

Marine Turtle Newsletter

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TEACHING CRITICAL CONCEPTS FOR THE CONSERVATION OF SEA TURTLES

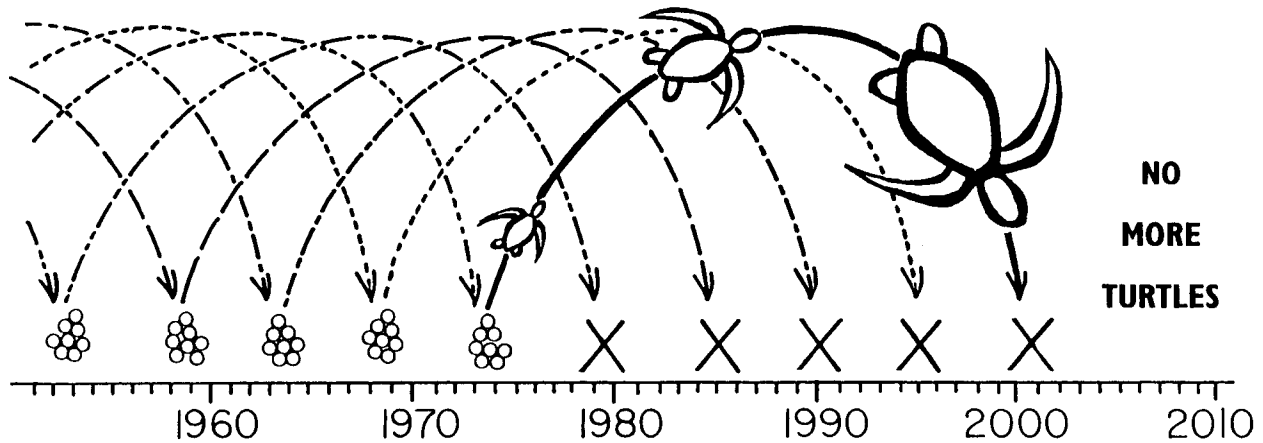
I am here presenting two visual aids (in a format that can easily be photocopied and distributed as hand-outs) that have proved helpful in explaining complicated aspects of the life history of sea turtles. An understanding of these concepts is critical to the design and public acceptance of effective sea turtle management plans. The singular difficulty in understanding these concepts stems from the long delay between the cause and the visible effect of certain devastating practices.

Scientific studies clearly demonstrate that, under natural conditions, most sea turtles are long-lived animals with delayed sexual maturity and high survivorship of adults. Unfortunately, these life history traits prevent a turtle population from showing early symptoms of over-harvest that are visible to the casual observer. They also limit the ability of populations to recover after having suffered extended over-exploitation (Congdon et al., 1993).

Over-harvest of eggs or of nesting females can continue for decades before it manifests itself at the nesting beach as a decrease in numbers of nesting females. In the interim, there may be no visible signs of population decline on the nesting beach, and so the general public often remains oblivious to the fact that over-exploitation is occurring. By the time the nesting population crashes, it may be too late to save the population at large from extinction.

These population dynamics are complicated, abstract, and difficult to explain to the general public, especially through words and mathematical equations alone. I have found, however, that people are very receptive to diagrammatic representation of these concepts, and the two presented here have proven to be effective educational tools.

Figure 1. Over-harvest of Nesting Females (modified from Mortimer, 1984). This figure represents a hypothetical case in which people slaughter 100% of the breeding females on the nesting beach before they can lay their eggs. (This was the situation for nesting hawksbill turtles on certain islands in the Seychelles during the early 1980's, and is still the case in many parts of the world today.)



Depending on the species, gravid (=egg-bearing) females average 2-7 clutches of eggs per nesting season, returning to the beach at regular intervals to deposit each clutch in turn. The circles at the ends of the arrows represent these clutches of eggs and the successful nesting by female turtles prior to 1975. (I arbitrarily chose the year 1975 simply for illustration.) The Xs indicate that, after 1975, people killed the female turtles before they laid their eggs. The arrows represent that after hatching from the egg, hatchlings depart from the nesting beach and do not return until they reach reproductive maturity decades later, at which time a new generation of adult females comes ashore to lay eggs in the sand. For illustration, I have used the span of 25 years to maturity, although the actual age to maturity is variable.

If, beginning in 1975, people killed every nesting female before she laid her eggs, the number of females arriving to nest would not decline drastically until the year 2000. Why? Because hatchlings produced before 1975 safely left the beach, matured at distant foraging grounds, and then returned (in this scenario, after a period of 25 years) to the nesting beach to breed. We can see that those that reached adulthood *before* 1975 were able to successfully reproduce for a minimum of one season. In contrast, those that attained adulthood *after* 1975 were killed prior to laying any eggs. To the casual observer standing on the nesting beach, there might seem plenty of nesting turtles available for slaughter year after year.

This seeming unending supply of adult turtles results from the fact that eggs laid in 1950 matured into adults to be slaughtered in 1975. Eggs laid in 1951 matured into the adults to be slaughtered in 1976. And so on. When the hatchlings that emerged from the last egg clutches laid in 1975 finally attain maturity in the year 2000, the population will be on the brink of extinction. This is because, after 1975, the turtles would not have produced any new offspring to replace the females that were slaughtered each year. With no surviving adult females, and no eggs laid for the period of one generation, the population collapses in the year 2001. Of course this is an idealized portrayal, but the fact that in reality turtles are maturing at ages that may vary from 20 to 50 years of age does not change the qualitative result.

Figure 2. Over-harvest of Eggs (Mortimer, 1991a, 1991b). This figure represents the destruction of a green turtle nesting population through over-harvest of eggs — as is occurring in many parts of south-east Asia and elsewhere. For this model, females are assumed to take 20 to 50 years to reach adulthood (National Research Council, 1990) and then to remain reproductively active for about 20 years (Carr et al., 1978). The diagram illustrates how harvesting 100% of the eggs would destroy the population “from the bottom up” because no new hatchlings would enter the population. This stands in contrast to the scenario depicted in Figure 1 where the population is destroyed “from the top down.”

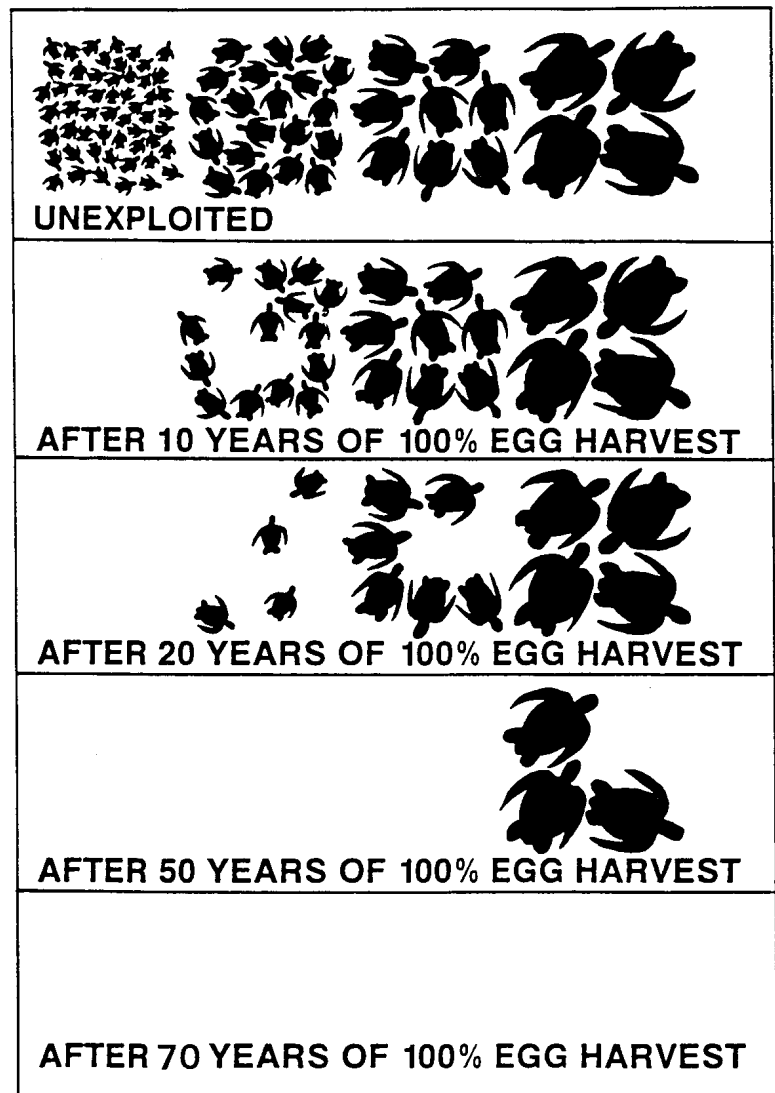
The top panel is a diagrammatic representation of an unexploited green turtle population, with four life stages indicated. Moving from left to right: the smallest turtles are hatchlings, next are juveniles, then subadults, and breeding adults. Each succeeding panel represents the same turtle population after 10 years, 20 years, 50 years, and 70 years of 100% egg harvest:

a) After 10 years of 100% egg harvest, no hatchling turtles will remain in the population, and the number of juvenile turtles will be reduced. However, the numbers of subadults and breeding adults will be the same as in the unexploited population. [N.B. Of course, hatchlings will be eliminated from the population after only *one* year of 100% egg harvest.]

b) After 20 years of 100% egg harvest, there will be no hatchlings, and fewer juveniles and subadults than were in the population after 10 years of 100% harvest. However, the numbers of breeding adults will remain the same as in the unexploited population.

c) After 50 years of 100% egg harvest, there will be no hatchlings, no juveniles and no subadults remaining in the population. The numbers of breeding adults that come to the nesting beach will have *begun* to decline. ***Only at this point will it be apparent to the general public that the population is in decline.*** By now, however, the population is on the verge of extinction. All the females remaining in the population are at least 50 years old.

d) After 70 years of 100% egg harvest, the turtle population will be extinct by the 71st year.



The model depicted in Figure 2 is conservative. Even in populations where some proportion of females require as long as 50 years to reach maturity, this is not likely to be the case for the majority of individuals. If we assume, for example, that the modal age at maturity is 35 years, with an expected reproductive period of 20 years, then the population described in the model will be virtually extinct in 55 years (55 years being a sufficient span of time to allow the majority of individuals to have matured and laid eggs for two decades). The younger the expected age to maturity (holding constant the reproductive period) the sooner the population would be expected to collapse.

For the sake of simplicity, both Figures 1 and 2 represent 100% harvest of previously unexploited populations. Real world situations are, of course, more complicated. At most sites, rates of exploitation are generally less than 100% (which would slow the rate of extinction), but are directed at more than one life stage (which would speed the rate of extinction). Another complication is that, in today's world, most turtle populations have already been in decline for decades, if not centuries, in response to a combination of factors. These may include purposeful harvest of turtles and eggs, accidental capture of juveniles and adults in fishing gear, habitat destruction, and pollution. Therefore, most sea turtle populations are, in reality, even *more* vulnerable to extinction than the hypothetical populations depicted in my figures.

