The Interpreter's Guide to Seashore Life on Hatteras Island

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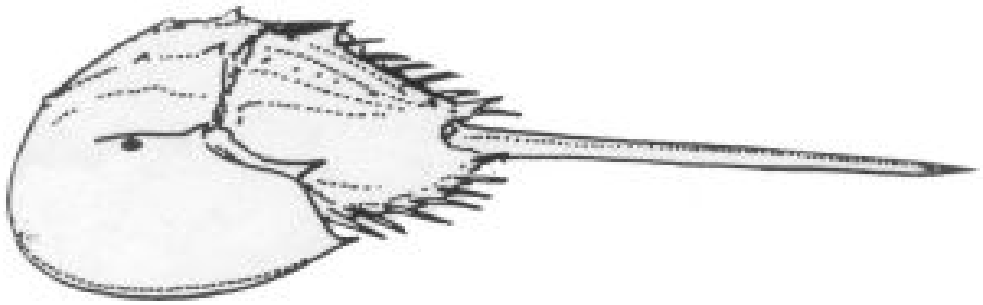
Introduction

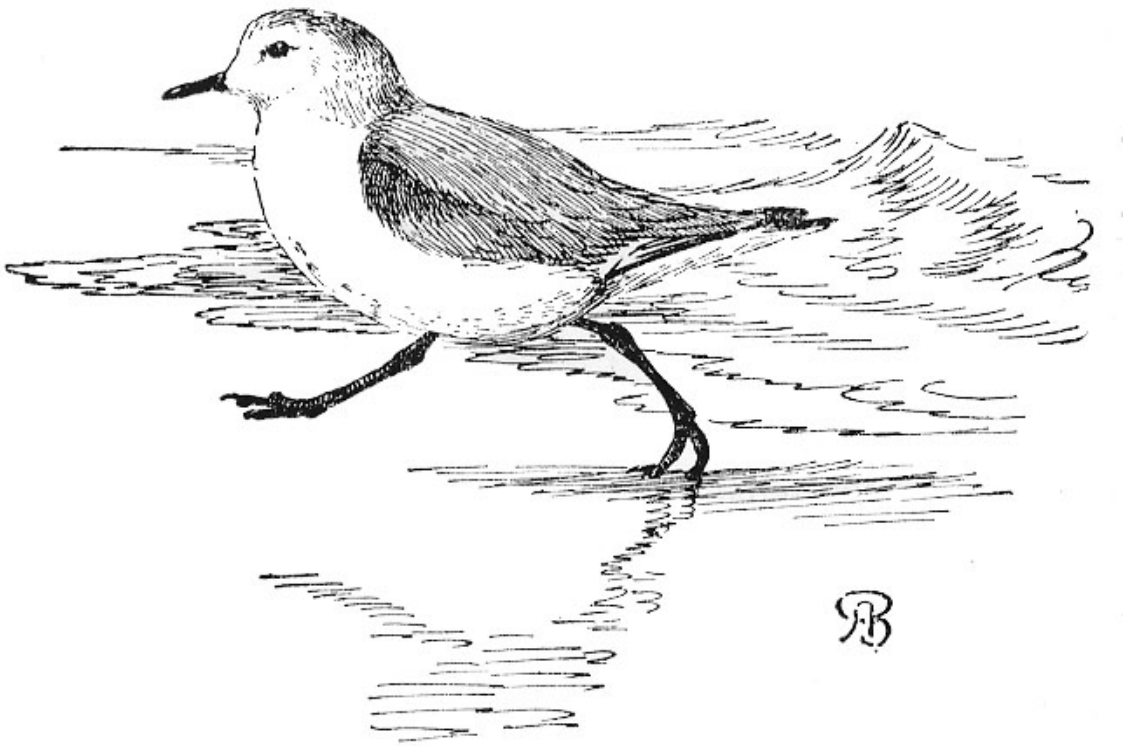
This book was designed to give you an introduction to the natural resources of Hatteras Island. Remember that this is just a start and by no means does it cover all of the species or facts about the island. These are just some of the most common plants, animals, ecosystems, and natural phenomena about which you will be asked. This guide was also designed not so much to provide just the facts and figures, but also to provide meaningful, interesting information that might foster quality interpretive moments.

This guide is divided by habitat type in order to give you a good idea about where to find these organisms. It is important to remember, however, that many of these animals can live in multiple habitats. The mollusks, for example, are at home in the sound and saltwater marshes, as well as in the ocean. So, although these animals have been listed under a particular habitat type, that habitat is not necessarily its exclusive home.

Because this is not an all-inclusive guide, there is a list of recommended reading and sources at the end. The internet is also a good source, but be careful as to which sites you use for information. Enjoy this guide and hopefully it will help you on your way to learning more about this unique and fascinating place in which you work.



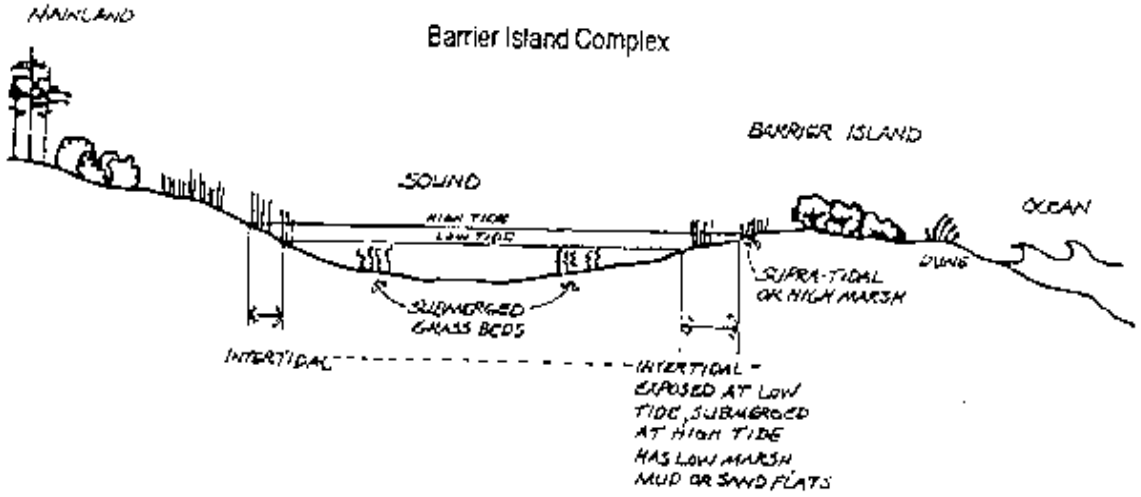
The Beach



SANDERLING (Winter)

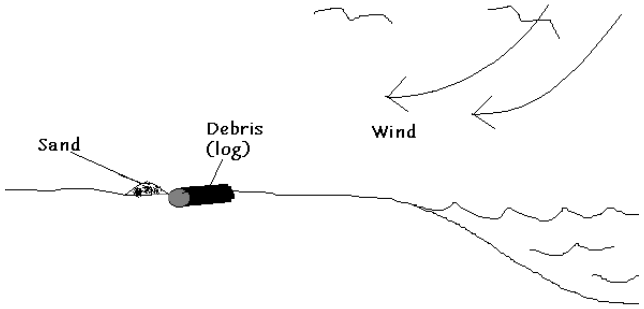
Barrier Islands

Barrier Islands are one of the most dynamic features on earth. They are constantly changing with the winds, the waves, and the tides. North Carolina is home to 23 barrier islands. Barrier islands in general are composed of the following zones: ocean beach, primary dunes, secondary dunes, maritime forest, salt marsh, and tidal flats. Each one of these zones is the habitat for unique plant and animal life. The ocean beach can be home to many different bird species, crabs, and other sea life. The primary and secondary dunes are home to a wide range of birds and mammals, sea oats, and many of the succulent beach plants. Most of the islands on the Atlantic coast including Hatteras, are moving in a Southwestern direction. This means that as they are losing sand on the north end, they are gaining, or accreting sand on the south end. This is due to the natural movements of the currents around the island. They are also moving from East to West. 10,000 years ago, at the end of the last glacial period, sea levels began to rise. This created shallow sounds and isolated ridges of sand. These ridges became barrier islands. Rising sea levels pushed the new barrier islands about 40 miles west to their present location. Overwash and breakthrough from storms continues to move the sand from East to West.

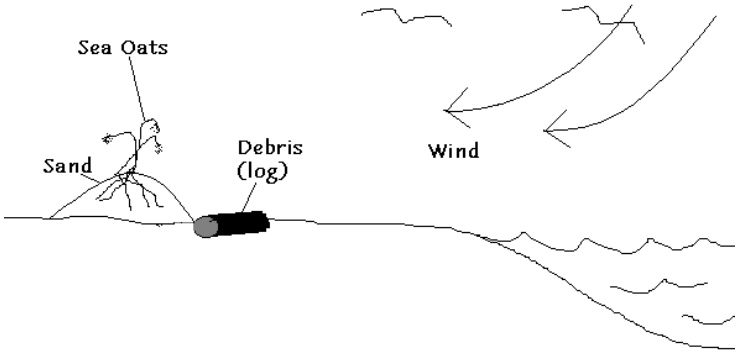


Sand Dunes

How does a sand dune form? It all starts with a little debris. Let's go back a few steps. There are three primary zones on the beach. You start out in the dunes where the sand is held in place by the roots of sea oats and beach grasses. You then move to the berm where the sand is soft and moved primarily by the wind. The third zone is the intertidal zone and the sand there is moved primarily by the water. Between the berm and the intertidal zone is the wrack line, or littoral zone, where debris is dumped at high tide. Why is all of this important? Because it is important to know where the dunes are forming and what's forming them. The dunes are formed primarily by the wind. The wind takes the sand from the berm and begins to pile it behind any piece of debris.



The wind piles sand behind the debris and forms a small "dune".



Animals that have eaten the sea oats or beach grass deposit seeds in the sand. With a little sun and rain, the sea oats begin to grow. Leaves begin to grow out of the sand and trap more sand behind them. The roots help anchor the plant to the ground and also help hold the sand in place. As the grasses are buried by the sand, they grow higher and grow more roots, which further stabilizes the dunes. These roots are also important in the propagation of the plant itself.

