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Incidental capture of loggerhead turtles in Cape Verde Islands (see López-Jurado *et al.* pp 14-16)

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Sea Turtles in Spanish Mediterranean Waters: Surprises in 2001

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The Western Mediterranean is an important feeding and development area for large stocks of juvenile loggerhead sea turtles (*Caretta caretta*) that originate from Atlantic and Eastern Mediterranean rookeries (Laurent *et al*. 1998; Tomás *et al*. 2001). It was previously thought that loggerheads are abundant in this area in the summer and that few individuals remain in these waters in winter, particularly around the Balearic Islands and Columbretes Archipelago (Camiñas & de la Serna 1995). However, recent aerial surveys have demonstrated that high numbers of loggerheads are present in the Spanish Mediterranean throughout the year (Tomás *et al.* in press, a).

Various human activities seriously affect sea turtles in the Western Mediterranean. The most serious threat is incidental captures by fisheries, particularly the off-shore long line fishery (reviewed in Laurent *et al*. 1998). The activities derived from tourism also represent a significant threat for sea turtles in Spanish Mediterranean coastal waters. These activities result in the injuries or death of a large number of loggerheads each year. Consequently, these animals are often found as live or dead strandings and may serve as indicators of seasonal turtle density and abundance. Here we present stranding data for loggerheads found in the Valencian Community (East Spain) from 1995 to 2002. We discuss an unusually high number of turtles found stranded in this region, and in others of the Spanish Mediterranean, in 2001 and report other notable accounts concerning sea turtle activity in these coasts during the same year.

The Valencian Community is a region to the east of Spain, composed by three provinces Castellón, Valencia and Alicante, running from north to south (Figure 1).

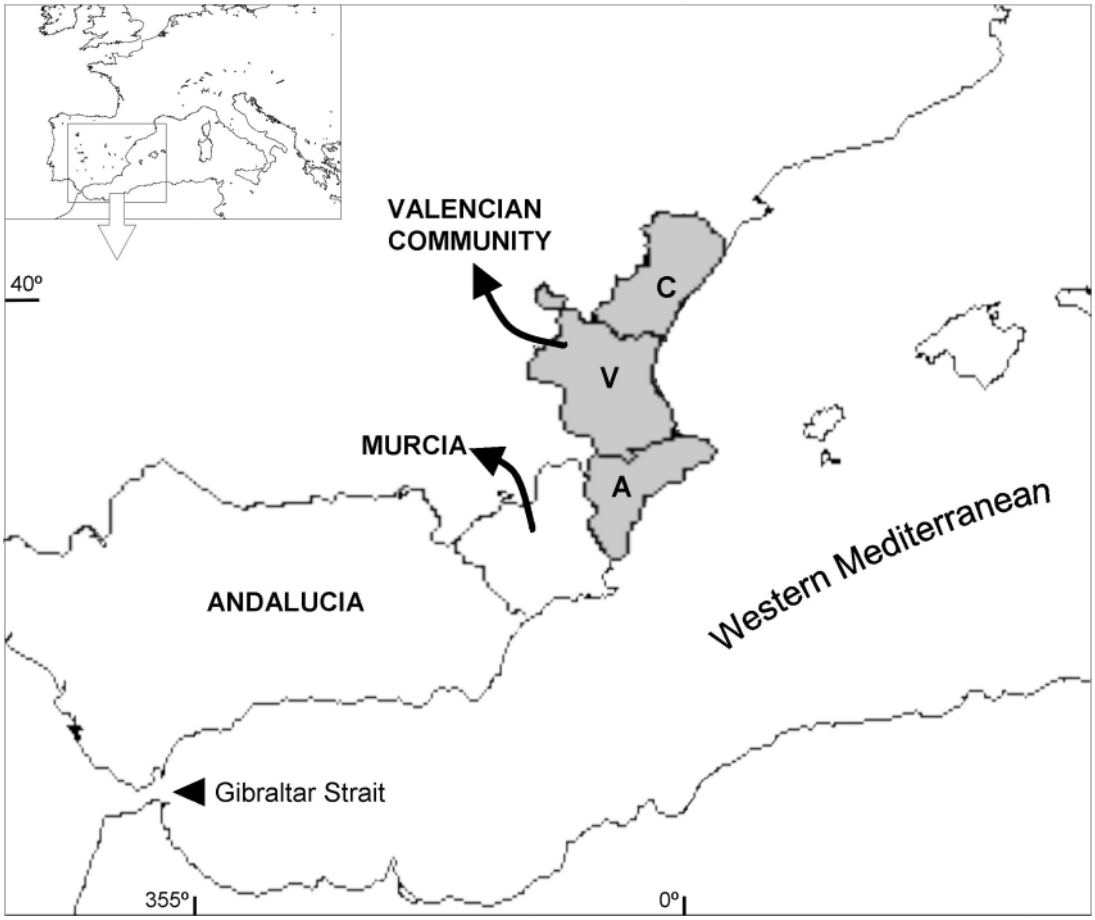

Figure 1. Map of the study area, including the three provinces of the Valencian Community: C, Castellón; V, Valencia; A, Alicante.

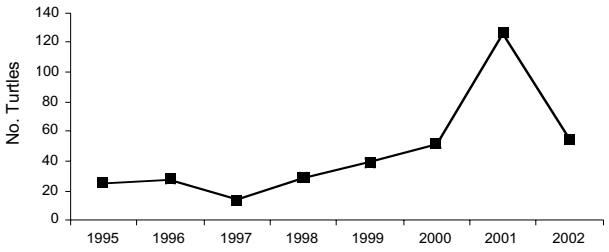

Figure 2. Annual number of loggerheads stranded on the coasts and captured in coastal waters of the Valencian Community (east Spain).

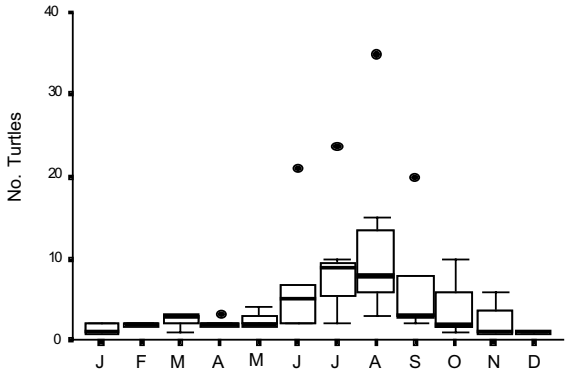

Figure 3. Monthly variation of loggerhead turtles stranded and captured in the Valencian Community for the period 1995-2001. The figure represents the median (transverse lines), the quartiles (boxes) and the extreme values (error bars) for each month 1995-2000. Note the outliers (dots) corresponding to 2001.

The coastline of this region extends for 419 km, from 40º31'N-0º31'E to 37º51'N-0º45'W. There is a stranding network in the Valencian Community composed of several public and private institutions, funded by the local government (Conselleria de Medio Ambiente de la Generalitat Valenciana) and coordinated by the University of Valencia. This network records all the turtles stranded on beaches or captured in coastal waters by artisanal or recreational fisheries. Between 1995 and 2000, this network recorded an average of 31 (range: 14-52) loggerheads per year. However, 2001 was a year of surprises regarding sea turtles in the Spanish Mediterranean coast, because the number of loggerheads observed as stranded was much greater than in previous years. In 2001, 127 dead or injured turtles were found stranded or were captured in coastal waters of the Valencian Community (Figure 2). In Andalucia (south Spain), three times as many turtles were recorded in 2001 by the regional strandings network, coordinated by the NGO Aula del Mar, as compared to 2000 (J. L. Mons, pers. com.). This increased stranding rate was not sustained in 2002, with only 54 turtles having been recorded in the Valencian Community.

Two hypotheses could explain the progressive increase of strandings in the Valencian Community since 1997: the increase of anthropogenic impacts on the turtles or, more likely, the improvement and increased effort of the stranding network. However, the high number of strandings in 2001 is more difficult to explain, since there was no significant improvement in the network between 2000 and 2001, and there was no obvious increase of any anthropogenic activity normally attributed to sea turtle strandings. The high numbers of 2001 might have been the result of an unusually large migration of turtles into the Western Mediterranean during this year, particularly during the summer. In the Valencian Community, strandings and captures in coastal waters normally occur throughout the year, but are more frequent from June to September (Figure 3). During these months in 2001, strandings were significantly higher than normal, while for the other months the rate was within the normal range (Figure 3).

In the Valencian Community at the end of May and early June 2001, most of the turtles were recorded in Alicante (Figure 4). In July and early August the number of strandings and captures decreased in this province, but increased in Valencia and Castellón. In late August and September, strandings were again prevalent in Alicante, in the south (Figure 4). These findings suggest that most turtles probably came from the south in spring and early summer. This is supported by the high number of loggerheads observed off the Murcia region during an aerial survey in May 2001 (Tomás *et al.* in press, a). Interestingly, Camiñas & de la Serna (1995) also suggested that in the western Mediterranean, turtles move from south to north in spring, returning south in early autumn.

It is possible that some of the loggerhead turtles that entered the waters of the Valencian Community in 2001 came from the Atlantic. Strandings in the southern

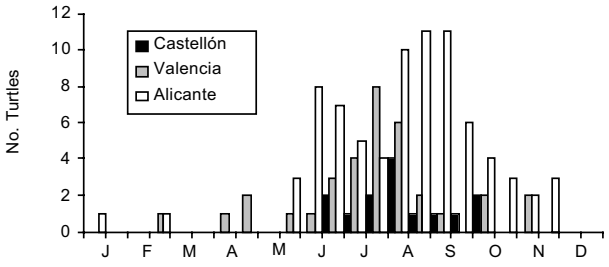

Figure 4. Bimonthly distribution of strandings in the Valencian Community by provinces in 2001.

regions of Spain during spring 2001, particularly in the provinces around the Gibraltar Strait where the Atlantic and Mediterranean meet, also increased substantially from previous years just prior to the high incidence of strandings observed in the Valencian Community (J.L. Mons, pers. com.). Additionally, we recorded the second occurrence of a Kemp's ridley sea turtle (*Lepidochelys kempii*) entering the Mediterranean in the coastal waters of the Alicante province (Tomás *et al.*, in press b). This observation also supports the hypothesis of a potentially significant recruitment of turtles from the Atlantic into the Mediterranean during 2001. However, genetic analyses would be necessary to determine the geographical origin of the stranded loggerheads we observed. Nevertheless, this contention should be further examined in the light of information on fishing effort of different fisheries and other human activities in the Spanish Mediterranean waters throughout the year.

Other unusual events contributed to the surprising nature of the 2001 season in this region. First, a loggerhead turtle nested on a beach in Almería, southeast Spain (Tomás *et al.* 2002). This is the first confirmed nesting event in the area. Second, we recorded the stranding of an adult leatherback turtle (*Dermochelys coriacea*) in Cullera (39º10'N 0º14'W), Valencia Province, in November 2001. The stranding event was the first of a leatherback in the Valencian Community in the last 10 years.

The information herein clearly demonstrates the paucity of information concerning sea turtles in the Spanish Mediterranean waters. More research is needed (particularly in ecology, morphology and genetics) to completely understand the geographical origin, spatial and temporal distribution, biology and population dynamics of sea turtles in the western Mediterranean. It is possible that the importance of this region to sea turtles, particularly to loggerhead turtles, has been underestimated in the past.

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CAMIÑAS, J.A. & J.M. DE LA SERNA. 1995. The loggerhead distribution in the Western Mediterranean Sea as induced from captures by the Spanish long line fishery. In: Llorente *et al*. (Eds) Scientia Herpetologica, pp. 316-323.

LAURENT, L., P. CASALE, M.N. BRADAI, B.J. GODLEY, G. GEROSA, A.C. BRODERICK, W. SCHROTH, B. SCHIERWATER, A.M. LEVY, D. FREGGI, E.M. ABD EL-MAWLA, D.A. HADOUD, H.E. GOMATI, M. DOMINGO, M. HADJICHRISTOPHOROU, L. KORNARAKY, F. DEMIRAYAK, & C.H. GAUTIER. 1998. Molecular resolution of marine turtle stock composition in fishery bycatch: a case study in the Mediterranean. Molecular Ecology 7: 1529-1542.

TOMÁS, J., F.J. AZNAR & J.A. RAGA. 2001. Feeding ecology of the loggerhead turtle *Caretta caretta* in the western Mediterranean. Journal of Zoology (London) 255: 525-532.

TOMÁS, J., J.L. MONS, J.J. MARTÍN, J.J. BELLIDO & J.J. CASTILLO. 2002. Study of the first reported nest of loggerhead sea turtle, *Caretta caretta*, in the Spanish Mediterranean coast. Journal of the Marine Biological Association of the United Kingdom 82: 1005-1007.

TOMÁS, J., A. GÓMEZ DE SEGURA & J.A. RAGA. In press, a. First aerial surveys of loggerhead turtles, *Caretta caretta*, in western Mediterranean waters. In: Proceedings of the First Mediterranean Conference on Marine Turtles, October 24-28, 2001, Rome.

TOMÁS, J., A. FORMIA, F.J. AZNAR & J.A. RAGA. In press, b. Occurrence and genetic analysis of a Kemp's ridley sea turtle (*Lepidochelys kempii*) in the Mediterranean Sea. *Scientia Marina.*

Confirmed Leatherback Turtle (*Dermochelys coriacea*) Nests from North Carolina, with a Summary of Leatherback Nesting Activities North of Florida

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Leatherback turtles (*Dermochelys coriacea*) nest circumglobally, primarily on beaches in the tropics, many of which have experienced severe population declines in recent decades (NMFS & USFWS 1992, 1998; Spotila *et al.* 1996). However, extremes in nesting distribution occur in temperate regions in the Western Atlantic. In South America, leatherback nests have been reported as far south as Torres, State of Rio Grande do Sul, Brazil (Soto *et al.* 1997). In North America, the northeast coast of Florida was considered the northern limit for leatherback nesting until the early 1980s (Allen & Neill 1957; Caldwell 1959; Caldwell *et al.* 1956; Nichols & Du Toit 1983; Seyle 1985). In 1981, two confirmed leatherback nests were documented in Georgia on Cumberland (Camden County) and Blackbeard (McIntosh County) Islands (Ruckdeschel *et al.* 1982). Recently, Frick *et al.* (2002) reported a single leatherback nest on the northern end of Wassaw Island (Chatham County), Georgia, as the northernmost verified leatherback nest on the East Coast of the United States. Herein we report confirmed leatherback nests in North Carolina, thus extending the northernmost nesting range for the species in eastern North America. We also report previously unpublished records of leatherback nesting activity in Georgia, South Carolina and Maryland.

Although adult leatherbacks are common in the Atlantic Ocean off the coast of North Carolina at certain times of the year (Epperly *et al.* 1995; Grant *et al.* 1996; Lee & Palmer 1981), nesting in the state is infrequent. The first potential evidence of leatherback nesting in North Carolina was in 1966 in the form of an unconfirmed report of hatchlings found on South Core Banks, near Cape Lookout (Carteret County) (Schwartz 1976, 1977). Since then, no credible reports of leatherback nesting activity were reported in the State until the summer of 1998. Confirmed nests also were reported during the 2000 and 2002 nesting seasons.

During the 1998 nesting season two confirmed nests (i.e., eggs or hatchlings observed), one on 3 June and the other on 26 July, and two potential nests (i.e., an unconfirmed nest reported as a "false crawl") on 6 July and 16 July, were observed at Cape Hatteras National Seashore (Dare and Hyde Counties), North Carolina. The 6 July and 16 July events may have actually been nests. In both instances the turtle disturbed a very large area of sand, but despite an exhaustive search for the clutch and regular monitoring of the area, no eggs or evidence of hatchlings were found. The 26 July nest was lost to erosion as a result of the landfall of Hurricane Bonnie on 26 August 1998, near Wilmington, North Carolina. The 3 June nest produced hatchlings, but because of the condition of the remains of the nest when it was excavated (i.e., many small eggshell fragments), clutch size and hatching success were not estimated. One full-term embryo was salvaged from the remains of the clutch (n=26 yolked eggs) and deposited in the North Carolina State Museum of Natural Sciences (specimen no. NCSM 62550).

During the 2000 nesting season four leatherback nests were confirmed in North Carolina. Three nests (16 April, 20 and 29 June) were documented at Cape Hatteras National Seashore and one (11 June) at Cape Lookout National Seashore (Carteret County). On 10 July 2000, the 16 April nest was excavated – no eggs hatched and clutch size was estimated as 70 yolked and 15 yolkless eggs. The 11 June nest was excavated on 29 August 2000 – eggs appeared to have hatched

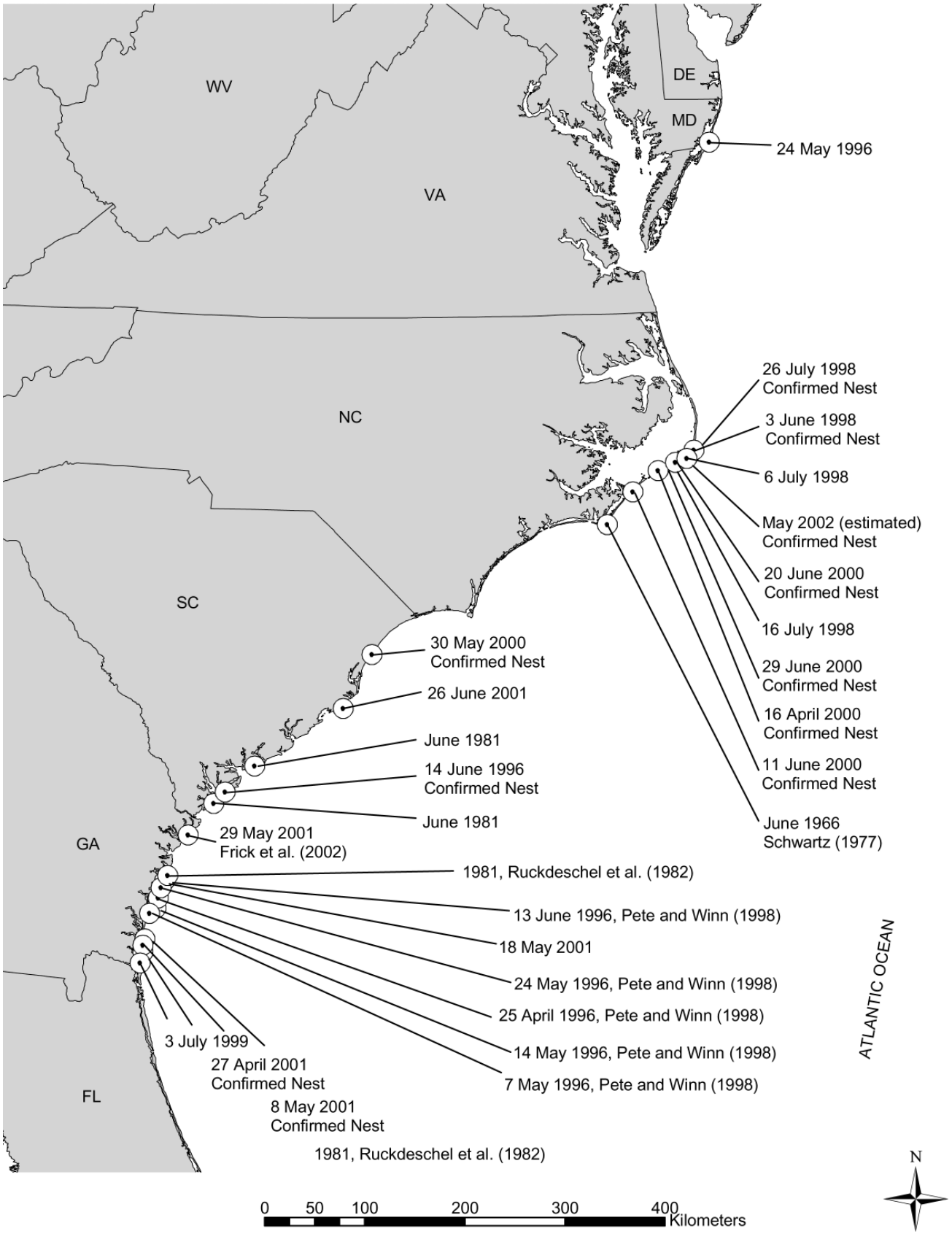

Figure 1. Leatherback turtle (*Dermochelys coriacea*) nesting activity along the East Coast of the United States of America, north of Florida. Individual locations were plotted using ESRI, Inc., ArcMap 8.2 software and the "State Boundaries of the United States" data layer from the U.S. Geological Survey.

and clutch size was estimated as 101 yolked and 31 yolkless eggs. Hatchlings from the 20 June nest emerged on 7 September 2000 – clutch size was estimated as 99 eggs (86 hatched and 13 unhatched), and hatching success was estimated as 87% when excavated on 13 September 2000. The 29 June nest was excavated on 22 September 2000, but because eggs could not be found during the final nest examination, clutch size and hatching success were not determined.

One leatherback nest was confirmed in North Carolina in 2002. The date of egg deposition is unknown and the nest was not discovered until 12 August when hatchling tracks were noted near the Town of Frisco (Dare County) within the Cape Hatteras National Seashore. The nest was excavated 72 hours later and leatherback hatchlings were found. The nest had an estimated clutch size of 96 yolked and 29 yolkless eggs, and the hatching success was estimated as 26% (n=25) of yolked eggs (emergenge success was 24% because two dead hatchlings were found in the nest). Because park biologists had no record of a sea turtle nesting emergence in the area, the turtle likely nested before crawl surveys were initiated in June.

Twelve leatherback emergences have been documented on Georgia beaches; the earliest of these were reported by Ruckdeschel *et al.* (1982), the most recent by Frick *et al.* (2002). Pete and Winn (1998) reported three leatherback nests from Sea and Sapelo Islands (Glynn County) and two non-nesting emergences from St. Simons (Glynn County) and Blackbeard (McIntosh County) Islands in 1996. Previously unpublished records include four additional leatherback nesting events. A probable nest was reported on 3 July 1999 on Cumberland Island (Camden County), but the potential nest site was lost to erosion caused by Hurricane Floyd, which made landfall near Wilmington, North Carolina on 16 September 1999. In 2001, two nests from Cumberland Island (Camden County) were documented on 27 April and 8 May. On 18 May 2001, an additional probable nest on Blackbeard Island (McIntosh County) was evidenced by a single yolkless egg found at the site. Unfortunately, additional information on these nesting events is not available.

Along the coast of South Carolina, two non-nesting emergences were observed during aerial beach surveys in June of 1981 on Hilton Head Island (Beaufort County) and Edisto Beach State Park (Colleton County). On 14 June 1996, the first State record of a leatherback nest was documented on St. Phillips Island (Beaufort County) during an aerial survey of the beach. Clutch size was estimated at 117 eggs, and they hatched successfully; although 30 hatchlings were found dead on the surface of the sand near the nest site. One full-term embryo was salvaged from the remains of the clutch and is on permanent loan to the University of South Carolina Beaufort at Pritchards Island (specimen no. PI-0196-USCB). On 30 May 2000, a leatherback turtle was discovered at Huntington Beach State Park (Georgetown County) at about 0600 hours in the process of laying eggs. Biologists relocated the nest (under appropriate State and Federal permits) because it was laid in an area prone to overwash. The nest contained 50 yolked and 53 yolkless eggs; an additional 4 yolked eggs were crushed by the turtle during nesting. Signs of hatchling emergence were noted on 29 August and the nest was excavated on 5 September 2000. Hatching success was estimated at 18% (n=9) of yolked eggs. The remaining eggs perished in early development (n=32), late development (n=1), or were depredated (n=8) by ghost crabs (*Ocypode quadrata*). The turtle was not tagged and the left rear flipper was missing; no other abnormalities were noted. Curved-carapace length was 135 cm and curved-carapace width was 113 cm. These measurements fall within the size range of adult leatherbacks recorded from the southeastern United States (NMFS & USFWS 1992). A leatherback emergence was reported on Cape Island (Cape Romain National Wildlife Refuge, Charleston County) by refuge biologists on 26 June 2001, but no additional information is available.

One leatherback emergence has been documented from Maryland. On 24 May 1996, a park biologist observed daytime nesting of a leatherback on Assateague Island National Seashore (Worcester County), Maryland. The turtle was observed for approximately one hour as she crawled in three tight circles that were connected by curving loops. This occurred within 0.5 meters above the high tide line and the turtle returned to the water around 1000 hours. A potential egg chamber was found at the site; however, no eggs were found despite a thorough search of this area. The turtle was measured before she returned to the water and had a curved-carapace length of 139.7 cm and curved-carapace width of 106.7 cm. The flippers were checked for tags or tag scars, but none were evident; although a portion of the right rear flipper was missing.

Leatherback nesting activity has not been reported from the beaches of Virginia; however, most of the Commonwealth's beaches are not regularly monitored for sea turtle nesting activity. Virginia's southern beaches within Back Bay National Wildlife Refuge and the City of Virginia Beach have been monitored since 1980 and 1993, respectively, but leatherback nesting

activity has not been reported (Williams & Gallegos, 2000; Cliche & Gallegos 2001). Additionally, leatherback nesting activity has not been reported on Virginia's portion of Assateague Island, where biologists have monitored piping plover (*Charadrius melodus*) nesting activity since the mid-1980s.

In summary, seven *Dermochelys* nests have been confirmed in North Carolina, eight nests confirmed in Georgia, and two nests confirmed in South Carolina (Figure 1). Numerous non-nesting emergences, some of which were probably nests, have been observed in these states. A single nesting attempt, which may have resulted in the deposition of eggs, was recorded in Maryland. The number of turtles responsible for these events and the factors associated with the apparent increase of nesting activities outside of the historical range of this species are unknown. Florida, however, hosts a small nesting colony of leatherbacks that has been significantly increasing (Witherington & Koeppel 2000) and may be the source population of the nesting females reported here.

The North Carolina records constitute the northernmost, confirmed reports of leatherback nests along the East Coast of the United States. Almost all *Dermochelys* nesting activity in North Carolina has been concentrated along beaches between Cape Lookout and Cape Hatteras, and confirmed nests have only been documented in 1998, 2000, and 2002. Leatherback sea turtles nest every two to three years and their average intraseasonal nesting interval is approximately nine to ten days (NMFS & USFWS 1992). Thus, the nesting emergences we report here for North Carolina could represent the activities of a single female.