Despite these complications and qualifications, the diagrams effectively depict the mechanisms leading to the extinction of turtle populations and the insidious nature of the processes involved. An understanding of these concepts must be communicated to resource managers and decision makers before they can be expected to take the measures necessary to prevent extinction of sea turtle populations. These diagrams have proven effective in public awareness campaigns I have conducted, and I invite anyone who wishes to use them to do so.

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ENDOSCOPIC REMOVAL OF POLYETHYLENE CORD FROM A LOGGERHEAD TURTLE

In 1983 the Naples Aquarium started a project whereby wounded loggerhead sea turtles, *Caretta caretta*, as well as those confiscated by legal authorities, were brought to the Aquarium for care and subsequent release in areas suitable for their survival. The loggerhead is the most common species of marine turtle in Italian waters. Most of the wounded animals which come from the Gulf of Naples are affected by stress caused by maritime traffic or pollution, or have been wounded by fishing nets or hooks. Consequently, they require specific therapy and rehabilitation. However, because of the lack of scientific data we work very much on an experimental basis. The following passage describes the protocol used for an endoscopy performed on a wounded juvenile.

On 11 November 1994, a juvenile loggerhead turtle was found approximately 1.5 meters north of the Island of Panarea (Sicily) trapped in a bundle of polyethylene packaging twine. A piece of cord had been swallowed and extended out of the animal's mouth for a length of 20 cm. It could not be extracted manually. The animal was brought to the Naples Aquarium where it was weighed (13.3 kg), measured (48.5 cm curved shell length), and x-rayed for the presence of hooks. It was decided that an endoscopy was necessary to remove the cord.

Based on the anatomy and size of the vital organs, we opted for a surgical instrument 1 meter in length and 9 mm in diameter, with a surgical canal 2.8 mm in diameter. We used an Olympus EVIS 100 video-endoscope that allowed direct viewing and video recording on VHS. Anesthesia was not necessary. As a precaution, we fitted the animal with a plastic mouthpiece, with a diameter of 3 cm, through which the cord was laced and the surgical instrument was introduced. To better facilitate the introduction of the instrument we followed the course of the cord slowly down through the esophagus of the animal. It was not possible to go beyond the cardiac sphincter, which was approximately 25 cm from the opening of the mouth, probably because of the shape of the muscle. A simple traction of the cord from the outside, even after a great deal of effort, did not result in its extraction. It remained entrapped in the papillae which are directed in an oral-anal fashion to facilitate movement of food into the stomach.

We decided to introduce air into the esophagus and use endoscopic pliers in an effort to keep the cord within the lumen and away from the papillae. Once the cord was in the lumen we were able to extract it a few centimeters at a time by small, delicate tugs. We did this many times until, with the last pull, the entire 80 cm length was removed. The distal extremity of the cord was swollen with putrefied feces which caused us to deduce that it had passed through the pyloric valve and entered the intestine. An endoscopic examination of the viscera showed the absence of lesions. The animal was placed in an open circuit seawater tank and did not show excessive signs of stress. Five days later it began to feed on the fish *Engraulis encrasicolus*, commonly known as the European anchovy.

It is our hope that in the future this procedure will enable us to safely and effectively remove other objects, such as fishing hooks or plastic bags.

Acknowledgements: We thank Vincenzo Esposito for technical assistance.

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RESULTS OF THE 1994 NESTING SEASON AT CHENKÁN, CAMPECHE, MEXICO

Introduction: The coast of Campeche, Mexico, at the southern limit of the Gulf of Mexico, is known to be one of the most important nesting areas for hawksbill turtles (*Eretmochelys imbricata*) in the world (Meylan, 1989). One of the more important sites, in terms of numbers of nests recorded, is Chenkán, which has been operating as a “campamento tortuguero” (sea turtle camp) since 1986. Both hawksbill and green (*Chelonia mydas*) turtles nest there (Barrios and Canul, 1993). During the 1994 nesting season, seven distinct turtle camps (including the one at Chenkán) were set up on the Campeche coast, each administered by a different organization. The present report is a summary based on the work carried out at Chenkán (Sanchez et al., 1994).

Study Area: During the 1994 nesting season, the Chenkán camp was responsible for 20 km of coastline between Rancho Nohán and Puente Chenkán II (km 90 to km 110 on the Federal Highway Carmen-Campeche). Chenkán (“snake hole” in Maya) is located at km 101.5 on the Federal Highway, and the study area lies between 19°15'N, 90°10'W and 19°00'N, 90°50'W. The area is typified as hot, subhumid, with a mean annual air temperature of 26°C and annual average rainfall between 800-1500 mm, most of which falls during the summer (Garcia, 1974). The vegetation of the beach is dominated by coconut plantations (*Cocus nucifera*), which are now dying because of a virus. The Federal Highway runs roughly parallel to the coast, and in the Chenkán area it is generally within 100 m of the shoreline. Immediately inland of the highway is a vast mangrove forest and estuary.

Materials and Methods: Beach monitoring began on 1 April 1994 and continued until the end of August. In addition to foot patrol, beach transportation was provided by a 4-wheel all-terrain-vehicle (Honda) and a pickup truck. Each night, at about 2200 hr, one group of people would set out east along the beach, while the other group went west. Nesting females were tagged with monel cattle-ear tags provided by the Secretaria de Pesca; tagging and measuring of females was carried out after they nested. Eggs from most nests were transported to a beach hatchery at Chenkán. The eggs were placed in man-made nests with dimensions similar to natural nests. A week before the hatchlings were expected to emerge, the artificial nest was covered with a cylinder of wire mesh. Hatchlings were counted and released during the night or early morning, and nests were excavated (post-hatching) to quantify the contents. From January to September approximately 35 km of beach, from km 90 to km 125, were patrolled during morning hours to record stranded turtles. Carcasses were weighed and measured, and their physical condition was described.

Results: During the 1994 season, 76 nesting hawksbills were tagged; of these, 32 individuals were recaptured a total of 49 times. Of the 300 hawksbill nests reported, 238 were transplanted to the hatchery, 8 were moved to new sites on the beach, and 54 were left *in situ*. Nesting was recorded from 8 April to 23 August; the peak occurred in June, with 34% of the nests. More nests were laid during new and waxing moons. Out of a subsample of 230 nests, 126 (55%) were laid between km 106 and km 109; the densest nesting occurred between km 107 and km 108, with 55 nests (24% of the subsample).

Of the 238 transplanted nests, 68% were laid in habitat characterized as ‘high beach with vegetation’. The average clutch size of the transplanted nests was 149.51 eggs, and the average number of hatchlings liberated from hatchery nests was 103.63, yielding an average hatch success of 69%. The average hatch success of *in situ* nests was estimated to be 74%, and nests moved to new sites on the beach had an estimated average hatch success of 53%.

A total of 50 hawksbills were found dead on the beach; 48 of them ranged in size from 17-55 cm in carapace length, with the two remaining turtles measuring 83 and 90 cm. One stranded green turtle was of juvenile size. Strandings were recorded from January to September, with a peak of 25 in May. Marks on the necks and heads of the cadavers indicated that they had been drowned in gill nets, which are commonly used in this region.

Acknowledgements: During the nesting season students from the Universidad Autónoma de Campeche and the Centro de Estudios Tecnológicos del Mar de Campeche collaborated with beach patrolling activities and took part in the release of hatchlings. Lic. Gabriel Sánchez Dzib helped with computer analysis, and Dr. J. Frazier with the preparation of this report.

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MANUEL SANCHEZ ARJONA, RAFAEL BARRIOS SANDOVAL, ADRIANA PAREDES MEDINA, ALBERTO CONTRERAS REJON and FERNANDO ALVAREZ RIVAS, Subdelegación de Medio Ambiente, Secretaría del Medio Ambiente, Recursos Naturales y Pesca, Av. 16 de septiembre s/n, 2º piso, Palacio Federal, Col. Centro, Ciudad de Campeche, Campeche C.P. 24000 MEXICO.

FONDAZIONE CETACEA AND THE CONSERVATION OF SEA TURTLES

Fondazione Cetacea, a non-profit organization established in 1988 for the study and protection of the marine environment, administers the educational and scientific activities of the Adriatic Sea World/Delphinarium Riccione (ASW) and, since 1993, of the Aquatic World/Delfinario Cattolica (AW) as well. As participants in the National Turtle Project (Argano, 1979) and as members of the Centro Studi Cetacei (Cagnolaro, 1985), we receive reports of injured sea turtles from both harbour and CITES offices, as well as from private citizens. Herein we report the results of ASW's and AW's activities in recovering injured turtles since 1986, a program which has been run by Fondazione Cetacea since 1988. To facilitate reporting, we collaborated with WWF Italia in 1993 to establish "ONDE DAL MARE" [Waves from the Sea], a radio- telephone network (VHF Radio, channel 74 - 156.725 MHz; phone number, +39-541-693675) which makes the reporting of cetacean and turtle sightings, and environmental problems in general, easier. This project is supported by the Italian Department of Environment and the Postmaster General.

The area of the Adriatic coast (the northeast coast of Italy) with which we are involved is between Senigallia (Ancona), the southernmost point, and Lido Volano (Ferrara) to the north. In this area, the most frequent turtle injuries (such as carapace damage) are caused by intensive fishing activity and heavy sea traffic, as has been noted by other authors in the Mediterranean (e.g., Bentivegna et al., 1993). After recuperative periods in captivity, the animals are returned to the wild, sometimes with the cooperation of local fishermen. Because of a lack of scientific data regarding care in captivity, we often proceed experimentally or contact other groups in Italy working under similar circumstances in order to compare information. ASW and AW greatly assist in the recovery of injured turtles by making rehabilitation pools (including portable pools and a sea-water pre-filtered pool, 400 x 200 cm) available to us for this work.

From 1986 to 1994, Fondazione Cetacea received reports of 130 injured turtles (Figure 1). About half (49.23%) of these individuals were stranded along the Northern Adriatic coast. Most of the remaining half were either entangled in fishing gear or found floating adrift (Figure 2). Forty-three of the recovered turtles were eventually tagged (cf. Pritchard et al., 1983) and released. In 1993 we noticed an increase in the number of injured turtles. We responded to reports concerning 53 loggerhead turtles (*Caretta caretta*). In one case, four loggerheads were accidentally caught together in the same fishing gear (long lines). All 53 turtles were eventually released, including 18 which were tagged prior to release. Stranded turtles are typically decomposed and the cause of death cannot be determined in the majority of cases. Since 1994, gut contents and whole parasites have been fixed in 70% ethanol for identification. In addition, tissue samples from fresh carcasses are sampled for the analysis of contaminants.

In addition to our rehabilitation program, we are working to increase people's awareness of the depleted status of the loggerhead turtle in the Mediterranean. To this end, two local dolphinaria facilities illustrate the conservation policy of Fondazione Cetacea.

