

Marine turtles on Bioko Island, Equatorial Guinea

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Four endangered species of marine turtle nest on the southern beaches of Bioko Island, Equatorial Guinea. The turtles and their eggs are an important traditional source of food for the people of the area and turtle populations have apparently declined considerably, probably because of overexploitation. This paper reviews what is known about Bioko's marine turtles, their nesting seasons, population trends, use by humans, conservation status and recent conservation efforts. Recommendations are made for additional research and conservation action.

Introduction

Relatively little attention has been given to the biology and conservation of marine turtles along the coast of West Africa (Brongersma, 1981; Groombridge, 1982; Fretey and Girardin, 1989; Groombridge and Luxmoore, 1989; Carr and Carr, 1991; Fretey and Malaussena, 1991). Bioko Island, Equatorial Guinea, is no exception (Figure 1).

In 1963 Eisentraut (1964) found green turtles *Chelonia mydas* and hawksbill turtles *Eretmochelys imbricata* nesting on the southern beaches of Bioko. Local people told him that two additional species of marine turtle also nested there. H. Wermuth suggested to Eisentraut that the other two species might be the olive ridley *Lepidochelys olivacea* and the loggerhead *Caretta caretta* or, less probably, the leatherback *Dermochelys coriacea*. All three species occur in the Gulf of Guinea, and all but the loggerhead are known to breed there (Brongersma, 1981; Groombridge, 1982; Iverson, 1986; Groombridge and Luxmoore, 1989).

During January–March 1986 and March 1990 I spent several days on the southern coast of Bioko as part of surveys of the island's primates and rain forests (Butynski and Koster, 1994). I was accompanied by Stanley H. Koster on the 1986 survey and by Dietrich Schaaf and Gail W. Hearn on the 1990 survey. During both visits, evidence of nesting marine turtles

was found and discussions concerning these animals were held with people from the local village of Ureca. On the second visit I brought published drawings of all five species of marine turtles known to occur along Africa's west coast. These were shown to the marine turtle egg collectors and hunters as an aid to species identification.

This paper presents some new information on Bioko's marine turtles and reviews what is known about their nesting seasons, population trends, use by humans, conservation status and recent conservation efforts. It is hoped that it will lead to more research on the status, biology and economic importance of Bioko's marine turtles, and to the conservation and management activities necessary for their long-term survival.

Background

Bioko Island (formerly Fernando Poo and then Macias Nguema Biyogo) lies 32 km off the coast of Cameroon (3°48'–3°12'N; 8°25'–8°57'E). The coastline of this 2017-sq-km island is dominated by cliffs and narrow, rocky beaches. There are, however, about 34 km of wide beaches covered with fine, black sand of volcanic origin (Figure 2).

The wettest period is July–October and the driest December–March. Annual rainfall on the southern coast is approximately 11,000 mm,

