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Mortality of olive ridley turtles at Orissa continues (Pandav & Choudhury, pages 10-12).

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Guest Editorial: The WTO Shrimp/Turtle Case

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In April, 1998, a dispute panel of the World Trade Organization (WTO) in Geneva, Switzerland found that United States of America requirements that imported shrimp be caught in trawls equipped with turtle excluder devices (TEDs) violate free trade rules under the WTO. How did sea turtle conservation become the stuff of disputes before the World Trade Organization? Some history may help.

By 1979, at the World Conference on Sea Turtle Conservation in Washington, DC, drowning in shrimp trawls had been identified as a major source of sea turtle mortality in many countries around the world, and testing had begun on various excluder devices to address the problem. But years of efforts to encourage voluntary use of TEDs failed miserably. In late 1989, TEDs were required in many US shrimp trawls, as science and the environmental community (in particular the Center for Marine Conservation (CMC), along with Greenpeace and the Environmental Defense Fund) finally prevailed in a 7+ year struggle to make TEDs mandatory. The US regulations have been expanded and refined several times since 1989 (e.g. TEDs are required in flounder bottom trawls in some areas now), but never has the US recanted on the basic premise that TEDs are an effective way to allow shrimping to proceed virtually unimpeded while protecting most sea turtles from drowning in trawls.

Recognising both the migratory nature of sea turtles and the threat the huge US shrimp market places on "US" and "other" turtle populations, US conservation organizations began providing information on TED use and benefits to scientists and advocates in other countries as well. Meanwhile, US shrimp industry representatives were concerned that imported shrimp caught in countries where TEDs were not required might constitute a cheaper, unfair advantage over US, TED-caught shrimp in the lucrative US market. Therefore, in November, 1989, the US Congress passed a rider to the Department of Commerce appropriations bill (Section 609 of Public Law 101-162), with support from a curious alliance of environmental and industry groups. Section 609 directed the President to initiate negotiations with other nations for bilateral and multilateral agreements for the protection of sea turtles and to ban the import of shrimp and shrimp products "which have been harvested with commercial fishing technology which may affect adversely such species of sea turtles." Congress provided a three-year time frame for countries to meet this standard before import bans would be implemented.

In implementing this law, the US State Department initially chose a narrow interpretation, applying it only to countries within the wider Caribbean and Western Atlantic. This interpretation was vigorously opposed by both US environmental and fishing industry concerns, as well as the law's authors. Eventually, the State Department agreed to extend application of the law outside the Caribbean, but with no specific timetable, and, therefore, no threats of embargoes. Several environmental and industry groups, led by the Earth Island Institute, filed suit challenging this interpretation. Meanwhile, the State Department also entered into discussions with the governments of Mexico and other American nations that eventually led to development of the Inter-American Convention for the Protection and Conservation of Sea Turtles.

Concurrently, many nations were also negotiating new rules to govern trade in the global economy. By 1994, they finalised the framework of the World Trade Organization, the next stage after the GATT (General Agreement on Tariffs and Trade), which oversees international trade issues and mediates disputes among party nations. To alleviate concerns raised by the environmental community, the preamble of the WTO agreement specifically refers to the "... objective of sustainable development, seeking both to protect and preserve the environment, and to enhance the means for doing so consistent with [the Parties'] respective needs and concerns..." The WTO also retains Article XX of the GATT, which allows for measures (b) "necessary to protect animal life or health" or (g) relating to the "conservation of exhaustible natural resources." In addition, a Committee on Trade in the Environment was established.

Soon, these parallel universes came into direct conflict. In late 1995, the US Court of International Trade found in favour of the environmental groups and shrimping industry, ordering that application of Section 609 be expanded to countries outside the Caribbean. The State Department conceded, but asked for a full year in which to implement this expansion. This was rejected and in December, 1995, the Court directed the State Department "to prohibit not later than May 1,

1996, the importation of shrimp or products of shrimp" from countries where their harvest might adversely impact sea turtles. Thus, on April 30, 1996, the State Department "certified" 36 nations as requiring TEDs or harvesting shrimp in a manner that did not harm sea turtles (e.g., artisinal fisheries, harvesting only cold-water shrimp). All other nations were effectively barred from exporting wild-caught shrimp to the US. The Court also prohibited the State Department from utilising a shipment-by-shipment certification procedure that environmental groups believed would have undermined the requirement that exporting nations have turtle conservation programmes comparable to that in the US (discussed later).

Shortly India, Pakistan, Thailand and Malaysia filed claims against the US under the WTO disputes procedures. (Interestingly, Thailand requires TEDs and its shrimp were not embargoed, but chose to enter the dispute, arguing that the US was violating Thailand's sovereign rights to determine how to harvest shrimp in its own waters.) And, in April, the 3-member WTO dispute panel found against the US.

Comments posted subsequently on the Internet, and other places, have suggested some may want to use this case to debate north-south issues, developed versus developing nations, etc. Debate of such issues may be legitimate, however, the far bigger issue here is whether we, collectively, will allow the goals of multilateral free trade to quash all consideration of the environmental and social impacts of such trade. I, for one, do not believe global free trade should come at the expense of loss of global natural resources, be they turtles or some other resource.

The crux of this dispute hangs on 2 issues:

1) How much can any country impose on the sovereign rights of another when the two are engaged in international trade? Readers may ask, what right has the US to tell other nations how to manage their shrimp fisheries and sea turtles? However, turtles migrate, and few, if any, species spend their entire life cycle in any single country's domain. Should any nation have the unfettered right to allow their trawlers to drown turtles that might spend only a portion of their lives in that country's waters? What about the rights of nations that might protect those same sea turtles while in their waters? And should not the US have sovereign rights to determine whether its market must accept products produced in a manner destructive to turtle populations? In fact, Section 609 is not discriminatory, i.e., the requirements for imported shrimp are no different than those for shrimp caught in US waters; there is no foreign import tax, or other discriminatory imposition, and shrimping nations are still free to sell their shrimp elsewhere.

2) Can nations protect natural resources, and their markets, against goods produced by harming wildlife within the rules of free trade agreements like the WTO? Readers may remember the tuna/dolphin dispute several years ago, in which the US was found in violation of the GATT. The GATT tuna/dolphin decision also held that the US could not discriminate against goods based on the manner in which they were prepared, i.e., if they were environmentally destructive. However, there are some very important differences between these two cases. First, the dolphins in the tuna/dolphin case were not endangered or threatened. Sea turtles are recognized as threatened or endangered in multilateral treaties to which all of the WTO shrimp/turtle disputant parties subscribe, such as CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora). In addition, the GATT did not have an objective, as set forth in the WTO preamble, of "seeking both to protect and preserve the environment," and no provisions were made for consultation with scientific experts under the GATT dispute rules, as there are under the WTO. An expert review panel of 5 scientists from around the globe, convened by the WTO in the turtle/shrimp case, found that: 1) sea turtles are threatened and endangered, and they are shared resources; 2) shrimp trawling is a significant cause of mortality that contributes to the endangerment of sea turtles; and 3) TEDs, when properly installed and used, are an effective means of mitigating that threat. But, the WTO dispute panel did not base its decision on the science; instead the panel determined the US law was "unjustifiable or arbitrary discrimination" because it "undermine[d] the multilateral trading system. "

Indeed, in October, after additional briefs and oral arguments, a WTO Appellate Body reversed a significant portion of the earlier decision by finding that Section 609 is, after all, legitimate under Article XX(g). The Appellate Body still held the US had applied the law "...in a manner which constitutes arbitrary and unjustifiable discrimination...," leaving the short-term outcome functionally the same for sea turtle conservation.

Meanwhile, in June, 1998, the US Court of Appeals for the Federal Circuit had vacated an earlier ruling by the US Court of International Trade, re-opening the door

for the State Department to rely on shipment-by-shipment certification of shrimp imports rather than requiring national programmes to protect sea turtles. In August, the State Department modified its rules for shrimp imports in just this manner, although litigation on the issue continues. Shipment-by-shipment raises two concerns: 1) in areas where shrimping is heavy, even a few trawlers without TEDs can drown significant numbers of turtles, undermining the efforts of shrimpers that do use TEDs and seriously impacting turtle populations; and, 2) it will be virtually impossible to verify the reliability of certificates issued in many nations where public officials are poorly paid and the pressure to certify for export to the US market is intense. Further, the October WTO Appellate Body ruling reaffirms the legitimacy of Section 609, which requires certification of national programmes, not individual shipments.

So that's how we got here; where do we go next? WTO rulings cannot overturn US law. The WTO rules do not require that the US accept non-TED caught shrimp under these rulings. US environmental groups had feared the April ruling might lead to renewed political pressure to weaken or repeal the US TED requirements. However, the October finding appears to open the door for the US to re-examine how it has implemented Section 609, seeking ways to apply it in a more open, even-handed manner. In this way, the US might be able to further sea turtle conservation while complying with the rules of the WTO. Recently, a diverse coalition of 14 organizations, ranging from the Center for International Environmental Law and the Consumers Choice Council to the Center for Marine Conservation and the Humane Society of the United States urged the State Department to do just this. They provide several recommendations for achieving more equity under Section 609, while still calling for environmental reform in the WTO. The groups also urged an end to shipment-by-shipment certification and a return to certification of national programmes.

Finally, turtle advocates throughout the Western Hemisphere should be urging their governments to ratify and implement the Inter-American Convention for the Protection and Conservation of Sea Turtles, which addresses issues of habitat conservation as well as threats from fisheries and other causes. President Clinton recently transmitted the Inter-American Convention to the US Senate, urging rapid ratification. Likewise, in the Indian Ocean region there is interest in development of a multilateral agreement for the conservation of sea turtles. Perhaps such an agreement could be facilitated under an existing rubric, such as the Bonn Convention on Migratory Species. Similar efforts should be encouraged in all ocean basins.

Guest Editorial: Common Sense Conservation

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The following is based on a keynote address to the 18th Annual Symposium on Sea Turtle Biology and Conservation, Mazatlan, Mexico, March 1998:

In the world of today, which is rapidly approaching what E.O. Wilson calls a "Malthusian precipice", where growing human populations will collide abruptly with diminishing world resources, none of us can afford *not* to be conservationists if we have any interest at all in assuring that our children and grandchildren have even a modicum of the quality of life that we enjoy. Being a human and being a conservationist must become synonymous, and quickly, if we are to avoid killing ourselves as a species.

