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DISCOVERING NEW NESTING AREAS OF *CARETTA CARETTA* IN GREECE

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INTRODUCTION

Greece hosts some very important nesting areas of *Caretta caretta* in the Mediterranean (Margaritoulis, 1982; Margaritoulis, 1988). The nesting capacity of the known areas has been assessed in previous projects of the Sea Turtle Protection Society (STPS; Table 1).

Caretta caretta is considered an endangered species within the boundaries of the European Economic Community. The most serious threat is the tourist development of the nesting sites. With an expanding tourism, it is of high priority to determine all nesting areas in order to acquire an overall view of the actual situation and thereby decide on the necessary action. The STPS of Greece has launched a four-year (1989-1992) project to document all existing nesting areas of the loggerhead turtle in Greece.

Some provisional results on the 1990 and 1991 work are presented in this paper.

METHODOLOGY

Identification of beaches

The coastline of the study areas has been investigated from the ground in order to identify all beaches consisting of "soft" material and also to determine the most promising of them as far as turtle nesting is concerned.

Beach identification includes on-site estimation of length and width of the beach as well as its inclination, type and grain size of the loose material, description of the geomorphology of the area, including prominent features at the hinterland and the sea, superficial observations on the flora and fauna, description of access routes and of existing development and activities, as well as of developmental pressures and plans.

Code system - Beach inventory

For the needs of the project, the shoreline of Greece has been divided in eight parts, each with a coded prefix. Numbers 001 to 999 were assigned to each of these prefixes. Thus, the code system has a capacity of incorporating about 8,000 beaches and/or beach sectors.

Identified beaches, generally longer than 100 m (or shorter if they presented a special interest) were located on 1:50,000 military maps and given a code number with the aim of assembling in due time a computerized inventory of all beaches in Greece. The coordinates of the approximate middle of the beach were taken on the maps with an accuracy of 5m. Care was taken to reserve code numbers for small or unidentified beaches, in case they would be included in the inventory at a later stage.

Beach surveys

After initial beach identification, promising sites were visited 2-4 times during the nesting season (June through October). Beaches were surveyed either on foot or by beach bikes. The aim of the surveys was to record any

reliable sign of turtle nesting, i.e. tracks of adult turtles (emergences), nesting or non-nesting pits, tracks of hatchlings (hatching nests), and depredated nests.

Sites presenting a relatively high nesting density were surveyed more frequently than originally planned or were included in the monitoring program of the STPS (e.g. some beaches in Crete).

RESULTS

A total of 7,536 km of coastline were investigated during 1990 and 1991 along 11 major study areas (Table 2). The coastline of Greece is generally very much indented. The length of identified beaches represents about 12% of the respective coastline length. It must be noted that the term "beach" does not necessarily imply only a sandy beach, but it may also include shingly or pebbly beaches not suitable for nesting. Turtle nesting has been documented in seven of the eleven investigated study areas (Table 2 and Figure 1).

DISCUSSION

With the present study, it can be said that nearly the entire coastline of Greece has been investigated for sea turtle nesting. New nesting areas with concentrated or sparse nesting have been discovered. According to the provisional results of the study, the total number of clutches laid on Greek beaches during a nesting season ranges from 2,652 to 3,677. It is estimated that this figure represents about 85% of the actual clutches, the remaining 15% being diffuse nesting not possible to be located.

It is almost certain that some of the investigated areas sustained important turtle populations (e.g. Corfu, Kos) in the past, but today they can be considered lost due to intense development and heavy human use. However, the remnants of these populations are still visible.

Other areas, mostly featuring sparse nesting, either are not subject to strong developmental pressures (e.g. some beaches in Crete) or are very extensive in length (e.g. some beaches in Ipirus) which makes them in a way "self protected." These areas should be monitored in order to assess precisely their nesting capacity, but no immediate conservation action is needed.

Finally, some areas of the present study, although subject to tourist pressures, maintain important nesting populations (e.g. some sites in Crete). Conservation actions should be undertaken in order to improve the situation on these areas. The STPS initiated in 1990 a public awareness program on Crete which showed very promising results, and it should be continued.

