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The Marine Turtles of Virginia

Families Cheloniidae
and Dermochelyidae

with notes on identification
and natural history

SEA GRANT PROGRAM
Virginia Institute of Marine Science
Gloucester Point, Virginia



The Marine Turtles of Virginia

Families Cheloniidae
and Dermochelyidae

with notes on identification
and natural history

by
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Introduction

THE MARINE TURTLES ARE AMONG the most interesting representatives of Virginia's migratory marine fauna. They include the leatherback (the world's largest living reptile) and four species of hard-shelled sea turtles. The latter are represented by the very large and common loggerhead, the much smaller, less common Atlantic ridley, the rare Atlantic green turtle and the Atlantic hawksbill, a species for which no verifiable Virginia records have been found. [1

All of our marine turtles may be recognized by their flipper-like legs, adaptations for their highly aquatic existence. These animals spend virtually their entire lives in the water, emerging on beaches only to lay eggs.

All five marine turtles are highly susceptible to annihilation by man, despite their apparent armoured immunity. With the exception of the leatherback, all species are considered edible, if not epicurean, by man. Active fisheries for marine turtles have been in existence in the tropics for centuries.

Marine turtles reach their highest vulnerability when they emerge from the sea to bury their eggs in nests on sandy beaches. At such times the adults may be slaughtered for food, and thousands of eggs (even of the leatherback) are collected with relish, to be prepared and eaten in much the same manner as hen's eggs. The greatest

[1 The author has recently compiled records of occurrence for marine turtles in Chesapeake Bay and nearshore waters from the literature and will not repeat these citations herein. (Musick, 1972) i

threats to the survival of all our marine turtles is such human harvesting of females and eggs at nesting beaches, and the actual destruction of such beaches because of real estate development in the southeast U.S.

In addition to harvesting by man, the eggs are vulnerable to predation by many other animals including pigs, dogs, raccoons and skunks. If a nest remains undisturbed and the eggs hatch after a month or more, the young turtles usually emerge at night and head for the sea. Natural predation by mammals, birds, fishes, land crabs and other animals on these nestling turtles can be very high, because the turtles are small, awkward, relatively thin shelled and defenseless. Another major threat to turtle survival south of Virginia is shrimp trawling. Many sea turtles captured accidentally in shrimp nets are drowned.

All of Virginia's marine turtle species are protected by Federal law and are listed as "Endangered" or "Threatened." Consequently, even incidental catches of marine turtles by commercial fishermen must be returned to the water immediately, whether the animals are dead or alive. **Federal penalties are severe for molesting marine turtles, or even for collecting the shells, skulls or other parts of dead specimens found awash on beaches.** Such specimens should be reported to the nearest representative of the U.S. Fish and Wildlife Service (U.S. Dept. Interior), The National Marine Fisheries Service (U.S. Dept. of Commerce) or the U.S. Coast Guard. Virginia strandings of marine turtles may be reported through the Virginia Institute of Marine Science. (804/642-2111).

Acknowledgments

Thanks are due to all the people of Virginia who have had enough interest in marine turtles to report strandings to us; and to John Gourley, Marguerite Shackelford, John Merriner, Carl Hershner, Mark Chittenden and other VIMS scientific personnel who have assisted in collecting data on marine turtles during the last ten years. The figures produced in this booklet by Dick Cook were adapted from Martin Michener's superb photographs published in *This Broken Archipelago* by J. D. Lazell. Also, Ken Dodd of the USFWS Office of Endangered Species was of great aid in recounting pending legislation and current status of marine turtles on the U.S. List of Threatened and Endangered Wildlife and Plants.

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Identification

The leatherback may be distinguished from all other marine turtles because it has no plates (scutes) on its shell and no scales on its head or body. Instead, the leatherback is covered by a skin that appears leathery or rubbery. The carapace (top shell) is distinguished by seven longitudinal ridges. This is our only black marine turtle, although it is often spotted with white on the lower parts of the head, limbs and body, Fig. 1.

The four species of sea turtles (Cheloniidae) may be identified by using color and scale or plate pattern. The pattern of plates on the carapace is important in distinguishing the loggerhead and ridley from the green and hawksbill. The loggerhead and ridley both have an "extra" pair of shoulder plates which touch the nuchal (neck) plate at the leading edge of the carapace. The green and hawksbill do not have these extra shoulder plates, but instead have a larger triangular central (vertebral) plate abutting the nuchal, Fig. 2.

