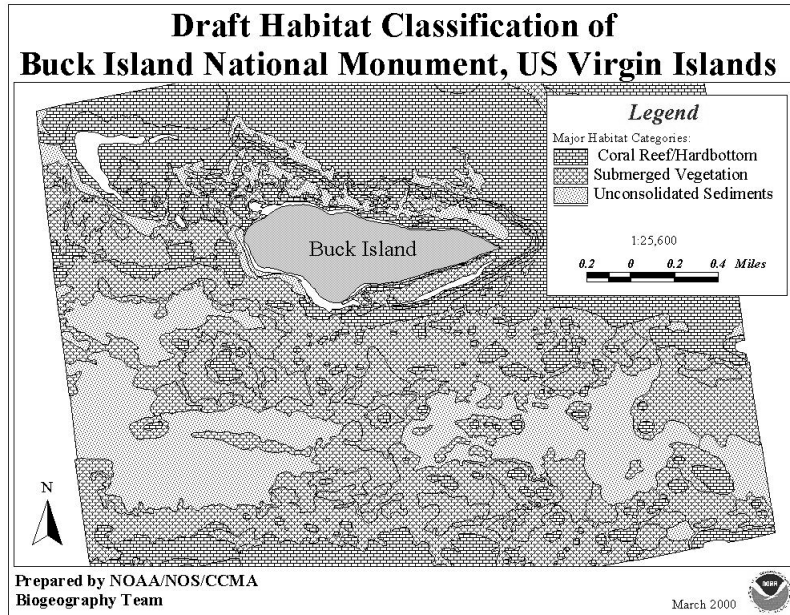


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Editorial:

Advances with the Inter-American Convention for the Protection and Conservation of Sea Turtles

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Various notes on the Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC) have appeared in this Newsletter over the past few years (Donnelly 1995; 1996; Somma 1996; Frazier 1997; Anon. 1998). As of the last update (Frazier 1999) the period for signing the IAC had closed (on 31 December 1998), and a total of twelve nations had subscribed to the treaty: Belize, Brazil, Costa Rica, Ecuador, Honduras, Mexico, Netherlands, Nicaragua, Peru, United States, Uruguay, and Venezuela. Of these, only Venezuela had ratified the Convention: on 20 August 1998. The IAC will come into force 90 days after the eighth instrument of ratification has been deposited with the Depository, Venezuela. Once the treaty comes into force, additional "States of North, Central and South America and the Caribbean Sea, as well as other States that have continental or insular territories in this region" may become members by acceding to it, but until that time no further countries can join.

Over the past year there have been numerous advances. Three more countries have deposited their instruments of ratification: Peru on 18 November 1999; Brazil on 22 November 1999; and Costa Rica on 17 April 2000. This brings the total number of ratifications to four, and other signatories are also progressing toward ratification.

On 29 April 1999 the Senate of Mexico approved the IAC, and the following year, on 10 July 2000, the *Diario Oficial* published a decree to that effect, dated 3 July 2000, and signed by the President, Dr. Ernesto Zedillo Ponce de Leon, and the Secretary of Government, Sr. Diódoro Carrasco. Once the paperwork clears the President's office, the instrument of ratification should be deposited in Caracas shortly thereafter.

The National Congress of Honduras passed Decree 101-99 on 13 July 1999, published in *La Gaceta* (No. 28,931) on 31 July 1999, approving the ratification of the treaty. On 9 August 2000 Resolution No. 031-2000, which was passed on 14 July 2000 by the Secretaría de Agricultura y Ganadería (SAG), Dirección General de

Pesca y Acuicultura (DIGEPESCA), was published in *La Tribuna* (Año XXIV, No 7482, pg 48). This resolution stated that fisheries inspectors would board and inspect shrimp trawlers to confirm if they are using turtle excluder devices (TEDs), and it also provided for sanctions. The resolution invokes the IAC, indicating that the actions proscribed in the resolution flow from being a Signatory to the treaty.

In Ecuador the National Congress passed Resolution No. 21-046 on 30 May 2000, approving the ratification of the IAC. Despite several pressing national problems in Quito, the Ministry of Foreign Affairs resolved a number of internal issues regarding the treaty, and on 14 August sent a recommendation for ratification to the President, Dr. Gustavo Noboa Bejarano. On 29 August the President signed Executive Decree No. 719, ratifying the IAC and instructing the Minister of Foreign Relations to deposit the instrument of ratification with the Depository. By mid September Ecuador should become the fifth country to ratify.

On 20 July 2000 the Senate Foreign Relations Committee of the USA held a hearing on four treaties, including the IAC; and on 26 July the Committee decided to support the Inter-American Convention and present it to the Senate for ratification. It is hoped that the US Senate will consider, and approve, the ratification of the IAC in September or by the end of the legislative session.

Internal legislation has been revised in Belize, strengthening national management plans and facilitating ratification of the treaty. The Government of Belize authorizes a controlled legal take of green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) turtles, during a regulated open season, and they plan to invoke Article IV, paragraph 3 (a) and (b) of the IAC to be able to comply with the terms of the Convention, but also to have a legal harvest of turtles for traditional communities.

The Kingdom of Netherlands consists of Netherlands, Netherlands Antilles and Aruba, so two levels of

STOP PRESS! On 11 September Mexico deposited its instrument of ratification, becoming the 5th country to ratify the IAC, and the treaty office in Caracas has been notified that Ecuador will soon be depositing their instrument.

legislative work are involved in the ratification of this treaty. The Ministry of Foreign Affairs in the Hague, Netherlands, is advancing in the legal process of ratification. In the mean time, the legislature in Netherlands Antilles is working hard to adapt national legislation to comply with the obligations of the IAC. An amendment of a recent law for nature management and conservation has been prepared by government and in the process of being sent to Parliament for adoption. It is intended that both the adaptation of national legislation and ratification will be completed by the end of the year.

On 12 October 1999 the IAC was submitted to Parliament in Uruguay. However, presidential and legislative elections at the end of 1999, and the subsequent development of the five-year budget had to take priority over many other issues. Nonetheless, the treaty has had continual support from various sectors in Uruguay, and it is hoped that it will be ratified by the end of the year. It is not known what the situation is in Nicaragua in regards to the ratification of the IAC.

It is expected that the governments of at least Belize, Ecuador, Honduras, Mexico, Netherlands, and the USA will deposit their respective instruments of ratification in Caracas before the year-end festivities begin in December. Thus, it is likely that the treaty will come into force in early 2001, and shortly after that a number of fundamental aspects regarding its operation will be decided at the first conference of the parties. Basic issues that will be taken up at that time include: the Secretariat, the composition and rules for the Consultative Committee and the Scientific Committee, and funding aspects.

The text of the IAC has served as a model in the development of other international instruments with similar objectives. These include the Memorandum of Understanding (MOU) on ASEAN Sea Turtle Conservation and Protection, as well as the MOU on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South East Asia (IOSEA). The ASEAN MOU is open for signing, and it is planned that the Conservation and Management Plan (CMP) for the IOSEA will be negotiated early next year. Once the CMP is approved, the IOSEA will then be open for signing. Several concepts, if not terms and expressions, from the IAC have been incorporated into these other sea turtle agreements. To date, the Inter-American Convention for the Protection and Conservation of Sea Turtles is the only legally-binding international instrument that focuses specifically on the conservation of sea turtles and their habitats. In addition to earlier articles published in the *MTN*, various

analyses of the IAC have also been published and/or presented in other fora (Naro-Maciel 1998; Bache in press a; in press b; in press c; Frazier in press; Frazier & Bache in press; Gibbons-Fly in press; McNee in press).

Acknowledgements: Several people have generously supplied information on the development of this treaty: Joanna Alfaro (Peru); Alfonso Alviles (Belize); Juan Carlos Cantú (Mexico); Hernán Calisto (Ecuador); Alejandro Fallabrino (Uruguay); Carlos Molinero (Honduras); Milagros López (Uruguay); Patrick Opay (Costa Rica); Jeff Sybesma (Netherlands Antilles); Santos Valero (Venezuela, treaty office); and Melania Yañez (Ecuador).

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Rearing Leatherback Hatchlings: Protocols, Growth and Survival

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Leatherback hatchlings are difficult to maintain under captive conditions because they (i) suffer from bacterial and fungal infections when water quality is poor (Frayr 1970) and (ii) are dietary specialists (Bjorndal 1997). Leatherbacks (iii) do not recognize physical barriers (Witham 1977) and can abrade their skin (leading to infections) by swimming into tank walls. To promote their survival in captivity, each of these problems must be solved.

We recently completed a study on the development of leatherback diving and feeding behavior, using juveniles transported periodically to the ocean as subjects. This study required us to rear the turtles for a short time (7 weeks) under laboratory conditions. Here, we report our rearing methods and procedures.

Several workers (Bels 1988; Berkenmeier 1971; Chan 1988; Deraniyagala 1936; Foster & Chapman 1975; Frayr 1970; Phillips 1977; Spoczynska 1970; Witham 1977) have reared leatherbacks. Water quality was strictly controlled (by continual supply or by filtering) in some efforts (Bels 1988; Chan 1988; Deraniyagala 1936; Foster & Chapman 1975), but not in others (Berkenmeier 1971; Phillips 1977; Spoczynska 1970). Turtles have been fed a variety of marine (cnidarians, fish, molluscs, tunicates, and algae) and non-marine (eggs, bread, chicken liver, beef heart) foods, sometimes imbedded in gelatin or edible agar (Chan 1988). Feeding leatherbacks fish can cause gut impaction and eventually, death (Bels 1988; Foster &

Chapman 1975; Witham 1977). But survival was apparently unaffected by other foods as hatchlings survived for long periods on either a variety (Deraniyagala 1936) or a limited array (Bels 1988; Foster & Chapman 1975; Witham 1977) of foods. In some instances (Berkenmeier 1971; Foster & Chapman 1975; Frayr 1970) barriers (netting or foam) were used to protect the turtles from tank walls and surfaces, but in other instances no barriers were present (Bels 1988; Chan 1988; Spoczynska 1970; Witham 1977). Three investigators (Bels 1988; Deraniyagala 1936; Witham 1977) succeeded in keeping turtles alive for more than a year (662, 642, and >1200 days, respectively), but these were the few survivors of initially larger groups of hatchlings.

Most of our hatchlings (n=22) were turtles recovered from nests in Palm Beach County, Florida, USA, three or more days after the majority of the clutch had emerged. Many of these turtles were probably stressed, weak, and had sores or injuries. Had they not been captured, most would probably have failed to emerge and have died in the nest. Thirteen hatchlings emerged naturally and were captured as they crawled down the beach. These turtles were in excellent condition.

Captured hatchlings were housed in a large room. Prior to capture, the floor was disinfected with a 10 % Chlorohexadene solution. This procedure was repeated periodically throughout the study. A step pan of Chlorohexadene was placed by the room entrance as a

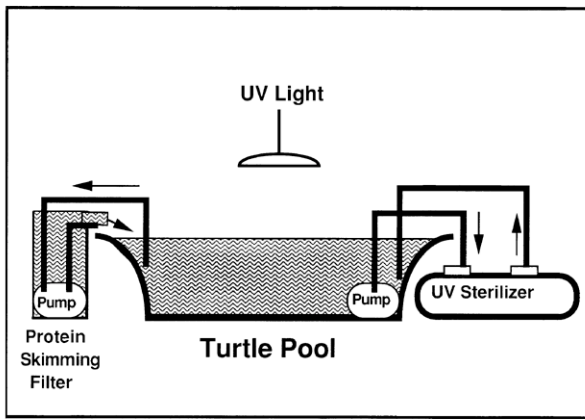


Figure 1. Schematic of each turtle pool. Arrows indicate direction of water flow through the filtering systems.

foot wash to prevent outside contamination. We also disinfected our hands with anti-bacterial soap. Any equipment (calipers, plastic containers, scrapers to clear algal growth from the tanks, etc.) that came in contact with the hatchlings or the tanks was cold-sterilized, again using a Chlorohexadene solution.

