

The Survival Situation of the Hawksbill Sea-turtle (*Eretmochelys imbricata*) in Madagascar

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ABSTRACT

Hawksbill Sea-turtles once occurred in vast numbers around Madagascar but persistent intensive exploitation has led to a drastic reduction in their population. Traditional hunting methods, employing harpoon, net, and grapple, are still in use, though Remora fishing is no longer widely practised. Although reduced, the current value of Hawksbill products is still substantial, and justifies rigorous enforcement of the adequate existing laws. The present population is such that, with some protection, it should prove possible to restore numbers to a safer level.

Of the five species of sea-turtles still extant around the shores of Madagascar, none is regarded as more typical than the Hawksbill, *Eretmochelys imbricata* Linnaeus (Figs. 1 & 2), which made Madagascar famous as a source of tortoiseshell.

Although numerically inferior to the Green Turtle (*Chelonia mydas*), Hawksbills or their products are found everywhere in the island and are so characteristic of Madagascar that some special measures should be taken to prevent any further decline in their already much-reduced population.

The data presented below were gathered during two lengthy visits to Madagascar as part of a survey of the status of sea-turtles in South East Africa (World Wildlife Fund Project No. 648 [originally]; cf. Hughes, 1972).

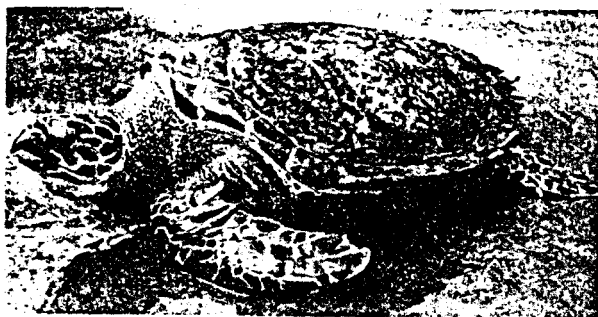


Fig. 1. Hawksbill Sea-turtle (*Eretmochelys imbricata* L.).
The carapace is 60 cm long.

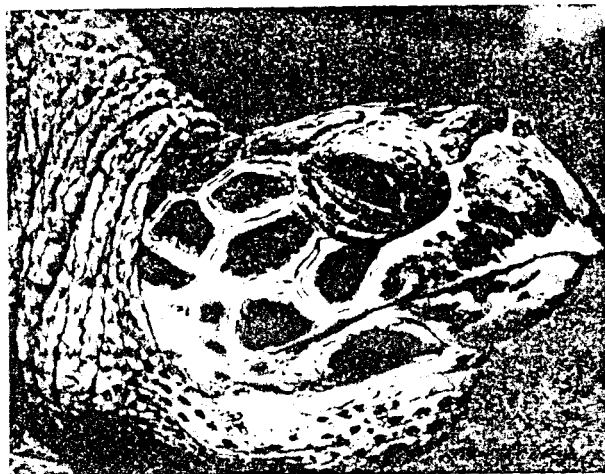


Fig. 2. Close-up of head of a Hawksbill Sea-turtle (about one-half natural size).

PAST STATUS

Few, if any, quantitative records exist concerning the past status of the Hawksbill Sea-turtle around Madagascar, but, from as early as 1613, tortoiseshell was remarked upon as an important export (Decary, 1950). Further, this export importance was maintained throughout the 19th century, with figures reaching 4,000 kg in the mid-1800s.

At the turn of the century this figure was still being maintained, more or less; but soon after the end of World War I, the first signs of a significant and drastic decline were recorded (Petit, 1930).

As indicated in our Fig. 3, the decline has continued steadily, with exports reaching barely 1,000 kg annually at mid-century, while at present the trade has virtually no export importance (see below).

The decline cannot be attributed to any factor other than overexploitation, for the drop in exports came long before the advent of plastics which have, to a very limited extent, replaced tortoiseshell for certain commodities. Further, it has not resulted from a lack

of demand, as prices on the open market can reach 14,000 FMG/kg (Rands 40).

If one considers that some 2.5 kg of tortoiseshell may be obtained from one adult Hawksbill, then at least 1,600 adult turtles must have been slaughtered annually for a period certainly exceeding 100 years. It is therefore surprising to report that there are still considerable numbers of Hawksbills in Madagascar's coastal waters.

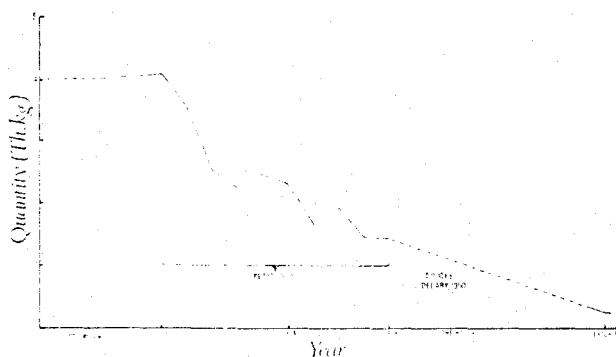


Fig. 3. Graph reflecting drastic decline in tortoiseshell exports from Madagascar. The amounts are in thousands of kilograms (i.e. tonnes).

