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Fibropapillomas in hawksbill turtles (D'Amato & Moraes-Neto pp.12-13).

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Guest Editorial:
Obstacles to Objectivity: First Impressions of a CITES CoP

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This April I attended the 11th meeting of the Conference of the Parties (CoP11) to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in Nairobi. It was my first CITES CoP and I was asked beforehand to write an objective editorial about the progress of the Cuban hawksbill proposals. 'No problem' I convinced myself, despite a personal aversion to the idea of hawksbill turtles being processed to supply the tortoiseshell trade.

My early, middle-England experiences of turtles involved seeing them in 1970's natural history documentaries. Marine turtles were invariably portrayed as beautiful and mysterious creatures that were threatened by over-utilisation. I suppose these first impressions left their mark, but as a Zoology undergraduate I was introduced to the concept of 'sustainable use' and eventually I pursued a career in community-based marine turtle conservation. Several years of working alongside fishermen, turtle harvesters and turtle egg collectors with the Turtle Conservation Project (TCP) in Sri Lanka developed my understanding of a utilisation culture. Over the years, my initial, naive impressions were completely adjusted to accept the significance of utilisation as an important consideration in conservation.

I have also had some personally significant moments with live turtles, including the rare occasions I was able to observe nesting and foraging hawksbills. And despite my thoughts on sustainable use, I have not yet come across a tortoiseshell item that was worth more to me than these experiences. Sri Lanka has a long history of hawksbill harvest for the tortoiseshell trade. Although a reliable national census of nesting and foraging turtles has yet to be carried out, the hawksbill is generally considered to be a rare species in Sri Lanka. Trade in tortoiseshell is illegal and hawksbill turtles are protected, but in the mid-1990's, illegal trade in finished tortoiseshell items was widespread throughout the island's tourist resorts. The TCP campaigned long and hard against this trade via education programmes, media campaigns and intense lobbying of the government. We were delighted when the government finally cracked down on persistently offending traders.

Thus, I was initially concerned when I read Cuba's proposals to reopen international trade in the species. Cuba, co-sponsored by the Commonwealth of Dominica, published finalised proposals 11.40 and 11.41 at the end of November 1999[1,2]. These proposals were comprehensive and well constructed, including detailed justifications as to why the part of the Caribbean hawksbill population that occurs in Cuban waters does not meet the CITES criteria for Appendix I. The proposals suggested that this population be down-listed to CITES Appendix II to facilitate regulated, international trade in tortoiseshell with Japan 'or other Parties with equivalent controls'.

Prop. 11.40 proposed to the selling of a 6.9 tonne registered stockpile of hawksbill scutes that had been accumulated as a by-product of Cuba's legitimate hawksbill fishery (for meat) between 1993 and March 2000. Prior to this period, Cuba harvested approximately 5000 hawksbills annually until they voluntarily reduced the quota in the early 1990's. This document also described future sales of scutes from Cuba's current annual hawksbill harvest of up to 500 hawksbills.

Prop. 11.41 proposed only the sale of the stockpile to Japan, after which the down-listed population would be treated as if it remained on Appendix I. The proposals included scientific justification of the sustainability of the management strategy. They described an elaborate registration system to ensure all exported hawksbill scutes were obtained legally and stated that a percentage of the revenue from this trade would benefit local communities and the conservation of the species in Cuba.

In the weeks and months before the proposals were finalised, both advocates and opposition lobbied intensively and the array of arguments for and against the proposals were expressed and countered by all concerned. The Japanese Government was allegedly using its overseas aid budget to persuade various countries to support its wildlife trade interests at CITES[3]. Cuba promoted its proposals in various Caribbean range states, while inviting CITES Parties and NGO's to inspect their management programme.

In 1999, the World Conservation Union (IUCN) Marine Turtle Specialist Group (MTSG) finally

published the justification for its controversial 1996 'critically endangered' listing of the hawksbill turtle (Meylan & Donnelly, 1999). However, the IUCN/MTSG analysis and position on the Cuban proposals included divergent views. Some members opposed the proposals on a number of levels, from criticisms of Cuba's scientific justifications to concerns over the efficacy of Japan's trade controls. While some members thought that reopening a legal hawksbill trade in Cuba would stimulate illegal stockpiling elsewhere, others supported the view that the proposed harvest may be sustainable and that the sale of the stockpile had no adverse conservation implications. TRAFFIC opposed Prop. 11.40 but supported Prop. 11.41 and suggested that this proposal be amended to a zero harvest quota until trade controls in Japan were proved effective. The WorldWide Fund for Nature (WWF) opposed both proposals due to lack of confidence in Japanese trade controls and uncertainty regarding the status of the Caribbean hawksbill populations.

The International Fund for Animal Welfare (IFAW) collected over 140 signatures from marine turtle scientists around the world in support of a statement of opposition. In the UK, IFAW lead several NGO's in lobbying the government to lead the European Union (EU) in opposing the Cuban proposals. The USA opposed the proposals, highlighting evidence suggesting that up to 58% of hawksbills in Cuban waters did not originate from Cuban rookeries. They reasoned, therefore, that trade in tortoiseshell from this population could jeopardise regional hawksbill conservation efforts[4].

It soon became clear to me that the CoP would not be a forum for objective discussion, debate and compromise regarding the trade in hawksbill turtles. It was obvious that the battle lines had been drawn and professional lobbyists on both sides would be doing their utmost to gain the votes of the delegations.

On arrival at the UNEP conference centre I was absorbed into a melee of government representatives, trade associations, hunters, consultants, whalers, journalists, Secretariat staff and a plethora of NGO's. I was representing the Environmental Investigation Agency (EIA), a UK-based NGO and spent much of the conference as part of a working group to debate measures to crack down on the illegal international trade in tigers and their derivatives. The tiger debate was highly controversial but it was overshadowed by the publicity surrounding the 'big issue' proposals including hawksbill turtles. Arguably, Cuba's proposals generated more tension than other issues and the outcome was uncertain until the final session of the conference.

For two weeks and with little respite, the country delegates were subjected to intense lobbying from all sides, resulting in a huge volume of propaganda literature. Opposing the Cuban proposals was the Species Survival Network (SSN), an alliance of over 50 conservation and animal welfare NGO's including the Humane Society International, the Japanese Wildlife Conservation Society and IFAW. The SSN's turtle lobby, assisted by the Centre for Marine Conservation and representatives of the Caribbean Conservation Corporation, distributed various information pamphlets. These included an open letter to the conference delegates from WIDECAST expressing the opposition of marine turtle conservation organisations from over 20 Caribbean nations. When the Commonwealth of the Bahamas issued and distributed a statement justifying their opposition to Cuba's proposals, the Cuban delegation issued a specific response and distributed leaflets produced by the Cuban Ministry of Fishing Industries to scientifically justify their management strategy.

There were a number of NGO's and individuals advocating 'sustainable use' and lobbying support for Cuba's proposals. Professor Nicholas Mrosovsky lobbied in their favour and distributed copies of his latest book in which he criticises the IUCN justification for listing the hawksbill as a critically endangered species (Mrosovsky 2000). He argues that Cuba has developed a precautionary and adaptive turtle management strategy and is convinced that the benefits from the strategy outweigh any potential risks. The Japan Bekko Association distributed materials describing the importance of the Japanese domestic tortoiseshell industry to hawksbill conservation. The IWMC World Conservation Trust, an NGO promoting sustainable use, and Dr Grahame Webb, an outspoken advocate of Cuba's proposals, held press conferences and also distributed lobbying literature. They suggested that if a greater economic value is attached to Cuba's turtles, there would be stronger incentive for their conservation.

Delegates from the EU were of particular interest to lobbyists. The EU nations have agreed to a consensus vote at CITES and represent a potential voting bloc of 13 countries. If they cannot reach consensus they have an understanding that all will abstain. Rumours regarding the overall EU position varied from day to day, but there was obviously a great deal of sympathy for Cuba's proposals within some the EU country delegations.

The Cuban delegation finally presented their proposals to the Parties on the floor of Committee I on the 19th of April. In recognition of the concerns of many

of the CITES delegates, they withdrew Prop. 11.40 and appealed to the delegates on behalf of the people of Cuba to support Prop. 11.41. Following the presentation the Chair was overwhelmed with requests for opportunities to comment. Citing time constraints she was forced to cut the list of speakers short, denying Costa Rica an opportunity to present a proposal for a regional Caribbean management programme that they had prepared as an alternative to Cuba's proposals.

Japan, South Africa, Namibia, Zimbabwe, Benin, Guinea, Honduras, Mongolia, Jamaica, Vanuatu and Antigua and Barbuda voiced their support for Prop. 11.41. In their comments to the chair, Dominica who co-sponsored the proposals stated that some opposition to Cuba's proposals was "scientifically and morally unfounded, politically motivated and aimed at serving the interests of those who have systematically attempted over the past forty years to bring Cuba to capitulation". Obviously for some delegates, this was not just a debate about hawksbill turtles.

The United Arab Emirates, Hungary, Brazil, Kenya, the USA, Canada and the Bahamas expressed their opposition. Because of their concerns regarding trade controls in Japan, the EU stated that they would abstain from the vote. The UK expressed a willingness to provide financial support for a Caribbean workshop to facilitate regional hawksbill population management. The WWF and IFAW pledged $45,000 to support the proposal that Costa Rica should have presented.

Despite these interventions pleading for greater regional co-operation before reopening hawksbill trade, Cuba requested a secret ballot. Of the 104 votes cast, 66 were in favour of the proposal, 38 against and 15 (including the EU) abstained. Cuba was just 3 votes short of securing the two-thirds majority necessary to carry the proposal. The opponents to Cuba's proposals were far from relieved. No one doubted that Cuba would exercise its right to reopen the debate in the final plenary session of the conference.

Lobbying on both sides intensified and again the EU was targeted. Costa Rica promoted their proposal for regional management as an alternative to Cuba's proposals, while Cuba engaged in intense corridor discussions with members of the EU delegation and TRAFFIC. On the day of the plenary session Cuba again presented Prop. 11.41, which had been amended to state that the sale of the stockpile would not take place until Japanese trade controls had been verified by the CITES Secretariat. Cuba also offered to host a regional meeting to discuss regional hawksbill management issues. In a point of order Portugal stated that they would like to hear Costa Rica's proposal for a regional workshop before voting on the amended proposal, but the CITES Secretariat deemed it inappropriate to discuss a document that was not an amendment to Prop. 11.41. Once again, Cuba called for a secret ballot. 67 votes were cast in favour of the amended proposal, 41 were cast against it and there were 9 abstentions. The proposal was therefore rejected.

Interestingly, the official position of the 13 voting EU countries was an agreement to abstain. But as only 9 abstentions were recorded it seems that some of delegations broke the agreement and voted either for or against the amended proposal. Perhaps this surprising development will undermine future confidence in the EU's voting system at CITES.

Even after the decisive vote, the issue was not laid to rest. The debate continued for some time after the results of the secret ballot had been announced, but the atmosphere had soured. Mexico and the Bahamas called for regional co-operation and Costa Rica attempted to open a debate to discuss its proposal for a regional workshop. Switzerland and Cuba stated that they had not seen or received a copy of the proposal and the Chair of the committee decided that the document had not been adequately circulated for discussion. Cuba, obviously disappointed at the outcome of the final vote, expressed regret at being involved in a 'laughable' discussion over Costa Rica's 'ghost document' and the debate was closed. The hostile climate even affected the following debate on basking sharks, when the Chair had to interrupt one delegate's inflammatory comments directed at the UK regarding the previous hawksbill debate. The debate in the final plenary session became distinctly hostile and was sensed by a number of people I spoke to afterwards. Unlike other controversial trade issues at CoP11, for example ivory and tigers, the hawksbill debate ended in discord and confrontation. Individuals on both sides of the argument were emotionally exhausted.

