

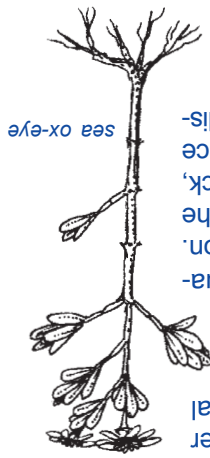
5 You are walking through a salt marsh, although it looks more like a mowed field. Salt marsh cordgrass is the main food source for the feral horses that inhabit the island. The term "feral" refers to domesticated animals that have gone wild. Horses were originally placed on the island in the late 1940s. The present population are descendants of that herd.

4 Walk to the edge of Taylor's Creek. You may see some short wet tubes scattered on the wet sand at low tide and sticking out of the sand, their tops encrusted with bits of shell and seaweed. The tube may extend more than a foot into the sand. At high tide, when the whole tube is covered with water, the resident – an iridescent, greenish – red plumed worm – sticks out its head and captures tiny invertebrates from the water to eat.

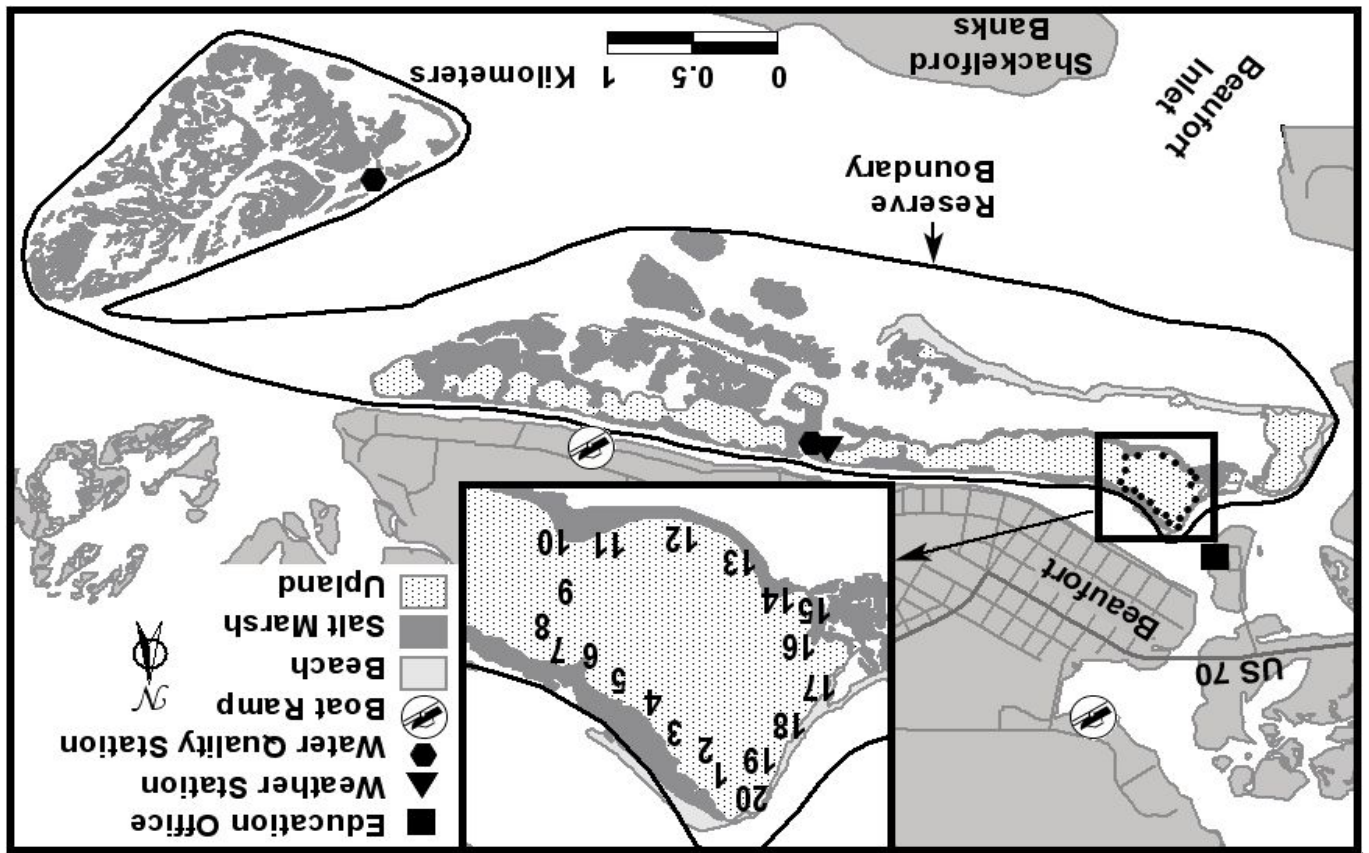
3 If the tide is low, you will notice numerous small burrows in the wet depressions around you. These are the homes of fiddler crabs. If you remain still the crabs will start edging sideways out of their burrows. Note that both front claws of some crabs are small (females); other crabs have one large claw and one small one (males). The males use their large claw to attract females or to threaten other males.



2 Note the pools of standing water left by the falling tide. Several plants have their roots in the water. Despite the abundance of water, this area is like a desert – the salt content of estuarine water can cause dehydration. As a result, some plants, like the sea ox-eye, have developed thick, waxy leaves and stems to reduce evaporation. The glasswort has dispersed with leaves altogether. It stores extra salt in its tissues to absorb and retain water.