Because leatherbacks on the East Coast of the United States may nest as early as late February (Meylan *et al.* 1995), current data for North Carolina are probably an underestimate of actual leatherback nesting activity. Beach patrols usually commence in May or June to maximize observations of nesting loggerhead turtles (*Caretta caretta*); therefore, leatherback nests may have been missed. Management considerations for the leatherback turtle nesting along the beaches north of Florida should include adjusting the commencement of beach patrols to account for its early initiation of nesting activities. This is of particular importance in areas that might be affected by beach management activities (e.g., beach driving, beach nourishment, beach bulldozing, etc.), which are primarily conducted during the winter and early spring.

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ALLEN, E.R., & W.T. NEILL. 1957. Another record of the Atlantic leatherback, *Dermochelys coriacea*, on the Florida coast. Copeia 1957:143-144.

CALDWELL, D.K. 1959. On the status of the Atlantic leatherback turtle, *Dermochelys coriacea*, as a visitant to Florida nesting beaches, with natural history notes. Quarterly Journal of the Florida Academy of Science 21:285-291.

CALDWELL, D.K., A. CARR & T.R. HELLIER. 1956. A nest of the Atlantic leatherback turtle, *Dermochelys coriacea* (Linnaeus), on the Atlantic coast of Florida, with a summary of American nesting records. Quarterly Journal of the Florida Academy of Science 18:279-284.

CLICHE, R., & J. GALLEGOS. 2001. Nesting loggerhead sea turtle activity report 2001. US Fish and Wildlife Service, Virginia Beach, VA. pp. 24.

EPPERLY, S.P., J. BRAUN & A. VEISHLOW. 1995. Sea turtles in North Carolina waters. Conservation Biology 9:384-394.

FRICK, M.G., K.L. WILLIAMS & D.C. VELJACIC. 2002. A record of the northernmost, verified leatherback sea turtle nesting event on the East Coast of the USA. Marine Turtle Newsletter 97:12-13.

GRANT, G.S., H. MALPASS & J. BEASLEY. 1996. Leatherback turtle and jellyfish surveys on Topsail Island, North Carolina. In J.A. Keinath, D.E. Barnard, J.A. Musick & B.A. Bell (Comps.). Proceedings of the Fifteenth Annual Workshop on Sea Turtle Biology and Conservation. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SEFSC-387. pp. 112-115.

LEE, D.S. & W.M. PALMER. 1981. Records of leatherback turtles, *Dermochelys coriacea* (Linnaeus), and other marine turtles in North Carolina waters. Brimleyana 5:95-106.

MEYLAN, A., B. SCHROEDER & A. MOSIER. 1995. Sea turtle nesting activity in the State of Florida 1979-1992. Florida Marine Research Institute Publication Number 52. pp. 51.

[NMFS & USFWS] NATIONAL MARINE FISHERIES SERVICE & U.S. FISH AND WILDLIFE SERVICE. 1992. Recovery Plan for the Leatherback Turtles in the U.S. Caribbean, Atlantic and Gulf of Mexico. National Marine Fisheries Service, Washington, D.C. pp. 65.

[NMFS & USFWS] NATIONAL MARINE FISHERIES SERVICE & U.S. FISH AND WILDLIFE SERVICE. 1998. Recovery Plan for U.S. Pacific Populations of the Leatherback Turtle (*Dermochelys coriacea*). National Marine Fisheries Service, Silver Spring, MD. pp. 66.

NICHOLS, V.A., & C.H. DU TOIT. 1983. A leatherback returns to Flagler County: a new northern nesting record for the U.S. Atlantic coast. Herpetological Review 14:107.

PETE, S.J., & B. WINN. 1998. Leatherback turtle (*Dermochelys coriacea*) nesting in Georgia. In S.P. Epperly & J. Braun (Comps.). Proceedings of the Seventeenth Annual Sea Turtle Symposium. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SEFSC-415. pp. 243-244.

RUCKDESCHEL, C., L. ELLIS & C.R. SHOOP. 1982. *Dermochelys coriacea* (leatherback sea turtle) nesting. Herpetological Review 13:126.

SCHWARTZ, F.J. 1976. Status of sea turtles, Chelonidae and Dermochelidae, in North Carolina. Journal of the Elisha Mitchell Scientific Society 92:76-77.

SCHWARTZ, F.J. 1977. Species accounts: Reptilia; Testudines; Cheloniidae. In Cooper, J.E., S.S. Robinson & J.B. Funderburg (Eds.). Endangered and Threatened Plants and Animals of North Carolina. N.C. State Museum of Natural History, Raleigh, NC. pp. 303-308.

SEYLE, C.W., JR. 1985. Correction of the northernmost leatherback nesting on the US Atlantic coast. Herpetological Review 16:38.

SOTO, J.M.R., R.C.P. BEHEREGARAY & R.A.R. de P. REBELLO. 1997. Range extension: nesting by *Dermochelys* and *Caretta* in southern Brazil. Marine Turtle Newsletter 77:6-7.

SPOTILA, J.R., A.E. DUNHAM, A.J. LESLIE, A.C. STEYERMARK, P.T. PLOTKIN & F.V. PALADINO. 1996. Worldwide population decline of *Dermochelys coriacea*: are leatherback turtles going extinct? Chelonian Conservation and Biology 2:209-222.

WILLIAMS, S., & J. GALLEGOS. 2000. Nesting loggerhead sea turtle activity report 2000 and 1980-2000 nesting summary. U.S. Fish and Wildlife Service, Virginia Beach, VA. pp. 34.

WITHERINGTON, B.E., & C.M. KOEPPEL. 2000. Sea turtle nesting in Florida, USA, during the decade 1989-1998: an analysis of trends. In H.J. Kalb, & T. Wibbels (Comps.). Proceedings of the Nineteenth Annual Symposium on Sea Turtle Biology and Conservation. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SEFSC-443. pp. 94-96.

Monitoring Nesting Loggerhead Turtles (*Caretta caretta*) in the Central Caribbean Coast of Colombia

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Four of the world's seven sea turtle species nest on the central Caribbean coast of Colombia. These are the loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*) and green turtles (*Chelonia mydas*). Although the loggerhead turtle is still the most common species, it has widely felt that it has declined in nesting abundance over the last 30 years at the Guachaca, Mendihuaca, Buritaca, Don Diego and Quintana nesting beaches in the Magdalena Department (Amorocho *et al*. 1999; Marrugo & Vasquez 2002; Muñoz *et al*. 1989; Pinzón *et al*. 1996; Ramirez 1975; Figure 1). The reduction of this nesting population mandates a recovery plan for its conservation in the Colombian Caribbean.

Herein I describe the nesting activity of loggerhead females and the hatching success obtained from nests transferred into protected hatcheries during the 2001 breeding season in a study area defined along the coast of the Magdalena Department between 11° 16' N - 73° 51' W and 11° 15' N - 73° 39' W, which includes the Mendihuaca, Guachaca, Buritaca, Don Diego and Quintana beaches, historically known as the main nesting ground for loggerheads in Colombia (Medem 1962, Kaufman 1968, Kaufmann 1971, Tufts 1972). The Buritaca nesting reserve is located between the mouths of the rivers Buritaca and Don Diego and it is locally referred as Don Diego beach (see Figure 1).

Eighteen of the 21 km of nesting beaches between the mouths of the Mendihuaca and Palomino rivers were monitored four nights each week from May 17 to September 2 of 2001. After this date, nighttime surveys were suspended due to security conditions in the area. Data gathered after September 2 during occasional daytime surveys have not been considered for the analysis of the results.

The nests collected by the research team within the study area were transferred into two protected hatcheries managed by a local NGO, which conducts

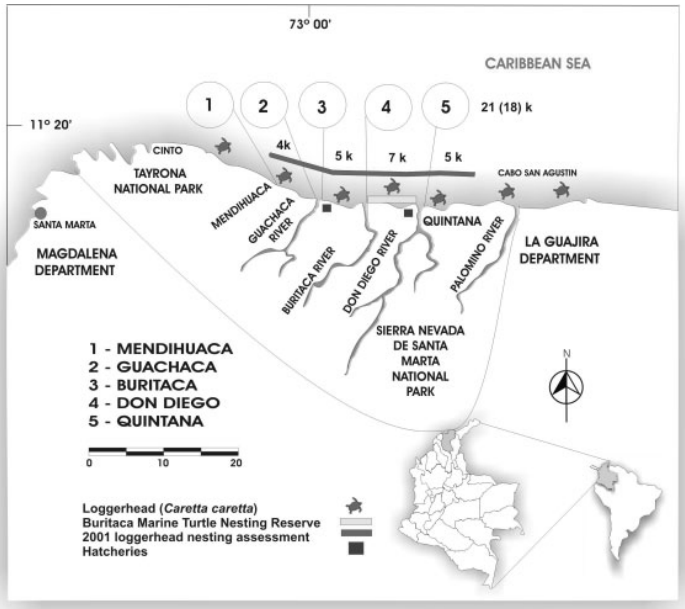

Figure 1. Map of study site.

sea turtle surveys in the beaches of Don Diego and Buritaca. The clutches were transplanted in the majority of cases more than six hours after deposition. Other nests purchased by local NGO from local villagers were relocated without knowing whether they included all the eggs from the clutch of origin. Since 1997, local conservationists managing the Don Diego hatchery have divide each nest into two equal parts and buried the eggs 30 cm below the surface following Ramirez (1975), who suggested that, for these beaches, lower clutch sizes resulted in higher hatching success rates. Conversely, in the Buritaca hatchery all the eggs of a single nest were relocated. Hatching success from the relocated nests was estimated by counting the number of hatchlings that emerged from each nest. Curved carapace length (CCL) and width (CCW) measurements were obtained from nesting females and inconel tags from the Archie Carr Sea Turtle Research Centre (University of Florida) were applied on the right front flipper of each individual that was intercepted during nesting.

Beaches	*Total Number of Nesting Activities*	*Number of clutches*	*Nesting success*
Quintana	9	8	89%
Don Diego	11	1	9%
Buritaca	4	1	25%
Guachaca	3	1	33%
Mendihuaca	19	6	35%
Total	**46**	**17**	**37%**

Table 1. Number of loggerhead nesting activities, clutches and resultant nesting success in the study area (2001 nesting season). Source: Marrugo & Vasquez (2002).

Forty-six nesting activities were counted within the study area in 2001 (Mendihuaca, Guachaca, Buritaca, Don Diego and Quintana beaches); of these only 17 resulted in egg-laying. A breakdown of nesting by study site is given in Table 1. Only two females were tagged: P4736 (CCL = 89 cm; CCW = 72 cm) and P4734 (CCL = 100 cm; CCW = 90 cm) during the 2001 season, and 71% (n=12) of the nests were transferred into protected hatcheries. Local villagers within the study area poached the other five nests. Seven nests (totalling 681 eggs) from Don Diego (n=1) and Quintana (n=6) beaches were relocated to the Don Diego hatchery. Here, the average incubation time was 47 (SD=2.19) days and the mean hatching success was 31.7% (SD= 26.49), producing 242 hatchlings of which 238 were released (Table 2). Five nests (561 eggs) collected from the beaches of Buritaca (n=1), Guachaca (n=0) and Mendihuaca (n=4) were relocated to the Buritaca – Guachaca hatchery. After an average incubation time of 48 (SD=1.58) days, the mean hatching success in this hatchery was 52% (SD=12.70), producing 258 hatchlings of which 239 reached the sea (Table 3). No data on hatch success of *in situ* nests were available during this survey due to local poaching.

The annual number of nesting females was approximated based on the number of nests laid, and dividing by an average clutch frequency of three nests

	Nests						
Caretta caretta	1	2	3	4	5	6	7
Number of eggs relocated	110	140	100	80	80	83	88
Live hatchlings	34	95	68	18	12	0	15
Hatchlings released	34	92	68	18	12	0	14
Hatching success	31%	68%	68%	23%	15%	0%	17%
Incubation period	48	47	48	48	46	50	43

Table 2. Incubation and hatching success of sea turtle nests relocated in Don Diego beach hatchery (Magdalena Department) during the 2001 nesting season. Source: Marrugo & Vasquez (2002).

per female per season (NMFS-USFWS 1998). Six (17/3 = 5.6) females in the five combined surveyed beaches were estimated. This is substantially reduced in comparison with records from the last 30 years in the Magdalena Department along the Central Caribbean coast of Colombia. We attempt to review all available literature (Table 4).

Kaufmann (1971) defined a frequency of two nests per night over 135 nights on the 7.5 km long beach of the "Buritaca Marine Turtle Nesting Reserve" between the Buritaca and Don Diego rivers – locally known as Don Diego beach – estimating a total of 270 nests or 90 females for the annual nesting season. Tufts (1972) questioned this estimate and arrived at a total of 116 nests, or 39 females for the same area in the early 1970's. At the end of the decade, Ramirez (1975) reported 12 individuals nesting in the Buritaca Reserve. Later, Muñoz *et al*. (1989) counted a total of 11 nesting females killed between the Buritaca and Don Diego rivers in 1987.

More recently, estimates over the last six years suggested that the loggerhead rookeries have been reduced to as few as between six and nine females in the 21 km area encompassing the five beaches that were considered for the 2001 nesting assessment (Pinzón & Saldaña 1999, Amorocho & Pinzón 2000, WIDECAST-Colombia Association 2001, Marrugo & Vasquez 2002).

Although the data suggest that the population has greatly decreased, care must be taken when extrapolating from nest numbers to population size (Ross 1997), particularly when information has not been gathered through a standardized and systematic method. However, the observed trends coupled with the intense ongoing consumption of nesting loggerheads and their eggs in the region indicate that the prospect for the species to recover to its historical abundance is low without profound changes being enacted.

Conservation status, under IUCN's Red List Criteria (IUCN 2001), is assessed from trends evaluated over a time period of 10 years or 3-generations, whichever is the longest (Abreu–Grobois 2001). In the case of loggerheads, the maximum lifespan for females in the wild is estimated at 62 years, including 30 years to mature with a maximum of 32 years of reproductive lifespan (Frazer 1995). Thus, the estimated generation length (maturity age + reproductive lifespan) would be 46 years. Although the data presented in this assessment fall short of the 3 generation requirement, the time span and magnitude of change in abundance are sufficient to detect a decline between 96.1% and 97.4 %, from the initial number of 700 nests, or approximately 233 females reported by Medem (1962) over the 21 km nesting area that includes the beaches monitored in 2001. This is more than adequate to justify Critically Endangered status (decline of >80% over 3 generations) for this nesting population. When data

	Nests				
Caretta caretta	**1**	**2**	**3**	**4**	**5**
Number of eggs per nest	80	97	109	105	110
Live hatchlings	56	34	52	49	62
Released hatchlings	54	30	45	49	61
Hatching success (%)	70%	35%	48%	51%	56%
Incubation (days)	46	49	47	48	50

Table 3. Incubation and hatching success of sea turtles nests relocated in the Buritaca – Guachaca beaches hatchery (Magdalena Department) during the 2001 nesting season. Source: Marrugo & Vasquez (2002). *****140 eggs relocated in the hatchery of which local villagers stole 60.

Nesting Season	*Source*	*Beaches*	*Length Km (∑)*	*Estimated no. nests (∑)*	*Estimated no. females*
1962	Medem, F. In Ramirez (1975)	Mendihuaca–Guachaca	4		
		Guachaca-Buritaca	5		
		Buritaca Nesting Reserve-	7.5		
		Quintana	5		
			(21.5)		233
1970	Kaufmann (1975)	Buritaca Nesting Reserve	7.5	91	32*
1971	Kaufmann. In Tufts (1972)	Buritaca Nesting Reserve	7.5	270	90
1971	Kaufmann (1975)	Buritaca Nesting Reserve	7.5	N/A	4*
1972	Kaufmann (1975)	Buritaca Nesting Reserve	7.5	56	44*
1972	Tufts (1972)	Buritaca Nesting Reserve	7.5	116	39
1974/5	Ramírez (1975)	Guachaca – Buritaca	5		
		Buritaca Nesting Reserve	7.5		
			(12.5)	36	12
1987	Muñoz et al. (1989)	Buritaca Nesting Reserve	6.5	2	11† + 1*
1995	Pinzón & Saldaña (1999)	Guachaca- Buritaca-	5	4	
		Buritaca Nesting Reserve	6.5	2	
			(11.5)	(6)	2
1996	Pinzón et al. (1996)	Guachaca – Buritaca	5	2	
		Buritaca Nesting Reserve	6.7	7	
			(11.7)	(9)	3
1997	Amorocho et al (1999)	Guachaca-Buritaca	5	8	
		Buritaca Nesting Reserve	6.7	8	
			(11.7)	(16)	5
1998	Pinzón & Saldaña (1999)	Guachaca – Buritaca	5	5	
		Buritaca Nesting Reserve	6.7	12	
		Quintana	5	4	
			(16.7)	(21)	7 {1*}
1999	Amorocho & Pinzón (2000)	Guachaca – Buritaca	5		
		Buritaca Nesting Reserve	6.7		
			(11.7)	9	3
2000	WIDECAST – Colombia Association (2001)	Guachaca – Buritaca	5		
		Buritaca Nesting Reserve	6.7		
			(11.7)	14	5
2001	Marrugo & Vásquez (2002)	Mendihuaca - Guachaca	4	7	
		Guachaca – Buritaca	5	1	
		Buritaca Nesting Reserve	7	1	
		Quintana	2	8	
			(18)	(17)	6 {2*}

* Tagged turtles

† Slaughtered turtles

{} Includes tagged turtles

NB The length of the Buritaca Nesting Reserve has varied through the years according to the different authors (6.5-7.5km).

Table 4. Summary of the loggerhead sea turtle (*Caretta caretta*) nesting assessments in the Magdalena Department, central Caribbean coast of Colombia (1962-2001).

Hatcheries	*1996*	*1997*	*1998*	*2000*	*2001*
Don Diego	53.3 % (n=7)	71.6 % (n=8)	65.3 % (n=12)	42.8 % (n=14)	31.7 % (n=7)
Buritaca	56.1 % (n=2)	62.6 % (n=8)	82.6 % (n=1)	No nests	No nests
Guachaca	No nests	No nests	61.2 % (n=4)	No nests	52 % (n=5)

Table 5. Hatching success per year in protected beach hatcheries of the Magdalena Department, Colombia. Source: Pinzón *et al*. (1996), Amorocho *et al.* (1999), Pinzón & Saldaña (1999), Amorocho & Pinzón (2000), Marrugo & Vásquez (2002)

gathered during this nesting assessment were compared to those of previous studies from the same area the conservation status of this species in the Magdalena region by the Colombian National Institute of Science and the Ministry of the Environment was reclassified from Endangered to Critically Endangered in the Colombian Red Book for Reptiles (Castaño-Mora 2002).

Although some attempts have been made at increasing hatching success in hatcheries, the success is not high. This is of particular concern in the case of the Don Diego hatchery (Table 5). At this site, the practice of splitting clutches appears not to have increased success, contrasting to the increased hatching success observed by Mortimer *et al*. (1994) after dividing nests of hawksbills (*Eretmochelys imbricata*) and leatherbacks (*Dermochelys coriacea*) into groups of 40 - 60 eggs in Malaysia. Other factors influencing low hatching success in the Don Diego hatchery were infestation of eggs by larvae, ants, and the relocation of eggs after periods of more than six hours following deposition.

An additional point of concern is that the nesting habitat is rapidly becoming unsuitable for loggerheads on the beaches of Don Diego and Buritaca due to natural erosion, driftwood accumulation, pollution and land development.

Despite sea turtle conservation efforts carried out by local, regional and national institutions and groups, the historical and current threats to loggerheads along the nesting shores of the study area have not been reduced. We reach the following conclusions:

1. Social and economic conditions faced by the growing numbers of local people are promoting an unsustainable use of sea turtles and their eggs.
2. New sources of income for fishermen and turtle hunters must be identified and encouraged by governmental and non-governmental agencies conducting sea turtle projects.
3. Community-based conservation approaches must be encouraged to allow institutional regulations, as well as social controls to be enforced at the local level.
4. Commitment is needed from regional environmental authorities, the Ministry of the Environment, and the National Marine Research Institute towards developing a long term monitoring program for the assessment of sea turtle nesting and feeding grounds of the Colombian Caribbean coast.
5. Current hatchery techniques should be evaluated in order to identify the causes of low success and determine the optimal conditions under which maximal hatchling production can be guaranteed. Relocating clutches to safer areas on the nesting beach (rather than to an enclosed hatchery site) has resulted in higher emergence rates and more hatchlings in other countries (e.g. Brazil: Santos *et al.* 2000).
6. The stock from which Colombian loggerheads are derived and its geographic scope within the region should be identified with genetic techniques and a more thorough tagging program. Do the individuals belong to a larger population or do they represent a unique local population? This information is valuable to conservation managers, who must recognize that adequate protection of marine turtles should encompass not only the nesting sites, but also the oceanic habitats.

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projects throughout the Western Atlantic basin.

ABREU-GROBOIS, A. 2001. Determinación de la distribución y estado de conservación de las tortugas marinas. In: K.L. Eckert & F.A. Abreu-Grobois (Ed).Conservación de Tortugas Marinas en la Región del Gran Caribe - Un Diálogo para el Manejo Regional Efectivo. WIDECAST, IUCN - MTSG,WWF,PNUMA, Santo Domingo: 105-116.

AMOROCHO, D., J. A. CORDOBA & S. MIKLIN. 1999. Current status of nesting sea turtles in the northern Colombian Caribbean. Marine Turtle Newsletter 85: 6-7.

AMOROCHO, D. & C. PINZÓN. 2000. Actualización en proyectos de conservación de tortugas marinas en Colombia, 1990-2000. WIDECAST-Colombia Association / World Wildlife Fund-Colombia. 38 pp.

CASTAÑO-MORA, O.V (Ed.). 2002. Libro Rojo de reptiles de Colombia. Libros Rojos de especies amenazadas de Colombia. Instituto de Ciencias Naturales – Universidad Nacional de Colombia, Ministerio del Medio Ambiente, Conservación Internacional-Colombia. Bogotá, Colombia

FRAZER , N. 1995. Loggerhead Sea Turtle, *Caretta caretta*. In: Plotkin, P.T. (Ed). National Marine Fisheries Service and US Fish and Wildlife Service Status Reviews for Sea Turtles Listed under the Endangered Species Act of 1973. National Marine Fisheries Service, Silver Spring, Maryland. p 2.

IUCN. 2001. IUCN Red List Categories and Criteria: Version 3.1 (9 February 2000). IUCN – The World Conservation Union. Gland, Switzerland.

KAUFMANN, R. 1968. Zur Brutbiologie der Meesschildröte *Caretta caretta caretta*. Instituto Colombo-Alemán de Investigaciones Científicas. 2:45-56.

KAUFMANN, R. 1971. Report on status of sea turtles in Colombia. Proceedings of the Second Working Meeting of Marine Turtle Specialists. IUCN Publications Supplement Papers. 31: 75-78.

KAUFMANN, R. 1975. Studies on the loggerhead sea turtle, *Caretta caretta caretta* (Linné) in Colombia, South America. Herpetologica 31 (3): 323-326.

MEDEM, F. 1962. Estudio sobre tortugas marinas: Informe sobre la comisión realizada en la costa atlántica. Corporación Autónoma Regional de los Valles del Magdalena y del Sinú. 12 pp.

MARRUGO, Y. & VASQUEZ, A. 2002. Aspectos reproductivos de la tortuga "gogo" (*Caretta caretta*) en las playas de Quintana, Don Diego, Buritaca, Guachaca y Mendihuaca, en el Caribe central de Colombia.2001.Facultad de Ciencias Básicas. Atlántico University, Barranquilla. Bachelor thesis.

MORTIMER, J.A., A. ZAID, K.SAFFE, M. DZUHARI, D. SHARMA & S. AIKANATHAN. 1994. Evaluation of the practice of splitting sea turtle egg clutches under hatchery conditions in Malaysia,. In: B.A. Schroeder and B. E. Witherington (Compilers) Proceedings of the Thirteenth Annual Symposium on Sea Turtle Biology and Conservation. NOAA Technical Memorandum NMFS-SEFSC-341: 118-120.

MUÑOZ, D., M. ALFARO, L. BLAIN, N. ANZOLA & G. GÓMEZ. 1989. Sea turtles in Buritaca - Don Diego, Colombia. Marine Turtle Newsletter 45: 20.

NMFS & USFWS.1998. Recovery Plan for U.S. Pacific populations of the loggerhead turtle (*Caretta caretta)*. National Marine Fisheries Service. Silver Spring, Maryland.

PINZÓN, C. & P. SALDAÑA. 1999. Conservación de tortugas marinas en el departamento del Magdalena, Caribe colombiano. In: Amorocho, D., Pinzón, C. & P. Saldaña (Eds). Memorias del II Seminario Internacional sobre Conservación y Biología de Tortugas Marinas en Colombia, Parque Nacional Natural Tayrona, WIDECAST-BP Conservation Programme. 72-78.

PINZÓN, C., P. SALDAÑA & D. PIÑEROS.1996. Diseño y evaluación de una incubadora para huevos de tortuga marina con fines de repoblamiento en el Caribe colombiano. Facultad de Ingeniería. Santa Marta, University del Magdalena. 74 pp.

RAMIREZ, E. 1975. Contribución al conocimiento de la tortuga "Gogo"(*Caretta caretta*) en la costa norte colombiana. Operación tortugas marinas 1974-1975. INDERENA, Bogotá. 51 pp.

ROSS, J.P. 1997. Caution urged in the interpretation of trends at nesting beaches. Marine Turtle Newsletter 74: 9-10.

SANTOS, A.S., M.A. MARCOVALDI & M.H. GODFREY. 2000. Update on the nesting population of loggerhead sea turtle in Praia do Forte, Bahia, Brazil. Marine Turtle Newsletter 89: 8-11.

TUFTS, C.E. 1972. Report on the Buritaca Marine Turtle Nesting Reserve with emphasis on Biological data from "Operación Tortuga 1972" and recommendations for the future. INDERENA. Bogotá D.E. Informe Técnico. 67 pp.

WIDECAST-COLOMBIA ASSOCIATION. 2001. Sea turtle research and conservation of loggerheads *(Caretta caretta)*. National Marine Fisheries Service-NOAA Technical Report, Cali. 13 pp.

