

LIBRARY OF  
GEORGE H. BALAZS

**Sea Turtle  
Resources  
of the Caribbean  
and Gulf  
of Mexico**

by Archie Carr

# Sea Turtle Resources of the Caribbean and Gulf of Mexico\*

by Archie Carr, University of Florida, Gainesville

The sea turtles of the Caribbean are among the classic resources of the New World tropics. The green turtle, especially, once tremendously abundant, was a fundamental factor both in the deployment of Caribbean Indians and in the logistics of early European navigation and colonization. At an early date, however, an insupportable drain began, and one nesting colony after another dwindled and disappeared. More recently there has been another marked increase in both the uses for sea turtles and the numbers of people using them, and an accompanying improvement in processes of harvesting and distributing turtle products. The rate of depletion has again risen and *Chelonia* — and perhaps other genera as well — seem on the verge of disappearing as economic assets, if not as natural species.

The sea turtles of the world belong to five different genera, all of which occur in the Gulf and Caribbean region.

The genus *Lepidochelys* is represented by *L. kempi* (Atlantic ridley, *lora*, *cotorra*, *cahuama*) in the Gulf of Mexico, and by *L. olivacea* (*warana*, *batali*) which is a sporadic wanderer in the extreme eastern Caribbean (Donoso-Barros, 1964; Flores, 1966). At one place or another, both species are killed and eaten by local people, but the chief threats to *Lepidochelys* are the consumption of the eggs, preferred above those of all other sea turtles, and the growing demands of the leather trade. According to Márquez (in press) 336 tons of ridley skins were taken in Mexican waters in 1967.

*L. kempi* is essentially a crab-eater, while in the places in which its diet is known, *L. olivacea* appears to incline toward shrimp as food. Practically the entire breeding effort of *L. kempi* is exerted during a few short emergencies on one small section of the Tamaulipas Coast in Mexico. At one time up to thirty or forty thousand females emerged on a single mile of beach. Heavy egg-hunting in the 1950's reduced the *arribadas*, however, and by the early 1960's *kempi* seemed to be at the point of extinction. As a result of strong intervention by the Mexican government the colony appears now to be slowly building up again (Márquez, in press; Chaves, Contreras and Hernandez, 1968). It has recently been revealed that *L. olivacea* makes comparable, though somewhat smaller, *arribadas* on the coasts of the Guianas and Guerrero. The Surinam colonies are receiving careful protection by the Forestry Department in Paramaribo, and Peter Pritchard of the University of Florida is engaged in a comparative study of various ridley populations on the Atlantic and Pacific coasts of the Americas.

The Atlantic loggerhead, *Caretta caretta* (*cahuama*, *caballera*), though found throughout the Caribbean as a wanderer or sporadic migrant, goes farther north to nest than any other sea turtle. The chief remaining breeding shores are those of the southeastern United States, although nesting occurs in the Bahamas and Greater Antilles, and, with decreasing frequency, down to northern South America. At Tortuguero, Costa Rica, during the fifteen years that surveillance of the beach has been maintained, only one loggerhead has been known to come ashore. *Caretta* is mainly carnivorous and relies heavily on crabs for its diet. It also regularly eats floating jellyfish and a variety of sessile or encrusting invertebrates. Under a special grant from the Tubman Trust a nesting census is now being made along the whole extent of the mainland breeding grounds of *Caretta*. The chief threats to the species in this vital section of its range are the encroachment of human works and depredations by the raccoon. Considerable drain is imposed by illegal egg hunters, and it is an anachronistic

scandal in Florida conservation legislation that two counties of the northern peninsula still have an open season for taking turtle eggs.

*Dermochelys coriacea* (leatherback, trunkback, *tinglado*, *tortuga de cuero*, *laud*, *canal*) is the largest of the sea turtles, reaching weights of close to 2000 pounds. It is carnivorous and appears to incline strongly to a diet of jellyfish. Though it breeds mainly in the tropics, its travels take it regularly into northern parts of the temperate zone. In some parts of the world — the eastern coast of Malaya, the Tongaland Coast of Zululand, the coasts of Surinam and especially French Guiana — *Dermochelys* nests in aggregations. Nesting areas are scattered throughout the Caribbean, wherever ocean beach provides sand deep enough to insure proper drainage for the deeply excavated nest chamber. In the Caribbean the only tendency to aggregate in nesting occurs on the coast of Costa Rica north of the mouth of the Matina River, a thinly settled region in which the illegal taking of eggs goes on steadily during the season. Although the leatherbacks are often harpooned for sport, or simply to be taken home as a curiosity, few are killed for meat. The main depletion factors are loss of wild nesting shore to development and widespread persecution by egg hunters.

