunteers who scouted for nests and marked their locations. Since the turtles are listed as threatened or endangered species, it requires a permit to excavate their nests. At Big Beach, the Dawn Patrol watched nests virtually around the clock, scaring away predators like mongoose and ghost crabs, and helping little turtles through vegetation and, in one instance, out of a deep human footprint. In 2008, there were 917 hawksbill hatchlings produced, out of 1,322 eggs; and 539 green sea turtle hatchlings, out of 866 eggs. The bigger greens put fewer eggs into each nest, from 69 to 114 this year; while hawksbill nests contained as many as 202 eggs. Maui Girl - officially green sea turtle 5690 - became the first green known to have nested in West Maui in half a century and now returns every other year. Orion, a hawksbill, laid five nests in 2001, the same in 2004, and at least four this year. Orion wears a data logger on the top of her shell, put on after her third nesting in 2008. She prefers Oneloa (Big Beach). The radio monitor on Orion showed some interesting turtle behavior. For one thing, she repeatedly dived down about 30 feet at the same spot, apparently to rest. Where that spot was, the radio did not reveal, but between Aug. 11 and Aug. 23, Orion made 469 dives, about half to what appears to have been a nap spot. She usually stayed down about 90 minutes. Source: *Maui News*, 9 February 2009.

Dead Turtle Arouses Residents' Emotions

Foul smells emitted from a dead hawksbill turtle within the police barracks compound at Namara in Labasa aroused the sympathy and rage of nearby residents. The hawksbill was supposed to have been one of the dishes at the function after the Commissioner's Cup challenge on Friday night. But according to police sources, it was crossed off the menu because of fears its meat was poisonous. "And it was to have been returned to the sea but was not returned on time because it died," the source said. The carcass was yesterday covered with flies and maggots and had an unbearable stench. World Wide Fund for Nature official Penina Solomona said the death of the turtle was an unnecessary waste. "If they were sure they were not going to use it than they should not have harvested it or really they should have returned it to the sea," she said. "That looks like an adult turtle capable of laying eggs and by the time the Fisheries Act kicks in from November to February during their nesting period when they are protected, their numbers will decrease," she said. "They are classified as critically endangered therefore their protection is still key to ensure their continued existence." The four-year moratorium safeguarding turtle species like the hawksbill ended in December 2008. Ms Solomona said this exposed turtles to over fishing and people needed to display more care. Source: *Fiji Times*, 8 April 2009.

AMERICAS

Statistics Paint Grim Picture For Sea Turtles

A young loggerhead sea turtle at Mote Marine's animal hospital in Sarasota, is recovering from two severe boat propeller gashes that stranded him in Fort Pierce six months ago. The turtle is one of 683 loggerheads that washed up injured or dead on Florida beaches last year. As a survivor of his injuries he is a rare statistic, but part of a dismal and baffling decade-long trend prompting concern about the species' future. About 80 percent of stranded sea turtles are found dead, victims of disease, boat injuries and entanglements in garbage and fishing line, said Allen Foley, a wildlife biologist and sea turtle expert with the Florida Fish and Wildlife Conservation Commission. He said years of increased loggerhead strandings - spiking in the bad red tide year of 2006, when more than 1,200 loggerheads washed ashore - coincide with a 41 percent decline in loggerhead nests on state beaches. The combination of increased strandings and decreased nests could jeopardize the animals' long-term survival. Loggerhead nest counts of about 45,000 in 2007 were the lowest since counting began 20 years ago. Last year was not much better, continuing a 12- to 13-year decline. Among the top suspected causes of mortality is the national fishing industry, which is allowed under the Endangered Species Act to kill about 4,700 loggerheads a year, according to the environmental group Oceana. Past fishing activity also has led to the decrease in nesting, said Marydele Donnelly, director of International Policy for the Caribbean Conservation Corporation. Shrimp trawling killed thousands of loggerheads each year in the 1980s before regulators required the trawls to have a turtle escape hatch. Shrimp, scallop, swordfish, flounder and tuna fishing also take a toll on loggerheads and other sea turtles, Donnelly said. Oil rig spills make them sick. Plastic fishing line cuts their flippers. Boat propellers slice their bodies. They mistake garbage, especially plastic bags, for food. Heavy metals in their food sources and new diseases also cause illnesses in the aquatic reptiles. Shoreline losses also affect the population: seawalls, jetties and developed coastlines hinder nesting. "It's hard to say that one person or that one fishery will mean that turtles won't survive, but when you add them all together, then it's a lot worse," Foley said. Source: *Sarasota Herald-Tribune*, 12 February 2009.