Incidental Capture of Loggerhead Turtles (*Caretta caretta*) on Boa Vista (Cape Verde Islands)

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The sea is one of the major natural resources of the Cape Verde Islands, a small archipelago located 500 kilometers off the coast of Senegal (West Africa). This country consists of ten main islands and several islets, and possesses an Exclusive Economical Zone (EEZ) of about 734 square kilometers and a coastal perimeter of nearly 2000 kilometers. The marine shelf, whose limit is the 200 m isobath, is particularly extensive on the island of Boa Vista (Figure 1). It is likely that most of the loggerhead turtles (*Caretta caretta*) that breed in this archipelago are concentrated on this island (López-Jurado *et al*., 1999).

All commercial trawling is strictly forbidden by the legislation of the Cape Verde Islands. Experimental trawling is permitted only with the authorization of the governmental organizations (Decree law No. 17/18 and 97/87) such as the National Institute of Fishery Development and the General Direction of Fisheries (Ministry of Agriculture and Environment). However, Cape Verde is a developing country where effective control in natural resource extraction is difficult to enforce. Frequently, foreign trawlers intrude upon the EEZ in the insular shelf, particularly in Boa Vista, to catch demersal fish species (General Marine and Harbor Director, pers. comm.).

Incidental capture in trawls is a well-known cause of mortality for sea turtles and have been reported all over the world (Eckert 1995; Hillestad *et al*. 1995; Lutcavage *et al.* 1997; Márquez 2000; Oravetz 1999; Pascual 1985; Seidal *et al.* 1995). Nevertheless, there are few illustrated examples, especially when massive incidental capture occurs. Here, we graphically report on the significant ecological damage caused by a trawl net in proximity of a turtle nesting colony at the beginning of the breeding season (see front cover of this issue).

On the 15th of June 2001 (at the beginning of the breeding season), a piece of a trawl net 20 m in length and 3 m in width was found on the shore of the island of Boa Vista (As Gatas Bay: 16º 12' N – 22º 42' W). Ten loggerhead turtles were found entangled in this net. The animals were measured (Curved Carapace Length CCL, Curved Carapace Width CCW) and sexed using

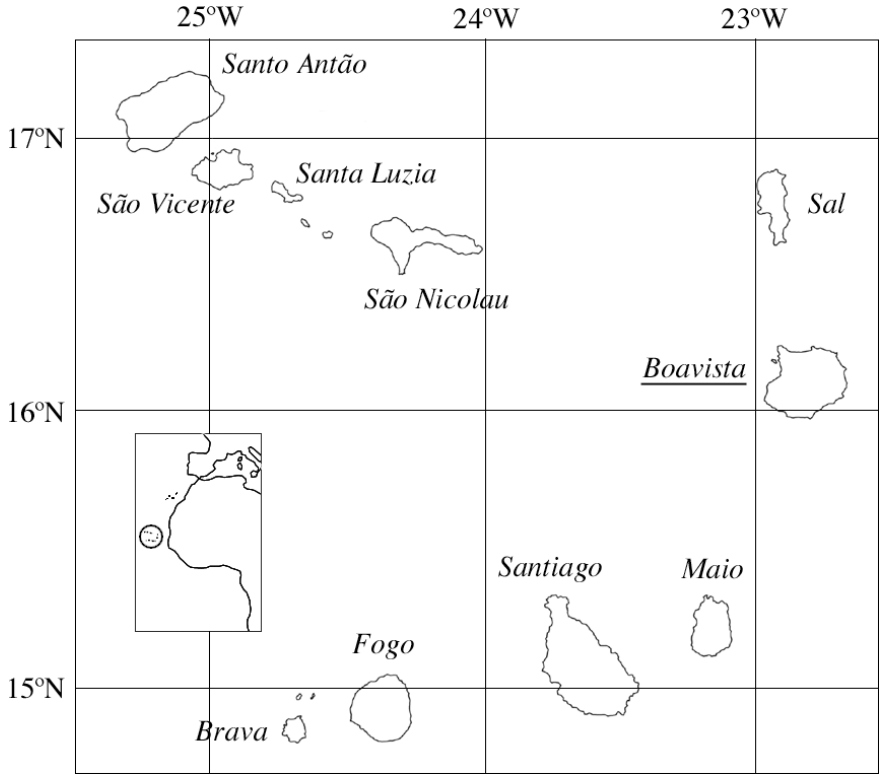

Figure 1. Map of Cape Verde Islands.

Turtle number	*Sex*	*CCL (cm)*	*CCW (cm)*	*PIT*
1	Male	89.0	83.0	
2	Male	82.0	74.0	
3	?Female	62.0	60.0	131215652A
4	Female	71.0	70.0	131115551A
5	Female	71.0	62.5	131123451A
6	?Female	69.0	66.0	131122672A
7	?Female	70.0	69.5	131164667A
8	Female	75.0	72.0	131144521A
9	?Female	68.0	66.5	Dead
10	Female	71.0	70.0	Dead

Table 1. ID number, Sex (F: female, M: male), Curved Carapace Length (CCL), Curved Carapace Width (CCW) and PIT number of the entangled loggerhead turtles.

tail length as an index (Table 1). Two nurse sharks, *Ginglymostoma cirratum* and one tope shark, *Galeorhinus galeus*, were also present in the net. Two female turtles and the tope shark were dead. The live turtles showed abrasions in different areas of their carapaces, skin and cephalic scales, apparently due to the friction from the net. We cannot be certain if the animals were victims of ghost fishing or whether some or all of the animals were captured and then discarded with the net.

Six live turtles (except both males) were PIT-tagged (Avid©) and all live turtles and sharks were subsequently released together. Four of the individuals had CCL measuring less than the smallest turtle (71.0 CCL) observed nesting on Boa Vista in the preceding 4 nesting seasons (Table 2). Thus we were not able to definitively assign sex, although we suspect all were female due to short tail length. Specimens 9 and 10 were autopsied but no developed eggs were found. The stomach was empty in one specimen and in the other several unidentified fish remains were found.

We have no information on the origin of the net, but because most animals were still alive when it was found, we suspect that their entanglement was relatively recent. It is important to note that males were encountered and that their CCL were greater than those of the females entangled. There is a popular belief in the Cape Verde Islands that the consumption of sea turtle meat, and especially the penis of the male, gives people sexual vigor. Because of this belief, males are selectively hunted by free diving in most of the islands (Cabrera *et al*., 1999). However, there are currently insufficient data to assess the influence of sex-specific turtle captures on the sex ratio of the breeding population.

		1998	*1999*	*2000*	*2001*
CCW	**Mean (cm)**	81.8	81.9	80.9	81.5
	SD	4.81	4.87	3.66	4.36
	Range	74.5-103.0	74.0-107.0	71.0-104.0	73.0-106.0
	N	74	280	593	522
CCL	**Mean (cm)**	76.8	77.4	76.3	76.9
	SD	4.57	4.19	4.60	4.48
	Range	67.0-96.0	63.0-97.0	54.2-96.0	58.0-98.0
	N	73	278	593	523

Table 2. Mean curved carapace length (CCL) and curved carapace width (CCW) of nesting females from Boa Vista Island over a 4-year study period (1998–2001).

CABRERA, I., D. CEJUDO & L.F. LÓPEZ-JURADO. 1999. Human predation on marine turtles in the archipelago of Cape Verde, western Africa. In: H. Kalb & T. Wibbels (compilers), Proceedings of the 19th Annual Symposium on Sea Turtle Conservation and Biology. NOAA-TM-NMFS-SEFSC-443, pp. 217.

ECKERT, K.L. Anthropogenic threats to Sea Turtles. 1995. In: K.A. Bjorndal (Ed.). Biology and Conservation of Sea Turtles. Revised edition. Smithsonian Institute Press, Washington D.C. pp. 611-612

HILLESTARD, H.O., J.I. RICHARDSON, C. MCVEA & J.M.WATSON. 1995. Worldwide incidental capture of sea turtles. 1995. In: K.A. Bjorndal (Ed.). Biology and Conservation of Sea Turtles. Revised edition. Smithsonian Institute Press, Washington D.C. pp. 489-495.

LÓPEZ-JURADO, L.F., I. CABRERA, D. CEJUDO, C. EVORA & P. ALFAMA 1999. Distribution of marine turtles in the archipelago of Cape Verde, Western Africa. In: H. Kalb & T. Wibbels (compilers), Proceedings of the 19th Annual Symposium on Sea Turtle Conservation and Biology. NOAA-TM-NMFS-SEFSC-443, pp. 245-247.

LUTCAVAGE, M.E., P. PLOTKIN, B. WITHERINGTON & P. L. LUTZ. 1997. Human impacts on sea turtle survival. In: P.L. Lutz & J.A. Musick (Ed.). The Biology of Sea Turtles. CRC Marine Science Series. CRC Press, Boca Raton, USA. pp 387-409.

MÁRQUEZ, R. 2000. Las tortugas marinas y nuestro tiempo. Second edition. La ciencia para todos / 144. Impresora y Ecuadernación Progreso, S.A. México, D.F. 198 pp.

ORAVETZ, C.A. 1999. Reducing incidental catch in fisheries. In: K.L. Eckert, K.A. Bjorndal, F.A. Abreu-Grobois, M. Donelly (Ed). Research and Management Techniques for the Conservation of sea Turtles. IUCN/SSC Marine Turtle Specialist Group Publication No 4. pp. 189-193.

PASCUAL, X. 1985. Contribución al estudio de las tortugas marinas en las costas españolas. I. Distribución. Misc. Zool. 9: 287-294.

SEIDEL, W.R. & C. MCVEA. 1995. Development of a sea turtle excluder shrimp trawl for the southeast U.S. penaeid shrimp fishery. 1995. In: K.A. Bjorndal (Ed.). Biology and Conservation of Sea Turtles. Revised edition. Smithsonian Institute Press, Washington, USA. pp. 497-502.

Observations on Sea Turtles in the State of Paraíba, Brazil

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Five species of marine turtle commonly occur on feeding and breeding grounds in Brazil, and the majority of regular nest monitoring efforts on the continental coast is concentrated on beaches stretching from the state of Sergipe south to the state of Rio de Janeiro (Marcovaldi & Marcovaldi 1999). Although organized monitoring has historically targeted the areas where turtles seem to be more numerous in Brazil, there is the possibility that turtles nest in lesser numbers elsewhere. Here we report sea turtle occurrences in the state of Paraíba, in northeastern Brazil.

We focused our monitoring on a narrow belt of seashore 1,800 m in length, named Mar do Macaco (in the municipality of Intermares) (7°S 34°W). This area bounded by the Jaguaribe river in the south and Ponta de Campina in the north, is in between the cities of João Pessoa and Cabedelo. The northern and southern extremes of this beach are also bounded by two coral reefs, clearly delimiting the sandy zone available for nesting turtles. The beach is backed by many residential and commercial buildings, and Intermares has a population of about 7,000 people. The local population and a variable number of tourists use the beach for many purposes, including surfing, jogging, fishing, and swimming, among others. Both cars and horses are regularly found on the beach, and at night artificial lighting from buildings and streets illuminates much of the beach.

We monitored this beach from December 2001 through August 2002 with the aid of volunteers. The protocols for fieldwork were modified from a Projeto TAMAR manual (unpublished). To organize the monitoring staff and to make their work easier, the nesting beach was divided in two halves: to the left of the "Bar do Surfista"(LSBS) and to the right of the "Bar do Surfista" (RSBS). The monitoring consisted

of daily early morning surveys to count all tracks before the tide and beach users effaced them. Nests were confirmed by verifying the presence of eggs. Each nest was marked with a unique number and 4 wooden stakes enclosed by a plastic mesh net (about 50cm high) that encompassed about $5m^2$ area around the nest. The idea was to keep animals, people and cars from trampling on the nest, and also to hold the hatchlings after emergence so they could be safely released closer to the sea. This was necessary because of the photo pollution (artificial lighting) along the seashore.

We recorded 64 hawksbill (*Eretmochelys imbricata*) nesting crawls, of which 58 were actual nests and 6 were "false crawls" (Table 1). Eleven nests were disturbed and their eggs stolen, while the 47 remaining nests hatched successfully. Of these 47 nests, 6 were not found until after emergence, when some of their hatchlings (a total of 220) were found the following morning concentrated under a streetlight.

A total of 5,492 eggs were laid within the 41 nests that were followed from laying to emergence, giving an average of 133.9 eggs/nest. Of these, a total of 4,395 live hatchlings were produced (80% overall hatching success rate, range for individual nests = 11.5% - 98.6%), while 172 dead hatchlings and 925 unhatched eggs were encountered in the nests upon post-emergence excavation.

The nesting season of the larger hawksbill population found in Bahia, Brazil runs from October until March (Marcovaldi *et al.* 1999). In Paraíba, the latest nest observed was laid on June 3 and emerged on August 15, 2002. Note that some nests could have been laid before the monitoring work started, although local fishermen report that the earliest observed nests historically have occurred in the second half of December. The peak of nesting is concentrated in February and March. The peak of nesting of hawksbills in Bahia, Brazil, is January/February, which suggests that these two nesting populations are not closely linked.

During the nesting season, we also had the opportunity to observe an adult male leatherback that had been accidentally captured by a small fishing boat on 03 April 2002 and brought to Acaú in the southern end of Paraíba. This turtle was covered by epifauna and was missing part of its right front flipper, although the wound appeared well healed. The curved carapace length was 160 cm and the curved carapace width was 106 cm. This turtle was released offshore soon after the measurements were taken. Although regular nesting of leatherbacks occurs in the southern part of Brazil (Barata & Fabiano 2002), there are relatively few at-sea observations of this species in Brazil (Sampaio 1999).

We also observed 32 dead stranded green turtles (*Chelonia mydas*) between March and November 2002 in the area between Cabo Branco in João Pessoa and Mar do Macaco, Cabedelo. All animals were measured, dissected and buried above the high tide line. The smallest turtle was 34.9 cm and the biggest was 104 cm in curved carapace length. The necropsies revealed different suspected causes of death, including drowning, intoxication and disease.

These observations of sea turtles in Paraíba suggest that expanded monitoring effort here would be a worthwhile conservation activity. This is particularly true in Mar do Macaco in Paraíba, because it is an urbanized beach with all the attendant impacts on sea turtles. As a result, we have created the non-governmental association called "Associação Guajiru: ciência – educação – meio ambiente" (Guajiru Association: Science, Education, and Environment), with the main objective to develop research in environmental conservation and education, with a focus on sea turtles and other marine and littoral fauna.

	Nests	*False Crawls*	*Disturbed nests**	*Nests discovered after emergence**
LSBS	20	4	1	2
RSBS	38	2	10	4
Total	58	6	11	6

*These nests were not included in analyses described in the text

Table 1. Hawksbill nests observed in the state of Paraiba, Brazil 2002.

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BARATA, P.C.R. & F.F.C. FABIANO. 2002. Evidence for leatherback sea turtle (*Dermochelys coriacea*) nesting in Arraial do Cabo, state of Rio de Janeiro, and a review of occasional leatherback nests in Brazil. Marine Turtle Newsletter 96:13-16.

MARCOVALDI, M. Â. & G. G. MARCOVALDI. 1999. Marine turtles of Brazil: the history and structure of Projeto TAMAR-IBAMA. Biological Conservation 91:35-41.

MARCOVALDI, M.Â., C.F. VIEITAS & M.H. GODFREY. 1999. Nesting and conservation management of hawksbill turtles (*Eretmochelys imbricata*) in northern Bahia, Brazil. Chelonian Conservation and Biology 3:301-307.

SAMPAIO, C.L.S. 1999. *Dermochelys coriacea* (Leatherback sea turtle), accidental capture. Herpetological Review 30:38-39.

Epibiotic Associates of Oceanic-Stage Loggerhead Turtles from the Southeastern North Atlantic

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Upon leaving rookery beaches in the southeastern USA, post-hatchling loggerhead turtles (*Caretta caretta*) migrate to oceanic developmental habitats in the waters of the eastern North Atlantic (Bolten *et al*. 1993; 1998; Carr 1986). Because of its proximity to the eastern edge of the North Atlantic Gyre, local sea floor topography and seasonal meteorological events, this area provides rich foraging habitats for juvenile loggerhead turtles and a variety of other oceanic organisms (Bjorndal 1997; Brongersma 1972; Carr 1986; Coston-Clements *et al*. 1991; Davenport 1992; Pouchet & de Guerne 1886; Van Nierop & Den Hartog 1984). Young turtles spend at least 6 years in these oceanic developmental habitats before recruiting to neritic habitats in the western North Atlantic (Bjorndal *et al*. 2000). During the oceanic stage, juvenile loggerheads are exposed to a wide variety of small organisms that rely upon flotsam for survival. As a result, juvenile loggerheads are often colonized by several commensal forms. The first available information on the epibionts of loggerhead sea turtles from the southeastern North Atlantic Ocean is apparently Tuckey's (1818) report of pedunculate barnacles *Lepas anatifera* and *L. membranacea* (=*Conchoderma virgatum*) from sea turtles ('*Testudo caretta*') near the Azores. Here, we tabulate a list of the epibionts associated with oceanic-stage loggerhead turtles from the southeastern North Atlantic Ocean. We present new records of epibiotic forms from oceanic-stage loggerheads from the Azores.

Turtles were captured in dipnets while floating at the surface in the waters around the Azores from March – November, 1986 -1994 (n = 17). The curved carapace length (CCL) of each turtle was recorded as the distance from the anterior edge of the nuchal notch to the posterior notch between the supracaudals (minimum mid-line CCL range= 14.6 – 62.1 cm; mean= 33.7). Epibionts were removed from turtles and preserved in either 70 % ethyl alcohol or 10 % formalin, depending upon preservative availability. Samples were placed in 500-ml polyethylene wide-mouthed bottles and labeled with the corresponding tag numbers of the host turtle. Specimens were later sorted and identified to the lowest taxon possible. Because sampling efforts for epibiota were not standardized and not all captured turtles were surveyed for epibiota, we are not able to provide information on the frequency of occurrence or density of any particular epibiont species. Nor should our list of epibionts be considered as complete for oceanic-stage loggerheads in the southeastern North Atlantic.

To our knowledge, at least 20 epibiont species or

types are present on oceanic-stage loggerhead turtles in the southeast North Atlantic (Table 1), 9 of which were previously unknown as epibionts from turtles in this region prior to our study. Ours is also the first report of gulf-weed swimming crabs (*Portunus sayi*), sea spiders (*Endeis spinosa*) and pelagic tunicates (*Diplosoma gelatinosum*) as epibionts of loggerhead turtles. The occurrence of *P. sayi* as an epibiont of *Caretta* is interesting because no other portunid crab has ever been reported as an epibiont of sea turtles. However, *P. sayi*, as well as a number of the epibionts listed herein, are commonly associated with floating *Sargassum* weed and it is not surprising that these species can exist as epibiotic associates of oceanic-stage *Caretta* as well (see Coston-Clements *et al.* 1991). Future studies will undoubtedly yield new records of epibionts associated with oceanic-stage loggerheads. Quantitative studies of the epibiota of oceanic turtles would be particularly valuable. Additionally, epibiont studies are needed from sea turtle developmental areas outside of the southeastern North Atlantic and the epibionts associated with all sea turtle species that have an oceanic life stage need documentation.

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Epibiont Species or Type	*Reference*
Arthropoda: Cirripedia: *Chelonibia caretta*	10
Arthropoda: Cirripedia: *Chelonibia testudinaria*	6
Arthropoda: Cirripedia: *Conchoderma virgatum*	1, 2, 5 & 11
Arthropoda: Cirripedia: *Lepas anatifera*	1, 5 & 11
[1]Arthropoda: Cirripedia: *Lepas anserifera*	11
Arthropoda: Cirripedia: *Lepas hilli*	2, 5 & 11
Arthropoda: Malacostraca: *Caprella andreae*	8 & 11
Arthropoda: Malacostraca: *Hyale* sp.	8
Arthropoda: Malacostraca: *Planes minutus*	4, 6, 9 & 11
Arthropoda: Malacostraca: *Podocerus chelonophilus*	3, 6, 8 & 11
[2]Arthropoda: Malacostraca: *Portunus sayi*	11
[2]Arthropoda: Pycnogonida: *Endeis spinosa*	11
[2]Chordata: Ascidiacea: *Diplosoma gelatinosum*	11
[1]Cnidaria: Hydrozoa: Unidentified Hydroid	11
[1]Algae: Bacillariophyceae: Unidentified Diatoms	11
[1]Algae: Chlorophyceae: *Chaetomorpha linum*	11
[1]Algae: Cyanophyceae: Unidentified Blue-Green Algae	11
[1]Algae: Isogeneratae: Unidentified Brown Algae	11
Algae: Rhodophyceae: *Polysiphonia carettia*	7 & 11
Algae: Rhodophyceae: *Polysiphonia* sp.	8

[1] First report as loggerhead epibiont in the region.
[2] First report as loggerhead epibiont.

Table 1. Epibionts associated with oceanic-stage loggerhead turtles from the southeastern North Atlantic. References: [1]Tuckey (1818), [2]Darwin (1852), [3]Chevreux & de Guerne (1888), [4]Milne-Edwards & Bouvier (1899), [5]Gruvel (1920), [6]Davenport (1994), [7]Rojas-Gonzalez *et al.* (1994), [8]Moore (1995), [9]Dellinger *et al.* (1997), [10]Southward (1998), [11]present study.

loggerheads in the waters of the Azores. Research in the Azores was supported by the US National Marine Fisheries Service. Leandro Bugoni and an anonymous reviewer provided helpful comments to improve the manuscript.

BJORNDAL, K. A. 1997. Foraging ecology and nutrition of sea turtles. In: P.L. Lutz and J.A. Musick (Eds.). The Biology of Sea Turtles. CRC Press, Boca Raton. pp. 199-231.

BJORNDAL, K. A., A. B. BOLTEN & H. R. MARTINS. 2000. Somatic growth model of juvenile loggerhead sea turtles *Caretta caretta*: duration of the pelagic stage. Marine Ecology Progress Series 202: 265-272.

BOLTEN, A. B., H. R. MARTINS, K. A. BJORNDAL & J. GORDON. 1993. Size frequency distribution of pelagic-stage loggerhead sea turtles (*Caretta caretta*) in the waters around the Azores and Madeira. Arquipelago 11A: 49-54.

BOLTEN, A. B., K. A. BJORNDAL, H. R. MARTINS, T. DELLINGER, M. J. BISCOITO, S. E. ENCALADA & B. W. BOWEN. 1998. Transatlantic developmental migrations of loggerhead sea turtles demonstrated by mtDNA sequence analysis. Ecological Applications 8: 1-7.

BRONGERSMA, L. D. 1972. European Atlantic turtles. Zoologische Verhandelingen, Leiden 121: 1-318.

CARR, A. 1986. New perspectives on the pelagic stage of sea turtle development. NOAA Technical Memorandum NMFS-SEFC-190, 36 pp.

CHEVREUX, E. & J. DE GUERNE. 1888. Sur un amphipode nouveau (*Cyrtophium chelonophilium*), commensal de *Thalassochelys caretta* L. Comptes Rendus Acad. Sci. Paris 88: 1-4.

COSTON-CLEMENTS, L., L. R. SETTLE, D. E. HOSS & F. A. CROSS. 1991. Utilization of the *Sargassum* habitat by marine invertebrates and vertebrates – a review. NOAA Technical Memorandum NMFS-SEFSC-296, 32 pp.

DARWIN, C. 1852. A monograph on the sub-class Cirripedia, with figures of all the species. The Lepadidae; or, pedunculated cirripedes. Royal Society, London, 400 pp.

DAVENPORT, J. 1992. Observations on the ecology, behaviour, swimming mechanism and energetics of the neustonic grapsid crab, *Planes minutus*. Journal of the Marine Biological Association of the United Kingdom 72: 611-620.

DAVENPORT, J. 1994. A cleaning association between the oceanic crab *Planes minutus* and the loggerhead sea turtle *Caretta caretta*. Journal of the Marine Biological Association of the United Kingdom 74: 735-737.

DELLINGER, T., J. DAVENPORT & P. WIRTZ. 1997. Comparison of social structure of Columbus crabs living on loggerhead sea turtles and inanimate flotsam. Journal of the Marine Biological Association of the United Kingdom 77: 185-194.

GRUVEL, J. A. 1920. Cirrhipedes provenant des campagnes de S.A.S. le Prince de Monaco (1885 – 1913). Resultants des campagnes scientifiques accomplies sur son yacht par Albert Ier, Prince Souverain de Monaco. Monaco 53: 1-88.

MILNE-EDWARDS, A. & E. L. BOUVIER. 1899. Crustaces decapodes provenant de campagnes *l'Hirondelle* (supplement) et de la *Princess-Alice* (1891-1897). Res. Camp. Sci. Monaco 13: 1-106.

MOORE, P. G. 1995. *Podocerus chelonophilus* (Amphipoda: Podoceridae) associated with epidermal lesions of the loggerhead turtle, *Caretta caretta* (Chelonia). Journal of the Marine Biological Association of the United Kingdom 75: 253-255.

POUCHET, G. & J. DE GUERNE. 1886. Sur l'alimentation des tortues marines. Comptes Rendus Acad. Sci. Paris 102: 877-879.

ROJAS-GONZALEZ, B., J. ALFONSO-CARILLO & C. IBEAS. 1994. New records of Rhodomelaceae (Rhodophyta) from the Canary Islands. Bot. Mar. 37: 133-138.

SOUTHWARD, A. J. 1998. New observations on barnacles (Crustacea: Cirripedia) of the Azores region. Arquipelago. Life and Marine Sciences 16A: 11-27.

TUCKEY, J. K. 1818. Narrative of an expedition to explore the river Zaire, usually called the Congo, in south Africa, in 1816, under the direction of Captain J. K. Tuckey, R. N. to which is added, the journal of Professor Smith; some general observations on the country and its inhabitants; and an appendix: containing the natural history of that part of the kingdom of Congo through which the Zaire flows. John Murray, London. 498 pp.

VAN NIEROP, M. M. & J. C. DEN HARTOG. 1984. A study on the gut contents of five juvenile loggerhead turtles, *Caretta caretta* (Linnaeus) (Reptilia, Cheloniidae), from the south-eastern part of the North Atlantic Ocean, with emphasis on coelenterate identification. Zoologische Mededelingen, Leiden 59: 35-54.

