



Frans Lanting

Green turtle

1983

Sea Turtle Conservation in the Caribbean

by Archie Carr

BACK IN THE 1950's, when concern over endangered species began to spread, the marine turtles were among the first groups of animals to receive international attention. Since then, considerable progress has been made in controlling some of the factors that threaten the group, but serious problems remain. Sea turtles are particularly difficult species to protect, owing to the complexity of their life cycles, the world demand for high-priced sea turtle products, subsistence hunting, entrapment in shrimping nets, beach development, and pollution of coral reefs and ocean waters.

Although there are important gaps in what we know about the habitat needs of all sea turtle

species, it is clear that no population of any of them can be completely protected within a single refuge. There are five genera of marine turtles: the green turtles (*Chelonia*), the hawksbills (*Eretmochelys*), the ridleys (*Lepidochelys*), the loggerheads (*Caretta*), and the leatherbacks (*Dermochelys*). All these share a basic pattern of migration from one habitat to another. The young hatch on land and on leaving the nest go straight to the sea, where they swim directly away from the shore. For a year or two they are pelagic (oceanic), perhaps drifting in currents where bands of floating algae or macro-plankton are concentrated. On approaching maturity, all the species move to inshore waters and begin the adult feed-

SMITH ISLAND SEA TURTLE PROJECT

The 11-mile-long beach at Smith Island (alias Bald Head Island) supports North Carolina's largest single nesting population of loggerhead sea turtles. From roughly the beginning of June to the end of August, the 300- to 400-pound females arrive—coming ashore at night and lumbering across the sand. Using their flippers, they scoop out flask-shaped holes into which they drop their leathery, golf-ball-sized eggs (an average clutch contains 120), cover them with sand, and return to the sea. The entire process takes around an hour.

In 1980 an estimated 78 percent of the threatened turtles' nests were lost to predation and erosion. Today—through a project backed by the North Carolina Nature Conservancy, the state's Wildlife Resources Commission, the North Carolina Natural Heritage Program, Bald Head Homeowners Association, and Bald Head Corporation—almost all the nests are being protected. Two biologists patrol the beach each night throughout the nesting season. As soon as a loggerhead has finished covering her nest, one of the biologists places a square wire-mesh screen over it. This keeps predators out but allows hatchlings to exit some 60 days later.

Nests subject to erosion at the beach's southern end are moved to a simple hatchery on the island. When burying these eggs, the biologists attempt to duplicate the shape and size of the nest dug by the mother. As the hatchlings emerge, they're helped in finding their passage to the sea.

During the 1982 nesting season, 96 nests were confirmed on Smith Island's beach. Of these, 46 were covered with wire mesh; 50 were relocated in the hatchery. Seventy percent of the eggs from all 96 nests hatched successfully. Because of increased nesting activity this past summer, more nests were being protected as of late July, 1983, than during the entire previous season.

ing regimen. For example, the herbivorous green turtle moves onto beds of marine vegetation, where it grazes by day and sleeps by night. It is still not known where adult leatherbacks, loggerheads, and ridleys migrate to feed.

Obviously, effective custodianship of such wide-ranging travelers is an imposing challenge. A population may spend part of its time at a breeding ground where it is adequately protected from poachers and predators, and then travel far away to a feeding habitat where protection is nonexistent or impossible. Loggerheads tagged on beaches of the U.S. Atlantic Coast are sometimes recovered across the Gulf Stream in the Bahamas, or in the West Indies. There is some evidence that the leatherbacks which nest on Caribbean shores migrate all the way to New England and feed on the seasonal bloom of jellyfish there.

The best known migrations are those of the green turtle, which people have exploited for centuries as a source of food. Unlike other sea turtles, it is herbivorous and tends to congregate to feed on beds of submarine vegetation, particularly turtle grass, which grows only in protected places where there is little wave action. But, like the others, it nests on exposed shores where sand beaches have been built up by heavy surf. Thus, the nesting and feeding grounds are widely separated and, as a result, some green turtles migrate a thousand miles or more to reach their breeding habitats. The population that for 26 years has been tagged and charted at Tortuguero, Costa Rica, comes to that 22-mile beach from all around the western Caribbean. Its main feeding pastures are in Nicaragua, Panama, and Colombia, but tagged individuals have been reported from as far north as Florida and the Gulf of Mexico, and as far east as Martinique and Trinidad. Tagging projects have shown that the green turtles which feed along the coast of Brazil journey all the way out to tiny Ascension Island in the central equatorial Atlantic to nest.