Beach Grasses

Beach grasses, such as **Sea Oats, Panic Grass, Broomsedge, and American Beach Grass** play an extremely important role in barrier island and beach ecology. They have adapted well to the harsh life in the primary and secondary dunes. They are flexible and do not break in the high winds. American Beach Grass is highly tolerant of the shifting sands. Sea oats, which can grow to be 6 feet tall, can send roots as long as 8 feet in all directions. These roots capture sand and stabilize the natural dunes, which helps curb erosion. All of these grasses have extensive root systems that can reach deeper into the sand to acquire valuable nutrients and groundwater. These grasses are also an important wildlife food. Everything from sparrows to rabbits to deer feed on the seeds of the beach grasses.

Broomsedge

Beach Plants

For anything to grow in the hot, dry climate that is that of the Outer Banks, it must have very special adaptations. The beach plants have many of those adaptations.

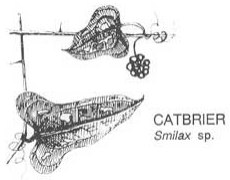
Sandspurs, yuccas, and thistles all have developed sharp thorns or spines. This adaptation helps with two things. It discourages animals from eating the plant and when the spines stick to fur or clothing, it helps the plant spread its seeds. Also, the flower of the yucca and the stem of the thistle are both edible.

Yucca

Bull Thistle

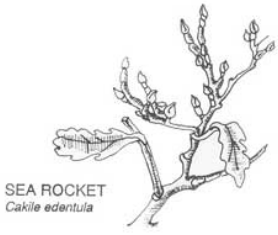
Many of the plants have developed a low growing profile, which keeps them out of the salty spray. These are the vines. They use their long stems to reach out for sunlight. These include **morning glories, pennywort, and smilax species.**

Beach Morning Glory



Sea Rocket, Sandwort, Beach or Marsh Elder, and Prickly Pear Cactus all fall under the succulent category of beach plants. These plants all have thick, fleshy, waxy leaves to aid in water storage. "Cuticle" cells on the surface reflect the sunlight and also reduce water loss.

Marsh Elder

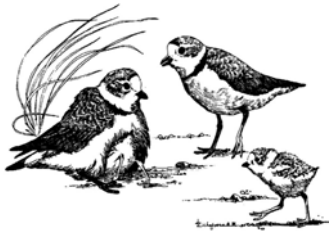


Prickly Pear Cactus

Sandwort

Birds of the Beach

The most famous **plover** of Hatteras Island is the **piping plover**. Their sandy gray plumage makes them masters of camouflage. The plovers lay four speckled eggs directly in the sand. When the young hatch they are quickly on the move on land and feed in the sand flats. The plovers are constantly running up and down the beach searching for mollusks, crabs, or worms in the surf line. They can be seen tapping the sand with one foot, possibly trying to draw food sources to the surface. Here in North Carolina, two of the greatest threats to the plovers are habitat loss and disturbance of their nests. Although migratory plover numbers have increased, the breeding populations here are down.



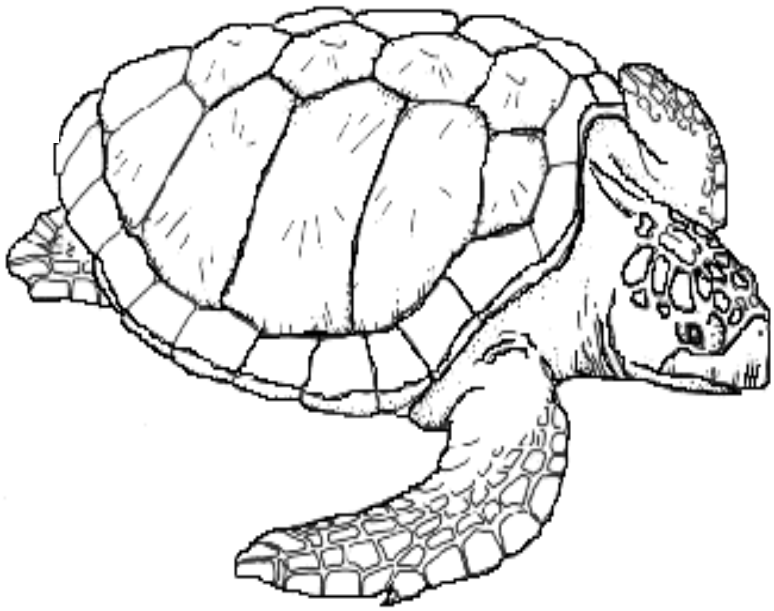
Terns are also common visitors to the Cape Hatteras shore. Terns can be easily identified by their unusual flight pattern, which involves flying over the water searching for fish, then quickly diving into the water to make the capture. They have forked tails, long pointed wings, and sharp bills, which all distinguish them from gulls. Most terns also have a black crown. Terns are colonial nesters and are very protective. Like the plovers, their numbers are declining.

Black Skimmers are very unique residents of Hatteras Island. These shoreline searchers can be identified by their striking black and white plumage and bright orange bill. They can be seen flying low to the water trying to scoop out fish and other prey. Their unique bill design makes them experts at this type of hunting. Their lower bill is actually longer than their upper bill! They, too, are colonial nesters

The American Oystercatcher

The American Oystercatcher can be found on the ocean and sound sides of the island almost any time of the year. It is easily identified by its black head, brown back, white belly, and bright red, straight bill. It wedges this bill into the gap left in most bivalves and snips the adductor muscle that holds the bivalve together. It then pries open the oyster or clam and enjoys a delicious feast! The Oystercatcher is a solitary ground nester and lays 2-4 eggs. She often lines her scraped out "nest" with shell fragments. Female Oystercatchers sit on their nests to incubate the eggs.

The Ocean



The Tides

Why are the tides important? For a lot of reasons (see marsh section), but first you need to know how they work. There are two high tides and two low tides per 24-hour period. They are controlled by the gravitational pull of the moon and to a limited extent, the sun. The sun being further away from the earth than the moon exerts less gravitational pull than the moon. As the moon orbits the earth, it pulls the earth's waters towards it. High tide occurs at the earth's surface closest to the moon and the opposite side as well due to centrifugal force. Low tide obviously occurs at the point in the earth that is furthest from the moon. The moon takes 12 hours and 52 minutes to orbit the earth. The sun does exert a force on the earth as well. When the sun, moon, and the earth are in a straight line, we have the highest and lowest tides of the month. That is what is called the "spring tide" (see fig 1). "Neap tide" occurs when the moon is pulling at right angles to the earth (see fig. 2). That gives us lower high tides and higher low tides.

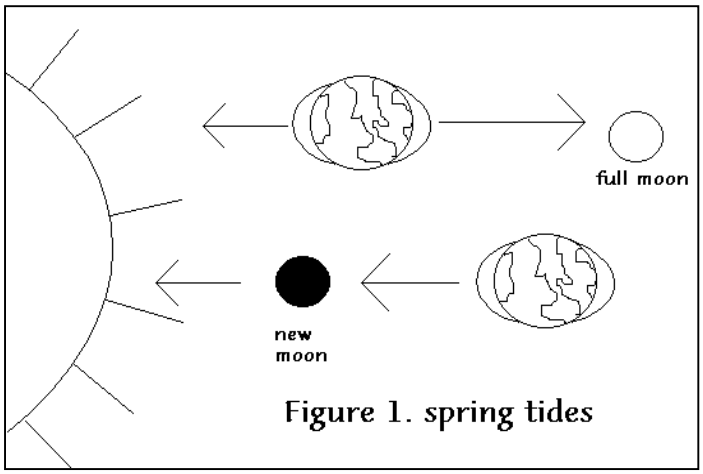


Figure 1. spring tides

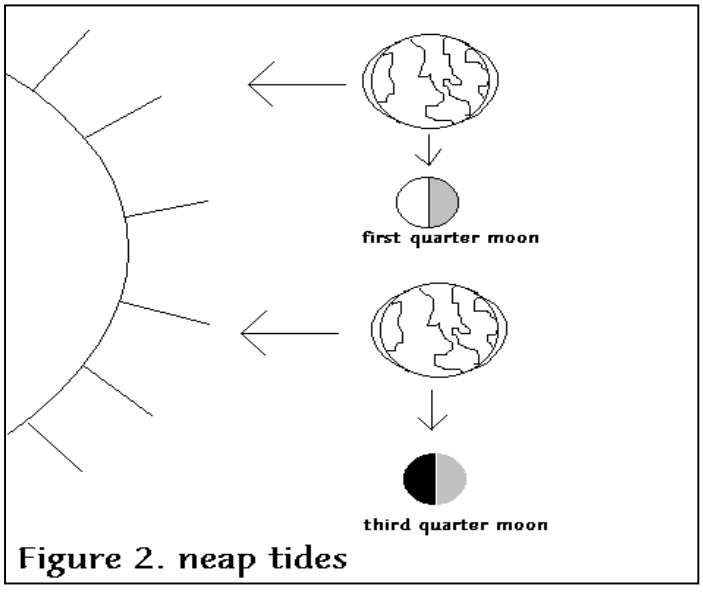


Figure 2. neap tides

Seaweed

Most of the seaweed you find washed up on the beaches is going to be one of three types: sea lettuce, sargassum weed, or calithamnion, although we do not have that much seaweed primarily because of lack of holdfasts. Seaweeds are non-vascular plants and grow completely submerged. Their color is generally dependent on the water temperature and depth of the water in which they grow. Green seaweeds tend to prefer warm shallow water, brown sea weeds like cooler deeper waters. Red sea weeds are found in very deep water where only UV light can get reach them. Seaweeds can be dried, pickled, cooked, and eaten. They also serve as a hiding place for many species of crab and fish.

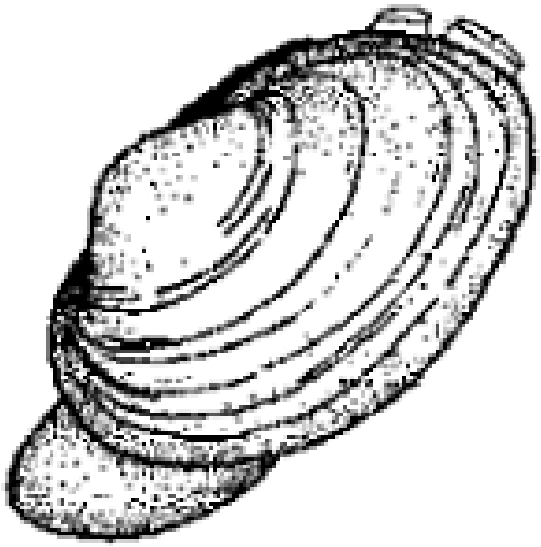
Sea lettuce grows in tidal pools and on muddy bottoms near organic debris. This can be found on the sound side of the island.