The First Report of Oral Tumors Associated with Fibropapillomatosis in Florida, USA

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Fibropapillomatosis (FP) is a debilitating and sometimes fatal disease found in marine turtle populations worldwide (George 1997). Although FP has recently been reported in other cheloniids (George 1997), it was first described in green turtles (*Chelonia mydas*) more than 60 years ago (Smith and Coates 1938) and is most commonly associated with this species. The disease is manifested externally by benign tumors (typically fibropapillomas) that are most often found on soft integumentary tissue (Jacobson *et al*. 1989). FP can hinder locomotion, occlude vision, and interfere with feeding and breathing (Balazs *et al*. 1997; Herbst 1994).

In the past 20 years, researchers in Hawaii and Florida have documented the occurrence and prevalence of FP in local green turtle populations (Balazs 1991; Bresette *et al*. 2002; Ehrhart *et al*. 1996; Fick *et al*. 2000; Herbst *et al*. 1999; Murakawa *et al*. 2000; Provancha *et al*. 1998; Schroeder *et al*. 1998). The only difference that had been detected in the way this disease is expressed in these two widely separated populations was that tumors were common in the oral cavities of afflicted green turtles from Hawaii but seemed to be absent in the oral cavities of afflicted green turtles from Florida (Balazs *et a*l. 1997). We present here the first two known cases of oral tumors associated with FP in green turtles from Florida.

On 28 March 1998, a live green turtle stranded on the beach at Patrick Air Force Base (Brevard County, 28º 22.5'N and 80º 36.1'W). The straight line carapace length (SCL, from the nuchal notch to the posterior marginal tip) of this turtle was 33.3 cm. It had numerous large (> 4 cm) tumors (unless otherwise specified these were always masses that were consistent in gross appearance with marine turtle fibropapilloma) on many areas of the body (but not on the eyes) and an approximately 6-cm-diameter tumor along the right side of the mouth. The attachment point of the tumor was on the dorsal surface of the oral cavity, on the soft tissue immediately posterior to the alveolar surface on the right side of the rhamphotheca. The base of the tumor was flattened and elongated so that the bulk of it rested outside the mouth and the mouth could close. This turtle was not emaciated when it was found, so we do not believe it had chronic difficulty in feeding. Because the bulk of the tumor was outside the mouth, it did not appear to interfere with breathing. The external appearance of this tumor was typical of a fibropapilloma, but it was not examined histologically.

On 5 March 2002, a live green turtle was captured at the St. Lucie Power Plant's intake canal located on Hutchinson Island in St. Lucie County (27° 22.3'N and 80° 14.9'W). The SCL of this turtle was 63.2 cm. It had numerous small (< 4 cm) tumors on many areas of the body (including the eyes) and an approximately 7-mm-diameter tumor completely inside the oral cavity. The attachment point of this tumor was on the right side of the oral cavity where the maxilla meets the mandible. The tumor did not appear to interfere with feeding or breathing. The turtle was in good condition and of normal body weight (33.0 kg). Dr. Nancy Mettee of the MarineLife Center of Juno Beach removed the entire tumor, and a sample was sent to Dr. Elliott Jacobson of the College of Veterinary Medicine at the University of Florida for histological evaluation. Dr. Jacobson reported that the histology of the tumor was compatible with FP.

The rarity of the two oral tumors reported here is significant given the large number of green turtles with FP that have been examined in Florida. The Florida Sea Turtle Stranding and Salvage Network (FLSTSSN) documented the oral tumor found in 1998. From January 1980 through July 2002, participants in the FLSTSSN examined 989 dead or debilitated (i.e., stranded) green turtles with FP in Florida. Of those turtles examined, only one (0.1%) was reported to have a tumor-like mass

in the oral cavity. Because the oral cavities of stranded green turtles may not have always been carefully and consistently examined, it may be more appropriate to consider only those green turtles that were necropsied and thus exposed to much greater scrutiny. Of the 280 green turtles with FP that were necropsied, only the one reported here (0.4%) had any findings suggestive of oral tumors.

Biologists from the sea turtle research program at the St. Lucie Power Plant documented the oral tumor found in 2002. This research program has been ongoing for more than 25 years, and more than 3000 green turtles have been captured (Bresette *et al*. 1998). Beginning in 1994, green turtles captured at the power plant were specifically examined for the presence of tumors associated with FP. When tumors were found externally on a turtle, the measurements and location of each tumor were noted and the oral cavity was examined. From January 1994 through July 2002, 127 green turtles were found with FP and only one of those (0.8%) was found to have an oral tumor.

Because oral tumors can interfere with breathing and feeding (Balazs *et al*. 1997), these two recent cases in Florida are cause for concern. Nevertheless, the occurrence of oral tumors among green turtles with FP in Florida is still far less than the occurrence of oral tumors documented for green turtles in Hawaii. (0.4%-0.8% vs. 40%-74%, respectively; Balazs 1997, Murakawa *et al*. 2000).

To better assess the frequency of oral tumors and to detect any future increase in their prevalence, it is vital that a standardized protocol for examining the oral cavities of green turtles be adopted by researchers throughout Florida. As is already practiced by some researchers, we recommend using an avian speculum to hold the jaws open and a narrow-beam light to illuminate the surfaces of the oral cavity. We also recommend using a standard search pattern to examine all the surfaces of the oral cavity.

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BALAZS, G. H. 1991. Current status of fibropapillomas in the Hawaiian green turtle*, Chelonia mydas*. In: G. H. Balazs and S. G. Pooley (Eds.). Research Plan for Marine Turtle Fibropapilloma. NOAA Technical Memorandum NMFS-SWFSC-156. pp. 47-57.

BALAZS, G. H., A. A. AGUIRRE, & S. K. K. MURAKAWA. 1997. Occurrence of oral fibropapillomas in the Hawaiian green turtle: differential disease expression. Marine Turtle Newsletter 76:1-2.

BRESETTE, M. J., J. C. GORHAM & B. D. PEERY. 1998. Site fidelity and size frequencies of juvenile green turtles (*Chelonia mydas*) utilizing near shore reefs in St. Lucie County, Florida. Marine Turtle Newsletter 82:5-7.

BRESETTE, M. J., J. C. GORHAM & B. D. PEERY. 2002. Initial assessment of sea turtles in the southern Indian River Lagoon System, Ft. Pierce, Florida. In: A. Mosier, A. Foley and B. Brost (Compilers). Proceedings of the Twentieth Annual Symposium on Sea Turtle Biology and Conservation. NOAA Technical Memorandum NMFS-SEFSC-477. pp. 271-273.

EHRHART, L.M., W. E. REDFOOT, & D. A. BAGLEY. 1996. A study of the population ecology of in-water marine turtle populations on the east-central Florida coast from 1982-96. Comprehensive Final Report to U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, 75 Virginia Beach Drive, Miami, Florida, 33149. 164 pp.

FICK, K., T. REDLOW, A. FOLEY, & K. SINGEL. 2000. The distribution of stranded green turtles with fibropapillomas in the eastern United States, 1980-1998. In: H. Kalb and T. Wibbels (Compilers). Proceedings of the Nineteenth Annual Symposium on Sea Turtle Biology and Conservation. NOAA Technical Memorandum NMFS-SEFSC-443. pp. 236-237.

GEORGE, R.H. 1997. Health problems and disease of sea turtles. In: P. L. Lutz and J. A. Musick (Eds.). The Biology of Sea Turtles. CRC Press, Boca Raton, Florida. pp. 363-385.

HERBST, L. H. 1994. Fibropapillomatosis of marine turtles. Annual Review of Fish Diseases 4:389-425.

HERBST, L. H., E. R. JACOBSON, P. A. KLEIN, G. H. BALAZS, R. MORETTI, T. BROWN & J. P. SUNDBERG. 1999. Comparative pathology and pathogenesis of experimentally induced and spontaneous fibropapillomas of green turtles (*Chelonia mydas*). Veterinary Pathology 36:551-564

JACOBSON, E. R., J. L. MANSELL, J. P. SUNBERG, L. HAJARR, M. E. REICHMANN, L. M. EHRHART, M. WALSH, & F. MURRU. 1989. Cutaneous fibropapillomas of green turtles, *Chelonia mydas*. Journal of Comparative Pathology 101:39-52.

MURAKAWA, S. K. K., G. H. BALAZS, D. M. ELLIS, S. HAU, & S. M. EAMES. 2000. Trends in fibropapillomatosis among green turtles stranded in the Hawaiian Islands, 1982-98. In: H. Kalb and T. Wibbels (Compilers). Proceedings of the Nineteenth Annual Symposium on Sea Turtle Biology and Conservation. NOAA Technical Memorandum NMFS-SEFSC-443. pp. 239-241.

PROVANCHA, J. A., M. J. MOTA, R. H. LOWERS, D. M. SCHEIDT & M. A. CORSELLO. 1998. Relative abundance and distribution of marine turtles inhabiting Mosquito Lagoon, Florida, USA. In: S. P. Epperly and J. Braun (Compilers). Proceedings of the Seventeenth Annual Sea Turtle Symposium. NOAA Technical Memorandum NMFS-SEFSC-415. pp. 78-79.

SCHROEDER, B. A., A. M. FOLEY, B. E. WITHERINGTON & A.E. MOISER. 1998. Ecology of marine turtles in Florida Bay: population structure, distribution, and occurrence of fibropapilloma. In: S. P. Epperly and J. Braun (Compilers). Proceedings of the Seventeenth Annual Sea Turtle Symposium. NOAA Technical Memorandum NMFS-SEFSC-415. pp. 265-267

SMITH, G.M., & C.W. COATES 1938. Fibro-epithelial growths of the skin in large marine turtles, *Chelonia mydas* (Linnaeus). Zoologica 23:93-98.

The First Records of Olive Ridleys in Florida, USA

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Although olive ridleys (*Lepidochelys olivacea*) occur worldwide in tropical and warm-temperate ocean waters, their distribution in the western North Atlantic is limited mostly to the northern coast of South America and adjacent waters. Regular nesting occurs only in Guyana, Suriname, and French Guiana, and the bulk of the foraging grounds are probably nearby (Reichart 1989). In rare cases, olive ridleys are known to occur as far north as Puerto Rico (Horta *et al*. 2000), the Dominican Republic (Carr *et al*. 1982), and Cuba (Moncada-G. 2000). We now report three recent records of olive ridleys from Florida. These become the northernmost known occurrences of olive ridleys in the western North Atlantic and the first reports of olive ridleys in the eastern United States. All specimens were photographed.

On 21 December 1999, a live olive ridley was found floating near Marathon (in the Florida Keys, Monroe County, 24° 41.2'N and 81° 02.1'W). It was entangled in approximately 15 kg of trawl net but otherwise appeared to be in good condition. The straight-line carapace length (CLSL, from the nuchal notch to posterior marginal tip) of the turtle was 62.6 cm. It had seven pairs of costal scutes and was presumed to be an adult male because the tail extended well beyond the carapace. The turtle was taken to a rehabilitation facility but died about a month later. The presumed sex of the turtle was confirmed during necropsy.

On 10 September 2000, another live olive ridley was found floating just offshore of Key Largo (also in the Florida Keys, Monroe County, 25° 03.9'N and 80° 28.7'W). It was missing its left front flipper, had numerous large abrasions on the left side of the carapace, and was emaciated and lethargic. The CLSL of the turtle was 66.0 cm. It had at least six pairs of costal scutes on the right side (the scute lines were difficult to distinguish in the photographs because of the carapace damage) and was presumed to be an adult male because the tail extended well beyond the carapace. The turtle was taken to a rehabilitation facility but died about ten days later. The presumed sex of the turtle was confirmed during necropsy.

On 11 October 2001, a dead olive ridley was found washed-up on the beach of Sunny Isles (just north of Miami, Miami-Dade County, 25° 54.2'N and 80° 07.3'W). It was mostly covered with tar but did not

appear to be emaciated. The CLSL of the turtle was 23.2 cm. It had seven costal scutes on the left side and six costal scutes on the right side.

The responding participants in the Florida Sea Turtle Stranding and Salvage Network (FLSTSSN) originally identified all three of the olive ridleys as Kemp's ridleys *(Lepidochelys kempii*). The authors made the correct species identifications during routine verifications of the stranding reports based on the photographs of each turtle that were submitted by the FLSTSSN participants. Fortunately, frozen samples of each turtle were saved and the revised species identifications were confirmed through genetic analysis performed at the National Marine Fisheries Service Molecular Genetics Laboratory in La Jolla, California. A 470bp sequence of the mtDNA control region was obtained from muscle tissue collected from each of the specimens using standard procedures described in Dutton *et al*. (1999). The PCR amplification was conducted using LTCM1 and HDCM1 primers (Allard *et al*. 1994). Sequences were compared with all known variants published to date for Kemp's and olive ridleys, and all three matched Haplotype F (Bowen *et al*. 1997). This confirms that these animals were Atlantic olive ridleys, since this haplotype has been found only in the Suriname, Brazil, and Guinea-Bissau nesting populations of olive ridleys and is quite distinct from the Kemp's ridley sequences.

Because the olive ridleys reported here were originally identified as Kemp's ridleys, we wondered if it was likely that olive ridleys had been found before in Florida but had not been properly identified. To answer this question, we reviewed the records of dead or debilitated (i.e., stranded) Kemp's ridleys documented in Florida since 1980 (concentrating particularly on large ridleys found in the Florida Keys or in southeast Florida during the latter part of the year). Although we cannot say with complete certainty that olive ridleys have not been found in Florida before those reported here, we are fairly confident that they have not been overlooked (especially beginning in 1990, when photographic documentation of sea turtle strandings became more common).

One of the three olive ridleys found in Florida and the only olive ridley found recently in Puerto Rico (Horta *et al*. 2000) were both entangled in fishing net. Another of the olive ridleys that was found in Florida had injuries (abraded carapace) that may have resulted from net entanglement. These cases of net entanglement highlight a conservation concern for olive ridleys in the western North Atlantic.

The olive ridley that was found washed ashore in Miami-Dade County (SE Florida) was presumed to be a pelagic-phase turtle (CLSL 23.2 cm). Pelagic-phase hawksbills (*Eretmochelys imbricata*), green turtles (*Chelonia mydas*), loggerheads (*Caretta caretta*), and Kemp's ridleys have also been found washed ashore in this part of Florida, many also covered with tar (FLSTSSN database). We believe this demonstrates that pelagic-phase turtles of at least five species share habitat offshore of southeast Florida. Another pelagic-phase olive ridley (CLSL 21.4 cm) was reported earlier from Cuba (Varona 1974), indicating at least a rare, repeating occurrence of pelagic-phase olive ridleys in this part of the western North Atlantic.

Olive ridleys and Kemp's ridleys are both found in the western North Atlantic, but within this area, their population centers are widely separated. The reported occurrences of each species of *Lepidochelys* have never clearly overlapped. Because Kemp's ridleys are regularly found in south Florida, the records of olive ridleys presented here represent the first well-documented, repeating overlap in the distribution of the two *Lepidochelys* species.

The presence of adult male olive ridleys in the eastern United States might result in some hybrids between olive and Kemp's ridleys. It may be useful to occasionally evaluate genetic samples from Kemp's ridleys to monitor for signs of such hybridization.

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ALLARD M.W., M.M. MIYAMOTO, K.A. BJORNDAL, A.B. BOLTEN & B.W. BOWEN. 1994. Support for natal homing in green turtles from mtDNA sequences. Copeia 1994: 34-41.

BOWEN, B.W., A.M. CLARK, F.A. ABREU-GROBOIS, A. CHAVES, H.A. REICHART, & R.J. FERL. 1997. Global phylogeography of the ridley sea turtles (*Lepidochelys* spp.) as inferred from mitochondrial DNA sequences. Genetica 101(3):179-189.

CARR, A. F., A. MEYLAN, J. A. MORTIMER, K. A. BJORNDAL, & T. CARR. 1982. Surveys of sea turtle populations and habitats in the western Atlantic. NOAA Technical Memorandum NMFS-SEFC-91. 98 pp.

DUTTON, P.H., B.W. BOWEN, D.W. OWENS, A. BARRAGAN & S. DAVIS. 1999. Global phylogeography of the leatherback turtle (*Dermochelys coriacea*). Journal of Zoology 248: 397-409 (1999).

HORTA, H. C., D. MOORE, R. MATOS, R. RAMOS, M. RIVERA, J. RIVERA, S. STIELOW, S. TRIPP & E. R. WILLIAMS. 2000. Olive ridley sea turtle stranded in Puerto Rico. A good example of our new rehabilitation program. In: F. A. Abreu-Grobois, R. Briseno-Duenas, R. Marquez, & L. Sarti (Compilers). Proceedings of the Eighteenth International Sea Turtle Symposium. NOAA Technical Memorandum NMFS-SEFSC-436: 270-271.

MONCADA-G., F., A. M. RODRIGUEZ, R. MARQUEZ-M. & E. CARRILLO. 2000. Report of the olive ridley turtle (*Lepidochelys olivacea*) in Cuban waters. Marine Turtle Newsletter 90:13-15.

REICHART, H. A. 1989. Status report on the olive ridley turtle. In: L. Ogren, F. Berry, K. Bjorndal, H. Kumpf. R. Mast, G. Medina, H. Reichart, and R. Witham (Eds.). Proceedings of the Second Western Atlantic Turtle Symposium. NOAA Technical Memorandum NMFS-SEFC-226. pp. 175- 188.

VARONA, L. S. 1974. Nuevo reporte de *Lepidochelys olivacea* (Testudinata: Cheloniidae) de Cuba. Poeyana Instituto de Zoologia Academia de Ciencias de Cuba 137:1-4.

Olive Ridley Sea Turtles in Porto-Novo, Tamil Nadu, India, with an Observation of an Asian Giant Softshell Turtle

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A survey of the nesting activity of olive ridley sea turtle (*Lepidochelys olivacea*) was undertaken between 22 January and 15 February 2002 on the coastline in Porto-Novo, in the state Tamil Nadu, India (11° 3' N and 79°4' E). This period corresponds to the annual migration made by adult female olive ridley turtles from more southern areas of the Indian Ocean to their main nesting sites in the state of Orissa. Some females choose to nest in Tamil Nadu and Andhra Pradesh, which lie south of Orissa (Rajashekar 1999).

The first day of the survey (22 January) revealed six stranded adult female olive ridley turtles. Four of these females had wounds apparently caused by propellers from boats.The other two stranded turtles were too decomposed to assess any injury. On 29 January a turtle emerged from the ocean and attempted to nest, but after two unsuccessful digging attempts it returned to the sea. Before it reached the water, it was intercepted for measurement and observations. This turtle had a curved carapace length of 67.0 cm, a curved carapace width of 68.5 cm, 6 pairs of lateral scutes, and 13 pairs of marginal scutes. A number of epibionts such as *Chelonibia testudinaria* were collected from the carapace of the live and stranded turtles.

Another large turtle was found stranded along the Porto-Novo coast near the mouth of the Vellar estuary: an Asian giant softshell turtle (*Pelochelys bibroni*). This species is considered to be rather tolerant of saline conditions (Pritchard 2001), and has been reported to reach the tidal limits of the sea (Das 1985). The curved carapace length of Asian giant softshell turtles can reach and occasionally surpass the size of olive ridley turtles (Pritchard 2001). Along the coast of Gahirmatha, Orissa, this species shares nesting beaches with the olive ridley, and is often seen approaching the nesting site from the sea and the river (Das 1985). In India, the Asian giant softshell turtle is normally distributed in the states of Orissa, Tamil Nadu (Mandapam) and West Bengal (Das 1985).

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DAS, I. 1985. Soft shell turtles. Indian turtles: A field guide. World Wild Life Fund- India (Eastern Region), Calcutta, 119 pp.

PRITCHARD, P.C.H. 2001. Observations on body size, sympatry, and niche divergence in softshell turtles (Trionychidae). Chelonian Conservation and Biology 4: 5-27.

RAJASEKHAR, P.S.R. 1999. Nesting activity of olive ridley, *Lepidochelys olivacea* (Eschscholtz) at important breeding habits of Andhra Pradesh coastline, India. In: H. Kalb & T. Wibbels (Eds.). Proceedings of the Nineteenth Annual Symposium on Sea Turtle Conservation and Biology. NMFS-SEFC-443. pp. 73-76.

Green Turtle with Living Tag Captured in the Southern Bahamas

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On 7 July 2001, Karen Bjorndal and Alan Bolten captured a green turtle with a living tag at their long-term study site in Union Creek, Great Inagua, Bahamas. The turtle had a straight carapace length (SCL; nuchal notch to posterior tip of longer postcentral scute) of 43.6 cm, no indication of previous tags, and an mtDNA haplotype of CM-A3. CM-A3 is the most common haplotype in the Greater Caribbean and is known to occur in nesting populations in México, Costa Rica, Aves Island (Venezuela), and Florida (USA). The living tag was slightly posterior to the center of the fourth left lateral scute. The living tag measured 2.5 by 3.8 cm. The turtle was tagged with flipper tags (primary tag: BP7586), and released at site of capture. The turtle was captured again in Union Creek on 12 June 2002 and measured 47.5 cm SCL.

In the Greater Caribbean, green turtles have been released with living tags by two programs: the Cayman Turtle Farm since 1983 (Wood & Wood 1993) and Tortugas Marinas X'caret, Quintana Roo since 1990 (Zurita *et al.* 1994). In October 1988, 1202 head-started yearling green turtles were released by Cayman Turtle Farm with a living tag in the fourth left lateral scute. In X'caret, 5039 green turtle hatchlings were released three days after hatching between July and October 1997 and an additional 130 captive-reared green turtles were released between December 1997 and March 1998 with a living tag in the fourth left lateral scute. Approximate SCL of head-started yearlings released by Cayman Turtle Farm is 29 cm (Wood & Wood 1993).

We believe it is extremely unlikely that a yearling green turtle released from Cayman Turtle Farm in 1988 with an approximate SCL of 29 cm would be 43.6 cm SCL 13 years later. The approximate growth interval from 29 to 43.6 cm SCL is about 2 years both in Union Creek (Bjorndal *et al.* 2000) and in the waters around Grand Cayman (mean growth rate 8.26 cm/yr; Wood & Wood 1993).

The turtle was almost certainly released at X'caret in 1997 as a hatchling or in 1997/1998 as a captive-reared turtle. This note is the first report of a green turtle from a rookery in México migrating to the Bahamas and is consistent with an earlier study of the genetic composition of the green turtles in Union Creek, which, based on mtDNA sequences, estimated that 5% of the green turtles were derived from México/Florida rookeries (Lahanas *et al.* 1998). Because we cannot determine whether BP7586 was released originally as a hatchling or as a captive-reared turtle, we cannot calculate growth rates or duration of the oceanic stage. The uncertainty concerning the source of this turtle underscores the need for programs that use living tags to coordinate their coding systems, as recommended earlier (Mrosovsky 1982).

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BJORNDAL, K.A., A.B. BOLTEN & M.Y. CHALOUPKA. 2000. Green turtle somatic growth model: evidence for density dependence. Ecological Applications 10:269-282.

LAHANAS, P.N., K.A. BJORNDAL, A.B. BOLTEN, S.E. ENCALADA, M.M. MIYAMOTO, R.A. VALVERDE & B.W. BOWEN. 1998. Genetic composition of a green turtle (*Chelonia mydas*) feeding ground population: evidence for multiple origins. Marine Biology 130:345-352.

MROSOVSKY, N. 1982. Editorial. Marine Turtle Newsletter 22:1-2.

WOOD, F. & J. WOOD. 1993. Release and recapture of captive-reared green sea turtles, *Chelonia mydas*, in the waters surrounding the Cayman Islands. Herpetological Journal 3:84-89.

ZURITA G., J. C., R. HERRERA P. & B. PREZAS H. 1994. Living tags in three species of sea turtle hatchlings in the Mexican Caribbean. In: B.A. Schroeder & B.E. Witherington (Compilers). Proceedings of the Thirteenth Annual Symposium on Sea Turtle Biology and Conservation. NOAA Technical Memorandum NMFS-SEFSC-341. pp. 273-277.

Second Record of a Green Turtle (*Chelonia mydas*) Tagged in Brazil and Captured in Nicaragua

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A green turtle (*Chelonia mydas*) bearing flipper tag BR7440 from the TAMAR Brazilian sea turtle project was captured in a turtle net off the central Caribbean coast of Nicaragua in late 2001. The turtle was originally double flipper tagged with monel tags and released on 8 June 1994, after incidental capture in a wooden fishing weir ("curral de pesca") off Almofala Beach (2°50'S, 40°09'W), State of Ceará, Brazil. When originally tagged the turtle measured 98 cm curved carapace length (CCL, nuchal notch to posterior tip) and 88 cm maximum curved carapace width, and had several tumour like masses on the neck and all four flippers.

A legal green turtle fishery is conducted by several indigenous and ethnic groups in Nicaragua as a source of income and protein (Lagueux 1998). The turtle was captured by Donald Marti, a Miskitu fisher from the indigenous community of Walpa. Because Mr. Marti was not at home when one of us (CJL) visited the community we can only report that the turtle was captured in the general area of 13º01'N and 83º24'W and was dead by 16 December 2001, the date we received the tag from his wife.

The Almofala region is a foraging area for green turtles (Lima 2001) ranging in CCL from 27 to 132 cm, and there is an ongoing mark-recapture study in the area in collaboration with fishers. Tag recoveries both in and away from this site reveal some of the complexity of the interactions among different breeding populations. This is the second record of a green turtle tagged at Almofala, Brazil and subsequently captured off the Caribbean coast of Nicaragua (Lima *et al.* 1999), and another green turtle tagged at Almofala was recovered in Trinidad (Lum *et al.* 1998). Green turtles tagged while nesting at Ascension Island and Suriname have been recovered in the Almofala region and elsewhere in northeastern Brazil (Carr 1975; Mortimer & Carr 1987; Pritchard 1973; Schulz 1975). Furthermore, a green turtle tagged in March 1999 on the nesting beach at Tortuguero, Costa Rica, and last seen on that beach in April 1999, was found dead in February 2001 in the municipality of Fortaleza, Ceará, about 200 km east of Almofala (Lima & Troëng 2001). Together these data suggest a link between green turtle populations of the western South Atlantic Ocean and Caribbean Sea.

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CARR, A. F. 1975. The Ascension Island green turtle colony. Copeia 1975: 547-555.

LAGUEUX, C.J. 1998. Marine turtle fishery of Caribbean Nicaragua: human use patterns and harvest trends. Doctoral dissertation, University of Florida, Gainesville, FL, USA. 215 pp.