*Eretmochelys imbricata*, the hawksbill or *carey*, is the most confirmedly tropical of all the sea turtles, and the most clearly confined to a littoral foraging habitat. It is a bottom feeder and appears most at home in coral reef environments. The narrow beak, which evoked the English common-name, hawksbill, may be an adaptation for gouging crabs out of crevices and for routing other invertebrates from irregular coral surfaces. In the Caribbean the hawksbill probably nests more ubiquitously than any other sea turtle, making use of short stretches of shore too low and limited in extent for a green turtle or leatherback to use. The decline in the tortoiseshell market during the 1940's, caused by the advent of plastic imitations, took the hunting pressure off hawksbill populations for a time, but now demand is again growing. This drain, stimulated also by the calipee and leather trade and combined with the constant raiding by egg hunters, makes *Eretmochelys* seem one of the most clearly endangered genera of reptile in the entire world.

The best-known Caribbean sea turtle is *Chelonia*, the green turtle, in Spanish called *tortuga blanca*, or simply *tortuga*. The genus is, like many freshwater turtles, carnivorous in youth and principally herbivorous in maturity. There is occasional nesting by green turtles on suitable deep-sand ocean shore all about the Caribbean, and small aggregations form at several places. It is a characteristic, world-wide tendency of *Chelonia*, however, to form big nesting assemblages at localities that may be hundreds of miles from the pastures of *Thalassia* or other marine plants that constitute the year-round residence grounds. In the Caribbean, only two such nesting assemblages occur. One of these is the Venezuelan Aves Island, a low exposure of the Saba Bank a hundred miles southwest of Monserrat in the Leeward Islands. The other is the Costa Rican shore between the mouths of the Tortuguero and Parismina rivers. As the only animal that converts marine spermatophyte plants into meat of high quality, the green turtle is of great potential importance to man. Because of its tendency to group at the nesting site and to be concentrated by the limits of its sub-marine pastures, green turtle management would appear to face no inherent obstacles. In spite of these advantages, however, the green turtle resource is on the verge of being lost.

There seems little hope that the widespread single nesting season can maintain populations of *Chelonia* in the Caribbean — much less restore them to their potential

\* Paper read at the Symposium on Investigation and Resources of the Caribbean Sea and Adjacent Regions, held at Curaçao, Netherlands Antilles, November 18-26, 1968.

limits set by the carrying capacity of the pasture grounds. The main hope for rehabilitation remains with the breeding aggregations at Aves Island and Tortuguero. The former is at present being given no formal protection whatever. The colony persists there only because high seas and the small size and slight elevation of the island pose a difficult navigational problem for the sailing sloops of the turtle hunters. Boats from St. Lucia, Dominica and the French islands are arriving with increasing frequency, however, and it appears only a matter of time before the Aves Island turtles will go the way of the other lost colonies of the Caribbean. To save them, close surveillance throughout the nesting season appears the only recourse. The island is low, waterless and a long way from the Venezuelan homeland. Setting up an effective sea patrol or land station there would not be easy. A possible compromise would be to make frequent reconnaissance flights throughout the season by airplane or helicopter. It is not known what territory the Aves breeding colony supplies with green turtles. To determine this a tagging program would be required, and none has so far been developed. The greater part of the green turtle population of the eastern half of the Caribbean Sea is probably of Aves origin. If so, that region will obviously lose its green turtles if prompt and successful protection is not achieved at Aves Island.

The territory served by the Tortuguero colony, by contrast, is fairly well known. 140 international returns from our long-term tagging program have shown it to be the whole western Caribbean from eastern Venezuela to Yucatan, Jamaica, Cuba and Florida. Until recently the outlook for the Tortuguero green turtle seemed reassuring. The Costa Rican government had passed laws prohibiting the taking of turtles or eggs on any beach in the Republic. Although there was some poaching there, and although harpooning was legal up to one kilometer from the nesting shore, the breeding population seemed to be holding its own. With the close of the 1968 season, however, it became clear that even at Tortuguero the future of *Chelonia* was bleak.

The cause of the decline is obviously over-exploitation. It is a frustrating but fundamental fact that Costa Rica really has no exploitable green turtle resource. The only green turtles on the Caribbean Coast of the country are those that converge at Tortuguero to breed. When their reproduction is finished these turtles go back to resident feeding grounds as far as a thousand miles away. There is no resident colony in Costa Rica because there is no grazing territory in which sub-marine spermatophyte plants cover large areas in continuous stands.

In arranging a management or protection program for any wildlife resource the first thought is usually to protect the species involved at its time and place of reproduction. In Costa Rica this policy has been reversed, simply because it is only thus that any harvesting at all could be done there. At present (1968) it is legal to harpoon green turtles during July and August, the first two months of the nesting season. As a result, the West Caribbean population is undergoing a threefold attack, as follows: (1) by legal turtlers who harpoon the mating pairs just outside the breaker-line at Tortuguero; (2) by

illegal hunters on the nesting beach, and (3) by the growing numbers of netters and harpooners on distant feeding grounds in Mexico, Nicaragua, Panama, Colombia, Cuba and elsewhere. Signs that the population is not withstanding this drain are: (a) reduction of the percentage of large, mature green turtles being taken on the pastures; (b) a shortening of the nesting season at Tortuguero, where breeding formerly occurred from June to December but now is increasingly being restricted to August, with a few arrivals in late July and

during the first half of September; (c) evidence of a lowering of the mean age of the Tortuguero nesting colony, and (d) an almost complete cessation of nesting on the southern third of the 24-mile extent of Tortuguero Beach. These signs all indicate a species in trouble.