Hatchlings were maintained in five circular plastic pools (1.5 m wide x 0.3 m deep), filled with 103 L of seawater (Figure 1). Water temperature ranged from 23 - 27° C. Water quality for each pool was maintained by two filter systems: an ultraviolet filter (Startronics™, with a 25W UV element) and a “Skilter” (Supreme 400™) filter containing a protein skimmer, ground carbon and fiberglass mat. A 150W UVA/B incandescent lamp, suspended 0.5 m above each pool, provided UV radiation. Banks of 100W “Vita-lite” fluorescent fixtures, suspended ~ 3.0 m overhead, provided full spectrum radiation. Water quality (pH = 8.0 to 8.3; salinity = 28 - 33 ppt; and ammonia concentration) was monitored daily. Partial water changes with ~ 50 L of fresh, sterilized seawater were made every 3-4 days.

On the day of capture, each hatchling was weighed (on an electronic balance) and measured (carapace length and width; front and rear flipper length; body depth). A small (1 cm²) piece of hooked velcro™ was attached to the posterior portion of its carapace with a drop of cyanoacrylic cement. The body and flippers were then immersed in a disinfectant (Betadine) bath. The head (avoiding the eyes) was disinfected with a cotton swab dipped in Betadine disinfectant.

Two long wood dowels were mounted at a 90° angle across the top of each pool. Two short (~ 12 cm) monofilament lines were tied to each dowel, about 15 cm from the inside tank wall. The other end of the line was tied to a small piece of felt velcro. When the velcro patch on the line was attached to the patch on a

hatchling’s carapace, the line served as a tether that confined the turtle to a tank quarter. Each hatchling could then swim or dive in any direction, but was unable to contact other turtles or the tank bottom and walls.

Turtles began feeding 5-8 days after capture. They were hand-fed strips of formulated food to satiation, once daily. The diet (Figure 2) consisted of prescription (Science Diet™ a/d) cat food, French bread, vitamins (Reptavite™), and minerals (Miner-Al-O™), blended with water and flavorless gelatin. This diet was low in fat (less than 5 %), as is typical of natural foods consumed by leatherbacks (Holland *et al.* 1990; Davenport & Balazs, 1991). When available, fresh gelatinous prey (live jellyfish or ctenophores) were substituted for water in the recipe. Hatchlings were otherwise left undisturbed except when weighed and measured (once weekly), or treated (daily) for external infections or loss of appetite.

Hatchlings with sores and fungal infections were treated with povidone iodine (10 %) solution and anti-fungal topicals (Microcide™). Hatchlings were given a 10 % povidone iodine bath (immersed from neck down). Wounds were then debraded with a soft bristled toothbrush to remove damaged skin and promote healing. The area was coated with a water-resistant anti-fungal ointment before the turtle was returned to its tank. If

Leatherback Recipe

Ingredients:

Water (2 cups)
 Dry French bread (1 cup)
 Science Diet (a/d Cat Food; 156g)
 1 tsp Reptavite™
 1 tsp Miner-Al-O™
 6 pk (4.2 g) Flavorless Gelatin

(Optional: Jellyfish and/or Ctenophores instead of water. Four cups of gelatinous zooplankton can be used to replace 2 cups of water.)

Pour two cups hot water into blender. Crumble French bread (one cup) into blender. Add half can of cat food, one teaspoon each of vitamins and minerals, into blender. Add six packets of flavorless gelatin. Blend to a smooth paste. Pour into plastic lidded container and allow it to cool and congeal in a refrigerator. Store in a freezer.

Figure 2. Recipe for the leatherback diet.

sores or infections were close to the eyes or mouth, we used Gentamicin Sulfate (eye ointment) instead of the iodine solution or anti-fungal gel. Daily treatment only rarely (3 cases) resulted in healing. Anti-bacterial or anti-fungal creams (such as Terazol™) were, when used alone, ineffective.

We used fine (1 mm inside diameter) flexible tubes attached to a syringe to force-feed the turtles. A liquid rehydrant and an appetite stimulant (Herpcare™) were given daily to induce voluntary feeding. Such efforts met with limited success. Hatchlings that may have had internal infections or that exhibited excess buoyancy were tube-fed with anti-bacterial and anti-gas (Symethicone™) medications (0.3 cc per 50-75g of body weight). These efforts, however, also met with limited success.

While turtles were healthy, they grew rapidly (Figure 3). Growth was apparent even before feeding began (end of week 1), while turtles probably depended upon their yolk reserves. Carapace length over the first 7 weeks increased by ~ 66 % while mass more than doubled.

Our methods focus upon the four problems revealed by previous efforts to rear leatherbacks: diet, water quality, inability to avoid barriers, and treatment of diseases. Our diet was adequate to promote hatchling survival for at least 7 weeks. By tethering the hatchlings we eliminated problems associated with barriers. But because mortality rates remained high, turtles may still have been stressed by our protocols. Dead turtles were necropsied and, in spite of our precautions, most died of a variety of systemic fungal and bacterial infections. These results suggest that the immune system of leatherback hatchlings is fragile under captive conditions. We believe that solving this problem is the key to rearing these turtles in captivity.

At the end of our study, we released 9 hatchling at sea in good condition. Of these, three were initially captured in poor condition while six were survivors of the 13 turtles captured in good condition. Our success with the latter group was encouraging (just under 50 %), especially since all hatchlings were twice taken to the ocean for behavioral tests and exposed to microbes. We hope that others will improve upon our methods, and our survival rates.

Acknowledgements: This study was expedited by the following beach workers who supplied us with hatchlings: Kirt Rusenko (Gumbo Limbo Nature Complex), Larry Wood (Marinelife Center of Juno Beach), Carrie Krady and Erik Martin (Ecological Associates), and Barbara Squillante (Jupiter Island). James Weege (DVM) and Nancy DiMarco (DVM) provided invaluable advice on the treatment of infections.

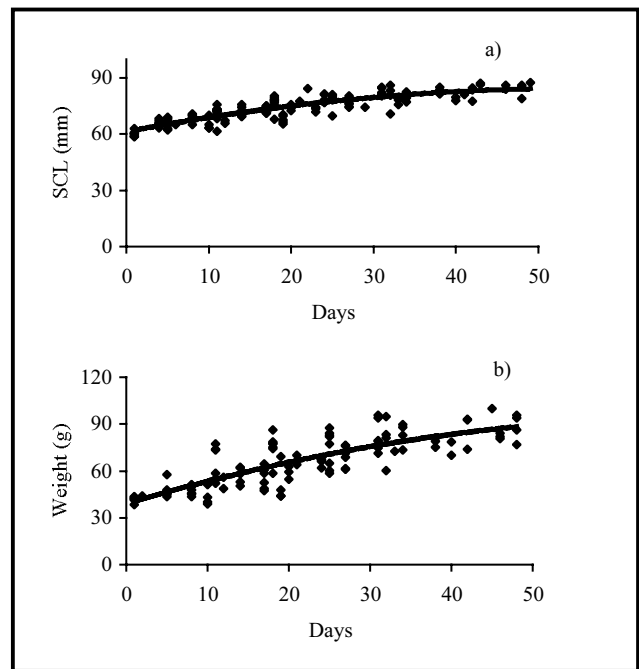


Figure 3. Growth rates of 35 turtles over seven weeks.
a) straight-line carapace length (n=135 measurements):
 $y = -0.0076x^2 + 0.84x + 61.34$ $R^2 = 0.78$;
b) mass (n = 159 measurements):
 $y = -0.011x^2 + 1.54x + 39.04$ $R^2 = 0.68$.

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Green Turtle Nesting at Pulau Banyak (Sumatra, Indonesia)

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The small Indonesian archipelago of Pulau Banyak (97° 05'E, 02° 03'N) is situated off the west coast of Aceh, Sumatra's north-westernmost province (Figure 1). Pulau Banyak is a remote group of about 99 islands, with a population of less than 5000 (Bangkaru 1997). The region supports a variety of habitats including coral reefs and mangroves and is a marine protected area with Recreation Park/Multiple Use Management Area status (Taman Wisata Alam). Detailed descriptions of Pulau Banyak and its habitats are reviewed in Stringell (1999).

In 1997, the Yayasan Pulau Banyak (YPB), a community run foundation, set up an environmental programme, which aims to study, conserve and increase the awareness of the region's anthropological and biological diversity (Steeman 1997). One major role of the YPB is monitoring the green turtles (*Chelonia mydas*) at Pulau Bangkaru, an island within the Pulau Banyak archipelago.

Green, hawksbill (*Eretmodochelys imbricata*), leatherback (*Dermodochelys coriacea*) and olive ridley (*Lepidochelys olivacea*) turtles nest in Indonesia and are protected by Governmental Decrees (Siswomartono 1997). Sea turtles nest at many locations in Sumatra (Salm & Halim 1984a; 1984b). West Sumatra and

Bengkulu support populations of green and leatherback turtles (Polunin & Nuijta 1982) but recent information on turtles nesting in Sumatra is very limited.

Hawksbill and leatherback turtles are known to nest only occasionally on the island of Pulau Bangkaru. Green turtles nest in large numbers at Amandangan beach, the main nesting site in the archipelago. Amandangan beach extends approximately 1.3km along the exposed western coast of Pulau Bangkaru (Figure 1). Sporadic green turtle nesting occurs on other smaller beaches in the Pulau Banyak archipelago (authors' pers. obs.).

Although local inhabitants have known about the nesting green turtle population of Amandangan beach for many years, YPB staff and volunteers have recorded data since 1997. The most complete data set is from 1997. No data exist for 1998, and continuous monitoring was hindered in 1999 due to lack of funding. Data were collected during nightly beach patrols where nests were marked and turtles were measured for mid-line straight carapace length and straight carapace width (SCL and SCW). Additionally in 1999, early morning beach surveys were introduced to count the number of nests and failed nesting attempts.

| Date recorded (No. nights) | No. of Nests | Mean no. nesting emergences/night (±SD) | No. failed nesting attempts | Mean no. failed nesting attempts/night (±SD) |
|----------------------------|--------------|---|-----------------------------|--|
| 19 - 28-Jun 1997 (10) | 65 | 6.5 (3.6) | - | - |
| 23-Oct -11-Nov 1997 (20) | 120 | 6.0 (2.6) | - | - |
| 16-Feb - 6-Mar 1999 (19) | 82 | 4.3 (1.9) | 59 | 3.1 (2.4) |

Table 1. Summary of nests and failed nesting attempts recorded for green turtles (*Chelonia mydas*) on Amandangan beach, Pulau Bangkaru for 1997 and 1999.

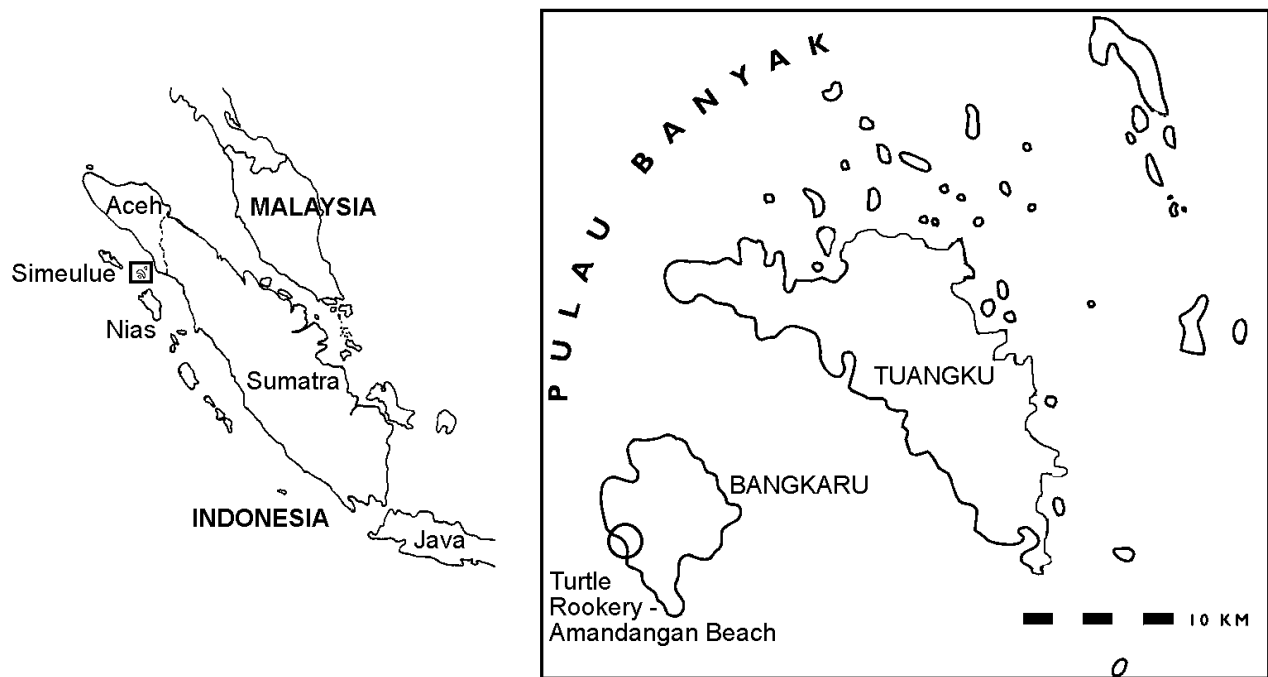


Figure 1. The location and detail of Pulau Banyak.