Ideally there would be no dichotomy between science and conservation science. There would be no more degrees and courses and textbooks for "conservation biology"; but rather conservation should become a broad and enveloping theme in all biology (all biologists should be conservationists), and policy experts and communications specialists, and economists and businessmen and women, as well as theologians. Conservation is in *everyone's* best interest, and it must become part of the fabric of human society, part of our culture and part of our permanent world view.

In the big picture, humans depend on nature for life, so we must seek ways to interact more harmoniously with it. Let us not fool ourselves,

conservation is something we do for ourselves. Nature does not care if we protect her or not. She rolls with the punches and accepts whatever we do to her, makes the necessary changes and continues to evolve, just as she always has. Yet, we humans *need* clean air, water, and food - the things that Nature provides - or we perish. Beyond these basic needs, we also have aesthetic and spiritual reasons for needing Nature. I, for one, would like for my children and their children to be able to see the amazing spectacle of Mexico's migrating butterflies, the beauty of a Galapagos hawk in flight, the unparalleled majesty of the rainforest, and the almost mystical phenomenon of the *arribada*. So let's get down to the Common Sense of how we "do" conservation.

Possess a Clear Mission
(Know where you are going)

This may sound obvious, but my friends have always said that I have a firm grasp on the obvious. A critical first step in any conservation effort (or any effort, really) is a clearly defined mission, from which will flow the goals and objectives and specific activities that need to be undertaken. If you know and "own" that mission, then you always know where you are going. It's your road map.

What might the mission be for a turtle conservationist? Most would agree that we want to "Save Turtles," ensure they do not go extinct. But a turtle is more than just what is inside its shell - it is only really a turtle when accompanied by its environment. So, I submit that our mission as sea turtle conservationists might be the following: "To maintain the global diversity of marine turtles and assure the natural integrity of the full range of ecosystems upon which they depend." You may be thinking that this makes the job too difficult, that it would be easier to just worry about the turtles. But if we ignore the big picture, the turtles (and we) lose in the end. A turtle is *not* a turtle in an aquarium. It is nothing without its surroundings, nor are the surroundings the same without the turtles, so we must conserve both if we are to conserve one.

I want to encourage you all to think about our common mission, and how you can contribute to it most effectively. It is precisely these types of fora that allow us to discuss and validate "where we are going" as a sea turtle conservation "movement", and to further develop a consensus amongst all of us on the goals, objectives and work that needs to be done, who will do it, and how.

I started working with turtles as a researcher in Georgia and in Latin America back in the disco era, but for the past 15 years or so I have been focusing more on biodiversity conservation in general. What I am going to offer at this point are some tidbits of advice based on the lessons I have learned, and how they might apply to turtles. These are my own personal "golden nuggets of truth," for what they're worth, and if nothing else I hope they encourage you to think about how what each of you does as a conservationist fits into the big picture.

Establishing Priorities / Working Strategically

It has been said that if you try to do everything, you will accomplish nothing. This is certainly the case with conservation. We do not have the time, nor the human and financial resources to deal with all the challenges at once, so we have to constantly assess which issues, ecosystems, species and methods are the highest priorities, and work on them first.

Now if you are talking about biodiversity in general, and tropical forests in particular, we have devised several methods that allow us to focus-in on priorities. I can tell you about "hotspots" for biodiversity conservation - tropical forest areas that account for less than 2% of the land area, but more than 50% of the world's plant and animal species. I can tell you about a different kind of priority area - major wilderness areas, probably the only sites left where natural evolutionary processes still take place and where traditional humans still live with no knowledge of the outside world. I can go further to talk about priority areas by geo-political units, the "megadiversity countries," and I can even take it right down to micro-priority areas (e.g. subregions within the broad Amazon basin). Progress in determining priorities for the marine realm has been slow, but advancements have been made there too.

With regard to threatened species, conservationists rely on global assessments, such as the IUCN *Red Data Books,* to set priorities. Studies have been done that examine diversity, endemism and threats by life stages for a variety of species from manatees to monkeys. For some taxonomic groups, specific, consensus-based plans for prioritized conservation action are available. These are just some of the tools conservationists have developed for strategically taking conservation step by step, starting with what we perceive to be the most critical priorities first.

Now for sea turtles. Through the work of the IUCN Marine Turtle Specialist Group and others,

we have done well at agreeing on threats to sea turtle survival and on some of the needed actions, but we have not yet developed a strategy that deals with clear priorities. I believe that, as a movement (the sea turtle conservation community), determining these priorities should be *our first priority*, because if we try to do everything at once, our chances of failure are great. We need to carefully consider and derive consensus on which species, habitats, and threats require the most immediate attention, and which of all the different methods for conserving turtles are the most efficient, then put a plan into action that takes things step-by-step, in proper order. My next bit of advice is the following:

Know the Animals

It is hard to set priorities if you do not possess a basic scientific understanding of the animals with which you are working. This is true for all branches of conservation, not just turtles, and it is one of the areas where we (both biodiversity and turtle specialists) are weak and need to redouble our efforts. As an example, did you know that of the world's estimated 100 million species of plants, animals and microorganisms, science has been able to identify only 1.4 million to date. A meager 1.4% of the world's biota described! And this tells us nothing of the ecological processes that tie these species together in functioning ecosystems.

I estimate that our knowledge of sea turtles for the purposes of conservation is at about the same level. Dr. Richard Byles was quoted in *National Geographic* magazine in 1994, "I know of no other branch of science where so much effort has been expended to learn so little." We have been spending time and energy, and lots of it, but not in a focused and efficient way. Our scientific understanding of sea turtles lags far behind other endangered species groups. We need to catch up. This does not necessarily mean more research, but rather more focused, conservation-oriented research. Remembering what I said earlier about establishing priorities, not all research questions are equally important for our mission as conservationists. It is useful perhaps to achieve yet another validation of the average number of eggs/nest for a given species, or yet another formula for calculating straight-line carapace length from over-the-curve measurements….but we need to ask ourselves, "Is this really the best use of our time?" – especially given that there are some big unanswered questions looming out there about marine turtles, knowledge of which would contribute greatly to their conservation. Things like:

- What are survival rates in the wild?
- What is long-term reproductive success?
- What are the rates and variability of recruitment?
- What are real population sizes and how are they distributed?

Knowing the animal is just one part of the conservation process. More importantly, we need to be aware of the pressures that affect them, which brings me to my next point:

Understand the Threats

Conservation is about reducing and removing threats. In conservation, threats are almost always (if not always) related to human activities. Many times people have said to me, "So, you're a conservationist! How exciting to work with plants and animals and ecosystems!" But the reality is that the work of conservation does *not* lie principally with the animals, plants and ecosystems - Nature already has a plan. Rather, conservation lies in dealing with humans. Above all, conservation is a social science, albeit with strong scientific underpinnings.

I have a Taoist view of threats - threats are not bad or good, they just "are". They are usually complex and culturally driven. You cannot just identify them, list them in a publication and then insist that they go away through laws or strong-arming, or in the end they merely come back. You must study threats, take them apart, understand their complexities, and seek ways to ameliorate them that work for the long term.

A good example of this approach is the Pro-TAMAR project in Brazil. The project sought to identify threats to sea turtles in Brazil, and soon discovered that the main threat was fishermen and their families. Project personnel were creative in their thinking, and they were able to successfully reduce this threat by employing the fishermen to help protect the turtles. Co-operatives were established for the fishermen's wives to make turtle motif handicrafts to sell to tourists to generate income. Childcare co-operatives were established to enable the women to work, knowing that their children were safe. Pro-TAMAR identified the threat, studied and understood it, then creatively found a way to diminish it in a fashion that will likely work for the long term.

The people we need to be talking to, as conservationists are the people that pose the threat, whether they are fishermen or business leaders. Focusing on the turtles is necessary, and it is a lot more fun, but without confronting the threats posed by humans, and getting creative about how to deal with them, conservation will not occur.

In presenting my next point, I'd like to talk a bit about the difference between protection and management, both of which are important parts of conservation. Protection, in my view, is merely reducing the human threats on a species or an ecosystem, and it implies a hands-off approach. Management, however, implies a hands-on approach and can be defined as any activity that alters natural systems a little or a lot, we hope in favor of conservation. This would encompass sustainable use initiatives.

Management is risky unless you have a complete, and I mean complete, knowledge of how Nature works and you can predict and control all the impacts of your management interventions . . . not just the biological aspects, but also those defined as social or economic. But of course, we do [not] know biodiversity or sea turtles that well, so common sense would dictate that the best conservation approaches for sea turtles and for biodiversity avoid management and focus more on protection. Nature herself is the best manager, so usually the best management means "leaving it to Nature" to the extent possible.

There are no less than a zillion examples of how man, with all good intentions, has messed things up by trying to "manage" Nature without fully understanding the effect(s) of his actions. Typically we do not discover that our management is dangerous until after we have been doing it for awhile. And then it may be too late to correct the mistakes. For example, about half of Africa's elephants were killed over a ten year period because we thought that "sustainable use" was the way to manage them. We made the mistake of incubating turtle eggs in Styrofoam boxes for a long time before we learned about temperature dependent sex determination, and only then did we realize that our management, done with all the best intentions, may have had a negative impact on the turtles.

I am not recommending *no* management, I am recommending *wise* management. The past 20 years of "sustainable development" as a conservation "mantra" has led many to believe that *everything* can be sustainably used, yet to date we have very few (if any) good examples of true sustainable use. I have come to believe that sustainable use too often represents a very arrogant view, not to mention a very dangerous one. Until such time as we fully understand Nature and the dynamics of man's interactions with it, any management is risky, so our safest route is to:

Protect the Core (Protect the maximum, and manage the minimum)

How big should the core be? In the case of tropical forests, we have been trying for a quarter century to figure out what the "minimum critical size" of an ecosystem should be for natural evolution to take place. We still don't know. With sea turtles, we are likely even farther away from an answer - we do not even know how many sea turtles exist. So in the absence of a clear idea, we should shoot to protect the greatest possible portion of the population, just as we do with tropical forests. We try to make the core zones of parks as big as possible. Just as we should try to protect, not manage, as many turtles as possible. And again, "protect" means "leave it to Nature".