Sargassum is a very important to young sea turtles because it provides a valuable habitat for food sources. The hollow air bladders keep the plant afloat.

Calithamnion is a very delicate seaweed and can be found in small reddish clumps on the beach.

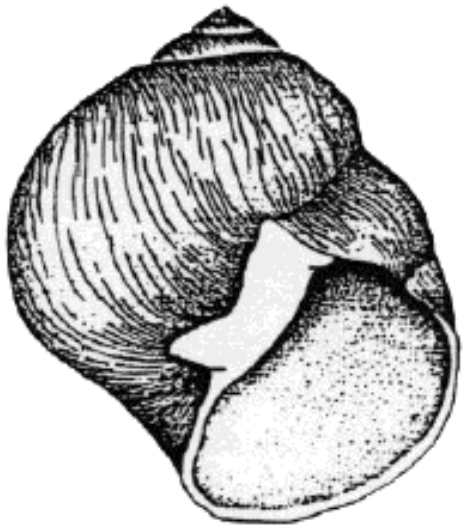
Mollusks

There are two basic types of mollusks: univalves and bivalves. Univalves, also known as gastropods ("stomach foot"), all have a feeding tube called a radula, which is covered with fine teeth. Many species use this apparatus to drill, scrape, or cut in order to get food. There are over 75,000 species of gastropods and most of them have a muscular foot used for crawling. They also have one shell that serves as a portable home. Bivalves are mollusks with two halves to their shells known as valves. The shells are kept closed by two large muscles. Bivalves do not have a head or a radula, but they do have a well developed foot used for digging and burrowing. Not all bivalves burrow and those that do not have a smaller foot. Bivalves that burrow have two siphons that help push water throughout the shell. These siphons are also used to aid the mollusks in movement.



Moon Snail or Shark's Eye

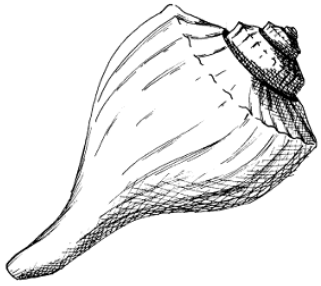
Moon snails are mollusks that can often be found on the Atlantic coast. They can be identified by their round shape and "pupil-like" spiral. Moon snails are carnivorous. They make their way along the ocean floor by gliding on their stomach (which is up to three times as large as their shells) looking for other unsuspecting mollusks. Once the prey is found, the moon snail wraps its large foot around the organism and begins to drill a hole with its proboscis. The "radular ribbon" of chitinous teeth scrape out a perfect 1/12" hole. The moon snail then scrapes out the meat with its radular spikes and passes it on to the gizzard for digestion. Mmmmm.



Whelks

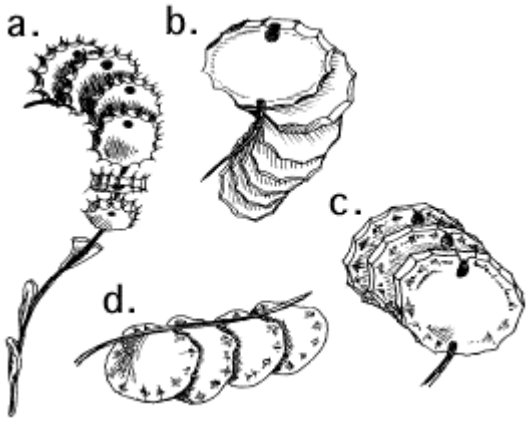
There are three common whelks found near Hatteras Island. They are the Knobbed Whelk, the Channeled Whelk, and the Lightning Whelk. They are all univalves and are about 5-9" long. Whelks are the largest of the salt water snails in United States waters. The snail itself has stalked eyes and hunt shellfish with a long proboscis. They capture their prey by beating them with their heavy shells, prying them open with the side of those shells and sucking the meat out with the aforementioned proboscis. From May- October look for the egg cases washed up on the beach. Each chamber can hold as many as 15 eggs that feed on plankton.

c. Lightning Whelk



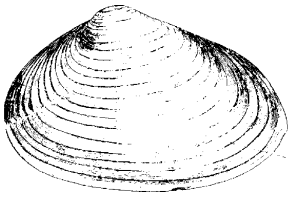
d. Channeled Whelk

b. Knobbed Whelk

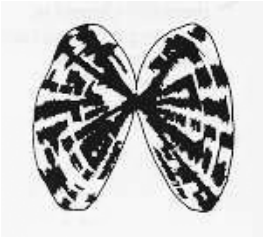


Clams

Surf clams are found in the intertidal and surf zones. They have thick shells and short siphons. They have been known to burrow to depths of 100 feet or more.

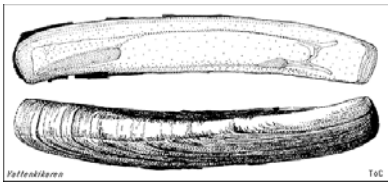


Coquina clams come in many different colors. They are often called the Butterfly Shell because their shell is hinged together and stays hinged after the mollusk has died. They live just below the tide line and can often be found by digging in the sand with a shovel or your hand. Sometimes its fun to watch them try to burrow into your hands through the sand.



Quahog clams live all along the East coast. Unlike most clams, where just the adductor muscles are edible, the entire clam is edible. This clam is the primary clam used for clam chowder. The inside of the quahog is a purple-ish color and was used by Native Americans for beads and trade.

Jackknife clams are some of the fastest burrowing clams and also some of the only swimming clams. Their odd shape and fragile nature makes them good beach finds. Look for them in the intertidal mud flats.



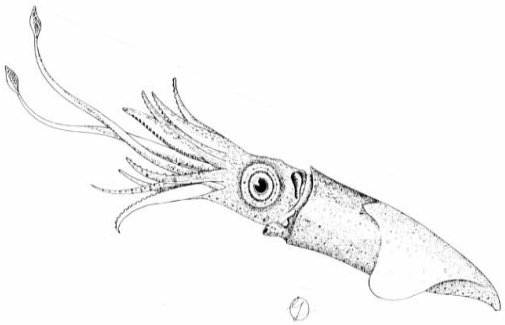
Cephalapods

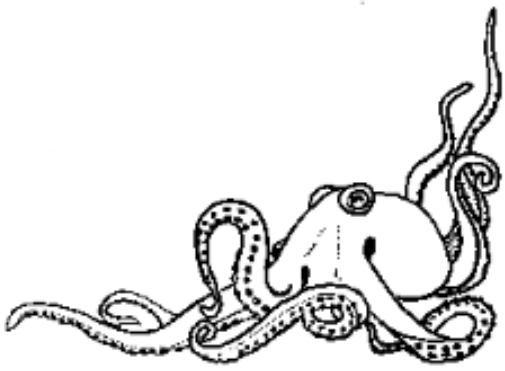
Many people do not realize that squid and octopi are mollusks. They are in the class Cephalopoda. Squid and octopi are active swimmers and they do this by pushing water through a siphon that comes out near the mouth. These critters are dioecious, which means males and females are separate. Males have an arm modified to insert a sperm packet into the female's mantle cavity.

Darren was unaware that, under the table, his wife and Raymond were playing "tentaclies."

Squid are the fastest invertebrate swimmers. Squids have eight arms and two tentacles covered with suckers used for capturing food. Squid eat primarily fish and can bite the heads off with their strong beaks. They usually do not eat the gut or the tail.

The Octopus crawls along the bottom of the ocean using the suction discs on their arms. They usually live in lairs, under rocks, or in other secluded spots. The octopus, unlike the squid, captures its prey with its tentacles and injects it with poison. Mucus from salivary glands begins to digest the prey before it even reaches the stomach!

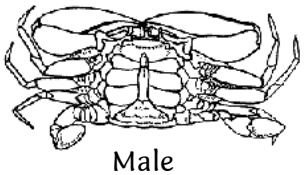




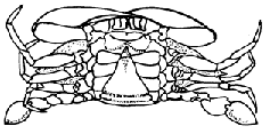
Crabs

Crabs come in all shapes and sizes and there are many different kinds of them out there. These are just a few of the most common.

The blue crab is one of the largest crabs commonly encountered. This guy is best spotted on the sound side of the island. Blue crabs are one of the best swimming crabs and use their paddle like back legs for that purpose. They are easily identified by their large blue claws that are tipped with orange. You can tell the difference between a male and a female by looking at the underside of the crab. If the "apron" is in the shape of the Washington Monument, it's a boy. It the "apron" is half-moon shaped or triangular, it's a girl. The larval for of the blue crab is plankton.

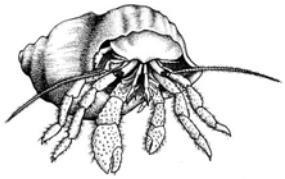


Male



Female

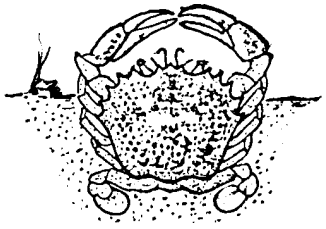
Hermit crabs are unique because although they do have an official "shell", it is not very hard. That's why these crabs live in the shells of mollusks. The body of the hermit crab is a tapered spiral to match the inside of the shells. They have rear claws that enable them to hook on to the interior of those shells. Hermit crabs have gills that must be kept wet.



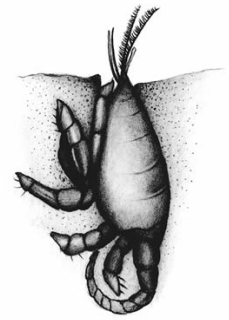
Ghost crabs can be found scouring the beach for food in the evening hours. They are primarily nocturnal and spend most of the day in burrows that may be up to four feet deep. Because they have gills, they must emerge from those burrows every so often to wet their gills. The females lay their eggs in the salt water in June and the larvae hide in the waves. They hibernate in the winter by storing oxygen in sacs near the gills.