ACKNOWLEDGEMENTS

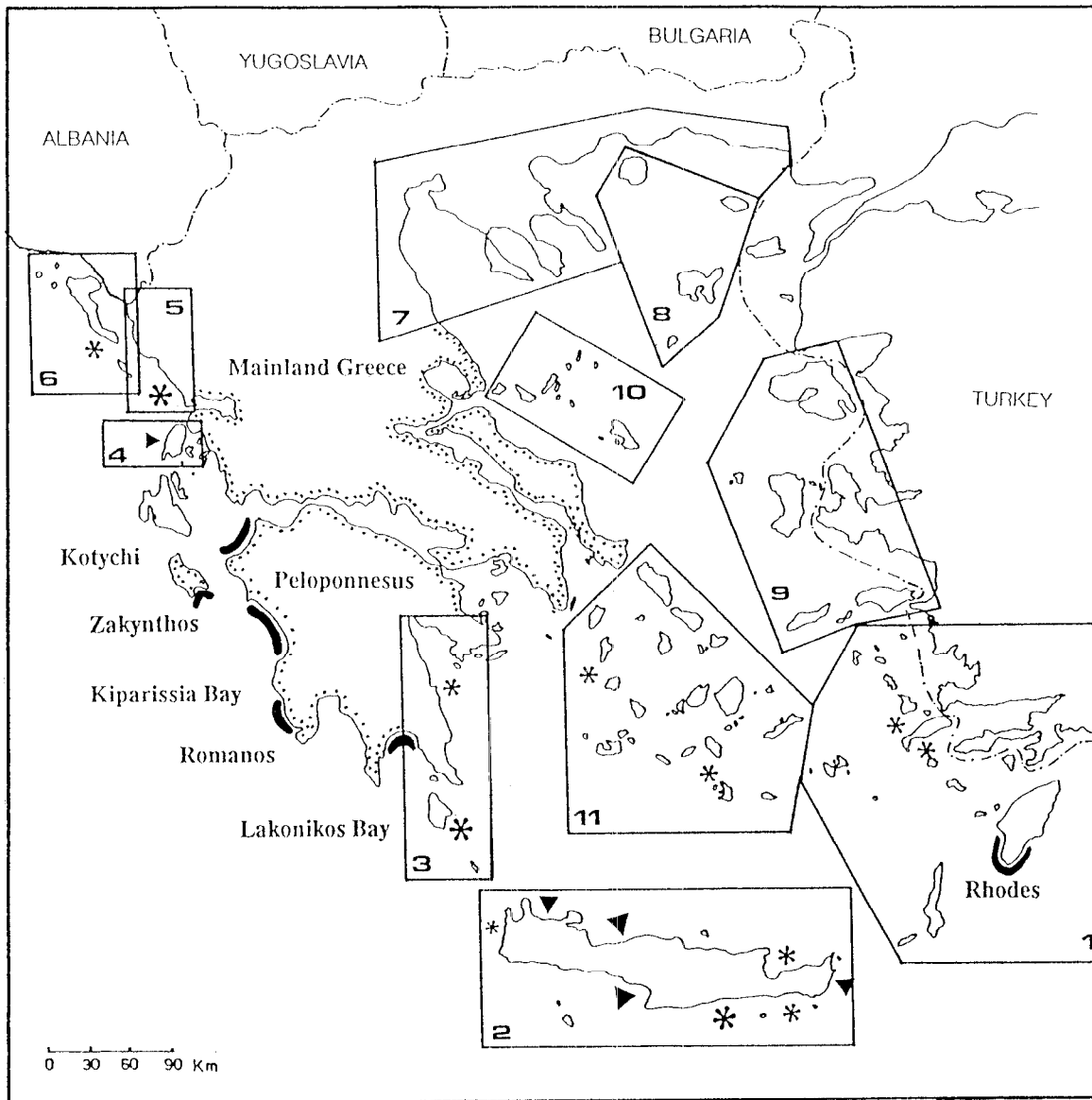
The project was financed by the Commission of the European Communities (DG XI). Many thanks to all participants for their efforts to carry out successfully an enormous task in such a short time. We also thank Port Police Stations and Fisheries Departments for providing information.

LITERATURE CITED

Margaritoulis, D. (1982). Observations on loggerhead sea turtle *Caretta caretta* activity during three nesting seasons (1977-79) in Zakynthos, Greece. *Biological Conservation* 24: 193-204.

Margaritoulis, D. (1988). Nesting of the Loggerhead Sea Turtle *Caretta caretta* on the Shores of Kiparissia Bay, Greece, in 1987. *Mesogee* 48: 59-65.

Figure 1. Sketch map of Greece showing known nesting areas (monitored by STPS), coastline surveyed during 1990-1991 and newly discovered nesting sites of *Caretta caretta*.








-  Known nesting areas monitored by STPS
-  Coastline surveyed before 1990 (occasional nestings were found in SW Peloponnesus and SW mainland Greece)
-  Major areas surveyed by STPS during 1990 and 1991 (1:Dodecanese archipelago, 2:Crete, 3:Southeastern Peloponnesus, 4:Lefkas island, 5:Ipirus, 6:Kerkyra island, 7:Aegean coast of northern Greece, 8:Northern Aegean islands, 9:Eastern Aegean islands, 10:Northern Sporades islands, 11:Cyclades archipelago)
-  Newly discovered areas with concentrated nesting
-  Newly discovered areas with sparse nesting

TABLE 1. KNOWN NESTING AREAS (BEFORE 1990) IN GREECE AND THEIR NESTING CAPACITY DERIVED FROM STPS PROJECTS

Area	Nests/season
Zakynthos	857 - 1,822
Kiparissia	598
Lakonikos	154
Rhodes	9 - 21
Kotychi	32 - 80
Romanos	17

The two values represent the highest and lowest number of nests recorded in different seasons.

TABLE 2. NEWLY (1990-1991) INVESTIGATED AREAS AND ESTIMATED NUMBER OF NESTS PER SEASON (PROVISIONAL)

Major study area	Coastline length (km)	Nests per season
Dodecanese (Rhodes not included)	1,433	60
Crete (incl.neighbouring islets)	1,218	800
SE Peloponnesus (incl.Kythira, Elafonissos)	371	20
Lefkas island	117	50
Ipirus coast	190	40
Kerkyra island (incl.neighbouring islets)	263	15
Aegean coast of northern Greece (from Mountain Pelion to Evros delta)	1,112	-
Northern Aegean islands (Thassos, Samothraki, Limnos)	412	- (*)
Eastern Aegean islands (Lesvos, Hios, Samos, Ikaria)	844	- (*)
Northern Sporades islands (Skiathos, Skopelos)	111	A
Cyclades (18 islands were mapped out of 30)	1,465	B
Total Coastline	7,536	

*: Surveyed only once within the nesting season (more surveys planned for 1992 nesting season)

A: Not surveyed within the nesting season (planned for 1992)

B: Two emergencies were reported on 2 of the 7 islands that were surveyed within the nesting season. The remaining islands will be examined during 1992 nesting season.