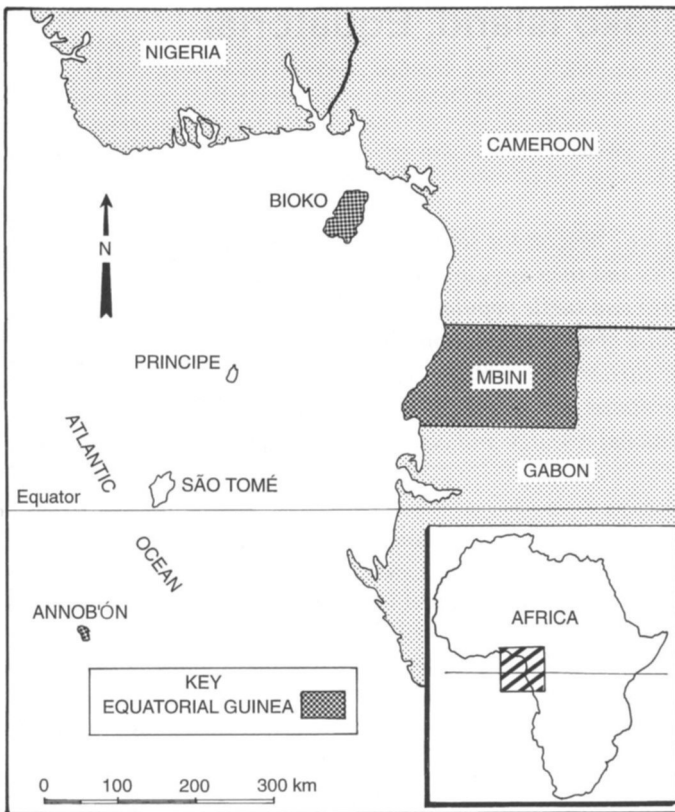


Figure 1. Equatorial Guinea is located in tropical West Africa. It consists of Mbini, Bioko Island and Annobón (Pagalu) Island.

making it one of the wettest places in Africa.

The southern quarter of Bioko has, by far, the lowest human population density. This is because the high precipitation and rugged terrain make accessibility and agriculture difficult. All of the 200–300 people on this part of the island live in the coastal village of Ureca, which is located near the centre of Bioko's longest stretch of turtle nesting beaches. The people of Ureca are the only ones within a 5-h walk or boat ride of these beaches. They, therefore, conduct nearly all of the island's turtle egg-collecting, and onshore and offshore turtle harvesting.

The surveys

Much of the information presented here was provided by the people of Ureca, particularly Chief Richard Leoncio Riaco and several turtle hunters. Valuable information was also given

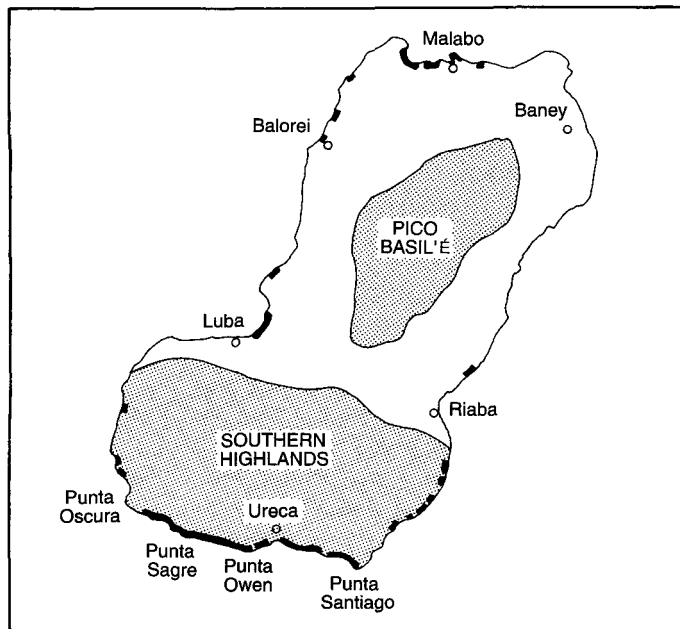
by Saturninio Malest Ballovera (Curator of the National Museum), Herbert Gross (GTZ Fisheries Adviser to Equatorial Guinea) and Juan Pedro Gonzalez Kirchner (primatologist). In addition, in 1986 we walked, at least once, nearly all of the 19 km or so of beaches on southern Bioko. About 6 km of southern beaches were searched in 1990.

Results and discussion

What turtles nest on Bioko?

As noted above, Eisentraut (1964) found green turtles and hawksbill turtles nesting on Bioko and was told by local hunters that two other species of marine turtles also nested on the island. Based on descriptions given to us in 1986 by the local people, it was obvious that one of the other two species was the leatherback. This was confirmed in 1990 when

Figure 2. Map of Bioko Island showing the locations of places referred to in this paper, including the Pico Basile (350 sq km) and Southern Highlands (600 sq km) protected areas. The thicker black lines along the coast indicate the locations of wide sandy beaches. Marine turtles nest on the beaches between Punta Oscura and Punta Santiago. Apparently the other beaches are not used, or are little used, by nesting turtles.



the eggs of this species were found (see below).