The green turtle may be distinguished from the hawksbill by further examining the plates on the carapace and also by examining the plates on the head between the eyes. The hawksbill has plates on the carapace that broadly overlap one another like shingles on a roof, whereas the plates on the green do not overlap (or do so slightly toward the rear of the shell, Fig. 2). In addition, the hawksbill has 2 pairs (4) of plates on the head between the eyes and the green has only 1 pair (2), Fig. 3.

The loggerhead may be distinguished from the ridley by color. The loggerhead is reddish brown with some yellow on the head and limbs, whereas the ridley is grey with some white on the head and limbs. In Virginia most loggerheads seen are large (> 100 lbs.), and most ridleys are small (< 40 lbs.). The loggerhead and ridley may be further distinguished by examining the large plates on the bridge between the upper and lower shells, Fig. 4. The loggerhead usually has 3 large plates (rarely 4) and the ridley has 4 or 5. In addition, ridleys have pores in their bridges plates and loggerheads do not.

Figures

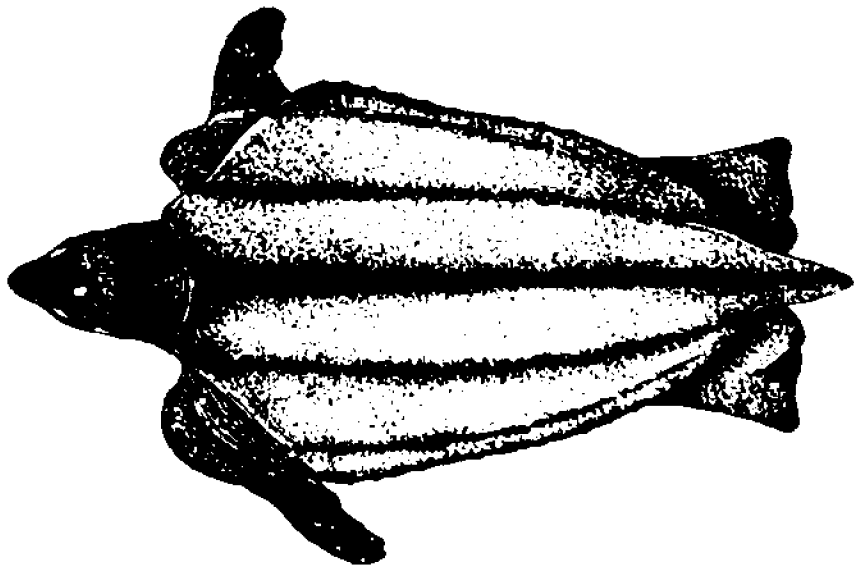
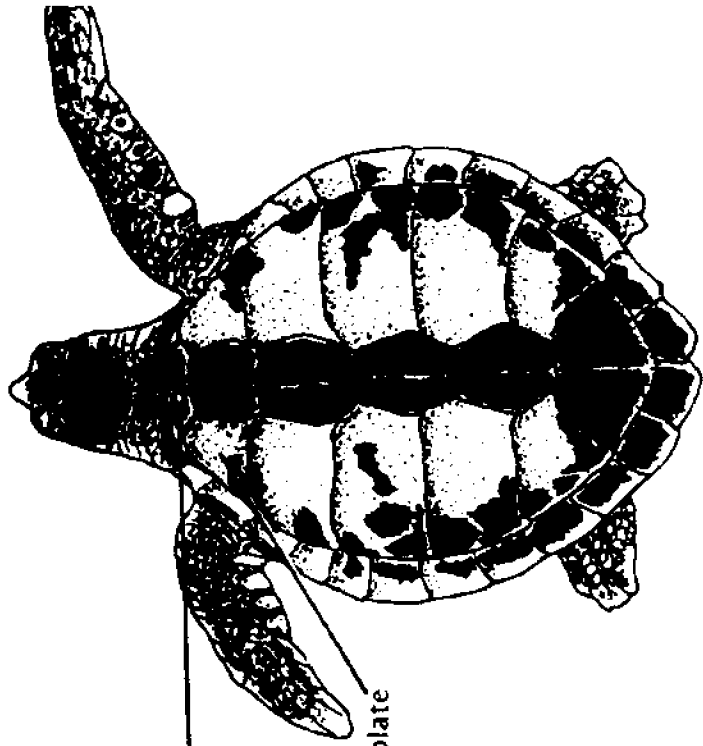
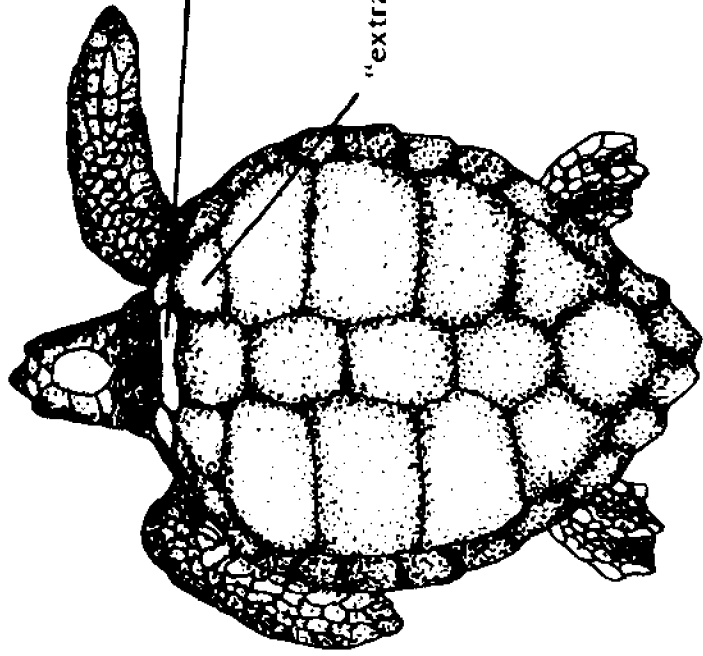