Carapace measurements of 184 turtles in 1997 had a mean SCL of 97.9 cm (range 86 -116 SD 5.76) and a SCW of 83.1 cm (range 68-99 SD 7.81). These results lie within the normal range for the species as listed by Hirth (1997).

Green turtles nest year round on Amandangan beach and the peak nesting time coincides with the dry eastern monsoon from November to May. Between 16 February and 6 March, 1999 (dry eastern monsoon), nightly emergences (nesting emergences and failed nesting attempts) averaged between 7 and 8 (Table 1). A minimum of 2 and a maximum of 8 clutches were laid each night during this period, with an overall nesting success of 58 %. In 1997, data were collected during both the eastern and western monsoons, and ranged from 3 to 13 nests per night (Steeman 1997).

Based on the data presented in Table 1, which comprise samples from both the eastern (peak) and western monsoon seasons, and from more than one nesting year, we suggest an overall nesting frequency of around 2 to 13 nests per night is representative of the rookery. This frequency of nesting translates to several thousands of clutches being laid annually by several hundred nesting females (Limpus pers. comm. 1999).

Nesting statistics for other Sumatran regions are not available for comparison. However, within the South East Asian region, the Pulau Bangkaru green turtle rookery is of comparable size to those found at Sarawak Turtle Islands, Malaysia (Leh & Yakup 1996) and Pangumbahan, Java, Indonesia (Sloan *et al.* 1994).

Pulau Bangkaru is therefore an important and newly reported addition of a significant green turtle rookery in South East Asia.

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Marine Turtles in Irian Jaya, Indonesia

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Irian Jaya (on the eastern perimeter of South Pacific Ocean) and its associated waters, are habitat for four marine turtle species: the leatherback (*Dermochelys coriacea*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*) and olive ridley (*Lepidochelys olivacea*) turtles. Leatherback turtles are distributed from Waigeo Island to Yapen Island (Tomascik *et al.* 1997). Petocz (1987) suggested that the other three turtle species are abundant in Cendrawasih Bay, Raja Ampat Islands, Yapen Island and Padaido Islands. To update available information on turtle populations in the region we present the results of data collection by WWF Indonesia (Sahul Bioregion) at three key sites: Jamursba Medi Beach, Cendrawasih Bay National Park and Jayapura Bay. These data provide some insight into the current status of sea turtle populations in the region and are summarised, by location, below:

Jamursba Medi Beach: Petocz (1987) assumed that the whole coast of northern Bird Head Peninsula and the North Coast of Yapen Island were potential turtle nesting areas and surveys have revealed nests on all beaches in this area. However, extensive hunting and egg collection, in addition to rapid rural and urban development, have reduced nesting activities in these

areas. Jamursba Medi, located on Bird Head Peninsula on the northern coast of Irian Jaya (0°20'-0°22' S and 132°25'-132°39'E), is one of few remaining nesting beaches available for the turtles, particularly leatherbacks. The beach is unique in that it is pristine and undeveloped. Unfortunately, a company (PT. Multi Wahana Wijaya) was recently granted permission from the local government to conduct logging activity in the vicinity.

Nesting in this region has been subject to at least sporadic monitoring since 1984 (Bakarbesy 1999; Bhaskar 1987). These studies found that the main nesting beach was 18 km long and divided into three sections: 1) Wembrak beach (approx. 8km) with black sand; 2) Baturumah beach (approx. 5km) with greyish white sand; 3) Warmamedia beach (approx. 5km) with greyish white sand. Between May and October 1999, a total of 3,408 adult female turtle nesting activities were counted on this beach and 3,244 (about 92.5 %) resulted in egg laying (see Table 1). During the peak of nesting in July 1999, approximately 30 leatherback nests were recorded every night, totalling 1,103 nests during this period (Teguh 2000). Methods used in data collection have differed between years but data suggest that more than 3000 nests are laid by leatherback turtles in

| Species | Wembrak (5.3 km) 127 days | Baturumah (4.9 km) 131 days | Warmamedidi (5 km) 127 days | Sub Total |
|--------------|------------------------------|--------------------------------|--------------------------------|-----------|
| Leatherback | 959 | 656 | 1368 | 2983 |
| Green | 13 | 80 | 78 | 171 |
| Hawksbill | 0 | 6 | 7 | 13 |
| Olive Ridley | 11 | 30 | 36 | 77 |
| <i>TOTAL</i> | | | | 3244 |

Table 1. Number of nests by species recorded in Jamursba-Medi beach (May to October 1999). Source: Teguh (2000).

this region annually.

Local egg exploitation has been relatively intense in the past. During the period 1984/1985, 4 - 5 boats visited the beach weekly, each removing 10,000-15,000 eggs. This activity has declined significantly since 1993 (Bakarbesy 1999).

At present, the logging concessions are not restricted to the southern boundary of the nesting beach, which is gazetted as limited production forest. The logging activities include lumber harvest and transportation, and the construction of a log pond and base camp. These activities have the potential to cause direct disturbance of the turtles and pollute the local environment and damage beach structure, due to changes to the physical environment, not to mention increasing the threat of poaching.

It is critical for the provincial government and the forestry agencies to be more proactive with respect to this issue, otherwise this unique asset will be lost. It is of utmost urgency that this beach is declared as a protected area. The district government of Sorong of Irian Jaya has already recommended that it receive Wildlife Reserve status under the Letter No. 522.5/1010, dated 8 November 1994, covering an area of 10, 000 hectares. However, recommendation is not enough, and legal status must be issued. So far, the government has shown no signs of serious action or follow-up on this

issue. To address the issue, WWF and Irian Jaya II Regional Nature Conservation Office held a workshop in December 1999 to gazette the beach as National Park, in particular for turtles. The proposed National Park will cover an area of 465, 543.45 hectares, including:

- Jamursba-Medi beach (278. 75 hectares),
- Limited production forest in the southern boundary of the beach (74, 855.50 hectares),
- Protected forest in the other part of the area (25, 595.30 hectares),
- Northern Tamrau Mountain Nature Reserve (351, 934.80 hectares) and
- Seas (12, 515.10 hectares).

Cendrawasih Bay: This is the largest bay in Irian Jaya. The western part of the bay (1°43'-3°22' S and 134°06'-135°10' E) was declared as a Marine National Park on 2 September 1993 by the Decree of Ministry of Forestry No. 472/Kpts-II/1993. The park occupies an area of 1,453,500 hectares of sea and islands. The park includes 80,000 hectares of coral reefs, 55,800 hectares of islands and 12,400 hectares of Northern Irian Jaya coastal lands (Reksodihardjo-Lilley 1993).

Cendrawasih Bay includes nesting habitat for green and hawksbill turtles. Leatherback and olive ridley turtles are known to feed in the bay. The islands of Nusambier, Iwari, Kuwom, Matas and Wairundi and

| Location | Green Turtle | | Hawksbill Turtle | |
|----------------|--------------|----------------|------------------|----------------|
| | Salm (1984) | Setyadi (1997) | Salm (1984) | Setyadi (1997) |
| Nusambier Is. | 1 | 0 | 0 | 0 |
| Iwari Is. | 0 | 0 | 0 | 1 |
| Matas Is. | 0 | 0 | 0 | 2 |
| Kuwom Is. | 0 | 0 | 1 | 0 |
| Rorebo Is. | 0 | 0 | 4 | 5 |
| Tridacna Atoll | 0 | 0 | 1 | 4 |
| Kabuai Is. | 0 | 0 | 3 | 2 |
| Nutabari Is. | 0 | 1 | 0 | 2 |
| TOTAL | 1 | 1 | 9 | 16 |

Table 2: Turtle nests on the island of Cendrawasih Bay

several mainland beaches have been recorded as having turtle nesting beaches.

Salm *et al.* (1982) recorded 169 turtle nests in the area (82 green, 52 hawksbill and 35 unidentified) and 88 discarded carapaces (20 green, 31 hawksbill and 17 unidentified), while another 33 turtles (21 green and 12 hawksbill) were detected in an aerial survey. Using comparable methodologies, Setyadi (1997) has more recently recorded turtle occurrences at several potential locations (see Table 2) showing that nesting numbers and relative distribution are similar to those of Salm *et al.* (1982).

Turtle hunting and egg exploitation, which have been practised mostly by outside fishermen for centuries, are the main threats in this area. Putrawidjaja (1997) reported the existence of trade in meat and eggs in the local fish market of Nabire. Approximately five turtles (average weight: 5 kg) are traded daily for Rp. 6,500-10,000 (US\$ 0.85-1.30) per kilo. Most of the turtles that were offered for sale were hawksbill and green turtle, and were caught in the park. Other turtles caught are thought to be exported to Bali, the largest turtle market in Indonesia. Eggs are also sold for Rp. 10,000 (US\$ 1.30) per 10-12 eggs. The trade also occurs in other major cities around the bay including Biak, Serui and Manokwari (Putrawidjaja 1997).

Jayapura Bay: According to WWF monitoring in 1999, olive ridley turtles were often seen feeding in the bays of Jayapura. In June 1999, an estimated several hundred olive ridley turtle were observed nesting on Hamadi beach (Yos Sudarso Bay), close to the Indonesian Naval Base and local fish market despite its highly populated nature and the fact that sago swamp occupies some of the area. Between 2-5 turtles (average weight: 5 kg) are traded daily in local fish market for of Rp. 15,000 (US\$ 2) per kg. Eggs are also traded for the same price in Nabire. Locals reported that approximately 500 eggs are traded in the market every day.

Management plans for turtle conservation are required to establish the protection of turtle nesting beaches and should include the following: Training and education, law enforcement, patrolling and monitoring, development of alternative local economies, e.g. seaweed and sea cucumber culture.

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Additional Evidence Supporting a Cleaning Association between Epibiotic Crabs and Sea Turtles: How will the Harvest of Sargassum Seaweed Impact this Relationship?

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Several studies have documented the occurrence of the Columbus crab (*Planes minutus*) as an epibiont of sea turtles in the Atlantic Ocean (Caine 1986; Chace 1951; Crane 1937; Davenport 1994; Dellinger *et al.* 1997; Frick *et al.* 1998; Roux 1828). Currently, three species of sea turtles in the Atlantic are reported as hosts of *P. minutus*: the loggerhead (*Caretta caretta*; Dodd 1988), green (*Chelonia mydas*; Crane 1937), and hawksbill (*Eretmochelys imbricata*; Witzell 1983) turtles. On sea turtles, *P. minutus* is commonly found clinging, with the walking legs, onto the underside of the turtle around the tail, cloaca, and hind limbs (Chace 1951; Crane 1937; Davenport 1994). This common attachment site led early reports to suggest that epibiotic *P. minutus* were possibly coprophagous, feeding upon the feces of the host turtle (Chace 1951; Crane 1937). Crane (1937) reported the stomach contents of one *P. minutus*, removed from the cloacal region of an adult green turtle. She found that the stomach of the crab contained finely digested animal material and suggested that it probably represented the excrement of the turtle. However, Davenport (1994) suggested that if *P. minutus* is in fact coprophagous then one would expect a *P. minutus* removed from a *C. mydas* to have stomach contents comprised mainly of plant matter since the green turtle is largely herbivorous (see Bjorndal 1985). Instead, Davenport (1994) reports that *P. minutus* apparently feeds within and upon a turtle's epibiotic community. His findings were based upon stomach contents of one adult female *P. minutus* that was removed from a juvenile loggerhead captured off the coast of Madeira. He found that the crab had eaten several items that have been commonly reported as epibionts of *Caretta* (e.g. *Lepas* barnacle cyprids, commensal amphipods, and other *P. minutus*). Additionally, Davenport (1994) suggests that *P. minutus* may also utilize the host turtle as a platform for capturing night-time neuston, since the aforementioned crab had also fed upon the eyes and antennae of a nocturnal euphausiid. Davenport (1994) also proposed that the postero-ventral positioning of *P. minutus* upon a host turtle is probably a reflection of the available hiding / grasping sites on the turtle as well as a refuge from turbidity created by the hydrodynamics of the turtle carapace.