We suspected that the fourth species was the olive ridley (Butynski and Koster, 1989a) but this was not confirmed until my 1990 visit. In 1990 local people identified the olive ridley from pictures and spoke of a turtle that when placed on its back could right itself. Of the five species of marine turtle, apparently only the olive ridley is capable of this. In 1990 J. P. Gonzalez Kirchner said he had photographed all four species of turtles nesting on Bioko and that the fourth species was indeed the olive ridley.

The people of Bioko do not seem to be familiar with the loggerhead. Although this turtle is seen occasionally in the Gulf of Guinea, there is no record of it nesting on any of its islands.

Based upon our interviews, it appears that the green turtle is the most common turtle nesting on Bioko. This species is probably followed in abundance by the hawksbill. The olive ridley and leatherback are apparently uncommon.

Nesting seasons

Between 31 January and 6 March 1986 we made three 1–2 day visits to the southern beaches of Bioko. Three fresh (less than 24 h old) green turtle nests were found during these visits. Two of the nests had been dug up and the eggs taken by people. The third nest had been destroyed by drills *Mandrillus leucophaeus*. On 6 March 1990, a butchered green turtle was found and on 20 March 1990 we saw the tracks of a large green turtle that had come ashore the previous night to nest.

Eisentraut (1964) stated that green turtles nest on Bioko during November–February and that they were first seen for sale in Luba in late November. During 7 weeks spent at Ureca, starting in January 1963, Eisentraut saw only green turtles coming ashore to nest. We were told that October–December is the peak of the green turtle nesting season but that small numbers nest in September, and January into March. Our observation of a new nest on 20 March 1990 confirms that the nesting season extends well into March. The conclusion is that the green turtle nesting season on Bioko begins in late September (near the

end of the wet season), continues throughout most of the dry season, and ends in late March.

Two nests excavated in 1990 by local collectors contained 79 and 102 green turtle eggs, respectively. The mean diameter of 30 eggs taken from these two nests was 38 mm (range 36–40 mm).

Hawkbills probably have a nesting season on Bioko similar to that of green turtles. Eisentraut (1964) saw hatchlings emerging from one nest near Ureca in late January 1963.

Small numbers of leatherbacks are said to nest on the southern beaches during October–February. Unlike the other three species, they are apparently only present in the offshore waters during the nesting season. In 1990 I found four empty, but otherwise intact, leatherback eggs (the contents had been removed by egg collectors) near the mouth of the Punta Sagre. Their mean diameter was 55 mm (range 54–56 mm).

Use by humans

The green turtle is a species of considerable traditional and economic importance to the people of Bioko, particularly to those living at Ureca. I was told that this is the only turtle whose meat is eaten by the people of Ureca and the primary one from which eggs are taken. Apparently the eggs are preferred to the meat.

Captured turtles are held in circular corrals, 5–10 m in diameter, made from stout poles pushed vertically into the ground. They are located under the shade of trees on the uppermost parts of the beaches. The eggs and live adult turtles are usually moved from Ureca to the village of Luba, or to the capital city of Malabo, by large (c. 7 m long) dugout canoes powered by outboard motors. In Malabo, a small- to medium-sized green turtle brought the equivalent of \$US35–45 in 1986, while a large one sold for about twice that.

Hawksbill shells were commonly displayed in Malabo and tortoiseshell was for sale. Like the green turtle, the hawksbill and olive ridley are killed for their meat. The meat of the hawksbill and olive ridley is not preferred by

the people of Ureca and, therefore, is most often sold to people in other villages. We were told that, compared with the green turtle, the flesh of other species of marine turtles is too fatty and of poorer taste.

Although the leatherback is not killed for its flesh, and seldom killed for oil, its eggs are harvested. It is believed by some that killing a leatherback will bring a big storm to Bioko.