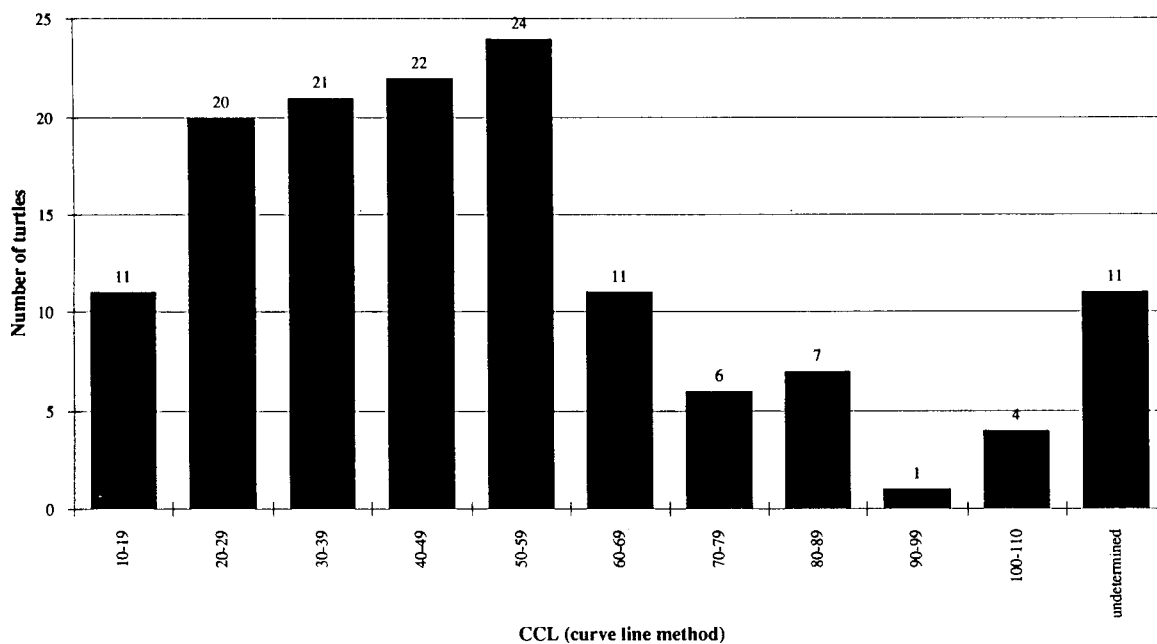


Figure 1. Distribution of curved carapace lengths of loggerhead turtles (n=130) examined between 1986 and 1994.

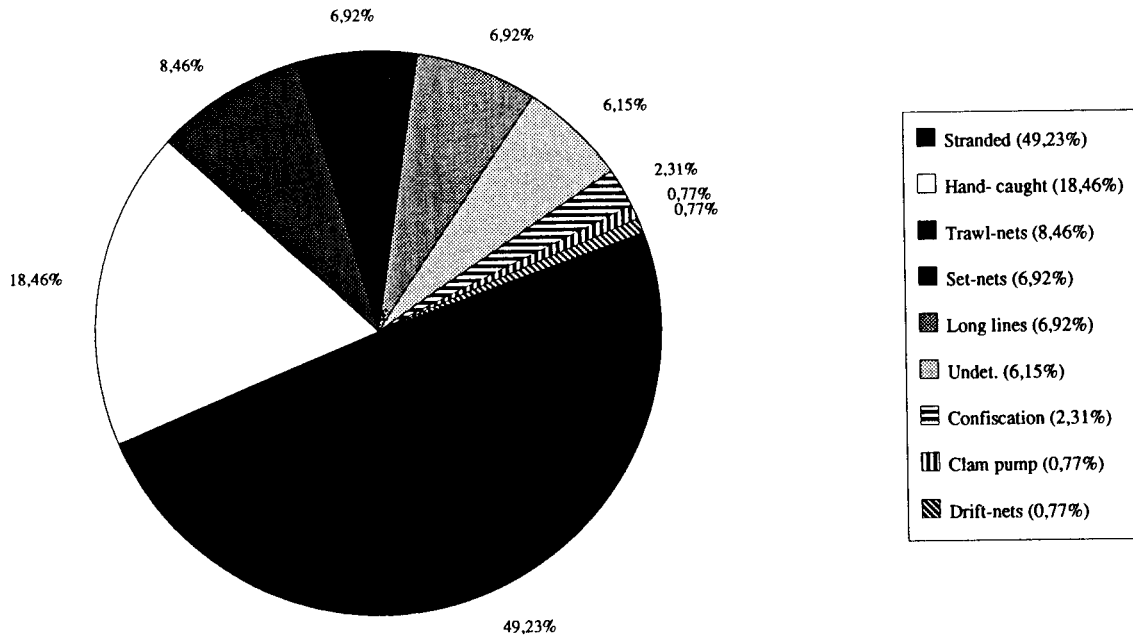


Figure 2. Reasons for which sea turtles were brought to Fondazione Cetacea for rehabilitation between 1986 and 1994.

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IMPORTANT MEDITERRANEAN NESTING BEACHES DISCOVERED

A survey of the Eastern Libyan coast was carried out from 19 June to 5 July 1995, during which about 1000 km of coastline were surveyed for sea turtle nesting. Previously unknown nesting areas for loggerhead turtles, *Caretta caretta*, were discovered between Syrte and the Egyptian border; 380 tracks and 205 nests were documented. The research team

included Libyan researchers and experts from France and Tunisia (INSTOP). The survey was coordinated by the UNEP/MAP centre in Tunis for Specially Protected Areas (RAC/SPA), with participation from WWF International, the Mediterranean Association to Save the Sea Turtles (MEDASSET) and Libyan authorities who, through the Technical Centre for Environmental Protection (Tripoli) and the Marine Research Centre (Tajura), played a pivotal role in the success of the survey.

Populations of marine turtles in the Mediterranean have been decreasing steadily in recent decades, mainly due to incidental catch in fishing gear, ocean pollution, and the use of nesting beaches for recreational activities. In response to these threats, the nations of the Mediterranean, working within the framework of the UNEP Mediterranean Action Plan, adopted the “Action Plan for the Conservation of Mediterranean Marine Turtles” in 1989. This Action Plan is a regional strategy which defines priorities for the protection of these endangered reptiles. The identification of nesting areas and their management are among the priorities defined by the Action Plan. To this end, several national and international organizations have organized surveys of Mediterranean coasts where marine turtle nesting is suspected. With the important results of the recent survey of the Eastern Libyan coast, the Mediterranean Action Plan has once again showed its effectiveness to act as a bond of cooperation among Mediterranean people to conserve the Mediterranean Sea and its biodiversity. Source: adapted from a *Press Release*, United Nations Environment Programme, 19 July 1995.

ILLEGAL TURTLE TRADE IN SRI LANKA AND THE MALDIVES — AND AN ENCOURAGING NOTE OF PROGRESS

All sea turtles have been protected by Sri Lankan law since 1974. Since 1979, Sri Lanka has also been a member of CITES [Convention on International Trade in Endangered Species], which prohibits the import or export of sea turtles and their products. On the beaches of Sri Lanka’s west coast, a team deployed by the Environmental Investigation Agency (EIA) recently filmed the illegal collection of turtle eggs from nesting sites. All the eggs were taken — in direct contravention of national law — destroying any chances that these species may have to regenerate. In addition to threats posed by the theft of eggs, an examination of the shops in many hotels patronised by large international holiday companies revealed that turtle products are widely on sale. Perhaps most disturbingly, despite a complete ban on its sale, tortoiseshell (hawksbill turtle shell) products were openly available in the government-run tourist shop (Laksala) in the capital, Colombo. To infiltrate the trade, EIA investigators posed as tortoiseshell buyers. They were told that the dealers were having difficulty in acquiring enough shell on the island because the turtles had been virtually wiped out. EIA eventually tracked down one of the biggest suppliers, in the Maldives. The dealer could immediately supply 500 kg of shell, which we estimate represented the lives of about 675 endangered hawksbill turtles (Milliken and Tokunaga, 1987, report 0.74 kg of tortoiseshell per hawksbill from the Indian Ocean region).

It is clear that despite tough legislation, there is a thriving and open market for tortoiseshell products in Sri Lanka. EIA interviewed a number of the leading dealers and discovered that the law is virtually never enforced. Further investigation in the Maldives revealed that four main dealers are exporting tortoiseshell to Sri Lanka, often smuggled in consignments of dried fish. The entire EIA investigation was filed with hidden cameras and broadcast on British national television on 30 March 1995 as part of the “Animal Detectives” series. We have been using this opportunity to lobby the Sri Lankan government to enforce their laws and to try and persuade the Government of the Maldives to ban the trade. [N.B. It is currently illegal to export raw shell from the Maldives, but legal to export finished products —

unless they are being sent to a CITES Party, which Sri Lanka is.] Since the majority of the demand for tortoiseshell comes from tourists, we have been engaging the support of tour operators in the European Union to boycott hotels and resorts where tortoiseshell is available and to educate tourists about the implications of buying tortoiseshell products. The campaign has already generated a great deal of publicity in Sri Lanka and we are now awaiting concrete action to end the trade.

Our complete findings from this international investigation are documented in a new report, "Report on an Investigation into Threats to Marine Turtles in Sri Lanka and the Maldives", available from EIA at the address below.

Milliken, T. and H. Tokunaga. 1987. The Japanese Sea Turtle Trade 1970-1986. Prepared by TRAFFIC(JAPAN) for the Center for Environmental Education, Washington D. C.

* *Update:* I am pleased to report that since we submitted this article to the Marine Turtle Newsletter, and in direct response to the EIA investigation, on 24 June the Government of the Maldives imposed a total ban on the catching of turtles in the Maldives as well as the sale, import and export of all turtle products. In addition, the Government has formulated new endangered species legislation, established sea turtle sanctuaries, and presented conservation awards. Finally, it has launched a public information campaign to increase public awareness about the need for turtle conservation and fragile marine ecosystems. EIA was informed by the Office of the President of the Maldives last month that the incidents filmed in the Maldives have been investigated by the police. Already, two people have been arrested and legal action has been promised. — S. Fisher, in litt. 10 July 1995.

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“LAST CHANCE LOST?” OR IS IT? A BOOK REVIEW

In three different decades I have had separate generations of red-faced, frustrated turtle farmers scream in my face, “Why won’t you conservationists let us farm these turtles so we can save them?” Actually, several well known conservationists including Leo Brongersma, John Hendrickson, Henri Reichart and Joop Schulz have supported the concept of turtle farming. As an inexperienced fisheries development specialist with the Peace Corps in Fiji in 1969, I myself became enthralled (and still am) with the idea that green turtles might be farmed or ranched as a resource for food protein, as well as to sell to foreign tourists and developed countries. In 1970, after reading Archie Carr’s captivating book “So Excellent a Fish”, my fate was sealed. In the final chapter of this book he made the case for farming sea turtles as a practical way to help save these endangered species. By 1972, I found myself working under John Hendrickson on reproductive physiology using “Mariculture, Ltd.” green turtles at the farm on Grand Cayman island. As a bit player in the continuing turtle farming saga, I have had an interesting vantage point to observe this continuing debate. The question is, “So why aren’t there lots of turtle farms in developing countries like there are crocodile farms?”

