



PROCEEDINGS
OF THE TWENTY-SECOND ANNUAL
SYMPOSIUM ON SEA TURTLE
BIOLOGY AND CONSERVATION



M i a m i . U S A

4 to 7 April 2002
Miami, Florida, USA

Compiled by:
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U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
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August 2003

habitats, population identification, population size estimation and tagging, also educational activities to sensitise the fishermen about the threats to sea turtles in the foraging habitats, like oil pollution, dynamite and chemical fishing, bottom trawling and other activities which directly or indirectly affect the health and physical integrity of sea grass, reefs, and related coastal ecosystems.

SUMMARY AND CONCLUSION

The social, cultural, traditional and economic potentials of the fishermen in El-Anphoshi area in Alexandria can be utilized in the conservation of the sea turtles. There is a growing interest amongst fishermen living in the area to establish their own conservation groups that will help in solving their local problems. Many fishermen have begun to understand what can be done to resolve the problems, and what tools can be used. A fishermen's Special Interest Group focusing on sea turtle conservation can help local people to better understanding the problem and to plan their own actions to address it.

Acknowledgements. I wish to thank all the Fishermen and the fishmongers for their friendly participation and encouraging attitude. I am sincerely grateful to Dr. Adel Abou Zahra (General Secretary of the Friends of the Environment Association, Alexandria) and Mrs. Lily Venizelos, President of the Mediterranean Association to Save the Sea Turtles, MEDASSET, for their support and advice. I wish to thank Omnia Mahmoud, Neven Fakhry, Sara Ahmed, Dimitie Caravous Marwa Nada, Gilan Yossief, Asmaa El Beshbeshy, Milda Helmy, Rehab Adel, and Hassan Shater for their valuable help and co-operation in conducting this study. I am sincerely grateful to my mother, family and friends for supporting my work. I am very thankful to the Global Environmental Facility (small grants) for funding my project, and wish to thank the David and Lucile Packard Foundation and the Sea Turtle Symposium for my travel support

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Five years of implementing management policies for the protection of sea turtles on Crete: an evaluation

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INTRODUCTION

Crete is the 5th largest island in the Mediterranean, hosting three important nesting sites for loggerhead sea turtles in Greece (Rethymno, Hania and the Bay of Messara). ARCHELON, the Sea Turtle Protection Society of Greece has been monitoring those sites since 1989 (Margaritoulis et al. 1992). Crete, with 2.9 million visitors per year, is also one of the three most important tourist destinations in the Mediterranean. Uncontrolled tourism development, which has replaced agriculture as the mainstay for the local economy is one of the main reasons why the nesting sites of the island are under pressure. With the conclusion in 1997 of a LIFE-Nature Programme, co-funded by the European Union, a Management Plan was compiled to address the threats sea turtles face in the area using techniques that can ensure their coexistence with human activities (Irvine 1997). Since that time ARCHELON has proceeded with its implementation, aiming to ensure the long-term viability of the nesting sites. This presentation analyses the strategy and results of the implementation of the Management Plan on Crete, and evaluates its successes.

OBJECTIVES

The intense tourist development has had an impact on the nesting habitats of Crete. Erosion caused by illegal constructions and beach armoring, the ever-increasing number of beach furniture and the use of heavy machinery for beach cleaning purposes reduce the area available for sea turtles to nest and may be detrimental to the safe incubation of the eggs. Furthermore, light pollution affects nesting activity and causes hatchling disorientation (Witherington and Martin 2000). The main objectives of the Management Plan include on one hand mitigating the effects of the current state of the beaches on sea turtle nesting and on the other preventing all future developments from having a negative impact on the beach, thus ensuring their viability as nesting sites. Another important objective is the achievement of the above with the active participation and support of the local community.

IMPLEMENTATION

Implementation of the Management Plan includes monitoring a total of 33 km of nesting beach on Crete where 400-800 nests are laid annually. All beaches require special management interventions so as to maintain the present levels of nesting. Nest protection includes caging, relocating to the back of the

beach or to natural beach hatcheries, and shading in order to prevent hatchling disorientation. Due to the above measures, the incubation of the eggs is ensured while hatchling loss due to disorientation is minimised. ARCHELON also runs a public awareness and environmental education programme addressed to tourists and the local community aiming to communicate with them and gain their support.