More Crabs

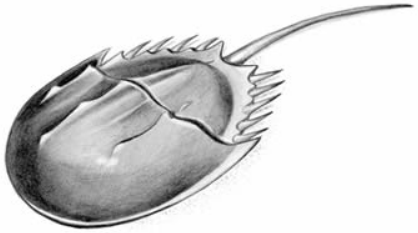
The **lady crab** is one of the more colorful swimming crabs. This crab has red and purple spots covering a cream colored shell. It does have the swimming legs that the blue crab has and often uses those legs for burrowing into the sand. It burrows so far into the sand that only its eyes, which are on pedestals, can be seen.



The mole crab is one of the most common crabs and molts of crabs you will find on the beach. They are primarily egg-shaped and are also called sand bugs or sand fleas. The mole crab eats plankton extracted from the water. Its legs are developed for burrowing. They are a favorite food for gulls and other birds.



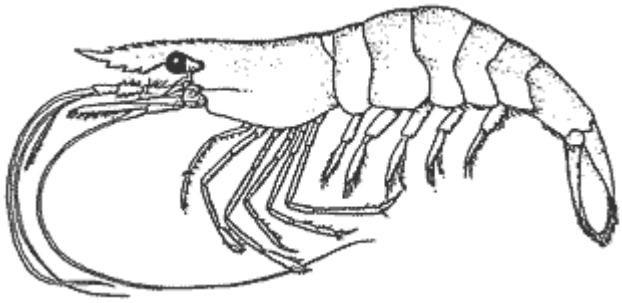
The **horseshoe crab** is not even really a crab, but it made it to this list anyway. The horseshoe crab is actually more closely related to spiders. This "crab" has both compound and simple eyes, a non-stinging spiked tail that acts as a rudder, and harmless "claws" and legs. Horseshoe crabs are "living fossils" and scientists can trace their lineage 100 million years- back to the trilobites.



Shrimp and Barnacles

Off the coast of Cape Hatteras, we have many different types of shrimp. The largest commercial species are the **brown, white, and pink shrimp**. There are also **snapping shrimp**, which resemble lobsters, and **grass shrimp** closer to the sounds and inlets.

Shrimp have a unique body plan. They have five sets of walking legs, five sets of swimmerets (obviously used for swimming), and a large back tail to propel the shrimp backwards. Shrimp spawn in very deep water and can lay up to 1 million eggs. Shrimp molt several times per year. They don't only molt their exoskeleton, but also their intestinal tract and stomach lining! Then they eat their molted shell. Mmmmm.



Barnacles are not usually thought of as arthropods, but they have all of the right characteristics. Although they are often hidden in their calcium carbonate shell, when they are covered with water, they come out and reveal their pairs of antennae and jointed legs. Barnacles are plankton eaters and use cirri (legs) to grab the plankton. They are all hermaphrodites, but most reproduction is by cross-fertilization.

Plankton

Plankton is the base of the marine food chain. Without it marine life would not exist. There are two basic types of plankton: Phytoplankton and Zooplankton.

Phytoplankton is basically plant plankton. They are primarily tiny unicellular organisms that are free floating. They can not swim against the currents. Phytoplankton, like all plants, photosynthesize and are responsible for over 80% of the world's oxygen production! There are two types of phytoplankton: diatoms and dinoflagellates. Diatoms are single-celled algae with a silica-based cell wall. They are well adapted to floating which allows them to get the maximum amount of light possible. They are eaten by zooplankton and oysters and clams. Dinoflagellates have flagella, which allow them to propel themselves through the water. They are responsible for "red tides" that are detrimental to shellfish.

Zooplankton is the animal plankton. Within this category of plankton are two sub-categories: meroplankton and holoplankton. Holoplankton remains plankton for its entire life like the jellyfish. Meroplankton is only plankton for the first part of its life. This includes larval crabs and barnacles. Although zooplankton cannot swim against the current, they can swim, which makes them easier to separate from diatoms when identifying them.

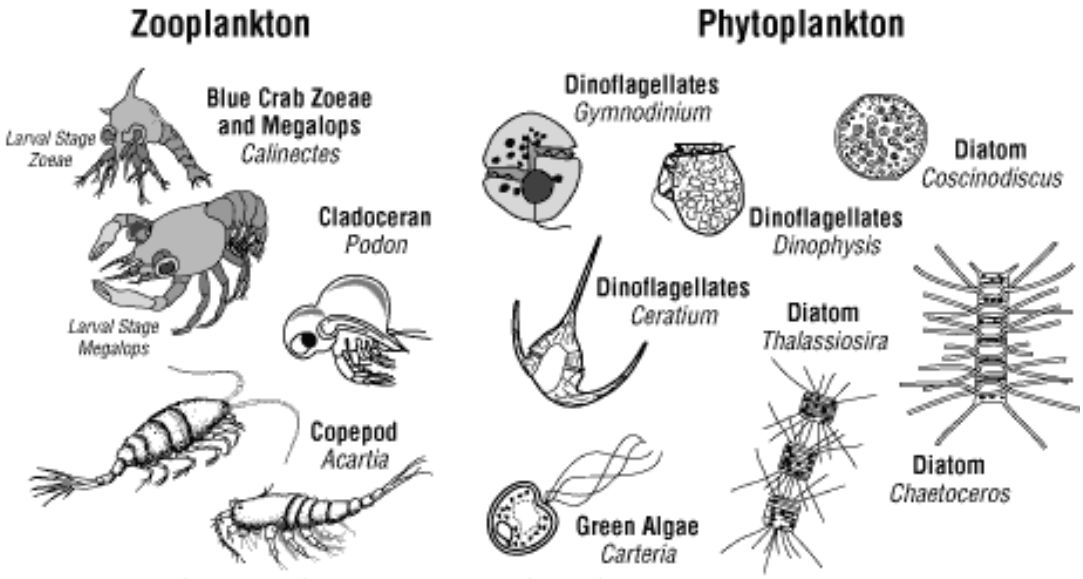


Figure 19-1. *Examples of various planktonic forms found in coastal and estuarine waters.*

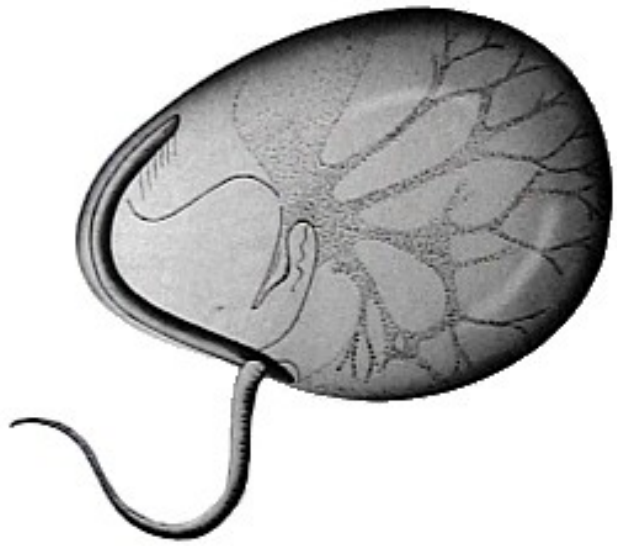
Bioluminescence

What is **bioluminescence?** Bioluminescence are those flashes of light that you see in the surf after dark. There are certain types of animals that produce light chemically as a response to movement nearby. This light is produced entirely without heat. There are several species that are bioluminescent and many of them are types of zooplankton. The most common of these is a one-celled dinoflagellate called Nocticula.

How does this work? Basically two chemicals react to create the light. This is not the same as phosphorescence, which is a redirection or re-emission of light, not the creation of light. The chemical reaction looks like this:

LUCIFERIN+OXYGEN → LUCIFERASE *(catalyst)* → OXYLUCIFERIN+LIGHT

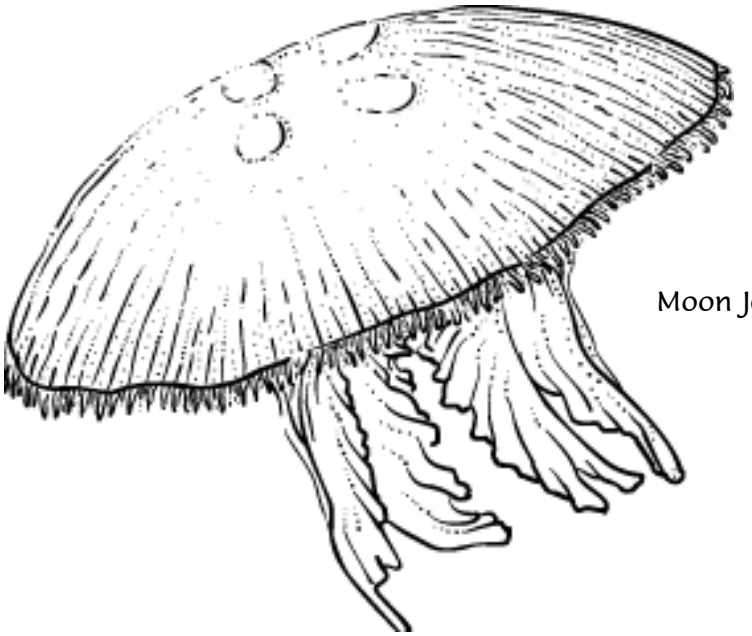
Who else is bioluminescent? Fireflies, comb jellies, squid, some bacteria, and glow worms.



Nocticula spp.