The answer to this question is clearly outlined in “Last Chance Lost? Can and should farming save the green sea turtle? The story of Mariculture, Ltd., --Cayman Turtle Farm.” by Peggy and Sam Fosdick [see MTN 67:31]. Actually, for the sea turtle person, the Fosdicks provide an illuminating history book! In an overly simplistic sense, it is the history of the 15

year battle which mostly simmered and occasionally raged between Archie Carr and his U. S. conservationist proteges on one side of the fence and several well-heeled business people on the other side, as to whether farming the green sea turtle should happen at all. “But wait, Dave, I thought you said Archie supported turtle farming.” He did at first, but by 1972 a new question emerged from the reptile group centered in Gainesville, Florida. What if farming turtles actually increased demand for their products, a demand which the farmers could not cover? Would illegal exploitation of wild turtles surge, further endangering the remaining wild populations? The powerful Gainesville group emphatically thought it would, and Archie did a 180 degree about-face in an article published in Audubon magazine in 1972. The line in the sand was drawn and the battle was on.

Presented largely from the point of view of Irvin Naylor, founder of Mariculture Ltd. and publisher of this book, science journalists Peggy and Sam Fosdick researched and wrote the text with surprising thoroughness and accuracy. The attractive book also makes good reading, with an interesting story line, real life adventures, great sex scenes, two knights of the British empire, and lots of historically important correspondence relative to reptilian conservation. On the other hand, the scientific contributions of the turtle farmers, while an underlying theme of the book, are not covered well enough. The scientific legacy of Bob Schroeder, Glenn Ulrich, Jim Wood and Fern Wood is one of “hard nosed” refereed journal-style science like no other little business on earth has ever or probably will ever do again. Working with dozens of collaborators, significant firsts were realized at the Cayman Turtle Farm in areas such as dietary requirements, blood sampling techniques, temperature dependent sex determination, laparoscopy, sexing techniques, living tags, sea turtle hybrids, specific protein radioimmunoassays, fibropapillomas and captive breeding of two endangered species; just to name a few.

Did the turtle farm on Grand Cayman get the shaft? Have sea turtles benefited from the Cayman experiment? Will there ever be other turtle farms? Should turtle farms be used in lieu of habitat protection? One Texan’s opinions are yep, yep, you bet and no way, respectively, respectfully!

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USING SEA TURTLES FOR TOURISM MARKETING

Since the beginning of the 1990’s, Dutch tour operators have increasingly used sea turtles in their descriptions of destinations in travel brochures. In the Netherlands, travel brochures are the most important — but by no means the only — tool applied by tour operators to seduce people into buying their travel product. The colorful brochures are instrumental in convincing the public to make bookings and, apparently, sea turtles play a role in luring people to specific destinations. Since travel brochures create expectations in the mind of the tourist regarding sea turtles, we believe that they can be effective venues for sensitizing visitors to “turtle friendly beach etiquette”.

Two specific destinations (Zakynthos in Greece, Dalyan in Turkey) were chosen to evaluate the impact of travel brochures on people’s awareness of sea turtles and their habitat (for the full results of the study, please see Cosijn, 1995). In the late 1980’s, only these two destinations in Europe were regularly marketed in travel brochures for their sea turtle nesting beaches. The other European turtle nesting beaches were virtually never mentioned explicitly in such brochures. In contrast, we found 141 citations (from a survey of hundreds of brochures)

during the last five years, 1991-1995, directly referring to the presence of sea turtles or to a sea turtle nesting beach. The results were sobering. It seems that rather than being a force for education, the brochures often contain misleading or profoundly inaccurate information. The results were as follows.

Referring to sea turtles and their habitat: (i) only one out of 141 citations correctly mentioned the Dutch name of the loggerhead turtle, (ii) several brochures mentioned the scientific name, *Caretta caretta*, but it was usually misspelled, (iii) Dutch travel brochures often confuse tortoises, terrapins and turtles, which in the Dutch language are normally distinguished as 'land turtles', 'freshwater turtles' and 'sea turtles', (iv) many tour operators seem to think that turtles sit on their eggs to incubate them, much the same as birds. Other mistakes include incorrect nesting or hatching seasons, population numbers, turtle size and weight, etc. Finally, numerous comparatively minor errors were evident concerning geography and the specific location of breeding sites.

Referring to sea turtle encounters, never did any of these brochures mention that sea turtles come ashore at night and that visitors have a slim chance of actually seeing an adult turtle or a hatchling on the beach. Further, some beaches, including Laganas (Zakynthos Island, Greece) and Dalyan (Turkey) are not accessible by night. Nonetheless, some tour operators explicitly create expectations by stating that people may view nesting or hatching sea turtles.

Referring to responsibility with regard to sea turtle conservation, some tour operators explicitly state that the use of nesting beaches at tourism destinations poses little danger to the turtles. Most, however, avoid speaking to the issue. There are inconsistencies in the way that tour operators use sea turtles, depending on the target audience. For example, "family packages" mention sea turtles like an additional attraction. Perhaps this is because the presence of wildlife creates the suggestion of a quiet, clean beach. These same tour operators do not mention sea turtles at all in their brochures for young, activity-oriented audiences. Instead they promote the same beach for its excellent opportunities for beach picnics, jet-skiing, parasailing and other activities that actually endanger sea turtles.

The Dutch tour operator ARKE makes the following statement in their promotion of the 1995 program for young people near a turtle nesting beach in Zakynthos: "Parasailing is advised because watching from the air provides the best opportunity to watch sea turtles." Not only are parasailing and speed boating near this beach important causes of mortality to turtles, these activities are illegal. It seems that few Dutch tour operators show much constructive involvement with the need to conserve endangered sea turtles at tourist destinations . . . most show no involvement at all, or worse. Sea turtles are simply a commodity to be marketed and exploited to lure people to holiday destinations.

As indicated above, sea turtles are "marketed" differently depending on the target audience. We could clearly distinguish three broad marketing strategies: (i) package holidays, (ii) day tours, such as excursions from other primary destinations, and (iii) sailing cruises with land excursions. In the first case, sea turtles are often mentioned, sometimes sympathetically as unique, impressive, threatened, etc. In the second case, brochures often refer to the presence of sea turtles by mentioning the opportunity to visit a "turtle beach", but hardly any more detail. In the third case, sea turtles and their nesting beaches are rarely mentioned.

Regretfully, the overall conclusion of our study is that: (i) tour operator knowledge of sea turtles and their habitats is lacking, (ii) tour operators use information about turtles that is often misleading or inaccurate (which violates requirements under Dutch law concerning travel arrangements), (iii) tour operators do not consistently respect the laws of the destination country

and in general do not indicate any awareness of their own responsibility toward nature conservation in the destination country (and therefore violate the requirements and regulations of the Dutch Federation of Travel Organizations, ANVR), and (iv) tour operators consistently disregard advisements from the Council of Europe since 1987 concerning conservation of European turtle nesting beaches and tourism development.

We suggest the following guidelines: (i) wildlife, such as sea turtles, should only be mentioned in travel brochures if the species plays a role in the holiday destination (e.g., people are able and allowed to observe the species), and (ii) recognizing that tourism plays a role in both the endangerment and the conservation of species, tour operators should provide the following information when using threatened wildlife as a marketing tool: a) details on the availability of the species for direct viewing (including the numbers to be expected during different seasons), b) relevant aspects of the biology of the species, c) the effect of tourism (for good or ill) on the species and its habitat, and d) a code of conduct toward the species.

These guidelines are now being evaluated for use with sea turtles, as well as a variety of other wildlife species, in the promotion of travel destinations by the Dutch travel industry. As part of this evaluation process, a study (partially funded by the Dutch Ministry of Agriculture, Nature Conservation and Fisheries) will involve inquiries to about 100 Dutch tour operators to assess what can be done to improve the performance of the industry in regards to sea turtle conservation. We are also actively evaluating the impact of travel brochures on other reptiles and on primates, as well as the information quality of these brochures. In 1996, we shall also include cetaceans and specific ecosystems that are marketed for their wildlife, such as the Galapagos Islands and the East African savannas.

Cosijn, R. 1995. Lopen op Eieren. Vermeldingen van Mediterrane dikkopschildpadden in Nederlandse reisbrochures ter beïnvloeding van aankoopbeslissingen voor vakantiereizen. *Ecologie en Toerisme* no. 2, Natour Foundation, Hengelo, Netherlands. 55 pp.

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TOURISM AND TURTLES: A CALL FOR CASE STUDIES

To assist the IUCN/SSC Marine Turtle Specialist Group (MTSG) in assessing the impact of tourism on sea turtles, readers of the Marine Turtle Newsletter are requested to send a short description (1-5 pages) of current projects that fall under one or more of the following six categories. If you are not personally involved with such a project, but know of someone who is, please encourage them to contribute a description. The subject areas are: (1) Turtle Watching (e.g., controlling, guiding, managing or studying turtle watching tourism), (2) Habitat Alteration Resulting from Built Facilities (e.g., recording, investigating or managing environmental impacts resulting from the construction of tourist facilities such as hotels, sea walls, airports, etc.; impacts may include artificial lights, beach erosion, pollution, etc.), (3) Water Sports not associated with Turtle Watching (e.g., motorized: 'jet skis', parasailing, water skiing; non-motorized: sail boarding), (4) Beach Activities not associated with Turtle Watching (e.g., beach sports, horseback riding, vehicles on the beach, camp fires, pedestrian traffic in nesting areas), (5) Trade and Souvenirs (e.g., sale of turtle products to tourists and/or the impact of tourism on product sale), (6) Direct and Indirect Impacts of Cruise Ships (e.g., habitat damage by anchorage, waste disposal).

With each project description should be: (1) the author's name, address, FAX number, and e-mail address (if possible), (2) project name and site description (name, location, size, and extent of tourist use, including the number of people visiting the beach per day during the turtle nesting season), (3) positive and/or negative impacts observed or measured, (4) management or impact mitigation techniques (e.g., public awareness programs, legislation), and (5) recommendations and future plans. These case studies are being collected as a first step in the process of facilitating an exchange of information and expertise between projects working on similar tourism impacts in various geographic areas. If your project has either had some experience in resolving tourism/turtle conflicts or is looking for ways to manage tourism and turtles, you are invited to participate in this initiative. Please send your descriptions to me at the address below by 1 February 1996. Thank you!

CLARE WHITMORE, MTSO Special Committee on the Impact of Tourism on Turtles, Suite 822, 2255B Queen Street East, Toronto, Ontario M4E 1G3 CANADA.

