

An Historical Account: Assessing Loggerhead nesting in Greece Through Aerial Surveys; Probably the First in the Mediterranean

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After the discovery of turtle nesting in Zakynthos (Margaritoulis 1982), I conducted in 1981 some reconnaissance surveys along Kyparissia Bay in western Peloponnese and found out that remarkable nesting occurred at the southern part of the bay. With support from IUCN, through the Hellenic Society for Nature Protection, I organized and supervised a small team of volunteers who in 1982 and 1983 monitored a short portion of beach around Vounaki hill (37.3322°N, 21.6994°E). We were gaining experience in assessing egg-laying from the appearance of nesting spoors, locating egg-chambers, and investigating ways to avert nest predation by foxes. Nevertheless, the extensive length of the western Peloponnese coast precluded any absolute assurance that our makeshift field station was positioned at the right spot to start a long-term systematic work. To be assured of this we should know the spatial distribution of nesting along the entire coast. This could be best done through a snapshot aerial survey at the peak of the nesting season. A literature search, not easy in those days, revealed few articles which provided hints on the best ways to assess turtle nesting from the air (Caldwell et al. 1959; Davis & Whiting 1977; LeBuff & Hagan 1978).

The Ministry of Environment, where I was employed at the time, were using helicopters, rented from the army, for various tasks. My proposal to use one for surveying the coastline was readily accepted. I did two aerial surveys, one in 1983 along the western Peloponnese coast and another in 1984 in western mainland Greece. I arranged the flight routes after studying military maps

1:50,000 to locate major beaches and conspicuous landmarks. I was fortunate to obtain in both flights the same chopper (Augusta Bell 206) and the same crew, a pilot and a mechanic (Fig. 1).



Figure 1. The Augusta Bell 206 chopper with the crew and the author.

On 14 July 1983, at 06:30, we flew from Tatoi airport, north of Athens to survey the western Peloponnese coast, from Araxos Cape until Pylos (see points A and P in Fig. 2). If circumstances permitted, we could also examine the long beach at the head of the Messenian Gulf (points Q-R in Fig. 2).

Since our flight direction was from north to south, we flew parallel to the coastline, 30-40 m seaward of the beach to have the best view of tracks against the rising sun. I used a portable voice recorder to record landmarks and turtle tracks upon observing them. I had the best sightings of turtle tracks at a flight height of 40 m and at a cruising speed of 70 km/h (Fig. 3). At this speed, I could differentiate between non-nesting emergences and nests but soon it became obvious that this could be done mostly for fresh tracks; in case of old tracks this was rather ambiguous. I also had good viewing of nests predated by



mammals. Eventually, I resorted in counting only tracks (i.e., emergences).

Results are summarized on Table 1. I observed 29 tracks in the Bay of Kyllini, most of them on the sand strip separating Kotychi lagoon from the sea (Point C in Fig. 2). Surprisingly very few tracks were observed in Chelonitis Bay (Bay of Turtles!) across Laganas Bay in Zakynthos, despite a wide beach backed by dunes and the absence of coastal development (E-F in Fig. 2). In Kyparissia Bay, the gradually increasing density of tracks was evident

with the highest density noted southwards of Neda River (Point J in Fig. 2). I stopped counting tracks at Vlassada (37.3386°N, 21.6961°E) (Point K in Fig. 2), between Agiannakis and Vounaki, at about the northern limit of the section monitored by the ground team.

