

ordinance issue with the assistance of the resource agencies. An informal survey of local business owners and residents met with overwhelming support. We received guidance from the county planner on how to proceed and then approached the County Commission. We were pleased that the County Commission showed support and a willingness to proceed. The process to pass an ordinance is set by statute. We reviewed several existing ordinances and spoke with groups that had attempted to pass ordinances and failed. With guidance from the Florida Department of Environmental Protection (FDEP) we modified Witherington and Martin's model ordinance to fit the needs of Franklin County. Several drafts were reviewed and modified in an attempt to use the least restrictive methods necessary to protect marine turtles. We presented the final draft to the County Commission and a public hearing on the ordinance was advertised and held. The only significant discussion centered around the fact that Florida Power Corporation did not have a rate schedule for the low-pressure sodium (LPS) vapor lamps that are required by the ordinance. We reached a compromise to allow non-compliant lighting until the year 2002, as long as the lighting has a cutoff feature and shield. The County Commission felt this would give Florida Power Corporation enough time to get a rate schedule for LPS lights. Overall, Florida Power Corporation has been very supportive of conservation measures to protect marine turtles and they agreed to the compromise. The County Commission voted and passed the ordinance on 16 June 1998.

Passage of this ordinance sets standards for both new and existing artificial light sources, seaward of the Coastal Construction Control Line, that provides the highest level of protection for nesting marine turtles and their hatchlings. Before granting any building permit for coastal construction, the Franklin County Planning and Building Department (FCP&BD) shall determine that all proposed development complies with the ordinance. Lighting shall not be changed without first obtaining a permit from the County. Such permits will only be issued when the proposed lighting plan complies with the ordinance. Anyone who submits an application for coastal construction activities will be informed of the existence of and the requirements of the ordinance.

The FDEP and the Florida Marine Patrol have authority to enforce the ordinance. Violators will be notified by the

FCP&BD about the ordinance. The notice will describe the violation and will include a lighting brochure from DEP and a copy of the ordinance. The violation will be corrected immediately or punished as a misdemeanor. The penalty upon conviction is a fine not to exceed \$500, imprisonment not to exceed 60 days or both. Each day of any such violation shall constitute a separate and distinct offense.

Public education will remain an important part of marine turtle conservation in Franklin County. Efforts are underway to assure that people are aware of and understand the ordinance. The residents, visitors, business community, and commissioners of Franklin County were very supportive of the ordinance. We hope this support continues and marine turtles find a suitable nesting environment in Franklin County for many years to come.

#### Acknowledgements

We would like to acknowledge the staff of the Apalachicola National Estuarine Research Reserve, Florida Power Corporation, the St. George Island Civic Club, the Franklin County Commission, and Allan Pierce for their contributions to the passage of Franklin County Ordinance No. 98-11, "Lighting Ordinance for Marine Turtle Protection of Franklin County, Florida". We also thank Sandra L. MacPherson and Charlotte Chumney for reviewing a draft of our manuscript.

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## Proposals for the Conservation of Marine Turtles on the Island of Boavista (Republic of Cabo Verde, Western Africa)

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Sea turtles are considered to be a potential high-value natural resource for the Republic of Cape Verde. Five species inhabit waters of this archipelago, where they feed and/or reproduce. *Caretta caretta* is the most common

species, nesting on the islands of Sal, Boavista, Maio and São Vicente. *Eretmochelys imbricata* is only seen as juvenile stages, with some, non-confirmed, references about breeding activity in this area. *Dermochelys coriacea*,

*Lepidochelys olivacea* and *Chelonia mydas* are also occasionally sighted.

The recently discovered nesting population of *Caretta caretta* on Boavista island has not yet been properly assessed. However, it seems to be one of the most important populations in the Atlantic Ocean.

The conservation of sea turtles at Boavista is affected by two major problems, due to the vulnerability of the nesting females when emerging from water:

- Direct exploitation of nesting females and their clutches by local people.
- Natural predation by the abundant ghost crab (*Ocypode quadratus*).