Economics, Policy and Communications

In cases where we do have to manage a resource, conservationists have found it very useful to look at the economics of the situation - most threats are economic ones, and diminishing them will require finding viable economic solutions. "Sustainable development" must be biologically as well as socially sustainable, but above all it must be economically sustainable in order to last in the long term. When good conservation also becomes good business, then our problems will be solved. Don't forget to carefully assess the economic drivers behind your conservation activities.

I'd also like to briefly comment on policies and politics as regards conservation. Conservationists love to engage in politics, which is why we tend to occur in higher densities in places like Washington, D.C. and Mexico City. A vast number of treaties, conventions, laws, policies, White Papers, and resolutions have been produced in recent decades, and much has been accomplished at the policy level for conservation and for sea turtles, especially since the Rio Conference [the Earth Summit in Brazil] in 1992. And there is a political awareness of the need for conservation at the highest levels now that is unprecedented in the history of humankind. The

danger is, of course, that we will lose sight of the fact that where the rubber hits the road, where the conservation really gets *done,* is *not* in Washington, D.C. or in Mexico City, but on the nesting beaches and in the fishing boats, at the interface between man and turtles. Policies are not an end, but only a means. Possibly our biggest challenge in conservation is "Closing the Gap." The gap between increasing interest in the importance of conservation at high levels of Government, and the actual on-the-ground success.

Lastly, a word about the importance of communication in the broadest sense. Policies that are not backed by a clear commitment of the people seldom work. Changing the way people view their relationship to Nature is the critical component of long term conservation success, be it sea turtles or biodiversity as a whole. As I said earlier, conservation is a social science. It is about people. When man as a species learns to live harmoniously with Nature, my job will be obsolete. Communicating this new paradigm (through the media, advertisement, education, training, face to face encounters and by example) needs to be an underlying theme of all we do. And do not be lulled into believing that our communications challenges are met simply because the world is now tied together by internet connections and satellite phones, thereby giving people easy access to enormous quantities of information. Providing information is just the first step. Our communications efforts will not be fully realized until that information is absorbed by people, and has created real changes in attitudes and behaviors – simply knowing that conservation is the "right thing to do" is still a long way from truly changing how one acts.

Here is a brief shorthand version of the points I have presented that I call the cornerstones, the key components of successful conservation:

- Science (biological and social)
- Protection/Management (protect the core, manage the rest)
- Economics (offer viable solutions)
- Policy (build the legal framework)
- Communications (Change human attitudes and behaviors)

Optimism

In closing I want to share some thoughts about motivating ourselves to act. We hear a lot of doom-and-gloom. The media especially like to dwell on the negative images and talk about how we are losing the battle. To the contrary, I prefer to remain optimistic and to encourage others to be optimistic about the environment as well, because despite the challenges we face, there are some real success stories out there that we can be very proud of. Examples include Pro-TAMAR in Brazil, the annual Latin American Reunion at the Annual Sea Turtle Symposia, the results of Lily Venizelos' conservation education work in Greece, Jeanne Mortimer's conservation success in the Seychelles, etc. The list goes on and on.

Pessimistic assessments of the world's environment leave us feeling that there is nothing we can do to make a difference, yet I think there is a chance to make a difference and that optimism is the fuel that can drive us to keep going in conservation.

One thing we frequently neglect to remember is that conservation is an experimental science. There is no cook book approach that can be applied everywhere. The cornerstones I have presented are a nice framework, but they need to be applied in different ways at each site and with each species and human community, and the proper mix involves some guesswork based on knowledge of the situation and common sense. But guesswork is OK, and a whole lot better than doing nothing. We still have a long way to go in understanding biodiversity and sea turtles, but we do not have time to wait for all the answers before acting. Time is working against us in all branches of conservation.

When it comes to the details, do not wait for the great and mighty gurus of conservation to tell you how to do it, because you are the gurus - no one knows your local reality like you do. The best way to learn is to just do it, make mistakes, but be honest about them, and use the lessons you learn to improve your techniques. And if we all do this, and share these lessons with each other, then we will be able to get the job done.

In summary:

Possess a clear mission
Establish priorities
Know your animal
Understand the threats
Protect the core

Get going if you have not yet begun. Keep going if you have already started. Close the Gap. Just do it!

Genetic Consequences of Coastal Development: The Sea Turtle Rookeries at X'cacel, Mexico

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In February 1998 it was announced that X'cacel (isk-ca-SEL), one of the few remaining nesting beaches for green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) turtles on the Atlantic coast of Central America, was to be sold to the Sol Melia Corp. for tourist development. X'cacel is located in the eastern coast of the state of Quintana Roo, Mexico (in the Yucatan Peninsula), along the Cancun-Tulum tourist corridor. Despite the pressures for tourist development, this beach has been maintained in a relatively pristine state, thanks to the efforts of conservationists and protective measures instituted by state and federal authorities. Approximately 500 loggerhead and 400 green turtles nest in this area every year (Prezas *et al.* 1998), such that X'cacel has the highest density of green and loggerhead turtle nesting on the Atlantic coast of Mexico (Zurita *et al.* 1993).

In view of the imminent risks to primary nesting habitats, here we review studies of mitochondrial (mt) DNA diversity for the nesting populations of green and loggerhead turtles at X'cacel. Recent research has provided a relatively complete atlas of Atlantic mtDNA diversity in these species (Encalada *et al*. 1996, 1998), and so the potential consequences of rookery extinctions on intraspecific genetic diversity can be estimated.

Samples from green turtle (n = 20) and loggerhead turtles (n = 20) were obtained from the nesting beaches of X'cacel and nearby Isla Cozumel. Haplotype frequencies from these locales were not significantly different and so the two locations are considered here as a single population. Samples consisted of a few drops of blood taken from the dorsal cervical sinus of nesting females following a protocol by Owens & Ruiz (1980). A mtDNA region of 391 base pairs (bp) and 510 bp from the mtDNA control region were sequenced from loggerhead and green turtles, respectively (see Encalada *et al*. 1996, 1998 for extended description of methods).

These surveys found that X'cacel populations of *Chelonia mydas* and *Caretta caretta* are unique in several respects (Encalada *et al*. 1996, 1998). Although there was some sharing of haplotypes with other regional nesting colonies (especially Florida, USA), haplotype frequency comparisons show that both the green turtle and loggerhead nesting populations are independent population units. Hence the first conclusion available from genetic data is that the nesting colonies at X'cacel and adjacent beaches are isolated stocks. If these nesting areas are extirpated, they are not likely to be recolonized over the ecological time scales meaningful to conservation. They will rise and fall largely on their own, and any loss of genetic diversity is likely to be permanent.

For both the green and loggerhead turtles of the Atlantic, the highest levels of genetic diversity were observed at the X'cacel nesting beaches (haplotype diversity $h = 0.82$ for green turtles; $h = 0.65$ for loggerheads). In addition, both species exhibited a high degree of haplotype endemism. Four of the eighteen haplotypes observed in Atlantic green turtles were unique to X'cacel and adjacent beaches. Three of the ten haplotypes observed in Atlantic loggerheads were found only at this location. Hence nesting populations of X'cacel contribute substantially to the overall mtDNA diversity of Atlantic green and loggerhead turtles. This observation prompts our second conclusion, that loss of the X'cacel nesting colony would have a strong impact on overall genetic diversity. Extirpation of Quintana Roo green turtles would entail a 22% loss of mtDNA diversity in Atlantic populations, while extirpation of loggerheads from X'cacel would eradicate 30% of mtDNA diversity in Atlantic populations (Figure 1). By any criteria, the nesting populations at X'cacel are major reservoirs of mtDNA diversity. In terms of natural genetic resources, the nesting beaches of Quintana Roo may represent one of the crown jewels of Mexican biodiversity (Zurita *et al*. 1993).

How would the loss of genetic diversity at Quintana Roo affect the prospects for survival of Atlantic sea

turtles? Genetic diversity is widely recognized as the insurance which allows species to cope with diseases, stress, and changing environmental conditions. While the specific consequences of this erosion of genetic diversity are difficult to predict, the extirpation of the most diverse nesting populations in the Atlantic Ocean can only be regarded with alarm.

It is important to note that loss of the mtDNA diversity at X'cacel may not directly influence natural selection, adaptation, and persistence of sea turtle populations. The mitochondrial control region is a noncoding region, and therefore does not contain the genes that are typically considered "the stuff of evolution" (see Lynch 1995). However, overall trends in genetic diversity in the mtDNA control region, especially processes such as erosion of diversity through population reductions, are likely to reflect parallel losses in genetic loci that affect long-term survival and adaptation.

Recent studies based on genetic markers and tag-recapture data have demonstrated that sea turtles, especially loggerhead turtles, travel much further than previously suspected. Adult females tagged at the Quintana Roo nesting beaches have been recovered in the Gulf of Mexico and Caribbean Sea (two females were caught off the coast of Honduras, and four subadults were caught in Cuba; Zurita *et al.* 1994). Subadult turtles from the Quintana Roo nesting population have been detected on the east coast of the United States (Rankin-Baransky 1997). Juveniles have been detected in the farthest points influenced by the North Atlantic gyre, including the Azores, Madeiras, and the Mediterranean Sea (Bolten *et al*. 1998, Laurent *et al*. 1998). From this evidence, it is clear that the nesting populations of Quintana Roo contribute to marine ecosystems throughout North Atlantic and European waters. When viewed from this perspective, the loss of the Quintana Roo nesting areas could have repercussions across a vast geographic and political scale.