After a short landing at Vounaki, to say hello to the surprised team, we continued southwards, where I noted three tracks on the short beaches between Kalo Nero and Giannitsena, stretching a few kilometres

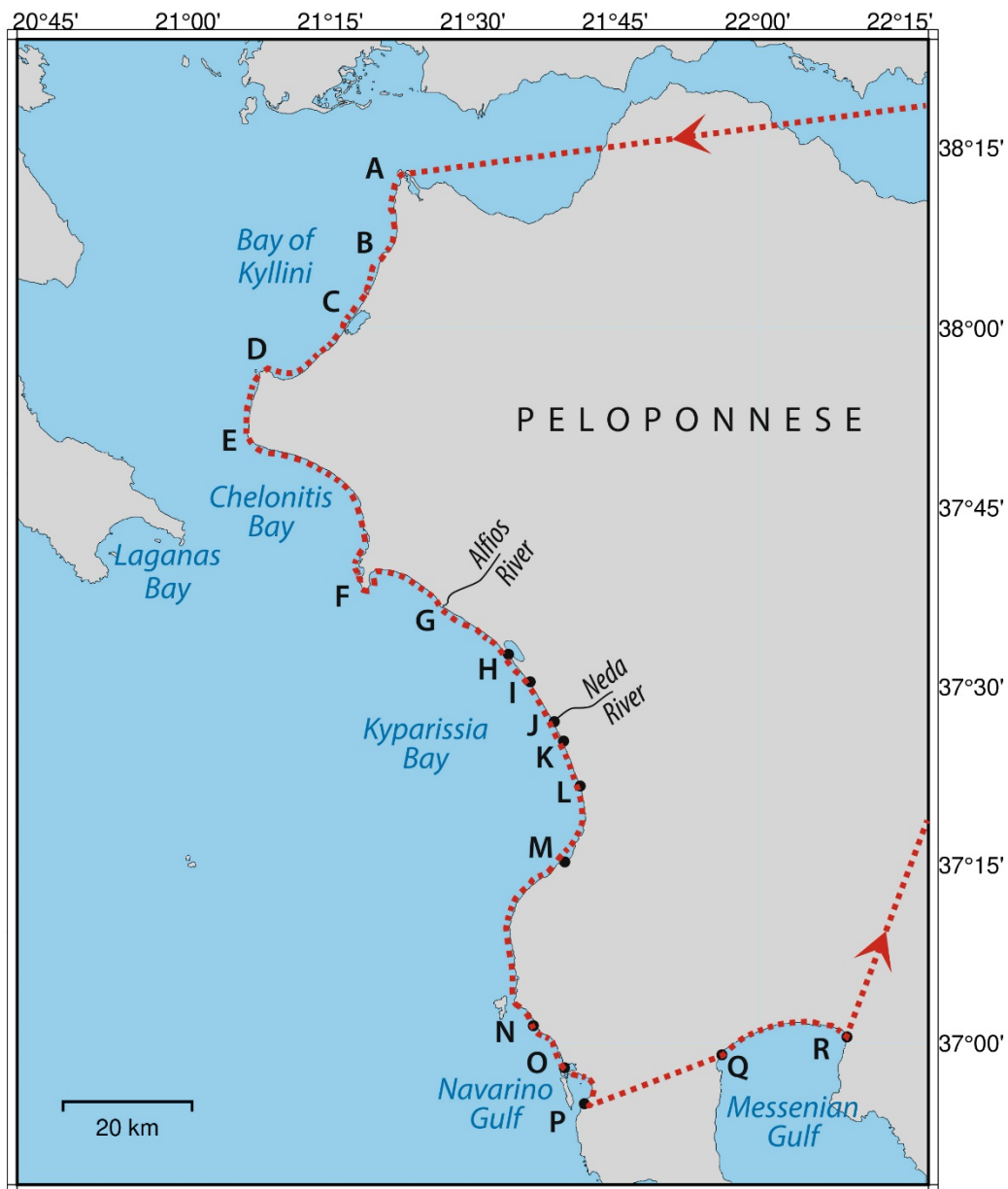


Figure 2. Flight path for surveying the western Peloponnese and Messenian Gulf coasts on 14 July 1983. Letters refer to Table 1.



Table 1. Turtle tracks observed in western Peloponnese and Messenian Gulf coasts during the aerial survey of 14 July 1983. Points A, B, C, etc. are shown on Fig. 1. Tracks in K-L were not counted (see text).