A NOTE ON THE OCCURRENCE OF SUB-ADULT OLIVE RIDLEY TURTLES ALONG THE GAHIRMATHA COAST

Gahirmatha beach, which forms the eastern boundary of Bhitarkanika Wildlife Sanctuary, extends 35 km along the coastline bordering the Bay of Bengal in the Kendrapara district, Orissa, India. The beach is the world's largest known mass nesting ground for the olive ridley sea turtle *Lepidochelys olivacea* (Bustard, 1976). Each year about half a million olive ridleys nest en masse (in events commonly referred to as 'arribadas') along this coast from January to May (Kar and Bhaskar, 1982; Dash and Kar, 1990; Pandav et al., 1994). An annual census of nesting females and regular monitoring of the coastline for nests laid and stranded dead turtles has been carried out since the establishment of the Gahirmatha Marine Turtle Research and Conservation Centre in 1976.

On 12 March 1995, as part of the routine beach patrol, a partially decomposed sub-adult olive ridley was found on the beach in front of Satbhaya village (15 km south of the main nesting beach). Detailed morphological measurements were taken: 57 cm curved carapace length (CCL), 56 cm curved carapace width (CCW), 40 cm plastron width (PW). The upper jaw of the specimen was missing and the plastron length could not be taken because of mutilation. The carapace scute counts were as follows: 9 centrals, 7 left costals, 6 right costals, 8 left marginals, 8 right marginals. A close examination of the specimen revealed that the mid plastral region, as well as portions of the inframarginal scales, were very soft.

On 29 April 1995, a second sub-adult was found dead near the Ekakula Forest Rest House (3 km south of the main nesting beach). The turtle measured 58 cm CCL, 57 cm CCW, 39 cm PW, and 41 cm plastron length. The scute counts were as follows: 6 centrals, 8 each left and right costals, 12 each left and right marginals. The inframarginal scales and the midline joining the plastron was soft. This particular character (i.e., softness in the plastron) seemed peculiar because it is our experience that neither adults nor hatchlings exhibit this character. It is possible that death was caused by incidental capture and drowning in a fishing net. About 40 mechanised trawlers were fishing in the coastal waters near Satbhaya village throughout the nesting season, including the time during which the turtle washed ashore. This area has been declared as a closed area and fishing has been banned along this coast, so these boats were operating in violation of the law.

The smallest nesting olive ridley recorded at Gahirmatha in the last 20 years measured 62.0 cm CCL, leading to speculation that this is the minimum size at which these turtles attain sexual maturity in the Bay of Bengal (Dash and Kar, 1990). The smallest nesting olive ridley measured at Galathea beach, Great Nicobar Island, was 62.5 CCL and 63.5 cm CCW (Bhaskar, 1993). Taking into account the length of the smallest nesting females at these two sites, we consider the two stranded individuals described above to be sub-adults. There is very little information in the literature relating to the size and weight of sub-adult olive ridleys. Occasionally stray individuals are captured in fishing nets or are found dead on island or mainland beaches. The only substantial sample of juvenile and sub-adult olive ridleys (21-62 cm carapace length) outside of the Indian Ocean was recorded near Japan by Nishimura et al. (1972) who proposed that since the olive ridley tended toward a demersal life style, individuals which drifted into Japanese waters would be expected to be almost exclusively sub-adults. The ovarian condition and the gut contents of a specimen recorded by Honma and Yoshie (1975) support this contention.

In other parts of the species' range, Hughes (1974) noted that no juvenile had been found in Southeast Africa except one noticeably sub-adult specimen measuring 49.2 cm and 47.4 cm straight carapace length and width, respectively. McKeown (1977) recorded a juvenile olive ridley from Makira (Solomon Islands) in July 1977, without providing information regarding size and weight. Deraniyagala (1953) provided the dimensions for two juveniles (12 months, 5 months) from Morutuva, Sri Lanka, as follows: 11.2 cm head length, 49 cm carapace length, 45 cm carapace width and 40 cm plastron length.

During his doctoral studies on olive ridleys at Gahirmatha, Chandra Sekhar Kar documented three dead sub-adults (Kar, 1980), bringing the Orissa total to five (with the two recorded in this paper). All were found during the nesting season. Coastal fishing occurs throughout the year (in contravention of state and federal law) at Gahirmatha, but neither adults nor juveniles have washed ashore dead on this beach during the non-breeding season. It is possible that immature individuals accompany adults during the breeding migration, arriving with them at the nesting beach. Cornelius (1975) has suggested that immature green turtles may accompany adults to the nesting beach, based on his finding many sub-adult turtles amongst 73 that had died from unknown causes during the nesting season in Costa Rica. Another fragment of evidence supporting this hypothesis is the report that sub-adult green turtles are frequently caught near Bocas del Tora, Panama, during the seasonal migration of adult Tortuguero (Costa Rica) bound migrants (Meylan, 1982).

We expect that further studies in this area will expand our sample size and assist us in defining the size distribution and seasonality of olive ridleys utilizing the seas near Gahirmatha.

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- BIVASH PANDAV and B. C. CHOUDHURY, Wildlife Institute of India, P. O. Box 18, Dehradun - 248001, Uttar Pradesh, INDIA and C. S. KAR, Research Officer, Mangrove Forest Division, Raj Nagar, Kendrapara, Orissa, INDIA.

A GLOBAL STRATEGY FOR MARINE TURTLES

The IUCN/SSC Marine Turtle Specialist Group (MTSG) is pleased to announce the publication of *A Global Strategy for the Conservation of Marine Turtles* (MTSG, 1995). This is the first of several language versions planned for this document. The French and Spanish translations will be published this fall; two MTSG members also are producing Arabic and Chinese versions. We encourage marine turtle conservationists to extend the influence of the *Strategy* by translating it into additional languages.

The *Strategy* includes recommendations to develop and support programs that promote the survival of healthy marine turtle populations and the habitats on which they depend. The cornerstone of the *Strategy* is the need for conservation to be guided by the constraints of marine turtle biology. It recognizes marine turtles are a shared international resource to be managed for sustainability by involving local communities and integrating local, regional, and national efforts.

The *Strategy* includes nine primary strategies. "Research and Monitoring" and "Integrated Management for Sustainable Marine Turtle Populations" focus on biology and reducing mortality, while "Regional and International Cooperation" involves the drafting and

implementation of agreements. "Evaluation of the Status of Marine Turtles" provides accurate designation of marine turtles by appropriate criteria under international conventions. "Public Awareness, Information and Education", "Community Participation in Conservation", and "Building Capacity for Conservation, Research, and Management" address human aspects of conservation. "Operation of the MTSG" and "Funding" seek to improve our organization and ability to undertake effective programs.

The participation of local communities and the need to incorporate sea turtle conservation in socioeconomic development are recurring themes within the *Strategy*. The *Strategy* addresses efforts that need to be undertaken by sea turtle conservationists and governments around the world to ensure the future health of marine turtle populations. To date, marine turtle conservationists from around the world have submitted research items for the as yet unpublished *Marine Turtle Action Plan*, but actions and implementation mechanisms have not been prioritized. The *Strategy* will complement the *Action Plan* (which will be produced as an electronic document in the near future) and enable us to promote critical conservation efforts and facilitate fund raising.

The *Strategy* should direct and promote the efforts of all of us to conserve marine turtles for years to come. Copies are available for US\$ 8.00 from the MTSG Washington D.C. office (address below). Please make checks payable to "MTSG/CMC" and indicate whether you would like the English, French or Spanish version.

MTSG. 1995. A Global Strategy for the Conservation of Marine Turtles. Prepared by the IUCN/SSC Marine Turtle Specialist Group. 24 pp.

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EARTH DAY CELEBRATION AT SANDSPIT TURTLE BEACH

Earth Day was celebrated on 22 April 1995 by Sindh Wildlife Department with great fervor and enthusiasm at Sandspit, the famous sea turtle nesting beach in Karachi, Pakistan. The celebrations were co-sponsored by the World Conservation Union (IUCN) and the Sindh Environmental Protection Agency (SEPA), in collaboration with Pakistan Maritime Security Agencies.

More than 1500 students of Class I to 0 level belonging to 35 schools, as well as a few colleges, participated in the Earth Day Programme. They reached there at 0900 hr in their school uniform carrying beautiful banners, colourful posters and placards in their hands. Some of them were wearing various types of masks exhibiting environmental hazards, pollution-creating factors, and endangered animals and plants. The day was started with recitation from the Holy Quran followed by an environmental song. The song was sung by very small children of Class I.

Among the Earth Day activities was an Environmental Quiz Programme where students were asked various questions by distinguished personalities; prizes were awarded to the winners. The questions in Quiz competition were based on environmental issues surrounding coastal areas, marine pollution, mangrove forests, marine turtles, dolphins, fish and birds. Certificates and gifts were awarded to all the schools who participated in the programme.

A bird watcher's guide was installed at the occasion in the form of an information signboard depicting beautiful pictures of endangered coastal wildlife species, particularly flamingos and shore birds (e.g., lapwing, curlew, avocet, black-winged stilt), but also green sea turtles and dolphins. The bird watcher's guide was designed by Sindh Wildlife Department. The expenses for installation and painting were donated by IUCN Pakistan.

A "wildlife gift shop" was arranged by the provincial Wildlife Department. There was an exhibition of posters, brochures, pamphlets, maps, greeting cards, stickers and various other publicity items and education materials for sale. Stuffed wildlife specimens (turtle shells, skulls, eggs and hatchlings, as well as some species of birds) made the shop unique and alerted customers and participants to threats facing these species. The main focus of the day was the participation of all the students and teachers in a beach clean-up, including the collection of plastic materials, and proper disposal of this garbage by the sweepers from Karachi Municipal Corporation.

Some private companies also participated in the programme, gaining publicity for their products by offering free gifts to the students. The students enjoyed the festivities a lot and learned about the environment as well.

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ENCOUNTER WITH A JUVENILE HAWKSBILL TURTLE OFFSHORE SAPELO ISLAND, GEORGIA

Information regarding the early pelagic stage ("lost year") of sea turtle development is limited. Encounters with "lost year" stage loggerhead (*Caretta caretta*), green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*) and hawksbill (*Eretmochelys imbricata*) turtles off the U. S. east and south (Gulf of Mexico) coasts have been documented by various authors (e.g., Carr, 1957, 1986; Carr et al., 1984; Witham, 1980; Meylan, 1984; Fletemeyer, 1978; Keinath et al., 1991), but loggerhead sightings dominate these records. Carr (1986) suggested that the predominance of loggerhead sightings may be due to large nesting aggregations in the southeastern U. S. and the proximity of these breeding colonies to the western edge of the Gulf Stream, which is the major current that flows from the Gulf of Mexico northeast along the U. S. east coast.

Hawksbill sightings follow second behind those of loggerheads in this region (Carr, 1986; W. Teas, NMFS, pers. comm.). Sightings of "lost year" stage hawksbills between 1981 and 1994 include pelagic encounters in Massachusetts, Virginia, North Carolina and Georgia and strandings in southern Florida and Mustang Island, Texas (Figure 1). There are prominent nesting colonies throughout the Caribbean basin (Carr, 1986; Meylan, 1984; Richardson, 1993; Witzel, 1983), but nesting in the continental U. S. is rare. Continental U. S. nesting is confined to southeastern Florida (NMFS/FWS, 1993). The hawksbill is a predominately tropical species whose foraging habitat has been determined to be coral reefs, where it preys on specific species of sponges (e.g., Meylan, 1985, 1988).

