



**PROCEEDINGS  
OF THE  
TWENTIETH ANNUAL SYMPOSIUM ON SEA  
TURTLE BIOLOGY AND CONSERVATION**

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**29 February through 4 March, 2000  
Orlando, Florida U.S.A.**

**Compilers:  
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**U.S. Department of Commerce  
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U.S. DEPARTMENT OF COMMERCE  
Donald L. Evans, Secretary

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
Conrad C. Lautenbacker, Jr., Administrator

NATIONAL MARINE FISHERIES SERVICE  
William T. Hogarth, Assistant Administrator for Fisheries

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## What Marine Turtle Strandings Can Tell Us

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### **INTRODUCTION**

In Greece, a country with 16,000 km of coastline and over 3,000 islands, the life of a great percentage of the population is directly related to the sea and its resources for income via the domestic fishing industry. Loggerhead (*Caretta caretta*), green (*Chelonia mydas*) and, occasion-

ally, leatherback (*Dermochelys coriacea*) sea turtles inhabit the Greek seas. Despite the existence of both national and international legislation protecting sea turtles (Groombridge, 1982) little action has been taken to ensure the survival of these endangered species at sea. Many sea turtles are found stranded nation-wide, with injuries primarily resulting from fishing activity. Lack of

awareness, combined with the decrease in fish stock and accidental damage in the fishermen's fishing gear, result in fishermen inflicting intentional injuries to a significant percentage of sea turtles. ARCHELON (the Sea Turtle Protection Society of Greece) has conducted conservation projects, since 1983, in the most important nesting areas of Greece: Zakynthos, Crete and the Peloponnese. In 1992, ARCHELON formed the Sea Turtle Rescue Network (STRN) in co-operation with the Ministry of Mercantile Marine. As a result, the Greek Port Authorities became directly involved in the collection of stranding information for the STRN. The objectives of the STRN include collecting information on live and dead strandings throughout Greece. This information revealed the large number of turtles requiring rehabilitation treatment, which resulted in the establishment of the Sea Turtle Rescue Centre (STRC) in 1994. The STRN and STRC are closely inter-linked. This has occurred as the publicity obtained at the STRC via media coverage (turtle admissions, release or death), has caught the attention of the Greek general public, encouraging them to become more involved in the plight of sea turtles. The stranding data collected in the period 1997-1999 are discussed in this report.

## METHODS

Port Police Stations, Fishery Agencies, ARCHELON personnel, environmental organisations, fishermen and concerned individuals report strandings to the STRN. For each turtle found a "stranding sheet" is completed. Photographs, thus enabling a fairly accurate evaluation of the cause of stranding, usually accompany records. For this report the strandings have been sorted into five categories as per their possible cause. These are:

1. Bycatch-in cases where the cause of stranding was hook ingestion and entanglement in fishing gear
2. Boat and propeller strike
3. Intentional injuries- primarily head trauma cases, weighted animals, decapitated animals
4. Other-cases of healthy, basking, weak, lethargic or cold-stun turtles or turtles with buoyancy problems, pathogenic infections or turtles that have ingested tar or plastic
5. Unknown-in cases where the cause of stranding could not be identified such as decomposition; possible entanglement; no apparent injuries; drowning; cases of suspected illegal fishing methods (i.e. dynamite fishing) that cannot be proven

Often these categories were found in combination (i.e. an intentional injury resulting after entanglement in fishing gear). Additionally, the data have been sorted into three size categories, according to the CCL (curved carapace length): 5-40 cm (hatchlings, post hatchlings and small juveniles); 41-60 cm (juveniles); 61-150 cm (sub adult and adult turtles).

## RESULTS AND DISCUSSION

### *Sea turtle Species Observed*

In the period 1997-1999, 524 marine turtle strandings were recorded along the Greek coastline. Of these 471 (89.9%) were *Caretta caretta*, 43 (8.2%) were *Chelonia mydas* and four (0.76%) were *Dermochelys coriacea*. In six cases (1.14%) identification of the species was not possible. The loggerhead turtle is the most common sea turtle species in the Mediterranean. Considering the occurrence of the green turtle, it is interesting to note that all the stranded *Chelonia mydas* (with the exception of one adult and one post hatchling turtle) were juveniles. Sixty-five percent of them were stranded in Peloponnese; 58% in Lakonikos Bay, which is a feeding ground for juvenile green turtles (Margaritoulis *et al.*, 1992, Margaritoulis *et al.*, 1999). Nine and a half percent were located around Attica and 7% were found on the island of Crete, possibly indicating small feeding grounds for this species. Another 11.6% were located in the East Aegean, near the Turkish coastline where green turtles are known to reproduce. Reproduction of *Chelonia mydas* has never been recorded in Greece, therefore green turtles observed in Greek waters could originate from populations nesting in Cyprus and Turkey. However, further research needs to be carried out to support the above hypotheses.