A study by Dellinger *et al.* (1997) reports that *P. minutus* from juvenile and subadult loggerheads off the coast of Madeira were larger than *P. minutus* collected from flotsam in the same area. Additionally, heterosexual crab pairs and ovigerous females were also common on turtles but uncommon on local flotsam. These findings suggest that turtles are the most prolific habitat for reproductive efforts by *P. minutus*. Dellinger *et al.* (1997) also noted a higher occurrence of juvenile *P. minutus* on local flotsam than on turtles. It is possible that such habitats are important nursery grounds for young Columbus crabs and they may also represent areas where turtles initially acquire *P. minutus*.

Caine (1986) and Frick *et al.* (1998) report three additional epibiotic crab species associated with loggerheads: mottled shore crabs (*Pachygrapsus* sp.), common mud crabs (*Panopeus herbstii*), and Say's mud crabs (*Neopanope sayi*). During the 1998 nesting season in Georgia, USA (May-August) we collected epibiotic crabs (*N. sayi*, *P. herbstii*, and *P. minutus*) from nesting loggerheads (see Frick *et al.* 2000 for barrier island study site localities). Twenty-two crabs, from 21 individual turtles, were collected. Stomach contents were obtained from 4 *P. minutus*, 5 *N. sayi*, and 2 *P. herbstii*. Eleven *P. minutus* were sent to Dr. Raymond Manning at the Smithsonian Institute in Washington, D.C. for deposition into the museum's specimen collection. Epibiotic crabs were collected from the postero-dorsal region of sampled turtles (see Frick *et al.* 1998), although we did not look for crabs in the postero-ventral area. However, one individual *P. minutus* was collected from a loggerhead nest during nest relocation. It is assumed that the crab was displaced from a postero-ventral position while the turtle was nesting. Future investigations of nesting loggerheads should include the postero-ventral area.

Stomach contents from *P. minutus* yielded brown algae, amphipods (*Podocerus chelonophilus*, *Dulichchiella appendiculata*, and *Caprella andrea*), and barnacle cyprids (Balanidae). Say's mud crabs (*N. sayi*) had consumed *P. minutus*, amphipods (*Caprella* sp. and *Corophium* sp.), leeches (*Ozobranchus margo*), brown algae, and green algae. Common mud crabs (*P. herbstii*) had consumed brown algae and *O. margo*.

Our findings support Davenport's (1994) conclusion that *P. minutus*, as well as other epibiotic crabs, aid in cleaning epibiota from loggerheads. It is also possible that epibiotic crabs glean epibiota from other sea turtle species that have been reported to host epibiotic crabs. More research is needed to determine the frequency of this observed relationship.

In addition to their residency on nesting loggerheads, mud crabs commonly occur in a variety of habitats along the East Coast of the United States where they feed upon oyster spat, young oysters, periwinkle snails, and other crabs (Heard 1982). Their presence on nesting loggerheads is probably attributed to the coastal residency of turtles during the nesting season, as they have not been reported on non-nesting turtles. Columbus crabs are reliant on buoyant material (including turtles) for their survival and are most often associated with the floating brown alga, *Sargassum*, hence their other common name: the gulf-weed crab (Davenport 1994). Currently, it is believed that *Sargassum* mats in the Sargasso Sea support the most extensive breeding congregations of *P. minutus* anywhere in the North Atlantic Ocean. However, additional evidence suggests that turtles also offer *P. minutus* exceptional breeding substratum (Dellinger *et al.* 1997). Davenport (1992) provides the most detailed description of the ecology of *P. minutus*.

Logan and Morreale (1994) reported the adverse effects of epibiont colonization on sea turtles. Epibiotic drag drastically alters the hydrodynamic characteristics of the turtle carapace and in turn increases the amount of energy needed for the turtle to swim. Thus, it is assumed that any activity or organism that rids a turtle of its epibiota would be beneficial to the host turtle. By removing small epibionts and epibiont larvae, epibiotic crabs could be considered 'beneficial symbionts' of the sea turtles they are associated with. Yet, the importance of their occurrence relative to the particular life stages of sea turtles needs further elucidation. For example, relatively large subadult and adult sea turtles would undoubtedly have an easier time compensating for increased drag as a result of a heavy epibiont load than would smaller pelagic stage juvenile sea turtles. Thus, their importance in removing epibionts from turtles might decrease as the turtles become larger. However, since small pelagic stage sea turtles do not have the means by which to scrape away epibiota (i.e. on benthic substrates) nor the strength to compensate for a heavy epibiont load, during this life stage an epibiotic crab may be more important. With this in mind, special attention is needed to collect information on epibiotic crabs associated with pelagic stage juvenile sea turtles.

If *P. minutus* routinely gleans epibiota from juvenile sea turtles than their presence and abundance could ultimately influence the overall health of sea turtle populations that have an oceanic pelagic stage. Moreover, the possibility exists that habitats that support the reproductive efforts of *P. minutus* (i.e. *Sargassum* mats) could be just as essential for the survival of juvenile sea turtles. In light of the aforementioned possibilities and the need for further research on epibiotic crabs, it seems that the recent decision by the National Marine Fisheries Service to allow for the harvest of *Sargassum* seaweed (see Evans 2000) may have more deleterious effects than the accidental capture of an occasional juvenile sea turtle.

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Report of the Olive Ridley Turtle (*Lepidochelys olivacea*) in Cuban Waters

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The olive ridley turtle (*Lepidochelys olivacea*) is a medium-sized marine turtle typically inhabiting warm waters of the eastern and western Tropical Pacific and Indian Oceans including the Mozambique Channel (Frazier 1974). In Oceania it is largely absent. In the Atlantic Ocean *L. olivacea* has a peculiar distribution, occurring on the western coast of Africa from Senegal to Angola (Brongersma 1982), but it is encountered sporadically or rarely in South Africa (Hughes 1974). It is thus well separated from the Kemp's ridley turtle (*L. kempfi*), which occurs only in the northern Atlantic Ocean. Those colonies of *L. olivacea* distributed along the coasts of South America have important nesting grounds in localities such as Shell Beach, Guyana (Pritchard 1966; 1969), Ya:lima:po, French Guiana (Marcovaldi in press) and Eilanti, Surinam (Caldwell *et al.* 1969, Pritchard & Trebbau 1984). The species is present to the east up to Rio Grande do Norte, Brazil (Márquez-M. *et al.* 1976) and from Sergipe to Espirito Santo (Pritchard & Trebbau 1984), where it also nests on beaches like Pirambu, Abais and Ponta dos Mangos, Sergipe, Brazil (Marcovaldi in press). According to these

reports, the presence of *L. olivacea* in Caribbean waters should be considered uncommon and the result of wandering specimens.

From time to time isolated individuals have been recorded "out of range" in the islands of the Caribbean Sea. One of the first such records was apparently made by Dunn (1918) in Port Antonio, northeastern Jamaica. Although registered as "unquestionably *Caretta kempfi*" through the description of the skull, it is considered likely that the specimen was *L. olivacea*. Additional records of *L. olivacea* have been made in Trinidad (Carr 1957), Puerto Rico (Caldwell & Erdman 1969; Caldwell *et al.* 1969) and Cuba (Aguayo, 1953; Carrillo & Moncada 1998; Varona, 1974). This paper reports a new sighting of *L. olivacea* in Cuba.

An individual *L. olivacea* was captured at Cayo Guajaba, one of four harvest locations at Nuevitas on the north-eastern coast of Cuba, on 29 April 1997. The animal was caught in fishing nets set for marine turtles (Carrillo *et al.* 1998a). The management procedure for hawksbill turtles (*Eretmochelys imbricata*) at the traditional harvest sites involves turtles being measured,

weighed and examined internally during processing (Carrillo *et al.* 1998a), and the same procedure was adopted for this individual. The turtle was also photographed in order to confirm the species identification.

Based on external features, the individual was identified as a female, and internal examination of the organs confirmed that it was mature. The turtle had a curved carapace length of 67 cm, curved carapace width of 69 cm (cloth measuring tape), and weighed 35 kg (0-100 kg spring balance). The carapace was almost circular, of dark olive green coloration, with some lineal scratches in the dorsal region and clear yellow color in the plastron. There were 8 costal scutes on each side of the carapace.

The first record of *L. olivacea* in Cuba was made by Aguayo (1953), who reported an adult individual being captured in Vita Bay, Holguin. The next report of the species in Cuban waters was presented by Varona (1974), of a small individual (21.4 cm straight carapace length, 19.9 cm straight carapace width). Although reported to be an immature female, it would be difficult to determine the sex from the external morphology of an animal of this size.

The utilization of marine turtles in Cuba can be traced back to the 1500s (Carrillo *et al.* 1998b). From 1968-92, the Cuban Ministry of Fisheries operated a commercial turtle fishery throughout the Cuban shelf (Carrillo *et al.* 1998c), with high numbers of marine turtles being captured annually. However no *L. olivacea* were recorded as being taken during this period. Interviews with fishermen throughout Cuba indicated that “caguamas”, which were very round, of medium size and green coloration were sighted occasionally. The data recorded to date indicate that *L. olivacea* can be considered to be rare in Cuban waters, but records of adults and a juvenile suggest that different life stages do occur from time to time.

The development of a formal recording system within the management program for *E. imbricata* at the two traditional harvest sites in Cuba (Carrillo *et al.* 1998a; ROC 1998) allowed detailed examination and measurement of the *L. olivacea* reported here. This exemplifies the importance of systematic monitoring of harvest within marine turtle management programs.

Acknowledgments We thank the traditional turtle fishermen of Cayo Guajaba, Betin and Osvaldo Fals and Osvaldo Prieto, without whom these data would not have been possible. Grahame Webb and Charlie Manolis (Wildlife Management International) reviewed an early draft of this paper, and their assistance is greatly appreciated.

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MEETING REPORTS

Second Annual Meeting of the Baja California Sea Turtle Conservation Network (Grupo Tortuguero de Baja California)

Wallace J. Nichols¹ & Fernando Arcas²

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On January 28th-30th, 2000 the second meeting of the Grupo Tortuguero de Baja California brought together more than 100 fishers, students, educators, conservationists, government resource managers and investigators to discuss the urgent efforts required to stem the decline in East Pacific sea turtle populations. The meeting was held at in Loreto, Baja California Sur and hosted by Grupo Ecologista Antares (GEA).

Javier Alvarado of the University of Michoacan gave the keynote address, which opened some eyes to a decade of negative population trends at the region's main green turtle rookeries in Michoacan, Mexico. Many of the green turtles born in Michoacan utilize Baja California's coastal waters as juveniles and adults during development and feeding. However, mortality in the area is high and may contribute substantially to the precipitous declines on the nesting beaches.

The Group voted to hold this annual meeting indefinitely and to focus on direct measures to reduce take of sea turtles and to work to stop clandestine harvest. This will be achieved, in part, through a network of local conservation teams, increased communication,

training workshops and statewide educational curriculum development.

The first Annual Manuel Orrantes Prize was awarded to Sr. Orrantes in recognition of his tireless work with ASUPMATOMA to protect the turtles and nesting beaches of Baja California Sur. The award will be given annually to an individual who has contributed substantially and selflessly to the recovery of Baja California's sea turtles.

Sponsors of the meeting were GEA, ASUPMATOMA, CRIP Sea Turtle Research Station-Bahía de los Angeles and Wildcoast. Financial assistance was provided by The University of Arizona Foundation, The Nature Conservancy, The Blank Environmental Foundation and Ocean Planet Research.

The Third Annual meeting of the Grupo Tortuguero de Baja California will be held on January 26th-28th, 2001 in Loreto, BCS. Contact authors for details.