FIGURE 1. Leatherback Turtle: Note that there are no bony plates, and that the leathery shell has longitudinal ridges.



nuchal

"extra" shoulder plate



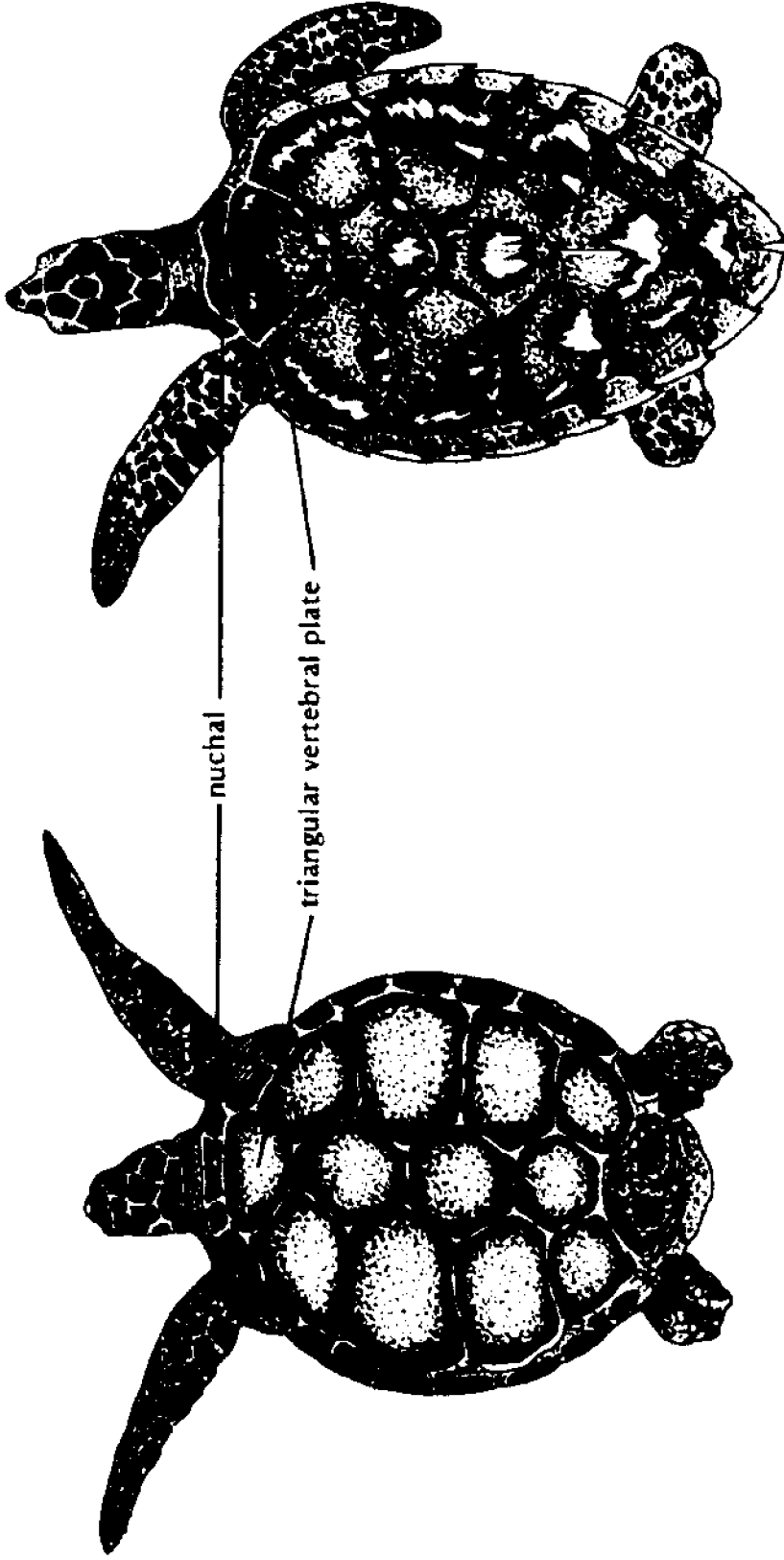
nuchal

"extra" shoulder plate

Ridley

Loggerhead

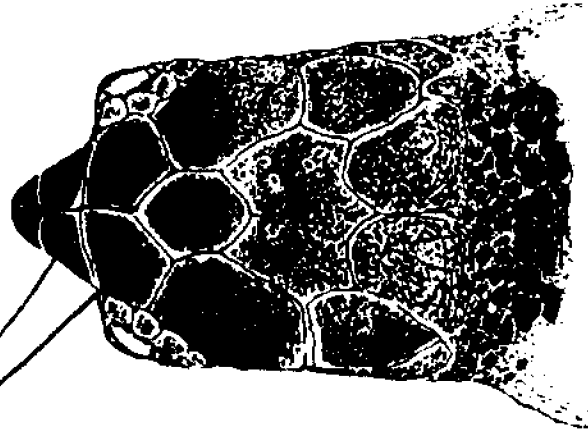
FIGURE 2. Sea Turtles: The Green and Hawksbill have a large triangular vertebral plate whereas the Loggerhead and Ridley have an "extra" pair of shoulder plates touching the nuchal plate.



Green Turtle

Hawksbill

4 plates
Hawksbill



2 plates
Green Turtle

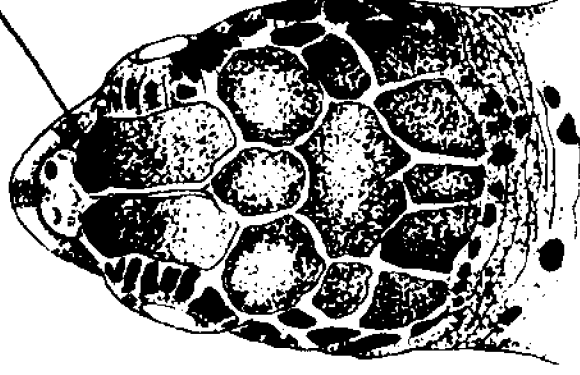


FIGURE 3. The Hawksbill has two pairs (4) plates on the front of the head between the eyes, whereas the Green has only one pair (2) plates there.