Given the extent and nature of the regional opposition to Cuba's proposals, I believe that the final decision on the CoP11 hawksbill debate was appropriate. Maybe this reflects my philosophical bias, although I like to believe I can think beyond my cultural influences. However, Cuba will maintain a legitimate, domestic harvest of hawksbill turtles. While it is uncertain that a regional management programme for the Caribbean hawksbill population will be initiated before CoP12 in 2002, the hawksbill trade issue will almost certainly return. Like others, I found it difficult to remain objective in the lobbying blizzard of Nairobi. But if CITES is to play a more constructive role in the conservation of marine turtles, I believe it is important that turtle

conservationists on both sides of the argument make an extraordinary effort in order to avoid expending valuable resources on endless confrontation. Mrosovsky states *'If some of the energy dissipated in battles within the community of turtle conservationists were devoted to co-operation and pragmatic compromise, who knows what might be possible'* (Mrosovsky, 2000). I hope we get the opportunity to find out.

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[2]CITES - <http://www.wcmc.org.uk/CITES/eng/cop/11/propose/41.pdf>

[3]LONDON WEEKLY GUARDIAN (18.10.1999).
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[4]US DEPARTMENT OF THE INTERIOR, Federal Register Vol. 65, No. 46. Notices. 12421 – 12422.

Community-Based Research and its Application to Sea Turtle Conservation in Bahía Magdalena, BCS, Mexico

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Five species of sea turtle are known to inhabit the coastal waters of Mexico. The two most common species to frequent the waters within and adjacent to Bahía Magdalena are the eastern Pacific green, or black, turtle *(Chelonia mydas*) and the Pacific loggerhead turtle *(Caretta caretta*). Other species include the olive ridley *(Lepidochelys olivacea*), leatherback *(Dermochelys coriacea*) and hawksbill *(Eretmochelys imbricata*) turtles. Sea turtles are an important part of the cultural history of northwestern Mexico. While overuse was largely responsible for their decline (Cliffton *et al.* 1982), it is the cultural connection to the animals that may in fact lead to their recovery. As in many fishing communities in the region, the multitude of uses of sea turtles by families living near Bahía Magdalena (a large mangrove estuarine complex on the Pacific side of the Baja California peninsula; Figure 1) have been an important part of coastal living. Green and loggerhead turtles are the species that were most commonly caught by the fishers of Puerto San Carlos, Puerto Magdalena and Lopez Mateos, the three largest communities on the shores of Bahía Magdalena (Nichols unpublished data).

Turtle use originated as subsistence harvest, but over time this use broadened into a directed fishery (Caldwell 1963). In addition to the food, medicinal uses and products provided to an individual fisher's household, there were economic benefits associated with the sale of turtle meat to the market.

For many years, the taking of turtles was largely unregulated, and the turtles seemed inexhaustibly abundant (Caldwell & Caldwell 1962) and as many as 375,000 turtles were harvested between 1966 and 1970. As populations began to decline, size limits and closed seasons were enacted. However, by the mid-1970's and early 1980's it became increasingly obvious that such large-scale harvest was not sustainable and that management schemes were ineffective (Cliffton *et al.* 1982). Broad legal protection of sea turtles in Mexico came with an Executive Order issued in 1990 by the Mexican Ministry of Fisheries and the Ministry of Urban Development and Ecology (now SEMARNAP). The legislation states that the Mexican Federal Government strictly prohibits the pursuit, capture, and extraction of any species of sea turtle on any beaches or in any federal waters. Article Three specifically states that:

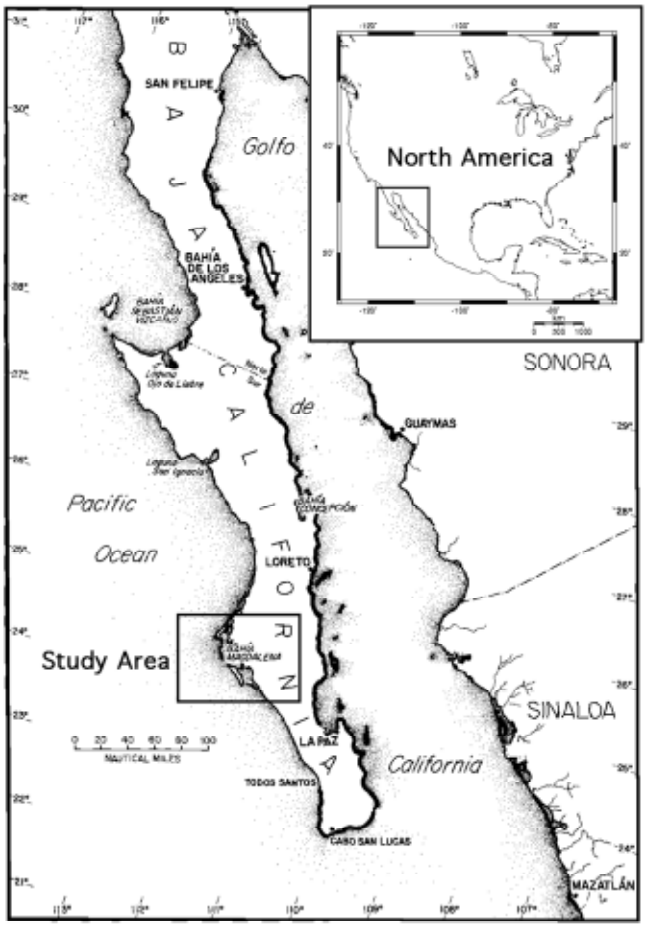

Figure 1. Study Area on the west coast of the Baha Peninsula

> "*the specimen of any species of sea turtle incidentally captured...shall be returned to the sea, independent of its physical state, dead or alive.*" (DOF, 31 May 1990)

However, the taking of turtles within Bahía Magdalena continues presently despite the passing of these strict laws prohibiting their use (Nichols & Gardner in press). Compliance is at a minimum within the community primarily due to the weakness of enforcement measures and the strong traditional use of turtles during holidays and special events. Additionally, incidental capture of sea turtles continues to occur in gillnets of local fishers, both in and outside the bay.

There has been much confusion over the legality of taking turtles for private household consumption. Many people that we had discussions with in the Magdalena Bay area believed that it was legal to take a turtle that had been accidentally caught in their nets, especially if it was freshly dead. Many people were not aware of the details of the legislation protecting sea turtles, and therefore did not consider that they were doing anything wrong by consuming turtles at home. There remains a need for enforcement of such legislation as well as a program to clearly explain the laws and their ecological purposes. As in many developing countries, there are socio-economic constraints to proper enforcement of laws involving endangered species. This is especially true in Baja California where communities are often separated by hundreds of miles. The goals of our research include the involvement of fishing communities in the development of conservation projects, the involvement of local students and fishers in the collection of data and the public sharing of research results on a regular basis. Community meetings serve as an outlet to share information on the biology of sea turtles as well as their protected status. Participation in community-based research is considered one component of an adaptive management approach to resource conservation.

The Community-Based Research Approach: With sea turtle populations continuing to decline globally, it is imperative that we constantly evaluate conservation strategies. There have been great advancements in our understanding of sea turtle biology and behaviour and the science of conservation is continually developing new tools. However, the major causes of sea turtle decline in many parts of the world, including northwestern Mexico, stem from anthropogenic factors and the human dimension may be the area of research where most conservation gains can be made. We have documented the ways that fishers have negatively impacted sea turtle populations, but what is often overlooked is how these same individuals can contribute to conservation. As researchers become increasingly aware of the cultural motivations involved in sea turtle exploitation, it becomes critical to shift our conservation efforts in the direction of the people at local levels.

By combining the knowledge gained through scientific investigations with the insights of the social sciences, we stand a much better chance of succeeding in our recovery efforts. Sea turtle conservation is multidimensional, as the causes of declines are multifaceted. Therefore, it is our responsibility to advocate adaptive management techniques. Feldmann (1994) states that even if the authorities devise strategies to protect resources, "*such strategies may be ineffective if they are incompatible with customary or traditional rights recognised at the community level*" (p.397). This dilemma is particularly true in the case of sea turtle conservation in Bahía Magdalena.

Community-based strategies are not new to sea turtle conservation. For the past decade local involvement in turtle conservation efforts has been increasing as

evidenced by the numbers of symposium papers and reports on the topic. Such approaches take a variety of forms including community monitoring of lighting practices on nesting beaches, community-based stranding networks and beach patrols, self-enforcement by fishing communities, formal sharing of traditional knowledge (Nabhan *et al.* 1999) and the systematic consideration of interviews with fishers (Tambiah 1999). Additionally, sea turtle conservation has become a main attraction in some ecotourism initiatives and other forms of sustainable development (Campbell 1998; Govan 1998; Vieitas *et al.* 1999).

One of the fundamental assumptions of community-based conservation is that individuals will necessarily choose to care for the animals and resources in which they have a vested interest (Mast 1999). Bromley (1994) states that "*community-based conservation seeks to locate arenas of mutuality between those who want biological resources to be managed on a sustained basis and those who must rely on these same biological resources for the bulk of their livelihood*" (p. 428). In most cases, this presents a difficult process of consensus building. However, in the case of the conservation of sea turtles in Bahía Magdalena, it appears that the two different values that Bromley described are not so unrelated. In our experiences, the local fishers have demonstrated an interest in conservation for ecological and aesthetic reasons, as well as to preserve a source of their traditional livelihood and an occasional source of food.

Signs of Success: Because of the intimate relationship between the turtles and the Bahía Magdalena communities, the use of community-based conservation strategies is extremely important. Developing the knowledge and trust of the fishers of Bahía Magdalena has been crucial to recent research and conservation efforts. Because of the illegality of harvesting turtles, community members have been very suspicious of any questions about the topic and have been quiet and reserved in their discussions. It has taken a great deal of time and patience to establish rapport within the community. However, a dialog has begun and the results are encouraging. This dialog is crucial to the success of conservation projects in the area. It has allowed us access to a more accurate understanding of the issues surrounding sea turtle recovery, as well as provided us with a forum for making recommendations. Involving local knowledge has been beneficial to our research objectives. Some fishers have provided us with advice in finding the best locations to capture turtles for sampling and tagging. Others have taken us to locations where they have seen and/or caught turtles. Local education and communication via town meetings has led to fishers providing valuable data such as tag returns and fisheries-related mortality information. Of note during the summer 1999 field season were tag returns from Japan; Michoacan, Mexico and California, USA. Fishers indicated that they typically discard tags due to fears of legal repercussions. Positive responses to those fishermen who do offer flipper tags will hopefully foster trust and lead to a further exchange of information. Furthermore, we have heard from increasing numbers of fishermen who return tagged turtles to the water unharmed, after recording tag numbers and capture locations. Our most skilled research team members are former turtle hunters.

The Baja California Sea Turtle Conservation Network (Grupo Tortuguero de Baja California), a grass-roots organization formed to promote sea turtle recovery in the region, represents a crucial component of sea turtle recovery in northwestern Mexico. The first meeting of this group was held in 1999 and was attended by NGO's, representatives of several local fishing co-operatives, governmental institutions, members of academia, and field researchers. This meeting represented one of the first interdisciplinary co-operative sea turtle management attempts in the region (Nichols & Arcas 1999). The group will meet annually and provide a forum for discussion of new research results, management ideas and training workshops. In January 2000 we expect nearly 100 members of Baja California fishing communities to participate in the second annual meeting of the Baja California Sea Turtle Conservation Network. At this meeting a variety of topics related to sea turtle biology and conservation will be discussed and workshops on data collection, turtle identification and measurement techniques will follow. Biologists from sea turtle nesting beaches in Michoacan and members of the Seri Indian community will offer their perspectives on sea turtle declines. Fishers attending this meeting will form the core of the Network and will share the information in their communities. For many, this meeting represents the first time that they have been actively involved in conservation and research.