Although the migrations of the other species have not been well traced, they probably differ considerably. The hawksbill appears to have the least tendency to make regular migrations. It occupies coral reef habitats, feeding mainly on invertebrates, and nests on the short stretches of sandy shore that may be associated with the reef forage ground. Its feeding and nesting places are thus not necessarily as widely separated as those of other species. Nevertheless, tagging has shown that hawksbills sometimes make lengthy migrations, for reasons that remain wholly unknown.

A hindrance to making clear decisions on how to allocate efforts and resources in sea turtle conservation is the elementary state of our understanding of the group's taxonomy. We don't really know how many species and subspecies there are. The five genera are well defined; and in these, eight species are generally recognized. If these species were as well represented in museum collections as are most other vertebrate animals—and if large

series of specimens of comparable age groups could be studied by up-to-date taxonomic procedures—the number of sea turtle “kinds” bearing scientific names would be far greater. If, as we claim, it is a basic obligation of conservation to conserve genetic resources, then saving only the eight currently recognized sea turtle species is not enough. In the Atlantic and Caribbean, for example, there is just one species of the green turtle, *Chelonia mydas*. It was described from Ascension Island by Carl Linnaeus long ago. However, the species has four large nesting grounds in the Atlantic, and the population at each of these areas mates and nests virtually nowhere else. After the breeding season is over, the turtles disperse to widely separated feeding grounds; but when the next breeding season occurs, each turtle consistently returns to its home nesting shore to court, copulate, and nest again. The navigation systems by which their journeys are guided are completely unknown, but they are surely complex. Although evidence of genetic differences among these separate breeding colonies has been slow in coming, there are subtle differences in body form and behavior, and probably hidden biochemical differences exist as well. Each of the four green turtle breeding colonies of the

Atlantic system is almost certainly a genetically separate entity and each must be preserved.

BUT WE FACE LOSSES more serious than the devastation of local breeding colonies. The extirpation of sea turtles from entire regions, which has been taking place for centuries, is accelerating; and some of the taxonomically recognized species clearly face extinction. Kemp's ridley, which nests only on the Gulf Coast of Mexico, is so diminished that the species may be irretrievably lost. The black turtle of the Pacific Coast of Mexico seems headed toward a similar fate. Throughout its range, the hawksbill is under intolerable pressure from the tortoiseshell trade. Inflated prices now being paid for tortoiseshell make it profitable for commercial divers to ransack the farthest reefs of the Caribbean and of all the tropical seas of the world. Today the hawksbill is clearly the most endangered species of sea turtle in the Caribbean.

Although international commerce in Caribbean sea turtle products has been controlled to some degree by the Convention on International Trade in Endangered Species (CITES), local turtle laws are generally weak and enforcement is inadequate. As the Caribbean region develops, the remaining



Kemp's ridley hatchlings head off on their first ocean voyage. The rarest and most vulnerable of the sea turtles, this species nests exclusively on Mexico's Gulf Coast.

C. Allan Morgan



Frans Landing

Leatherback turtle

BLOWING ROCKS

Jupiter Island, off Florida's east coast, is the only known nesting site in the U.S. for as many as four species of sea turtles: loggerhead (averages 2,500 nests each year), green (15 to 20 nests per year), leatherback (3 to 5 nests annually), and hawksbill (an individual has nested repeatedly on the island). The Conservancy's Blowing Rocks Preserve, on the island's southern end, supports the densest population of nesting sea turtles in the nation.