LIMA, E.H.S.M. 2001. Helping the people help the turtles: the work of Projeto TAMAR-IBAMA in Almofala, Brazil. Marine Turtle Newsletter 91: 7-9.

LIMA, E.H.S.M., C.J. LAGUEUX, D. CASTRO W. & M.Â. MARCOVALDI. 1999. From one feeding ground to another: green turtle migration between Brazil and Nicaragua. Marine Turtle Newsletter 85: 10.

LIMA, E.H.S.M. & S. TROËNG. 2001. Link between green turtles foraging in Brazil and nesting in Costa Rica? Marine Turtle Newsletter 94:9.

LUM, L.L., E.M. LIMA & A. SANTOS. 1998. Green turtle tagged in Brazil recovered in Trinidad. Marine Turtle Newsletter 82: 9.

MORTIMER, J.A. & A. CARR. 1987. Reproduction and migrations of the Ascension Island green turtle (*Chelonia mydas*). Copeia 1987: 103-113.

PRITCHARD, P.C.H. 1973. International migrations of South American sea turtles (Cheloniidae and Dermochelyidae). Animal Behaviour 21: 18-27.

SCHULZ, J.P. 1975. Sea turtles nesting in Surinam. Zoologische Verhandelingen (Leiden) 143: 3-172.

When a Turtle is Worth a Hook

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Incidental capture by fishing gear is recognized as one of the most important threats to marine turtle populations. Apart from the mortality due to interaction with the fishing gear alone, the fisherman may intentionally kill the turtles captured. This behavior is known to be motivated by a number of different reasons such as: trade, personal use, and even antagonism and superstition. New legislation, enforcement of existing laws, and awareness campaigns are the solutions currently adopted to solve this problem. In Italy, turtles were often killed for local use in the past, but this phenomenon has basically disappeared in more recent times, thanks to specific national legislation (since 1980 capturing, holding, transporting or trading in sea turtles has been illegal by a ministry decree: Decreto Ministero Marina Mercantile 21/05/1980) and to long-term awareness campaigns (Argano 1992). So, in Italy intentional killing is thought to be a problem of the past, and the issue of fishery-induced mortality is approached as a problem of fishing effort, gear characteristics, gear use, and onboard procedures to reduce post-release mortality (the usual practice is to release turtles with the hook and part of the branch line still in the mouth or digestive tract which is potentially lethal). However, here we report evidence that another factor may make intentional killing an important problem in the present and in the future.

Within the framework of an onboard observation program, collaboration was established with drifting longline fishermen of a harbour in the eastern (Ionian) coast of Sicily (south Italy). In recent years these fishermen have adopted a new type of hook, which is rather expensive (about € 1.50 each) in comparison with the previous one (about € 0.25 each). While in the past they didn't care much of the loss of hooks, now they feel the need to limit it to minimum. In order to recover these expensive hooks they now cut the turtle's throat, so killing the animal, a behavior both described by the fishermen and directly observed by one of us (G.C.). This behaviour is driven by economic reasons and not by ignorance or prejudice. In fact, fishermen are aware of the protected status of the species and do not show a particular antagonism towards these animals. Since economic optimization of fishing activity is a fundamental rule for any fisherman, it is likely that this kind of intentional killing occurs whenever recovering the hook is economically favorable.

Long line fishing is known to catch a large number of turtles in the Mediteranean (Gerosa & Casale 1999) and it probably represents a serious threat in other regions too (e.g. NMFS 2001), so that a diffusion of expensive hooks, if associated with intentional killing, would be reason of further concern on the impact of this fishing gear on sea turtle populations. This problem is of acute concern given the apparent lack of available solutions. As a result of the economic nature of the problem, an awareness campaign would be not the proper tool to address it and enforcing the legal protection of turtles on vessels on the open sea is unrealistic. Probably, the only possible solution in this case is to prevent hooks becoming so valuable, thus removing the need of intentional killing. To ensure fishermen use cheaper hooks is a difficult task, and different solutions may be explored (e.g. a new hook, intrinsically cheaper and equally effective), but certainly any annoying restrictions should be avoided, in order not to induce ill-will among fishermen.

In conclusion, it seems there is an urgent need for an assessment of the use of expensive hooks, the behaviour of fishermen using them, and the possible effective solutions to the problem.

ARGANO, R. 1992. Sea turtles and monk seal in Italian seas: conservation and perspectives. Bollettino Museo Istituto Biologia Università Genova 56-57:113-135.

GEROSA, G. & P. CASALE. 1999. Interaction of marine turtles with fisheries in the Mediterranean. UNEP/MAP, RAC/SPA, Tunis. 59 pp.

NMFS. 2001. Stock assessments of loggerhead and leatherback sea turtles and an assessment of the impact of the pelagic longline fishery on the loggerhead and leatherback sea turtles of the Western North Atlantic. U.S. Department of Commerce NOAA Technical Memorandum NMFS-SEFSC-455. 343 pp.

Possible Factors Leading to Non-Occurrence of 'Arribada' at Gahirmatha, Orissa, India in 2001-02

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Gahirmatha is one of the world's most important nesting ground for the olive ridley sea turtle *Lepidochelys olivacea* and the largest rookery for the species in Asia (Bustard 1976). This species nests *en mass* in events termed "arribadas" or "arribazones" which in Gahirmatha occur in the period January to May (Dash & Kar 1990; Kar & Bhaskar 1982). Normally the main arribada occurs for a brief period extending for up to seven days, although additional sporadic nesting occurs throughout the period. Diffuse nesting by olive ridley turtles is recorded all along the Orissa coast, but mass nesting occurs at variable sites in Gahirmatha, Devi River mouth and Rushikulya. In Gahirmatha, the most important nesting areas are currently 2- 3 km of beaches on shifting uninhabited sand bar islands (Nasi-1 and Nasi-2). The Nasi Islands were formed from a 5 km spit that extended from the main Gahirmatha beach and are now situated very close to the permanent Wheeler Islands. For a detailed review of study site and past nesting see Pandav (2000), Chadha and Kar (1999)

During the turtle season 2001-02, mass nesting of olive ridley turtles did not take place, although large numbers of these turtles were located near the Nasi Islands between November 2001 and March 2002. This was not the first time that mass nesting had not occurred at Gahirmatha, with no arribadas having been recorded in the seasons of 1985-86, 87-88, 96-97 and 97-98 (Chadha & Kar 1999; Dash & Kar, 1990).

The factors which have been suggested as triggering the arribada for olive ridleys at Gahirmatha include the presence of: 1. strong southerly winds; 2. receding tide in the period between full moon and new moon; 3. dry beach conditions i.e. sand unaffected by either rain or tidal inundation (Dash & Kar 1990).

In January 2002, large numbers of turtles were seen congregated in front of Ekakula (the mainland beach at Gahirmatha, adjacent to the river mouth, where nesting used to occur) within 2 km of the shore over an area of approximately 4 km^2. It is presumed that these turtles were awaiting the correct environmental conditions to stimulate nesting.

On the 25th January, test firing of missiles was carried out from the outer Wheeler Islands, which may have had an effect on the aggregating turtle less than 2km away. Additionally, on the 28th and 29th of January, heavy rain fell (a total of 22 mm and 13 mm were recorded at the nearby Dangmal station within Bhitarkanika National Park on the two days, respectively). It is plausible that either of these factors may have deterred arribada nesting at that time. The period between 1st and 7th February was considered to be highly favorable for mass nesting in view of the high concentration of turtles close to the nesting beach and this being the period of receding tide. Many female turtles were found crawling up the beach only to return without nesting.

At the following full moon on 27th February, most of the nesting beach at Nasi-1 and Nasi-2 islands was inundated with tidal waters, again rendering a significant part of the beach unsuitable for nesting.

Another major development is that the Nasi Islands have shifted significantly and have almost become a part of the Wheeler Islands. Nasi-2 was in fact approachable by humans on foot from Outer Wheeler Island even at high tide. Several dogs from Outer Wheeler Island were found on the nesting beach of Nasi-2 feeding upon dead turtles that had stranded and turtle eggs laid during sporadic nesting activities. Measures were subsequently taken to eliminate these dogs with the help of defence personnel stationed at Outer Wheeler Island.

The non-occurrence of any arribada at Gahirmatha is a cause for concern. The failure could be due to any or a combination of the reasons above or some as yet undetected factor. My opinion is that while factors such as missile testing, light pollution, dog menace and untimely rain may aggravate the situation, the primary reason is the geomorphological changes undergone by the Nasi Islands. As these islands get closer to main Wheeler islands, the probability of mass nesting may be reducing even further. It should be noted, however, that the gradual emergence of another island to the seaward aspect of Nasi-1 Island may offer a ray of hope for the future.

Acknowledgements: I would like to thank the staff of Mangrove Forest Division (Wildlife); Rajnagar, who have assisted me wholeheartedly in collecting the data pertaining to above study. I am also extremely thankful to the MTN Editors and an anonymous reviewer for having made valuable contributions to the improvement of this manuscript.

BUSTARD, H.R. 1976. Tigernotes: World's largest sea turtle rookery? Tiger Paper, 3(3); 25

KAR, C.S. & S. BHASKAR. 1982. The status of sea turtles in the east Indian Ocean. In: The biology and conservation of sea turtles. Bjorndal, K.A. (ed). Smithsonian Institution Press, Washington DC; 365-372.

DASH, M.C. & KAR, C.S. 1990.*The Turtle Paradise-Gahirmatha.* Interprint, New Delhi, 1990, p. 295

CHADHA, S., KAR, C.S. 1999. Bhitarkanika, Myth and Reality. Nataraj Publishers, Dehradun. India.

PANDAV, B. 2000. Conservation and management of Olive Ridley sea turtle (*Lepidochelys olivacea*) population along the Orissa coast. Ph.D. Thesis, Utkal University. Bhubaneswar, Orissa, India. 116pp.

MEETING REPORTS

President's Report on The 23rd Annual Symposium on Sea Turtle Biology And Conservation

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The 23rd Annual Symposium on Sea Turtle Biology and Conservation was held between 17 and 21 March 2003 at The Legend Hotel in Kuala Lumpur, Malaysia, hosted by the Community Conservation Network, Hawaii, and WWF-Malaysia. The meeting was attended by slightly more than 300 participants representing 73 countries, a dramatic drop in participation from previous years brought about in no small part by the looming war in the middle east region and concerns over travel safety. For 22 years the Symposium had been based in North America, even though it is the annual gathering of the "International" Sea Turtle Society, and with the move to Malaysia, the Symposium hoped to raise the awareness among the general public of the plight of marine turtles in Southeast Asia, and share the enormous expertise of the world authorities on sea turtles with this so-far underrepresented region. Adopting the theme, "Living With Turtles", the Symposium had a very personal flavour, and the smaller number of participants made it possible to make and renew acquaintances, and have time for discussion between sessions. It was a pity, particularly to the large contingent of people who attended the event for the first time from underrepresented regions, that many of the household names linked to marine turtle biology and conservation were not present to share their knowledge and promote the global concerns on the plight of turtle populations.

The venue was ideal for the event, and the staff were attentive and keen to assist in bringing together what resulted in being a seamless event right from the very beginning. Notwithstanding the typically-higher price range of the hotel for Malaysian standards, the management were extremely flexible in pricing their services, food and beverage at reasonable costs to accommodate and even lower the typical prices encountered at several previous venues. I believe the room costs (USD 45 per night) and food costs (circa USD 10 per day) in many ways offset the higher travel costs encountered by a large percentage of the participants.

The Symposium also included a number of side events, including the 10th Annual Reunion of Latin American Specialists (MTN 101: 37), the 2nd Meeting of Mediterranean Specialists (MTN 101: 38-39), the Second Reunion of African Sea Turtle Biologists (MTN 101:40) and the first meeting of the Advisory Committee to the Memorandum of Understanding on the Conservation and Management of Marine turtles and their Habitats of the Indian Ocean and South East Asia (IOSEA MoU) (MTN 101:40). There was also a special lunch session on Freshwater Terrestrial Chelonians (MTN 101:39) to take advantage of the location to address regional issues on trade, a discussion session on the interactions between fisheries and marine turtles (MTN 101:34), and the annual meeting of the IUCN

Marine Turtle Specialist Group (MTSG).

The Special Session this year was entitled "Indigenous Cultures and Marine Turtles" and was an attempt to bring together people from different ethnic backgrounds for whom turtles have a religious or cultural significance, and to address the issue of use versus conservation, or even their coexistence, providing time for discussions among the varied and opposing viewpoints (MTN 101:33-34). An additional major component of the educational aspect of the Symposium was the Tagging and Telemetry Workshop (MTN 101: 35-36).

Given the impending threat of war in the middle east region, many participants cancelled their registration and many more simply did not attend, creating a major problem in the development of the programme. Therefore, shortly before the event started, the committee completely rebuilt the programme to do away with the numerous gaps created by the cancellations. In the end we showcased over 70 oral presentations and 158 posters, and many parts of the world were represented for the very first time at the event. In an effort to maintain some of the standards that had been set during previous meetings, simultaneous translation was provided from Spanish to English and vice-versa during the entire event.

As occurs each year, the student awards competition again attracted a significant number of participants. The results of the student awards competition were as follows: Biology paper runner up - Fulvio Muffucci, Zoological Station of Naples: "Trace elements accummulation and tissue distribution in loggerhead turtles from the Western Mediterranean Sea". Biology paper winner - Rusty Day, College of Charleston: "Mercury in loggerhead sea turtles in the southeast US: assessing health impacts and developing monitoring strategies". Biology poster winner - Eduardo Amir Cuevas Flores, Universidad de Merida: "Mapping and characterizing foraging habitat of immature hawksbill turtles in front of the biosphere reserve Ria Lagartos, Yucatan, Mexico". Conservation paper winner - Yianna Samuel, Cornell University: "Underwater noise and anthropogenic disturbance in critical sea turtle habitat". Conservation poster winner - Cathi Campbell, University of Florida: "Assessment of the Tortuguero, Costa Rica green turtle population". I would like to take this opportunity to once again congratulate all the winners for the outstanding contributions.

This year the Society was the recipient of a number of grants from various organizations and foundations. The Symposium managed to attract USD 127,000 in funding to support travel awards, the costs of hosting the event, and the simultaneous translation services. Support for this symposium came from many sources, reflecting the diverse nature of the group the international sea Turtle Society has become: the NOAA /National Marine Fisheries Service Southeast Fisheries Science Center and Office of Protected Resources, the David and Lucille Packard Foundation, the Western Pacific Fisheries Management Council, Fisheries and Oceans Canada (Science Branch), the World Wide Fund for Nature (UK), the Global Green Fund, RARE Center, the ASEAN Regional Centre for Biodiversity Conservation, the Homeland Foundation, and the Convention on Migratory Species.

While the final figures are still being compiled, in addition to the funds raised through grants, the Symposium also had some 35,000 to 40,000 in income from registration fees, sales and auctions, for an approximate total of circa USD 163,000, and experienced costs in the region of USD 148,000. I expect that when all is tabulated the Symposium will have contributed a sum of over USD 10,000 to the Society's accounts, although we await the final report from our Treasurer.

Another initiative that took place during the 23rd STS was a membership drive for the International Sea Turtle Society, which is currently undergoing the transition from Annual Symposium to Society. Membership in the Society will provide voting privileges and discounts on registration fees for the annual symposia. Fees will also go toward supporting the *Marine Turtle Newsletter*, which is a key information dissemination avenue for Society-related announcements and reports. I would encourage all who have not done so to sign up as members through the <SEATURTLE.ORG> website.

Finally, I would like to take this opportunity to thank once again the people who made this event possible through their contributions in time and dedication: Michael Coyne, who made the website available; Sam Sadove and Kartik Shanker for putting together the program; Brendan Godley and Matthew Godfrey for arranging the Tagging and Telemetry Workshop: Chuck Shaffer for arranging the Freshwater Tortoise session; Paolo Casale for putting together the discussion session on Fisheries/Turtle Interactions; and Jeff Seminoff, Ana Barragan, Karen Eckert, Alan Bolten, Annette Broderick, Brendan Godley, and Angela Formia for getting all the travel awards out to those in need. A great deal of appreciation goes to Ed Drane for helping keep accurate control of our finances, and to Manjula Tiwari, Leslie du Toit, Anny Chaves and Herda

Hutabarat for translating all the announcements. Finally, I'd like to thank Matthew Godfrey, Kartik Shanker and Lisa Campbell for helping arrange the Use Session, which was a highlight of the event.

I am certain that our new President, Rod Mast, will do an excellent job and put together a wonderful symposium. The annual gatherings of our membership are a highlight of the year and also an important opportunity for us to share our ideas, knowledge and experiences. However, the Society should not limit itself to just meeting once a year. Both Rod and I have committed to developing plans for an expansion of the Society's roles, and we welcome any feedback from the membership.

Finally, for me personally, putting together this Symposium was a wonderful experience. A significant addition to my workload, but an unforgettable experience nonetheless. I got to meet many new people, make many new friends, and generally felt it was a constructive effort and extremely rewarding. Given the nature of people who work with marine turtles, many of whom are personal friends of mine, this is not that hard to understand. I look forward to meeting as many of you as possible at our next venue in Costa Rica. I am sure it will be another memorable event!

Travel Grants to Attend the 23rd Annual Symposium on Sea Turtle Biology and Conservation in Kuala Lumpur, Malaysia

Jeffrey A. Seminoff

NOAA – National Marine Fisheries Service, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive, La Jolla, California 92037, USA

The 23rd Annual Symposium on Sea Turtle Biology and Conservation has come and gone and we can look back on another successful meeting. This was the second time that the Symposium was held out of the United States and as usual, it lived up to the standard of excellence we've all come to expect.

Thanks to the generous support of the David and Lucile Packard Foundation, Homeland Foundation, World Wildlife Fund, Western Pacific Fishery Council, Sea Turtle Society, Convention on Migratory Species, RARE Foundation, Global Greengrants Fund, and National Marine Fisheries Service we were able to provide travel grants to 109 symposium participants from 67 countries from around the globe. These travelers authored or co-authored over 130 oral and poster presentations (over 50% of the paper and poster presentations!).

Managing the travel grants is an enormous task and fortunately we have a tremendous team that makes up the travel committee. This year's committee included Ana Barragan, Alan Bolten, Annette Broderick, Karen Eckert, Angela Formia, Brendan Godley, and Nicolas Pilcher. Each volunteered countless hours and deserves special recognition and appreciation from all the grant recipients along with everyone else who enjoyed and benefited from the international participation. In addition to the travel committee there were a number of individuals that greatly helped in the granting and travel organizing process: Ed Drane, our perennial fiscal guru and symposium treasurer helped all along the way, keeping us on track, and providing valuable behind-the-scenes assistance. Michael Coyne managed the website and travel grant database and continued to refine the entire process, making the application and award process easier for us all. Kartik Shanker, the Symposium Secretary, help in numerous ways, enabling us to make this symposium the best it could be. Finally, the biggest thanks goes to Dr. Nicolas Pilcher. Not only did Nick serve as Symposium President; he was also the Asia/Pacific Travel Chair, and perhaps most importantly, he was the primary grant writer, and thus directly responsible for getting such a large number of participants from around the world to come to Kuala Lumpur. As Travel Committee Chair, I would like thank everyone, especially Nick, for the countless hours they contributed to make this such a special event. We all benefited from your involvement in many ways!

Report from the "Research on Use" Session at the 23rd Symposium on Sea Turtle Biology and Conservation, Kuala Lumpur, Malaysia

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Use of sea turtles, both consumptive and non-consumptive, exists worldwide. Whether we wish to eliminate it, manage it, or promote it, we first need to understand it, like any other aspect of sea turtle conservation. Consumptive or direct use of sea turtles is a contentious subject, and support or opposition to it is a major dividing line for many people involved in sea turtle conservation (Richardson 2000). Nonconsumptive or indirect use is also a major issue in sea turtle conservation, and is often invoked (in the form of ecotourism) as a means to afford ongoing protection of different populations of nesting sea turtles (e.g. Hirth *et al.* 1993). Despite its importance, and possibly due to passions evoked by it, utilization has never been broached as a session theme during annual sea turtle symposia. In March 2003, in Kuala Lumpur, we were given the opportunity to hold a session devoted to use.

Our intention was to focus on what can be learned from research on use, and build on infrequent papers presented at previous symposia. We wanted to bring a variety of disciplinary perspectives to the session, as use has important biological, legal, economic, social, cultural and political components and impacts. With this in mind, we invited a wide range of speakers to discuss their studies and results related to both consumptive and non-consumptive use.

The following presentations were made.

- Grahame J.W. Webb led off the session, presenting results of research on sustainable use of species other than marine turtles, and suggesting how these results may be instructive in some situations for marine turtles.
- Perran Ross presented biological data on green turtles that had been captured by local small scale fishermen in coastal Arabia, and discussed the nutritional importance of green turtles for local diets.
- Lisa M. Campbell discussed the economic impacts of non-consumptive use (and difficulties of measuring these) associated with two sea turtle projects in Caribbean Costa Rica that differ in both scale and size.
- Sali J. Bache traced the meaning of "sustainable use" as used in international instruments and conventions.
- Sue Ranger discussed the methodological challenges associated with measuring the socio-economic value of sea turtle use in UK overseas territories in the Caribbean using a standardized survey.
- Michael Guilbeaux discussed an ongoing effort to assess the social and biological impacts of the use of hawksbills in the Republic of Palau.
- Brendan J. Godley discussed historical harvests of green turtles on Ascension Island and the present day impacts and responses of the population.
- Charlie Manolis presented an overview of the results of the research involved with the ongoing hawksbill fishery in Cuba.

The presentations were followed by an open-floor discussion. To set the stage for this, we had asked two people (Jack Frazier and Kartik Shanker) to act as formal discussants, by briefly responding to the ideas presented in the session. Following their responses, general comments and questions were invited from the entire audience, and presenters were given the opportunity to respond. Due to time constraints, and perhaps because people were unfamiliar with the format (an unusual one for the symposium) the overall discussion was short. In the following days, however, we encountered a variety of reactions to the session, ranging from support to opening the discussion on use, to disappointment that the topic was included in a 'conservation' forum. As one of our aims was to facilitate further reflection on utilization as a topic for research, thereby leading to greater understanding, any kind of reaction (both positive and negative) was indicative of success.

Acknowledgements: We are grateful to Nick Pilcher for supporting our initiative and ensuring that all these papers were presented in one block of the symposium. We thank all the presenters and discussants, and those who were invited

to participate but could not attend the symposium for various reasons: George Balazs, Selina Heppell, Jon Hutton, Wallace J. Nichols, Pamela Plotkin, Robin Sharpe, and Jeanette Wyneken.

HIRTH, H. H., J. KASU, & T. MALA. 1993. Observations on a leatherback turtle *Dermochelys coriacea* nesting population near Piguwa, Papua New Guinea. Biological Conservation 65:77-82.

RICHARDSON, P. 2000. Obstacles to Objectivity: First Impressions of a CITES CoP. Marine Turtle Newsletter 89:1-4.

Discussion Forum: "*Reducing fishing-induced sea turtle mortality – Available methods for large scale campaigns*", at the 23rd Annual Symposium on Sea Turtle Biology and Conservation, Kuala Lumpur

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As part of the 23rd Annual Symposium on Sea Turtle Biology and Conservation a one-hour meeting took place, organized by Paolo Casale (acting as moderator), Luc Laurent, Bojan Lazar (acting as rapporteurs), Dimitris Margaritoulis and Jesus Tomas, within the framework of the Starter Project *Reduction of the impact of the EU fishery on Mediterranean sea turtles*, funded by the EU. A total of 34 persons from 20 countries attended the meeting.

The *Discussion Forum* was opened by introducing its aims. Although conceived in the context of the Project above, the meeting aimed to share experiences and get inputs from people involved in sea turtle bycatch issues worldwide. Based on the need of urgently applying available knowledge for reducing sea turtle mortality in fisheries, in parallel with carrying out research projects to provide new knowledge and measures for the future, the Discussion was focused on the actions and measures already available for reducing fishery-induced mortality which could be promptly implemented on a large-scale. Trawl and longline fisheries have been recognized as two widespread fisheries with a potentially high impact on sea turtle populations that could be addressed by such means. So, as a first approach, the participants prepared lists of possible measures to reduce the impact of these two fishing gears on sea turtles.

The Turtle Excluder Device (TED) was proposed as an available tool. However, since TED is not suitable for every trawl fishery (especially in relation to the target species) and introducing it in a new fishery requires specific projects for its evaluation, possible modification, and legislation, it was not considered among the readily available measures which were the object of this meeting.

For trawlers the following measures were identified: reduction of the height from which the codend is opened on the deck, education of fishermen in recognizing the signs of life of captured turtles, education of fishermen in procedures for on-board treatment of turtles in a comatose state, and enforcing and promoting existing fishery regulations. For longliners the identified measures were to provide fishermen with tools (dip-nets to bring turtles onboard, de-hooking devices, and line-cutters) in concert with the provision of information on how to reduce post-release mortality, by using these tools and other methods.

Since providing fishermen with information appeared to be a fundamental action for both the above fishing gears and since it was recognized that much of the success of such actions depends on how the information is given, means to provide fishermen with information were identified: approaching fishermen through their own national and/or local organizations; direct contacts with fishermen; wide educational campaigns (through mailing, mass-media, etc.); approaching fishermen through key-persons in harbors.

An interesting discussion on all these items was generated. For instance, it was suggested that some measures theoretically valid at a first approach, may actually be counter-effective if evaluated. However, because of lack of time it was decided to continue this constructive discussion through e-mail.

To be included in the discussion group send an e-mail to:
<seaturtlesandfisheries-subscribe@yahoogroups.com>

Report from the Tagging Workshop at the 23rd Symposium on Sea Turtle Biology and Conservation, Kuala Lumpur, Malaysia

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Marking or tagging sea turtles is a cornerstone of many conservation and research projects. Being able to recognize and follow individual turtles can provide details on many aspect of chelonian life history including migration, growth, age at maturity, and reproductive behaviour (Balazs 1999). The application of tags is so common in sea turtle monitoring programs that there have been suggestions that some tagging is mere "reflex" (e.g. Mrosovsky 1982). Nevertheless, tagging sea turtles has and will continue to reveal a wealth of information regarding sea turtles.