VIIth Reunion of Latin American Sea Turtle Specialists

Hedelvy J. Guada¹, Héctor Horta², & Lesbia Montero³

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The VIIth Reunion was held at Camp Challenge in Sorrento (north of Orlando), Florida from 26 to 28 February 2000. The Coordinators were Hedelvy Guada, Hector Horta and Lesbia Montero. Seventy-four people registered, representing 20 countries: Australia, Austria, Belize, Brazil, Chile, Colombia, Costa Rica, Cuba, France, Guatemala, Honduras, India, Mexico, Nicaragua, Panama, Peru, Puerto Rico, Uruguay, USA and Venezuela.

National updates were presented for 16 Latin American countries. Two interactive training workshops were held: “Raising funds successfully”, taught by Polly Morrison (The Nature Conservancy, USA) and “Environmental education strategies and community-based participation” conducted by Joca Thomé (Project Tamar, IBAMA, Brazil). Brief updates were also presented on topics of general interest: the “Reunion for the Conservation of the Sea Turtles in the Wider Caribbean - A dialogue for an “Effective Regional Management”, and the publication of the “Research and Conservation Techniques” MTSG Manual (A. Abreu, UNAM-MTSG); the “IIInd Reunion of the Central American Network” and the “Manual of best practices for sea turtle conservation in Central America” (D. Chacón, Asociación ANAI); the sea turtle reunion organized during the “Vth Latin American Congress of Herpetology” (A. Fallabrino, Proyecto Karumbe, Uruguay); plans for a regional workshop on sea turtle conservation by World Wildlife Fund (J. Frazier, Smithsonian Institution). Laura Sarti (INPESCA, Mexico) convened a meeting to gather information about *Dermochelys coriacea* in the region.

An exposition of CITES Proposals 11.40 and 11.41 presented by Cuba for the 12th Conference of Parties (COP) was made by Adela Prieto and Elvira Carrillo, with assistance from F. Moncada and G. Nodarse (Centro de Investigaciones Pesqueras). Four simultaneous round table discussions were organized (following up discussions from previous reunions): incidental fisheries, sustainable use, Inter-American Convention for the Protection and Conservation of the Sea Turtles (IAC), and sea turtle strandings.

During the final Plenary session on Monday 28th the VIIth Latin American Reunion passed two

resolutions: concern for incidental captures in fisheries and supporting the IAC; both of these were latter approved during the Plenary of the 20th Annual Symposium. A proposed resolution presented by the Costa Rican delegation emphasized the “Critically Endangered” status of the hawksbill turtle, requesting that the resolution be passed to the CITES Authorities in the COP 12 (Nairobi, April 2000). There was a tie between the number of votes supporting the resolution and those that favored leaving the decision pending until the VIII Latin American Reunion in 2001.

A plaque was given to Jack Frazier in recognition of his motivation and support in initiating and organizing the Latin American Reunions. The Coordinators for the VIII Latin American Reunion are:

Roxanna Silman

(CCC-Costa Rica; E-mail: baulas@sol.racsa.co.cr),

Clara Padilla

(WCS-Costa Rica; E-mail: baulas@sol.racsa.co.cr)

Carlos Molinero

(MOPAWI, Honduras; E-mail: mopawi@optinet.hn)

Acknowledgements: The main financial contributions for the VII Latin American Reunion were from: National Marine Fisheries Service, 20th Annual Symposium, David and Lucile Packard Foundation, People Trust for Endangered Species, PROARCA/Costas-USAID-GCAP, and Comisión Centroamericana de Ambiente y Desarrollo. In addition, generous cash or in-kind contributions were provided by The Nature Conservancy; Sea Grant Program, Universidad de Puerto Rico; Department of Natural and Environmental Resources, Puerto Del Rey Marina, Inc.; Trade-Winds; Vicente & Asociados; Camp Challenge, Sea World Orlando; and WIDECAST. Special thanks also for the contributions of J. Frazier, D. Chacón, K. Eckert, E. Possardt, R. Byles, B. Schroeder, B. Witherington, E. Drane, J. Nichols, and the volunteers who helped with registration and transportation: A. Barrios, A. Avilés, D. Amorocho, V. Vera, A. Trujillo, and M. García. Beside her support and hard work in the Travel Grants Committee, A. Barragán prepared the minutes of the reunion.

Workshop on Marine Turtles Nesting in Cuba.

Félix G. Moncada Gavilán

Investigador del Proyecto Tortugas Marinas del Centro de Investigaciones Pesqueras Ministerio de la Industria Pesqueras. 5ta. Ave. y 248. Barlovento. C. Habana. Cuba. (E-mail: elvira@cip.fishnavy.inf.cu)

As a part of the Cuban effort in marine turtle conservation, the first “Workshop on Marine Turtle Nesting” was held June 13–18 2000, under the joint auspices of the Centro de Investigaciones Pesqueras (CIP) of the Ministerio de la Industria Pesquera and Empresa Nacional para la Protección de la Flora y la Fauna (Ministerio de la Agricultura). The workshop was organized to teach personnel from the Empresa Nacional para la Protección de la Flora y la Fauna, who work in the different parts of the Cuban Archipelago, knowledge and skills related to the protection of different marine turtle species.

The objectives of the course were:

1) To promote cooperation in the activity of conservation of marine turtles throughout the Cuban Archipelago, within a framework of scientific and technical collaboration.

2) To organize and develop the task of conservation of marine turtle populations nesting in the Cuban Archipelago.

3) To create a situation where collection of information about marine turtle nesting is part of the integral management of protected areas of the Empresa Nacional para la Protección de la Flora y la Fauna.

Fourteen trainees participated in this workshop. Félix Moncada and Gonzalo Nodarse lead sessions on different aspects of marine turtle biology followed by field work at nesting beaches (San Felipe Keys, an important nesting site of green turtle and loggerhead turtle, located in the Canarreos Archipelago, in the southwestern region of Cuba). Elvira Carrillo covered Cuban research related to CITES issues. At the end of fieldwork all participants met again in Havana to discuss activities and findings.

LETTER TO THE EDITORS

Correction: Orlando Resolution Not Unanimous

Dear Editors

Epperly and Frazier (2000) recently stated that resolution 2000-7 concerning the Inter-American Convention for the Protection and Conservation of Sea Turtles was passed unanimously at the 20th Annual Symposium, Orlando. This is not correct. Several people voted against this resolution. If organizers of such resolutions wish to make statements going beyond “passed” or “rejected” about the votes, it would be desirable to have voting assessed by a show of hands, or roll call, rather than by ayes and naves which may perhaps not be heard from the front in a large hall, although from where I was sitting some naves were clearly audible.

EPPEPLY, S. & FRAZIER, J. 2000. Resolutions of the members of the 20th annual symposium on sea turtle biology and conservation. *Marine Turtle Newsletter* 88:20.

N. Mrosovsky, Department of Zoology, University of Toronto, Toronto, Ontario, Canada M5S 3G5
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ANNOUNCEMENTS

The 21st Annual Symposium on Sea Turtle Biology and Conservation (24 February – 28 February, 2001, Adam's Mark Hotel, Philadelphia, Pennsylvania, USA): Announcement and Call for Papers

James R. Spotila

*President of the 21st Symposium. Drexel University, School of Environmental Science, Engineering and Policy, Nesbitt Hall, 33rd & Market Streets, Philadelphia, PA 19104 USA,
(Tel: + 1-215-895-2627, FAX: +1-215-895-2267, E-mail: STS2001@drexel.edu)*

All are invited to attend the 21st Annual Sea Turtle Symposium hosted by Drexel University. This year's theme "Coming of Age" represents the maturation of the Symposium. This will be a time to reflect on our accomplishments through the adolescence of the Symposium and look to the future of its adulthood. What started out as a small workshop of about 50 people has grown into a major international meeting of almost a thousand. We are faced with the challenge of meeting the requirements of a major meeting while recapturing the informal and personal touch of the original workshop. We will try to do both by focusing on the human dimension of sea turtle biology and conservation in a leadership panel that discusses past, present and future challenges, by focussing on the future in a series of sessions and workshops on environmental education and children, and by bringing more music into the Symposium. Music plays a central role in all cultures and in the growth process from child to adult. We will enjoy two nights of great music and dancing with fantastic local bands, but we will have more. Bring your musical instrument for a series of "jam sessions" in the evenings. Let's write a "sea turtle" song. We will have music for the auction. Get ready to sing as your money floats away for a great cause. There are many small meeting rooms available so let us know if you want to organize a workshop, discussion group or band. The 21st Symposium is expected to attract well over 800 participants including sea turtle researchers, resource managers, educators, policy-makers, students and enthusiasts from all over the world. Come and be a part of it.

Symposium Registration: You must register to attend the Symposium. The preferred registration method is to visit us online at the Web site: <<http://www.seaturtle.org/symposium/>>. There you will find everything you need to know about the Symposium in addition to a user-

friendly interface for Symposium registration. Please help us by registering via the Internet. However if you do not have Internet access you may also register by post mail. A hard copy Symposium announcement and registration form will be mailed to all individuals who have registered for previous Symposia. If you do not receive a Symposium announcement by post mail, contact the Symposium Registration Coordinator, Donna Broadbent (E-mail: zenith@citlink.net ; Tel: + 1-304-947- 5366, Fax: +1-304-947-5364; 480 Address: Williamsport Pike, Suite 3, Martinsburg, West Virginia, 25401, USA).

Registrants who cannot access the Internet and who require a personal invitation letter to attend can request this letter by contacting the Symposium Secretary, Sheryan Epperly-Chester (E-mail: sheryan.epperly@noaa.gov; Tel: +1-305-361-4207; FAX: +1-305-361-4478; Address: NOAA/NMFS, 75 Virginia Beach Drive, Miami, Florida 33149, USA).

Schedule of Events: Tuesday-Wednesday before the Symposium, 20-21 February, the Eighth Reunion of Latin American Sea Turtle Specialists will take place at the Pocono Environmental Education Center, Dingman's Ferry, Pennsylvania. A bus will transport all those wishing to attend this event from Philadelphia on Monday afternoon (Feb. 19) to Dingman's Ferry and back to the Symposium Hotel on Wednesday night (Feb. 21). If you plan to attend, you need to arrive in Philadelphia by 3pm February 19. We will meet you at the airport. Alternatively, you can arrive by train and we will meet you at the 30 Street Train Station. For other travel options please contact us. Please plan to bring warm clothes and a coat because it is usually cold in the Poconos. For additional details about this meeting, please contact: Clara Padilla or Roxana Silman (information below).

The Annual General Meeting of the Wider Caribbean Sea Turtle Conservation Network (WIDECAST) will be held in the Adam's Mark Hotel on Thursday and Friday, 22 & 23 February. For additional details about this meeting, please contact Karen Eckert (information below).

On Friday evening, 23 February we will have a Pizza social at the Adams Mark Hotel for early arrivals. At 7pm, Symposium volunteers will meet to coordinate activities. To be a volunteer, contact the volunteer coordinator (TBA).

Saturday, 24 February late registration will begin and continue through Sunday. Sessions begin with invited, as well as contributed, oral presentations. Poster sessions also begin on this day. There will be a "Philly-style" social at 6:30pm with complimentary beer and wine, cheese steaks and pretzels (local cuisine) and a great Latino band – plan to do some dancing. A ticket is required.

Sunday, 25 February, a special session of invited oral presentations on leatherback turtles will take place in the morning and early afternoon. Regular sessions will continue in the afternoon. The Board of Director's meeting will take place in the evening.

Monday, 26 February, a special session of invited panel participants will discuss past, present and future challenges in sea turtle conservation from 9 – 11am. Regular sessions will continue in the afternoon. The live auction will take place starting at 8pm. Proceeds from the auction go to the Symposium's international travel fund so please think about contributing auction items for this worthwhile cause. As always, refreshments will be available at the auction for all in attendance.

Tuesday, 27 February, regular contributed sessions continue until 3:30 pm. The Plenary session will be held from 3:30 – 4:30 pm. The awards banquet will begin at 6:30 pm. There will be a live dance band from 8 pm to Midnight so plan to dance some more.

Wednesday, 28 February, the IUCN Marine Turtle Specialist Group Annual Meeting will take place from 10am – 12pm. Several field trips and workshops will also occur throughout the day.