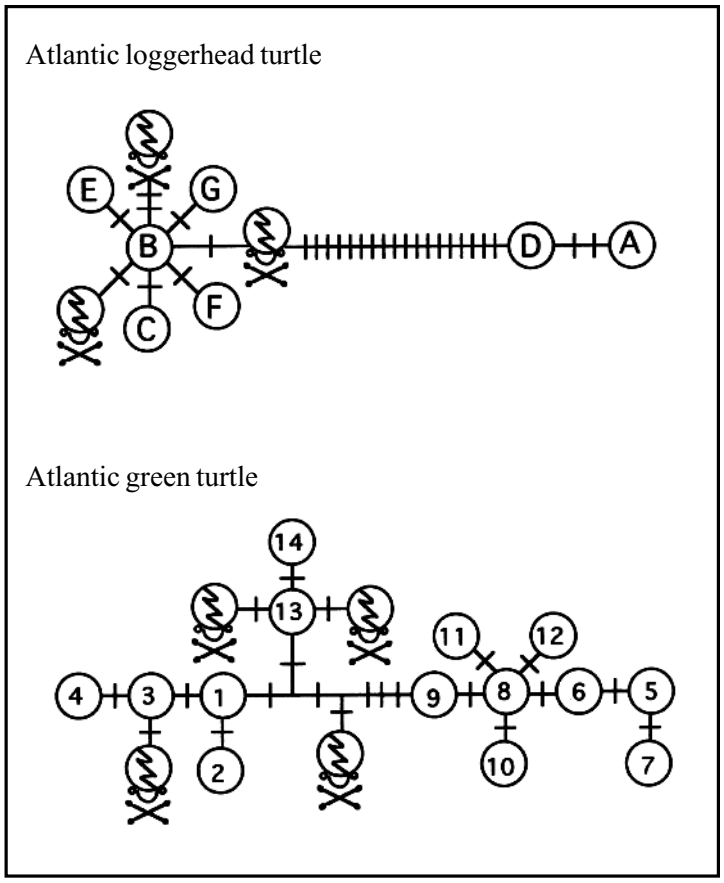

Figure 1. Haplotype networks for Atlantic loggerhead and green turtles. Haplotypes endemic to the coastal area threatened by development (X'cacel and adjacent beaches), are indicated by skulls. For the loggerhead turtle, these include (clockwise from lower left), haplotypes J, I, and H (Encalada *et al*. 1998). In the green turtle these include (clockwise from lower left), haplotypes 15-18 (Enclalda *et al.* 1996).

Of course the management of loggerhead and green turtles cannot be solely based on genetic considerations. The biologists that have been working with marine turtles in X'cacel for over a decade have highlighted the importance of this beach for the perpetuation of sea turtle nesting in Mexico, and have demonstrated the ecological importance of the area as a whole. Ecological roles, environmental education, and the needs of local people must remain paramount (Zurita *et al*. 1993; Prezas 1996; Prezas *et al.* 1998). To these primary considerations, we add a warning that the loss of nesting habitat at Quintana Roo, Mexico, would entail a substantial loss in Atlantic mtDNA diversity for green and loggerhead turtles. Genetic data also demonstrate that the loss of Quintana Roo nesting colonies would deplete marine ecosystems across thousands of kilometres, making the sale of X'cacel for tourist development a matter of serious international concern. Taken together, the ecological and genetic studies indicate that X'cacel represents a unique source of diversity and thus we urge the incorporation of this beach into long term management plans designed with the ultimate goal of permanent protection.

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An Update on the Mortality of the Olive Ridley Sea Turtles in Orissa, India

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Olive ridley turtles (*Lepidochelys olivacea*) nest in low densities all along the eastern coast of India. However, the most important nesting beaches are in Orissa, where three of the few remaining mass nesting or "arribada" sites in the world are found (Gahirmatha, Robert Island and Rushikulya; Pandav & Choudhury 1998). A significant portion of the world's olive ridley turtle population nest at these three rookeries and they have received considerable attention in recent times due to the large scale mortality of adults, mostly due to drowning in illegally operated trawl fisheries. Fishing in the coastal waters off Gahirmatha became restricted in 1993 and was completely banned in this area in 1997, when Gahirmatha was given the status of a Marine Sanctuary.

Uncontrolled mechanised fishing in areas of high sea turtle concentration has resulted in large-scale mortality of adult sea turtles during the last two decades in Orissa (James *et al*. 1989; Dash & Kar 1990; Pandav *et al*. 1994; Pandav *et al*. 1997). Dash and Kar (1990) report the stranding of 4,682 adult olive ridley turtles at Gahirmatha rookery between September 1978 and May 1985. James *et al*. (1989)

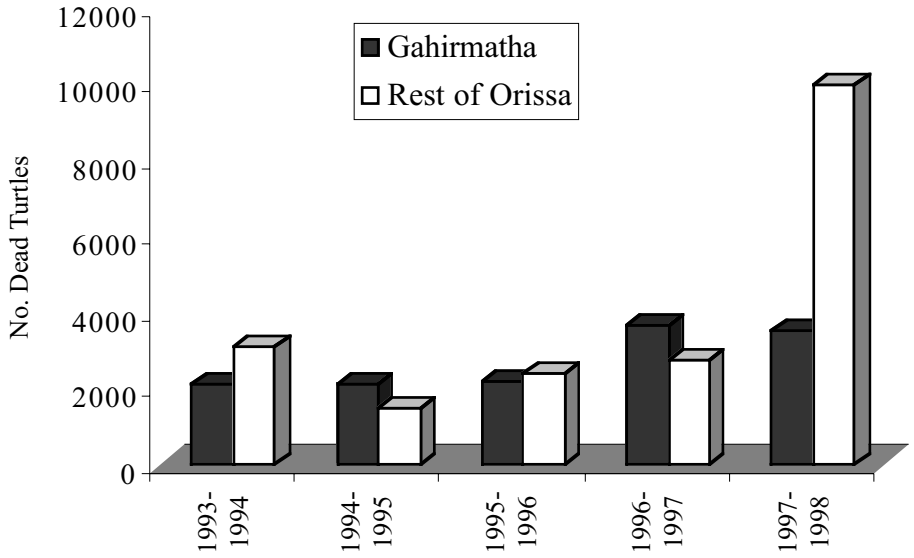

Figure 1. Dead turtles stranded at Orissa (1993-1998, n=33,617).

document the stranding of more than 8,000 individuals between 1983 and 1987.

Since November 1993, records of marine turtle strandings on the coast of Orissa have been kept as a part of the ongoing sea turtle research programme of the Wildlife Institute of India. The entire Orissa coast, stretching over 480 km has been divided into eight survey sectors (Pandav *et al*. 1994) and each of these sectors is walked once every two weeks during the breeding season (November-April). Dead turtles washed ashore are measured, sexed and marked with white paint on their carapace to avoid repeat counts during subsequent surveys. In the 1993/94 season, 5,282 dead olive ridley turtles were recorded (Pandav *et al*. 1994; Pandav *et al*. 1997). Since then we have documented the stranding of more than 30,000 olive ridley turtles in Orissa (Figure 1). Near shore mechanised fishing, specifically shrimp trawling, is thought to be the major cause of this high mortality. Mortality due to such illegal trawling has been increasing each year and reached a

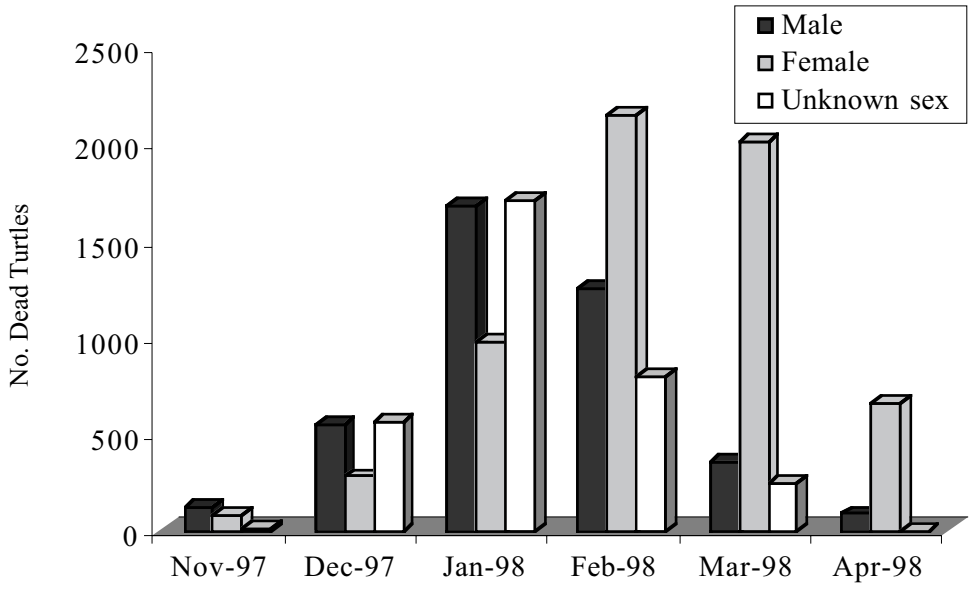

Figure 2. Seasonal stranding at Orissa (November 1997- April 1998, n=13,575).

record high of 13,575 ridleys in the 1997/1998 season (Figure 2). This figure is thought to be a minimum estimate. The majority (89.6%) of the recorded strandings occurred on the coast near Gahirmatha, Paradeep, Kujang and Devi (Pandav *et al*. 1994). The coastal waters of these four sectors are subjected to the highest levels of shrimp trawling in Orissa.

Shrimp trawling has been identified as one of the greatest causes of sea turtle mortality throughout the world (Hillstad 1981; Ruckdeschel & Zug 1982; Henwood & Stunz 1987; Ehrhart 1987; Magnuson *et al*. 1990; Robins 1995). Despite the wide acceptance of this fact, the Government of Orissa and the Orissa State Fisheries Department appear reluctant to accept this large scale mortality is a result of incidental capture of turtles in fishing nets. They speculate that disease, migration fatigue, and marine pollution (as cited in many Indian newspapers) are the causes of these deaths. To counteract these arguments quantitative information on observed captures of sea turtles and the rate of mortality of these individuals during offshore fishing operations is absolutely essential. In the interim, strict enforcement of Orissa Marine Fishing Regulation (OMFR) Act 1982 and Rules 1983, which prohibit any kind of mechanised fishing within five km of the shore along the Orissa coast, is needed. A blanket ban on near shore mechanised fishing should significantly reduce the turtle mortality. A second step towards minimizing this mortality would be the mandatory use of Turtle Excluder Devices (TEDs) in trawl nets. Currently none of the 3,000 odd trawlers operating off the Orissa coast use TEDs in their nets.