The diversity in types and applicability of tags for sea turtles has grown in recent years, and in order to facilitate a sharing of knowledge and experience amongst the sea turtle conservation community, a workshop on tagging was held during the annual International Sea Turtle Symposium (17-21 March 2003) in Kuala Lumpur, Malaysia. For this particular workshop, we concentrated on the three most commonly used types of tags: metal alloy flipper tags, internal Passive Integrated Transponder (PIT) tags, and Platform Terminal Transmitters (PTTs), otherwise known as satellite tags. Other types of tags (e.g. living tags, internal chemical tags, or genetic tags) were not discussed, due to time and logistic constraints. In addition, analysis of tagging data (including estimating and accounting for tag loss) was given only cursory recognition at this workshop; future fora should address these important issues.

The workshop was divided into two main parts: the first half was moderated by Brendan Godley and included overview presentations by Duncan Limpus (metal flipper tags), Matthew Godfrey (PIT tags), and Catherine McClellan (PTTs on hardshells), with supplemental information from Brendan Godley (on behalf of Scott Eckert and Graeme Hays), Steven Morreale and Anders Rhodin (PTTs for leatherbacks). The second half of the workshop included 8 different stations for hands-on demonstrations. Catherine McClellan, Nicholas Pilcher, Wendy Cluse and Jeff Seminoff demonstrated general methods for the adhesive application of PTTs directly to hard-shelled turtles while Brendan Godley demonstrated a harness-type attachment of a PTT for leatherbacks. Larisa Avens, Michael Coyne and Matthew Godfrey explained the two main types of PIT tags and scanners (Trovan and Avid-Destron), and participants were able to inject/scan PIT tags in mock turtle flippers. Duncan Limpus, Mark Hamman and Bryan Wallace instructed participants on the different types of metal flipper tags and the different tagging locations on mock front flippers. Handouts and information pamphlets were also available to all participants.

One of the planned outcomes of this workshop is the creation of a tagging information link on http://www.seaturtle.org/tagging that will include downloadable copies of the presentations and handouts available in Kuala Lumpur; look for future announcements regarding when this will be available online. In addition, a survey of the expectations and comments of participants was administered (Table 1). Feedback on the workshop was generally positive, with more comments received on the helpful aspects of the workshop than on areas for improvement. Most attendees expected to learn new techniques and/or gain knowledge through access to experienced taggers during the demonstrations. A majority (58%) did find the presented information/demonstrations useful and informative, suggesting a successful workshop. Respondents also indicated that some of the set-ups, for example the mock flippers, were probably not realistic enough for proper training, and were disappointed with lack of sufficient time available during the workshop. Our original intention had been to keep the workshop small, which may have addressed some of the logistical problems. We recognize that the best way to learn how to apply a specific type of tag is to have someone experienced demonstrate this on an

Origin of participants	*Tagging experience*	*Expectations*	*Positive aspects of workshop*	*Areas for improvement*
S/SE Asia 50%	Yes 67%	Practice/instruction 54%	Hands-on demos 58%	Logistics of workshop 62%
Aust/Pacific 17%	No 33%	Experienced advice 25%	Specific tags 38%	Provide specific details 12%
Europe 17%	w/metal tags 63%	Specific technique 25%	Demonstrators 8%	Provide post-tagging info 8%
Americas 13%	w/PITs 25%	New information 21%	Everything 8%	Hold at a nesting beach 4%
Middle East 4%	w/PTTs 4%	General discussion 17%		
		Purchase information 12%		

Table 1. Responses of survey questionnaire to participants of the Tagging Workshop. Forty questionnaires were distributed and 24 were returned with answers (60% response rate).

individual basis. Nevertheless, the high attendance at this event suggests that a smaller workshop would have excluded many eager participants.

Acknowledgements: This workshop could not have been possible without the generous support and donations of various manufacturers and distributors of the different kinds of tags, including Brenda Burger (Telonics, USA), Michael and Anna Forehan (Stockbrands Pty Ltd, Australia), Eric Haas (National Band and Tag Co., USA), Kevin Lay (Sirtrack, New Zealand), Mark Owens (BioMark USA), Roland Stump (Trovan Inc., Netherlands). We are also grateful to the creative powers of Catherine McClellan and Carmen Pilcher for making the mock carapaces and flippers, to Peter Richardson and Sue Ranger for providing the inflatable leatherback to demonstrate the harness attachment, and to Michael Coyne, in agreeing to provide web space on seaturtle.org for the workshop's accessible materials. Thanks to Jack Frazier for constructive advice during the meeting.

BALAZS, G.H. 1999. Factors to consider in the tagging of sea turtles. In: K.L. Eckert, K.A. Bjorndal, F.A. Abreu-Grobois & M. Donnelly (Eds). Research and Management Techniques for the Conservation of Sea Turtles. IUCN/ SSC Marine Turtle Specialist Group Publication No. 4. pp. 101-109.

MROSOVSKY, N. 1983. Conserving sea turtles. British Herpetological Society, London. 176 pp.

Report of the Xth Meeting of Latin American Sea Turtle Specialists (Kuala Lumpur, Malaysia, March 16-17, 2003)

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During March 16th and 17th the X Reunión de Especialistas Latinoamericanos en Tortugas Marinas (RETOMALA) took place in the Legend Hotel, in the beautiful city of Kuala Lumpur as part of the 23rd Symposium on Sea Turtle Biology and Conservation. It was the first time that the RETOMALA was held outside of the Americas, and despite the substantial effort needed for all the participants to travel to Asia, there was significant participation, with 40 delegates taking part.

With the Inter American Convention for the Conservation and Protection of Sea Turtles (IAC) being such an important instrument for the future of research and conservation of sea turtles in Latin-American countries, the X RETOMALA had as its main objective to debate and reinforce its value and strategise its implementation. On day one, Samantha Namnum was in charge of the opening comments, during which she gave a presentation about the current status of the IAC. After that, Clara Padilla talked about the IAC Secretary and the results of the first conference of the parties. The morning was closed with Melania Yañez and her experiences regarding the successful process of IAC ratification in Ecuador. In the afternoon, the members of the Organization Committee discussed the text of the IAC (Annexes) and the mechanisms of participation. The day reached its end with a speech of Neca Marcovaldi about the "Brazilian Plan for Reduction of Incidental Sea Turtle Capture in Fisheries".

During the second day, two working groups were created, one consisting of participants from countries that have not yet signed or ratified the IAC, and the other with the countries that are IAC members. The first group (Argentina, Colombia, Cuba, Dominican Republic and Uruguay) analyzed the current situation of each country and established a strategy to ensure signing and/or ratification of the IAC. The second group (Brazil, Costa Rica, Ecuador, México, Puerto Rico and Venezuela) established the next steps to follow in order to help the countries of the first group. We would like to highlight the participation of Jack Frazier and his invaluable contributions towards the IAC throughout the meeting. The meeting finalized with a presentation by Rod Mast about the funding opportunities for sea turtle projects in Latin America, and another from Perran Ross about the IUCN Marine Turtle Specialist Group. The final report of the X RETOMALA will be available at the RETOMALA´s website < http://members.seaturtle.org/retomala/index.htm> along with other pertinent information.

Costa Rica´s CIT-006 "Resolución sobre la conservación de la tortuga baula (*Dermochelys coriacea*) en el Pacífico Oriental" was supported by the group, and it was also decided that the next RETOMALA will be held together with the 24th Annual Sea Turtle Symposium in Costa Rica 2004. It will be organized by Rolando Castro (Costa Rica), Laura Sarti (México), Félix Moncada (Cuba), Carlos M. Orrego (Colombia) and Claudia Ceballos (Colombia).

Acknowledgements: We would like to give very special thanks to the President of the 23rd Symposium, Nicolas J. Pilcher for all the help he provided during the organization of the X RETOMALA, and to Carmen Leong Pilcher for the design of the Meeting's logo. Also to the coordinators of the travel grants, Ana R. Barragan and Jeff Seminoff, for all their good will and dedication that have given to ensure wide particpation. We are also grateful to Michael Coyne of seaturtle.org for his help in establishing the RETOMALA website.

The Second Reunion of Mediterranean Sea Turtle Specialists in Kuala Lumpur

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The Mediterranean is an almost closed sea hosting important populations of loggerhead and green turtles. It is surrounded by 21 countries featuring a diversity of cultures, religions and languages. Although important steps have been made, through official channels, in coordinating sea turtle conservation among states, very little contact has been established among individual researchers and conservationists working on sea turtles in the region. The International Sea Turtle Symposia provide an excellent opportunity for improving such communication. Following a suggestion of Annette Broderick, a first gathering was organized in Philadelphia (February 2001), with support of the then Symposium President Jim Spotila, where about 30 people attended and, with a little help of Mediterranean wine, they came to know and talk to each other. The following year (April 2002) at the Symposium in Miami a proper meeting was organized, featuring an agenda of 8 important items (Margaritoulis & Glen 2002).

At this year's Symposium (March 2003, Kuala Lumpur), 32 people (incl. 8 observers) attended the Mediterranean Reunion. The minutes of the meeting, drafted by Brendan Godley, have been posted in the regional listserver MedTurtle. (If you are not a MedTurtle subscriber and would like to see the minutes, please, contact DM). A brief overview of the main discussions are presented below:

Next Regional Conference. After the successful First Mediterranean Sea Turtle Conference (Rome, October 2001), a proposal of Turkey to host the second regional conference in autumn 2004 was announced and approved. However, the opinions of the three International Conventions, expected to finance the conference, are to be solicited.

Rescue Centres. A vision for a regional network of Rescue Centres and the main design considerations for these specialized facilities were presented by Flegra Bentivegna. Several points were raised from participants as the criteria for severity of injuries to keep turtles in centers, when to release rehabilitated turtles, criteria for euthanasia, importance in facilitating education and research, need for associated stranding networks, need for training initiatives and specialist information exchange. A final point was that Rescue Centres should not be viewed as compensating for mortalities caused by fishing activities.

Standardization of Tagging. It was decided that tag manufacturers should be contacted to help in redirecting tag orders to national focal points with the aim to reduce tag code redundancy. A team to achieve this task by 1 July 2003, comprised of Paolo Casale (coordinator), Yakup Kaska, Sara Pont and Alan Rees, was created.

European Marine Turtle Project (EMTP). An overview of the recently completed joint project by France, Greece, Italy and Spain (co-funded by EU) assessing turtle bycatch in European Mediterranean fisheries was presented by Luc Laurent. The project report can be found, thanks to Michael Coyne of seaturtle.org, at: <http://www.seaturtle.org/gforum/gforum.cgi?post=171>.

A New Joint Project. Taking advantage of the results of the EMTP project, a new joint project among Croatia, France, Greece, Italy and Spain, to reduce turtle mortalities in European Mediterranean fisheries, was presented by Paolo Casale. The project will seek funding through the European Union.

A Cooperative Monitoring Programme at Sea. The value of long-term monitoring projects at sea, which would provide an assessment of the relative abundance, was presented by Paolo Casale and had a positive response from several participants. A working group, comprising of Paolo Casale (coordinator), Carlos Carreras, Bojan Lazar, Aliki Panagopoulou, Sara Pont, and Jesus Tomas, was created to prepare a more detailed proposal and relevant data sheets by 1 July 2003.

Adoption of a Resolution. A resolution on the need to focus the FAO Technical Consultation on the issue of incidental turtle captures by fisheries worldwide was presented and agreed.

Assessing the Genetic Structure of Loggerhead Populations. A collaborative project to assess the

genetic structure of loggerhead populations was presented by Carlos Carreras and has secured samples from nesting beaches in Cyprus, Greece, Italy, Libya and Turkey.

Research and Conservation Priorities. To make best use of available resources and focus on specific regional targets the necessity to prepare Research and Conservation Priorities for the next 5 years was decided. Two working groups were created, one for Research, comprising of Luc Laurent & Bojan Lazar (coordinators), Flegra Bentivegna, Sandra Hochscheid, Jesus Tomas and Oguz Turkozan, and one for Conservation, comprising of Aliki Panagopoulou (coordinator), Paolo Casale, Hasibe Kusetogulary, and one person from DHKD (Turkey). The groups will prepare draft proposals by 1 July 2003 and then seek and accept comments through MedTurtle.

Evaluating the meeting's results, it is evident that regional cooperation is on course. Important collaborations and joint projects have started to bloom. It is expected that this momentum will continue and an equally successful regional meeting will be organized at the next International Symposium (spring 2004).

Acknowledgements: I thank all participants for their active involvement, especially all subject proposers for preparation and presentation of agenda items, Brendan Godley for drafting the minutes, Michael Coyne for soliciting participants' details, Jack Frazier and Sally Bache for assisting with the resolution, and Alan Rees for technical assistance.

MARGARITOULIS, D., & F. GLEN. 2002. Short report on the meeting of Mediterranean specialists (Miami, USA, 3 April 2002). Marine Turtle Newsletter 98:13-14.

Asian Terrestrial and Freshwater Chelonian Session at the 23rd Symposium on Sea Turtle Biology and Conservation, Kuala Lumpur, Malaysia

Chuck Schaffer

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This well attended lunch session, highlighting the current situation facing Southeast Asian terrestrial and freshwater chelonians, was held at the 23rd Symposium on Sea Turtle Biology and Conservation, Kuala Lumpur, Malaysia. Common interest in the sea turtle biology/ conservation community and the critical status of this region's chelonians led to the inclusion of this non-marine turtle event. This forum allowed for an unprecedented exchange of ideas between in and ex-situ researchers and conservationists. A number of attendees, who came specifically for this session, were also able to benefit from the marine turtle sessions.

All told, 55 people decided to forego lunch and take advantage of this unique session. In the limited time available, much information was disseminated. After a short introduction by Chuck Schaffer (University of North Florida), Indraneil Das (University of Malaysia, Sarawak) gave an excellent background on the region's chelonian fauna, its natural history, ecology and threats. Peter Paul Van Dijk (TRAFFIC, Southeast Asia) covered the Southeast Asian Turtle Trade and the grim situation facing these animals. Peter Pritchard (Chelonian Research Institute) devoted his time to the current state of turtle use in China. Following this, Chuck returned and tried to tie the previous topics together relative to one species, *Manouria emys*. Anders Rhodin (Chelonian Research Foundation, Turtle Conservation Fund, the IUCN/SSC Tortoise & Freshwater Turtle Specialist Group, and Chelonian Conservation and Biology) spoke of progress and partnerships in tortoise and freshwater turtle conservation efforts and the Turtle Conservation Fund. Discussion, begun during the session, moved out into the hallway and continued for the rest of the symposium. This opportunity for marine and non-marine chelonian conservationists to mix, share problems and solutions was a definite success. The session will be offered again next year in Costa Rica and we hope to make it an annual event.

African Reunion, Kuala Lumpur

Manjula Tiwari[1] & Angela Formia[2]

[1]Archie Carr Center for Sea Turtle Research and Department of Zoology, University of Florida, Gainesville, FL 32611, USA (E-mail: mtiwari@zoo.ufl.edu) [2]Angela Formia, School of Biosciences, Cardiff University, Cardiff CF10 3TL, UK (E-mail: formiaa@cardiff.ac.uk)

The Second Reunion of African Sea Turtle Biologists at the Annual Symposium was held on request of some of the African delegates to formally meet and discuss projects with colleagues working in the region. The meeting was attended by 19 individuals, representing sea turtle work in 12 African countries. Each participant provided a brief summary of their project accomplishments and future plans, and some of the common problems were discussed.

Among the issues raised and discussed were economic incentives for conservation, compensation for the release of incidentally captured turtles or damaged nets, elimination of carapace stockpiles, and implementation of fines for users of turtle products. A common theme from many of the delegates was lack of funding and the need for a coordinated approach to fund-raising, as well as standardized methodologies for tagging and data collection. One of the participants stressed the importance of our power as a unified sea turtle group working in Africa, and our ability to make our voice heard and promote sea turtles on the agenda of large political organizations such as NEPAD (The New Partnership for Africa's Development). Sources and access to reference material were also discussed and dissemination of publications and technical manuals was deemed a priority.

Michael Coyne offered to set up a listserv for the African group. It was unanimously agreed that a mailing list exclusively for Africa would be extremely valuable for promoting collaborations, discussions, and information exchange in the continent. The detailed minutes of the African Reunion in Kuala Lumpur will be posted on this new listserv. Anyone interested in joining should contact Angela Formia (formiaa@cardiff.ac.uk).

Indian Ocean – Southeast Asian Marine Turtle Secretariat Operational

Douglas Hykle

IOSEA Marine Turtle MoU Secretariat, c/o UNEP Regional Office for Asia and the Pacific, United Nations Building, Rajdamnern Avenue, Bangkok 10200, Thailand (E-mail: hykle@un.org)

The secretariat of the *Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia* has been formally established in Bangkok, as of April 2003. Co-located with the UNEP Regional Office for Asia and the Pacific, the secretariat is headed by Douglas Hykle, former Deputy Executive Secretary of the Convention on Migratory Species (CMS).

The Advisory Committee established under the MoU held its first meeting in March 2003, in Kuala Lumpur, in conjunction with the 23rd Annual Symposium on Sea Turtle Biology and Conservation. Four of the six members were present: Dr Jack Frazier, Dr Jeanne Mortimer, Dr Nicolas Pilcher and Romeo Trono (The other Committee members are Dr Colin Limpus and Dewapriya Amarasooriya.)

The first meeting served primarily to review the Committee's terms of reference and to share ideas on how best to fulfil the mandate entrusted to it by the Signatory States to the MoU. The Committee's first tasks include: contributing to the knowledge base and exchange of information about relevant turtle conservation activities, providing advice on priorities for implementation, and looking into the feasibility of undertaking a "Year of the Turtle" campaign in 2005.

Recently, the Secretariat circulated copies of the MoU's Annotated Conservation and Management Plan, containing preliminary information on implementation in three of the MoU's four sub-regions. Copies in Word and/or PDF formats are available from the Secretariat on request, at the address above.

A web site for the IOSEA Marine Turtle MoU is currently under development, and will contain many useful features of interest to marine turtle conservationists in the region. Details will be highlighted in a coming issue of the MTN.

Mini-Symposium on Sea Turtles – VI Latin American Congress of Herpetology

Andrés Estrades

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The VI Latin American Congress of Herpetology (VI CLAH) was held in Lima, Perú at the Universidad Nacional Agraria la Molina from January 19 – 23, 2003. For the first time an oral session in the format of a mini-symposium, exclusively dedicated to sea turtles, was performed. The purpose of the Meeting was to transmit to the participants the importance of the integration and exchange of information between the different projects working with sea turtles at a National and International level. Over 50 attendees from Latin-America were present, including researchers from Brazil, Chile, Ecuador, Perú, Uruguay, USA and Venezuela. Paper presentations included sea turtle investigations from Chile, Panamá, Perú and Uruguay.

Presentations performed during the mini symposium session are listed as follows:

A. Estrades (moderator): Comentarios de Apertura (Opening Comments).

T. N. Engstrom: Aplicaciones de Técnicas Moleculares para la Biología y Conservación de las Tortugas Marinas. (Molecular Techniques Aplications for the Biology and Conservation of Sea Turtles).

H.J. Guada: La Importancia de las Redes de Investigación y Conservación de Tortugas Marinas (resumen presentado por Andrés Estrades). (The Importance of Sea Turtle Research and Conservation Networks) (summary presented by A. Estrades).

Estrades, M. López, C. Lezama, M.N. Caraccio, V. Calvo, M. Laporta, M. Hernandez, A. Bauzá, V. Quirici, A. Aisenberg & A. Fallabrino: Investigación y Conservación de las Tortugas Marinas en Uruguay: Proyecto Karumbé 1999 - 2002. (Research and Conservation of Sea Turtles in Uruguay: Karumbé Project 1999-2002.

J.C. Ortiz, L. Miranda & M. Donoso: Situación y Estado de Conservación de las Tortugas Marinas en Chile. (Situation and Conservation Status of Sea Turtles in Chile.

C. Manrique, X. Velez-Zuazo & S. Kelez: Aspectos Generales sobre las Tortugas Marinas Reportadas en el Perú, años 2000 – 2002. (General Aspects of Sea Turtles Reported in Perú, year 2000-2002).

N. De Paz, J. Reyes & M. Echegaray: Estado Actual de las Investigaciones de Tortugas Marinas en la Zona de Pisco, Perú. (Actual Status of the Investigations on Sea Turtles in Pisco, Perú)

J. Alfaro: Estado de las Tortugas Marinas en el Perú. (Status of the Sea Turtles in Perú).

The session was preceded by a passionate keynote lecture delivered by Dr. Jack Frazier: "Tortugas Marinas del Pasado: ¿Una Visión hacia el Futuro?". ("Sea Turtles from the Past. A Vision towards the Future?")

The VICLAH schedule also included two research works, which enriched the mini-simposium even more:

M.A. Rondón & H.J. Guada: Aspectos Reproductivos de las Tortugas Marinas en Cipara, Península de Paria, Venezuela entre las temporadas 2000-2002. (Poster)

X. Velez-Zuazo & C.E. Diez: Aspectos de la Dinámica poblacional de las Agregaciones de Tortuga Verde (*Chelonia mydas*) en el Archipiélago de Culebras, Puerto Rico. (Oral)

The extended abstracts of the papers presented will be published by the organizers of the VI CLAH as soon as possible.

Acknowledgements: I would like to thank the organizers of the VICLAH: Lily Rodríguez, Alessandro Catenazzi and to all the volunteers of the Congress, without its valuable help this meeting wouldn't have been possible. I would also like to thank Alejandro Fallabrino and Camelia Manrique for their contribution on the organization of this meeting. Milagros lopez helped with the English translation. Travel funds to this meeting were generously provided by the VI Latin American Congress of Herpetology (VICLAH).

FIRST ANNOUNCEMENT
24th Annual Symposium on Sea Turtle Biology and Conservation
(San Jose, Costa Rica, February 22-29, 2004)

Roderic B. Mast

President, International Sea Turtle Society (ISTS), c/o, Center for Applied Biodiversity Science, Conservation International, 1919 M Street, NW Washington, DC 20036 USA (Email R.Mast@Conservation.org)

Venue and Theme

I am happy to announce that plans for the 24th Annual Symposium on Sea Turtle Biology and Conservation are well underway. The Symposium will take place at the beautiful Herradura Hotel and International Conference Center in San Jose Costa Rica, from February 22-29, 2004. A full array of activities are being planned, including pre and post Symposium travel opportunities; a mini-symposium on Costa Rica's contribution to sea turtle research and conservation; plus banquets, music and cultural shows, a very special auction night and lots of chances to dance, discuss turtles, and enjoy the Latino hospitality for which Costa Rica is famous.

This year's theme will be *Sea Turtle Lifescapes*. It urges us to consider marine turtles as pieces of greater biodiversity landscapes, to discuss the niches that sea turtles fill in marine and terrestrial ecosystems, and to ponder as well their "fit" in Earth's broader Biosphere. More importantly, the 24th Symposium encourages us to analyze our own niche as powerful human components in the selfsame Biosphere, and to express our thoughts and voice our opinions about the most synergistic actions we can take as institutions, governments, a sea turtle conservation "movement", and as individuals, to assure that sea turtles thrive.

I must express my gratitude and recognize my local Organizing Committee consisting of ISTS Board member, Clara Padilla, Mario Boza (Costa Rican Executive Director of The Leatherback Trust) and Marcos Solano (Executive Secretary of the Inter-American Sea turtle Convention); they have already assisted enormously in smoothing the waves and assuring that local logistics are handled ably. Thanks also to the other Costa Rican partners who have demonstrated their unflagging support for the Symposium, including Costa Rican President, Abel Pacheco, the Costa Rican Sea Turtle Network, Conservation International, and officials from MINAE (the Ministry of Environment and Energy), who are dedicating time and energy above and beyond the call. I am also grateful to ISTS Treasurer, Ed Drane and retiring President, Nicolas Pilcher and his wife Carmen, for having provided useful advice and guidance, not to mention leaving behind some finances from a highly successful fundraising effort that led up to the 23rd Symposium in Malaysia.

Why Costa Rica?

Long before accepting the ISTS Presidency some months ago, I analyzed what would be my goals for a 24th Symposium were I to accept Earl Possardt's persistent pleas. I wanted to: 1) host a fabulous, memorable gathering where ideas could be exchanged and valuable networking take place; 2) provide opportunities for Symposium participants to get out into the field and experience tropical Nature first-hand, and; 3) impact the conservation of sea turtles worldwide by encouraging policy shifts and providing an "attraction" for media and communications attention that would get-the-word-out about sea turtles to communities beyond our own. Furthermore, I wanted to be able to offer all this at a venue that was affordable, safe, fun and logistically un-complicated for a majority of Symposium participants.

Costa Rica is the epicenter of global ecotourism for a reason. It is a safe, fun, manageable, and relatively inexpensive travel destination. The infrastructure for international visitors is advanced, the airfares are reasonable, and it is very conveniently situated geographically for participants from around the world. There are lots of interesting places to visit post and pre-symposium, including two ocean coasts, and a variety of sea turtle *Meccas* like Tortuguero, Ostional, Nancite, and Playa Grande, just to name a few. Furthermore, Costa Rica is a showcase for biodiversity conservation. It was among the first tropical countries to really take national parks seriously, the first to adopt "ecotourism" as a national strategy, and first in a handful of other biodiversity and environment achievements from debt-swap, to carbon offset, to bio-prospecting. Costa Rica has not only served as a conservation model for other tropical countries, but perception-wise it is among the first places that comes to the minds of most Northern Hemisphere-dwellers when they think "tropical nature".

Having visited Costa Rica regularly since 1983 when

I coordinated the first WATS (Western Atlantic Turtle Symposium) with the late Dr. Fred Berry, I am keenly aware of the important role the country plays as a global leader with respect to sea turtles. Indeed, many consider Costa Rica to be the birthplace of modern sea turtle research and conservation. Famous as the site of Archie Carr's historic Tortuguero green turtle project, launched in the late 1950's and still led today by the Caribbean Conservation Corporation, the accounts of Costa Rican turtles in *So Excellent A Fishe* and other volumes have fueled the imaginations of many a young biologist (myself included). More importantly, they brought sea turtles to the attention of the public for the first time as something other than a soup ingredient – rather, through Archie's stories, sea turtles became mysterious, beautiful and *Excellent* examples of the multiple wonders of Nature. In addition to being Archie Carr's former stomping ground and the site where hundreds of today's active researchers first learned the ropes of beach work, Costa Rica is currently at the center of what is unquestionably one of the top sea turtle conservation issues of our day, that being the vertiginous decline of the Pacific Leatherback. The Baulas de Guanacaste National Park plays a central role as one of the last remaining beach-heads in efforts to conserve the species, and it is indeed an ecosystem anchor in a broad biodiversity landscape spanning several nations from Cocos Island to Galapagos, the conservation of which will be critical to the survival of not only Pacific leatherbacks, but countless other marine species as well.