PRESENT DISTRIBUTION

Although Hawksbill Sea-turtles are found in all coastal parts of Madagascar, they appear to be most common around the northern third of the island, which also constitutes the major nesting-ground (Fig. 4).

The east coast from Tamatave southwards is the region of least occurrence, probably owing to the lack of suitable feeding grounds and the presence of heavy and continual surf. South of Morondava along the west and south coasts the Hawksbill population is high, and this probably constitutes the area of most intense exploitation as a result of the numbers of fishermen operating on the coastal reefs. The Vezo people, in particular, hunt extensively for sea-turtles and do not discriminate between species when it comes to capturing or killing them (Hughes, 1971). Apart from the northern third of Madagascar, Hawksbills are reputed to nest also on Nosy Hao and Nosy Vasy; these are small islands off the south-west coast (Fig. 4).

The Malagasy people refer to all sea-turtles as 'Fano', but the Hawksbill has specific names in certain regions, namely *Fanohara* (Northern Sakalava tribe, Vezo tribe), *Fanojatry* (South Sakalava tribe), and *Fanotanga* (Antonosy tribe). The French refer to the Hawksbill as 'le Caret' or 'la Tortue d'Ecaille'.

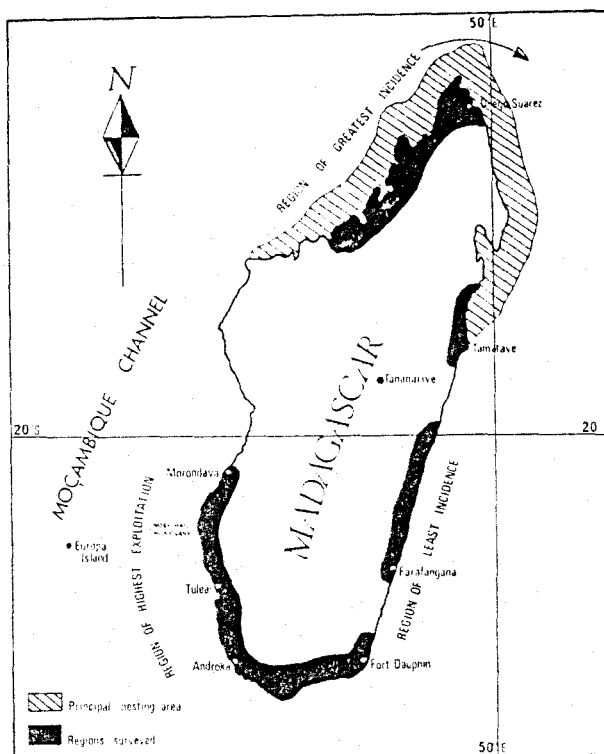


Fig. 4. Sketch-map of Madagascar showing area surveyed and variations in Hawksbill distribution and nesting activity. This huge island is some 1,700 km long and has a maximum width of 576 km.

EXPLOITATION

Catch Size and Numbers

When dealing with a country the size of Madagascar it would be presumptuous to claim full accuracy for the figures presented in Table I. Yet the figures reflect, albeit roughly, the extent of exploitation that is being carried out today.

The figures included above were derived from direct specific information and, in the case of adults, from annual weights of tortoiseshell handled or exported (2.5 kg = 1 adult).

The number of juvenile Hawksbills prepared for sale in Madagascar is remarkable, for they are displayed in virtually every shop, stall, and marketplace, in the coastal region and in Tananarive. In Diego Suarez not less than 50 were counted in one single workshop.

Tortoiseshell jewellery and bric-à-brac are found in every jewellery or tourist shop, and quantities are difficult to assess (see below).

Hunting Methods

(a) 'Turning' nesting females on beaches is common on the north-east coast. (Turning is a term that is commonly used by turtle people and is derived from

TABLE I

The Estimated Numbers of Hawksbill Sea-turtles Killed Annually in the Coastal Waters of Madagascar, with Percentage make-up of Different Size-groups

Region	Juveniles (carapace ≤ 40 cm)	Sub-adults (carapace 40-60 cm)	Adults (carapace ≥ 60 cm)
SW Region (Morondava-Androka)	1,200	400	400
Diego Suarez	400	?	40
NE Coast (including Narinda Bay)	?	?	130
Tamatave	40	?	?
TOTALS	1,600 (62.3%)	400 (15.6%)	570 (22.1%)

GRAND TOTAL: 2,500 - turtles

the habit of rolling the females onto their backs prior to slaughtering them: one man can 'turn' many turtles, which are then helpless, and he may return hours later to kill them at leisure.)

