

A TALE *of* Two Beaches in Greece

By DIMITRIS MARGARITOULIS, THOMAS E. RIGGALL, and ALAN F. REES



The loggerhead nesting beaches in Laganas Bay, Zakynthos Island (TOP) and Kyparissia Bay in western Peloponnese (BOTTOM), Greece host 27 percent of all loggerhead nesting in the Mediterranean. While the number of nesting turtles is in decline at Laganas, nesting is on the rise at Kyparissia. © ARCHELON

The Mediterranean Sea is home to loggerhead populations that originated from the northwestern Atlantic about 12,000 years ago, which was at the end of the last glacial period. Mediterranean loggerheads are generally smaller than their Atlantic counterparts and are genetically distinct. A little over a decade ago, the average annual nesting abundance in the entire Mediterranean was estimated to be about 5,000 nests; by 2009, this figure was raised to about 7,000 nests, with the inclusion of new nesting sites such as Libya. The two largest aggregations, representing 27 percent of all loggerhead nesting in the Mediterranean, are in Greece: Laganas Bay on Zakynthos Island and Kyparissia Bay in western Peloponnese, with Laganas Bay historically considered the largest.

Although the two areas are separated by only 90 km (56 mi) of open sea, their ecological features are remarkably different. The nesting habitat in Laganas Bay is 5.5 km (3.4 mi) and is spread over six discrete beaches with mostly fine-grained sand, while the nesting habitat in Kyparissia Bay is 44 km (27.3 mi) of continuous beach interrupted by three rivers, with mostly coarse sand. Because the predominant winds in the summertime come from the northwest, the south-facing Laganas Bay beaches are not usually affected by inundations, while west-facing Kyparissia Bay frequently receives high surf that affects nests laid close to the water. Moreover, clutches in Kyparissia Bay are affected by severe predation, mainly by foxes, whereas in Laganas Bay, such a threat is negligible. Further, Laganas Bay is characterized by severe tourist pressure, including speedboats, beach furniture, bright lights, and human presence on beaches at night, whereas Kyparissia Bay still enjoys relatively low tourist pressure and coastal development.

Since 1984, both areas have been monitored by ARCHELON, the Sea Turtle Protection Society of Greece, including locating and monitoring clutches as well as tagging nesting females. Those efforts covered all Laganas Bay beaches, but in Kyparissia Bay the entire area was monitored only during the period 1984–1989, and then turtle work was restricted to the southernmost 9.5 km (5.9 mi) of beach. That length of shore is where the majority of nesting concentrates (estimated to be 84 percent), and where all nests have been fully protected against predation and flooding since 1992. In 2006, it was noted that the annual number of clutches in this core nesting area of 9.5 km (5.9 mi) were increasing, as was the number of first-time nesters. Given that the increase was first observed in 2006 after 15 years of full protection there (coinciding with the minimum age of sexual maturity for Mediterranean loggerheads), it is our belief that the increased recruitment in Kyparissia Bay is from turtles that hatched on those beaches during the years of full protection.

In contrast to Kyparissia, annual nesting levels at Laganas are in decline, even after the establishment of a Marine Park in 1999. In addition to tourism's long-term interference on the nesting beaches, other possible reasons for this unfortunate trend are the recent increase in mortalities from interaction with fisheries, predation by endangered Mediterranean monk seals, or increased disturbance by the many boats conducting unregulated turtle watching in the waters of Laganas Bay.

Statistical examination of annual nesting levels over the past 20 years (1994–2014) shows a significant decline at Laganas Bay and a significant increase at Kyparissia Bay, to the extent that in 2013 and 2014, the number of nests at the core area of Kyparissia Bay alone surpassed those at Laganas Bay by about 21 percent. To assess how this increase relates to nesting distribution along the whole Kyparissia Bay, ARCHELON has monitored a further 4 km (2.5 mi) of beach adjacent to the core area since 2013, and in 2014 it undertook a 15-day midseason count of the remaining 30 km (18.6 mi) of the northern section. Those surveys indicated that the proportion of nests in the

... Kyparissia Bay now hosts the largest nesting aggregation of loggerhead turtles in the Mediterranean, making it crucial that appropriate protection status be established for this magnificent area.

northern section is larger than previously assessed. Indeed, taking into account the recent data, the number of nests in the entire 44 km (27.3 mi) Kyparissia Bay exceeds Laganas Bay by about 60 percent. Hence, Kyparissia Bay now hosts the largest nesting aggregation of loggerhead turtles in the Mediterranean, making

it crucial that appropriate protection status be established for this magnificent area.

Since the late 1980s, the regional importance of Laganas Bay has inspired international interest in its protection, including the active participation of the European Commission and the Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats), which bore fruit in 1999 with the establishment of the National Marine Park of Zakynthos and the associated management agency. Unfortunately, though, the marine park has suffered from poor management, especially in periods of reduced funding and political support, and the significant declines in loggerhead nesting there call for a reassessment of the regulations and a redoubling of their enforcement.

Kyparissia Bay also requires greater protective status. Despite a large portion of the area being included in the European Union's NATURA 2000 network of protected areas, no specific protection measures are currently in force. As a result, a gradual degradation of the coastal ecosystem is being caused by human encroachment, resulting in beachfront construction, destruction of dunes, deforestation, and unregulated beach use. Plans for intense coastal building of holiday houses, even adjacent to the core nesting area, recently resulted in the European Commission taking Greece to the European Court of Justice for violating their directives concerning nature conservation. Shortly after, following an on-the-spot appraisal, the Bern Convention adopted a 12-measure recommendation urging Greek authorities to improve protection and to ban construction in the core nesting area.

The response from Greece's Ministry of Environment has been inadequate, and many of the major nature conservation organizations in Greece have appealed to the Supreme Court of Greece for resolution. It is hoped that the decision of the Supreme Court will be in favor of conservation and will keep Greece's valuable loggerhead nesting areas safe. This long-term project wouldn't have happened without the devotion and enthusiasm of several thousand volunteers who are from all over the world and who worked tirelessly day and night on the beaches of Laganas Bay and Kyparissia Bay. Their efforts are a testament to the immense conservation value of those natural areas and of the Mediterranean loggerheads that nest there each year. ■