	From - To	Observed tracks
A-B	Kalogria-Kounoupele Cape	3
B-C	Kounoupele Cape-Kotyhi lagoon (Bouka)	25
C-D	Kotyhi lagoon (Bouka)-Kyllini	1
D-E	Kyllini-Cape Arkoudi	11
E-F	Cape Arkoudi-Katakolo (Chelonitis Bay)	5
F-G	Katakolo-Alfios River	1
G-H	Alfios River-Kayafa Lake	12
H-I	Kayafa Lake-Kakovatos	15
I-J	Kakovatos-Neda River	59
J-K	Neda River-Vlassada	92
K-L	Vlassada-Kalo Nero	Numerous
L-M	Kalo Nero-Kyparissia town-Giannitsena	3
N-O	Vromoneri-Voidokilia	22
O-P	Voidokilia-Pylos (Navarino Gulf)	0
Q-R	Petalidi-Kalamata	12

on either side of Kyparissia town. These beaches appear in subsequent publications under the collective name “Beaches adjacent to Kyparissia town” (Margaritoulis et al. 2003; Margaritoulis & Panagopoulou 2010; Casale et al. 2018). South of Giannitsena, the greatest part of coastline is unsuitable for nesting until Romanos beaches on which I counted 22 tracks (N-O in Fig. 2; Table 1). I saw no tracks on the narrow beaches inside Navarino Gulf (O-P in Fig. 2). To avoid running short of fuel we crossed over the land and surveyed the long beach at the head of the Messenian Gulf (Q-R in Fig. 2), where I recorded 12 tracks (Table 1). After refuelling at Kalamata airport, we returned to Tatoi.

On 18 and 19 July 1984, I undertook another survey in western mainland Greece from about the Albanian border to Messolonghi lagoon (38.3603°N, 21.3500°E), including the coastline of Amvrakikos Gulf. I saw three tracks along the Epirus coast (one track on Loutsas beach (39.1792°N, 20.5436°E) and two tracks on the 12 km beach of Nikopolis

Bay (39.0628°N, 20.6919°E)) and two tracks on the sand spits at the mouth of Acheloos River (38.3425°N, 21.1000°E) (Fig. 4). No beaches, suitable for nesting, were observed inside Amvrakikos Gulf, later proclaimed an important foraging area (Rees et al. 2013).



Figure 3. Best sightings of turtle tracks were taken from a height of about 40 m. Note the different start of tracks, owing to tide changes between emergences, indicating different emergence times.

Aerial surveys are best for obtaining a broad picture of turtle nesting distribution and abundance over extended coastlines



(Schroeder & Murphy 1999). And helicopters are best for this as they are more flexible, having adjustable speed and possibility to hover. These two aerial surveys, probably the first in the Mediterranean for assessing turtle nesting, provided a reliable indication of nesting distribution along western Peloponnese and the western mainland Greece and guided the planning of ARCHELON to establish monitoring projects, some of them running until today.



Figure 4. Non-nesting emergence on sand spit at the mouth of Acheloos River in western Greece (see text).

A large part of Kyllini Bay (named Kotychi in subsequent publications) was monitored in the years 1986, 1987, 1989 and 1995-1997, as well as in the period 2018-2021 in the course of the recent LIFE Euroturtles project (Margaritoulis et al. 2003; Margaritoulis & Panagopoulou 2010; ARCHELON unpublished data). Today, all nesting beaches in Kyllini Bay are included in the Kotychi-Strofylia Wetlands National Park. In Kyparissia Bay, systematic monitoring started in 1984 and the core nesting area was assessed (Margaritoulis & Rees 2001). Romanos beaches were surveyed in the years 1984, 1989, 1998-2000, 2004, and onwards from 2009 (Teneketzis & Margaritoulis 2021). Regrettably, it was not possible to establish a monitoring project at the head beach of the Messenian Gulf, undoubtedly a remarkable nesting area.

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