In this paper I describe an encounter by the crew of the research vessel *R/V Georgia Bulldog* with a pelagic stage hawksbill turtle floating in a sargassum weed raft off the Georgia coast, as well as the climatic and oceanic conditions prevailing prior to and during the encounter. The turtle was encountered on 31 May 1994, 37 nm east of Sapelo Island, Georgia

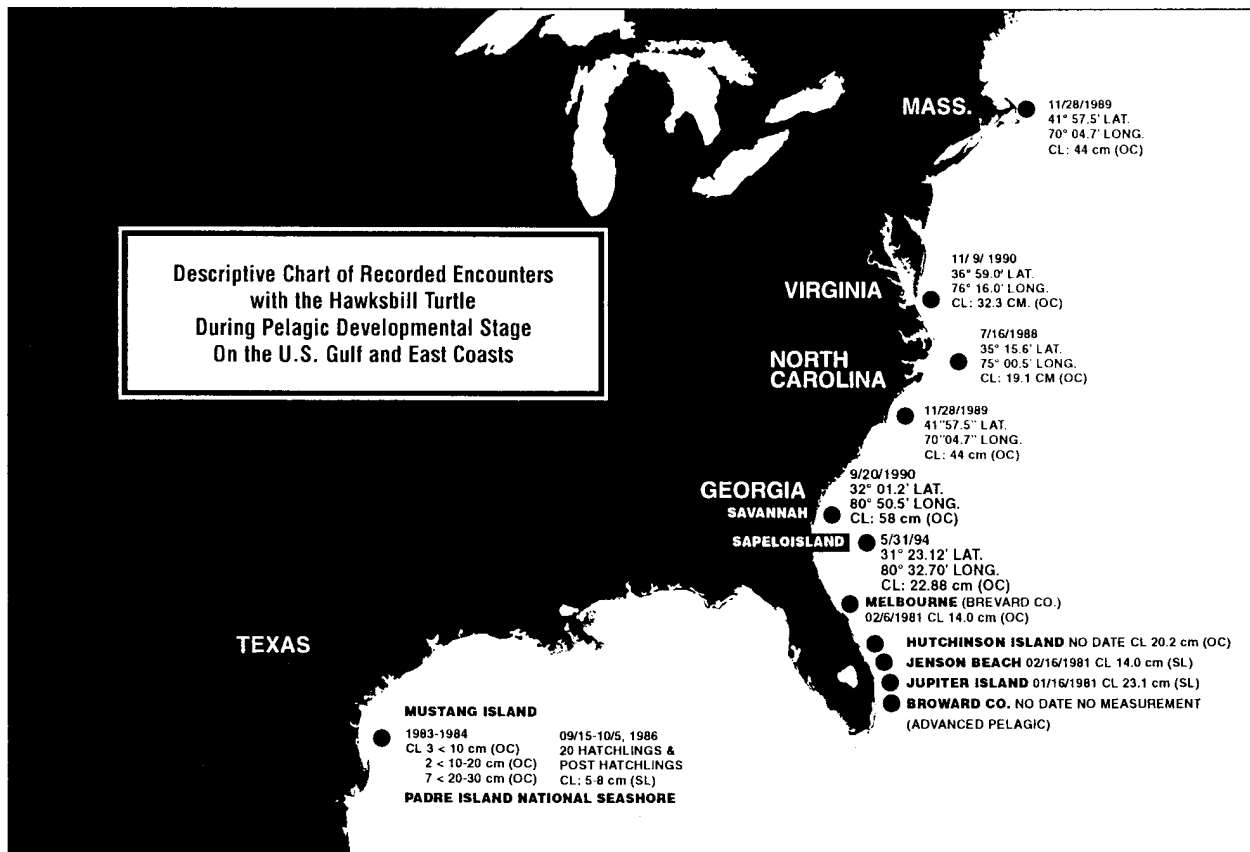


Figure 1. Recorded encounters with pelagic-stage hawksbill turtles off the U. S. Gulf and east coasts. Data courtesy of Wendy Teas, National Sea Turtle Stranding Database, National Marine Fisheries Service, Miami; January 1995.

(31°23.12'N, 80°32.70'W as determined using a Furuno LP-1000 Loran System) at 1545 EDT and captured using a dip net tied to a 15-foot pole. Curved carapace length was 23 cm (width: 19 cm). Five imbricated central scutes were counted, as well as four pairs of costal scutes. There were four pairs of inframarginal scutes. The turtle was kept on board for about five minutes and then released from the rear of the vessel in approximately the same location where it was captured. The turtle dove just beneath the surface and swam away from the vessel.

All aspects of the encounter (measurements, time of day, sea conditions, observations) were video-recorded and documented in the ship's log. Copies of the video tape were sent to sea turtle biologists for positive identification. Certified buoy data from the Savannah Light Station and Gulf Stream Analysis data were obtained from NOAA for the month of May 1994 and descriptive analyses were conducted. A May 1994 Coast Pilot Chart prepared by the National Ocean Survey was also examined to determine the flow direction of the near shore currents in the area. Information regarding the possibility of seasonal cycles of sargasso weed raft occurrences in Georgia waters was obtained from observations recorded by Captain Judy Helme of Ms. Judy Charters.

The May 1994 Coast Pilot Chart indicated a current flowing north just east of the 100 fathom line from the Gulf of Mexico to approximately 32-40°N, 80°W, where the current appeared to diverge, creating a south current that flowed near shore from South Carolina to

Florida. According to Captain Helmey, who has well over 20 years experience fishing off the Georgia coast, thick rafts of sargassum weed are located 30-42 nm off the Georgia coast during the months of May, June and in some years through July. These large rafts appear to flow slowly southward. Captain Helmey's records indicate that this is an annual occurrence and that rafts observed during these months are so dense that they form thick driftlines from Savannah, Georgia southward.

The capture site had experienced moderately strong northeast winds during the 64 hours prior to the encounter. Mean wind direction was as follows: May 29, 80°; May 30, 76°; May 31 (first 16 hr), 68° and mean wind speed was: May 29, 17.36 kts; May 30, 20.04 kts; May 31 (first 16 hr), 16.68 kts. During this same period, significant wave height ranged from 1.1-1.7 m. Gulf Stream Analysis data indicated that the approximate location of the western edge of the stream just south of the encounter on May 24 was 30°50'N, 80°80'W. On May 26, the location of the western edge was approximately directly south of the encounter at 31°00'N, 80°32'W. On May 31, the western edge of the Gulf Stream (31°23.12'N, 80°00'W) was about 60 nm east of the turtle's location. In summary, climatic and sea conditions present 64 hours prior to the encounter with the hawksbill turtle by the *R/V Georgia Bulldog* suggest that the raft carrying the turtle broke away from the Gulf Stream and drifted southward propelled by a south flowing current in the area as well as by moderately strong northeast winds.

Since Georgia offshore waters experience seasonal (May-July) sargassum driftlines, it appears that an opportunity to gather more information in regards to "lost year" stage hawksbills (and other sea turtle species) may exist. Detailed information should be gathered regarding the cycle of such driftlines. Based on these findings, commercial fisheries active in these waters could be encouraged to participate in the monitoring of these rafts for the presence of post-hatchling and "lost year" turtles. A detailed species identification leaflet denoting diagnostic characteristics would need to be produced and distributed. Instruction in standardized data collection with participating vessel captains should be offered by competent authorities. The hawksbill turtle is classified by the U. S. Endangered Species Act of 1973, as amended, as Endangered. Any information regarding elusive early life stages would be very useful in recovering this depleted species.

Acknowledgements: Dave Harrington (UGA Marine Extension Service); A. R. Kontos (Longwater & Company); Captain Judy Helmey (Ms. Judy's Charters); Skidaway Marine Aquarium staff: Pete Schlein, Heather Sarg, Bob Williams and Sonia Mullenix; *R/V Georgia Bulldog* crew: James Higgins Jr. and Paul Daniels; Wendy Teas (NMFS); J. A. Keinath (VIMS); Paruij Doari and Longwater & Company.

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ASEAN SYMPOSIUM WORKSHOP ON SEA TURTLE CONSERVATION

The First Association of Southeastern Asian Nations (ASEAN) Symposium Workshop on Sea Turtle Conservation was held in Manila, Philippines from 6-10 December 1993. This planning activity was jointly funded by World Wildlife Fund (WWF) and the U. S. Agency for International Development (USAID). More than 30 participants and observers from Indonesia, Malaysia, Philippines, Thailand and Japan attended the symposium workshop. Dr. Colin J. Limpus of the Queensland Department of Environment and Heritage (Australia) participated as a resource person and Adviser. The symposium workshop recognized the fact that sea turtles, being highly migratory, are a shared resource and that more effective and successful management can be achieved through a concerted effort among neighboring nations.

An offshoot of two previous meetings of the ASEAN Working Group on Nature Conservation (AWGNC), the symposium workshop provided a forum for sea turtle experts from the ASEAN to present status reports on sea turtles from their respective countries. Resource speakers presented relevant topics including the ASEAN decision-making process, integrated protected areas as a tool for sea turtle conservation, worldwide status of sea turtles, sea turtle biology and ecology, and ongoing regional programs on sea turtle conservation. Four country reports and eight technical reports were presented providing extensive and up-to-date information about sea turtles from the ASEAN region.

It was very interesting to note that reports on tag recoveries presented by the participants and Dr. Limpus revealed that the Philippines is a crucial management area for sea turtles not only for the ASEAN region but also for the entire Asia-Pacific region. Loggerhead turtles from Japan have been reported recaptured as far south as Basilan in Mindanao, southern Philippines. Green turtles from Malaysia and the South Pacific island of Yap, Federated States of Micronesia are being caught in Philippine waters. Leatherback turtles from Terengganu, an important rookery in Peninsular Malaysia, are being caught by Filipino fishermen from southern Luzon, Visayas and Palawan. A hawksbill turtle from Malaysia was recaptured in Antique, Philippines.

It appears, based on these tag recoveries, that the islands of the Philippines lie along migratory routes of different populations of sea turtles from the Asia-Pacific region and possibly provide various critical habitats for these endangered species. This also gives the Philippines the serious responsibility of strengthening its sea turtle conservation program and initiating efforts towards establishing a regional center for sea turtle conservation in the country, a recommendation forwarded by the participants.

The workshop generated a significant output which is the Proposed ASEAN Regional Marine Turtle Conservation Program which was annexed into the report submitted to the AWGNC. This report along with the proposed regional program has already been approved by the AWGNC, and subsequently by the ASEAN Senior Officers on the Environment (ASOEN) which convened last April. Having been already approved by the ASOEN, the workshop output now serves as the framework for a regional cooperative program which will hopefully ensure the continued survival of sea turtles in the ASEAN region.