Another, even more reliable sign was a strong disparity in numbers of nesting arrivals in the 1965 and 1968 seasons.

Sample track counts made in 1965 indicated that during August about 600 female turtles were emerging each night to nest. A direct head count made during one night of the same period tallied 625 turtles on the beach. By contrast, in 1968 six track counts and a number of estimates from spot sampling of nest-density all agreed closely on one hundred as the approximate nightly total for the Tortuguero shore. The cause of the abrupt onset of this drop can no doubt be found in the timing of the

nesting schedule in *Chelonia*. The Tortuguero turtles nest every three, or less often, every two years — never in successive seasons. The individuals that make up the nesting colony of a given year thus have three different backgrounds: some of them are new recruits that have just reached maturity; some are returning after an absence of two years; and a larger number have come back after being away for three years. Commercial exploitation in Costa Rica increased markedly in 1965. Because of the predominance of the three-year nesting cycle, the 1968 season was that in which the increased toll of 1965 became clearly evident.

Still another symptom of the decline was an energetic effort made during the 1968 turtle season by local commercial interests to try to have the open season extended through to September, to allow the industry to recoup losses brought by the low catch in July and August. The Costa Rican government denied the request.

To save and rehabilitate Caribbean sea turtles will be an exercise in international cooperation — one in which whole species, despite their awkward habit of crossing national boundaries, are effectively taken in charge. The resource is a littoral phenomenon, linear in distribution, while the demand for it is three dimensional and is growing in every dimension. Such recent developments as the strong new markets for turtle leather and turtle oil enormously increase the energy of the turtle hunter and attract capital for even greater exploitation. In the case of the West Caribbean green turtle, the obvious move is to prohibit all turtling in Costa Rican waters, because turtles are there only to breed, and because spearing them a kilometer off shore is not very different from taking them at their nests on shore. To put teeth into such a law, however, it would be necessary to stop all exporting of calipee, the gelatinous material between the



Green Turtle

Photo: Diamant-Foto by courtesy of the World Wildlife Fund Photographic Library, Morges.

bones of the under-shell. Calipee is essential in all recipes for clear green-turtle soup, now growing in popularity in Western Europe. It is a light, imperishable, high-priced material that can be taken from turtles killed secretly at night, and can easily be slipped into legitimate trade. What the other countries of the western Caribbean could do to repay Costa Rica for producing their green turtles with no profit to herself is not in my field of competence to conceive. But the answer ought to be sought without delay.

One recourse that appears to offer promise is turtle mariculture. There is no inherent reason why green turtles, for example, cannot be profitably reared through their carnivorous first year and then put out on turtle grass pastures. Two harmful side effects to be expected from the premature spread of turtle culture are the inevitable parasitization of natural nesting grounds for eggs with which to stock rearing pens, and the stimulation of new markets and higher prices before the volume-production necessary to satisfy the demand and relieve the pressure on wild populations is achieved. Controls should be set up to keep turtle farms from prematurely attempting commercial operation. Permits to take eggs should be issued only to sound pilot projects that embody plans for careful efforts to abridge the complex migratory life cycle of the species and induce it to breed in enclosures. Production for profit should go ahead only when results of these experiments make the project independent of natural nesting grounds.

As preliminary steps in an international program to protect and maintain sea turtle populations in the Caribbean, the following moves are recommended:

- Organize and maintain for a period of at least three years a comprehensive nesting survey, to determine what Caribbean shores are visited by separately nesting sea

turtles, where any tendencies to aggregate may occur, and what the limits and peaks of nesting seasons are.

- Initiate a seasonal tagging project at Aves Island, to outline the resident ranges of the sea turtles that nest there.
- Arrange effective protection for the nesting colony of *Chelonia* on Aves Island.
- Arrange to provide complete protection for the Costa Rican nesting colony of *Chelonia*, both on shore and in coastal waters, working out suitable compensation to Costa Rica for this contribution to the welfare of her neighbors.
- Promote local legislation throughout the Caribbean prohibiting the taking of eggs or nesting female turtles on any island or mainland shore.
- Organize strict local and international control over the trade in calipee and over that in turtle skins, prohibiting the exportation or storage of either product between the months of June and November, and taking steps to insure that neither product, when taken from a turtle not otherwise used, may enter the market.
- Promote pilot turtle mariculture, supporting only projects in which experimental breeding is a major factor of the plan and allowing production for profit only when a project has shown itself to be independent of natural nesting grounds.

It seems certain that saving the Caribbean sea turtles will require an integrated international effort, grounded not on parochial self-interest but on the facts of ecologic zoogeography. It seems equally clear that unless such an effort is made, the present decline of the resource will accelerate, the people of the seaside Caribbean will lose an age-old asset, and some of the species of Caribbean turtles will disappear completely.