The impact of trawlers operating off the coast of Bioko on the marine turtle populations is not known. Russians stationed at a naval base at Luba during the 1970s also exploited turtles on the southern coast. Unfortunately, I obtained no information on their level of harvest.

Food is very expensive on Bioko and this is reflected in the high prices paid for green turtles. While the capture and sale of Bioko's green turtles might seem financially profitable, it is important to note that the costs of boats, outboard motors, fuel and labour are high. In 1986 the people of Ureca no longer owned even one outboard motor. As a result, they hired boats to come and carry their turtles to the markets. This is an expensive undertaking.

Population trends

People at Ureca claimed that in the 1940s the peak nightly harvest was 200–300 green turtles. In 1986 I was told that, during the height of the nesting season, two to four boats per day each hauled 15–20 green turtles from the southern nesting beaches to Luba or Malabo (boat rides of about 5 and 12 h, respectively). From visits to the major turtle markets on Bioko, H. Gross (pers. comm.) estimated that in 1986 approximately 2000–2500 turtles were captured on Bioko. During the 1985/86 season the peak capture rate was said to be about 100 turtles per night with roughly 50 per cent of the green turtles coming ashore being harvested. In 1990 it was claimed that 200–500 green turtles were captured each year.

The consensus of the people of Ureca is that there are far fewer green turtles and hawkbills nesting on Bioko today than during the 1940s. It is difficult to avoid the conclusion

that these two species are overexploited and in decline. The harvesting of green turtles, hawksbills and their eggs on Bioko is an exception to Brongersma's (1981) statement that, 'Today intensive exploitation [of marine turtles] for human consumption does not seem to take place in the Eastern Atlantic.'

Local people claim that the only marine turtle species which appears not to have declined noticeably in numbers since the early 1940s is the leatherback. This may be due to the fact that it was never common, and that the adults are seldom killed by turtle hunters.

Nesting beaches

Based on the excellent 1 : 50,000 maps available for Bioko, I estimate that there are about 15 km of broad, sandy beaches scattered along the north, east and west coasts (Figure 2). Most of these beaches are less than 1 km long. The three longest beaches are near major roads and the three largest towns on the island (Malabo, Luba, Riaba). Most, or all, of these beaches may be suitable for marine turtle nesting but I was told that there was little or no nesting on them as of 1990. This might be due to past overexploitation of the turtles. No historical data on this matter were located.

Fortunately, the most extensive stretch of sandy beaches lies along the southern coast. This is the most remote part of Bioko, has few people, no roads, and is in a relatively pristine state. Based on what I was told, the most important beaches for turtle nesting on the Island lie between Punta Oscura and Punta Santiago (Figure 2). Here there are about 19 km of beaches along a 23-km stretch of coast. Local people contend that the beaches near Punta Sagre receive the highest number of nesting turtles.

Conservation initiatives

The 1994 IUCN *Red List of Threatened Animals* classifies the green turtle, hawksbill, leatherback and olive ridley as Endangered, and the loggerhead as Vulnerable

(Groombridge, 1993). The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) lists all five marine turtle species in Appendix I. The world populations of all five species are in decline due to overexploitation, disturbance, drowning in trawl nets, loss of habitat, disease and pollutants (for example oil, organochlorines and plastic) (Brongersma, 1981; Groombridge, 1982; King, 1981; Ross, 1981; Hutchinson and Simmonds, 1992).

With at least four species of marine turtles nesting on its beaches, Bioko is probably vital to the conservation of marine turtles in the Gulf of Guinea. One of these, the olive ridley, is not known to breed on any of the other islands in the Gulf of Guinea. Unfortunately, Bioko has no enforced laws governing the capture of marine turtles or the taking of their eggs, no effectively protected waters or nesting beaches, and no marine turtle management plan. There are, however, several important initiatives that could soon do much to promote the conservation of Bioko's marine turtles. These initiatives are largely the results of a close and highly effective working relationship between the Government of Equatorial Guinea and the Proyecto de Investigación y Conservación de la Naturaleza en Guinea Ecuatorial (PICN) (Castroviejo *et al.*, 1986; Fa, 1991). PICN began work on Bioko in 1985 and is financed by Cooperación Española.