While quantitative signs of sea turtle recovery may be years off, these results and the development of community-based initiatives encourage us.

Conclusions and Recommendations: Although the legislation is in place to protect Baja California's sea turtles enforcement is prohibitively expensive in such a

vast area. Laws and enforcement have not adequately abated harvest of and declines in turtle populations, especially in rural areas where the laws are misunderstood or disregarded and enforcement is infrequent. Community-based solutions should be considered in concert with standard vigilance practices. Such an approach can lead to a sense of responsibility for the resource and feelings of empowerment through their direct contribution to the conservation of the turtles that inhabit the coastal waters near their home. Murphee (1994) states that "*conservationists now often prefer treating local people and their behaviours as a most effective vehicle for furthering their aims rather than unfortunate stumbling blocks*" (p. 404). In order to successfully implement community-based strategies, the local communities must be provided with ongoing technical assistance, current information on the status of the populations and timely assessments of successful actions. In other words, the community-based approach must be a two-way process.

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Update on the Nesting Population of Loggerhead Sea Turtles in Praia do Forte, Bahia, Brazil

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Projeto TAMAR-IBAMA is the national sea turtle conservation and research program in Brazil. Soon to reach its 20th year of existence, TAMAR is a network of more than 20 conservation and research stations spread out over the continental coast and oceanic islands in Brazil, with community participation and local development (Marcovaldi & Marcovaldi 1999). The research and conservation station at Praia do Forte, in Bahia (12°34'56"S, 38°00'02"W), was founded in 1982. Data on nesting female turtles and their nests have been collected yearly, and a hatchery was erected to incubate clutches at risk due to heavy use by tourists or intense night-time lighting from nearby houses or hotels. In 1987, data collection on all nesting beaches monitored by TAMAR was standardized, thereby facilitating comparisons among both areas and years.

The area monitored by the base of Praia do Forte is visited mainly by loggerhead sea turtles (*Caretta caretta)*, with hawksbill (*Eretmochelys imbricata*), olive ridley (*Lepidochelys olivacea*), and green turtles (*Chelonia mydas*) also nesting, in descending order of incidence. Marcovaldi and Laurent (1996) presented data from 6 seasons of monitoring, and compared the hatching success of nests incubated in hatcheries with those left *in situ*. Here we present another 6 seasons of data for loggerhead turtles, again comparing hatching rates of nests subject to different management techniques. We also analyze the numbers of nests laid per year, to look for trends in the size of the nesting population. A general description of hawksbill nesting in the area was presented by Marcovaldi *et al.* (1999).

The details of this area were described by Marcovaldi and Laurent (1996), with one important change: at the start of the 1994/95 nesting season the area of coverage of this base was increased 7 km by the addition of the beach at Jacuipe, in the south. The total area monitored by the base of Praia do Forte currently covers about 50 kilometers of nesting beach, from the Jacuipe river north to the Sauipe river (Figure 1), and is cut by several smaller rivers in between. The nesting beaches are classified as being part of either an Intensive Study Area (ISA) or a Conservation Area (CA).

The ISA, which is roughly 30 kilometers long, is monitored daily by biologists and/or local community residents trained by TAMAR. The majority of nests are left to incubate *in situ*, after being located, marked, and covered with a protective wire mesh (minimum mesh size 7cm to allow hatchlings to leave the nest) as a means to protect against predation by the crab-eating fox (*Cerdocyon thous*). Since the 1994/95 season, nests which required relocation in the ISA were transferred to locations on the nesting beach, rather than to the

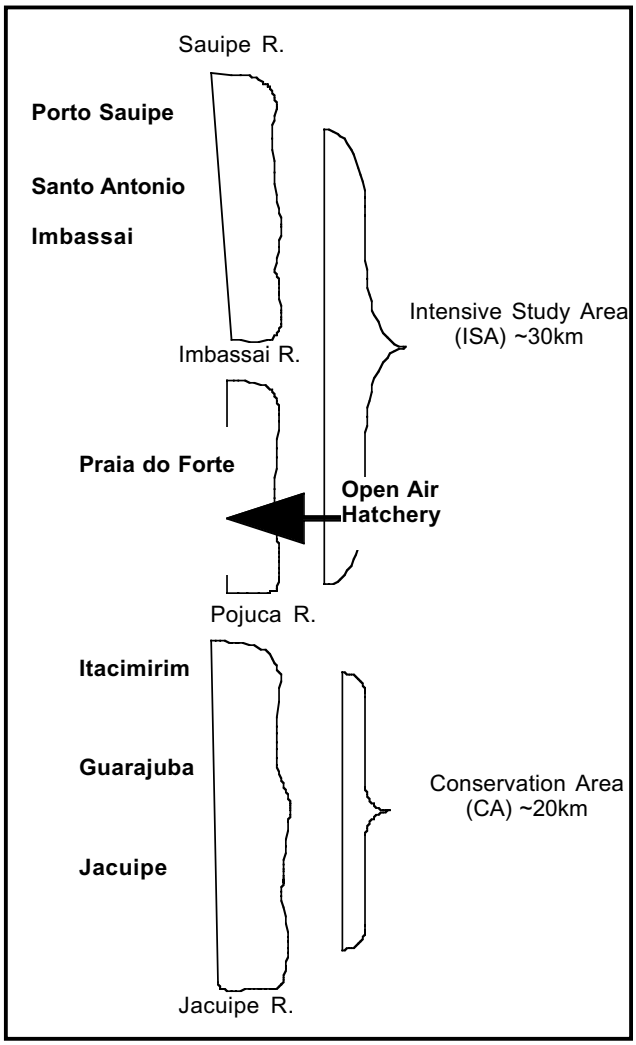

Figure 1. Schematic map of the nesting beaches (in bold) which are monitored by the Projeto TAMAR-IBAMA base of Praia do Forte. The beach of Jacuipe was added in 1994/95 nesting season. The location of the central open-air hatchery, to where all clutches laid in the Conservation Area are moved for incubation, is indicated by the arrow.

	In situ	Transferred to Beach	Transferred to Hatchery
mean	74.01	67.24	65.62
SEM	1.04	1.53	0.89
n	874	393	1149

Table 1. Mean hatching success for loggerhead nests laid on beaches monitored by the Projeto TAMAR-IBAMA station of Praia do Forte, between the 1994/95 and 1998/99 nesting seasons. Analysis of variance, followed by the Bonferroni Multiple Comparisons Tests, of the three types of management used showed that there was a significant difference between nests left *in situ* and nests transferred to the hatchery (t=8.60, $p<0.001$), and between nests left *in situ* and nests transferred to the beach (t=5.18, $p<0.001$ in both cases).

central hatchery (Marcovaldi & Barata 1998). After 45 days of incubation, nests are monitored daily for signs of hatchling emergence, indicated by a mass of hatchling tracks emerging from the top of the nest. In Praia do Forte, the majority of hatchlings in each nest emerge on a single night. At the first sign of emergence, the nests are opened to verify species, to count number of live hatchlings produced (estimated by counting the number of empty egg shells remaining in nest, minus any dead pipped hatchlings), and to count total number of eggs (live hatchlings plus dead pipped hatchlings plus unhatched eggs). Any live hatchlings found remaining in the nest are immediately released to the sea.

The CA, roughly 20 km long, is divided into 4 sections of 5 km, each patrolled once daily by local community members employed by TAMAR. These areas are heavily populated and developed, making it nearly impossible to guarantee the safety of developing eggs on the beach. All nests laid the previous night are located and transferred to Styrofoam boxes (one nest per box), with a minimum of rotational movement of the eggs (Blanck & Sawyer 1981). All boxes are brought to predetermined transfer points, and then to the central open-air hatchery, where the majority are reburied within 8 hours of being laid. The beaches in Santo Antonio and Porto Sauipe are in transition from CA to ISA, with the majority of the nests being left *in situ.*

For data analysis, values for nest hatching success (number of live hatchlings produced divided by total number of eggs) were transformed using the arcsine transformation prior to analysis of variance followed by the Bonferroni post-hoc test (Zar 1984). For nesting trends over time, data from Jacuipe were excluded from the linear regression analysis in order to maintain consistency in monitoring effort since 1987. Non-nesting activities of turtles ("false crawls") were also recorded, but as it was nearly impossible to identify species, these data are not included.

The overall number of loggerhead nests recorded during the 12 nesting seasons was 4803, and the total number of hatchlings produced was 391,348. When nests laid in Jacuipe are excluded, the mean number of nests laid per season in the area monitored in all seasons was 337.6 ±12.3 SEM (n=12).

There was yearly variation in the number of nests laid by loggerhead turtles in the areas monitored by the Praia do Forte base of Projeto TAMAR (Figure 2). Regression analysis of the numbers of nests laid per year (excluding those laid in Jacuipe) revealed that the slope was not significantly different from zero (p=0.15), indicating that there was neither an increase or decrease in numbers of nests over time (regression equation: $Y=5.03X - 61.60$; $r^2 = 0.20$). Regression analysis of numbers of nests laid only on Praia do Forte beach (14km) also revealed neither an increase or decrease over time, with a slope not significantly different from zero ($p = 0.15$; $Y=2.72X - 117.79$, $r^2 = 0.18$).

In terms of management techniques, analysis of variance revealed that there was a significant difference in hatching success of nests subject the three different management techniques ($F=38.52$, $df = 2415$, $p<0.0001$) (Table 1). The Bonferroni post hoc test showed that nests left *in situ* had significantly higher hatching success than both nests relocated to the hatchery (t=8.60, $p<0.001$) or nest relocated to the beach (t=5.18, $p<0.001$). Although nests relocated elsewhere on the natural nesting beach had a slightly higher mean value of hatching success than those moved to the hatchery, it was not significantly different ($p>0.05$).

Although there have been changes in management procedures in the last 12 nesting seasons, overall the basic strategy has been to protect nesting females and their incubating eggs on the beaches monitored by Praia do Forte base of Projeto TAMAR. The annual number of nests laid by loggerhead turtles during the study period suggests that the population is stable, although care must be taken when extrapolating from nest numbers to population size (Ross 1997), or inferring population status from short-term trends in population size (Limpus & Nicholls 1987). Nevertheless, at the current time the only available estimator of population size is annual number of nests laid (Gerrodette & Taylor 1999; Godfrey 1997).