Jellyfish

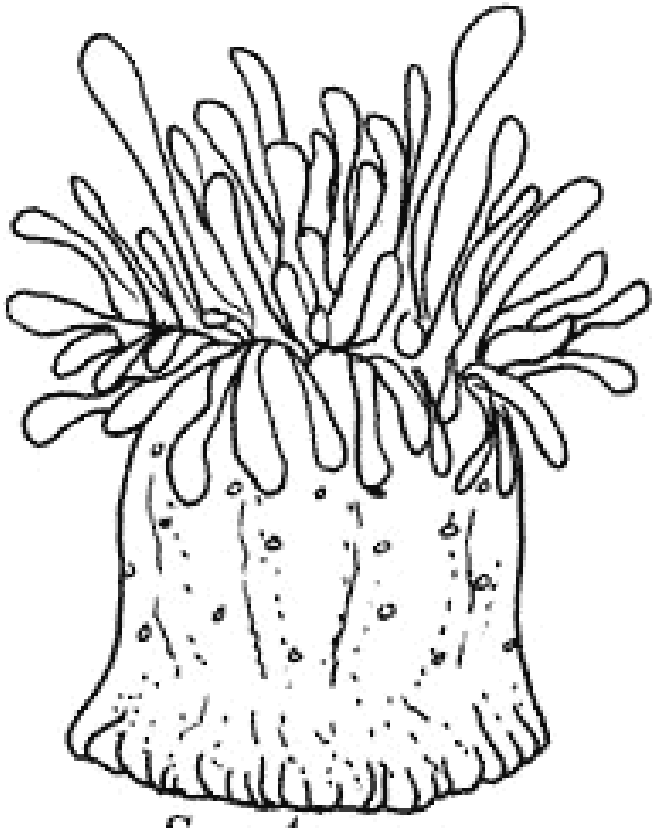
Jellyfish come in all shapes and sizes. They do not have a backbone, a heart, or a brain. They are basically just floating mouths and intestines. The mouth and intestines are covered by a muscular "skeleton" filled with a liquid called a mesoglea, which helps the jelly stay afloat. Jellyfish are some of the largest plankton around. They can not swim against the current. Although it may appear that jellyfish attack, they are just floating with the current. How do jellies sting? All jellyfish have stinging cells on their tentacles called nematocysts. Within the nematocysts is also a bristly trigger that uncoils on contact after being triggered by a chemical reaction. When these cells are activated they release a toxin that paralyzes the victim. Will this paralyze you? Probably not. The only jelly on the Atlantic coast capable of paralyzing a human victim is the Portuguese Man of War. That doesn't mean, however, that the rest of them won't hurt. Although not all jellies are strong enough to sting through the human skin, many of them are, so check the field guides before picking them up. And be careful! Jellies can sting up to two days after being washed up on the beach. AND… COMB JELLIES ARE NOT TRUE JELLY FISH! They are Ctenophores and do not have nematocysts. But they do bioluminesce and that's neat!



Moon Jelly

Sea Anemones

Anemones are members of the Cnidarian Phylum and have nematocysts. They are polyps and live in a hollow tube only coming out to feed on small fish and plankton. Their tentacles paralyze the victim, which is then guided down into the gut where it is digested. They are primarily sessile, but can move along the ocean floor. Anemones have a couple of ways that they reproduce. Some types can reproduce sexually by releasing eggs and sperm into the water, but others reproduce asexually. They move around the bottom and leave fragments of tissue behind, which may grow into an adult anemone. Although anemones will eat most small fish that swim by, the clown fish has developed a special relationship with them. The clown fish has mucus covering its scales that make it immune to the sting of the anemone. It can hide in the anemone and be protected from predators that would get stung if they tried to attack.



Sea Anemone

Corals and Sea Whips

The coral that wash up on the beach are actually the remains of what once housed millions of tiny organisms called polyps. The polyps live in tiny cylindrical compartments in calcium carbonate that they build around themselves. These organisms are colonial. They send out their tiny stinging tentacles (nematocysts) to paralyze and trap small items of prey. These critters are closely related to jellyfish. The colors of coral are actually created by different types of algae that grow on the coral. Coral is a sessile member of the Cnidarian Phylum. The sea whip is a type of coral that is often confused with a plant. Look for this thin coral washed up in the wrack line. It is important to note that coral reefs, like the one pictured below do not form this far north, although pieces of coral often wash up on our beaches. Encrusting corals and soft corals, like the sea whip, can survive this far north.

Sponges

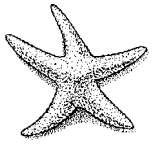
Sponges come in many different shapes and sizes. They are sessile members of the Porifera phylum, which means that all sponges have holes or pores. Because they cannot chase their prey sponges are able to filter food particles through their pores. It is believed that they primarily consume plankton. They use collar cells to trap food particles from the water as it passes through the pores. Although sponges are very simple invertebrates, they do have a complex system of water canals and a spiculum, which enables the sponges to hold their shape. Sponges are primarily colonial organisms, although they may also be single. This means that any one sponge may actually be millions of organisms living together as a unit. These units have regeneration ability and can reproduce either sexually or asexually. Sponges are home to many critters including shrimp, crabs, worms, and starfish.

Echinoderms

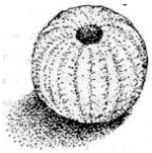
Animals in the phylum Echinodermata all have spiny skin and five-part radial symmetry. They all have a water vascular system that ends at the tube feet on the surface of the animal. The tube feet are used for movement and food collection. All echinoderms have regeneration ability and most have their mouths on the underside of their body. So who fits into this category?

Brittle stars are fast moving, inconspicuous critters that spend most of their time under rocks and seaweed.

Sea stars are NOT fish (although their common name "starfish" suggests otherwise)! They all have a mucus covering on their bodies that traps dirt and debris. Quite a few of them also have tiny pincers that aid in feeding. Sea stars usually eat with their stomachs outside their bodies. They eat worms, crabs, and bivalves.



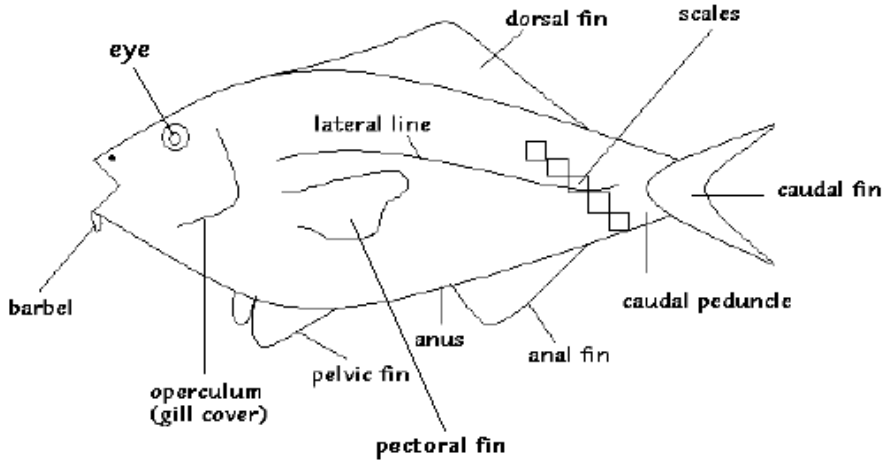
Sea Urchins have long spines that can easily penetrate the human skin. They eat using a structure called Aristotle's lantern in the mouth. The structure has five teeth that are used to scrape algae off of rocks.



Sand Dollars are commonly found buried underneath the sand where they use their Aristotle's lantern to obtain food. They are very similar to sea urchins. They are a favorite food of the flounder.

Fish

There is a plethora of fish species off the coast of Hatteras Island. We won't cover all of them here, but we'll cover a few neat ones. First let's go over the basics. All fish have the same basic body structures.



1. Dorsal fin: acts as a keel to prevent rolling.
2. Caudal fin: helps propel the fish through the water.
3. Anal fin: also prevents rolling.
4. Pectoral fins: used in braking.
5. Pelvic fins: Keep the fish horizontal.
6. Operculum: bony gill cover
7. Barbel: Used for tasting and feeling
8. Scales: contain growth rings, either **ctenoid**, **cycloid**, **ganoid**, or **placoid**.
9. Lateral line: made up of sensory cells to detect movement in the water.

Fish you might find (see your field guide for more!):

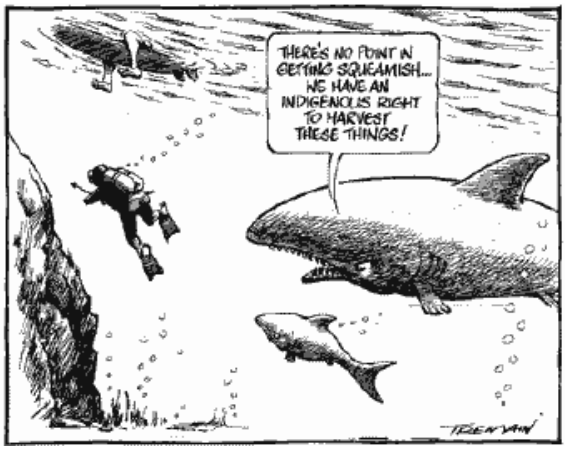
Flounder: Have the ability to change colors to blend with surroundings. They start life like a normal fish, then one eye actually migrates to the other side allowing the fish to become "flat". They are edible benthic fish.

Silverside: Common catch in the seine nets. Identified by its silver stripe. Relatively small fish.

Croaker: You'll know it when you catch it! This fish makes a loud croaking noise upon capture.

Red Drum: The state fish of North Carolina. Identified by a large black spot in front of the tail. They eat mollusks and crustaceans and are considered a great catch by surf fishermen.

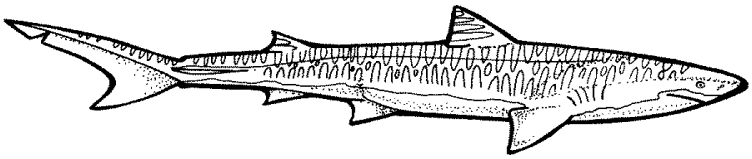
Whales and Dolphins



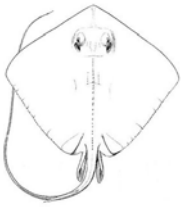
Whales and dolphins fall into a group of animals called cetaceans. There are two types of cetaceans: the toothed whales and the baleen whales. Toothed whales feed on larger prey and have one blow hole on the top of their heads. Baleen whales feed on planktonic organisms and actually have two blow holes. All whales navigate the oceans using echolocation. They communicate with one another by forcing air through their nasal passages. Being mammals, whales and dolphins breathe using lungs, which means they must come up for air. Some might say this would limit their swimming ability. The truth is that some whales can hold their breath for over 40 minutes and dive to depths of over 1000 feet. How do they do this? One reason is because their muscles contain myoglobin, which stores oxygen. Whales also are much more efficient breathers than humans. Whales can replace up to 90% of oxygen depleted air with each breath, whereas humans can only replace 10%. The most common cetacean you will see is the bottlenose dolphin. These "whales" can grow to be 7-12 feet long and weigh over 500 lbs. They can be seen in shallow waters in pods of 4-6 searching for squid, fish, and crabs. Dolphins are very social animals and like many mammals, care for their young. After having carried the fetal dolphin for a whole year, the mother gives birth to a two-foot calf. She nurses this calf and teaches it how to fish within the first year. Whales are very rarely seen due to the shallow nature of the waters of the Carolina coast, except in winter when the humpback is an occasional visitor.