(b) Harpoons are used widely in the southwestern area, particularly by the Vezo tribe who use a special turtle harpoon known as the Teza, or Samona, harpoon (Fig. 5).

(c) In the north-east region, nets are set parallel to the edge of the reefs and these catch the turtles as they try to regain deeper water during the falling tide.

(d) Fishermen in the north-east also use a method involving many small grapnels attached to strong

cords. The grapnels are thrown over a feeding or sleeping turtle and jerked upwards, so that the tines become embedded in the plastron.

(e) Remora fishing was once widespread in the north but is not employed widely today. It involves catching turtles by means of suckerfish of the genus *Remora* which are released near a basking turtle. A cord from the boat is attached to the fish by means of a brass ring around the caudal constriction. When the fish has attached itself to the turtle, the fishermen pull the fish and turtle to the boat.

Value

There appears to be considerable disparity between prices paid to the fishermen collecting tortoiseshell and the final sales figure. Fishermen are paid 500 FMG (R1.50 = US\$2) per kg of shell, irrespective of quality. The same shell is, in turn, sold for 1,000 FMG/kg to buyers in the capital.

Shell exported to Italy and France obtains prices varying from 5,000 to 14,000 FMG/kg. However, only some 250 kg is exported annually as unworked shell. Worked shell fetches much higher prices, but as it is sold as definable objects and not by weight it is difficult to allocate a bulk value. For example, a necklace of polished tortoiseshell fragments weighing less than 100 grams retails at 2,000 FMG (R6, US\$8), so 1 kg of worked shell is worth at least 20,000 FMG; allowing for 20 per cent wastage, the mean worked shell value can be taken at 16,000 FMG.

In contrast to all other sea-turtles in Madagascar, the Hawksbill has no value as food. Hawksbill meat is generally discarded, although some Malgache living in penury will consume it.

No documented incidents involving poisoning as a result of eating Hawksbill meat have been found in Madagascar, although the possibility of such cases occurring may be the reason for the lack of interest. It is illegal in Mauritius to sell Hawksbill meat on the

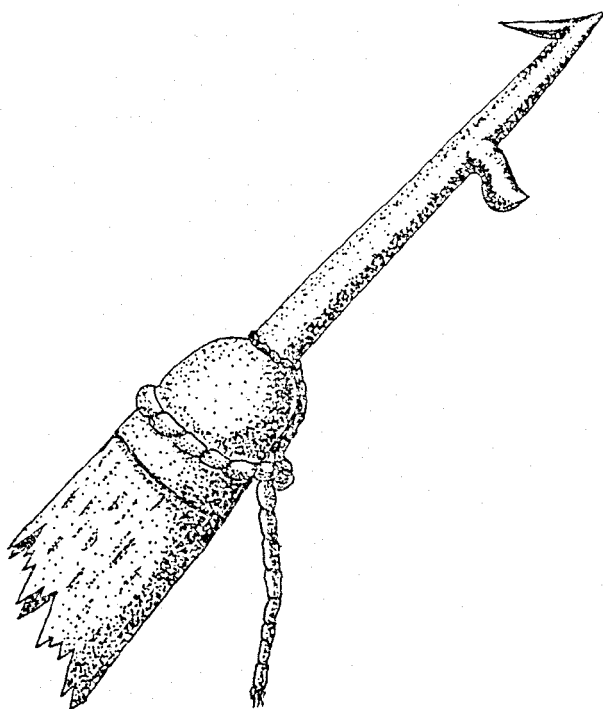


Fig. 5. Teza or Samona harpoon as used by the Vezo tribesmen of the SW Coast of Madagascar.

TABLE II
Estimated Annual Value of Hawksbill Sea-turtle Products during 1971

	Quantity (Kg)	Sale value		
		FMG	Rands	US dollars
(i) Raw tortoiseshell exports at 7,000 FMG/kg	250	1,750,000	5,239	7,479
(ii) Worked tortoiseshell at 16,000 FMG/kg	1,175	18,800,000	55,294	73,438
(iii) Stuffed and polished juveniles at 6,000 FMG each	1,000 approx.	6,000,000	17,964	25,641
Total value:		26,550,000	78,497	106,558

market (Jones, 1956). This law was first passed in 1884 as a result of numerous poisonings on the island. Considering the relatively close proximity of Mauritius to Madagascar, it is probable that an occasional poisoning has occurred in Madagascar.