Thus, for the aforementioned reasons alone, one can easily see that Costa Rica is truly a worthy place to host a Symposium focused on the importance of sea turtles. But the clincher came last November, when I was invited by colleagues from The Leatherback Trust to attend a fundraiser in San Jose for FAICO (The Friends of Cocos Island Foundation). I accepted the invitation, and somehow wound-up at the head table (I am convinced that the name cards were accidentally switched), there surrounded by Costa Rica's President, Abel Pacheco, former President Rodrigo Carazo, the current Minister of Environment and Energy and his family, a handful of other Ministers, and a plethora of assorted Costa Rican luminaries. Between their speeches that evening, my conversations with these delightful dinner guests naturally centered on sea turtles, and I was overwhelmed by the support I received from them all for the idea of hosting the 24th Annual Symposium in their country. Most of all, I felt not only honored to have had the opportunity to "talk turtles" with the country's President, but thoroughly surprised and pleased to find that President Pacheco is himself a turtle enthusiast. He and the others whom I met that evening demonstrated a deep concern for the plight of sea turtles and their habitats, and a strong commitment to help in any way to support their study and conservation in Costa Rica and to assist the ISTS with the organization of the 24th Symposium.

What is In Store – A Tentative Schedule of Events

The final schedule for the meeting is still under development. The following represents the current thinking of the organizers (regular updates will be posted on seaturtle.org).

Friday, February 20, 2004
- 11th Latin American Sea Turtle Specialists Meeting – registration
- Other Regional Meetings (to be announced)

Saturday, February 21
- 11th Latin American Sea Turtle Specialists Meeting
- Other Regional Meetings (to be announced)
- Pre-symposium excursions

Sunday, February 22
- 24th Annual Sea Turtle Symposium - registration
- 11th Latin American Sea Turtle Specialists Meeting
- Other regional Meetings (to be announced)
- Pre-symposium excursions

Monday, February 23
- Opening ceremonies (National Theatre)
- Mini-symposium on Costa Rican Turtle Conservation and Research
- Afternoon poster and oral sessions
- Opening banquet sponsored by the Costa Rican Tourism Institute

Tuesday, February 24
- Poster and oral sessions
- Lunch session-Fresh Water Turtle Research & Conservation
- Tippling Turtle Bar

Wednesday, February 25
- Poster and oral sessions
- Tippling Turtle Bar
- Auction

Thursday, February 26
- Poster and oral sessions
- Reception and awards ceremony sponsored by Costa Rican Ministry of Environment and Energy
- Tippling Turtle Bar

Friday, February 27
- Morning poster and oral sessions
- Closing Ceremonies
- Post-symposium excursions

Saturday, February 28
- Special ceremonies and press conference at Playa Grande, Guanacaste (for invited guests)
- Post-symposium excursions

Associated Events
One of the highlights of the meeting will be a mini-symposium on Costa Rica and the important role it has played in sea turtle conservation and research; for more information, please contact Committee member, Dr. Mario Boza (E-mail: ecoamericas@amnet.co.cr). The 24th Symposium will also serve as host for the 11th Reunion of Latin American Sea Turtle Specialists, to take place either at the Herradura Hotel, or at Ostional National Wildlife Refuge. We will communicate the final venue in our web page and in future communications. The coordinator for this meeting is Dr. Carlos Orrego, Ministry of the Environment and Energy, (E-mail: carlosmarioo1@yahoo.com.mx). We also welcome meetings of others who may be interested in similar regional or thematic meetings (please contact Roderic Mast to schedule special meetings and events).

Call For Papers and Resolutions
The program committee will review all proposals received prior to ***15 November 2003***. Final details are still being worked out regarding the themes and chairpersons for the various sessions. Nonetheless, we would like to provide you now with the information required for abstract submission. We urge all potential presenters to review the Symposium website over the coming months to determine the oral or poster sessions most appropriate for their presentation, and we also request that you consider the theme of the Symposium, as described above – *Sea Turtle Lifescapes* – as you conceive your topics for presentation. Please use the Symposium web site: <http://www.seaturtle.org/symposium/> to access guidelines and to make your submission. If you cannot access the web site, you may submit your abstract as a text file attachment to an e-mail sent to <abstracts@seaturtle.org>. If you are unable to submit your abstract via internet or email, then send your proposals by fax to + 1 202-318-4448. A printed copy of the submission guidelines can be mailed to you upon request (contact Roderic Mast). If you wish to submit a Resolution to be considered by the Board of Directors of the ISTS please follow the guidelines presented at the website <http://www.seaturtle/symposium/resolutions/> or request guidelines via e-mail: <resolutions@seaturtle.org>.

Symposium Registration
You must register to attend the Symposium. The preferred registration method is to visit the Symposium's 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 registration. Should you wish to receive a printed copy of the registration materials, please contact Rod Mast.

Lodging and Transfers in Costa Rica
The Organizers are currently negotiating discounted airfares, as well as a formal relationship with a travel provider that will allow for the purchase of tickets and the arrangement of pre and post symposium travel on-line. We have reserved a block of rooms at the Hotel Herradura, which can be reserved by calling (+506) 239-0033, by faxing to (+506) 293-2713, or by e-mail to <gventas@hotelherradura.com>. The web site of the hotel is <www.hotelherradura.com>. Be sure to make reference to the Sea Turtle Symposium. The Juan Santamaria International Airport in San Jose is only 15-20 minutes away from the Herradura Hotel and International Conference Center, and shuttles will be made available at pre-determined times for Symposium participants. Please stay tuned for future articles in the *Marine Turtle Newsletter*, or check the Symposium website for updates on travel arrangements.

Visas
Citizens of the USA and Canada do not require a visa for Costa Rica, and indeed only a very small number of foreign countries are required to obtain a visa before entering Costa Rica. A "Public Interest Decree" is presently being negotiated with the government of Costa Rica, that will allow for the provision of special assistance to participants in the 24th Symposium requiring visa services. If you are from Colombia, South Africa or if you envision that you may have difficulty obtaining a visa in your home nation, please seek advice from the Symposium Organizing Committee, c/o Clara Padilla <Clarits@hotmail.com)>.

ISTS Travel Assistance
As in past years, the ISTS will provide support for a limited number of qualified presenters at the 24th Symposium from around the world. The deadline for submission of applications will be ***15 November 2003***. See announcement in this issue (MTN 101:45).

Conclusion
The ISTS, the Organizing Committee and I are all very excited about the 24th Symposium, and are working hard to assure that it will be both a wonderful experience for you, the participants, as well as a positive step for the conservation of sea turtles worldwide. Check our website for regular updates, and we will continue to provide additional information through the MTN. We look forward to seeing you in Costa Rica next February.

Travel Assistance For The 24th Annual Symposium On Sea Turtle Biology And Conservation In San Jose, Costa Rica

The Travel Committee for the 2004 Symposium are pleased to announce that limited travel funds are available to assist participants in their efforts to attend the 2004 Symposium in San Jose, Costa Rica. As in previous years, 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, 15 November 2004, and to individuals from relatively under-represented regions. **The committee looks favorably on 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 2004 Symposium in San Jose, Costa Rica, apply via the symposium webpage, which will be based at <http://www.seaturtle.org/> before the deadline. No late applications will be considered.

Applicants should follow this procedure:

1. Register for the symposium
2. Submit your abstract to the symposium for consideration (required for travel applicants from USA and Canada)
3. Using your symposium registration number, complete the online travel grant application in full, prior to the 15 November 2003 deadline.

Applicants should apply to the region from which they are traveling from, NOT where the research was conducted. Awards will be announced by 15 January 2004, and all recipients are expected to apply for visas immediately upon award if they have not already done so. Please contact the appropriate Regional Chair with any questions. It is greatly preferred that all correspondence is carried out by e-mail/internet; however, if this is impossible to access an online computer, applicants can make contact with their Regional Chairs by fax. Grant recipients are expected to attend the entire symposium.

Travel support contacts:

Travel Committee Chair:
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The Sea Turtle Activist Newsletter

The EcoTeach Foundation (USA/Costa Rica) has begun a monthly email newsletter that highlights quick, easy actions that people can take to help protect sea turtle populations worldwide. Recent issues have urged companies, governments, and commissions to take action by making responsible choices, preventing over development, or upholding and enforcing laws. While emphasis is placed on Costa Rica, we include actions from throughout the world and reach students, activists, and concerned citizens in the US and abroad. The newsletter also includes news updates, volunteer opportunities, and other ways to help. Please contact Brad Nahill, EcoTeach Foundation Outreach Director at turtleactivist@hotmail.com to sign up or for questions.

A Sea Turtle Conservation and Research Project Between countries of South East Asia

Southeast Asia Sea Turtle Co-operative Research 2000 (SEASTAR2000) is a co-operative research project between Thailand, Japan, Malaysia, Vietnam, Cambodia, Myanmar, Brunei, India. The objectives of the co-operative research are to discover migration paths of adult female green turtles in the Gulf of Thailand and the Andaman Sea, using a satellite tracking system; monitoring of sand temperature using temperature recording dataloggers in the nesting ground to estimate the sex ratio of hatchlings ; genetic analyses of the local population structures of sea turtles; correlation between fishing effort and turtle by-catch and development of a scientific strategy for conservation. The co-operative project was funded by Kyoto University and A Grant-in-Aid from the Japanese Ministry of Education, Sport, Science and Technology.

The project started in 1999 as a Japanese-Thai co-operative project and in 4 years it became wider including additional countries of South-east Asia. The diversity of migration routes found in the Gulf of Thailand highlighted the need for a wider international co-operation. So Cambodia, Vietnam, Malaysia, Philippines, Brunei, Myanmar and India were included in the project.

SEASTAR2000 represents an important move toward the conservation of sea turtles, in particular in South East Asian countries, where there is a strong will to build conservation initiatives. SEASTAR2000 holds a workshop once a year, which are summarised in proceedings. Information can be requested to Dr. Nobuaki Arai E-mail: arai@bre.soc.i.kyoto-u.ac.jp or <http://bre.soc.i.kyoto-u.ac.jp/seastar2000/>

Monica Aureggi, Naucrates, Onlus - Friends of Sea Turtles Via Corbetta,11 - 22063 Cantu' (CO) - ITALY <www.naucrates.org>
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Kachhapa 8 Now Available

Kachhapa is a newsletter for sea turtle conservation and management in the Indian ocean and south Asia. The newsletter provides a forum for exchange of information on sea turtle biology and conservation, management and education and awareness activities in the south Asia Indian subcontinent. The newsletter includes articles (which will be peer reviewed), short notes, letters and announcements. Online or electronic submissions are encouraged.

Kachhapa 8 is a special issue on Turtle Excluder Devices in India. It includes an editorial which reviews the TED in India, articles on implementation of TEDs in Andhra Pradesh, the state immediately south of Orissa, construction and installation of the indigenous CIFT TED, and reports on a TED workshop in Orissa. The issue also includes a review of thirty years of sea turtle conservation in Madras, and articles on education programs in Goa and community based conservation in Madras.

Kachhapa 8 is now available as PDF files and html at the website www.kachhapa.org. A new feature of the website is that individual articles are also available as PDF files. The size of PDF files of individual articles as well as the complete newsletter are indicated, so that users can download if its appropriate for their bandwidth. Hard copies have been mailed to current subscribers. If anyone would like to be added to the mailing list, or if your address has changed recently, please send an email to the editor with your current postal address.

Since this newsletter hopes to serve as a link for coastal and marine conservation, the more people we can reach, the more effective it will be. Please send us names and addresses of individuals, NGOs, research institutions, schools and colleges and anyone else who would be interested in receiving *Kachhapa*. Electronic versions of past and present issues of *Kachhapa* can also be received by email automatically. For subscription services, visit:
<http://www.kachhapa.org/subscriptions/>.

Kartik Shanker, Editor, *Kachhapa*, Scientist, Centre for Herpetology/Madras Crocodile Bank Trust (Email: editor@kachhapa.org, kartikshanker@vsnl.net) & **Karthik Ram**, Webmaster, Kachhapa.org. Dept Biology, University of New Orleans, (E-mail: karthik.ram@uno.edu)

BOOK REVIEWS

Title: Introduction to Conservation Genetics

Year: 2002
Authors: Richard Frankham, Jonathan D. Ballou, David A. Briscoe
Publishers: Cambridge University Press
ISBN: 0-521-63985-9 (paperback), 0-521-63014-2 (hardback)
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Cambridge CB2 2RU, UK.
URL: <http://www.cambridge.org>.

This publication is an essential reference for conservation biologists and wildlife managers, as well as undergraduate and graduate students, engaged in the study and conservation of endangered species. It provides an accessible and much-needed compilation of genetics applied to species and population management. Conservation genetics is defined as "the application of genetics to preserve species as dynamic entities capable of coping with environmental change. It encompasses genetic management of small populations, resolution of taxonomic uncertainties, defining management units within species and the use of molecular genetic analyses in forensics and understanding species' biology." It is a component of the relatively new discipline of conservation biology, evolved from population genetics, quantitative and evolutionary genetics, partly as a consequence of the ongoing controversy between scientists and policy-makers on the relevance of genetic considerations to conservation planning for wild and captive populations.

The book is divided into 20 chapters grouped into three sections: "Evolutionary genetics of natural populations", "Effects of population size reduction" and "From theory to practice". Throughout the book, the text is clearly presented, organised into subheadings, with beautiful illustrations and numerous useful tables and figures. Terminology and main points are highlighted in boxes along the margins, relevant examples and important case studies are appropriately distributed in text boxes. Each chapter ends with a summary, suggestions for further reading and practice problems for students. At the end of the book are revision problems, a glossary, problem answers and references, in addition to a section summarising take home messages.

The first three chapters are an excellent introduction to the book's "protagonist", genetic diversity, its importance, how it can be measured, why it is linked to extinction and why it should be conserved. They also describe endangered species from the point of view of their genetic characteristics, and convincingly justify the application of genetic study to minimising extinctions. For example, extinction risk can be reduced by minimising inbreeding and loss of genetic diversity, and by maximising fitness. Genetics can also aid conservation by identifying populations of concern, resolving population structure and reducing fragmentation, detecting hybridization, and by defining the best sites and choosing the best populations for reintroductions. Chapter 3 provides a brief overview of molecular biology methods and markers. Table 3.1 defines terminology which non-geneticists might find useful in understanding genetic literature, and Box 3.3, Table 3.2 and Figure 3.1 summarise some of the most commonly used techniques for measuring genetic diversity in nuclear and mitochondrial DNA, the advantages and disadvantages of each, and the application of non-invasive sampling combined with polymerase chain reaction (PCR) to generate millions of copies of DNA fragments from very small samples.

Since the authors assume little prior knowledge of genetics, their coverage of several subjects in Section I (Chapters 3-9) is perhaps excessively detailed and heavy reading. Some topics appear too simplified for postgraduate students, yet too detailed for undergraduates and conservation practitioners. Chapters 4-8 describe the evolution of natural populations through the Hardy-Weinberg model, as well as the role of quantitative variation in adaptive evolution and reproductive fitness. The authors summarise the factors involved in evolution of large populations (illustrated in Figure 6.1) including selection, mutation and migration. By contrast, evolution in small populations is affected by a greater impact of inbreeding and of chance effects, such as genetic drift resulting in fixation and loss of genetic diversity.

One of the book's shortcomings is that it sometimes fails in its attempt to strike a balance between complex calculations of variables such as inbreeding coefficients, gene flow or genetic distances, and accessibility to managers and non-scientists. Section II (Chapters 10-14) may discourage readers that are not mathematically inclined, but does address essential issues for consideration. These include the changes in genetic diversity over time, reduced fitness as a consequence of reduced genetic diversity, the effects of population declines, bottlenecks and fragmentation, the concept of effective population size, the increase in inbreeding over time in populations of different sizes, the incidence of inbreeding depression in the wild, and the genetic consequences of dispersal and gene flow. In Chapter 14, the authors turn to an excellent discussion of genetically viable populations, and of the minimum viable population sizes needed to retain reproductive fitness and evolutionary potential in both wild and captive populations.

Section III (Chapters 15-20) is recommended as the highlight of the book, making for the most pleasant and useful reading for a wide audience. It is not necessary to digest the preceding sections to grasp the last four chapters, and the reader is referred back when topics were previously covered in greater depth. Throughout this section, the authors make good use of case studies to illustrate putting theory into practice. The red wolf, tuatara, orangutan, North American puma and others are used as examples of how resolving taxonomic uncertainties aids in defining units to be managed as separate entities. In the past, the use of alternative definitions of species and different approaches to measuring genetic distance between populations have generated some confusion and conflict at both species and subspecies levels. Disappointingly, the authors do not adequately address this issue, and present little about the traditional concepts of management units (MUs) and evolutionarily significant units (ESUs), which they judge to be inadequate. Instead, they emphasise Crandall's method of classifying populations on the basis of genetic and ecological exchangeability, although this is still not a widely applied way of defining stocks for conservation.

From Chapter 16 the authors focus on the practical applications of conservation genetics to the work of wildlife managers and field biologists. Subject headings include diagnosing genetic problems and recovering small inbred populations with low genetic diversity, managing species with a single population lacking genetic diversity, managing gene flow among fragmented populations and re-establishing extinct populations. Case studies ranging from the scarlet gilia plant to the black rhinoceros illustrate the suggested management techniques and past successful strategies. Chapter 16 also discusses the genetic considerations of reserve design, the dangeres of introgression and hybridization and the impacts of harvesting. Chapters 17 and 18 use several case studies to describe the genetic management of captive populations and genetic management for reintroduction.

Chapter 19 is particularly relevant to marine turtles in that it emphasises the importance of genetic markers to the conservation of species "by aiding in detection of illegal hunting and by resolving important aspects of species biology; they have been used to detect bottlenecks and other demographic events in a population's history, estimate effective size, detect selection, determine parentage, sex, mating systems, population structures, dispersal rates, population sizes, diet, disease status and to detect introgression." Loggerhead turtles are used to show that dispersal rates can be inferred from genetic differentiation among populations. Finally, Chapter 20 concludes the book by placing genetics in the context of population modelling, population viability analysis and applied management decisions. Figure 20.1 summarises the extinction vortex and the role of genetic stochasticity in small populations, and of genetic factors among the causes of endangerment and extinction.

A textbook of conservation genetics is particularly relevant to anyone working on sea turtles, as genetic research in the last decade has played an essential role in developing our understanding of sea turtle biology and enhancing our effectiveness in sea turtle conservation. Genetic sampling has become routine in many projects worldwide, thanks to its non-invasive nature, easy collection and storage, and low costs. Researchers recognise the value of molecular data as a complement to ecological, demographic and taxonomic studies. Among other things, genetic analysis has contributed to phylogenetic debates, is used in the forensic identification of confiscated turtle products or harvested turtles, and helps to identify stranded individuals, individuals in captivity or for reintroduction. Phylogeographic studies are underway to fully describe the genetic characteristics of nesting populations in all ocean basins, and have contributed to our understanding of philopatric and migratory behaviours in both sexes,

and of the composition of mixed aggregates (in conjunction with tagging and satellite tracking). In addition, neutral markers have been used in fine-scale studies of paternity, mating behaviour and demographic structure and history. However, this book reminds us that sea turtle genetics should perhaps begin to look at non-neutral markers and quantitative traits, such as those affecting resistance to disease, fitness and the ability to adapt to a changing environment.

In summary, this volume is an excellent introduction and overview of its subject. For the first time, the authors have presented a comprehensive and detailed overview of the most relevant issues in the emerging discipline of conservation genetics, including seminal studies over recent decades which form the basis for future work and are a source of inspiration and guidance. Introduction to Conservation Genetics is an invaluable reference for all conservation practitioners, not overly technical in most sections and thus, accessible to scientists and non-scientists alike. The authors' sense of urgency and enthusiasm are infectious, convincing the reader that genetic issues cannot be ignored, as they play a key role in shaping the way we understand biodiversity and human interactions with the environment.

Angela Formia, School of Biosciences, Cardiff University, Cardiff CF10 3TL, UK (E-mail: formiaa@cardiff.ac.uk)

The Mediterranean Sea – A Source of Life

Public education and awareness are recognized keystones of any successful conservation initiative. In the world of marine turtle conservation there are many fine examples of awareness and environmental education materials aimed at teaching people of all ages about the biology and conservation turtles. However, as we become increasingly aware of the importance of a regional and more holistic approach to marine turtle conservation, we need to acknowledge that it may no longer be enough for the target audience to just understand the basic life history and conservation status of turtles. There is a need for a more comprehensive understanding of the world turtles inhabit. With the publication of their educational pack for 6-12 year olds "The Mediterranean Sea – A Source of Life" The Mediterranean Association to Save the Sea Turtles (MEDASSET) has moved the goalposts and effectively illustrated how to bring a regional and inclusive aspect to environmental education. In short, this pack is not just about saving turtles, it is about fostering an understanding and appreciation of the Mediterranean as a living resource and thereby achieving a better understanding of the world.

This pack is aimed at teachers, parents and group leaders of 6-12 year old children and includes a wide variety of appealing and accessible factsheets on issues ranging from animals of the sea to monuments and cultures, threats, protected areas and coastal and marine ecosystems. The factsheets are accompanied by activity sheets, jam-packed with thought provoking group activities, that promote cooperative learning and investigation. It is designed to be flexible to the needs of the user and is a resource you can work your way through or dip into for inspiration. This resource will be particularly useful to anyone working in the Mediterranean region, but has relevance for all practitioners.

The pack has been produced by MEDASSET, Kaleidoscope Publications and the Hellenic Children's Museum. The Kit website may be accessed from the MEDASSET homepage at:
<www.euroturtle.org/medasset/>
For more details contact: MEDASSET-Greece, 1c Licavitou Str., 10672 Athens, Greece E-mail:medasset@hol.gr

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NEWS AND LEGAL BRIEFS

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

AFRICA

Turtle Losses Mount

Turtles are washing up dead, often beheaded or with their throats cut, on the beaches of Mozambique in East Africa. In the first few weeks of 2003, shocked tourists and residents have found dozens of green and loggerhead turtle carcasses. The cause is bycatch—the unintentional catch of nontarget species-by illegal and unlicensed fishing vessels operating close to the coastline of Mozambique and even within protected areas. The boats are said to be of Chinese, Korean, or Taiwanese origin, and they are using longlines to catch sharks, some of which are protected species in Mozambican waters. With nearly 1,700 miles of coastline, Mozambique lacks the means to stop these vessels or drive them from its waters. Source: *Mangrove Action Project Newsletter*, February 2003.

THE AMERICAS

NOAA Publishes Rules to Modify TEDs

The US National Marine Fisheries Service has amended the turtle excluder devices (TEDs) regulations to enhance TEDs' effectiveness in reducing sea turtle deaths that result from trawling in the southeastern United States. The modifications, which apply throughout the Atlantic Ocean and Gulf of Mexico, affect shrimp fishermen that use bottom trawl gear in state and federal waters and take effect on April 15, 2003 in the Atlantic, and August 21, 2003 in the Gulf of Mexico. The changes include: requiring the use of either the recently approved double cover flap TED or a TED with an opening of at least 71-inch straight-line stretched mesh measurement in all offshore waters and the inshore and offshore waters of Georgia and South Carolina; requiring the use of TEDs with a 44-inch straight-line stretched mesh opening in all inshore waters, except those of Georgia and South Carolina. Source: *United Stated Department of Commerce News*, 21 February.

Scientists Ask UN to Ban Certain Types of Fishing in Pacific

Marine scientists called on the United Nations to ban the use of longline boat and gill net fishing in the Pacific Ocean, saying the methods kill not just fish, but sea birds, endangered turtles and other animals. Scientists are worried about the effect of "bycatch" - animals that are caught inadvertently while fishermen pursue other fish - on already struggling populations of fish and marine mammals. One animal that is in grave danger, they say, is the leatherback turtle. If nothing is done to protect them, leatherback turtles could go extinct in 10 to 30 years, which is why more than 400 scientists and 100 marine conservation groups are pushing for a UN moratorium. While some state and federal governments have passed laws restricting or banning longlines or gill nets in U.S. waters, the use of those methods is not restricted in international waters. Source: *Associated Press*, 18 February.

Bill Would Create Tougher Penalties for Turtle Egg Poachers

A South Florida lawmaker is sponsoring a bill to create tougher penalties on sea turtle egg poachers. Senator Steven Geller's bill (SB 174) would make it a third degree felony to possess 12 or more sea turtle eggs with a penalty of up to five years in prison and a fine of up to $5,000. While federal law allows penalties of up to five years in prison and $250,000 in fines for taking eggs from nests, poachers are often tried in state court, where simply possessing eggs carries a penalty of up to 60 days in jail and a $500 fine. Geller hopes the bill will be effective not only in punishing the people who take eggs, but also the people in restaurants, bars and elsewhere who sell the eggs. The Senate could pass the bill as early as this week. A similar bill in the House (HB 399) has received unanimous support in two committees and has one more stop before going to the full House. Source: *Associated Press*, 1 April.

New Toll Free Information Line Established to Protect Sea Turtles

The Gulf Office of the Sea Turtle Restoration Project and HEART (Help Endangered Animals-Ridley Turtles) announce the sponsorship of a toll free Texas Sea Turtle Information Line. This number allows beach visitors to report sightings of sea turtles and their nests along the Texas coasts, and will allow government agencies and biologists to better respond to protect these endangered species if needed. Anyone who visits a Texas beach and sees a nesting turtle or its tracks, hatchlings, a turtle nest, or an injured or dead sea turtle is asked to call the toll free number 1-866-TURTLE-5. The caller will be given a telephone number for a sea turtle biologist or government agency representative who is closest to the location of the turtle and be asked to make a second call to that person. Source: *HEART/STRP* press release, 2 April.