Woman Indicted for Turning Sea Turtle Into Guitar Picks

A Santa Rosa, CA woman has been indicted in federal court in San Francisco for allegedly taking part in the illegal trade of endangered sea turtle parts from China into the United States, authorities said today. A spokesman for the U.S. Attorney's Office said the 54-year-old woman was indicted Thursday for her alleged role in importing and selling guitar picks made from the shells of the endangered hawksbill sea turtle. Hawksbill sea turtles are one of seven sea turtle species listed as endangered under either U.S. law or international treaties, according to the U.S. Attorney's Office. The alleged activities took place from 2005 to 2007, and included the possession and sale both of imported picks made from the shells and of imported shells that were later fashioned into picks, prosecutors said. The woman has been charged with one felony count and one misdemeanor count of violating the Lacey Act, which prohibits illegal trade in wildlife, and one misdemeanor count of violating the Endangered Species Act, according to the U.S. Attorney's Office. She faces a maximum penalty of five years in federal prison and a $200,000 fine for the felony, and one year in prison and a $100,000 fine for each of the two misdemeanors, the U.S. Attorney's Office said. Source: *San Jose Mercury News*, 27 March 2009.

New Fishing Rule to Save Sea Turtles

In Florida, regulators voted this week to take steps to shut down a common type of fishing that uses long lines affixed with hooks and squid bait because it may be killing hundreds of threatened sea turtles yearly. The Gulf of Mexico Fishery Management Council voted 10-7 during a meeting Thursday in Bay St. Louis, Miss., to close fishing with long-line gear in shallow waters off the coast of Florida for six months. The shutdown may start by June 2009. The National Marine Fisheries Service must approve the shutdown, but it is likely to do so because of mounting evidence that long-line fishing is killing sea turtles such as the loggerhead, protected by the Endangered Species Act. About 100 boats in the Gulf would be affected by the shutdown, and most of those dock in the Tampa Bay area. Besides red grouper, fishermen also would be barred from catching gag and other reef fish with long lines. The harvests are worth more than $30 million a year, according to industry estimates. During the shutdown, officials, fishermen and conservationists plan to draw up a long-term conservation plan, which could involve measures such as reducing the number of boats, banning squid bait and permanently ending long-line fishing. The move comes after studies showed that as many as 1,000 sea turtles are being snagged every 18 months in long-line gear, a practice in which fishermen bait fishing lines before they lay them on the ocean bottom. Of the 1,000 sea turtles caught, scientists estimate that about 800 of them were loggerheads, a species that is listed as threatened. Conservationists say the fishing technique is harmful to sea turtles that forage in the same reefs red groupers use off the west coast of Florida. But fishermen dispute that they are catching so many sea turtles on their lines. Glen Brooks, the president of the Gulf Fishermen's Association, said the 18-month study of long-line fishing in 2006 and 2007 used scientific models that do not depict reality. Allison said a shutdown was still not enough to ensure sea turtles do not become extinct. "What we need to do is [pass] a Sea Turtle Protection Act to give sea turtles the same kind of protection that mammals get," Allison said. "There are a lot of other issues, as the fishermen point out. There are problems with nesting beaches, with lights on the beaches, with the armoring of the coast." Source: *Orlando Sentinel*, 31 January 2009.

One Flipper Turtle Swims Again

Allison was rescued from the South Padre Island surf in the summer of 2005. Bloodied by a likely shark attack, Allison's bones protruded from her body in three places. With a single flipper left to her name, the turtle would not survive in the ocean. She was set to be euthanized. But an intern at Sea Turtle Inc asked that the animal be given a little more time. Allison's wounds healed. Soon she could swim in tight circles in her tank. When she needed to breathe, she pushed her head against the bottom of the tank to propel herself to the surface. In February of last year, a dentist and two veterinarians attempted without success to fashion a prosthetic flipper for Allison. When a turtle was fitted surgically with a prosthetic in the past the creature quickly developed osteoporosis. With a single flipper, Allison's expected life span of 100 years would be long and lonesome. She would likely grow to more than 500 pounds and 5 ½ feet in length and Sea Turtle Inc. employees worried her single flipper would no longer be enough to propel her around a small tank. Tom Wilson, a 21-year-old intern, wondered if the same principles that make a canoe move straight could help a wounded sea turtle. Wilson then designed a sleek black suit with a fin on the back. Now, when Allison thrusts her front flipper, a carbon-fiber fin acts as a rudder and propels her straight forward. The center will continue to fashion new jackets for her as she continues to grow. "She can't be released - she wouldn't survive," a spokesman for the center said. "Her future is to educate people about the endangerment of sea turtles." Source: *Brownsville Herald*, 8 April 2009.