The Management Plan is also implemented through lobbying, cooperations and partnerships with the authorities, the tourism industry, and other NGO's, who become active participants in the effort to protect the sea turtle nesting habitats on a long-term basis. More specifically: (1) The Ministry of Environment was the authority that determined that the nesting sites of Crete are to be included in the proposed NATURA 2000 Network based on the fact that *Caretta caretta* is included in Annex II (priority species) and Annex IV of the Habitats Directive (92/43/EEC). As obliged by the directive, NATURA 2000 sites should come under a special protection status and all activities have to comply with specific management proposals. (2) In Greece, the area within a set distance from the sea is considered public land and is regulated by the Public Land Department, which is answerable to the Ministry of Finances. In cooperation with ARCHELON, they have issued a set of instructions regulating the use of the sea turtle nesting beaches on Crete. It is also the authority dealing with any illegal constructions within that zone. (3) ARCHELON co-operates with all the major tour operator companies. They contribute to raising awareness, by providing information to tourists before or upon arrival to the island. During 2001, information about the Society and sea turtles on Crete was included in 107,000,000 brochures distributed to the companies' prospective clients. Additionally, tour operators apply pressure on hotel owners and local authorities in order for them to enforce protection measures for the sea turtles of Crete. (4) The Hellenic Society for the Protection of Nature is an NGO coordinating the Blue Flag Awards in Greece. The Blue Flag is awarded to beaches meeting a set of criteria, concerning the environment as well as the facilities available to beach users. ARCHELON cooperates with HSPN. At the nesting sites of Crete, one must comply with specific regulations concerning the protection of sea turtles in order to receive the Blue Flag.

RESULTS

Mitigation of existing beach status on the nesting activity. According to the Management Plan, regulated use of beach furniture may reduce sea turtle nesting activity. It is suggested that no more than 50% of the beach should be covered in beach furniture and umbrellas should be set in straight rows and columns, leaving a 5-metre zone at the back of the beach for sea turtles to nest. Sunbeds should be collected at night and stored away from the beach to be replaced the following morning. In 2001, all the major hotels on the nesting sites of Crete complied fully with these regulations. As a result, 2,063 sunbeds were collected at night, representing 17.7% of the total. The Public Land Department and the port authorities fined owners who did not abide to the existing regulations. According to regulations issued by the Public Land Department and the port authorities, The use of heavy vehicles on the beach is not allowed between the 31st of May and the 31st of October. Beach cleaning during the nesting/hatching season should be conducted either manually or using light machinery and under the supervision of an ARCHELON representative. The prefecture of Rethymno was the first to establish a company responsible for beach cleaning in 1998, with ARCHELON being a shareholder and a member of the Board of Directors. 2001 was the first year that no heavy vehicles were used on the beach during the nesting/hatching season.

Light Pollution is one of the most difficult problems to tackle, due to the large number of lights used on buildings directly behind the beach. ARCHELON first focused on floodlights, which were assessed to have the most detrimental effect.

In 2001, 90% of the floodlights was switched off, shaded or directed away from the beach. This helped to reduce the amount of light pollution, although, ARCHELON still needs to resort to nest protection measures like nest shading in order to prevent hatchling disorientation.

Thanks to ARCHELON's cooperation with the Public Land and Town Planning Departments, 1000 m² of illegal constructions were removed from the beach and \$130,000 were paid in fines during 2001. Most of the new constructions were stopped after the relevant authorities were informed.

Controlling developments on the nesting sites. Plans for large-scale works have been blocked by the authorities because of the impact they would have on the sea turtle nesting sites. These include constructions of beach roads, a fishing harbor and a motorway extension. The Public Land Department have agreed not to sell any of the land within the sea turtle nesting sites. The Ministry of Environment has stipulated regulations concerning future developments on the nesting habitats of Crete. These fully agree with the management plan. In order to obtain permission to be built, a construction must among be at a set distance from the beach, do not alter the dune area and ensure that there is no light spillage on the beach. Furthermore, the local community of Rethymno is planning to establish a Management Body for the protection of the sea turtle nesting sites. The main partners include besides ARCHELON and a local NGO, The Prefecture of Rethymno, the municipalities involved, the General Tourism Office, The Hoteliers Association and the port authorities. The management proposals put forward will be submitted to the Ministry of Environment in order to achieve a ministerial decision regulating beach use and development on the coastal zone.

CONCLUSIONS

In the years that followed the compilation of the Management Plan, ARCHELON has managed to: (1) maintain the levels of nesting activity; (2) mitigate the condition of the nesting habitats by improving the conditions under which sea turtles nest; and (3) prepare the grounds for effective legislation to be enforced on the nesting sites of Crete without opposing the needs of the local community. While it is obvious that a lot of effort is still required, especially in matters concerning beach use, ARCHELON will continue to work actively for the implementation of the management plan.

Acknowledgements. The authors wish to thank Alan Rees and Thanos Belalidis for their valuable input and feedback while preparing this presentation. Special thanks are due to Vivian Gerogiannis for the graphic designing and preparation of the present poster. The Authors also wish to thank the David and Lucile Packard Foundation for their financial assistance, which has made it possible for Aliki Panagopoulou to attend the 22nd Sea Turtle Symposium in Miami, Florida.

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