Sharks, Skates, and Sting Rays

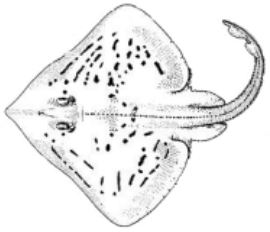
There are over 35 species of sharks in the waters of the Carolinas and they can be found in anywhere between 3 and 3,000 feet of water. All of these sharks have the same basic characteristics: a cartilaginous skeleton, skin covered in tiny scales called dentricles, triangular shaped dorsal fins, and gills. Important safety tip: the odds of you being attacked by a shark are less than the odds of you being struck by lightning. You are not its primary food source. They prefer fish, crabs, and sea turtles. Some common sharks include threshers, hammerheads, blues, nurse sharks, lemon sharks, tiger sharks, white sharks, sharp nose sharks, blacktip sharks, and sandbar sharks. It is important to remember that although these sharks live in the open water, very rarely will you see them close to shore.



Sting rays are also cartilaginous sea dwellers. These graceful creatures are relatively docile unless they are disturbed. They have a long, whip-like tail that contains one to three venomous barbs that, upon irritation, will puncture the foot of unsuspecting swimmers. Sting ray young develop inside eggs carried by the mother and hatch completely ready to fend for themselves.

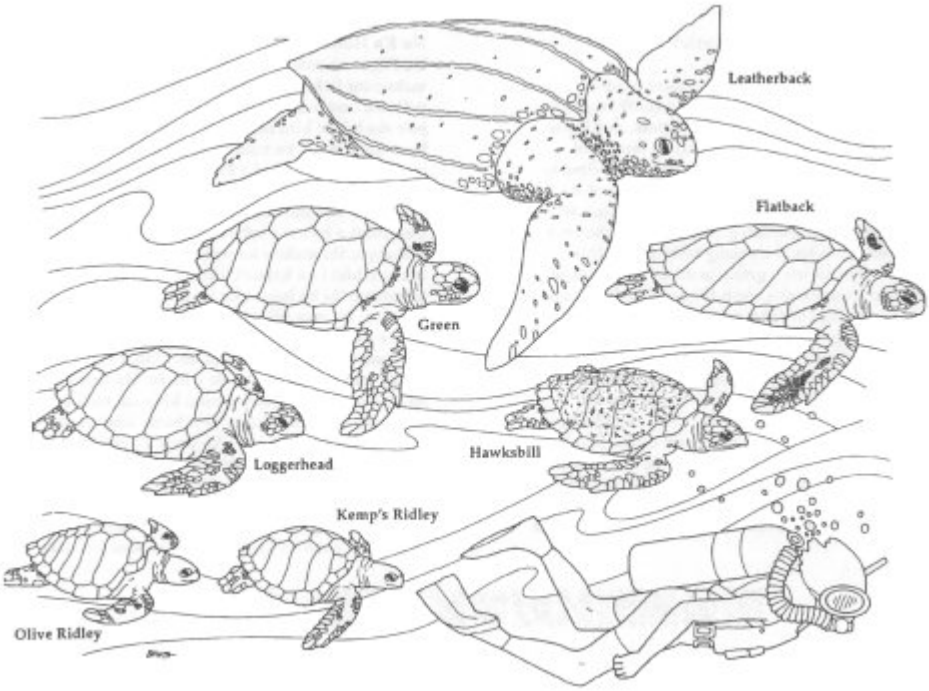


Skates are often mistaken for stingrays given their similar shape. Skates are very closely related to sharks and stingrays. They are cartilaginous, have the modified pectoral fins that stingrays do, and dorsal fins on the back tail. The biggest difference between these and stingrays is that they lack the venomous barbs on their tails. You can often find the egg cases of these bottom dwellers washed up on the beach.

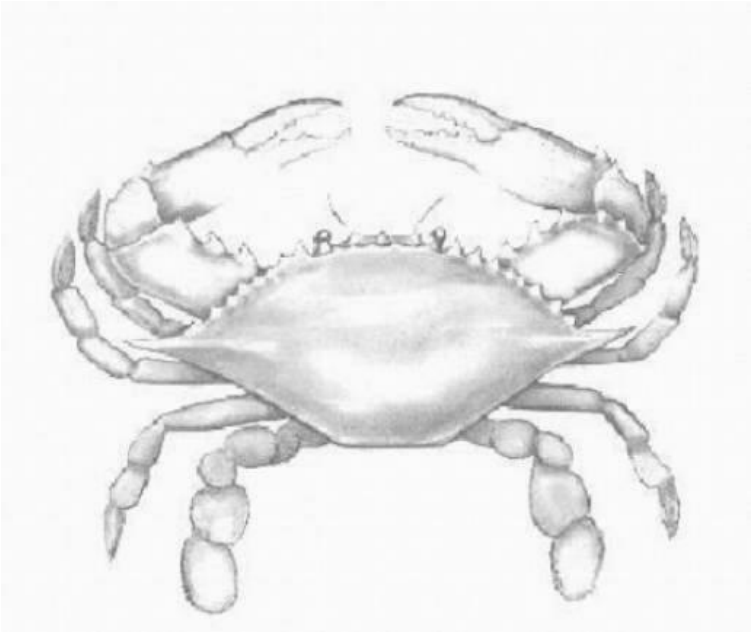


Sea Turtles

There are eight species of sea turtles worldwide. They are the **Kemps Ridley, the Olive Ridley, the Loggerhead, the Atlantic Green, the Leatherback, the Flatback, the Pacific Green, and the Hawksbill.** The most common visitor to Hatteras Island is the Loggerhead, although we also have greens, and the occasional leatherback nest. The loggerhead can grow to about four to five feet in length and weigh over 400 lbs. They are named for their large heads. The loggerhead is by far the most abundant sea turtle on the Atlantic coast, although like all 81 species, they are endangered. Sea turtles are primarily aquatic and only the females ever come to shore to nest. When the females nest they dig holes with their back flippers. They lay anywhere between 100 and 120 soft, leathery eggs, cover the hole with their front flippers by flinging sand over it, then head back to the ocean. Of the eggs that hatch maybe 1 will survive to adulthood. Their primary predators are ghost crabs and fox. Once the young sea turtles make it into the ocean (guided by the moonlight) they immediately begin following the gulf stream and live in the seaweed beds. The sound waters are also very important to the developing Kemp's Ridley and Green sea turtles. Adult sea turtles have varied eating habits. Loggerheads are omnivorous and leatherbacks, the largest sea turtles in the world, eat nothing but jellyfish.



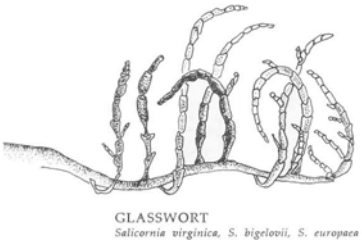
The Salt Marsh and Sound



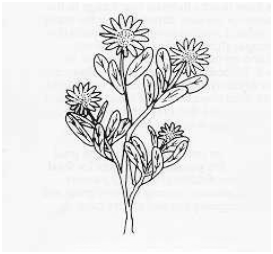
The Salt Marsh

The **salt marsh** is an environment teeming with life of all kinds. It is also more useful than most people think. The salt marsh acts like a sponge and soaks up excess water, alleviating floods. It provides a protected environment in which young creatures can grow. It provides a habitat for many species of plants and animals and is aesthetically appealing. It also helps filter out toxins before they reach open water.

The plants of the salt marsh have developed very unique adaptations to survive in the watery desert that is the marsh. Because of the lack of fresh water available, many of the plants have developed water storage systems. **Glasswort or sea pickle,** for example, stores water in the pods on the stem. This edible plant was also used by Native Americans in meals. **Sea oxeye daisies** store water in their thick, waxy leaves. The **Spartina or salt marsh cord grass** can actually excrete salt onto its stems to get rid of excess salt. It also grows very tall to keep part of the stem above water in order to continue acquiring oxygen through the stems.


GLASSWORT
Salicornia virginica, S. bigelovii, S. europaea

Spartina grass


sea oxeye daisy

There are many different animals that call the salt marsh home. It all starts with the **plankton**. The marsh waters are usually brownish green and are often thought of as being dirty. The opaque water is a result of all of the microscopic and macroscopic little critters floating around. The plankton feeds the fish and the crabs. The fish and crabs feed the wading birds and sometimes even the dolphins. The salt marsh is home to fiddler crabs, marsh periwinkle snails, and ribbed mussels. Male **fiddler crabs** have one claw that is larger than the other, which he uses for mating purposes. He uses his small claw to filter **detritus** out of the mud. **Marsh periwinkle snails** are plankton eaters. They crawl up and down the stalks of the spartina filtering plankton out of the water. You can read about ribbed mussels in the Mollusk section.