However, the use of TEDs alone will not eliminate turtle mortality resulting from fisheries. Additional factors which must be considered are that in areas of high fishing intensity, turtles that are captured and released several times may die and turtles are also caught and drowned in gill nets. Therefore strict enforcement of the existing law, prohibiting near shore mechanised fishing seems to be the best short term solution to reduce turtle mortality

The number of nesting females at Gahirmatha has declined in recent years. Although intense offshore fishing activities may have played a role, it is also thought that this may be due in part to unsuitable beach conditions. The beach width has been severely reduced due to erosion processes. A third possibility is that artificial illumination created by construction work at the nearby missile testing range at the Outer Wheeler Island, has caused disturbance. Notwithstanding, the high levels of marine turtle mortality in the area are a matter of utmost concern and urgently need to be addressed.

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Decline of Marine Turtle Nesting Populations in Pakistan

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Marine Turtle Project, Sindh Wildlife Department, Government of Sindh, Karachi, Pakistan.

The beaches of Hawkes Bay and Sandspit in Karachi, Pakistan host the nesting of the green turtle (*Chelonia mydas*) and the olive ridley turtle (*Lepidochelys olivacea*). In 1979, a conservation project was initiated at these sites and nesting females, their eggs and hatchlings, are protected from predators (mainly feral dogs) and poachers (Asrar 1997; Firdous 1988). In addition, marine turtles have been declared 'endangered' and are legally protected under the Sindh Wildlife Protection Ordinance (1972) and the Sindh Wildlife Protection Act (1993).

Surveys were conducted along the entire 20 km of beach that constitutes Hawkes Bay and Sandspit. At this site, green turtle nests are laid throughout the year, with most nests occurring between July and December. Between 1980 and 1997 a total of 17,008 green turtle nests were recorded. Numbers of nests since 1987 are apparently lower than the earlier years of this initiative (Figure 1). To date, 3087 green turtles have been tagged at this site and in addition to many local recaptures individual females have been recaptured in India (Bhaidar Island, Gulf of Kutchch Gujarat, 22°27'N 69°17'E), Africa (Beraisole, Eritrea, NE Africa 13°39'N 42°08'E) and more recently in Iran (Between Lengeh and Dayyer in the Persian Gulf, 27°45'N 52°15'E).

Olive ridley nesting at Hawkes Bay and Sandspit was only recorded between the months of March and October with a marked peak between July and September. A total of 654 olive ridley turtle nests were recorded at this site between 1980-1997. During the entire period of study, 42 olive ridley females were tagged and 12 tag returns recorded at the nesting beaches (7 after 1 year; 4 after 2 years and 1 after 5 years). A peak of olive ridley nesting occurred during the 1987 season when 113 olive ridley nests were laid on these beaches. There has however, been a profound decline over the last decade (Figure 2). In each of 1996 and 1997 only 2 olive ridley nests were recorded.

The reasons for the apparent decline in marine turtle populations of both species nesting at Hawkes Bay and Sandspit are not known. However, other than those mentioned above, many threats exist in the region including: beach development, fishing activities, noise from neighbouring villages, pollution from a nearby harbour and exploitation of turtle products. We have not however observed any mass mortality of olive ridley turtles on these beaches as have been found on the Gahirmatha coast of Orissa in India. These data highlight the need to gain a better understanding of

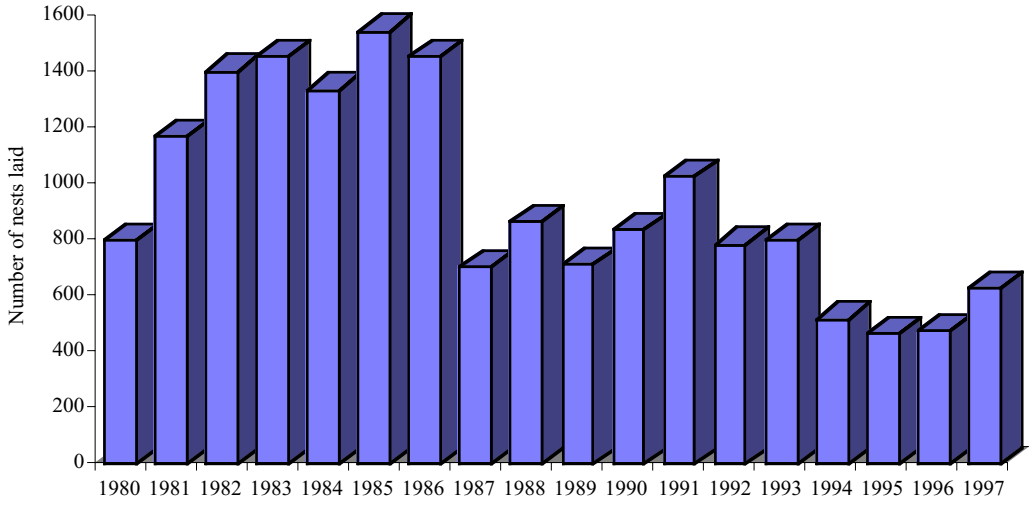

Figure 1. Number of green turtle nests recorded in each year 1980-1997.

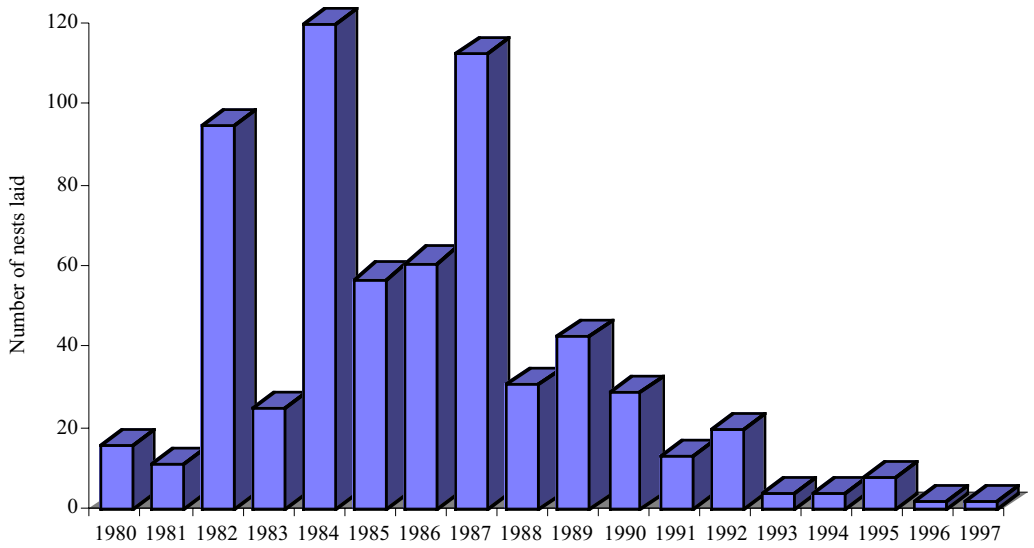

Figure 2. Number of olive ridley nests recorded in each year 1980-1997.

marine turtle populations in the region, both on land and at sea, and the importance of regional sea turtle conservation and management programmes.

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ANNOUNCEMENTS

Turtle Fieldwork on the Net

For those who work with schools, a programme that might be of interest is now on the Internet. In conjunction with the Earthwatch Institute and the Scholastic Network, biologists working on leatherback turtles in Playa Grande, Costa Rica from the Department of Biology, Indiana-Purdue University, Fort Wayne, USA, have recently started a programme of on-line chat with school children. The initiative will create a virtual expedition for students who would like to watch the daily and weekly progress of the experiments and communicate with the postdoctoral, postgraduate and undergraduate scientists working on the beaches. They will be able to observe the research team and see the progress they are making with data collection. For a free trial access to the scholastic network and to sign up for this Internet Discovery Program call +1-800-296-1876 in the USA, E-mail: Meg Warren at <mwarren@earthwatch.org>or sign up at: <http://www.scholasticnetwork.com/turtles/tguide.htm/>

British Chelonia Group Makes 1999 the 'Year of the Sea Turtle'

The British Chelonia Group (BCG) is a registered charity dedicated to the care and conservation of Chelonia world-wide. Throughout its twenty one year history it has launched a number of annual conservation appeals to help many projects striving to safeguard terrestrial, freshwater and marine Chelonia around the world. This year has been declared the BCG's 'Year of the Sea Turtle' and a campaign is being mounted to raise monies for marine turtle projects. The aim will be to allocate the monies collected to projects that fall under the headings of: Research, Protection and Education. Grants are unlikely to exceed £500 ($800). Proposals of projects worthy of funding are invited to be submitted by 1st April 1999. They should be addressed to: The British Chelonia Group, c/o Bob Langton, 13 Springfield Road, Exmouth, Devon, EX8 3JY, UK. Fax: + 44 1395 270720.

Update on 19th Annual Symposium on Sea Turtle Biology and Conservation

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Plans for the above Symposium which is being held on South Padre Island, Texas from the 2nd - 6th March 1999 are coming together fast. The theme for the Symposium is "The Promise, the Pain, and the Progress of 50 years of Sea Turtle Research and Conservation". On 2nd March there will be a full day Mini-symposium on the "Biology and Conservation of the Kemp's Ridley Sea Turtle" sponsored by the US National Marine Fisheries Service. The preliminary list of invited Kemp's ridley speakers includes: P. Burchfield, S. Heppel, K. Kichler-Holder, A. Landry, R. Marquez, S. Morreale, M. Renaud, D. Rostal, J. Schmid and D. Shaver. Confirmed plenary speakers include L. Ehrhart, N. FitzSimmons, N. Frazier, B. Gallaway, L. Herbst, R. Mast, P. Meylan and N. Mrosovsky. In addition, a special evening series of more popular lectures will feature K. Bjorndal and C. Limpus. For this new Wednesday evening event, hosted by Sea Turtle Inc., we will also invite local resident participation.

There will be an increased emphasis on high quality poster sessions. A full hour for poster viewing each morning and afternoon will be designed around the coffee breaks. We also ask your help with coffee break sponsorships at $250 for a co-sponsorship and $1000 for a single sponsor.

Other important meetings associated with the Symposium include the Latin American Marine Turtle Specialist's Meeting, 26th Feb - 1st March at Camp Lula Sams near Brownsville, Texas. In addition, the Wider Caribbean Sea Turtle Conservation Network (WIDECAST), will convene on the 1st – 2nd March and the Marine Turtle Specialist Group (MTSG) will meet on Saturday morning of 6th March. Both of these events will take part at the Bahia Mar Hotel, the main centre for the symposium.