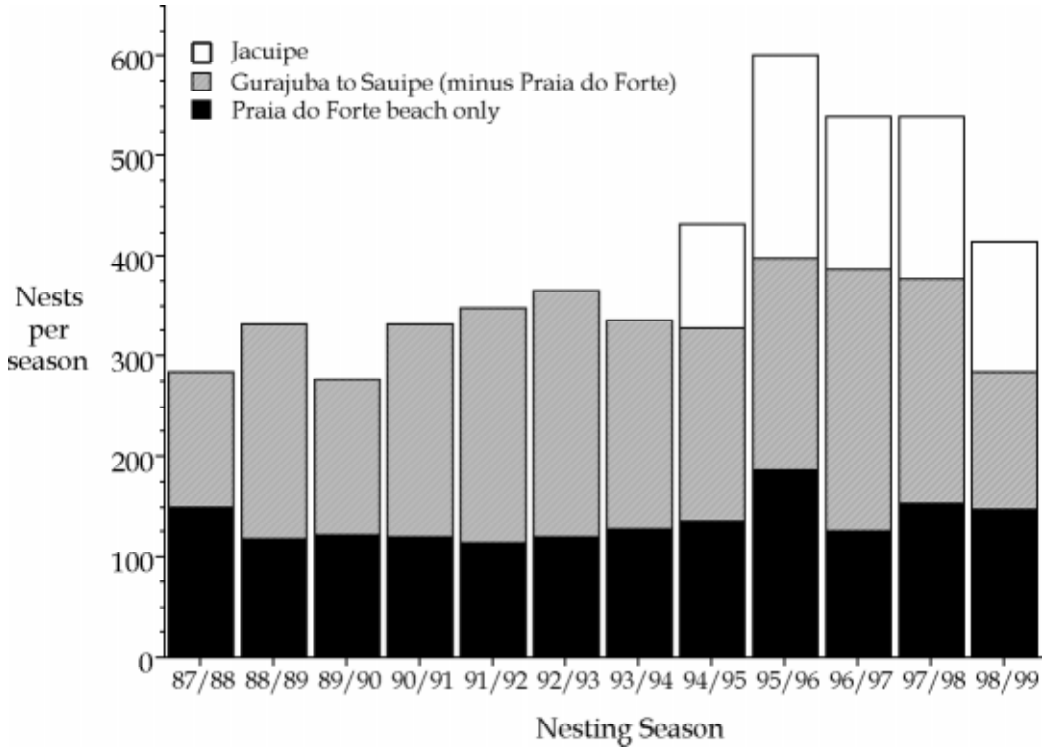

Figure 2. Numbers of loggerhead clutches laid per nesting season on beaches monitored by the Projeto TAMAR-IBAMA base in Praia do Forte, Bahia, Brazil. Solid bars are nests laid only on Praia do Forte beach (14km), hatched bars are nests laid on all other beaches monitored by this base, with the exception of Jacuipe beach (white bars), which was added to the area of coverage as of 1994/95.

A stable nesting population is likely to be an improvement over the situation encountered in the late 1970s, when initial surveys on sea turtle activities revealed a history of consumption of nesting sea turtles and their eggs by local coastal residents (Marcovaldi & Marcovaldi 1999). Although not formally organized, use of sea turtles was widespread enough to pose a serious threat to the survival of local populations. With the founding of Projeto TAMAR in 1980, public education campaigns were mounted, and all sea turtles were protected by Brazilian national law in 1986. Since then, almost all use has been eradicated, and the reproductive cycle of sea turtles on the principal nesting beaches has been protected. Given that maturation of loggerhead turtles is probably on the scale of several decades (Frazer & Ehrhart 1985), an increase in nesting population (as indicated by an increase in annual number of nests laid) is not expected at this time. Monitoring will continue into the next decade, and it is hoped that indications of a population increase will be seen in the future.

In terms of management strategies, the statistical analysis showed that there was no significant difference in hatching success between nests relocated to the central hatchery and nests relocated to areas on the natural nesting beach. However, there are other benefits to relocation to the natural nesting beach besides improved hatching success. For instance, relocation to the natural nesting beach is much less labor-intensive, as transportation time and its potential disturbance of the eggs are minimized, and egg incubation in the hatchery requires daily care and maintenance (e.g. Naro-Maciel *et al.* 1999). Finally, in terms of emergence and seafinding, the hatchlings from nests relocated to the nesting beach encounter a natural situation, unlike in the hatchery, where turtles are retained by mesh nets prior to counting and release by biologists. Therefore, in general terms, the relocation of nests to natural nesting beaches is a more desirable management technique.

Unfortunately, it is not always possible to relocate nests to the natural nesting beach, for various reasons. One threat to nests in the CA is the heavy use of the beach by tourists, and the possibility that clutches will be damaged inadvertently by people on the beach. Another problem is the excessive use of artificial lights near the nesting beach, where housing or development was already established before Projeto TAMAR was

created. Emerging hatchlings, which use differences in light as cues to find the sea (Salmon *et al.* 1992), are attracted to artificial lights shining on the beach (Witherington & Bjorndal 1991). This disruption in seafinding is a danger, because often as a result the hatchlings never reach the sea. Although the best possible solution would be to reduce the level of artificial lighting, at the current time this is not possible. Projeto TAMAR is working on the problem of photopollution, with the aim to minimize as much as possible the impact of artificial lights on sea turtles in Brazil.

Management and conservation of marine turtles at the Projeto TAMAR base of Praia do Forte is flexible, responding to changes and new approaches. The introduction of the technique of relocating clutches to safer areas on the nesting beach has resulted in higher emergence rates and hence more hatchlings. In addition, the expansion of the ISA to include the beaches of Santo Antonio and Porto Sauipe resulted in greater numbers of nests left *in situ*, also producing a higher percentage of hatchlings than those moved to the hatchery. This change is part of a larger philosophical effort to maintain as many nests *in situ* as possible. This has been possible largely through the public education campaigns mounted by Projeto TAMAR, which has increased conscientiousness of local people with respect to sea turtles. It is hoped that with more time, greater numbers of nests can be left safely *in situ*.

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First Documentation of Fibropapillomas Verified by Histopathology in *Eretmochelys imbricata*

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Fibropapillomatosis (FP) is a cutaneous disease globally affecting sea turtles (George 1997). It is characterised by the appearance of benign tumors, both internal and external. FP can become life threatening when the size and location of the tumors interfere with locomotion, vision, breathing of the turtle, or internal physiology of afflicted organs. First described in green sea turtles (*Chelonia mydas*) over 60 years ago (Lucke 1938; Smith & Coates 1938), FP has been encountered with increasing frequency not only in green turtle populations throughout the world, but also in loggerhead (*Caretta caretta*), olive ridley (*Lepidochelys olivacea*), and flatback (*Natator depressus*) sea turtles (Herbst 1994). With respect to hawksbill (*Eretmochlys imbricata*) sea turtles, we are not aware of any reports with verification based on histopathology of the disease occurring in this species. A nasal wart from a captive individual in an aquarium in Germany was reported (Harshbarger 1991), but it probably is not comparable to FP. Here we report two cases of FP tumors in hawksbill sea turtles from Brazil, both of which were confirmed by histopathology.

The first case was observed in September, 1996, of a female with a curved carapace length of 84 cm. This individual turtle had been maintained in captivity by Projeto TAMAR (the national marine turtle conservation program of Brazil) since hatching from a nest laid on the beach in Praia do Forte, Bahia, and had been kept in communal tanks with other species, including green turtles. It is possible that this hawksbill could have been exposed to FP via contact with infected turtles or contaminated water. When 7 to 8 years old, this individual developed a large mass (46cm by 43 cm by 38 cm) on its right front flipper and several small ones (approximately 5 cm in diameter) on its rear flippers and close to its cloaca, and was isolated from other turtles. The masses were pendunculated with a firm and elastic consistency. Normal swimming behavior in this turtle was constrained, therefore the masses were removed surgically. During the surgery, a large internal mass that was smooth and nonpedunculated (i.e. macroscopically different from fibropapillomas) was discovered in the coelemic cavity and had begun to invade the lungs. It was decided not to remove the mass because of its large size and the extent of infiltration into various tissues. The individual died soon afterwards. No histopathology was performed on this internal mass.

The second record also comes from a female turtle, currently with 69 cm curved carapace length, which was raised in captivity by Projeto TAMAR in the state of Sergipe, Brazil, since hatching from its nest. This turtle was also maintained in communal tanks with different species of marine turtles, and may have been exposed to FP from infected turtles or contaminated water. This individual had 3 masses: two on the head and one on the anterior portion of the right front flipper (see front cover). The masses on the head were in the region of the frontal bone, and measured 9cm and 1 cm in diameter. The presence of the larger mass had raised several of the prefontal scutes on the head, exposing a portion of the skull. The third mass was located at the base of the flipper, close to the first marginal scute of the carapace. All external tumors were surgically removed, and currently the animal remains under veterinary care.

Histological analysis of the tumors of both individuals revealed several features that met the criteria of FP previously published (e.g. Santos & Mello 1983): a layer of connective tissue with small mononuclear cells, areas of newly formed and congested vascularization covered with typical keratinized scaly epithelial tissue. There was an absence of displasic or malignant cells, and few instances of fibroblasts depositing collagen in an inflamed area. The margins of the areas treated with surgery were free of the lesion.

There are at least two pertinent factors relative to these cases. The first is that the individuals were raised in captivity from an early age. Captivity may engender FP in this species, for example by compromising their immune systems, by exposing them to pathogens they normally would not encounter, or by placing them in densities that make them more susceptible to infection. In normal wild conditions, these animals may not have developed the tumors. The second factor is that hawksbill turtles in Brazil exhibit a relatively high level of hybridisation with loggerhead turtles (Bass *et al.* 1996).

Although we do not know if these individuals are hybrids, it may be the case that hybrids are more susceptible to FP than non-hybrid hawksbill turtles. Fibropapillomatosis is known to affect green sea turtles in Brazil (Matushima *et al.* in press). We now confirm that FP has crossed another interspecific barrier, widening the sea turtle populations which may be affected. Further study of FP in hawksbills is needed in the general effort to better understand this disease, which is crucial in developing successful treatments.

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Mangroves in the Diet of *Chelonia mydas* in Queensland, Australia

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Pendoley and Fitzpatrick (1999), in reporting their observations in Western Australia of *Chelonia mydas* feeding on mangrove, *Avecinnia marina*, leaves, have highlighted the poor appreciation of the role of mangroves in the diet of *C. mydas*. Pritchard (1971) reported that "*Caulerpa algae and mangrove roots and shoots apparently form a substantial part of the diet"* for *C. mydas* in the Galapagos Islands. In Queensland, Australia, *C. mydas* has been so commonly observed feeding on mangroves that we now identify three main vegetation groups when describing its herbivorous diet: seagrasses, algae and mangroves (Limpus 1998).

Shoalwater Bay (22°20'S, 150°12'E) in central Queensland has been the site of regular winter surveys of a large foraging *C. mydas* population since 1986. The bay supports extensive seagrass pastures fringed by mangrove forests as well as rocky outcrops with fringing coral reef. *C. mydas* ranging in size from small immature to large adult turtles (CCL = 40-120cm) forage daily within the mangrove forests at high tide. These turtles move out of the mangroves and fall back across the seagrass flats as the tide drops and return with the rising tide. While seagrass constitutes the main part of the diet of these turtles, at times, mangroves also form a significant part of their diet. For example, in July 1989 there was a very dense crop of *A. marina* fruit in Shoalwater Bay. In that season, a series of *C. mydas* encompassing all size classes, were captured by

the turtle rodeo method (Limpus & Reed 1985) while foraging within the mangrove forest and included in diet studies (n=20). These turtles were examined for mouth contents on capture and for stomach contents by levage several hours later (Forbes & Limpus 1993). Although mouth contents of these *C. mydas* mostly consisted of seagrass blades (*Halophila* sp. and *Halodule* sp.), two mouth samples contained *A. marina* leaves. While all levage samples contained seagrass (mostly *Halophila* sp. and *Halodule* sp.) and small amounts of unidentified algae, most levage samples also contained substantial amounts of well chewed *A. marina* cotelydons. Only three of these turtles had chewed *A. marina* leaves in the levage samples. Necropsy of a large adult female *C. mydas* in July 1988 revealed alternating broad bands of chewed *A. marina* cotyledons and seagrass extending from the crop well down into the small intestine. This observation suggests that the turtle had been visiting the mangrove forest over the course of many high tides and feeding on seagrass during the intervening periods.