Mexico Ecological Park to Set Record for Turtle Hatchings

Xcaret, Mexico's biggest private ecological park, will set a record this year by releasing 2,000 baby turtles that hatched in the park as part of a successful program of breeding program. Located south of Cancun on the Mexican Caribbean, Xcaret began in 1993 its so-called Initiation Program, which consists of maintaining for 15 months two nesting sites for turtles in captivity, who are then released into the sea after receiving special care and feeding by a team of veterinarians. Xcaret Park regularly sets free turtles that are 30 centimeters (1 foot) long and therefore have a greater chance of surviving the predators lying in wait for them. The turtles are released with tourists looking on. "One of the program's main goals is to raise people's awareness about the plight of marine turtles in Mexico," said Ana Cecilia Negrete, coordinator of operations and preventive medicine for marine turtles in Xcaret. The principal dangers to Mexico's turtles include the invasion of beaches by people, sport fishing, the depredation of their nests by some communities that still eat their flesh and eggs, and injuries to some of them by outboard motors on boats. Xcarethas also undertaken since 2003 the treatment and cure of those found injured or stranded. Veterinarians at the park have achieved a recovery rate of 98.4 percent for the turtles they receive. In addition, Xcaret protects Xcacel Beach to the south of the Maya Riviera, the main nesting ground for the country's green sea turtles.At that location, from May to October up to 6,000 turtle nests can be found, of which Xcaret takes two for its installations. Source: *Latin American Herald Tribune*, 4 April 2009.

AFRICA

Authorities Protect Turtles in Lobito

In Angola, the Municipal Administration of Lobito and the Marine Research Regional Institute intend to create soon in the Egipto Praia commune a "Reserve Zone" for the reproduction of turtles. The information was given Monday by the Lobito administrator, Amaro Segunda Ricardo. According to the district administrator, this Reserve Zone creation project aims at protecting this species that is in extinction. Government authorities are doing the work of mobilizing financial and human resources to support the project, which will bring about gains for tourism and the environment. Data from the Marine Research Regional Institute reveal that the seafront in Egipto Praia commune is a region in which turtles lay eggs, but because many people collect them on a daily basis, the species cannot reproduce. Source: *Agência Angola Press*, 10 February 2009.

Kenya wildlife perishes in nets bought with US aid

Plastic fishing nets - some bought for poor fishermen with American aid money - are tangling whales and turtles off of Diani beach, one of Africa's most popular beaches with American and European

tourists. The fishermen traditionally used hooks and hand lines to haul in their catch, which they then sold to tourist hotels. The use of plastic nets has become common as growing populations have competed to catch shrinking supplies of fish, marine biologist David Obura said. In 2003, USAID began a four-year project worth US $575,000 to improve the lives of coastal communities. The project provided freezers for the fishermen to store their catch, and boats and nets. But the plastic nets are destroying the very ecosystems that the fishermen depend on and the tourists come to see, said a local diving school owner. Officials, experts and even the fishermen themselves acknowledge the nets are killing wildlife and coral. The aim of the project was to help lift local people out of poverty, said a USAID official involved in the initiative. But there were no studies to show how the kind of equipment supplied might affect the marine life. A USAID spokesman acknowledged that USAID was "partly" responsible but also was dependent on local organizations to provide information. The project did not provide the type of nets or long fishing lines, which catch fish without entangling other marine life that fishermen requested, said a member of the local fishermen's associations. The fishermen, who say their old hook-and-line method never caught turtles or whales, practice conservation where they can. One fisherman said most marine animals are trapped by nets left on the reefs overnight to catch lobsters for the tourists. The fishermen interviewed by The Associated Press agreed that their livelihoods depended on preserving the seas and were interested in trying long lines if they were provided. But USAID's involvement with the fishermen's group had been finished for a year and a half, and there were no plans to replace the nets. In addition to the growing groups of poor fishermen crowding onto the reefs, huge European and Asian trawlers much further offshore are overfishing the deeper coastal waters. One fisherman said the nets provided with USAID funds have increased the fishermen's average daily earnings from $4.50 to $7 — still less than a tourist pays for a fish fillet at an expensive hotel. Khamis knew the nets could be destructive, but had three sets of school fees to pay totaling $460 a year and no other options for work in a country riddled with corruption and poverty. He says he could not afford to sacrifice his children's future for a turtle's. Source: *Associated Press*, 26 March 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

ALFARO SHIGUETO, J., J.C. MANGEL, J.A. SEMINOFF & P.H. DUTTON. 2008. Demography of loggerhead turtles *Caretta caretta* in the southeastern Pacific Ocean: fisheries-based observations and implications for management. Endangered Species Research 5: 129-135. J. Alfaro Shigueto, Pro Delphinus, Octavio Bernal 572-5, Lima 11, Peru. (E-mail: joga201@exeter.ac.uk)

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For an article in an edited volume;

GELDIAY, R., T. KORAY & S. BALIK. 1982. Status of sea turtle populations (*Caretta caretta* and *Chelonia mydas*) in the northern Mediterranean Sea, Turkey. In: K.A. Bjorndal (Ed.). Biology and Conservation of Sea Turtles. Smithsonian Institute Press, Washington D.C. pp. 425-434.

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