Lawsuit Challenges Scallop Dredging

Oceana filed suit against the National Marine Fisheries Service (NMFS) as part of its ongoing effort to protect marine habitats and endangered sea turtles from scallop dredging in New England and Mid-Atlantic waters. The lawsuit filed in US District Court in Boston asks for an injunction on NMFS regulations known as Framework Adjustment 15, which were approved in late February. Oceana claims current management measures fail to protect sensitive cod nursery grounds or to reduce the millions of pounds of wasteful bycatch, including endangered sea turtles, being caught in scallop dredges. Source: *Portsmouth Herald*, 31 March.

Supreme Court Upholds Current Status of Shrimp Import Regulations

Animal rights groups lost a Supreme Court appeal that sought to toughen the standards for countries that catch shrimp for American consumers. The groups argued that the State Department has lax rules for imports that put in jeopardy five species of sea turtles which are listed as threatened or endangered under the Endangered Species Act. The lawsuit stems from a congressional ban on imports of shrimp harvested with technology that may hurt sea turtles. Countries can prove that they have turtle-protection programs to get special status. The American Society for the Prevention of Cruelty to Animals, the Sierra Club and other groups sued, claiming that the ban was not being properly enforced. The case is Turtle Island Restoration Network v. Evans. Source: *Associated Press*, 7 April.

Test results show upswing in red tide levels

Red tide levels along local beaches are on the upswing with the worst reports coming from Lee County, according to test results released March 21. Since January, county sea turtle monitors have recovered 11 dead turtles, eight of them in March alone, said Maura Kraus, a biologist who leads the county's turtle program. That compares with six stranded sea turtles counted in the first three months of 2002. Organs from four of the turtles will undergo tests for red tide poisoning at the University of Florida in Gainesville. Source: *Naples Daily News*, 22 March.

Judge Dismisses Sierra Club Lawsuit

A federal judge on dismissed a lawsuit by the Lone Star Chapter of the Sierra Club that was intended to stop drilling on the Padre Island National Seashore. The Sierra Club filed a lawsuit against the federal government in April 2002, seeking to halt heavy truck traffic involved in the drilling. The group said it posed an imminent threat to the endangered Kemp's ridley sea turtles. US District Judge John Rainey ruled that the defendants were taking the appropriate steps to protect the sea turtle. Source: *Associated Press*, 18 April.

US Raps Venezuela and Honduras for Harming Sea Turtles

The United States said it would bar some shrimp imports from Honduras and Venezuela, apparently because their fishermen may be drowning sea turtles in their nets. The State Department said US law bans imports of shrimp harvested in a way that harms turtles unless a country has a "sea turtle protection program" like the United States or has a fishing environment "that does not pose a threat" to turtles. The key element of the US sea turtle conservation program is that commercial shrimp boats must use sea turtle "excluder devices" to prevent the accidental drowning of sea turtles in shrimp trawls, the department said. Source: *Reuters*, 10 March.

Destructive Hogs to be Eradicated from Cumberland Island

The US National Park Service has begun hunting and trapping wild hogs to prevent further damage to the fragile habitat on 18-mile-long Cumberland Island, near the Florida line. The feral hogs, brought here more than 200 years ago by British settlers, compete with native deer and other animals for food. The hogs in recent years also destroyed nearly two-thirds of endangered sea turtle nests. Source: *Associated Press*, 9 March.

Toxic Spill Threatens Turtles in Brazil

Officials say a toxic waste spill from a paper pulp factory is threatening endangered marine turtle species in a nature reserve. Several species of marine turtle bury their eggs at the mouth of the Paraiba do Sul river where the spill has spread over more than 50 square kilometres off Rio de Janeiro state, the environment secretariat said. The substance, which includes caustic soda, is slowly headed north towards the beaches of Espiritu Santo state. Some 20 million litres of the toxic waste escaped a week ago from a paper factory in Minas Gerais state, contaminating the Pomba river. The paper factory was shut down and ordered to pay an initial $US15 million fine. Source: *Australian Broadcasting Corporation*, 6 April.

Campaign in San Diego, Mexico aims to Save Endangered Turtles

Wildcoast, an advocacy group working to save endangered sea turtles unveiled a campaign to discourage visitors to Baja California from eating the reptiles. "Would you eat a panda?" reads a billboard just north of the San Ysidro entry point into Tijuana, Mexico. "Don't eat endangered sea turtle!" The campaign coincides with the season of Lent, when the turtles - which live on beaches and in the water off Mexico's Baja Peninsula, are often eaten by visitors and residents who mistakenly consider the reptiles an acceptable substitute for meat during the religious period. Spanish-language television and radio messages broadcasting similar pleas are planned this week, and additional billboard messages will be posted in La Paz, Cabo San Lucas, Tijuana and Ensenada, the group said. Source: *Associated Press,* 8 April.

First Kemp's Ridley Nest

For only the 11th time in the history of Padre Island National Seashore's Head Start program, a Kemp's ridley sea turtle that had been tagged by the U.S. Geological Survey returned to the park to lay its eggs. More than 24,000 turtles have been released during the program. The nesting was the first one reported to park officials this year. The turtle was fitted with a two-pound transmitter that will enable scientists to track the turtle for about a year, it was re-released into the Gulf of Mexico. The eggs were taken to a field station, where they will incubate for about 55 days. Source: *Corpus Christi Caller-Times*, 10 April.

ASIA

Brunei Museums Dept Launches Workshop For Turtle Conservation

The Director of Brunei Museums, Awg Hj Matassim Hj Jubah, spoke at the launch of the "Turtle Management and Recovery" workshop the morning of February 17. He explained that sea turtles are protected under the 1978 Wildlife Conservatory Act of the Museums Department. The four-day workshop is fully financed by the Asean Regional Centre for Bio-Diversity Conversion with the collaboration of the Forestry Department. Participants are students from upper secondary schools, staffs of the Museums Department, Forestry and Fisheries as well as some volunteers. Conducted by an invited lecturer from Malaysia, the workshop also deals with the theory and practical lessons on turtle conservation. Source: *Borneo Bulletin*, 18 February.

Protected Sea Turtles Hatchlings Released into The Sea

Endangered olive ridley sea turtles were given a head start in life recently when protected hatchlings were released into the sea. Officers and staff from the Global Environment Facility/United Nations Development Program/International Maritime Organization Regional Program on Partnerships in Environmental Management for the Seas of East Asia were on hand to participate in the undertaking. The release of captive-bred hatchlings was part of the ongoing turtle conservation efforts by the Community-Based Pawikan Conservation Project in barangay Nagbalayong in Morong, Bataan. The project has transformed the community's fisherfolks from poachers to protectors as they now guard turtles' nesting grounds and protect turtle eggs until they are hatched. Source: *ABS-CBN News*, 24 February.

Rantau Abang Sees Zero Nesting Of Leatherbacks

The famed Rantau Abang turtle sanctuary has ceased to be the nesting place of leatherback turtles. Fisheries Department data confirmed that not a single clutch of eggs was laid although three landings were detected during the recent nesting season between April and October 2002. The three landings paled in comparison with the 10,000 recorded in the 1960s. Last year, nests failed to produce any hatchlings because none of the eggs were fertilised, indirectly confirming the theory

that the turtle sanctuary's hatchery methods deployed since the 1960s had produced more female than male turtles. However, Fisheries Department marine park chief Abdul Khalil Abdul Karim dismissed the conclusion that the leatherback species could become extinct. Source: *The Star Malaysia*, 3 March.

Endangered Olive Ridley Sea Turtles Begin Mass Nesting on India Coast

Wildlife experts voiced relief that 50,000 Olive Ridley turtles crawled up an eastern Indian beach this week to lay eggs, after the endangered animals missed nesting last year. Turtle experts believe that widespread illegal fishing along the 480-kilometer (300-mile) coast of Orissa state, where three protected turtle nesting grounds lie, is responsible for the deaths of 100,000 Olive Ridleys in the past 10 years. Turtle experts plan to count the nests, turtles and hatchlings and help forest officials protect them. Source: *Associated Press*, 11 March.

OCEANIA

Turtles Under Siege

Green sea turtles have been part of Papua New Guinean coastal villagers' culture for generations. Sadly that way of life is fading. The stressful modern lifestyle is putting pressure on people to over-harvest the depleted stock of green turtles for money. In March, The National accompanied the Department of Environment and Conservation officials on a 15-minute drive eastward along the Magi Highway to the University of Papua New Guinea Motupore marine research island outside Port Moresby. The occasion was to release two endangered green sea turtles back to the sea after recovering from nasty wounds that they had received from local fishermen six weeks ago. Marine species officer Job Opu said that he had come across the turtles that are protected under the PNG Fauna Protection Act (1978) when he was doing his normal market round. Source: *The National*, 4 April.

RECENT PUBLICATIONS

This section is compiled by the Archie Carr Center for Sea Turtle Research (ACCSTR), University of Florida. The ACCSTR maintains the Sea Turtle On-line Bibliography: <http://accstr.ufl.edu/biblio.html>. It is requested that a copy of all publications (including technical reports and non-refereed journal articles) be sent to both:

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

AGUIRRE, A.A., G.H. BALAZS, T.R. SPRAKER, S.K.K. MURAKAWA & B. ZIMMERMAN. 2002. Pathology of oropharyngeal fibropapillomatosis in green turtles *Chelonia mydas*. Journal of Aquatic Animal Health 14: 298-304. (Columbia Univ, Wildlife Trust, 61 Route 9 W, Palisades, NY 10964 USA. E-mail: aguirre@wildlifetrust.org)

ANON. 2002. Abstracts of papers presented in 13th Japanese Sea Turtle Conference in Anan. Umigame Newsletter of Japan No. 56: 16-17. In Japanese. (E-mail: newsletter@unigame.org)

AVENS, L., J.H. WANG, S. JOHNSEN, P. DUKES & K.J. LOHMANN. 2003. Responses of hatchling sea turtles to rotational displacements. Journal of Experimental Marine Biology and Ecology 288: 111-24. (NOAA, NMFS, 101 Pivers Island Rd., Beaufort, NC 28516, USA. E-mail: larisa.avens@noaa.gov)

BLOCK, B.A., D.P. COSTA, G.W. BOEHLERT & R.E. KOCHEVAR. 2002. Revealing pelagic habitat use: the tagging of Pacific pelagics program. Oceanologica Acta 25: 255-66. (Stanford Univ, Hopkins Marine Stn, Tuna Res & Conservat Ctr, Oceanview Blvd., Pacific Grove, CA 93950 USA. E-mail: bblock@stanford.edu)

BRODERICK, A.C., F. GLEN, B.J. GODLEY & G.C. HAYS. 2003. Variation in reproductive output of marine turtles. Journal of Experimental Marine Biology and Ecology 288: 95-109. (Marine Turtle Research Group, School of Biol. Sci., Univ. Wales Swansea, SA2 8PP, UK. E-mail: mtn@swan.ac.uk)

CAMPBELL, S. 2003. Earthwatch cheerleader (Leatherback turtle project, otters). Smithsonian 33: 12.

CARRIOL, R.P. & W. VADER. 2002. Occurrence of *Stomatolepas elegans* (Cirripedia : Balanomorpha) on a leatherback turtle from Finnmark, northern Norway. Journal of the Marine Biological Association of the United Kingdom 82: 1033-34. (Museum Natl Hist Nat, Lab Paleontol, 8 Rue Buffon, F-75005 Paris, France. E-mail: rene-pierre.carriol@wanadoo.fr)

COBB, G.P., T.A. BARGAR, C.B. PEPPER, D.M. NORMAN, P.D. HOULIS & T.A. ANDERSON. 2003. Using chorioallantoic membranes for non-lethal assessment of persistent organic pollutant exposure and effect in oviparous wildlife. Ecotoxicology 12: 31-45. (Texas Tech Univ, Inst Environm & Human Hlth, Lubbock, TX 79416 USA. E-mail: george.cobb@tiehh.ttu.edu)

COLLINS, J.T. & T.W. TAGGART. 2002. Standard common and current scientific names for North American amphibians, turtles, reptiles & crocodilians. Fifth Edition. The Center for North American Herpetology, Lawrence, Kansas: 44 pp. Copies are available from: The Center for North American Herpetology, 1502 Medinah Circle, Lawrence, KS 66047, USA. <http://www.cnah.org>.

DE LA FAYETTE, L. 2002. United States—Import Prohibition of Certain Shrimp and Shrimp Products—Recourse to Article 21.5 of the DSU by Malaysia. American Journal of International Law 96: 685-92.

GARCIA, A., G. CEBALLOS & R. ADAYA. 2003. Intensive beach management as an improved sea turtle conservation strategy in Mexico. Biological Conservation 111: 253-61. (G. Ceballos, Fdn Ecol Cuixmala AC, Apartado Postal 161, Melaque 48980, Jalisco, Mexico. E-mail: chanoc@unm.edu)

GODLEY, B.J., A.C. BRODERICK, F. GLEN & G.C. HAYS. 2003. Post-nesting movements and submergence patterns of loggerhead marine turtles in the Mediterranean assessed by satellite tracking. Journal of Experimental Marine Biology and Ecology 287: 119-34. (Marine Turtle Research Group, School of Biol. Sci., Univ. Wales Swansea, SA2 8PP, UK. E-mail: mtn@swan.ac.uk)

HAMANN, M., C.J. LIMPUS & J.M. WHITTIER. 2003. Seasonal variation in plasma catecholamines and adipose tissue lipolysis in adult female green sea turtles (*Chelonia mydas*). General and Comparative Endocrinology 130: 308-16. (IUCN, Vietnam Office, IPO Box 60, Hanoi 10000, Vietnam. E-mail: mark.hamann@iucn.org.vn)

HATASE, H., K. GOTO, K. SATO, T. BANDO, Y. MATSUZAWA & W. SAKAMOTO. 2002. Using annual body size fluctuations to explore potential causes for the decline in a nesting population of the loggerhead turtle *Caretta caretta* at Senri Beach, Japan. Marine Ecology Progress Series 245: 299-304. (La. of Fisheries and Environmental Oceanography, Graduate School of Agriculture, Kyoto University, Sakyo, Kyoto 606-8502, Japan. E-mail: hatase@kais.kyoto-u.ac.jp)

HAYS, G.C., A.C. BRODERICK, F. GLEN & B.J. GODLEY. 2003. Climate change and sea turtles: a 150-year reconstruction of incubation temperatures at a major marine turtle rookery. Global Change Biology 9: 642-46. (School of Biological Sciences, University of Wales Swansea, Singleton Park, Swansea SA2 8PP, UK. E-mail: g.hays@swan.ac.uk)

HAYS, G.C., A.C. BRODERICK, B.J. GODLEY, P. LOVELL, C. MARTIN, B.J. MCCONNELL & S. RICHARDSON. 2002. Biphasal long-distance migration in green turtles. Animal Behaviour 64: 895-98. (Address as above)

HEITHAUS, M.R., J.J. MCLASH, A. FRID, L.M. DILL & G. MARSHALL. 2002. Novel insights into green sea turtle behaviour using animal-borne video cameras. Journal of the Marine Biological Association of the United Kingdom 82: 1049-50. (Simon Fraser Univ, Dept Biol Sci, Behav Ecol Res Grp, Burnaby, BC V5A 1S6, Canada. E-mail: mheithaus@mote.org)

HIRANO, K. 2002. A loggerhead turtle and her hatchlings found beneath a bridge across the Kurosaki River, Nagasaki. Umigame Newsletter of Japan No. 56: 15-16. In Japanese. (E-mail: newsletter@unigame.org)

INATANI, K. 2002. Sea turtle nesting beaches in Tanegashima Island. Umigame Newsletter of Japan No. 56: 8-12. In Japanese. (E-mail: newsletter@unigame.org)

IRWIN, W.P. & K.J. LOHMANN. 2003. Magnet-induced disorientation in hatchling loggerhead sea turtles. Journal of Experimental Biology 206: 497-501. (Univ N Carolina, Dept Biol, CB 3280, Chapel Hill, NC 27599 USA. E-mail: wpirwin@E-mail.unc.edu)

ISRAEL, D. 2002. Scientists call for fishing moratorium to save leatherback sea turtles. Umigame Newsletter of Japan No. 56: 13. In Japanese. (E-mail: newsletter@unigame.org)

JACOBSON, E.R., G.R. HARMAN, L.K. MAXWELL & E.J. LAILLE. 2003. Plasma concentrations of praziquantel after oral administration of single and multiple doses in loggerhead sea turtles (*Caretta caretta*). American Journal of Veterinary Research 64: 304-309. (Dept. of Small Animal Clinical Sciences, College of Veterinary Medicine, Univ. of Florida, P.O. Box 100126, Gainesville, FL 32610, USA. E-mail: JacobsonE@mail.vetmed.ufl.edu)

KAYO, M., K. HIRATE, A. KIKUKAWA, M. WAKATSUKI & N. KAMEZAKI. 2002. A sea turtle residing in a fishing harbor in Kunigami, Okinawa. Umigame Newsletter of

Japan No. 56: 14. In Japanese. (E-mail: newsletter@unigame.org)

LENGLET, G., J. HAELTERS, O.S.G. PAUWELS & T. JAUNIAUX. 2003. *Dermochelys coriacea* (leatherback sea turtle). Stranding. Herpetological Review 34: 57. (Dept. of Recent Vertebrates, Institut Royal des Sciences Naturelles de Belgique, Rue Vautier 29, 1000 Brussels, Belgium. E-mail: Georges.Lenglet@sciencesnaturelles.be)

MAGLOTHIN, M.L., M.M. LAMONT & R.R. CARTHY. 2002. *Caretta caretta* (Loggerhead Sea Turtle). Nesting behavior. Herpetological Review 33: 48-50. (Fla. Coop. Fish & Wildlife Res. Unit, Univ. of Florida, P.O. Box 110450, Gainesville, FL 32611, USA. E-mail: marthamaglothin@worldnet.att.net)

MAROS, A., A. LOUVEAUX, M.H. GODFREY & M. GIRONDOT. 2003. *Scapteriscus didactylus* (Orthoptera, Gryllotalpidae), predator of leatherback turtle eggs in French Guiana. Marine Ecology Progress Series 249: 289-96. (M. Girondot, Univ Paris 11, Lab Ecol Systemat & Evolut, UPRESA 8079, Batiment 362, F-91405 Orsay, France. E-mail: marc.girondot@ese.u-psud.fr)

MATSUZAWA, Y. 2002. Report of 5th Annual Meeting of the Sea Turtle Conservation Network of the California. Umigame Newsletter of Japan No. 56: 17-18. In Japanese. (E-mail: newsletter@unigame.org)

MEAKINS, R. H. & S. Y. AL-MOHANNA. 2003. Some problems and the importance of reptile biodiversity in Kuwait. Journal of Arid Environments 54: 209-217. (Kuwait Univ, Fac Sci, Marine Sci Unit, P.O. Box 5969, Safat, Kuwait).

MROSOVSKY, N., S. KAMEL, A.F. REES & D. MARGARITOULIS. 2002. Pivotal temperature for loggerhead turtles (*Caretta caretta*) from Kyparissia Bay, Greece. Canadian Journal of Zoology 80: 2118-24. (Univ Toronto, Dept Zool, Toronto, ON M5S 3G5, Canada. E-mail: mro@zoo.utoronto.ca)

NEFF, B.D., T.E. PITCHER & J. REPKA. 2002. A Bayesian model for assessing the frequency of multiple mating in nature. Journal of Heredity 93: 406-414. (Univ Western Ontario, Dept Biol, Biol. & Geol. Sci. Bldg., London, ON N6A 5B7, Canada. E-mail: bneff@uwo.ca)

NEWBURY, N., M. KHALIL & L. VENIZELOS. 2002. Population status and conservation of marine turtles at El-Mansouri, Lebanon. Zoology in the Middle East 27: 47-60. (Dept. of Biology, John Dalton Bldg., Manchester Metropolitan Univ., Chester St., Manchester M15GD, UK. E-mail: nicnewbury@madasafish.com)

POLAND, R., L.B. LA VELLE & J. NICHOL. 2003. The Virtual Field Station (VFS): using a virtual reality environment for ecological fieldwork in A-Level biological studies - Case Study 3. British Journal of Educational Technology 34, no. 2: 215-31. (L. B. la Velle, Univ Bristol, Grad Sch Educ, Bristol BS8 1JA, Avon, England. E-mail: linda.lavelle@bris.ac.uk)

POLOVINA, J.J., E. HOWELL, D.M. PARKER & G.H. BALAZS. 2003. Dive-depth distribution of loggerhead (*Caretta caretta*) and olive ridley (*Lepidochelys olivacea*) sea turtles in the central North Pacific: Might deep longline sets catch fewer turtles? Fishery Bulletin 101: 189-93. (NOAA, NMFS-SFSC, SW Fisheries Sci Ctr, Honolulu Lab, 2570 Dole St., Honolulu, HI 96822 USA. E-mail: Jeffrey.Polovina@noaa.gov)

PRESSLER, B.M., R.A. GOODMAN, C.A. HARMS, E.C. HAWKINS & G.A. LEWBART. 2003. Endoscopic evaluation of the esophagus and stomach in three loggerhead sea turtles (*Caretta caretta*) and a Malaysian giant turtle (*Orlitia borneensis*). Journal of Zoo and Wildlife Medicine 34: 88-92. (N Carolina State Univ, Coll Vet Med, Dept Clin Sci, 4700 Hillsborough St., Raleigh, NC 27606 USA. E-mail: barrak.pressler@ncsu.edu)

SCHMID, J.R., A.B. BOLTEN, K.A. BJORNDAL, W.J. LINDBERG, H.F. PERCIVAL & P.D. ZWICK. 2003. Home range and habitat use by Kemp's ridley turtles in west-central Florida. Journal of Wildlife Management 67: 196-206. (Conservancy SW Florida, 1450 Merrihue Dr., Naples, FL 34102, USA. E-mail: jeffs@conservancy.org)

SHEIL, C.A. 2003. Osteology and skeletal development of Apalone spinifera (Reptilia : Testudines : Trionychidae). Journal of Morphology 256: 42-78. (Univ Kansas, Nat Hist Museum, Div Herpetol, 1345 JayHawk Blvd., Dyche Hall, Lawrence, KS 66045 USA. E-mail: csheil@ku.edu)

STAMPER, M.A., M.G. PAPICH, G.A. LEWBART, S.B. MAY, D.D. PLUMMER & M.K. STOSKOPF. 2003. Pharmacokinetics of florfenicol in loggerhead sea turtles (*Caretta caretta*) after single intravenous and intramuscular injections. Journal of Zoo and Wildlife Medicine 34: 3-8. (Walt Disney World Resort, EPCOT, Living Seas, EC TRL W-251, P. O. Box 10000, Lake Buena Vista, FL 32830, USA. E-mail: andy.m.stamper@disney.com)

STEVENSON, P. 2002. The World Trade Organisation rules: a legal analysis of their adverse impact on animal welfare. Animal Law 8: 107-42.

TANAKA, K. & K. UETSUJI. 2002. Profiles of the Mon Repos Beach in Australia. Umigame Newsletter of Japan No. 56: 2-4. In Japanese. (E-mail: newsletter@unigame.org)

TURKOZAN, O., C. ILGAZ, E. TASKAVAK & A. OZDEMIR. 2003. Hatch rates of loggerhead turtles and physical characteristics of the beach at Fethiye, Turkey. Journal of the Marine Biological Association of the United Kingdom 83, no. 1: 231-32. (E. Taskavak, Adnan Menderes Univ, Fac Sci & Arts, Dept Biol, TR-09010 Aydn, Turkey. E-mail: taskavak@sufak.ege.edu.tr)

UETSUJI, K. 2002. Visiting report to Mon Repos. Umigame Newsletter of Japan No. 56: 5-7. In Japanese with English summary. (E-mail: newsletter@unigame.org)

WALKER, J.A. & M.W. WESTNEAT. 2002. Kinematics, dynamics & energetics of rowing and flapping propulsion in fishes. Integrative and Comparative Biology 42: 1032-43. (Univ So Maine, Dept Biol Sci, 96 Falmouth St., Portland, ME 04103 USA. E-mail: walker@usm.maine.edu)

WEISHAMPEL, J.F., D.A. BAGLEY, L.M. EHRHART & B.L. RODENBECK. 2003. Spatiotemporal patterns of annual sea turtle nesting behaviors along an East Central Florida beach. Biological Conservation 110: 295-303. (Univ Cent Florida, Dept Biol, Orlando, FL 32816 USA. E-mail: jweisham@mail.ucf.edu)

WOLD, C. 2002. Implementation of Reservations Law in International Environmental Treaties: The Cases of Cuba and Iceland. Colorado Journal of International Environmental Law and Policy 14: 53-118.

WORK, T.M., G.H. BALAZS, M. WOLCOTT & R. MORRIS. 2003. Bacteraemia in free-ranging Hawaiian green turtles, *Chelonia mydas*, with fibropapillomatosis. Diseases of Aquatic Organisms 53: 41-46. (US Geological Survey, National Wildlife Health Center, Hawaii Field Station, 300 Ala Moana Blvd., Room 5-231, Honolulu, HI 96850, USA. E-mail: thierry_work@usgs.gov)

THESES AND DISSERTATIONS

MORAN, K.L. 2003. Simulated green turtle grazing: effects on structure and productivity of seagrass (*Thalassia testudinum*) beds in the central Bahamas. Ph.D. Dissertation. University of Florida, Gainesville: 137 pp. (E-mail: kmoran@zoology.ufl.edu)

SENEY, E.E. 2003. Historical diet analysis of loggerhead (*Caretta caretta*) and Kemp's ridley (*Lepidochelys kempi*) sea turtles in Virginia. M.S. Thesis. School of Marine Science, The College of William and Mary in Virginia, Gloucester Point, VA: 123 pp. (E-mail: ees3a@alumni.virginia.edu)

SIGURDSSON, A. 2000. An ecological assessment of green turtles (*Chelonia mydas*) in coastal foraging and resting habitats of Hanauma Bay and Wawamalu, Oahu, Hawaiian Islands, USA. M.S. Thesis. University of Gothenburg,

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BUSVINE, J.R. 1980. Insects and Hygiene: The biology and control of insect pests of medical and domestic importance. Third edition. Chapman and Hall, London. 568 pp.

For an article in an edited volume;

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

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BJORNDAL, K.A., A.B. BOLTEN, C.J. LAGUEUX & A. CHAVES. 1996. Probability of tag loss in green turtles nesting at Tortuguero, Costa Rica. Journal of Herpetology 30:567-571.

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