We were unsuccessful in directly observing whether the turtles were feeding on the cotelydons of mangrove propagules while they were still fruit on the trees or as dispersing fruit that had dropped from the trees into the water or whether they were feeding on the cotyledons of the growing seedlings on the bottom. During July in Shoalwater Bay, the highest tides occur at night. During the night high tides in July 1989, *C. mydas* were observed by spotlight within the mangrove forest and apparently feeding within the partly submerged canopy of the trees. In contrast, by daylight when the mangrove canopy was not submerged by the high tide, *C. mydas* were observed foraging across the submerged forest floor beneath the mangrove forest canopy. However, the local fishermen reported seeing *C. mydas* foraging by day among the leafy branches of mangroves submerged at high tide (W. Chippendale, pers. comm.). Day time high tides are the highest during the summer months in this region. Further evidence of these turtles moving within the canopy of the forest at the higher levels of the tidal cycle comes from two records of live and otherwise healthy *C. mydas* found hanging from trees within the mangrove forest with their flippers wedged in the forks of the branches. During 1989, the vast *C. mydas* herd (probably tens of thousands of turtles) in Shoalwater Bay would have been a significant consumer of the *A. marina* fruit and/or seedlings. In contrast to the regular occurrence of *A. marina* in diet samples at Shoalwater Bay, we have only a single record of the fruit of a second species of mangrove (*Rhizophora* sp.) from a levage sample.

At Shoalwater Bay in July 1994 when there had been a very poor fruiting by *A. marina*, relatively few *C. mydas* were found feeding within the mangrove forest. Little or no *A. marina* fruit occurred in the gut contents from three *C. mydas* captured foraging within the mangrove forest (Brand 1995) or in the levage samples (n>20) examined from *C. mydas* captured while feeding within or adjacent to the mangrove forest.

In subtropical (south) Queensland, Read (1991) studied the diet of immature *C. mydas* that foraged in Flathead Gutter in eastern Moreton Bay (27°20.5'S, 153°24.8'E; Limpus *et al*. 1994). As in Shoalwater Bay, these turtles foraged across the seagrass flats up to the mangroves with the rising tide and fell back to the gutter at low tide. Read (1991) recorded that 21% of the *C. mydas* levage samples contained *A. marina* fruit. In contrast, Brand (1995) using the same study site in 1994, reported no *A. marina* in the entire gut samples of 3 individuals or in the 20 levage samples from immature *C. mydas*.

In south and central Queensland, mangrove leaves appear to constitute only a trivial part of the diet of *C. mydas*. However when they are available to *C. mydas* feeding in inshore bays, the potentially nutritionally rich and readily digestible *A. marina* cotyledons appear to be a major food item taken in preference to seagrass. This would be a "fruitful" topic for further study.

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Recapture of a Tagged, Captive Reared Juvenile Loggerhead Turtle - An Example of Habituation?

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The Conservancy of Southwest Florida (TC) is one of approximately 20 facilities in Florida that are permitted to maintain live loggerhead sea turtles (*Caretta caretta*) for public education. In TC's interpretive museum, a single turtle and native fish are maintained in a 5678 litre aquarium. The turtles come from other facilities in Florida and are typically *ca.* 20-cm straight carapace length (SCL) on arrival. They grow rapidly and are released when the SCL reaches 45 cm. They are usually in residence for about a year. The SCL, straight carapace width (SCW) and weight of the turtle are recorded monthly. Prior to release, an inconel tag from the Archie Carr Center for Sea Turtle Research is placed in the rear margin of each front flipper. The turtles are released in Gullivan Bay, a large, biologically rich area on the SW coast of Florida, *ca.* 29 km SE of Naples, Florida. While juvenile loggerheads (<60 cm SCL) are not typically found on the central-west coast of Florida; Collier to Jefferson County (Florida Department of Environmental Protection, Florida Marine Research Institute, Sea Turtle Stranding and Salvage Network Data Base), Gullivan Bay is *ca.* 128 km from Florida Bay where juvenile loggerheads are present.

On 4 October 1996, TC obtained a 2 kg juvenile loggerhead with a SCL of 23.5 cm from the Clearwater Marine Aquarium in Pinellas County. The turtle was at TC until 9 September 1997 when it was released in Gullivan Bay. At release the turtle weighed 15.4 kg and measured 46.5 cm SCL. On 2 October 1997, a state biologist observed the turtle loitering near a boat dock at Indian Key State Historic Site in the Florida Keys, a straight line distance of *ca.* 150 km from its release point. The turtle was captured after the biologist noticed it was tagged. In his report he noted that the animal was a healthy active specimen; however, he also indicated that it did not exhibit the typical avoidance behavior he was accustomed to seeing in "wild" sea turtles. The turtle's escape behavior consisted of swimming in a wide circle, after which it returned to the vicinity of the dock. In short, the turtle was far too easy to capture. Swingle *et al.* (1994) found that head-started loggerhead turtles did not exhibit normal behavior initially upon release. It was found that their diving patterns were different from previously tracked wild loggerheads and that the released loggerheads showed no consistent directional movement.

Aside from the distance this turtle traveled in 23 days, what is of note here is what appeared to be the turtle's seemingly lackadaisical escape behavior during its capture. If the animal was healthy as indicated, the question becomes one of how habituated the animal became during its captivity, especially during scheduled feedings and, perhaps, also by repeatedly seeing museum visitors through the aquarium glass. How long such habituation may persist after release is unknown, but this incident suggests that once such associations are established they may persist for some time in the wild.

The authors would like to suggest that holding

facilities evaluate their procedures, especially feeding, to find ways of reducing interactions that could lead to habituation in turtles that will eventually be released. Standing behind a blind during feeding so the turtles would be less apt to result in turtles associating humans with food is one approach that could be helpful.

Public education about the life histories and conservation needs of sea turtles has generated widespread support for their protection. Live exhibits are one of the most effective ways of getting the message across. Placing an emphasis on maintaining turtles that cannot be released in the wild is an option that could be used effectively to point out threats to sea turtles and their habitats. This would address concerns about habituation. It should also be noted that, many of the juvenile turtles in facilities have been live strandings whose size did not correspond to the typical size of juveniles normally found in Florida waters. Periodically hatchlings are also brought to State agencies by individuals who find them by chance on a nesting beach. Regardless of their origin, many of these animals are held in facilities until they are 45 cm SCL, the typical size of juvenile loggerheads found in Florida waters. Educational displays or programs at facilities that hold these turtles should consider addressing these circumstances with an emphasis on sea turtle life history the and importance of protecting nesting beaches and juvenile habitat in Florida and elsewhere around the world.

Acknowledgements: Many thanks to Pat Wells for taking a swim, Florida Department of Environmental Protection, Florida Marine Research Institute, Sea Turtle Stranding and Salvage Network DataBase.

SWINGLE, W.M., D. WARMOLTS, J. KEINATH, & J. MUSICK. 1994. Loggerhead sea turtle head-start evaluation: captive growth rates and post release movements and behavior. In: K.A. Bjorndal, A.B. Bolton, D.A. Johnson, & P.J. Eliazar (Ed.). Fourteenth Annual Symposium on Sea Turtle Biology and Conservation. NOAA Technical Memorandum NMFS-SEFSC-351, pp. 289-292.

Early Report of Fibropapilloma from St Croix, USVI

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Early records of the incidence of fibropapillomatosis in green turtles are valuable in recreating the origin and spread of this disease. Recently, we came across correspondence in the archives at the Archie Carr Center for Sea Turtle Research that apparently provides such a report. On 22 June 1971, William Rainey, then with the Caribbean Research Institute in St. Thomas, U.S. Virgin Islands, wrote to Archie Carr with the following information:

> "*We have a green turtle captured near St. Croix which (in addition to imbedded barnacles) has numerous 1-5 cm wide pendant growths of soft, whitish, papillose tissue on the eyelids, throat and both sides of the flippers. The growths on the eyelids nearly blind the animal. The growths harbor leeches about 1 cm long with delicate branching, filamentous gills which extend laterally from the body. I discussed the animal's condition with Peter [Pritchard] by phone and it seemed unusual to him.…A set of slides made from an excised growth has been sent to the Department of Animal Diseases, University of Connecticut*."

The turtle was captured by a diver north of St. Croix at a depth of 15 m on the edge of the shelf on the 20th of April 1971. Straight carapace length measured 52 cm; the turtle was tagged (C1456, UF tag) and released. In his response of 16 July 1971, Archie Carr wrote:

> "*The infestation affecting the green turtle from St. Croix is something completely new to me and I hope you get a diagnosis for it."*

There is no record of a diagnosis having been received from the University of Connecticut.

MEETING REPORTS

Physical Monitoring Workshop: Survey Results and Summary

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Beach nourishment is currently viewed as the acceptable engineering solution to Florida's coastal erosion because the process is believed to extend the life-expectancy of urban areas, revitalize recreation and improve ecological function. However, current constraints on the selection and placement of fill material frequently result in the construction of beaches that deviate significantly from their natural counterparts. This may have a deleterious effect on marine turtles and therefore regulatory agencies often require the successful permit applicant implement some type of monitoring program when nesting beaches are targeted for nourishment. To date, numerous monitoring programs have been undertaken in association with the nourishment of Florida's nesting beaches. These programs generally require a large economic investment and generate huge data sets; however the ecologic benefit of undertaking this type of monitoring program is rarely obvious (Lucas & Parkinson in press).

It is clearly time to re-evaluate the design and function of marine turtle monitoring programs undertaken in association with the nourishment of Florida's nesting beaches. As an initial step, a workshop on the physical monitoring of nesting beaches was convened in conjunction with the 20th Annual Symposium on Sea Turtle Biology and Conservation. The goal of this workshop was to establish monitoring protocol necessary for the effective long-term assessment of alterations to the physical environment (1) induced by coastal construction (i.e., beach nourishment, armoring) and (2) which are known to influence marine turtle nesting and/or reproductive success. Of the 15 technical or regulatory experts invited to participate in this workshop, 13 were in attendance. Much of the program was designed to document expert opinion on topics related to the workshop goal. However, time was given throughout the evening for statements from symposium attendees whom were also present.

The workshop program consisted of three tasks:
1) *Significant Parameters*: to generate a list of physical parameters which should be included in a comprehensive nesting beach monitoring program.
2) *Prioritization*: to rank the parameters from most- to least-significant by considering their relationship to the stages of marine turtle nesting and logistics.
3) *Data Acquisition*: to identify the methods and units by which each of the parameters should be quantified.

A survey form was provided to each invited participant as a means of facilitating the successful completion of each workshop task. In concept, the participants were to complete the appropriate survey section after finishing round-table discussions related to each task. The workshop summary would then consist of a review of the survey data. Unfortunately, time did not permit the participants to address all of the program tasks. In fact, only Task 1 was discussed in detail and even this aspect of the program had to be rushed in order to complete all components. Further complications were introduced by the fact that each panel member completed his or her survey form in a distinct manner. Hence, the survey could not be quantified as originally planned. There now follows, the qualitative results of Task 1 discussions and survey data. In addition, we present the conceptual framework for Tasks 2 and 3, which might be undertaken during another workshop.

Task 1: Significant Parameters Based upon personal experience and a review of the literature, a comprehensive list of relevant parameters was constructed for the workshop. The panel was asked to either accept or reject each parameter as a necessary component of any comprehensive physical monitoring program. If there are alternate approaches to the quantification of any parameter (i.e., ambient-beach vs *in situ*-nest temperature), the panel was asked to chose the one most appropriate. These data are presented in table 1.