Updates include:

1. We have added tourism specifics to the home-page (URL below) regarding SCUBA diving, bird watching, and trips to the nearby Gladys Porter Zoo in Brownsville.
2. We have established a listserv to facilitate alternative travel and accommodation plans at the Symposium, especially considering car pooling, room mates, and those with special requirements, which will be administered by Don Hockaday of the Pan American University Marine Laboratory. Access this site through the symposium home page (see below).
3. Camping is available at the Boy Scout Camp on the island. The cost is $5.00 per night per person for a tent with 2 bunks on a wooden platform. Showers are also available. The Camp is about 8 km from the meeting site. Contact: Glenn Harrison, Camp Director for more information (Tel: +1 956 761 7806, E-mail: rgcbsa@acnet.net).
4. Marydele Donnelly, regional chair of the Asia and Pacific travel committee, has a new E-mail address (Mdonnelly@dccmc.org).
5. For those wishing to stay over Saturday night 6th March there are several options. The Surf Motel and the Padre South Resort both have rooms set aside (call Marie at the Convention Centre +1 800 657 2373 or Fax: +1 956 761 3024 or E-mail: convctr@sopadre.com).

   The La Quinta in Harlingen has also given us a rate of $63 per night for 1-4 people. Call them directly at +1 956 428 6888, toll free: 800 687 6667 or Fax: +1 956 761 3005

How to Get Complete Information: For complete details on accommodation, travel and registration information please refer to the official Symposium announcement in MTN 82: 16 or to the symposium home page, <http://www.bio.tamu.edu/tortugas/> or contact the Symposium Registrar: Chris Koeppel DEP/ FMRI, 9700 South A1A Melbourne Beach, Florida 32951, USA (Tel: +1 407 757 6709; Fax: +1 407 757 5508;
E-mail: tortugas99@aol.com).

MTN-Online Seeks Volunteers

Part of the long-term goal of the MTN/NTM is to have all issues available on the World Wide Web (WWW). Unfortunately not all issues are available in electronic format. Therefore, the MTN-Online is seeking volunteers to help convert back-issues of the *Marine Turtle Newsletter* and *Noticiero de Tortugas Marinas* into electronic format. Prospective volunteers should be able to either scan or type individual issues. Scanned text should be processed with OCR (optical character recognition) software and proofed and all issues submitted in either Word or WordPerfect format. Old issues of the MTN and NTM can be mailed to volunteers who do not have access to hardcopies.

We are also looking for individuals with Adobe PageMaker or HTML experience to help convert electronic issues into PDFs and for use on the WWW. An issue in Microsoft Word format can be provided to each volunteer along with a "recipe" and WWW templates for conversion to HTML. Issues converted to PageMaker format should match the original layout of that issue.

Please contact the MTN-Online Coordinator Michael Coyne (E-mail: mtn@seaturtle.org) if you are interested in volunteering.

NTM En Línea Now Active

<http://www.seaturtle.org/ntm/>

The Spanish version of the *Marine Turtle Newsletter*, *Noticiero de Tortugas Marinas*, is now available online. This initiative offers each new issue of the NTM as pages that users can browse or print on the World-Wild Web (WWW). In addition, complete electronic copies of recent issues are available in Adobe's Portable Document Format (PDF). The PDF files can be downloaded and viewed, searched and printed on your local computer. If printed to a laser-quality printer, readers can expect the same quality as the version normally received in the mail.

We hope that this effort will allow widespread distribution of this most important sea turtle resource in Spanish and that subscribers who have convenient access to the Internet will consider unsubscribing from the hardcopy version. Doing so will help the non-profit MTN/NTM remain a free service. Please make the effort and try it out.

Second Meeting of the Joint Technical Working Group, Turtle Islands Heritage Protected Area

On 31st May 1996 the Governments of Malaysia and Philippines signed a Memorandum of Agreement, establishing the Turtle Islands Heritage Protected Area (TIHPA), the first ever trans-boundary marine turtle conservation area. This bilateral initiative is formally structured with a ten-member Joint Management Committee (JMC), which is advised by an eight-member Joint Technical Working Group (JTWG). Over the past two years, representatives of both governments, NGOs and academia have met both formally and informally to advance plans for joint management of this unique model for international cooperation of shared marine resources.

Between 12th and 14th October 1998 the JTWG met in Sandakan, Sabah (North Borneo), Malaysia. The second time that this group has convened, advances were made on several fronts, notably the Joint Management Plan, which contains a prioritized listing of management tasks for both countries, including responsibilities shared by both Parties. These tasks are grouped under six general topics, namely: surveillance and enforcement; research and monitoring; education and awareness; capacity building; shared database and collaboration and networking. Details of joint research activities were also discussed. The results of this meeting will be presented to the JMC for approval and will then be used as a fund raising document, as well as to guide future research and management actions.

Further information on the TIHPA can be obtained from:

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Harry Jalanka Memorial Medal Award Won by Turtle Veterinarian

Harry Jalanka DVM, PhD (1951-1993) worked as a veterinarian in the Helsinki Zoo. He was also a professor of wildlife medicine at the College of Veterinary Medicine, Helsinki. In his work, Dr. Jalanka always aimed at improving and maintaining the welfare of animals. He developed excellent new methods for the handling, sedation and anaesthesia of zoo and wild animals. He treated diseased animals with extreme skill and patience. To commemorate Dr. Jalanka, the College of Veterinary Medicine, the Helsinki Zoo and Orion-Farmos Pharmaceuticals have struck a medal. The medal, with a conjoining award, is given annually to a young scientist in recognition of a distinguished achievement in zoo and wildlife medicine or in promoting the health and welfare of wild animals and his/her contribution to the field with new techniques or methods to improve animal health. Dr. Alonso Aguirre was selected as the second recipient of this international award for his outstanding achievements in wildlife management and conservation medicine undertaken whilst working with US National Marine Fisheries Service, Hawaii. The award was announced during the meeting of The American Association of Zoo Veterinarians and American Association of Wildlife Veterinarians, Omaha, Nebraska, October 1998. The selection committee felt that Dr. Aguirre's accomplishments and current endeavours exemplify the type of accomplishments that Dr. Jalanka strove for in his efforts to expand the field of zoo and wildlife medicine.

Regional Training Workshop, Turtle Islands, Philippines

The National Marine Turtle Program of the Philippines - now known as The Pawikan Conservation Project (PCP) - was established by Executive Order in 1979. It is part of the Protected Areas and Wildlife Bureau (PAWB), of the Department of Environment and Natural Resources (DENR). Over the past two decades, the responsibilities and impacts of the PCP have grown from provincial and national to regional and international.

From August 15th to September 1st, 1996, staff of PCP conducted an orientation-training program on marine wildlife conservation and marine ecology, with a special focus on marine turtles. The participants included six Vietnamese (the director and three rangers from Con Dao National Park; a university lecturer; and a Field officer from the World Wide Fund for Nature (WWF)) and one Indonesian (WWF).

The two-week training program, funded by WWF Indo-China, was conducted on Baguan Island Marine Turtle Sanctuary, Tawi-Tawi, Philippines (The Turtle Islands, shared by Philippines and Sabah, Malaysia, are the most important nesting ground for green turtles left in the ASEAN Region, and Baguan is the largest of the nine islands). The main topics included: marine turtle biology and conservation measures; dugong biology and conservation measures; cetacean species identification, rescue and rehabilitation procedures; marine ecosystems (corals, sea grasses and mangroves); survey techniques; marine wildlife conservation strategies - especially criteria for the selection of marine protected areas and considerations for the development of marine protected areas and management plans.

An important part of the program was hands-on training, particularly: tagging marine turtles; monitoring and interpreting nesting activity; collecting, handling and transplanting eggs to hatcheries; release of hatchlings from hatcheries; and evaluation of hatching success. Simple procedures for the collection and preservation of tissue samples for genetic studies were also taught. After their SCUBA training, the trainees took part in surveys of coral and sea grass communities.

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Campaign to Ban the Harvest of Sargassum- A Vital Habitat for Hatchling Sea Turtles

Sargassum seaweed is an essential component of the open-ocean ecosystem. It is particularly important to the survival of hatchling and post-hatchling sea turtles, which are known to spend the first year or more of their lives drifting in the sargassum rafts. Sargassum also supports a diverse community of marine life.

In the last few years, commercial fishermen operating along the east coast of the United States of America have begun to harvest sargassum for use as an additive to livestock feed. Until recently, there have been no regulations on the harvest of this important marine resource despite ample evidence documenting the role it plays in the survival of countless marine organisms. The decision regarding the future of the harvest of sargassum off the Atlantic coast of the United States is to be made by the South Atlantic Fisheries Management Council (SAFMC). The Council was due to meet on December 3 and 4, 1998 to vote on the proposed regulation (this was after this issue of the MTN went to press but a report will appear in the next MTN). The Sea Turtle Survival League of the Caribbean Conservation Corporation (CCC), has been lobbying for a moratorium on Sargassum harvest through a awareness and letter writing campaign, encouraging organisations and members of the public to write, fax or sign on an e-mail letter available on the web-site of the Caribbean Conservation Corporation at: <http://cccturtle.org/act-now/sargassum.htm>.

For more information on this issue please contact Dan Evans, Co-ordinator of the Sea Turtle Survival League, Caribbean Conservation Corporation, 4424 NW 13th St, Ste A-1, Gainesville, Fl 32609, USA.
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Sea Turtle Biologues Now Available

The US Fish and Wildlife Service (USFWS) has recently added sea turtles to its biologue series. This is a two page document covering the biology, status and threats faced by the six species found in US waters. It includes illustrations and a mini profile of five of the species. Copies may be obtained by calling the USFWS Publication Unit on (+1) 304 876 7203 or, in the near future, the document will be able to be downloaded from the Internet: <http://www.fws.gov/r9extaff/biologues/wildspp.html/>.

Assessing the Status of Ascension Island Green Turtles

The marine turtle population breeding at Ascension Island (7º57'S, 14º22'W) is one of the largest in the Atlantic, with turtles migrating from distant feeding grounds along the South American coast to nest on the island's 32 beaches. Despite the international importance of this nesting colony, there has been no assessment of the size and status of the Ascension Island green turtle population since Jeanne Mortimer conducted a comprehensive survey in 1977/1978.