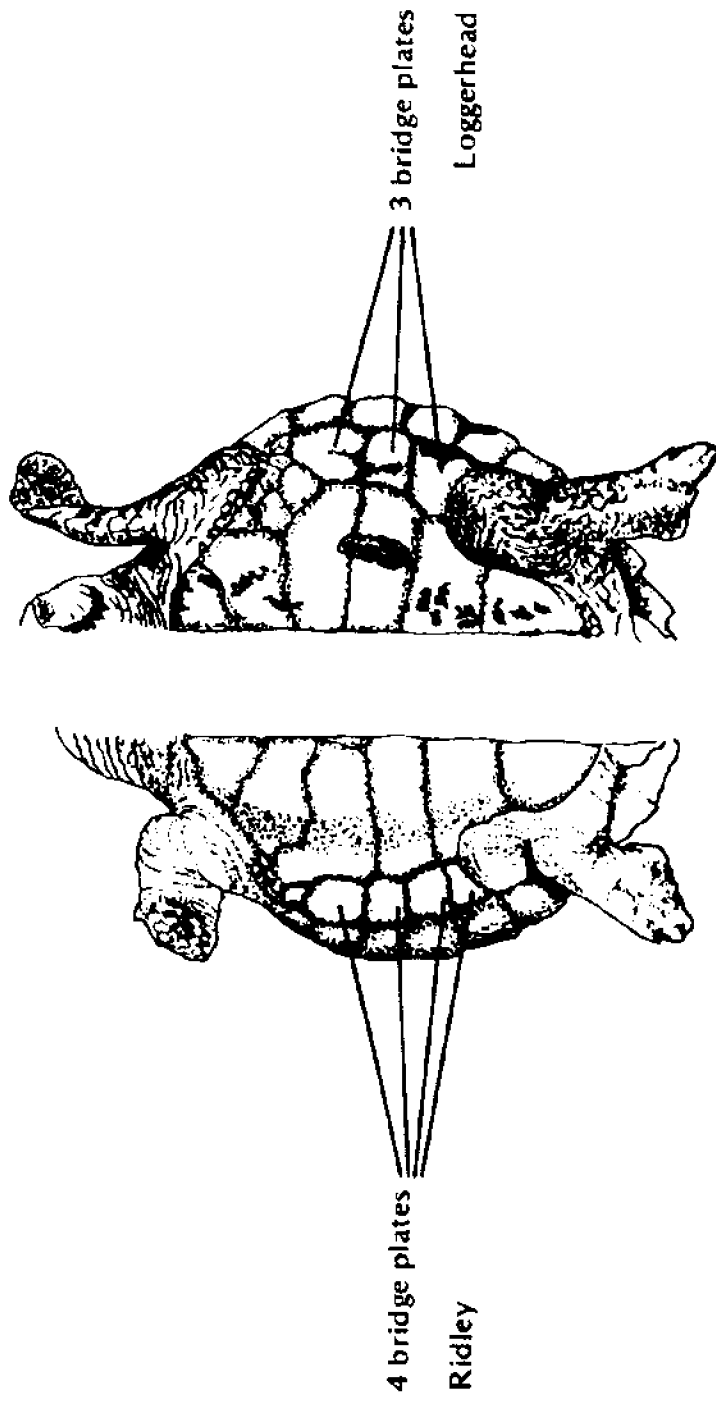


FIGURE 4. The Ridley has four bridge plates, whereas the Loggerhead has three bridge plates.

Natural History and Status in Virginia²

[2 Major literature sources for these accounts were Carr, 1955, 1967; Conant, 1975; Ernst and Barbour, 1972; Musick, 1972 and Pritchard, 1967.



ATLANTIC LEATHERBACK

Dermochelys c. coriacea (Linnaeus)

SIZE: This species attains a weight of at least 1,600 lbs. in the Atlantic and may reach a ton. A Pacific specimen has been recorded at 1,900 lbs. Most Virginia specimens examined by Virginia Institute of Marine Science (VIMS) personnel have probably weighed less than 1,000 lbs. Straight line carapace lengths ranged from 34 to 63 inches.

HABITS AND HABITAT: The leatherback is pelagic, spending most of its life in the open ocean. Even so, specimens have been reported from upper Chesapeake Bay, and in Virginia estuaries as far upstream as Severn River in the Mobjack Bay system. This species is the only turtle known to be warm-blooded and capable of maintaining body temperatures near 80° F. even when living at ambient sea temperatures near 45° F.

Because leatherbacks can maintain their body temperature, they are capable of surviving in cool boreal waters. Apparently, many individuals migrate in summer from the tropics to the productive waters off New England and the Canadian maritime provinces, where they feed on the abundant boreal jellyfish *Cyanea sp.* Similarly, a large leatherback appeared to be feeding on the sea nettle *Chrysaora quinquecirrha* and another jellyfish, *Aurelia aurita*, in a tide line off Fort Story, just northeast of Cape Henry, Virginia on 29 July 1977. A leatherback was also observed there on 24 August when VIMS personnel returned. The same turtle may have been resident for several days in the area, where prevailing currents formed a large back eddy which concentrated flotsam, including planktonic jellyfishes.

Leatherbacks have been reported capable of swimming very rapidly despite their cumbersome appearance. Estimates of 10 knots may not be excessive. The author observed a large leatherback breaching at Triangle Wrecks, 18 mi. NNE of Chesapeake Light Tower, on 29 August 1977. The turtle must have been swimming at some considerable speed in order to propel part of its massive body from the water.