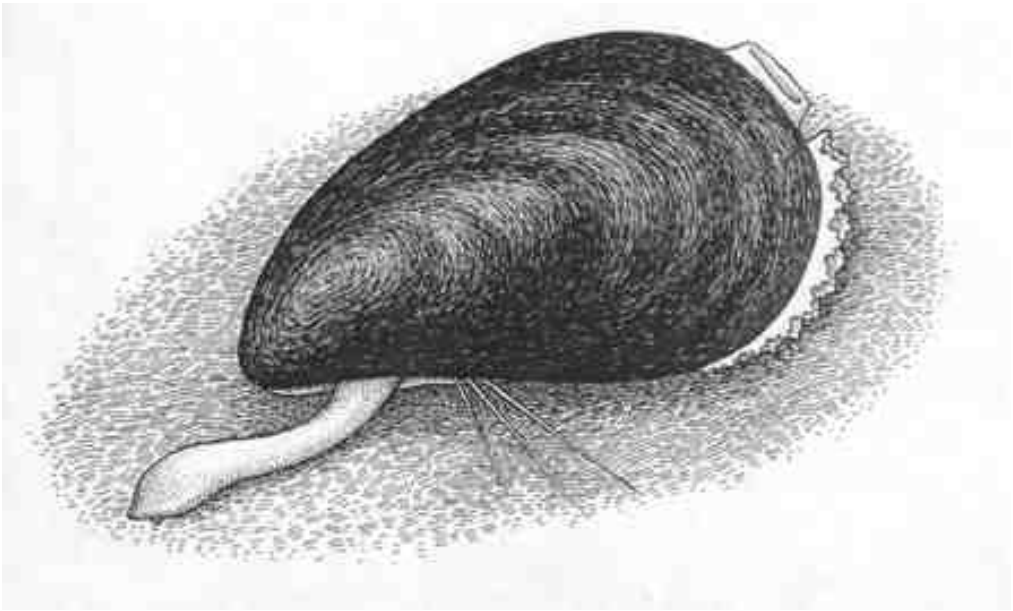
Fiddler Crab

Eel Grass

Marine plants of the sound are primarily non-vascular plants, which includes the alga and other phytoplankton. Eel grass, however is vascular, which means that it is a true flowering plant. Eel grass grows completely under water primarily on the sound side of the island. Sandy Bay is a great place to find it. Although most animals do not like to eat the eel grass when it is alive, many eat it while it is decaying. Canada geese, Brants geese, and some ducks, however, will eat it while it is alive. It also provides protective covering for many types of crabs and small fish. Because its roots form a tight mat below the surface, they help to stabilize the sand in areas where they grow.

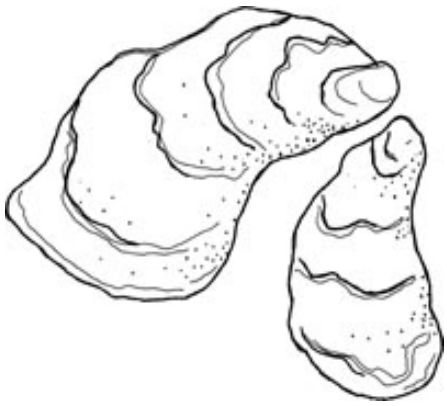
Mussels

Mussels are non-burrowing bivalves. They attach themselves to pilings, rocks, and jetties with byssal threads. These threads are secreted from a gland near the foot. They are primarily filter feeders. Mussels have gills that filter the water separating detritus and oxygen. They can circulate up to 9 gallons per hour! The 1/2" pea crab sometimes lives in the gills of the ribbed mussels to scrape away excess food materials from the filaments and to get a free meal. There are several types of mussels off the coast of Cape Hatteras including the Blue mussel, which grows in clumps and beds, the Tulip mussel, which has a shaggy covering on its shell, the Hooked mussel, and the Ribbed mussel, which is found primarily in the salt marshes.



Eastern Oyster

Oysters are colonial organisms. They live attached to rocks or other hard objects for life. Although all mollusks can produce pearls, the oyster is probably the most well known pearl producer. A pearl is produced as a result of a particle becoming stuck in the shell and is basically an irritation coated with shell layers. Oysters can be found in waters with salinities of anywhere between 35 parts per thousand to 12 parts per thousand. In the summer, Oysters release over 500 million eggs, which are fertilized by the male's sperm. The larva form shells in only two days, but only one in 1.145 million will survive to adulthood!



Scallops

Scallops are bivalves. Unlike many bivalves, however, scallops live on the bottom of the sound or ocean. They do not burrow. Scallops are regularly consumed by both critters and people. The edible part of the scallop is the adductor muscle. Because scallops live freely on the bottom, they have to be able to swim. To do this, they shoot water out of their valves and that propels them forward. Scallops have light detecting eyes that line the edge of their mantle.

Wading Birds of the Marshes Part I

Wading birds are characterized by long legs and long, pointy beaks, and in some cases long necks. They are some of the most elegant and unique inhabitants of the Outer Banks. These birds are at home in both the salt and fresh water marshes.

The Great Blue Heron is the largest of the wading birds. You can find them hunting in fresh water ponds and salt marshes. Their long bills and necks help them spear their fish, crabs, frogs, and insects. They are primarily solitary hunters and are only found in groups during the breeding season. They nest on platforms of twigs and grass cemented together with guano in April and May. This bird does not nest on the Outer Banks, but is a frequent visitor in the winter and spring. Its smaller relative, the little blue heron does nest on the Outer Banks.

Great Blue Heron

Little Blue Heron

The Great Egret has a rich history and was once very valuable. They can be found in similar places as the Great Blue Heron. The Great Egrets were once prized for their long white feathers, which were used heavily in the fashion industry in the early 1900's. Great Egrets were almost hunted to extinction by the 1920's. Its feeding and breeding habits are very similar to those to the Great Blue Heron, although they are colonial nesters.

Wading Birds of the Marshes Part II

Snowy Egrets are quite a bit smaller than their "great" cousins. They are easily identified by their black legs and *yellow* feet. During the mating season, the birds have an extra 50 long feathers on their backs, which fan out to attract a mate. Their feeding habits are similar to the other wading birds. Several families of snowys will nest in a shared tree of shrub and each mom will lay between 2-5 eggs.

Cattle Egrets are similar in size to the snowy egrets, but have a yellow bill and pink legs. They feed primarily on insects. The most unique thing about cattle egrets is that they did not even live on this continent until 1937 and it was not a human introduction! These birds, for reasons currently unknown, traveled from North Africa and Southern Europe across the Atlantic Ocean to Northern South America then migrated north. They made it to the United States some time in the late 1940's and to the Carolinas in the 1950's.

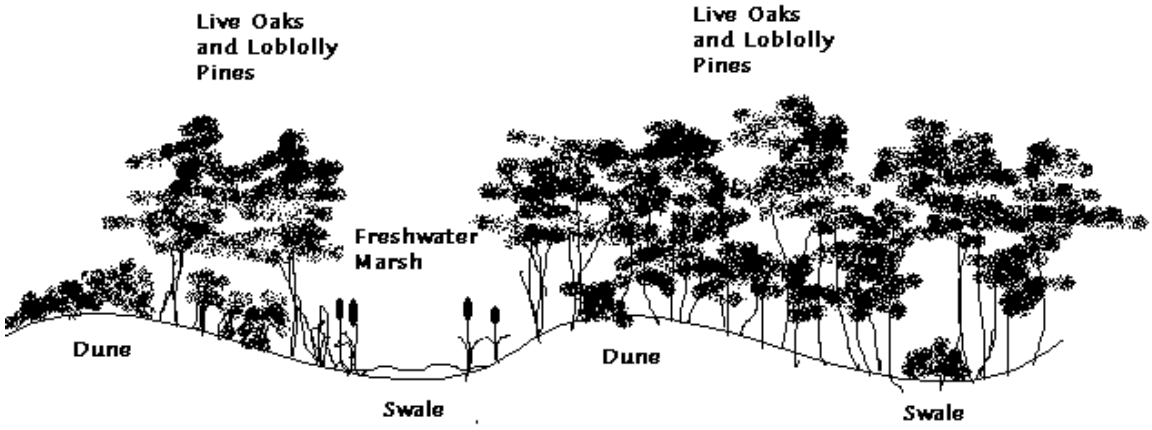
The Maritime Forest

Live Oak (Quercus virginiana)

The Maritime Forest

The Buxton Woods represents the largest remaining maritime forest in North Carolina. Maritime forests support a diversity of unique plant and animal life and are also home to many of the island's freshwater marshes. The trees and shrubs of the maritime forest have adapted to very sandy soil, a rolling dune-swale landscape, and the constant threat of salt spray and overwash. The roots of many of these plants have adapted deep, sprawling root systems not only to anchor the plants to the ground, but also to reach for groundwater. The leaves of many of these plants are very thick and waxy, which helps in water storage and to protect the plant form salt spray. The maritime forest provides continuous shade and cover for both people and wildlife, which make them a valuable resource.

What makes up the maritime forest on Hatteras Island? The understory is composed of shrubs like yaupon, beauty berry, and wax myrtle. Live oaks and loblolly pines create the canopy. You will also find many vines stretching for sunlight including smilax and grape. The outer edges of the forest, nearest the ocean, contain dwarfed versions of many of these plants due to the harsh salt spray.



The Live Oak

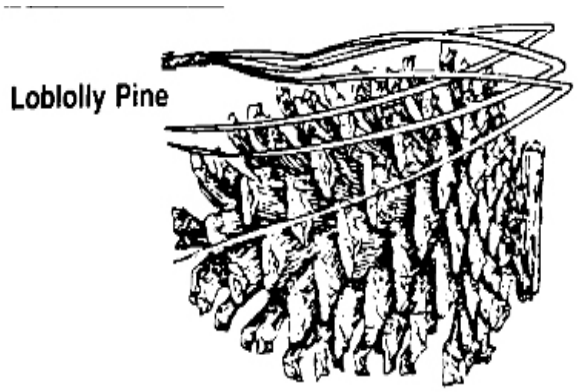
Live Oaks represent a large portion of the maritime forests. They are large, sprawling, low growing trees with extensive root systems. They typically grow in coastal areas from Virginia to Florida. They are well adapted to the sandy soil and typically only grow to be 40 or 50 feet tall. Their branches, on the other hand, have been known to reach out three times that far. They often have thick trunks to support the weight of the branches.

Why do we call it a live oak? It remains green year round. It does loose its leaves, but it is a gradual process. They are not all lost at one time. The leaves are very thick and have a waxy cellulose covering, which protects it from salt spray, intense sun, and occasional freezes.

The live oak is a useful tree to both wildlife and man. The acorns available in the fall are eaten by squirrels, raccoons, and deer. The sprawling limbs create a canopy runway for treetop mammals and a home for birds, lizards, and tree frogs. In the past live oaks have provided much for man. Native Americans would soak the acorns, removing the tannic acid and eat the meat inside. The U.S. Navy used the strong wood of the limbs in shipbuilding. Today they provide much needed shade and good tree climbing!