### *Cause of Stranding*

Identifying the cause of stranding, especially when it comes to dead individuals, posed many problems to the processing of the data. The absence of experienced personnel to conduct a necropsy, decomposition or the lack of apparent injuries seriously interfered with the identification of the cause stranding. Such records have been included in the "unknown" category, which contains a considerable percentage (36%) of the reports. According to the data, bycatch was the most common cause for stranding, with a percentage of 26%. The second most important threat to the Greek sea turtle populations was trauma inflicted deliberately by fishermen. Twenty-three percent of the stranded turtles had been intentionally killed or injured. However, in the last five years only one such incident was witnessed and officially reported. Boat strikes were a seasonal phenomenon, occurring during the summer, with the intense use of the beaches and the sea by people (speedboats, jet skis, etc).

### *Live and Dead Strandings*

There is a correlation between the fluctuation of live and dead strandings. From the 524 strandings reported, 31% were alive. Of these, 74% were admitted to the STRC for rehabilitation, 6% were treated by others and 20% were released or observed only, regardless of their condition.

### *Spatial Distribution of Strandings*

Fifty-one percent of the reported strandings, referring to individuals of various sizes, were located near the major

nesting areas. On the island of Crete there was an increase of over 50% in reported strandings during 1998-1999, as a result of the obtained publicity by ARCHELON. In the north-east Aegean stranding reports were over double in 1999 as a result of the closer co-operation with the regional Fishery Agency and the Port Authorities.

#### Seasonal Stranding Information

The data suggest that loggerhead and green sea turtles inhabit Greek waters throughout the year. About 50% of all stranded individuals were located during summer; 72% of the reported *Chelonia mydas* were stranded between May and September. Three out of the four stranded leatherback sea turtles were found in September and one in August, concurring with a previous study (Margaritoulis, 1986).

#### Size Based Evaluation

Of all the stranded individuals; 26.5% had a CCL ranging from 5 to 40 cm; 26.3% had a CCL between 41-60 cm; 47.2% were adult and sub adult (CCL 61-150 cm). In this size category the four stranded leatherback turtles have been included. These percentages have remained consistent over the last three years even when there was an increase in stranding reports. Due to the absence of experienced personnel on site, some of the records might have contained false or incomplete information (e.g., measurements, cause of death). Therefore there is a possible error factor that may have biased current data analysis. However, an attempt was made to estimate possible mistakes and minimise the error factor through the authors' personal experience, collection of photos concerning stranded individuals and communication with those reporting the strandings. During the period of 1997-1999 there was a considerable increase of the stranding reports in comparison to previous years. However, this may represent not an actual increase in stranded sea turtles, but can be attributed to the following: the more efficient operation of the STRN, closely co-ordinated by the STRC; public awareness raised through ARCHELON's projects; and publicity promoted by ARCHELON through the media. Thanks to the direct involvement of relevant governmental bodies, the general public and fishermen, as well as the achieved publicity, an increase of live stranding reports was also observed. One hundred and nineteen (23%) of the located sea turtles were admitted to the STRC for rehabilitation. Of these, 60% were released to the wild. This is an encouraging step forward for the conservation of sea turtles, as the life of each individual is significant for the survival of the population. The STRN should continue to expand through closer co-operation with the fishermen via workshops, meetings and in situ presence of ARCHELON observers on the fishing boats. The first steps towards this direction have already been taken with encouraging results. The expansion of ARCHELON's work beyond the nesting areas should provide a more accurate view of the situation

and further publicity about sea turtle conservation. As a result a further increase of stranding reports should be expected. Research on beach strandings indicated that turtles found washed up on the beach may represent only 7 to 13% (Epperly *et al.*, 1996) of actual at-sea mortalities, due to the drag effects of differential surface and bottom sea currents. This statistic indicates that the 524 reported strandings might have actually been between 4000 and 7500. Involving people whose survival depends on the coastal zone, the sea and its resources, as well as the general public, in the conservation of sea turtles should lead to a significant decrease in mortalities. To this respect the STRN proves to be a valuable conservation tool and its continuation is essential to provide sea turtles with a more secure future.

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