Cooperating to ensure the success of the symposium workshop were the Pawikan Conservation Project of the Protected Areas and Wildlife Bureau-DENR, the Marine Turtle Foundation Inc. (a local NGO dedicated to supporting government initiatives on sea turtle conservation, as well as other marine wildlife species such as dugongs, whales and dolphins), and the WWF-Philippine Program which is currently in the process of developing its marine program. Valuable support also came from the Miriam-Peace Foundation and the ASEAN Desk of the Department of Foreign Affairs. Copies of the Proceedings are available from the Marine Turtle Foundation, Diliman, Quezon City, Philippines; FAX: (632) 924-3690.

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WWF PUBLICATIONS: WILDLIFE TRADE

Wildlife Trade Education Kit by Lynne Hardie Baptista (author) and Andrea L. Gaski (contributor). The updated kit demonstrates the impact of commercial trade on wildlife through fact sheets on parrots, primates, rhinos, elephant ivory, and other heavily traded species; a full-color poster; an 80-picture slide show; and an educator's guide that includes a quiz and suggested activities for both high school and younger audiences. Revised 1994. US\$ 45.00. Order code HAWT.

International Wildlife Trade: A CITES Sourcebook (1994, 174 pages, ISBN 1-55963-348-4) edited by Ginette Hemley. This new reference book explains how CITES operates and includes the full text of the CITES treaty as well as CITES Appendices I, II and III. Also included are a list of CITES Parties as of April 1994 and a list of species reservations by Parties as of October 1993. The publication provides a valuable overview of the strengths and weaknesses of the treaty and current wildlife trade issues, including facts and figures on the wildlife trade. US\$ 16.95. Order code HEIWP.

Both publications are available from: WWF Publications, P. O. Box 4866, Hampden Post Office, Baltimore, Maryland 21211; Tel (410) 516-6951. Please add shipping and handling charges of US\$ 2.00 for the first book and \$1.00 for each additional copy.

LEGAL BRIEFS

ATTENTION U. S. SEA TURTLE CONSERVATIONISTS — The National Marine Fisheries Service (NMFS) has received a petition for rulemaking from the Texas Shrimp Association (TSA) to revise the current sea turtle conservation requirements for the shrimp trawl fishery (*i.e., TED requirements*) in the southeastern USA. The petition is based on a report prepared for TSA entitled, "Sea Turtle and Shrimp Fishery Interactions — Is a New Management Strategy Needed?" To solicit public comment and review of this report, NMFS has published an advanced notice of proposed rulemaking in the Federal Register (Vol. 60, No. 177, p.47544-47545; 13 September 1995). Copies of the report can be obtained from and written comments should be addressed to: Chief, Endangered Species Division, Office of Protected Resources, NMFS, 1315 East-West Hwy, Silver Spring, MD 20910 USA (deadline: 13 November 1995). An analysis of this report is available from the Center for Marine Conservation, 1725 DeSales St. NW, Washington D.C. 20036 USA. ***Make your voices heard!***

* * *

ECOCARE MALDIVES — The efforts of ECOCARE to save endangered marine turtles in the Maldives have been very successful and have received national recognition. Our "Save the Marine Turtle" project has distributed over 25,000 information packages to urge tourists to discontinue purchasing anything made from turtle shell. As a result, shopkeepers report that the market for turtle products fell as low as 1% in May 1995. Further to this, a page of the ***Haveeru*** newspaper has been reserved solely for the purpose of stopping turtle trade throughout the country. A letter of appeal delivered to each member of the Citizen Majlis (Parliament) has brought this issue to the attention of the Parliament. In the meantime, the Government had started moving in a very positive direction in protecting marine turtles. At a recent Cabinet Minister's meeting, the decision was made to prohibit catching turtles throughout the Maldives and to ban trade in turtle shells, live turtles, and ornaments and jewellery made from turtle shell unconditionally for ten years. Dolphins and some other marine species have also received

enhanced protection under the new legislation. Now we are planning to start a strong awareness campaign among the school children and general public of the country. The focus of this campaign will be sea turtles and dolphins. Later, we hope to include seabirds. We would be grateful for the support of readers of the Marine Turtle Newsletter in sharing relevant books, posters, slides, videos, etc. with us. Thank you! ECO CARE, c/o Mr. Mohamed Zahir, Kinara House, Machchangolhi, Iskandharu Magu, Male 20-03, Republic of Maldives.

* * *

A WIN FOR TURTLES — Emergency rules protecting threatened and endangered sea turtles from shrimp trawling in Texas and southern Louisiana (USA) waters were granted by Federal District Court Judge Samuel Kent in Galveston, Texas on 1 August 1995. The Judge granted a request by the Center for Marine Conservation (CMC) asking the National Marine Fisheries Service (NMFS) to ensure that only the most effective turtle excluder devices (TEDs) are used to prevent sea turtles from drowning in shrimp nets. CMC sued NMFS under the Endangered Species Act in October 1994 when record numbers of sea turtles washed ashore dead on beaches in Texas and Louisiana, jeopardizing the survival of one of the most endangered animals in the world, the Kemp's ridley turtle [see MTN 66:8-9, 67:2-5]. Specifically, the Judge ordered shrimp trawlers to use only hard grid TEDs. Hard TEDs are also required in trawl nets with a headrope length greater than 15 ft, and top opening TEDs must be rigged with shortened flaps over the escape openings. The restrictions apply through 10 September 1995, in NMFS statistical zones 17-21 in Texas and southern Louisiana waters within 12 miles of shore, including the inshore bays and estuaries. Should sea turtle strandings increase significantly despite these new gear rules, the Judge stated that NMFS may adopt more stringent sea turtle conservation measures. The ruling is an important step in protecting sea turtles from shrimping activities in the Gulf of Mexico. We are hopeful that Judge Kent will adopt additional, more permanent conservation measures when the parties convene for the next hearing on 6 October 1995. For more information, please contact Dr. Deborah Crouse or Attorney Tim Eichenberg, Center for Marine Conservation, 1725 DeSales Street NW, Washington D.C. 20036 USA.

* * *

GOOD INTENTIONS ENDANGER TURTLES — BENTOTA, Sri Lanka (AP) — To save the nation's dwindling population of marine turtles, conservationists began in 1979 to build sanctuaries [=egg hatcheries] near Sri Lankan beaches. They buy turtle eggs from poachers, hatch them and guard the newborns as they crawl into the Indian Ocean. Today some of those hatcheries are doing more harm than good, according to the Turtle Conservation Project, an environmental group based in England that is working in Sri Lanka. To become money-making attractions, the hatcheries cram hundreds of baby turtles into small cement tanks of salt water and risk their lives by holding them there for days. The turtles swim in circles, wasting the energy they will need to swim two or three days to safety once they enter the ocean. "We're trying to persuade the government to promote the few good hatcheries and close down the very bad ones," Peter Richardson, a project director, said in an interview. Suhashini Hewavisenthi, a zoologist at Colombo University, says the hatcheries must be preserved. "There is no option at this moment other than the hatcheries. If not, the eggs will end up in someone's stomach," she said in an interview. Richardson agrees, as long as they are improved. Source: excerpted from *Pacific Daily News*, 16 June 1995.

* * *

THREE CHEERS FOR SNAPPER! — Snapper Power Equipment and the Sea Turtle Survival League (STSL) announce a unique corporate/non-profit partnership to save threatened

and endangered sea turtles. For the next year, a portion of the profits from every Snapper rear-engine riding lawnmower sold in the U. S. will go to support conservation and education efforts of the Sea Turtle Survival League program of the Caribbean Conservation Corporation. STSL Director David Godfrey praised Snapper for taking the corporate lead in the fight to save endangered sea turtles. "If all corporations follow Snapper's example, significant progress could be made on solving many of the world's social and environmental problems," Godfrey said. Source: Sea Turtle Survival League *Press Release*, 7 August 1995.

* *

POLICE SEIZE TURTLE CARGO — Police have seized what is described as a sizable amount of turtle meat on board the vessel 'Lady Genevieve' belonging to the Island Development Company (IDC). It is reported that the turtle meat was in the personal possession of an employee of the company returning to Mahé [Seychelles] on the boat, and not part of IDC cargo. The seizure was made early this week when the boat arrived in Port Victoria from a trip to the outer islands. Apparently acting on a tip-off, police boarded the vessel for a search and found a consignment which included fresh and dried turtle meat and birds' eggs. The turtle meat is believed to have come from Cosmoledo. No confirmation has been available from police sources. It is uncertain that any charges will be brought since previous cases of illegal trading in turtle meat have never been prosecuted, in particular a major case in 1993 when about two tons of meat were seized. Source: excerpted from a Seychelles newspaper, *Regar*, 14 July 1995.

* * *

CONDOS FINED FOR LIGHTING VIOLATIONS — On 8 June 1995, The Breakers Condominium in Melbourne Beach, Brevard County, Florida, signed a settlement agreement with the U. S. Department of Interior regarding 1992 hatchling sea turtle disorientations caused by the Condominium's external lights. The settlement included paying the Fish and Wildlife Service a civil penalty of \$15,000. In the 18 April 1994 Notice of Violation submitted to The Breakers, a civil penalty of \$45,000 was proposed [see MTN 67:34]. This amount was reduced at settlement [because] (1) The Breakers presented substantial information showing that the Condominium Association Board was not apprised of contacts received by its manager regarding the need to modify beach lighting to avoid [the disorientation] of sea turtles, and (2) subsequent to receiving the 1994 Notice of Violation, the Condominium Association took quick corrective action of its lighting problems. Source: excerpted from Fish and Wildlife Service, Southeast Region *Sea Turtle Recovery Update*, July 1995.

* * *

TURTLES DRIVE CARS OFF DAYTONA BEACH — A federal judge banned nighttime driving and parking along 40 miles of seashore sands around Daytona Beach [Florida] yesterday to protect endangered sea turtles — forcing changes in a century-old tradition. The temporary injunction issued by U. S. District Judge Anne C. Conway in Orlando was a partial victory for environmentalists who claim that vehicle traffic is killing loggerhead and green turtles and many of their hatchlings. [N.B. In June, two Volusia County citizens filed a lawsuit against the County for alleged failure to adequately protect sea turtles from the harmful effects of beach driving and for failure to eliminate artificial light sources during the turtle nesting season; source: U.S. Fish and Wildlife Service.] The 26-page order also affects daytime traffic in a so-called "conservation zone", which extends seaward from the turtle nesting dunes for 30 feet along the entire Volusia County coastline. The judge's order is in effect until 1 November 1995. Trial on the lawsuit would presumably take place after that. The turtle nesting season is from May to October. Source: excerpted from *The Times Union* (Jacksonville), 2 August 1995.