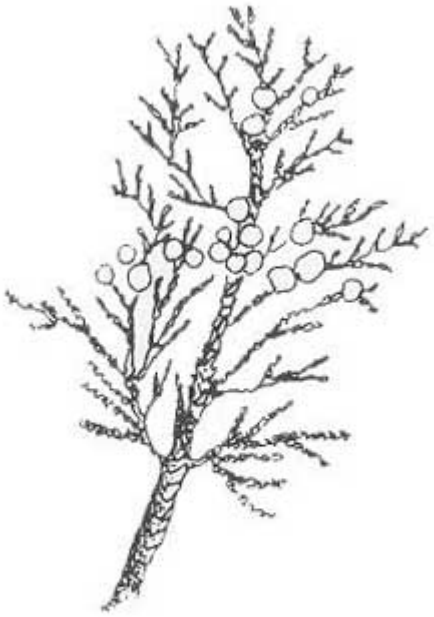
Loblolly Pine

The Loblolly Pine is very well adapted to barrier island life. It grows well in sand soils and prefers low lying, wet areas. It got its name from its propensity for growing in depressions called "loblollies". The loblolly is a fast growing pine, reaching up to 75 feet in only 30 years. This tree is dependent on fire. Its seedlings cannot grow under the shade of a thick understory and rely on fire to clear that out. Because the pine is so fast growing, it is able to establish itself before the understory can fill back in. It's pole-like trunks make it and excellent source of timber. Its widespread roots anchor it tightly in the sand, which enables the tree to withstand the high winds of the Outer Banks. The Loblolly has both male and female blossoms on the same tree. In late winter, the yellow male blossoms are visible on the lower branches of the tree. The female blossoms grow in the upper branches. The cones are 2-6" long and have triangular spines on the ends of scales. The needles are 2-3" long and can be found in groups 3. The seeds of the loblolly provide a valuable food source for birds and squirrels, while deer can eat the needles and twigs.



Southern Red Cedar

The Southern Red Cedar is difficult to confuse with any other tree on the Outer Banks. Its characteristic evergreen "leaves" are closely pressed to the stalk like scales and its "cones" are in the form of waxy berries. When they grow near the shore they are usually dwarfed by the salt spray. In more protected areas the red cedar grows taller and had a characteristic "Christmas Tree" shape. The bark has a shredded look to it and is reddish in color. The berries or cones are a favorite wildlife food for many bird species and deer like to eat the twigs and leaves. The wood of the cedar is very aromatic and is used to line chests and closets. The wood is also used for cabinets, siding, and graphite pencils.



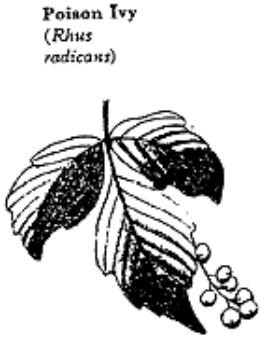
RED CEDAR
Juniperus virginiana

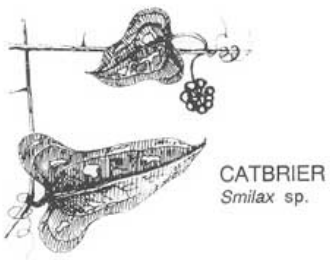
Shrubs, Trees, and Vines of the Maritime Forest

The wax myrtle or southern bayberry is a very common and aromatic plant. Both the leaves and the blue-gray berries of the plant have a "spicy" scent. Wax myrtle is typically confused with the northern bayberry, but northern bayberry leaves are more narrow than the wax myrtle leaves. The berries of the wax myrtle generally grow underneath the leaves close to the stem. The waxy covering on these berries were used by early colonists to make bayberry scented candles. The oils of the bush are highly flammable making the wax myrtle a volatile plant in fire prone areas.

The yaupon holly is known for its red berries and thick, leathery, oval-shaped, leaves. It is dioecious, which means that there are separate male and female plants. Without both, the red berries would not be produced. Native Americans would boil the leaves of the yaupon and make a tea that was very high in caffeine. The scientific name, *Ilex vomitoria,* leads one to believe that the plant could cause vomiting. There is not a whole lot of evidence to substantiate this claim other than the fact that drinking a lot of any hot liquid (like the tea) could cause one to vomit.

There are many different **vines** that creep through the maritime forest. All of these vines must compete with other species for light and can be found creeping up the stems of taller plant to reach the sunlight. The most common vines are poison ivy, grapes, and smilax or greenbriar.



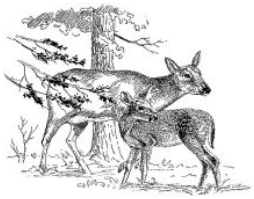


Osprey

The **osprey** is a common sight soaring over Hatteras Island. The birds are identified in flight by their white underside, and crooked wings. The female birds have a brown speckled "necklace" on their underside as well. They nest in large stick nests on either platforms or on dead branches. Most of the nests on Hatteras Island are found in trees in the maritime forests. They are excellent fishermen and can frequently be seen gliding low over the water in search of fish. Their strong talons are adapted for plucking the fish from the water and carrying it back to the nest. The osprey flies with the fish facing forward to avoid drag. Aside from the vultures, they are the most common birds of prey seen in the area.

The Terrestrial Mammals of the Maritime Forest

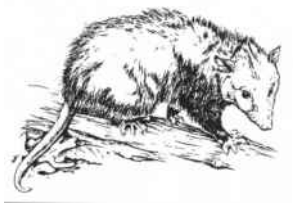
The white-tailed deer is the largest mammal on the island. They are smaller than their mainland relatives are and their food sources are a bit different, but they are the same deer. They can be seen grazing on the sea grasses, eating acorns in the fall, and quietly roaming the forest and beaches.



The red fox is a key predator on the island. Foxes are nocturnal hunters and present a major threat to the sea turtle and bird nests here. There is limited trapping going on to reduce this threat.

Raccoons can be seen scurrying about the island after dark and when they're not in your trash cans, they can be found looking for crabs and other small seashore creatures to eat.

Opossums are the only marsupials in America and the only marsupials with a prehensile tail and opposable thumbs. They are primarily nocturnal and are known for playing dead to ward off predators.

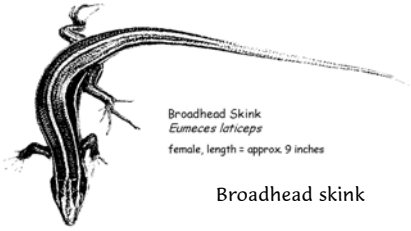


Other notables include the **gray squirrel, many, many mice, nutria (which are invasives), muskrats, and rabbits.**

Reptiles of the Maritime Forest and Beyond

The five-lined and the broadhead skinks are often seen scurrying around in front of the lighthouse or catching some rays on the sides of the buildings or sidewalks. The five-lined are easily identified by their bright blue tails and the broadhead by their red heads.

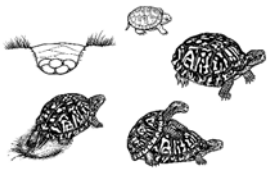
Five-lined skink



Broadhead skink

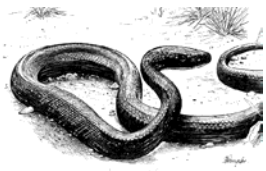
Visitors will frequently ask you about the turtle pond by the old lighthouse sight. Well, they obviously didn't move the pond with the lighthouse, so they'll have to head over to the old site to see it. But what will they see? Mostly **yellow-bellied sliders**. These are large freshwater basking turtles. They typically nest in May and June. They are omnivorous, although the young are more carnivorous than the adults. In the forest you may also run across the **eastern box turtle**, which is the only turtle able to close completely inside its shell.

Yellow-bellied slider



Eastern box turtle

We have a large **snake** population here on the island with both venomous and non-venomous snakes represented. Some of our non-venomous species include **black and yellow rat snakes, black racers, corn snakes, eastern hognose snakes, who eat mostly small rodents and bird eggs, and eastern king snakes,** who actually eat other snakes. We have two venomous snakes and those are the **cottonmouth, or water moccasin, and the timber rattlesnake.** To tell the difference between venomous snakes and non-venomous snakes, the safest thing to look at is the head shape. A diamond shaped head typically indicates a venomous snake. An oval shaped head indicates a non-venomous snake. You can also use the scales on the bottom of the tail and the pupil shapes, but by then you're probably too close anyway.



Black rat snake

Timber rattlesnake

The Freshwater Marshes of the Maritime Forest

The maritime forest is home to Hatteras Island's freshwater marshes. This is a unique environment that provides a wide range food and cover for plants and animals. The **yellow-bellied sliders** make their home here. Many species of birds take advantage of the fresh drinking water and valuable cover provided by many of the marsh plants. One of the more famous residents of the freshwater marshes is the **cottonmouth** or **water moccasins**. These venomous snakes are some of the more aggressive critters on the island, but when given proper space, are nothing major to worry about. **White-tailed deer** take cover in the plants surrounding the marsh and also enjoy the valuable source of fresh water. Some of the plants of the marshes include **wild rice, saw grass, cattails, marsh pennywort, and water smartweed.**

Wild Rice

Cattail

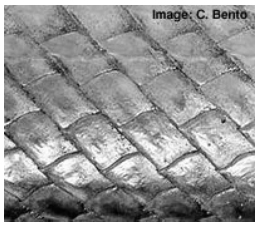
Marsh Pennywort

Glossary

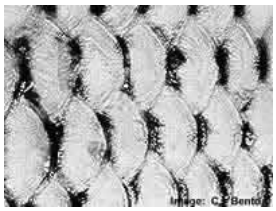
Arthropod: Any organism with the following characteristics: jointed legs, paired antennae, and gills.
Benthic: Bottom dwelling
Berm: The soft, typically dry part of the beach
Cnidarian: An organism with stinging cells; they can be either sessile or planktonic.
Colonial: To live in a colony or group
Detritus: decaying organic material (plant or animal)
Echinoderm: Any organism with the following characteristics: Five-part radial pattern, bilateral symmetry, regeneration ability.
Non-vascular: a plant that does not contain channels or tubes for the transfer of water and other nutrients.
Proboscis: Any long tube-like structure used for feeding.
Seine: To use a large net with two poles on either end to catch marine life.
Sessile: Permanently or semi-permanently affixed to one location.
Succulent: a plant with fleshy tissues that conserve moisture
Vascular: a plant containing channels or tubes for the transfer of water and nutrients.
Wrack line: debris left at the high tide line.

Ctenoid scales:

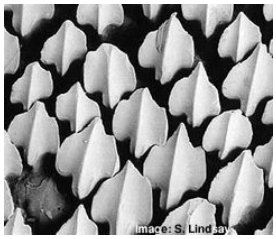
Ganoid scales:



Cycloid scales:



Placoid scales:



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