Temperature: Nesting beach temperature is quantified because it effects the duration of incubation and hatchling sex ratio. Most panel members (10) indicated temperature was a relevant physical parameter. The parameter can be quantified either as ambient or *in situ* (i.e., within a nest and therefore effected by metabolic heat). Survey results weighted each as nearly equal, with several suggesting both parameters should

General Parameter	Specific Parameter	Score
Temperature		10
	Ambient	8
	In situ	6
Grain size		10
	Mean	5
	Sorting	6
	Other (%fines, shape)	9
Grain composition		9
	Organic	5
	Carbonate	5
	Other (Quartz)	3
Moisture		9
Density		3
"Hardness"		12
Topography		11
	Cross-shore profile	12
	Scarping	9
	Other (dune crest,bathymetry)	4
Other		
	Colour/reflectance	6
	Offshore bathymetry	6
	Groundwater	5
	Contamination	2
Station location		
	Mean high water	3
	Spring high water	3
	Mid-backshore	8
	Toe of dune	9
	Other (Crest dune, nest specific)	5
Sample depths		
	Surface	3
	-30cm	6
	-45cm	3
	-60cm	3
	Other (random, continuous)	3

Table 1. Parameters which survey participants considered important in the monitoring of the effects of beach nourishment. Thirteen participants took part but varied in the way they completed the form. Data are therefore only approximations of the panel's opinion.

always be monitored. Discussions of temperature during the workshop suggest it should not be assumed either method is equally valid. Rather, the logistics of quantifying *in situ* temperature are perhaps a significant justification for deferring to ambient-beach temperature.

Grain Size: Grain size refers to the diameter of sediment particles, typically measured in millimeters. The grain size of nesting beaches may potentially influence all stages of the nesting sequence. Grain size was identified as a relevant parameter by 10 of the panel members. The panel was asked to further identify what related textural parameters should be quantified, including mean-grain size and sorting. The surveys suggest mean-grain size and sorting should both be quantified. Five participants indicated the percent fines (i.e., silt and clay) and grain shape (i.e., angularity) should also be estimated.

Grain Composition: In peninsular Florida, beach sediment is composed of organic matter, carbonate (shells, limestone), and quartz. The proportion of carbonate content increases with decreasing latitude and may introduce physio-chemical problems (i.e., cementation, beach rock) not generally associated with beach nourishment in temperate climates. Problems of cementation in Dade and Collier Counties were acknowledged by one participant. The proportion of each mineral in beach fill might influence the nesting environment by altering beach hardness, heat capacity, and moisture content. Several members indicated they were not familiar with the concept of grain composition. Of those remaining, 8 panel members felt composition should be included in a comprehensive monitoring program.

Moisture Content: The moisture content of a nesting beach may alter the process of nest excavation and the incubation environment. It is typically expressed as a weight percent relative to a dry sediment sample. Nine panel members identified moisture as a relevant parameter. There were many comments written in the Moisture section of the survey. Most of these appear to focus on myriad methods by which water content is quantified or expressed. These include: 1) gravimetric, 2) volumetric, 3) water potential, and 4) degree of saturation. The panel did not have time to evaluate the merits of each method or express a preference.

Sediment Density: The density of a beach sediment does not necessarily exert a direct effect on marine turtle nesting, but can be used to help understand variations in parameters like beach hardness, moisture content, and temperature. Based upon the number of questions and comments regarding beach density, most panel members were not familiar with the rationale for quantifying this parameter. Only 3 panel members indicated sediment density should be quantified. This outcome is probably more indicative of participant comprehension than it is a measure of the utility of sediment density in quantifying the physical environment of a nesting beach.

Beach Hardness: Beach hardness is a general term used to characterize "firmness" or the resistence to probing, penetration or digging. Synonymous terms, applied either properly or improperly, include beach compaction, penetration resistance, shear resistance, and density. This parameter may affect nest excavation and the incubation environment (i.e., temperature, moisture, and gas exchange). The panel weighted this parameter greater than all others (n = 12).

Topography: Topography is typically quantified by conducting a beach survey that enumerates elevation as a function of distance from a fixed reference point. A survey generally extends from the toe of dune to the intertidal or subtidal zone. Female emergence and nest site selection are known to be influenced by the profile of a beach. As most nourishment projects elevate the beach profile significantly above adjacent beaches, scarping commonly occurs during the initial stages of beach profile evolution. It is perhaps for this reason that 11 panel members selected this parameter as a relevant one, second only to hardness. Twelve panel members felt the entire beach profile should be surveyed, while quantification of scarping alone received 9 marks. Additional comments suggested it is important to compliment the survey with measurements of: 1) nearshore submarine relief, 2) dune vegetation, 3) beach inclination (slope, dip), and 4) beach width.

It has recently been reported (L. Ehrhart personal communication) that nesting females may bypass the entire nourished beach in the absence of visual cues (i.e., dune line, horizon). This has been shown to result in nesting within upland, back-beach areas. Panel members therefore agreed the template or profile of a nourished beach should be designed to mimic the coastline's natural geomorphology. This led several participants to suggest a beach survey must extend beyond the primary dune and perhaps into the seaward edge of coastal uplands.

Other: A section of the survey was titled "Other" and provided space for comments on aspects of physical monitoring which might not have been addressed in the preceding sections. The following parameters were recommended for consideration:

1. Sediment color and reflectance (n = 6)
2. Groundwater elevation (n = 5)
3. Contaminants (n = 2)
4. Gases (n = 1)

Station Location and Sample Depth: Time did not permit discussion of optimal station location and sample depth. Recent documentation of nest-site selection and statistical analysis of cross-shore variation in the physical data suggest traditional sample locations (i.e., spring-high water, mid-backshore, toe of dune) may need re-examination. Mean- and spring-high water station locations received only 3 marks, while mid-backshore and toe of dune received 8 and 9, respectively. In addition, as many as 6 panel members felt stations should be nest specific, although at least one study has indicated there is no significant difference in the physical data obtained at randomly located and nest-specific stations (Cornelisen 1996).

Once on station, samples of beach sediment are obtained for laboratory analysis. Samples might be obtained at discrete intervals or by continuous sampling. Presumably, samples should be obtained at locations proximal to the area in which the eggs are deposited. For loggerheads, sample depths of 30 cm and 60 cm have often been selected as an approximation of the top and bottom of the chamber. However, an even weighting of all sample depth choices (Table 1) suggests the panel has not formulated a unified opinion.

There was space provided for comments in both Station Location and Sample Depth(s) sections, including the category "Other". Participants recommended the following:

1) Sample the top (crest) of dune, if present (n = 4).
2) Sample the beach at random elevations from -60 cm to the surface (n = 1).
3) Sample the beach using a core or auger between -45 and -60 cm (n = 1).
4) Sample the borrow area to fully characterize the geotechnical nature of the fill material which will later be tracked as a measure of impact assessment (n = 1).

Task 2: Prioritization: Prioritization was sought because a comprehensive nesting beach monitoring program that uses all of the parameters discussed above may simply be too expensive or time consuming. Ranking would help to ensure the most important parameters are monitored during any construction project. Those of highest priority would be selected first and those of lower priority to follow until the resources were fully utilized. The panel did not have time to prioritize the relevant parameters.

Task 3: Data Acquisition: Cursory inspection of monitoring reports (eg Ernest and Martin 1999; Parkinson *et al*. 1995) suggest there are a wide variety of methods for quantifying each physical parameter. For example, grain-size diameter has been reported in both millimeter and phi units. Beach temperature has been quantified in both Celsius and Fahrenheit. Furthermore, some investigators report temperature variation over a 24 hr period at 3 hr intervals, while others do not. Finally, the method by which all of this data is stored varies as a function of the investigator's preference.

The combined effect of all variations in data acquisition is obvious. If we are to make significant advances in assessing the impact of beach nourishment, the acquisition of data must be tailored to a common function and format. The panel did not have time to address this issue.

Concluding Remarks: Panel members and the audience expressed strong support for improving the

physical monitoring of marine turtle nesting beaches subject to nourishment. A clear link between the stages of marine turtle nesting and a physical monitoring program must be established. To date, the two monitoring programs are often designed independently; any association between the two data sets is therefore haphazard and highly subjective. Once this link has been established, through the development of new monitoring protocol, the details of data acquisition (i.e., methods and storage) can be addressed to ensure we are capable of: 1) selecting the appropriate borrow site, 2) constructing a nourished beach which, as best we can, matches the natural conditions, and 3) maintaining the project site on an annual basis until it has been fully assimilated into the littoral system through sediment reworking and transport.

This workshop, by all accounts, was a success and the conveners were encouraged to organize another one promptly. For information on activities associated with the physical monitoring of Florida's marine turtle nesting beaches see our website at <http://www.fit.edu/new-coastal/orlando2000.htm.>

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Meeting Report: Taxonomic Status of the East Pacific Green Turtle (*Chelonia agassizii*)

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Most of the uncertainties about sea turtle systematics and taxonomy have been resolved in the last 15 years, due to rigorous morphological, biochemical, and genetic assessments (see Bowen &Karl 1996; Dutton *et al.* 1996; and references therein). Perhaps the sole exception, and the last frontier in sea turtle taxonomy, is the status of the black turtle or East Pacific green turtle. To address this issue, a colloquium was held at the Annual Symposium on the Biology and Conservation of Sea Turtles (Feb. 29-March 4, 2000). The debate over taxonomy of the black turtle has been revitalized in recent years by the infusion of genetic data, the dire conservation status of the black turtle, and the publication of a forum in *Conservation Biology* (13:990-1016).

Opinions range from retention of species status to the possibility that this is a melanistic population (or group of populations) of *Chelonia mydas*. Here, we provide a summary of the conclusions from each presentation. The detailed arguments for each position are presented elsewhere (Bowen & Karl 1996, Carr 1961; Dutton *et al*. 1996; Figueroa & Alvarado 1991; Kamezaki & Matsui 1995; Karl & Bowen 1999; Mrosovsky 1983; Parham & Zug 1996; Pritchard 1996; Pritchard 1999; and references therein).

Presentations in this forum included the following:

B.W. Bowen (moderator): opening remarks.

P.C.H. Pritchard: Taxonomy and classification of the black turtle.

N. Kamezaki & K. Kuroyanagi: Morphology and osteology of *Chelonia.*

S.A. Karl & B. W. Bowen: Evolutionary genetics of *Chelonia.*

J. Alvarado & C. Delgado. Ecological and behavioral

aspects of the black turtle (NB Presented by Jeff Seminoff)

P.A. Meylan: Systematics of green turtles, a phylogenetic perspective

Pritchard has consistently championed the species status of the black turtle. After presenting a review of the taxonomic history of *C. agassizii*, he cautioned against reassignment of the black turtle to subspecific status until more information is available. Until then, he argued that the current binomial assignments should take precedence. Pritchard also developed two themes that would emerge in several presentations: First, that reproductive isolation is the most important test of species status; and second, that the black turtle could be an emerging species, undergoing divergence in a peripheral, atypical habitat. Finally, Pritchard warned against over-reliance on lab machinery and modern technology *in lieu* of traditional classification and field observations.

Kamezaki and colleagues have previously advocated subspecies status for the black turtle based on cranial morphology. New data and ongoing studies of shell morphology, however, prompt the authors to tentatively support species status.

Karl and Bowen have maintained that the genetic differentiation of the black turtle is typical of populations, rather than species. We recognize, however, that this may be an incipient evolutionary entity.

Alvarado and colleagues have previously supported the species status of the black turtle, based on morphological considerations. Here Alvarado and Delgado raise the possibility of significant differences in ecology, reproductive biology, and trophic specialization that distinguish the black turtle from the green turtle. Furthermore, these authors emphasized that taxonomic issues are secondary to concerns about the dire decline of East Pacific populations.