It was recently announced that a detailed survey would be undertaken throughout the next two seasons (1998/1999 and 1999/2000). This study will be undertaken by local turtle wardens working with British scientists from the School of Biological Sciences, University of Wales Swansea (Annette Broderick, Brendan Godley and Graeme Hays). This initiative is to be supported by the British Government's Darwin Initiative for the Survival of the Species, in conjunction with the Ascension Island Administrator's Office. The Darwin Initiative seeks to assist in safeguarding the world's biodiversity by drawing on British strengths to help countries lacking in sufficient resources. The Initiative was announced at the Conference on Environment and Development held in Rio de Janeiro, Brazil in June 1992.

The main objectives of the project are fourfold:

1) To estimate the current size of the Ascension Island green turtle population.
2) To quantify the reproductive output by individuals.
3) To assess the current sex ratio of hatchlings produced on the Island.
4) To ascertain the foraging grounds for the population using satellite telemetry.

For further information contact: Annette Broderick/ Brendan Godley, Marine Turtle Research Group, School of Biological Sciences, University of Wales Swansea, Swansea, UK, SA2 8PP (E-mail: MTN@swan.ac.uk).

Marine Turtle Conservation and Management in Northern Australia

A two day workshop on marine turtle conservation and management was held at the Northern Territory University, Darwin, in June 1997. About 40 indigenous and non-indigenous turtle researchers, managers and custodians from a diverse array of government, non-government, university and indigenous organisations gathered to talk turtle, share information, make contacts and explore ways to promote cooperation in sea turtle conservation issues and activities. Papers included indigenous perspectives on management and harvest, population biology and tagging programmes, aerial survey, heavy metal accumulation, fisheries bycatch and the use of remote sensing. Proceedings have been published in "Marine Turtle Conservation and Management in Northern Australia" (1998) Eds. R. Kennett, A. Webb, G. Duff, M. Guinea and G. Hill, by the Centre for Indigenous Natural and Cultural Resource Management and Centre for Tropical Wetlands Management, Northern Territory University, Darwin. Copies of the book are for sale. Price: AU$25 for overseas buyers and AU$20 for Australian buyers. Please contact: Book Sales, Centre for Indigenous Natural and Cultural Resource Management, Northern Territory University, Darwin, Northern Territory, Australia 0990.
Tel: +61 8946 7756; Fax: +61 8 89467755;
E-mail: cincrm@ntu.edu.au

Campaign to Save X'cacel

The pending sale of X'cacel, Quintana Roo, Mexico, one of the most important green and loggerhead nesting beach in the country, was announced in February 1998. The site consists of two sandy inlets totalling a little over a mile in length. After an international outcry the Quintana Roo State Governor created a "reserve" from the 60 metre isobath to 100 metres up the beach. This does not satisfy the concerns of many. Greenpeace recently filed a lawsuit at the General Attorney's Office of Environmental Protection (PROFEPA) against one of the buyers, Sol Melia, a Spanish hotel chain. During the building of fences and paths Sol Melia destroyed species protected by Mexican law. Fences were built inside the "reserve". Photos of this can be found at <http://www.student.wau.nl/~jellef/herpdigest/hdindex.html>. Several international groups have joined the campaign including Friends of the Earth, Netherlands and Global Response. The Audubon Society is writing a letter to the Mexican Government concerning X'cacel and other NGOs are welcome to sign the letter also. People/organisations are being encouraged to write letters to the president of Mexico, Sol Melia, and American and Continental Airlines, who have taken Sol Melia as a travel partner in their frequent flyer programs. More details and information can be obtained at <http://www.turtledisaster.org/> or from Mary Louise Whitlow, 3224 Bryn Mawr, Dallas, TX 75225-7645m, USA. E-mail: marylouisew@msn.com

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.

New Tank For Aquarium

This week, crews will begin pouring concrete for a 185-thousand-gallon tank at the Roanoke Island aquarium. The massive tank will feature sharks, sea turtles, and a variety of reef fish. The tank will also contain a partial recreation of the USS Monitor, the famous Civil War ironclad that sank off Cape Hatteras. The public will get its first chance to view the tank in the spring of 2000. Source: *Yahoo! News*, 16 November, 1998 <http://dailynews.yahoo.com/>

Kemps Ridley Turtles Tracked in Texas

Satellite transmitters were attached to four adult female Kemp's ridley turtles that nested along the Texas coast this summer. One tagged at Padre Island National Seashore, surfaced off of Galveston, Texas nine days after release and arrived in Louisiana waters 20 days later. Five months after release, US Department of Interior biologist Donna Shaver, had tracked her to the Florida Gulf Coast. Two other turtles were near her, along the Florida panhandle, and the fourth was outside New Orleans. Source: *Baton Rouge*, 17 October, 1998.

X'cacel Hotels Crowding Turtles

Environmentalist have launched a world-wide campaign to raise US$11 million to buy X'cacel beach, in the state of Quintana Roo, Mexico, from a hotel development corporation. Over 4,400 green and loggerhead sea turtles have nested on the east coast of Quintana Roo in the last 15 years, mostly on X'cacel and sister inlet X'cacelito. Earlier this year the area was divided and sold. Forty-five hectares (111 acres) went to the hotel group Melia, which has offered to sell this land to environmentalist. The concern is that turtle-watching will become a tourist activity destroying habitat and that bright lights will discourage females from nesting and disorient hatchlings.

X'cacel and adjoining areas were sold for development despite a federal ordinance which calls for their protection. Because of a requirement to protect turtles, Quintana Roo governor Perez Erales recently declared a portion of X'cacel a state turtle reserve. However, the protected area extends only 100 meters from the water line. Environmentalist believes the governor's gesture is a "smoke-screen" to cover the sale to developers. Source: *Environmental News Service*, 10 August, 1998. <http://www.ens-news.com/ens/aug98/1998-08-10-02.html>

NOAA Nabs Turtle Killer

The US National Oceanic and Atmospheric Administration (NOAA) has charged the captain and the owner of a Louisiana shrimp trawler with civil violations of turtle excluder device regulations and killing a Kemp's ridley sea turtle. Senior enforcement attorney Karen Antrim Raine of NOAA's Office of General Counsel, prosecuting the case, put a civil penalty of US$6,000 in a Notice of Violation and Assessment against the skipper for violations that occurred in Lake Pontchartrain, LA. A US Coast Guard team boarded the trawler and found the turtle excluder device sewn shut, thus preventing the escape of a sea turtle that became entrapped in it. Source: *CommercePeople*, September/October, 1998. <http://www.doc.gov/opa/photo/people/page14.htm>

Mauritania Park Gets Conservation's Help

The World Wildlife Fund has raised 400,000 Swiss Francs to help promote sustainable fish management in the Parc National du Banc d'Arguin on Mauritania's Atlantic coast. The funds are designated for maritime park surveillance includes three new patrol boats. Fishing is one of Mauritania's main economic activities, but the park has become a case study illustrating the destruction of fish stocks for short-term profit. Implementing a sustainable approach to fishery management is difficult in Mauritania for two reasons; there are an estimated 4,000 small fishing boats belonging to the indigenous population, and they compete with European trawlers.

In the last five years, fish catches have decreased drastically. This growing competition, together with illegal fishing, has driven the Imraguen people (the ethnic group living and fishing in the park) to switch from their traditional subsistence fishing of yellow mullet, to fishing shark and ray for the Asian market. This has lead to a drastic decline in the yellow mullet population and shark and ray catches. After centuries of sustainable subsistence fishing, the balance has been destroyed by the world's growing demand for fish, according to WWF. Victim of by-catch and poaching, the park's sea turtle population is also threatened. Source: *Environmental News Network*, 7 October, 1998.

<http://www.enn.com/enn-news-archive/1998/10/100798/mauritania.asp>

Protest Over WTO Ruling

The World Trade Organization drew criticism from environmental groups for ruling that the US violated a free trade agreement when it required foreign shrimp boats to use devices that allow sea turtles to escape. The second and final ruling by the international body that resolves trade disputes cannot be appealed, and puts an end to complaints that four countries brought against the US after it implemented the rule in 1990. The WTO ruling used narrow legal language about the US regulation of foreign shrimpers, saying the manner and procedure of how it was applied was arbitrarily and unjustifiably discriminatory, rather than making a broad prohibition against any US regulations on shrimp importers.

The ruling does not nullify the US law, but if the law is not changed, the US can face fines - which the trade organization cannot force it to pay - or trade sanctions from the affected countries. Environmental groups have criticized the US State Department for a policy change it made while the case was pending. The new "ship by

ship" policy requires two stamps - one from the exporter or company owner and one from a government inspector - to be considered sea turtle free and allowed to enter American markets. "There's no way to enforce it," Tim Eichenberg of the Center for Marine Conservation said. "It's a disincentive to do a real program" of inspections and regulations. Source: *Houston Chronicle*, 13 October, 1998.

WTO Director Hit by Cream Pies

About 20 environmentalists threw cream pies at the chief of the World Trade Organization. WTO Director-General Renato Ruggiero had just given a speech at the Royal Institute of International Affairs in London when the pies flew. "When they have no more rational arguments, the fringe elements have to use cake," Ruggiero said in a one-sentence statement from his Geneva headquarters. In his speech, he had been defending a WTO decision to overturn US attempts to protect endangered sea turtles from shrimp fishermen. A group calling itself the Biotic Baking Brigade later issued a statement saying its pie throwers sent "a sticky message to Ruggiero and the global elite: To those who wish to dominate the world, the world replies, 'Let them eat humble pie. Source: *Associated Press*, 30 October, 1998.

World's Oldest Reptile Nest Found

The world's oldest known reptile nests have been identified in Arizona. The 62 bowl-like depressions in a sandstone layer in Arizona's Petrified Forest National Park were dated at 220 million years old, twice as old as any previously known reptile nests. The nests - holes in the sand that over time turned into stone - were probably made by crocodile-like creatures called phytosaurs or by aetosaurs, which were armoured reptiles, said Stephen Hasiotis, a consulting geologist for Exxon who discovered the sites.

Other scientists said the discovery suggests that at least 220 million years ago, during the Triassic Period, some vertebrates stopped laying their eggs directly on the ground and started protecting them in nests. Hasiotis discovered the nests in 1996 when he was a research associate at the University of Colorado. He said he frequently walked past dozens of depressions without realizing their significance. No eggs or shell fragments were found in the Arizona nests.