The Symposium Meeting Site: The Symposium will be held at the Adam's Mark Hotel, City Avenue and Monument Road, Philadelphia, Pennsylvania, 19131, USA, +1-215-581-5000, Fax: +1-215-581-5069; <<http://www.adamsmark.com>>. The Adams Mark has 2 dozen meeting rooms and banquet halls, 515 guest rooms, 4 restaurants and lounges, a health club, indoor pool, gift shop and guest parking.

Reserving a place to stay at the Adams Mark Hotel: Rooms at the Adams Mark are \$ 99 plus tax per night for 1 – 4 people. Reserve your room by contacting Donna Broadbent (E-mail: zenith@citlink.net; Tel: + 1-304-947- 5366, Toll Free: +1-800-476-0542, Fax: +1-304-947-5364, 480 Williamsport Pike, Suite 3, Martinsburg, West Virginia, 25401, USA). All hotel reservations must be made through Donna.

How do I get there?: Air travel – Those traveling by air will land at the Philadelphia International Airport. Fly on US Air or United Airlines, the official airlines of the 21st Symposium. To obtain a discount you must use the special rate code for the Symposium. For U.S. Airways, call toll free +1-877-874-7687 ,To obtain a discount/special fare. Refer to the "gold file # 71671661". Check the web site or contact Donna Broadbent to get the special code for United.

Ground transportation: The airport is approximately 10-15 minutes away from the Adams Mark Hotel. Use the "Super shuttle" company to take you from the airport to the Adams Mark. You should reserve this shuttle in advance if possible (Tel: +1-800-669-0521 (bluevan), Fax: +1-215-669-052, URL: <<http://www.supershuttle.com/phl.htm>>). You can also call the shuttle service after you arrive at the airport by using their special phone located in the baggage claim area of the airport. The cost for travel between the airport and hotel is \$10. One other option for ground travel to Philadelphia is passenger train. Amtrak trains service Philadelphia's 30th Street Station. You will have to take a taxicab to travel between the train station and the Adams Mark Hotel. This 5-minute ride will cost approximately \$10-\$12.

Call for Papers: Contributed oral and poster presentations will be accepted until 10 November 2000. Because we are not going to have concurrent sessions, there will be fewer oral presentations this year. We strongly suggest that you consider presenting your information in one of the poster sessions. We have a huge room for the poster sessions this year. The room is large enough to accommodate the vendors, coffee breaks, silent auction items and the posters and poster observers all at the same time!!!

Submission: If you have access to the Internet (or have access to someone who does), please use the Symposium web site for your abstract submission: <<http://www.seaturtle.org/symposium/>>. If you cannot access the Symposium web site, you may send your abstract and the additional information below to the Program

Chair, Pamela Plotkin, (Address: Center for Marine Conservation, 1725 DeSales St., NW, #600, Washington, D.C.20036, USA, Fax: +1-202-872-0619, E-mail: sts2001@dccmc.org).

Author information and abstract:

1. Name of presenting author
2. E-mail of presenting author (an E-mail contact is required)
3. Fax number of presenting author
4. Date this information was submitted (DD/MM/YY)
5. Title of presentation (ALL IN UPPERCASE)
6. All authors of the presentation in the order you want them to appear in the program. Please place each author name on a separate line.
7. Author(s) affiliation(s) in the same order as above. Please clarify any multiple affiliations.
8. Abstract describing your presentation (250 words maximum). The abstracts must be in English to facilitate proper placement in the Symposium program. Please note that for the Symposium Proceedings you will be able to present an extended abstract version of your presentation (maximum four pages).
9. Specify the type of presentation you wish to make. Your choices are: oral, poster, either oral or poster, or video/film.
10. Equipment needed. Your choices are: slide projector, overhead projector, computer projector system with MS Power point or Corel Presentations, Video tape player, or other (please give details).
11. Indicate whether you are a student and whether you would like to be considered for the Archie Carr Student Paper Awards (given to both oral and poster presentations of merit). Recently graduated presenters who are presenting work done as students will qualify for these awards.

THE DEADLINE FOR SUBMISSION OF ALL ABSTRACTS IS 10 NOVEMBER 2000.

Notice of acceptance: Final decisions on paper acceptance will be made by the Program Committee. All first authors will be notified of the acceptance of their oral or poster by January 2001. If you need an acceptance letter sent to someone other than yourself, please specify this in your abstract submission.

Preparation and submission of extended abstracts: For inclusion in the 21st Symposium Proceedings your extended abstract (no longer than 4 pages including figures and tables) must be submitted via the Symposium web site. There will be computers available at the

Symposium for you to use.

Travel funds: Limited travel funds are available to assist US/Canadian students and international participants in their efforts to attend the Symposium. Awards should not be expected to cover the full cost of symposium travel. Priority will be given to those who will be presenting papers or posters, those who apply before the deadline, **10 November 2000**, and to individuals from relatively under-represented regions. The committee looks favorably upon those who demonstrate efforts to secure additional sources of travel funds or matching grants. If you are in need of assistance for travel to the Symposium apply via the symposium web page. Applicants should follow this procedure:

1. register for the symposium
2. submit your abstract to the symposium for consideration
3. using your symposium registration number, complete the online travel grant application in full, prior to the 10 November 2000 deadline.

If you do not have Internet access, please contact the Travel Chair, Wallace J. Nichols (information below) by fax or mail, however, it is highly preferential that all correspondence is carried out by e-mail. Grant recipients are expected to attend the entire symposium. Candidates should not hesitate to contact their regional travel chair for advice.

Travel support contacts:

Travel Chair:

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WIDECAST Meeting

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Indian Ocean - South-East Asia Marine Turtle MoU Concluded under CMS

Douglas Hykle

Deputy Executive Secretary, UNEP/CMS Secretariat, United Nations Premises in Bonn, Martin-Luther-King-Str. 8, D-53175 Bonn, Germany, (E-mail: dhykle@cms.unep.de)

Co-operative efforts to conserve globally threatened marine turtles received a boost in July with the adoption of the text of a *Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia*. The Memorandum is the second of its kind to be concluded under the auspices of the Convention on Migratory Species (CMS).

Twenty-four States were represented at the negotiation session, hosted by the Malaysian Department of Fisheries and held near the coastal city of Kuantan, from 11-14 July. The meeting built upon the solid progress made at a first round of consultations convened by Environment Australia, in Perth, in October 1999. Once again, the discussions benefited from the presence of a number of resource persons affiliated with the IUCN and its Marine Turtle Specialist Group.

The Memorandum of Understanding puts in place a framework through which States of the region - as well as other concerned States - can work together to conserve and replenish depleted marine turtle populations for which they share responsibility. It acknowledges a wide range of threats to marine turtles, including habitat destruction, direct harvesting and trade, fisheries by-catch, pollution and other man-induced sources of mortality.

The Memorandum recognizes the need to address these problems in the context of the socio-economic development of the States concerned, and to take account of other relevant instruments and organisations. A small secretariat and an advisory committee will be established to help implement its provisions. Voluntary contributions will be secured to guarantee that this essential co-ordination function is provided at the initial critical stage of the Memorandum's existence.

The Meeting agreed to work towards finalising a Conservation and Management Plan at the next intergovernmental session to be held in early 2001, at which time the Memorandum of Understanding will be open for signature. The Memorandum further envisages the development of sub-regional plans, where these are not already in place, to give effect to the specific actions needed to conserve the region's marine turtles and their habitats.

The CMS Secretariat is acting as Depository for the Memorandum of Understanding and is providing basic secretariat services until the office established under the Memorandum is operational, hopefully by the end of 2001. The full text of the Memorandum of Understanding, in English, can be found on the CMS Web site. Arabic and French language translations are being prepared by the Malaysian Government.

The range States (38) concerned include: Australia, Bahrain, Bangladesh, Brunei, Cambodia, Comores, Djibouti, Egypt, Eritrea, France (Réunion), India, Indonesia, Islamic Republic of Iran, Kenya, Kuwait, Madagascar, Malaysia, Maldives, Mauritius, Mozambique, Myanmar, Oman, Pakistan, Papua New Guinea, Philippines, Qatar, Saudi Arabia, Seychelles, Singapore, Somalia, South Africa, Sri Lanka, Sudan, Thailand, United Arab Emirates, United Republic of Tanzania, Vietnam, Yemen. All but ten of these attended either the Perth (October 1999) or Kuantan, Malaysia (July 2000) negotiation sessions, or both. The United States of America was also represented.

The negotiation session was funded, for the most part, by a generous contribution of the Government of the United States, with additional support from CMS and Environment Australia. The staff of the Malaysian Department of Fisheries are to be congratulated on the excellent arrangements for the meeting and their warm hospitality. This included visits to an impressive interpretation centre devoted to marine turtle conservation and a hatchery that has successfully returned to the ocean thousands of green turtle hatchlings that would otherwise have perished.

While it may be too late, regrettably, to reverse the precipitous decline of leatherback turtles nesting on the east coast of peninsular Malaysia, it is hoped that the adoption of this Memorandum of Understanding will give renewed impetus to conservation programmes for these and other threatened marine turtles throughout the Indian Ocean and South-East Asia region.

Here follows the text of the Memorandum (also available online at: <<http://www.wcmc.org.uk/cms>>):

**Memorandum of Understanding on the
Conservation and Management of Marine Turtles
and Their Habitats of the Indian Ocean
and South-East Asia**

THE SIGNATORY STATES,

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

Noting that marine turtles have a priority for conservation action through their listing in the respective texts or appendices of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),

the African Convention on the Conservation of Marine and Natural Resources, and the Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region and related protocols;

Recognising that the conservation of marine turtles and their habitats is specifically addressed in the Memorandum of Understanding on ASEAN Sea Turtle Conservation and Protection and the Memorandum of Agreement on the Turtle Islands Heritage Protected Area (TIHPA);

Recognising that other international instruments, including the United Nations Convention on Law of the Sea (UNCLOS), the FAO Code of Conduct for Responsible Fisheries, the International Convention for the Prevention of Pollution from Ships (MARPOL), and the Convention on Biological Diversity (CBD), are relevant to the conservation of marine turtles and their habitats;

Aware that existing regional organisations, including the Association of Southeast Asian Nations (ASEAN), the Regional Organisation for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA), and the Regional Organisation for the Protection of the Marine Environment (ROPME) operate programmes relevant to the conservation of marine turtles and their habitats;

Recognising that marine turtles migrate and disperse over vast distances, which makes their survival dependent on their conservation over a wide area and in a wide range of marine and coastal habitats;

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

Recognising the importance of integrating actions to conserve marine turtles and their habitats with activities related to the socio-economic development of the signatory States, including coastal development and maritime activities;

Acknowledging their shared responsibility for the conservation and management of marine turtle populations and their habitats;

Recognising the importance of involving all the States in the Region, as well as relevant inter-governmental, non-governmental and private sector organisations, in co-operative conservation and management of marine turtles and their habitats;

Noting the desirability of involving other States whose nationals or vessels conduct activities that may

affect marine turtles of the Region, as well as States that may be in a position to contribute resources or expertise that may promote the implementation of this Memorandum of Understanding;

Recognising that concerted and coordinated action must be taken immediately to address the threats posed to marine turtle populations and their habitats;

Desiring to establish through this Memorandum of Understanding co-operative measures for the protection, conservation and management of marine turtles and their habitats throughout the Region;

AGREE to pursue the actions set forth in this Memorandum of Understanding, individually and collectively, to improve the conservation status of marine turtles and their habitats.

DEFINITIONS:

1) "Marine turtles" means any of the species listed below:

| Common name | Species |
|---------------------|-------------------------------|
| Loggerhead turtle | <i>Caretta caretta</i> |
| Olive ridley turtle | <i>Lepidochelys olivacea</i> |
| Green turtle | <i>Chelonia mydas</i> |
| Hawksbill turtle | <i>Eretmochelys imbricata</i> |
| Leatherback turtle | <i>Dermochelys coriacea</i> |
| Flatback turtle | <i>Natator depressus</i> |

2) "Habitats" means all those aquatic and terrestrial environments which marine turtles use at any stage of their life cycles.

3) "Region" means all of the waters and coastal States of the Indian Ocean and South-East Asia and adjacent seas, extending eastwards to the Torres Strait;

4) "Conservation status of marine turtles" means the sum of the influences acting on a marine turtle species that may affect its long-term distribution and abundance.