Meylan, using a survey of available phylogenetic data, noted that if the black turtle is a valid subspecies, then several other regional aggregates of *C. mydas* might qualify as subspecies. He also pointed out the most prominent gaps in morphological and genetic assessments, and developed the recurrent theme that phylogenetic information on the *Chelonia* group is fragmentary at present.

Elsewhere in the Sea Turtle Symposium, Omar Chassin Noria and colleges presented new data on mitochondrial DNA differentiation of East Pacific turtles. These authors concluded that the genetic data do not support species status for the black turtle.

Following the presentations there was an open discussion by the speakers and attendees. Several people reiterated the need to collect phylogenetic data across the range of *Chelonia*. Particular emphasis should be placed on under-sampled regions. The need to share data across geopolitical boundaries also was emphasized.

	Species	Subspecies	Population
Biologist	5	7	14
Conservationist	3	4	3
Volunteer	2	0	2
Other	3	4	3
Total	13	15	22

Table 1. Results of attendee voting on the taxonomic status of the black turtle.

At the end of the presentations, ballots were distributed to determine the opinions of attendees. The results of voting indicate that a majority considers the black turtle to be either a population or a subspecies (Table 1). However, if we remove the half dozen ballots from our close associates (e.g., students, spouses, and collaborators), the results are approximately a three-way tie. A consensus clearly does not currently exist. There was a broad agreement, however, on two issues.

First, the black turtle is unique in some respect and is likely to be an emerging evolutionary lineage. Second, the taxonomic debate will be moot if population declines continue.

Acknowledgements: We thank the invited speakers and participants for making the colloquium a success. Jeff Seminoff filled in for Javier Alvarado at short notice, who being refused entry to the US was unable to attend the symposium. Thanks to the Florida Sea Turtle Protection Program, especially Blair Witherington and Allen Foley, for making this colloquium possible.

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Modeling Workshops at the 20th Annual Symposium on Sea Turtle Biology and Conservation

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On the 2nd and 3rd of March 2000, as part of the 20th Annual Symposium on Sea Turtle Biology and Conservation in Orlando, Florida, I ran two workshops on population modeling. The first workshop, "Modeling 101: Deciphering the Black Box", was an overview of population models for biologists with little modeling experience. About 40 participants gathered for the workshop. All participants received a diskette of Excel spreadsheet programs with some basic tools for teaching and understanding simple population models. The second workshop, "Modeling 202: A Model for Every Question", was a discussion group of about 20 participants who had some experience with population models in the past.

My goal of this beginners' workshop was to explain some of the types of models used in conservation biology as well as terminology and model assumptions. Because most biology programs do not require demography or other quantitative courses, many biologists are uncomfortable with projects or research papers that include mathematical equations. Unfortunately, when we ignore the equations that are presented in a paper, or fail to carefully read the methods used in the model analysis, we may be misled by the model results that are presented. Although population models can be extremely useful, it is important to maintain a healthy skepticism about them and to understand what assumptions and data were required to reach the conclusions presented. This is especially important for sea turtles, because most population models require demographic information such as survival rates, which are difficult to obtain in the field.

In the second workshop, I encouraged participants to bring their questions and thoughts about different types of models used in Population Viability Analysis (PVA). Because our time and space were limited, we were not able to have a hands-on, computer workshop as I had planned. However, there were interesting discussions about: the analysis of field data for parameter estimation, the pros and cons of deterministic models (such as matrix models without variance) vs. stochastic models (those which include environmental variance), the differences between sampling error (uncertainty) and process error (stochasticity) and the difficulties of acquiring all of the information necessary to run a PVA (which includes variance and co-variance of life stage-specific survival, growth rates, and reproduction parameters).

The participants agreed that a half-day or all-day workshop at next year's Symposium would be very beneficial, especially if it included information on how to incorporate field data into models. Anyone who would like a copy of my Excel teaching program can contact me by e-mail - I would be happy to send you a copy.

Workshop for Marine Turtle Permit Holders of Florida

Karen M. Moody

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A workshop for Florida's marine turtle permit holders was held at the 20th Annual Symposium of Sea Turtle Biology and Conservation in Orlando, Florida. This workshop was held *in lieu* of the annual marine turtle permit holder meeting normally scheduled in January of each year. Approximately 100 people participated. The workshop invitees are permitted to conduct nesting surveys, recover and rehabilitate stranded turtles, keep turtles and turtle parts for educational purposes, and conduct research within the state of Florida. David Arnold, chief of the Bureau of Protected Species Management, Florida Fish and Wildlife Commission (FWC), the state program that issues marine turtle permits, introduced the workshop. Statewide nesting data for 1999 was presented by Kerri Powell FWC Florida Marine Research Institute. Additionally, this workshop was utilized to address technical (paperwork-related) concerns. Karen Moody focused on how to improve lines of communication between the agency and the permit holders. The use of more current technology, such as utilizing a listserve to enhance timely communication and sharing of files, forms, and information was discussed. Concerns directly affecting the recovery of Florida's marine turtle populations, such as coastal construction and other barriers to nesting, were also explored. Plans of action to address some of these concerns were determined.

Workshop on Managing the Arribada Beach at Ostional, Costa Rica

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A prospecting meeting to address the problems regarding the Ostional Egg Commercialization Program (OECP) was held during the 20th Annual Symposium on Sea Turtle Biology and Conservation. The basic objective of the meeting was to discuss the details (objectives, content, breath) of the organization of a major workshop to be held in Costa Rica at a later date, directed towards improving the OECP. The meeting was held at the Chelonian Research Institute (CRI) and was attended by Peter Pritchard (CRI), Nicholas Mrosovsky (University of Toronto), Lisa Campbell (The University of Western Ontario), Anny Chaves and Leslie du Toit (TECNATUR), Steve Cornelius (Sonoran Institute), Randall Arauz (Sea Turtle Restoration Project), Isabel Naranjo (PRETOMA), Didhier Chacón and Jairo Castro (ANAI), and Roldán Valverde (University of Michigan). Due to lack of funding it was not possible to have a representative from the government of Costa Rica (MINAE), the Ostional Wildlife Refuge, the University of Costa Rica (UCR), nor a representative from the Association for the Integral Development of Ostional (ADIO).

The lack of representation from key institutions/ organizations involved in the management of the OECP undoubtedly made it difficult to make sound, in-depth decisions as to how best organize the Costa Rican workshop. After much discussion it was agreed to continue to work towards the organization of the Costa Rican workshop, which would include representatives from all major institutions/organizations that have been historically related to the OECP. The first immediate step was for ANAI to prepare a proposal for funding. At this point, time to prepare the proposal was very limited given the prospected scope of the event and the need to use the grant within the current fiscal year. Unfortunately, after the Orlando meeting ANAI representatives decided that the new process was no different from an earlier effort conducted in Costa Rica with similar objectives. They considered that the ongoing work was to face similar difficulties and follow the same fate. Thus, ANAI declined their continued facilitation role. This decision plus the proximity of the deadline by the funding organization brought the entire effort to a halt. In spite of this setback we remain hopeful that a solution will be reached within Costa Rica that will allow the improvement of the OECP.

Acknowledgments: We want to thank Peter Pritchard for kindly hosting the Orlando meeting. We also thank all those individuals who participated in the meeting, as well as Blair Witherington for his sponsorship.

Sea Turtle Anatomy Workshop 20th Annual Symposium of Sea Turtle Biology and Conservation.

Jeannette Wyneken
Department of Biological Sciences, Florida Atlantic University, 777 Glades Road, Boca Raton, Florida 33431-0991 USA (E-mail: jwyneken@fau.edu)

A total of 40 people attended the two sea turtle anatomy workshops held at the annual symposium this year. The workshop was designed as an introduction to basic internal and external anatomy as well as species identification. Prosected carcasses were demonstrated to show the major layout of organs, differences in species, as well as how to identify the sex of carcasses from the gonads and their ducts. A dissection of a young post-hatchling was used to show the persistence of the yolk sac. Additionally, a simple brain dissection method was demonstrated. A carcass with latex-injected arteries and veins was used to show the locations of the venipuncture sites and the routes of major vessels.

Workshop on Lighting Management on Sea Turtle Nesting Beaches

Kristen A. Nelson[1], Mario Mota[2] & Maura Kraus[3]
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A workshop on lighting management on sea turtle nesting beaches was held at the 20th Annual Symposium on Sea Turtle Biology and Conservation in Orlando, Florida. Approximately 90 people participated including representatives from Brazil, Costa Rica, Israel, Japan , Malaysia and the USA.

The workshop started out with a talk by Robert L. Gent, the Public Relations Officer for the International Dark-Sky Association (IDA). His talk, entitled "Quality Outdoor Lighting - Protecting Sea Turtles and Much More" discussed the problem of light pollution for humans as well as turtles and migrating birds. Topics included were the false sense of security acquired with increased lighting and lighting ordinances around the world to decrease light pollution.

Dr. Art Upgren from the International Dark Sky Association and Wesleyan University talked about changing attitudes towards lighting pollution on Sanibel Island, Florida in his talk titled "The Dark Sky of Sanibel Island Reconsidered."

A brief discussion of conducting lighting surveys and modifying lights also took place. Demonstration lights donated by Voigt Lighting, Hubbel Lighting, Inc., Westek, Advanced Lighting Inc. and SUNLITE Inc. were on display. Tinted glass samples were available from Southwall Technologies and AFG Industries Inc. There was an exchange of educational materials and example lighting ordinances. Contact information for guest speakers and manufacturers of products is listed:

Robert Gent, Public Relations Officer
International Dark-Sky Association
325 Cloudes Mill Drive
Alexandria, Virginia 22304-3080, USA
Fax: +703 751-6806; E-mail: BobGent@aol.com

Dr. Arthur Upgren
5 Red Orange Road, Middletown, Connecticut 06457, USA
E-mail: aupgren@wesleyan.edu

Voigt Lighting Industries, Inc.
135 Fort Lee Road, Leonia, New Jersey 07695, USA
Fax: + 201 461-7827

Hubbel Lighting, Inc.
2000 Electric Way, Christiansburg, Virginia 24073, USA
Fax: +703 382-1526

Westek
9295 Farnham Street, San Diego, California 92123-1201, USA
Fax: + 619 268-1681

Southwall Technologies
1029 Corporation Way, Palo Alto, California 94303, USA
Fax: + 650 967-8713

AFG Industries
P. O. Box 929, Kingsport, Tennessee 37662, USA
Tel: + 423 229-7200

ANNOUNCEMENTS

Help Sought in Liberia

The Liberia Sea Turtle Project (LSTP) is a project of the Save My Future (SAMFU) Foundation, an indigenous non-profit, NGO founded and working in Liberia (West Africa). The goal of the foundation is to promote and facilitate participatory and sustainable natural resources management and development, especially of forests of high biological diversity and endangered species.

The LSTP is undertaking a baseline survey of the Liberian coast. The survey aims to gather scientific and baseline data for the development of a national strategy for sea turtles conservation. The survey runs from April 2000 – April 2001. Major activities includes:

1. Gathering baseline data on the coastal communities, beaches and the species of sea turtles active in these areas.
2. Identification of nesting population, nesting beaches, recruitment and juvenile development areas, etc. and collating gathered data.
3. Identify threats and potentials for conservation.
4. Conduct workshop and discuss findings with local community leaders and solicit their support and participation in the development of an integrated national coastal zone management with emphasis on sustainable management/protection of sea turtles.