DISTRIBUTION: Worldwide Atlantic Ocean from Newfoundland to Argentina, including the Gulf of Mexico and Caribbean Sea; occasionally, the Mediterranean Sea. In Virginia it is an occasional summer visitor.

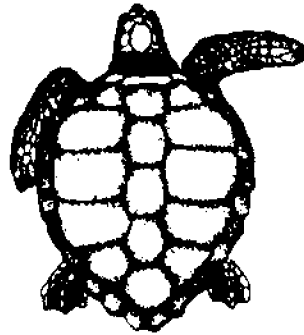
REPRODUCTION: In the western Atlantic the leatherback nests from April through November on beaches in the West Indies, Bahamas, Central America and Florida, with one nesting reported as far north as North Carolina (Schwartz, 1976).

STATUS: The U.S. List of Endangered and Threatened Wildlife and Plants includes this species as "Endangered."

Family *Cheloniidae* - Sea Turtles

ATLANTIC LOGGERHEAD

Caretta c. caretta (Linnaeus)



SIZE: This species, the largest of the hardshelled sea turtles, attains a weight of at least 1,000 lbs. and perhaps 1,200 lbs. Most Virginia specimens examined by VIMS personnel have been medium-sized adults (33 - 36 inches carapace length).

HABITS AND HABITAT: The loggerhead is an ubiquitous subtropical marine turtle. It has been observed several hundred miles at sea, yet also penetrates estuaries far up into brackish water. The loggerhead's diet is as catholic as its habitat, and includes jellyfishes, sponges, bivalve mollusks, gastropods, squid, crabs, shrimp, barnacles, fishes and various sea grasses (*Zostera*, *Thalassia* and *Sargassum*).

DISTRIBUTION: Atlantic Ocean from Newfoundland south to Argentina and including the Gulf of Mexico, Caribbean and Mediterranean seas. In Virginia it is by far the most common marine turtle occurring nearshore in Chesapeake Bay and marine waters in spring, summer and fall.

REPRODUCTION: In the western Atlantic the loggerhead nests

from April through August on beaches in Costa Rica, Cuba and the Virgin Islands, and in the U.S. from Florida to Virginia, with isolated accounts of nesting as far north as New Jersey. Nesting in Virginia has been reported on the barrier islands off the Eastern Shore (Castagna, personal communication) and in and near the Back Bay Wildlife Refuge south of Sandbridge in Virginia Beach. A dead hatchling was found by VIMS scientists at Sandbridge on 11 August 1973, and a loggerhead nest was examined south of the refuge on 24 August 1972. In addition, U.S. Fish and Wildlife Service (USFWS) personnel have transplanted eggs from South Carolina to Wildlife refuges in Virginia at Assateague Island and Back Bay over the last several years.

STATUS: The status of the loggerhead is somewhat enigmatic. It has recently been listed as "threatened" on the U.S. List of Endangered and Threatened Wildlife and Plants. Yet, this species is by far the easiest to manage because there are nesting colonies along the East Coast of the U.S. This means resource managers do not have to deal with foreign governments in order to protect the nesting beaches. In fact, many such beaches are already protected by inclusion in the USFWS refuge system, the U.S. Park Service National Seashore system or in preserves managed by the Nature Conservancy. In addition, the loggerhead appears to be common off Virginia presently. It is an unusual day when one or more of these turtles is not sighted by summer boaters off the Virginia Capes.

Conversely, ongoing or projected real estate development in North Carolina, South Carolina, Georgia and Florida will certainly lead to destruction of some loggerhead nesting beaches. Such development must be strenuously discouraged, not only for the sake of sea turtle survival, but for a host of other reasons associated with the degradation and destruction of delicate and dynamic barrier beach ecosystems.

Another point of concern regarding survival of the loggerhead is adult mortality induced incidentally by established fisheries. Specifically, the inshore trawl fishery for shrimp and fishes off the Carolinas and Georgia often takes loggerheads, many of which are drowned in the nets.