YOUNG-POMBO BILL A 'DEATH SENTENCE' FOR ENDANGERED SPECIES

U. S. Congressional Representatives Don Young (R-AK) and Richard Pombo (R-CA) have introduced the "Endangered Species Conservation and Management Act of 1995" (HR.2275), a bill that will undermine and unravel virtually every protection for endangered species and marine wildlife. Like Senator Slade Gorton's (R-WA) companion bill in the Senate (S.768) [see MTN 70:24], if passed, the Young-Pombo bill will cost taxpayers millions of dollars in wasteful bureaucracy and landowner entitlements programs, while taking away essential protections for recovering imperiled species. *Please call your Representative and Senators and urge them to vote against HR.2275 and S.768* for the following reasons:

- ** The bills abandon the goal of recovering species to healthy population levels. They give the Secretary of Interior sole power to determine a "conservation objective" — including taking no action to recover species from the brink of extinction.
- ** The bills grant oil, gas and commercial fishing industries a license to kill sea turtles and other endangered marine wildlife, if the death is incidental to legal activities such as drilling or fishing.
- ** The bills allow shrimpers to ignore proven, effective conservation measures such as turtle excluder device (TED) requirements. The National Academy of Sciences has found that shrimp fishing without TEDs poses the greatest threat to the survival of threatened and endangered sea turtles and that captive breeding is no substitute for conserving species in the wild. Despite this, the Young-Pombo bill allows shrimp fishers to avoid using TEDs if they support highly experimental captive breeding programs which simply dump juvenile sea turtles into a marine environment where they are vulnerable to capture and drowning in shrimp nets before they mature.

Please call the capitol switchboard at (202) 224-3121 and they will connect you to your representative's offices. For more information, please contact Kristin Siemann, Ctr for Marine Conservation, 1725 DeSales St. NW, Washington D.C. 20036 USA; Tel (202) 429-5609.

FLORIDA LEGISLATURE 'TURNS BACK THE CLOCK'

Two new bills passed by the 1995 Florida Legislature could eliminate a number of hard-fought protections for sea turtles and their nesting habitat in the state. The bills have already passed both chambers of the legislature and will become law once signed by Governor Lawton Chiles. These setbacks are particularly devastating given that over 90% of all sea turtle nesting in the continental United States takes place on the Florida coastline.

The Caribbean Conservation Corporation and its Sea Turtle Survival League (STSL) program have worked for years to restrict the use of sea walls, rock revetments and other types of coastal armoring, which are used as short-term remedies to protect poorly sited beachfront homes from erosion. Coastal armoring structures, especially when built in areas with dense sea turtle nesting, can often block female turtles from reaching suitable nesting sites. These structures also create a sort of "domino effect" by increasing erosion on the adjacent beach and encouraging the building of additional armoring structures down the shoreline. One of the bills just passed establishes a new, weaker coastal armoring policy in the state. Rather than encouraging alternatives to armoring, or requiring that armoring be used only as a last resort, this new law would almost guarantee that any public or private structure on the Florida coastline that is threatened by erosion could be "protected" by armoring on the beach. This law only requires that [the homeowner] asks for an "after the fact" permit from the state within sixty days.

Another bill passed by the legislature would amend Florida Statutes to forbid the Department of Environmental Protection (DEP) from timing beach renourishment, restoration or sand transfer projects to avoid impacts to marine turtles during the nesting season. If signed by the governor, this new law would require DEP, in every situation, to allow these projects to proceed in the middle of nesting season as long as nest relocation programs are initiated. Florida currently discourages summer renourishment on nesting beaches, but timing restrictions are customarily only imposed in six east coast counties [which are of] critical importance as marine turtle nesting areas. The STSL does not deny the value of renourishing critically eroded beaches as a tool to temporarily recover nesting habitat. What it questions is the necessity to perform this function [during] the turtle nesting season. The issue of cost is always raised, but no one seems able to provide an objective cost-benefit analysis. Even if the cost of winter dredging is higher, this does not provide an excuse to allow the taking of endangered and threatened species.

Summer renourishment projects, especially in dense nesting areas, will involve having to relocate huge numbers of nests. Such relocation will have the following impacts on sea turtles: (1) Even when qualified scientists are monitoring nesting, studies have shown that an average of 7% of all nests are missed (i.e., recorded as 'false crawls'). These nests would obviously not be relocated and would likely be buried during the project. (2) Nesting females could become entangled in renourishing equipment on the beach or disoriented by lighting and activity on the beach at night. (3) The dredges used in renourishment projects are known to occasionally suck up and kill adult turtles. Both females and males will be concentrated offshore in greater numbers during the nesting season and would be at much greater risk from summertime dredge operations. (4) Relocation can influence the sex ratio of hatchlings. (5) Relocating nests greatly increases mortality rates of eggs and hatchlings. Recent analysis by DEP shows that nest relocation results in an average 12% increase in egg/hatchling mortality rates. The total number of sea turtles that will be killed if summer renourishment is allowed throughout Florida would be staggering. Source: excerpted from Caribbean Conservation Corp. *Velador*, Spring 1995. **Update:** It is unfortunate that both of these bills have now become law in Florida — *Editors*.

“CRY OF THE TURTLE”

At last, the first compact disc (CD) has been produced to help save the world's sea turtle populations! “Cry of the Turtle” is a masterpiece of composition, dazzling and majestic, poetic and deeply inspired. The music on this album depicts the leatherback turtle's journey through its life cycle and includes the sound of its breathing while on the beach laying eggs. Produced by one of America's leading classical performers, Paul Lloyd Warner, a large portion of the sale of the CD will go to the Luginbuhl Institute for Endangered Species. In collaboration with Drexel University (Department of Bioscience and Biotechnology) and other groups, the Institute has been involved with tracking leatherbacks, protecting nesting populations, and studying diving behavior since 1981. The Institute was instrumental in bringing the plastic-bag-jellyfish-look-alike issue to the general public in 1982 by utilizing television public service spots. The Institute is seeking domestic and international distributors to ensure the maximum sales effort. Should anyone have such contacts or would like further information, please write: Save the Leatherback, P. O. Box 263, Ellington, Connecticut 06029 USA. Thank you!

“TURTLE, TURTLE”

“Turtle, Turtle” is a rap song with a strong message to save sea turtles and to highlight turtle conservation to the youth of the South Pacific in the campaign “1995 Year of the Sea Turtle”. “Turtle, Turtle” is composed by Islandhood's Shane Rivers, a well-known Samoan

musician based in Auckland. Shane Rivers performs the song with Auckland rapper Herman Loto. Shane's daughter Renate Rivers sings the haunting background chant "*Laumei faiaga*" which is based on a traditional Samoan chant. Growing up in Samoa and taking care of a turtle for three years instilled a conservation ethic in Shane who donated the use of the song to SPREP (South Pacific Regional Environment Programme) for the participants of the sea turtle campaign "1995 Year of the Sea Turtle". The song was recorded at Auckland's Piula Studio (NZ). The rap music is available [free of charge] in rap song music and rap music video from SPREP, P. O. Box 240, Apia, Western Samoa; FAX: 685.20231. Source: Action Humanitaire Internationale (Fiji) *Press Release*, 22 August 1995.

A PLEA FOR ASSISTANCE

El Nido PALAWAN in the Philippines is one of the most beautiful places on Earth. It was only a matter of time before developers would target Bacuit Bay with its 19 islands of dense primary jungle and spectacular black marble cliffs . . . and in the process threaten green and hawksbill sea turtle nesting sites with construction, beach lighting, activity, poor waste management, and so on. Now a WWF-initiated "debt for nature swap" has created the largest marine sanctuary in the Philippines here in Bacuit Bay, including some 1000 km². Of the islands, only Minilog and Pangulasian (because of existing tourist development) and Malapacao (because of its fishing community) are classified as multiple use zones; the rest will be protected. The sanctuary is a grand beginning, but as is so often the case there are too few rangers and insufficient financial/technical support.

I, Australian by birth, now a Filipino citizen have lived on Malapacao island for many years as a self-financed volunteer, laboring to protect the sea turtles as well as working with other residents to reduce illegal fishing in the bay and destructive "slash-and-burn" practices in the forests. To generate an income and continue my protection activities, I offer simple "retreat" experiences featuring a tranquil environment for retirees and convalescents, as well as adventure holidays for environmentally conscious tourists, with the hope that they could be encouraged to become involved. Our efforts on behalf of marine turtles include seasonal (January-May) monitoring of nesting activity to (a) protect nests from natural and man-made threats (e.g., egg gathering by local residents) and (b) facilitate the hatchlings to the sea. Evening lights at the retreat are kept to a bare minimum and efforts are made to educate and involve the local population in grassroots conservation, including abstaining from turtle egg consumption.

The decision to allow development on Malapacao, coupled with plans for an international airport with road links to El Nido, places our many years of struggle for this lovely bay in jeopardy. I have decided to take a great risk and now have a contract to purchase four hectares. I have the support of a few friends who desire simple vacation/semi-retirement cottages that I could manage and rent when not in use in order to provide a modest return on their investment. With a few more interested parties, the retreat could be slightly enlarged and improved for other uses, such as occasional small-scale nature conservation workshops to generate NGO interest and financial/technical support so desperately needed by the Sanctuary. The long term goal is to protect critical habitat for the turtles, to maintain a base for environmental awareness, and to create a model for sustainable, small scale tourism in our area. What we have achieved is considered by many to be special. I ask readers who may be interested in personal involvement to contact me at the address below.

LEE ANN CRUZ, Malapacao Island Retreat, 5313 EL NIDO, Palawan, PHILIPPINES

NOTICIERO DE TORTUGAS MARINAS

Five years ago, beginning with Marine Turtle Newsletter (MTN) issue number 50 (July 1990), we realized a long held desire to distribute the MTN in the Spanish language. Susana Salas, an accomplished bilingual translator resident in Costa Rica, submitted a proposal to the Editors requesting permission to translate each issue of the MTN into Spanish. With institutional support from Confederación Universitaria Centroamericana (CSUCA) and financial support from the U. S. Fish and Wildlife Service, *Noticiero de Tortugas Marinas* (NTM) was born.

In producing the NTM each quarter, Susana served a growing community of Latin American colleagues and established a precedent of technical and esthetic quality in the NTM that was widely respected. She has now moved her family from San José, Costa Rica, to a rural area of Guanacaste (Costa Rica) where she is involved in managing a Guest House on a sea turtle nesting beach. Without the amenities necessary to continue publishing an international periodical, she has resigned as our translator. We will all miss her dedication to purpose and her love of the MTN/NTM. And we thank her for five years of effort!

We are pleased to announce that after a brief lapse, the NTM is back in service. Angela Mast, a Colombian-born educator who has translated entire volumes on wildlife management, coastal zone management, and related subjects for USAID, WWF, Conservation International and other organizations has taken on the task of producing the NTM. We would like to extend a warm welcome to Angela! If you or someone you know would enjoy reading the NTM, please contact Angela Mast, *Noticiero de Tortugas Marinas*, c/o Conservation International, 1015 18th Street NW, Ste. 1000, Washington D.C. 20036; FAX: (202) 887-5188. Thank you! KLE/SAE

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