Since 1969, members of the Atlantic Loggerhead Turtle Research project—administered by the Izaak Walton League's Loxahatchee River Chapter—have tagged more than 7,000 of the island's egg-laying turtles to determine the frequency of nesting, as well as movements between nestings. (Loggerheads appear to average two nests per turtle per season, though some may nest several times.) By analyzing reproductivity and movement, scientists can better decide how much beach a turtle requires and, in turn, how to adequately manage sea turtle nesting beaches. In addition, researchers count nests and crawls, and frequently relocate nests threatened by erosion or predators. The entire project is aimed at effectively protecting sea turtle populations.

sea turtle colonies may be destroyed by subsistence use alone.

There is urgent need for sea turtle sanctuaries throughout the islands and coastal waters of the Caribbean. Up to 20 years ago, the few existing marine parks were on islands or shoreline areas—usually where seabirds nested. As diving gear improved during the 1950's, growing numbers of people were introduced to the aesthetic and scientific marvels of the submarine environment, particularly the biological splendor of coral reefs. The concept

of the submarine park rapidly took hold. Established in 1961, Buck Island National Monument in the U.S. Virgin Islands was the first Caribbean reef system to be specially designated as an undersea preserve. Its beaches are good turtle-nesting grounds, and the spectacular reefs are foraging habitat for hawksbills and young green turtles. Earlier, more extensive systems of reefs and sea-grass flats had been preserved in the Virgin Islands National Park on St. John. Since these two sanctuaries were created, marine parks have sprung up around many of the Caribbean islands, and proposals for several more are being considered.

For marine turtle conservation, the most important preserve in the Caribbean is Costa Rica's Tortuguero National Park. The area includes 18,947 hectares (46,932 acres) of tropical wet forest and palm swamp, and an 18-mile stretch of nesting beach for the largest breeding assemblage of green turtles in the Americas.

When Tortuguero was declared a national park, it seemed likely that it would long remain a "paper park." Because of its isolation, the refuge was little visited by either tourists or Costa Ricans, and protection of its forests and wildlife was difficult to ensure. Funds have not been sufficient to allow consistent management of all the 14 parks now in the Costa Rican system, and those refuges most likely to bring public support for the system have naturally received the greatest attention. But Tortuguero has not been neglected, and The Nature Conservancy has provided significant support in expanding and protecting the area. The Conservancy continues to assist Costa Rica's National Parks Foundation in creating, extending, and maintaining other national parks in the country. (See the July/August 1982 *News*).

At Tortuguero, the Park Service has assumed the unenviable job of enforcing the turtle laws. With financial help from outside sources, it has done this fairly effectively on the nesting shore itself. Offshore, however, poaching by harpooners who come up from Limon, 50 miles to the south, continues. By law the harpooners are forbidden to navigate within three miles of the nesting beach, but they pay the restriction little heed and regularly canoe in to spear the female turtles and mating pairs almost inside the breaker zone. Little can be done to stop this poaching because no craft suitable for longshore patrolling is available to the Park Service, and the Tortuguero surf is usually too strong to allow small boats to be launched from the beach.

Nonetheless, since the shore was declared a national park, exploitation at the Tortuguero turtle breeding ground has diminished. Moreover, three Nicaraguan packing houses that used to export

around 10,000 green turtles a year have been closed, thereby lowering pressure on the West Caribbean colony at its main feeding ground. In 1980, Costa Rica signed the Convention on International Trade in Endangered Species (CITES), and the legal export of turtle meat stopped. Today, the survival outlook for the green turtle colony that nests in Costa Rica and feeds on the Miskito Cays turtle-grass pastures of Nicaragua is much improved. However, the future of the other group of green turtle migrants, those that travel north from Panama, Colombia, and more distant places, is altogether unpredictable.

Because of their long-range migrations, a really effective campaign to protect the various species of sea turtles requires international cooperation—not only restriction of international commerce, but also collaboration in creating preserves or sets of preserves. No such international system of sanctuaries now exists. Four areas have been considered, however, as ideal sites to include in such a system. One of these, in the Sulu Sea between Sabah and the Philippine Islands, encompasses important feeding and breeding grounds of the Pacific green turtle. Here, a single extensive marine preserve is required, embracing both the Sabah nesting islands and the Philippine pasture flats. Such a sanctuary would help safeguard the entire range of an adult sea turtle population. Both the Sabah and the Philippine governments have favorably considered such an arrangement, but firm agreements have not yet been reached.