5) "Conservation status" will be taken as "favourable" when:

- population dynamics data indicate that the marine turtle species is maintaining itself on a long-term basis as a viable component of its ecosystems;
- the range of the marine turtle species is neither currently being reduced, nor is likely to be reduced, on a long-term basis;
- there is, and will be in the foreseeable future, sufficient habitat to maintain the population of the marine turtle species on a long-term

basis; and

- the distribution and abundance of the marine turtle species approach historic coverage and levels to the extent that potentially suitable ecosystems exist and to the extent consistent with wise wildlife management.

OBJECTIVE:

The objective of this Memorandum of Understanding is to protect, conserve, replenish and recover marine turtles and their habitats, based on the best scientific evidence, taking into account the environmental, socio-economic and cultural characteristics of the signatory States.

ACTIONS:

To achieve the objective of the Memorandum of Understanding, in a spirit of mutual understanding and co-operation, the signatory States will:

- Co-operate closely in order to achieve and maintain a favourable conservation status for marine turtles and the habitats on which they depend.
- Implement, subject to availability of necessary resources, the provisions of the Conservation and Management Plan which shall be annexed to this Memorandum of Understanding. The Conservation and Management Plan shall address: marine turtle habitat protection; management of direct harvesting and trade; reduction of threats, including fisheries bycatch; research and education; information exchange; and capacity building.
- As necessary, review, formulate, revise and harmonise national legislation relevant to the conservation of marine turtles and their habitats, and make every effort to effectively implement such legislation.
- Consider ratifying or acceding to those international instruments most relevant to the conservation of marine turtles and their habitats in order to enhance the legal protection of these species in the Region.
- Establish a Secretariat which will assist communication, encourage reporting and facilitate activities between and among signatory States, sub-regional institutions and other interested States and organisations. The Secretariat shall transmit to all of the signatory States and to each of the sub-regional institutions created pursuant to paragraphs 5 and 6 of the Basic Principles, all of the national reports it receives, prepare a periodic overview of progress in implementation of the Conservation and Management Plan, and perform such other

functions as may be assigned by the signatory States. The Secretariat shall be based in the office of an appropriate national, regional or international organisation, as agreed by consensus of the signatory States at their first meeting, after consideration of all offers received.

- 6) Establish an Advisory Committee to provide scientific, technical and legal advice to the signatory States, individually and collectively, on the conservation and management of marine turtles and their habitats in the Region. The signatory States may nominate for membership on the Committee individuals with expertise in the fields of marine turtle biology, marine resource management, coastal development, socio-economics, law, fisheries technology, and other relevant disciplines. The size, composition and terms of appointment of the Advisory Committee shall be determined by the signatory States at their first meeting.
- 7) Designate a competent national Authority to serve as a focal point for communication between signatory States and activities under this Memorandum of Understanding, and communicate the complete contact details of this Authority (and any changes thereto) to the Secretariat.
- 8) Provide to the Secretariat a regular report on their implementation of this Memorandum of Understanding, the periodicity of which will be determined at the first meeting of the signatory States.
- 9) Assess at their first meeting, the extent of the need for and possibilities of obtaining financial resources, including the establishment of a special fund for purposes such as:
 - a) meeting the expenses required for the operation of the Secretariat, the Advisory Committee and activities carried out under this Memorandum of Understanding; and
 - b) assisting the signatory States to carry out their responsibilities under this Memorandum of Understanding.

BASIC PRINCIPLES:

- 1) This Memorandum of Understanding shall be considered an agreement under Article IV, paragraph 4, of the CMS. It shall take effect on the first day of the third month following its signature by the second State. It shall remain open for signature indefinitely for subsequent States, and will come into effect for those States on the first

day of the third month after their signature.

- 2) Each signatory State will implement, within the limits of its jurisdiction, the Memorandum of Understanding with respect to:
 - a) its land territory in the Region;
 - b) marine areas in the Region under its national jurisdiction; and
 - c) vessels operating in the Region under its flag.
- 3) Implementation of this Memorandum of Understanding, including the Conservation and Management Plan, shall be assessed at regular meetings to be attended by representatives of each of the signatory States and persons or organisations technically qualified in, or relevant to, the conservation of marine turtles. Such meetings shall be convened by the Secretariat and shall be hosted by, and organised in collaboration with, one of the signatory States. Such meetings should be held annually, at least initially. The periodicity of these meetings may be reviewed and revised by consensus of the signatory States at any of their regular meetings.
- 4) This Memorandum of Understanding, including the Conservation and Management Plan, may be amended by consensus of the signatory States. When appropriate, the signatory States will consider amending this Memorandum of Understanding to make it legally binding.
- 5) Signatory States may establish, by mutual agreement, bilateral, sub-regional or regional management plans that are consistent with this Memorandum of Understanding.
- 6) Actions under this Memorandum of Understanding will be coordinated with signatory States, as well as with sub-regional institutions in the Region.
- 7) The original text of this Memorandum of Understanding, in the Arabic, English and French languages shall be deposited with the UNEP/CMS Secretariat which shall be the Depository. In the event of any discrepancies, the English version will be considered definitive.
- 8) Nothing in this Memorandum of Understanding shall preclude signatory States from implementing stronger national measures than those specified in the Conservation and Management Plan, in accordance with international law.
- 9) This Memorandum of Understanding shall remain in effect indefinitely, subject to the right of any signatory State to terminate its participation by providing one year's notice to the Depository.

Mass Media and Environmental Education: A Sea-Turtle Video Game Project to Bridge the Gap

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Reaching out to an international public through mass media is a challenging approach to environmental education. Such initiatives require an excellent understanding of the advantages and limitations of a given medium, as well as a global and comprehensive view of the environmental issue.

Considering that the video and computer game industry represent one of the fastest-growing segments of the global entertainment industry, a project called, «Penyu: a Sea-Turtle Survival Game»© has recently been devised. This would take advantage of the interactive media's popularity to promote the cause of marine turtle protection. WWF International is currently investigating the possibility of financing the project whose aims are three-fold:

- 1) Provide educational material on the plight of sea-turtles worldwide to a larger public.
- 2) Provide an entertaining experience which exceeds current video-game standards.
- 3) Empower players to involve themselves directly or indirectly in marine conservation.

Since it is hoped the game will be made available in many countries, individuals from different origins will identify threats which are specific to the area where they live, i.e. turtle-trade in Indonesia and fishing pressure in Costa Rica. If users are living close to a nesting or sea-turtle exploitation area, they are more likely to exert pressure against this type of activity if they have this gaming experience.

Users playing the game should understand through the adventures of the game character what threats marine turtle species are facing today. Indirectly, they will also gain insight into more general environmental issues such as marine pollution, unsustainable coastal development and harmful fishing practices, as well as coral reef depletion.

The peculiarity of this game is that it should not be promoted as an educational tool. Rather than preaching to the converted, it is more useful to embed the educational material into an action/adventure game. The Trojan horse is an apt comparison to the technique used here.

The contents of the game involve:

The progression of the game follows that of a lifestyle, where each level is a chronological continuation of the previous one. Stimulating episodes such as the main character being lost in foreign waters after a freak storm or being illegally shipped to a foreign country are potentially realistic and enhancing features.

From hatching level to the sea-turtle's first return to its natal beach, the player opposes his sea-turtle to most of the threats that exist today. Cyanide and dynamite fishing, coral mining, outboards, sewage pipes, sea-turtle traders, non-TED compliant fishing vessels are just a few of the experiences the sea-turtle encounters.

When progressing from one level to another, an animation will enhance the narrative dimension of the game as well as provide visual insight into the threats against turtles. While developing these, it should not be forgotten that the overall aim is for the user to understand 'why you lose' as a sea-turtle. The odds of survival should always be stressed.

Two versions of the game are currently being considered:

- 1) A console-based version (Sony Playstation, Nintendo 64, Sega Dreamcast)
- 2) A CD-ROM support version with enhancing features: sea-turtle adoption scheme, information booklets emphasizing non-financial ways of helping, i.e. an internet program similar to the WWF Conservation Action Network website. A list of NGOs and programs should also complete this booklet, including possibilities of volunteering for sea-turtle conservation. A marine turtle website will complement the package. Furthermore, ways of recording game scores and exchanging them for conservation program funds with sponsors are potential constructive solutions among many others.

Because an internet-based game would only benefit individuals with powerful internet connections, this option has been discarded. The dangers of such an endeavour are numerous. Excessive scientific vulgarisation and generalisation, misrepresentation of sea-turtles, scattershot attempt at global sensitisation, undermining of bioregional programs through pictorial

depictions of 'baddies' to name just a few. To limit and hopefully eradicate such events, a balance between the commercial imperatives and the educational mission must be reached. This will be the project's greatest hurdle to overcome.

To this end, we are seeking to set-up a committee of individuals ready to cooperate in the preparation of the project. Such an involvement will include overlooking

the material pertinent to that person's area of expertise. The supervision of the Mediterranean section of the game has tentatively been endorsed by ARCHELON in Greece as potential consultant for the Mediterranean contents of the game. We are now looking for people to overlook the Pacific and Atlantic/American contents.

To obtain a copy of the full project proposal including detailed contents for each level, please contact the author.

Project Update: Benthic Habitats of Puerto Rico and the US Virgin Islands

The National Oceanic and Atmospheric Administration (NOAA) and many Federal, Territory, Commonwealth, and local partners have joined together to develop digital benthic habitat maps with emphasis on coral reefs for Puerto Rico and the US Virgin Islands. The objective of the project is to consistently and comprehensively map the distribution of coral reefs and other benthic habitats in shallow waters surrounding the island communities. This work was initiated in support of Essential Fish Habitat requirements for Fisheries Management Plans. The project also supports the President's Executive Order that created the US Coral Reef Task Force that called for mapping of all US coral reef ecosystems. The investigations have been underway for approximately one year in the US Virgin Islands and Puerto Rico.

Data acquisition was completed in December 1999 using NOAA aircraft to collect aerial photography. Color photographs were taken for all of the USVI and Puerto Rico shorelines and offshore to water depths of approximately 20 meters to capture most of the coral reef habitats. Habitats will be mapped by classifying mosaics of the aerial photography. Two "test areas" were classified using a draft habitat classification scheme. The scheme was devised by NOAA staff working with expert photointerpreters and members of the local research and management community. The scheme was reviewed by the wider research and management community in March 2000 and was finalized in April 2000. Results from the test areas are currently being evaluated by NOAA staff using ground truth data.

The benthic mapping project went into production mode in April. Mapping is being conducted using special

software created for ARCVIEW. A "Habitat Digitizer" software extension developed for this project is being used to delineate coral reefs and other benthic features directly on the digital georeferenced imagery. St. Thomas and St. John draft delineations have been completed thus far. Puerto Rico and St. Croix will be mapped in coming months.

A series of interim products will be released during map production. For example, many of the digital aerial photos can now be downloaded from the NOAA/NOS Biogeography Program's web site (see below). Remaining photos will be available shortly. Georeferenced digital mosaics will be made available as they are completed. Additional deliverables will ultimately include the Habitat Digitizer extension and a habitat Classification Manual that will assist the local communities in developing similar mapping projects in the future. Draft benthic maps will be completed by late 2000. Maps will be reviewed by the local community during workshops, revised, and then distributed via CD or the internet in Spring 2001. For additional info see: <<http://biogeo.nos.noaa.gov/benthicmap/caribbean/>> or contact Matt Kendall, Caribbean Mapping Project Manager at 301-713-3028 Ext: 144; or Dr. Mark Monaco, Biogeography Program Manager Ext:160.

Acknowledgements: This work has been made possible through strong partnerships between NOAA, the Virgin Islands National Park Group, the US Geological Survey, Puerto Rico's Department of Natural and Environmental Resources, the US Virgin Islands Department of Planning and Natural Resources, and many additional local academic and private sector partners.