Law 8/1988 provides a legal basis for the protection of endangered species and their habitats, as well as a framework for the rational exploitation of wildlife (Fa, 1991). Also, under this law, the 600-sq-km Southern Bioko Protected Area was decreed. Included within this protected area are all of the turtle nesting beaches along the southern coast of Bioko. With a gradual expansion of protection, conservation and education capabilities on Bioko, we should see a reduction in the harvesting of turtles and their eggs, and eventually an increase in turtle numbers.

Recommendations

There is considerable justification for a detailed 1-year survey of the conservation and economic status of marine turtles on Bioko. Specifically, the survey should have the objectives listed below.

- to determine where on Bioko each species of marine turtles nests and to estimate numbers of nesting females, nests, eggs laid, and hatchlings reaching the ocean;
- to estimate rates of predation of nesting females and eggs by humans and other species;
- to train at least two local counterparts in the collection of these data;
- to evaluate the importance of Bioko's nesting beaches to each species's conservation and to the island's people, particularly those living at Ureca;
- to make recommendations for the better management and protection of the island's marine turtles (for example rates and methods of exploitation, enhanced law enforcement) while, at the same time, remaining sensitive to Bioko's economic, political and traditional constraints;
- to gain the support of the people of Bioko, particularly those at Ureca, for the conservation of marine turtles on their beaches;
- to initiate a long-term marine turtle monitoring and conservation project for Bioko.

Additional recommendations, which are more generally directed towards the conservation of Bioko's fauna and flora, but which also concern the marine turtles, are given in Castroviejo *et al.* (1986), Butynski and Koster (1989b) and Fa (1991). Because all the species of marine turtle nesting on Bioko and using its offshore waters are probably migratory to some degree, it is important to determine eventually what levels of exploitation occur elsewhere in their range (for example along the coast of mainland Africa).

Marine turtles and their eggs have long been an important traditional source of food for the littoral people of Bioko. This is still the case today, especially for the residents of Ureca. Every consideration should be given towards continuing the local subsistence and

commercial exploitation of Bioko's marine turtle populations as long as this can be achieved on a sustainable basis. What little information is available, however, suggests that the marine turtle populations of Bioko are being depleted. Given the political and economic realities of Bioko, and our lack of adequate data, it would probably be counter-productive, if not impossible, to argue successfully for the complete protection of the marine turtles. I recommend, as the first step towards the conservation and proper management of Bioko's marine turtles, that exploitation be limited to a minimum harvest, compatible with the traditional needs of the people of Ureca. Once the survey mentioned above is undertaken and the situation becomes better understood, detailed recommendations on how to conserve and exploit Bioko's marine turtles can be made. If it is found that these populations are so threatened that all harvesting of turtles and eggs needs to cease temporarily, then efforts should be made to substitute this lost of protein and cash through cash grants and/or employment of the hunters.

It is also recommended that Equatorial Guinea become a signatory to CITES, the Convention on the Conservation of Migratory Species of Wild Animals, the African Convention on the Conservation of Nature and Natural Resources, and the Sea Turtle Conservation Strategy (Ehrenfeld, 1981; Navid, 1981). Participation in these conventions will provide an important framework within which Equatorial Guinea can develop a national conservation strategy and participate in co-ordinated international activities for conserving its natural resources, particularly its marine turtles.

Equatorial Guinea is encouraged to take the above recommendations as the basis for developing a Bioko Island marine turtle conservation plan. The goal of this plan should be the recovery of Bioko's marine turtle populations to a level of abundance that will permit sustainable exploitation of this valuable resource by future generations of its people.

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