A pilot monitoring and research site will be established in September 2000 and will operate as such until September 2001. The aim of the project is to identify ways of promoting the survival of the sea turtle populations, including the sustained recovery of depleted stock, the safeguarding of critical habitats, nesting beaches, feeding and juvenile development areas. Experience from this pilot project will be replicated in other communities identified for intervention during the survey.

The project team will conduct daily/nightly patrols of a 15km stretch of beach between Borgor Point and Rock Cess to assess and gather data about nesting activities and experiment with means of providing alternative source of income for sustainable livelihood. Activities will include:

1. Counting fresh tracks (with/without nest), locating nests, recording evidence of poaching of nests, types of predation, etc.
2. Recording date of emergence, identifying species and threats to emerging hatchlings, etc.
3. Identify means of providing protection for nesting females and nests (*in-situ* or setting up hatcheries), hatchlings, nesting beaches and juvenile developmental areas.
4. Set up a community savings and credit scheme for income generation to make up for income loss from trading in sea turtles and parts and alternative source of protein (meat).

The LSTP is seeking volunteers to provide technical assistance to the above projects in the areas of:

1. Training - for SAMFU staff/local people in conservation and data collection techniques;
2. Developing of recording system and the setting up of a database;
3. Participate in daily/nightly patrols to monitor nesting activities beaches, feeding and juvenile development areas and collating of data;
4. Project monitoring and evaluation;
5. Developing a strategic plan for ST conservation in Liberia.

The SAMFU Foundation needs your support and assistance and would greatly appreciate it if you could consider the conditions below, we however encourage further discussion with prospective volunteers who have specific questions we have not addressed here.

1. We do not have the financial resources to pay for your travel to and from Liberia, therefore interested candidates will be required to raise their own funds to cover travel expenses.
2. The foundation will provide accommodation for the duration of your stay. However, you will be required to provide subsidy towards rent in the amount of U$100 per month or U$300 for stays beyond three months (up to six months).
3. Students doing research (graduate) are encouraged to apply. Specialists/experts are preferred.
4. Preferred minimum duration one month. No upward limit.

Please send a CV to one of the following addressed:
Ronnie Siakor–E-mail: samfufoundation@hotmail.com
Silas Siakor – E-mail: samfu1@yahoo.com
Fax: + 231-226210 or + 31-594-552123 EXT 2002 (Attn. Silas Siakor)
Post: C/o Silas Siakor, UNDP Liberia, P. O. Box 1608 GCS, New York, NY 10163-1608, USA

New GIS Map Application for Indian Ocean Marine Turtle Nesting Beaches

The Secretariat of the Convention on Migratory Species (CMS) and the World Conservation Monitoring Centre (WCMC) have collaborated on the development of a unique GIS application to present spatial data, over the Internet, on marine turtle nesting in the Indian Ocean.

This prototype, first released in 1999, has recently been improved and now sports a new interface that allows users to combine nesting beach data with information on protected areas, coral reefs and mangroves. Users may also query the underlying GIS data, which are a subset of a global database developed by WCMC.

The project is intended as a model for the delivery, revision, maintenance and exchange of information on marine turtle nesting beaches. While the prototype concentrates on the Indian Ocean, the activity may, in future, be broadened to cover other regions.

To access the site, go to <http//www.wcmc.org.uk/cms> and click on "Marine turtle".

The aims of this joint initiative are:

(1) to make preliminary turtle information available to a wide user audience, including turtle biologists and coastal planners;

(2) to seek feedback from users on the value of the database; and

(3) to invite users to contribute new or revised data and so allow the existing data set to be improved.

Your assistance will be greatly appreciated! Any comments on the site and improvements to the data are welcome. Comments sent to WCMC using the "Feedback" facility will be automatically copied to the CMS Secretariat.

NEWS AND LEGAL BRIEFS

This section is compiled by Michael Coyne. Please submit news and legal briefs regarding marine turtles to the MTN-online website <http://www.seaturtle.org/mtn/> or forward via e-mail to mtn@seaturtle.org with the subject header: MTN News and Legal Briefs. It is requested that a copy of original news sources be faxed to M.Coyne at +1 301 713 4384 or mailed to: 1305 East-West Hwy, Rm 9216, Silver Spring MD, 20902, USA.

Adjustment of the Date of the Texas Closure

NMFS announce an adjustment to the start of the annual closure of the shrimp fishery in the exclusive economic zone (EEZ) off Texas. The closure is normally from May 15 to July 15 each year. For 2000, the closure will begin on May 11. The Texas closure is intended to prohibit the harvest of brown shrimp during the major period of emigration from Texas estuaries to the Gulf of Mexico so the shrimp may reach a larger, more valuable size and to prevent the waste of brown shrimp that would be discarded in fishing operations because of their small size.

The EEZ off Texas is closed to trawl fishing, except for trawling for royal red shrimp beyond the 100-fathom (183 meter) depth contour, from 30 minutes after sunset, May 11, 2000, to 30 minutes after sunset, July 15, 2000, unless the latter date is changed through notification in the Federal Register. Source: *Federal Register*, 12 May 2000.

Property Owners on Alert to Dim Lights

Dozens of Pompano Beach, Florida beachside property owners will be cited this week [13 April 2000] for violating a law meant to protect hatchling sea turtles from artificial lights. Inspectors have written 59 citations against hotels, condominium towers and other buildings with lights that could confuse hatchlings and cause them to crawl inland instead of out to sea. Many Florida communities have laws restricting coastal lights during turtle nesting season, from March to October. Most of the violations in Pompano involved parking lot lights, said Ed Snyder, code enforcement supervisor at the Broward Sheriff's Office. Violators have 30 days to correct the problems. After that, they face fines of up to $500 a day.
Source: *Naples Daily News,* 13 April 2000.

Texas Shrimp Plan Can Help Save Sea Turtles

Proposed changes to Texas shrimp fishery rules were presented to the state's Shrimp Advisory Committee and could help protect the endangered sea turtles. Texas Parks & Wildife Department is proposing new shrimp gear restrictions and no-trawling zones - including a closed area similar to the marine reserve proposed by national and Texas environmental organizations - that may enhance the recovery of the Kemp's ridley sea turtle. Texas Parks & Wildlife Department is proposing a permanent year round closure to shrimp fishing off South Padre Island from Aransas Pass to the Mexican border out to 10 fathoms as a key element in its draft plan. To provide safety for the greatest number of Kemp's ridleys turtles, it has been proposed to extend the closure out to 17 nautical miles. The State of Texas would close the first nine miles, and the federal government would close federal waters from nine to 17 miles. This is an area most travelled by Kemp's ridley sea turtles that nest at Padre Island and in Mexico.

Public comments on the proposed shrimping regulations can be sent to the Texas Parks and Wildlife Department, c/o Robin Riechers, 4200 Smith School Road, Austin, Texas 78744. Source: *Environmental News Service*, 24 April 2000.

Turtle Friends Gather to Mark Beginning of Nesting Season

Lee County [Florida] turtle advocates gathered at the Little Hickory Island site Monday [1 May 2000] to kick off this year's nesting season. The park was selected because it was developed with nesting turtles in mind. "The good news is that we can share the beach with these ancient, time-honored creatures," said Eve Haverfield, chairwoman of Turtle Time Inc., a nonprofit group that monitors and protects turtle nests in southern Lee County. The Brooks Beach Club represents a true turtle-sensitive development, Haverfield said. The park, created by Bonita Bay Properties for use by residents of The Brooks development, includes low-pressure sodium lights, and shoe-box style lighting along walkways. In addition, the dune system was left intact, giving sea turtles access to prime nesting areas. Park staff also collect furniture from the beach each night during nesting season. Bonita Bay developed the park with input from county environmental scientists. Source: *Naples Daily News*, 2 May 2000

41 Nations Certified to Export Turtle Safe Shrimp

The U.S. State Department has certified 41 nations to export shrimp to the U.S. market after finding that they meet requirements for protecting sea turtles. Shrimp from other nations that may have been harvested in a manner harmful to sea turtles will be embargoed. Certification was granted to 16 nations that require their shrimpers to use turtle excluder devices (TEDs) to prevent the accidental drowning of sea turtles in shrimp trawls. U.S. shrimpers are subject to the same requirement. The 16 meeting the TEDs standard are Belize, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Indonesia, Mexico, Nicaragua, Panama, Suriname, Thailand, Trinidad and Tobago, and Venezuela, the department said.

Honduras lost its certification, which was granted in 1999. The State Department certified 25 nations where the fishing environment poses no threat to sea turtles. Shrimpers from the Bahamas, China, the Dominican Republic, Fiji, Haiti, Jamaica, Oman, Peru and Sri Lanka were certified because of their use of manual harvesting techniques. Sixteen other nations' shrimpers harvest in cold waters where the risk to turtles is negligible. They include Argentina, Belgium, Canada, Chile, Denmark, Finland, Germany, Iceland, Ireland, the Netherlands, New Zealand, Norway, Russia, Sweden, the United Kingdom and Uruguay. Source: *Environmental News Service*, 28 April 2000. <http://ens.lycos.com/ens/apr2000/2000l%2D04%2D28%2D09.html>

Egg Thieves in Puerto Rico

A man was sentenced to four months in jail and one month probation for possessing 136 hawksbill turtle eggs which he had removed from the nest. After observing his activities, agents from the Puerto Rico Department of Natural Resources and the US Fish and Wildlife Service detained him during which time he admitted to selling eggs. Souce: *Traffic North America* 3:9 March 2000

Large Mesh Gillnet Fishery Closed

NOAA Fisheries announced the closure of waters along the coasts of Virginia and eastern North Carolina and in the mouth of the Chesapeake Bay to fishing with gillnets with a stretched mesh size 6 inches or larger. The closed area includes all Atlantic Ocean waters between 35°13' N. latitude (approximately Cape Hatteras) and 38° N. latitude (approximately the

Virginia-Maryland border), west of 75° W. longitude, and the waters in lower Chesapeake Bay, east of the Hampton Roads bridge-tunnel and south of a line drawn between Old Point Comfort and Cape Charles City. Fishermen have until 11:59 p.m. on May 13, 2000 to retrieve any gillnets with 6 inch stretched mesh or greater that are already set. This closure is in effect for 30 days.

An unprecedented number of dead sea turtles have washed ashore on the North Carolina Outer Banks in April and May. During two concentrated stranding events from April 14-17 and May 3-8, a total of 280 dead turtles have been found between the town of Ocracoke and Oregon Inlet. The ten-year average is only 219 loggerheads stranding in all of North Carolina in an entire year. Winds and currents helped bring the carcasses ashore in large numbers, but reports from fishermen indicate that many dead turtles are still at sea, so the actual extent of the turtle mortality offshore is likely much greater than the strandings would indicate.

Four of the loggerheads that stranded in May were entangled in gillnets with stretched mesh sizes of 10 to 12 inches. NOAA Fisheries has determined that the most likely source of this sea turtle mortality is large-mesh gillnetting for monkfish and possibly dogfish. Other possible causes, such as disease, toxic algae, trauma, or hook and line fisheries, are not consistent with the nature of the strandings. Satellite sea surface temperature information has allowed NOAA Fisheries to reconstruct the likely times and locations of the sea turtle mortality. Gillnetting for dogfish and monkfish have been the active fisheries in those times and places. These fisheries have long soak times, ranging from overnight to several days. Large-mesh gillnets are known to be highly effective at catching turtles and in fact were the gear of choice during the historical sea turtle fishery. Source: Barbara Schroeder, National Marine Fisheries Service.

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).

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.

Readers should note that the Umigame Newsletter of Japan can be contacted by e-mail: <bx102325@nifty.ne.jp> or <makotoi@tkc.att.ne.jp>.

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