DISCUSSION AND CONCLUSION

If the 1971 figures reflected in Table II are approximately correct, the annual exploitation of adults is roughly the same as it was in 1950; for although the export figures were lower in 1971 than in 1950, the local trade (sales to tourists, etc.) has probably increased. This would suggest that either the rate of exploitation is identical and there is a balance between exploitation and recruitment, or that more people are working harder to collect the same quantity of shell—which means that the Hawksbill populations are dwindling even further.

From the survey that was carried out, this latter possibility would not appear to be the case, and some fishermen, interviewed in the north-west, claimed that Hawksbill populations were actually increasing. The Northern Sakalava people are completely disinterested in sea-turtles and neither hunt nor kill them deliberately. Incidental catches of Hawksbills may be sold, but among these people, there is a distinct social stigma attached to the killing of sea-turtles. Unfortunately, other clan areas of Madagascar, e.g. the Antakarana and Vezo people, have no such stigma attached to their killing.

It is thus concluded that, in its Hawksbill Sea-turtle populations, Madagascar once had a very valuable resource which has been badly misused; this has led to its serious decline. The general situation must be regarded as in poor condition but far from being irrecoverable. Given sound enforcement of the perfectly adequate laws governing the exploitation of

sea-turtles in Madagascar, an increase in turtle populations could be expected, followed by an increasing source of revenue and the re-creation of one of the greatest Hawksbill Sea-turtle concentrations in the world.

RECOMMENDATIONS

(i) Considering the data presented in this report, it is recommended that a strong effort be made to stop the killing of nesting Hawksbill females on the north-east coast of Madagascar.

(ii) Any killing of Hawksbill Sea-turtles should be done under licence from the Government, which, at present, has no income at all from the exploitation of animals on which it expends some revenue for protection.

(iii) Only a very limited number of such licences should be issued. By operating under the licence system, greater control would be possible and a much clearer picture of Hawksbill exploitation would result.

ACKNOWLEDGEMENTS

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Resolutions and Recommendations Galore

Although it was customary for us to publish accounts, and sometimes detailed resolutions, etc., of important pertinent conferences and meetings, pressure on our limited space is such that we are glad to leave the privilege to others—especially now that the occasions are so numerous and often productive of resolutions. Yet we feel it desirable to give references to important instances, and so note that the 23 Resolutions of the 11th General Assembly of IUCN, held at Banff, Alberta, Canada, last September, are published as a four-page supplement to the *IUCN Bulletin* (Vol. 3, No. 10, October 1972). The headings are as follows:

1. Stockholm Conference.
2. Conservation of the World Heritage.
3. Convention on the Conservation of Wetlands.
4. Man and the Biosphere Programme.
5. FAO Activities in Environmental Issues.
6. Ecological Principles for Economic Development.
7. Conservation and Development of Tropical Rain Forests.
8. Balanced Tourism.
9. Oil Exploration in the Mediterranean.
10. Ecological Considerations in Planning Boundaries of Parks and Reserves.
11. Marine Parks and Reserves.
12. Arctic International Wildlife Range.
13. New Hebrides Kaori Forest.
14. Regional Parks in Brazil.
15. Protection of Wide-ranging Species.
16. Conservation of Marine Resources.
17. International Trade in Wildlife.
18. Agreement with Industry on Use of Threatened Species.
19. Use of Endangered Species in Research and Teaching.
20. Use of Non-human Primates in Research and Teaching.
21. Conservation of the Cheetah.
22. Environmental Law.
23. Environmental Education for Professionals.

Likewise, the 20 Recommendations of the Second World Conference on National Parks, held at Yellowstone and Grand Teton National Parks, Wyoming, USA, later in September, have been published as a four-page supplement to the *IUCN Bulletin* (Vol. 3, No. 11, November 1972), the headings being as follows:

1. Conservation of Representative Ecosystems.
2. Conservation of Tropical Rain Forest Ecosystems.
3. Conservation of North Polar and Sub-polar Ecosystems.
4. Marine National Parks and Reserves.
5. Establishment of Antarctica as a World Park under United Nations Auspices.
6. International Parks.
7. Regional Systems of National Parks and Other Protected Areas.
8. Conservation of the World Heritage.
9. Wetlands Convention.
10. Standards and Nomenclature for Protected Areas.
11. Integrity of National Parks and Equivalent Reserves.
12. Usage of National Parks.
13. Detrimental Effects of Vehicles, Boats, and Aircraft, in National Parks and other Protected Areas.
14. Research on National Park Values.
15. Planning of National Parks and Other Protected Areas.
16. Exchange of Information.
17. Technical and Financial Assistance for National Parks.
18. Training.
19. International Services for National Parks.
20. Education in National Parks and other Protected Areas.

Although this may seem an awful lot of resolutions, etc., we may comment that they are often valuable to cite and point to, for example when dealing with governmental agencies; and we can testify to the concerted effort that went into their drafting and final passage.

EDITOR