In addition, annual evidence since 1971 supports the possibility of substantial loggerhead mortality in Chesapeake Bay during late May and June. In 1977 between May 18 and June 22, seven dead loggerheads were reported to VIMS and examined in Mathews, Gloucester and York Counties. Most of these were bloated and stranded by the tide. Seven turtles may seem like a small number,

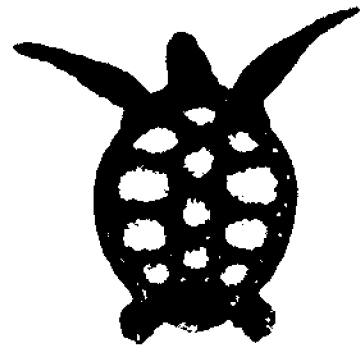
but the reports were unsolicited (with no public awareness campaign) and all were within a 30 mile radius of the VIMS laboratory. It is unlikely that even within this radius all dead loggerheads present were reported or found, and this area represents only a small portion of the entire Chesapeake Bay system.

The enduring question is: What are the sources of these mortalities? They cannot be attributed to a trawl fishery because Chesapeake Bay is closed to trawling. The most active Bay fishery in May and June is the poundnet fishery. Most turtles captured in pound nets should survive because the nets are constructed so that turtles can reach the surface to breathe. Turtles can be released from such nets, although there is a possibility that some poundnet fishermen might kill the turtles so that they do not re-enter the nets (thus causing the repeated labor of releasing them again).

Some loggerhead carcasses examined show evidence of trauma (cuts on the limbs or head, or even bullet holes). Most show no such overt signs. The advanced state of decomposition of some carcasses makes any conclusions concerning cause of death quite speculative. As noted previously, these spring loggerhead mortalities have been occurring in lower Chesapeake Bay at least since the start of the 70's, when VIMS began to keep cursory records of them.

ATLANTIC GREEN TURTLE

Cheloni m. mydas (Linnaeus)



SIZE: This species attains a weight of 850 lbs. Records for Chesapeake Bay have included mostly juveniles (< 100 lbs.).

HABITS AND HABITAT: The green turtle is a tropical species which undertakes long oceanic migrations but also feeds in shallow areas, particularly in the vicinity of sea grass beds. Normally coming ashore only to nest, green turtles have occasionally been observed "hauled out" basking in the tropics. Juveniles tend to wander further from the tropics than do adults. Thus, most records from New England and the Middle Atlantic states are of juveniles. In addition, juveniles tend to be more carnivorous (jellyfish, mollusks and crustaceans) than the adults, which feed heavily on the submerged sea grass *Thalassia* and other marine plants.

DISTRIBUTION: Atlantic Ocean from New England to Argentina, including the Gulf of Mexico and Caribbean Sea. In Virginia the green turtle is rare, occurring occasionally during summer.

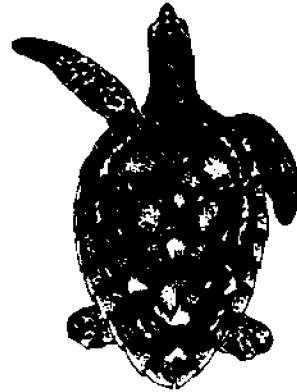
REPRODUCTION: In the western Atlantic the green turtle nests from March to October (peak, May-June) primarily on beaches in the West Indies, the Caribbean shores of South and Central America and on the Dry Tortugas. Occasional nesting occurs on the coasts of the Gulf of Mexico, Florida and Bermuda.

STATUS: The green turtle is the most highly valued marine turtle for food. Consequently, it has been intensely harvested and depleted throughout its range.

This species is listed as "Threatened" on the U.S. List of Endangered and Threatened Wildlife and Plants. Its rare occurrence in Virginia might suggest that it is extra-limital. However, considering the depleted population levels of the species in the Caribbean center of distribution, it is probable that juvenile green turtles were at one time more common in Virginia.

ATLANTIC HAWKSBILL

Eretmochelys i. imbricata (Linnaeus)



SIZE: This species attains a weight of 280 lbs., but most individuals are much smaller (approximately 50 lbs.).

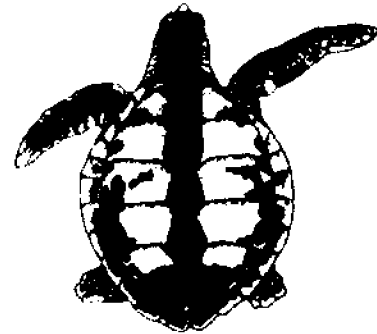
HABITS AND HABITAT: The hawksbill tends to be restricted to the tropics more so than any of our other marine turtles. It has been found most often in shallow areas near rocky or coral reefs and in estuaries and lagoons. The hawksbill has been reported to be omnivorous, but tends to include more animal than plant material in its diet. A wide variety of animal food has been recorded, including sponges, coral, Portuguese man-of-war, ectopods, sea urchins, mollusks, fishes and crustaceans.