The oldest reptile fossils are dated to about 300 million years old. Prior to the Arizona discovery, the oldest fossil nest of any kind was a 110 million-year-old sea turtle nest. It was located on the dry plains of eastern Colorado on what was the coast of a shallow, ancient sea. Paleontologist Gale Bishop of Georgia Southern University, one of the turtle nest experts, described the Arizona discovery as "quite convincing." Source: *Associated Press*, 28 October, 1998.

Turtle Nests Delay Hurricane Cleanup

Unhatched sea turtle nests in Florida were keeping crews from cleaning up parts of Naples Beach strewn with sea grass. City and county officials predicted it would be weeks before the cleanup is complete and would cost more than US$1 million. Workers removed 1,850 tons of sea grass from Marco Island during the first week of cleanup and estimated that there was another week's worth of work and two more weeks' work on Vanderbilt Beach after that. Vanderbilt Beach is one of two spots - along with Park Shore Beach - where unhatched sea turtles nests could hamper the cleanup.

State regulators ordered county and city officials to keep heavy equipment off the beaches to protect 15 unhatched nests, allowing only a scaled back cleanup with pitchforks and all-terrain vehicles. County biologist Maura Kraus said baby sea turtles had no problem climbing over mounds of sea grass on the beach. Source: *Naples Daily News*, 6 October, 1998.

Japan Enforces Conservation Laws

Police officers from Aichi Prefecture and Customs Officers from Nagoya arrested three men and two women in connection with a failed attempt to smuggle 66 kg of turtle shell into Japan. The attempted importation contravenes CITES, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, to which Japan is a member. The shell was allegedly obtained in Singapore and the accused attempted to smuggle it into Japan in four suitcases. Known as "Bekko" in Japan, the shell plates of Hawksbill Turtles have been used to produce highly valued traditional tortoiseshell products for some 400 years.

In 1992, Japan agreed to ban imports until a sustainable supply of shell could be obtained that did not compromise the conservation of wild populations of hawksbill turtles. Hawksbill turtles are regularly caught in legal fishing operations around the world, and since Japan banned imports, stockpiles of shell have been growing in many countries. Source: *Japan Becko Association Press Release*, 1 October, 1998.

Corps of Engineers Tracking Turtle

A cold stunned loggerhead sea turtle was released on 14 August from Assateague Park on Maryland's eastern shore. This project was conducted by the Baltimore National Aquarium, the US Army Corps of Engineers and in cooperation with the National Marine Fisheries Service. Information gained from the year-long study, headed by Dr. David Nelson of the Army Corps' Waterways Experiment Station, will be used to determine additional ways to reduce human impacts on sea turtles.

Studying this loggerhead turtle and others will provide input to an on-going discussion between sea turtle biologists about their migration along the east coast of the US. According to the Corps' Jacksonville District Biologist William Fonferek, this study should help determine whether there are two separate loggerhead populations existing in coastal waters, as some experts believe. The results of these studies will be shared with the Caribbean Conservation Corporation <http://www.cccturtle.org/>. Source: *US Army Corps of Engineers News Release*, 11 August, 1998. <http://www.saj.usace.army.mil/pd/satelite.htm>

European Union takes Greece to Court

The Mediterranean Association to Save the Sea Turtles (MEDASSET), first filed an official complaint to the EC against the Greek Government in 1993, for the non-implementation of national and international laws and the recommendations of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern). Events recently came to a head with the expiration of a 25 March 1998 deadline agreed between the Greek Government, the EC, and the Bern Convention Standing Committee for the setting up of the Zakynthos National Marine Park.

As a result of their inactivity, the European Commission has taken Greece to court for failing to protect rare Mediterranean sea turtles which nest on the island of Zakynthos. In a statement, the European Union executive body said the Greek government had infringed EU laws on protection of natural habitats by allowing "disturbances due to tourist-related activities" on beaches favoured by the turtles. Source: *Athens News*, 10 October, 1998.

Singapore Customs Foils Egg Smugglers

Customs officers foiled an attempt to smuggle about 5,000 marine turtle eggs into Singapore in one of the largest consignments confiscated there in more than two years. The eggs were believed to be headed for Singapore restaurants. Acting on a tip, Customs officers were keeping watch on lorries loading cargo consignments at the Pasir Panjang lighter wharves when three were spotted they believed to be transporting the eggs. The vehicles were stopped at the Pasir Panjang Gate Customs checkpoint and the eggs were found packed in three Styrofoam boxes hidden among consignments of electronic goods. The eggs were brought into Singapore by an Indonesian-flagged ship, the Mahkota Express, that arrived from Batu Ampar, Batam. One of the lorry drivers and his attendant were arrested. Two Indonesian crew members of the Mahkota Express were also detained. Source: *The Straights Times*, 10 November, 1998. <http://straightstimes.asia1.com>

Destruction of Turtle Shell Stockpile

The Government of Seychelles recently destroyed it's stockpile of raw turtle shell, carried out in front of the world's press and contestants for the 1998 Miss World Contest. The Vice-President of the Republic, Mr. James Michel, who is also Minister for Environment, lit the fire. Like many other island states, the Seychelles had a historical tradition of sea turtle exploitation. However, in recent years, the Seychelles Government has taken strong action to protect the animals. The stockpile, weighing 2.5 tonnes, is thought to have represented the shell of some 3,300 individual sea turtles. It had been in storage on Mahe since July 1994 when it was acquired from local tortoiseshell artisans.

Maurice Loustau-Lalanne, Principal Secretary in the Ministry of Environment, told the press, "The stock we have burned today represents about US$115,000. The artisans have been compensated with Seychelles Government funds as well as funds provided by the

Global Environment Facility administered by the World Bank. Our actions today turn the page on an aspect of our people's cultural past and sets a firm course for Seychelles to be the leader in environment conservation. We wish through today's event to send out this important message to the world." In order to give its message an international dimension, the Seychelles Government also arranged for twelve of the contestants who are taking part in the Miss World Contest to help dispose of a portion of the stockpile. The contestants, representing six continents, sailed out to the deep ocean behind the Ste. Anne Marine Park and cast the shells out to sea.

The hawksbill turtle populations of the Seychelles, although much reduced from previous levels, is still relatively large. Seychelles, mindful that tourists come to enjoy her beautiful environment, now prefers to "exploit" her sea turtles as a tourist attraction. Visitors to Seychelles have the opportunity to enjoy watching live sea turtles as they lay eggs on the nesting beaches and swim among the beautiful coral reefs. The hawksbill turtles of the Seychelles are unusual, in that they nest primarily in daylight.

This event is indicative of Seychelles ongoing commitment to environmental conservation further evidenced by the presence of environmental clubs in every one of the nation's schools and the fact that 50% of the land area of the archipelago is now under conservation management. In addition, the Seychelles, known as being one of the most beautiful and unspoilt island groups in the world, is this year launching a world first in environmental tourism. Known as the "Seychelles Goldcard" the strategy calls on every visitor to the islands to pay a one-off environmental visa of US$100 to become a "Friend of Seychelles" for life and help support the country's environmental efforts. Source: *Associated Press*, 22 and 23 November, 1998. <http://wire.ap.org/>

Humpty Dumpty Put Back Together Again

Gray's Reef National Marine Sanctuary (GRNMS), off the coast of Georgia, is one of the largest reef habitats off the southeast coast of the USA. Since 1996, researchers at GRNMS have been conducting a satellite tracking project to study the movement and behaviour of adult and juvenile loggerhead sea turtles found there. A turtle captured in July for the tracking project was found to have severe injuries, including a crack running the entire length of it's carapace from head to tail. The turtle, nicknamed Humpty, was taken to shore and transferred to Marineland Florida for treatment. Following this, the turtle was returned to GRNMS waters, fitted with a satellite transmitter and released on 27 September 1998. Humpty swam north for a few days before returning to sanctuary waters on 5 October and continuing south to Florida. On 12 October the sea turtle was travelling back in the direction of GRNMS. Humpty's latest position can be found on the Internet at <http://www.sanctuaries.noaa.gov/>. Source: *NOAA Report*, November, 1998. <http://www.publicaffairs.noaa.gov/nr/nov1998.pdf>

Protecting Sea Turtles Protects Beach Too

Efforts in Volusia County Florida to protect nesting sea turtles may have benefits beyond safeguarding the endangered hatchlings or fending off a federal lawsuit. Recent research at the University of Florida shows that the eggs laid by nesting sea turtles hold essential nutrients that feed beach vegetation and help strengthen the dune system against erosion. A graduate student at the University of Florida, Sarah Bouchard, studied nesting turtles along a 12.5-mile stretch of Melbourne Beach in Brevard County in 1996. She monitored the beach for nutrients left behind by turtle eggs and the possible effects they had on the beach ecosystem. She found that the nutrients supplied by sea turtle eggs far exceeded those from any other source, including rain water, algae tossed up by waves and other animals active in the dune system.

Bouchard suggests the plants are definitely using the nutrients, with plant roots even growing into the nests so helping to stabilise the entire dune system. Nutrients found inside the eggs can be distributed in several ways: Some eggs may be disturbed by predators such as raccoons, crabs or birds that eat the eggs and scatter them across the dune; others are damaged when the roots of plants break through their shells to reach the nutrients inside; those that produce hatchlings retain fluid that stays in the ground and provides nourishment for the dune ecosystem. The importance of the nutrients provided by sea turtles is magnified because the sandy soil doesn't retain nutrients very well and salt spray can limit vegetation growth. Bouchard said it will take more research to show what impact, if any, the sea turtle eggs have in Volusia, where far fewer nests are laid than in Brevard. Volusia has taken steps to safeguard nesting sea turtles since 1995, when a lawsuit was filed under the Endangered Species Act. Source: *The Orlando Sentinel*, 20 November, 1998 <http://www.orlandosentinel.com/news/112098_TURTLE20.html>

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://nervm.nerdc.ufl.edu/~accstr/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.

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Erratum:

The authors of Shaver and Caillouet (MTN 82: 1-5) have recently received additional information enabling them to determine that the turtle exhibiting living tags from the 1987 year-class that nested at Padre Island National Seashore (PAIS) in 1998 had been experimentally imprinted at PAIS and not Cayman Turtle Farm. Living tags had only been applied to 1987 year-class turtles at PAIS (Dickie Revera, pers. comm.).

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