Several management and scientific actions must be accomplished in the short term, in order to preserve the Boavista population as a promising ecological and tourist resource. This strategy could serve as a model for the conservation of other Caboverdean marine turtle populations.

### Human Pressure

Direct human exploitation is a significant threat to all sea turtles. These animals are intentionally caught in the sea by fishermen and slaughtered on the beaches when the females emerge to lay their eggs. Turtle meat and eggs are consumed, whereas the shells (and other by-products) are sold as decorative items (for the tourist trade).

The number of nesting *C. caretta* at Boavista appears to be declining year by year, due to an increasing human pressure.

### Natural Predators

The ghost or sand crab (*O. quadratus*) is one of the most important recognized predators of both developing eggs and hatchlings. It inhabits Boavista beaches in great numbers, digging deep galleries to gain access to the turtle clutches. During the incubation period, they prey upon eggs, reducing the hatching success. The predatory activity of crabs also facilitates the development of opportunistic bacterial infections within the clutch. Moreover, these crabs may also feed on hatchlings either in the own clutch or on the way of the small turtles to the sea.

### Proposals for the Conservation of Marine Turtles in Cape Verde

1. *Creation of a Biological Reserve on Boavista Island:* Priority must be given to the protection of the most important nesting areas. *A priori*, 'Biosphere Reserve' appears to be a suitable conservation term to define these sites, since it includes those areas with a high natural value that can be used by the islanders to increase their economical status (or income). The limits of a first reserve (on Boavista) could be established covering the eastern half of the island.

2. *Continuous monitoring and tagging campaigns of sea turtles and their clutches.* A continuous tagging program, already started in the 1998 breeding season, is important to complete the knowledge of nesting turtles on

Boavista island. Some of the targets of this proposal are to determine the population size and rate at which it declines due to human activities and natural predators, and the improvement of hatching success. In this regard, the development of an incubation program, transferring vulnerable clutches to safer areas, is intended to improve hatchlings' survival rate. Finally, it could be feasible to establish new nesting colonies on those beaches, that were abandoned because of a severe predatory pressure, using hatchlings resulting from the mentioned incubation program.

3. *Vigilance of beaches and reinforcement of conservation laws.* New protection measures must be added to the existing legislation to impede or, at least, reduce the capture of sea turtles and their eggs. First of all, it is essential an intensive vigilance at beaches during nesting season, especially those included in the proposed natural reserve, since they host the major number of turtles. Besides, they have been the most exploited in recent years. Second, compensatory measures must be offered to local people in order to assure a gradual replacement of this traditional food resource, since it should not be forgotten that some human nucleus lack of enough protein sources in their diet.

4. *Status of marine turtles on other islands from Republic of Cape Verde.* First of all, it is necessary to complete the distribution of all marine turtle species that inhabit this archipelago. On the other hand, taking into account that the turtle population is declining due to human consumption, research should be addressed to discover new nesting colonies of *C. caretta* and other species. Maio, Sal, or Santa Luzia are the islands that *a priori* might be candidate to host marine turtles, since they have suitable beaches. Some bibliographical references appear to confirm this fact.

5. *Education program.* It is essential to implement an education program with the aim of making Cabo Verdean people aware of the cultural and economical importance of preserving this significant natural resource. This program should contemplate the following subjects:

- The production of TV reports and advertisements directed to local people.
- The elaboration and delivery of educational leaflets at schools, on the importance of preserving marine turtles and the littoral environment.
- To offer information talks at every island to sensitize islanders to the need for reinforcing (or managing) this natural resource.
- Likewise, a cooperative link between local NGOs and other community projects should be agreed to develop environmental education programs.

6. *Use of ecological resource.* The need for the local inhabitants to stop capturing the marine turtles must be compensated for by offering valid choices to improve their living conditions. The turtles as a source of income through ecological tourism has already been tested in several places in the world, so it can be considered as unailing. At the same time, this activity will increase substantially the tourist attractiveness of the archipelago, and so the standard of living for Caboverdeans.