DISTRIBUTION: Atlantic Ocean from Massachusetts through the Gulf of Mexico to southern Brazil. There are no confirmed reports of this species from Virginia, but it is known from a shell labeled only "Chesapeake Bay" in the collections of the Natural

History Society of Maryland. There are a few other records from north of Cape Hatteras, including one shell from Massachusetts. Schwartz (1976) has reported four specimens from North Carolina. Probably this species is extra-limital in Virginia, occurring, if at all, as a stray.

REPRODUCTION: In the Western Atlantic the hawksbill nests from April through November on beaches from Florida and Mexico through the West Indies and along the Caribbean coasts of South and Central America. Its major nesting beach appears to be Mona Island, Puerto Rico.

STATUS: The hawksbill's shell has long provided the tortoise shell of commerce. In addition, the eggs and flesh are marketed for food (even though the flesh of some hawksbills has been reported to concentrate toxins from their food). Consequently, the hawksbill has been depleted throughout its range, and is classified as "Endangered" on the U.S. List of Endangered and Threatened Wildlife and Plants.



ATLANTIC RIDLEY

Lepidochelys kempi (Garman)

SIZE: This species is our smallest marine turtle, attaining a maximum weight of 110 lbs. Most Virginian specimens have been small (<40 lbs.).

HABITS AND HABITAT: The ridley is a coastal sea turtle, being most often encountered in mangrove habitats. In Virginia it has been taken far up into estuaries, including the Ware River (Mobjack system) and York River. The ridley's diet consists mostly of benthic animal matter, including mollusks and crustaceans.

DISTRIBUTION: Western Atlantic Ocean from Nova Scotia to Bermuda and Mexico. In Virginia the ridley is recorded occasionally during summer.

REPRODUCTION: In the western Atlantic the ridley nests from April to August, primarily on beaches from southern Texas to Vera Cruz, Mexico. Very heavy nesting concentrations called "arribadas"

(Spanish word meaning "arrival") occur north of Tampico, Mexico at Aldana (Rancho Nuevo).

STATUS: The Atlantic ridley is classified as "Endangered" on the U.S. List of Threatened and Endangered Wildlife and Plants. Ridley populations have been depleted by fishing, and particularly by nest robbing and slaughter of nesting females on the Mexican beaches, where nesting has been so heavily concentrated. A program to transplant eggs from Mexico to Padre Island National Seashore in Texas may aid in the recovery of the Atlantic ridley. In Virginia, the last recording of a ridley to date (April 1979) was in the summer of 1973. Lazell (1976) has suggested that the ridley's occurrence off New England may be cyclic, and this may be true in Virginia as well.

Bibliography

(Because this booklet is meant to be used by laymen as well as scientists, I have endeavored to avoid cluttering the text with citations to original literature sources. Most of these may be found in my 1972 paper or in the other work cited below. J. A. Musick)

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Parts of this publication were prepared for the "Symposium on Threatened and Endangered Plants and Animals of Virginia" convened in May 1978 at The Virginia Polytechnic Institute and State University.

About the author

Dr. Musick received his academic training from Rutgers (B.A.) and Harvard (M.S., Ph.D.) Universities. He has extensive experience with oceanic and estuarine biota and has been affiliated with VIMS since 1967 as an associate marine scientist within the VIMS Ichthyology Department. His research interests include sharks and marine finfish ecology, deep sea biology and ecology of the herptiles of the Virginia-North Carolina coastal area.

Dr. Musick's recent research is centered on deep sea biology, continental shelf fisheries and species ecology relative to outer continental shelf development for oil and gas production. He has collaborated with the National Park Service since 1971 and has developed a catalog of the herptofauna of the outer banks areas of Virginia and North Carolina. He maintains voucher collection materials, range records and specimen data for herptiles of the coastal plain, including the marine turtles of Virginia.

Additionally, Dr. Musick has extensive experience at sea aboard research vessels, has published in many scientific journals and is a member of, among others, the American Society of Ichthyologists and Herpetologists, the Ecological Society of America, the Herpetologists League and the Society for the Study of Amphibians and Reptiles.

Field notes and sightings

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