The other prospects for cooperative sea turtle preserves pose more complications, because in each case the sites would not be contiguous but widely separated. One of these is a pair of sanctuaries to protect the mature stages of the green turtle population that nests on Ascension Island and resides a thousand miles away on the coast of Brazil. Another such system, vital to the survival of the olive ridley (*Lepidochelys olivacea*) in the East Pacific, would be a trio of sanctuaries: one each in Mexico and Costa Rica, which contain the most important remaining nesting places; and another in Ecuador, where developing stages of both the Mexican and the Costa Rican ridley populations migrate to rich feeding grounds along the coast.

Creation of a reserve in Nicaragua's Miskito Cays to protect the feeding grounds of the West Caribbean green turtle population has long been a dream of conservationists attempting to save this species in the Caribbean. More recently, a sanctuary in Bocas del Toro Province of Panama has been proposed. The refuges in both Nicaragua and Panama would safeguard the population on its extensive feeding pastures, in developmental habitats, and along its migratory routes. Results of the West

Atlantic Sea Turtle Survey of the National Marine Fisheries Service, and field studies by Anne Meylan, a sea turtle biologist at the University of Florida, indicate that the Bocas del Toro area is the richest territory in the entire Caribbean for sea turtles. The island of Bastimentos and nearby Zapatilla Cays also are under consideration by the Panamanian government as a national park. Their preservation not only would benefit the Tortuguero green turtle colony, but also would improve survival chances for the beleaguered hawksbill turtle and other marine wildlife.

IN A TRIPARTITE CONVENTION held in 1969, Costa Rica, Nicaragua, and Panama agreed to collaborate in the custody of their shared green turtle population. Today the Costa Rican nesting shore is a national park. At the World Conference on Sea Turtle Conservation in 1979, Reynaldo Arostegui of the Nicaraguan Institute of Natural Resources and the Environment announced that his government was interested in developing a national reserve in the Miskito Cays and adjacent coastal region of Nicaragua. In 1980, a group from the United States joined with Nicaraguan representatives in aerial and sea-surface surveys of the proposed reserve area. Since then, because of unrest in the Miskitia, the project has gone no farther, but it is still definitely alive. As recently as July, 1983, Sr. Jaime Incer, national representative of Nicaragua to the West Atlantic Sea Turtle Symposium in San Jose, Costa Rica, reaffirmed his government's continued interest in the project. The question now is whether Panama will save her share of the West Caribbean turtle colony, along with the biologically rich and aesthetically magnificent marine landscapes of Bocas del Toro Province, which are gravely threatened by disruptive development.

Throughout the diminished ranges of the world's sea turtle populations, the migratory habits of the species impose the same conservation problems. A colony that is safe in one habitat travels to other sites that are not protected. As with whales and migratory waterfowl, effective custodianship of the sea turtles of the world must involve the collaboration of two or more countries. Such agreements are hard to reach, but without them there is little hope that sea turtles will remain in the seas.

Dr. Archie Carr is graduate research professor at the University of Florida, chairman of IUCN's Sea Turtle Specialist Group, and technical director of the Caribbean Conservation Corporation, which has operated the turtle research station at Tortuguero for the past 26 years. His books, *Windward Road* and *So Excellent a Fish*, are popularized accounts of his work with Caribbean sea turtles.

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COVER: Sandhill cranes at day's end on Nebraska's Platte River, where the Conservancy helped safeguard 2,000 acres of matchless migratory bird habitat. Photo by Paul Johnsgard.

The Nature Conservancy is a national conservation organization committed to the preservation of natural diversity by protecting lands containing the best examples of all components of our natural world.

To date the Conservancy and its members have been responsible for the preservation of 2,019,342 acres of forests, marshes, prairies, mountains, and islands: home to rare and endangered species of wildlife and plants. 3,157 projects have been completed since the acquisition of the first preserve in 1954. Approximately 60% of all preserves are retained by the Conservancy and managed by staff and volunteer land stewards.

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