HerpDigest - A Free Weekly Conservation Newsletter for Reptiles and Amphibians

HerpDigest, the first free weekly newsletter on conservation dedicated to reptiles and amphibians had its first issue on August 12, 2000. You are welcome to subscribe. To do so, just send you name and e-mail address to <x5245@erols.com>. HerpDigest is made possible by a grant from an anonymous donor who is partially covering expenses. **Allen Salzberg**, Publisher/Editor, HerpDigest™

NEWS AND LEGAL BRIEFS

Please note that this section is now being compiled by Kelly Samek. You can submit news items at any time online at <<http://www.seaturtle.org/news/>>, via email to news@seaturtle.org, or by regular mail to Kelly Samek, 2811 SW Archer Road G-49, Gainesville FL, 32608, USA.

North Carolina Sea Turtle Deaths Puzzle Scientists

More than 200 dead sea turtles have washed ashore on North Carolina's Outer Banks beaches [in the course of a week], an unusually high number for such a short period of time. The strandings have pushed the toll for this year to more than 340 and have prompted an investigation by the National Marine Fisheries Service. Remnants of fishing nets were found on four carcasses. Most of the dead turtles were loggerheads and a few were Kemp's ridley turtles. Source: *Raleigh News & Observer*, 11 May 2000.

Layoff of Long-line Inspectors Spurs Concern

The federal government has dramatically cut the number of observers monitoring long-line fishing boats to see if they snag green sea turtles, monk seals and other endangered creatures. The National Marine Fisheries Service laid off 12 of the 14 inspectors in Hawaii. Carroll Cox, head of EnviroWatch Inc., said the 14 positions provided monitoring for only 3-5 percent of the state's 118 long-line vessels. Source: *Honolulu Star-Bulletin*, 13 May 2000.

Kemp's Ridley Sea Turtles Hatching a Comeback

Scientists believe the Kemp's ridley, the most endangered of five sea turtles in US waters, has almost reached sustainable population levels, though they hesitate to claim victory too soon. "To say that this problem is solved, that the turtle is saved, would be a big mistake," said Patrick Burchfield, program coordinator for the US Fish and Wildlife Service. Other conservationists are working to set aside the Padre Island coast out to 17 nautical miles as a marine reserve closed to shrimp fishing, said Teri Shore, campaign director for the Sea Turtle Restoration Project, located near San Francisco. Proposed regulations by the Texas Parks and Wildlife Department to close an area from "Fish Pass" south of Port Aransas to the Texas-Mexico border out to five nautical miles are already under fire from shrimpers and seafood industry entrepreneurs. Source: *San Antonio Express-News*, 24 June 2000.

Judge Denies Hearing in 5-Year-Old Lawsuit

A federal judge ended a 5-year-old lawsuit when she ruled that she will not grant another hearing to two women who contended Volusia County wasn't doing enough to protect endangered sea turtles. US District Court Judge Anne Conway ruled that the US Fish and Wildlife was doing its best to protect sea turtles and monitor the county. Volusia County residents Shirley Reynolds and Rita Alexander sued the county in 1995, contending that the Endangered Species Act required its officials to do more to protect sea turtles from the effects of lights along its 40 miles of beaches. Source: *Associated Press*, 19 May 2000.

President Orders Captain's Killing Probed

[Philippines] President Joseph Estrada yesterday called for an investigation into last weekend's incident in which the Coast Guard had a firefight with Chinese fishermen, resulting in the death of the Chinese captain and the arrest of the crew. Initial reports on the incident said that the fishermen had intruded into Philippine territorial waters to catch sea turtles. Source: *Manila Bulletin*, 30 May 2000.

Ad Calls on Bush to Protect Sea Turtles

Texas Governor George W. Bush has failed to act on his own state agency's plan to protect the Texas shrimp fishery, rare sea turtles and declining fish species. In response, the Sea Turtle Restoration Project (STRP) published a full-page advertisement in the New York Times calling on Governor Bush to take immediate action. Texas Parks & Wildlife Commission will make its final decision on Aug. 31 on new shrimp regulations that include a no-shrimp zone out to five nautical miles along the South Texas coast that: would enhance the recovery of the most endangered sea turtle in the world, the Kemp's Ridley; protect the shrimp fishery from predicted collapse; reduce bycatch of declining fish including red snapper; and attract more ecotourists to Texas, invigorating the coastal economy. Turtle deaths decline to nearly zero during the annual Texas shrimp closure. Source: *Sea Turtle Restoration Project*, 2 August 2000.

Fisheries Service Tightens Line with Regulations

More juvenile swordfish, sea turtles and other bycatch will be spared in the wake of seasonal and year-round longline regulations issued by the National Marine Fisheries Service. Year-round closures to open-sea longline fishing operations for swordfish, tuna and shark will be implemented in the Desoto Canyon in the Gulf of Mexico beginning Nov. 1 of this year, and on the eastern coast of Florida beginning Feb. 1, 2001. An annual three-month closure from Feb. 1 to April 30 in the Charleston Bump off the coast of North Carolina will be effective in 2001. The use of live bait in the Gulf of Mexico will also be prohibited starting Sept. 1 of this year. The regulations, which came after 15 public hearings in coastal communities, are designed to reduce the number of undersized swordfish, billfish and other species incidentally caught with longline fishing gear. Source: *Environmental News Network*, 3 August 2000.

Problems at Laganas Bay, Zakynthos National Marine Park (ZNMP)

Prior to the first meeting of the newly appointed committee for the management of the ZNMP, chaos prevails on the nesting beaches. The patrol boat supplied for the day to day policing of Laganas Bay has not been seen there for at least 22 days in spite of pleas to the port authorities by the Mediterranean Association to Save the Sea Turtles (MEDASSET). On 26 July 2000, passengers of a jet ski, continually in use in the protected area that day, attacked volunteers of the Sea Turtle Protection Society. Three were injured. In addition effluent seeping from the biological garbage treatment unit ends up with the swimmers in the sea. The plant was established about four years ago despite protests by all concerned NGOs in the area. Garbage lorries at the plant attract gulls that pose a threat to the emerging sea turtle hatchlings. Constant lobbying to the European Commission since 1993 has resulted in the Commission opening a case against Greece because of their lack of conformity with European environmental legislation. Source: *MEDASSET*, 31 July 2000.

Turtle Nest Vandalism on the Rise in Florida, USA

So far this year, 15 nests have been disturbed by humans in Collier County, compared to 10 for all of last year. Although finding definitive proof is close to impossible, turtle monitors, environmentalists and law enforcement officers suspect poachers as the main culprit. Experts say poachers can sell the eggs for as much as \$8 apiece. Source: *Naples Daily News*, 17 July 2000.

Longline Fishing Industry Calls Ban ‘Devastating’

Wholesalers, distributors and other buyers at the Kewalo fish auction predicted sweeping effects from a court decision they say will kill Hawaii's longline fishing industry. However, environmentalists hailed U.S. District Judge David Ezra's ruling saying it will give endangered turtles more protection. The decision requires all 115 longline fishing boats in Hawaii to have a federally trained observer on board in 30 days, which fishermen say is impossible. Ezra also ordered the National Marine Fisheries Service to finish an environmental impact statement by April 1, 2001, to determine how longline fishing affects sea turtles and other marine animals. His decision, intended particularly to protect endangered leatherback sea turtles, could halt longline fishing through next year. Source: *Honolulu Star-Bulletin*, 24 June 2000.

Three Traumatized Turtles—Ambassadors for Sea Turtles in the UK

On 24 July British Airways flew three unreleasable sea turtles to Britain in a campaign organised by ARCHELON - the Sea Turtle Protection Society of Greece and Sealife Centres. The turtles were accompanied by Thanos Belalides, Sea Turtle Rescue Centre co-ordinator, Gail Schofield (STRC Biological representative) and Mitchell Hird (Sealife Centres biological representative). Fotini (“light”), Lefteris (“freedom”) and Antiopi arrived in 1999 for treatment yet remained permanent residents of the Sea Turtle Rescue Centre (STRC) for over a year. Sealife Centres offered to provide long term homes for these 3 turtles, in order to allow space for other animals requiring rehabilitation. All three turtles are currently being held at Weymouth Sea Life Centres, for a period of adjustment before being transferred to Great Yarmouth Sealife Centre Aquarium. Source: *ARCHELON*, 8 August 2000.

Leatherback Turtles Face Extinction

The leatherback sea turtle, an endangered species worldwide, faces likely extinction in the Pacific within the next few years. According to a mathematical model presented in *Nature*, fewer than 50 nesting leatherbacks will remain in the entire Pacific by 2004. James Spotila said the current decline of these sea turtles is too severe to be the result of egg poaching or beach development, but correlates closely to fisheries reports of by-catch. Source: *Discovery.com News*, 31 May 2000.

Saving the Giant Sea Turtle in Ghana

Environmentalists in Ghana are to set up six sanctuaries along the Atlantic coast to save the leatherback turtle. The Ghana Wildlife Society has launched a campaign to raise \$20,000 for the protection of beaches where several hundred turtles come to lay. Their nesting season lasts from August to March every year. Sadly, wildlife activists estimate that at least two-thirds of turtles that swim up onto the coast of Ghana are caught and slaughtered by local fishermen for food. Source: *BBC News Online*, 20 July 2000.

TED Inventor to Visit Costa Rica

From 5-16th August, Mr. Sinkey Boone, a Georgia shrimp known for inventing Turtle Excluder Devices (TEDs) in 1969 will visit Costa Rica. On Monday he will meet with the Chamber of Fishermen of Puntarenas and later during the week he will do some experimental fishing. The incidental capture and mortality of sea turtles by different industrial fisheries, particularly shrimp trawling, has been identified as one of the main worldwide threats for their survival. Source: *Sea Turtle Restoration Project*, 6 August 2000.

Coast Guard Tracking Oil Dumping Ship

US Coast Guard investigators boarded ships in Miami and Port Everglades, trying to determine which crew dumped oil off the South Florida coast, creating the area's worst oil spill in a decade or more. While no birds or other animals had been injured, volunteers hurried Wednesday to protect thousands of green and loggerhead sea turtles about to hatch at John U. Lloyd Beach State Recreation Area near Hollywood. Numerous volunteers came to the beach trying to clear the sand of oil-covered seaweed that could block the hatchlings' path to the ocean. Source: *Associated Press*, 10 August 2000.

Vandals Are Damaging Pinellas Sea Turtle Nests

Marine scientists say more than 60 sea turtle nests have been damaged on Pinellas County beaches, with vandals uprooting protective enclosures and smashing monitoring equipment. So far, no eggs or hatchlings have been disturbed, though, according to Scott Swaim, Clearwater Marine Aquarium spokesman. But vandalism is on the rise. Swaim said 20 nests were damaged during all of last egg laying season. Source: *Associated Press*, 10 August 2000.

Seaworld Releases Turtle After Long Recuperation

A rare Kemp's ridley turtle that was flown from Great Britain after being found off the Welsh coast was released into the Atlantic Ocean [on April 12]. Scientists with SeaWorld Orlando released the 20-inch turtle, named Beaky, about a mile off the Brevard County coast. The endangered turtle was found stranded in Wales last December. "Beaky" was flown to SeaWorld Orlando by British Airways and spent the next four months being treated for dehydration and abrasions. Source: *The Orlando Sentinel*, 13 April 2000.

Oily Mess on Karachi Beach (Pakistan)

An enormous, mysterious oily black spill has engulfed the nesting grounds of the green and olive ridley turtles near Karachi just at the start of the nesting season. An SOS has been sent to government agencies to determine the source of the spill and plug the leak before it wipes out the endangered turtles and other marine life. The Marine Turtle Conservation Project, working under the Sindh Wildlife Management Board, has sent a red alert to the Maritime Security Agency, Environment Protection Agency, Marine Fisheries Department and related agencies to inform them that the charcoal like pollutant is suffocating marine turtles and other species. But all officials contacted by the Environment News Service claimed ignorance. Source: *Environmental News Service*, 10 July 2000.

Florida Sea Turtles Killed In Dredging Projects

It is usually a violation of federal law to kill sea turtles, an endangered species that thousands of Floridians work to protect. But not when the turtles die during a dredging operation -in the name of beach replenishment and aiding shipping firms, the federal government gives dredging companies a one-of-a-kind license to kill the species. The turtles are routinely ground up as dredgers clear bays and channels for shipping and gather sand for shoreline protection. Exactly how many are killed is unclear - no one counts too closely, the *Sarasota Herald-Tribune* found during an eight-month investigation of the industry. Source: *Associated Press*, 5 July 2000.

RECENT PUBLICATIONS

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

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

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

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

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