1 You are standing on a small beach directly across Taylor's Creek from the Beaufort Water-front. The sand ridge was created and is constantly modified by wind and wave action. The sand is high enough to allow plants to root in some places.



Welcome to the Rachel Carson Component of the North Carolina National Estuarine Research Reserve. The site is named in honor of Rachel Carson, a scientist and author who conducted research at the site during the 1940s. The Rachel Carson Component is located in a tidal river and sound where the Newport and North rivers meet the Atlantic Ocean. The site is a complex of salt marshes, tidal mud and sand flats, eelgrass beds and upland islands created by dredge material deposits. The 1/2-mile trail loop, marked with numbered posts and described in this brochure, will introduce you to habitats and the plants and animals that live in this important natural area. There will be seasonal variation in which organisms are seen. Low tide is the best time to follow the trail. Keep tidal changes in mind when anchoring your boat so that you are not left high and dry. Please wear shoes that protect your feet from hot sand and sharp oyster shells and that you do not mind getting wet.

Estuaries are found where rivers or streams meet the ocean. Freshwater carrying silt and particles of decaying organic matter mixes with mineral-rich saltwater to create a unique and highly productive habitat. More than two-thirds of the fish and shellfish harvested each year in the United States depend on these areas, as do many birds and other animals. Yet it is estimated that more than half of our nation's coastal marshes and estuaries have been altered or destroyed by development and pollution.

For this reason, the North Carolina National Estuarine Research Reserve was established as part of the National Estuarine Research Reserve System, a National Oceanic and Atmospheric Administration program. The North Carolina Reserve protects representative estuarine sites for research and education. The Reserve includes Zeke's Island, Masonboro Island, Rachel Carson and Currituck Banks. They are part of the North Carolina Coastal Reserve system, which includes six other sites: Bird Island, Bald Head Woods, Permuda Island, Buxton Woods, Emily and Richardson Preyer Buckridge and Kitty Hawk Woods. The Coastal Reserves are managed by the Department of Environment and Natural Resources/Division of Coastal Management.

Interested in supporting the North Carolina National Estuarine Research Reserve?

Join our Non-Profit: the Carolina Estuarine Reserve Foundation (CERF)!

Become a CERF-er today!
www.cerf.us

For more information about the Rachel Carson Reserve and other components of the North Carolina National Estuarine Research Reserve, contact:

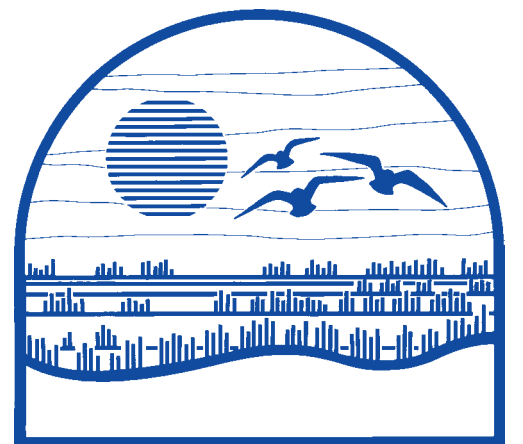
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Illustrations by Debbie Pagliughi

Rachel Carson Interpretive Trail Guide



North Carolina National Estuarine Research Reserve
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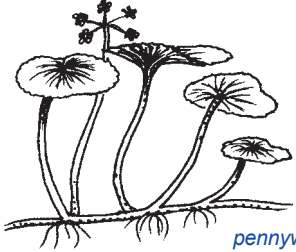
6 A greater variety of plants is found here in the high salt marsh. Only storms and unusually high tides bring salty water here.

7 Walk through the break in the shrub thicket – a trail made by the horses. Follow the path to the top of the sand berm.

8 This elevated area was created when sand was dredged from Taylor's Creek and deposited here. The porous sand holds little water. Note adaptations to the arid environment, such as that of the vinelike pennywort whose round leaves turn to a vertical position at mid-day to reduce evaporation. Other sandy ridge species include the beach pea and seaside goldenrod.



seaside goldenrod



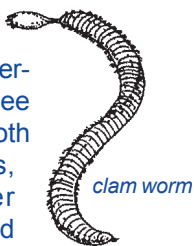
pennywort

9 From the top of the sand ridge looking South, you have a good view of Beaufort Inlet with Fort Macon on Bogue Banks to the right and Shackleford Banks to the left. Beaufort Inlet is an important feature of the estuary. It is through this opening that ocean water flows twice daily, causing tidal and salinity changes to occur. The inlet is an important source of renewal – the tides move nutrients around in the estuary and flush pollutants out to sea.

10 The numerous large shell fragments around you were deposited with the sediments during the dredging process. The lighter sediments are blown around by the wind, leaving the heavier shell bits on the surface. Continue through the shrub thicket toward the mud flat.

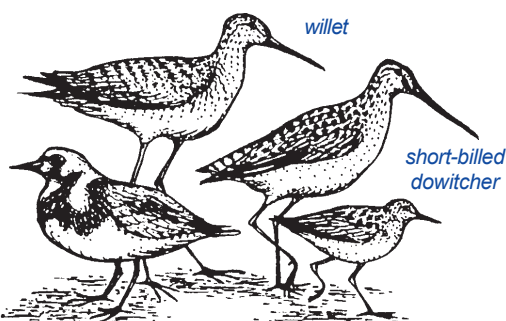
11 Looking out across the expansive mud flat, you may see birds foraging and people digging clams. Explore the mud flat as you walk across to Bird Shoals, the sandy area just inside the inlet. Be careful of the sharp oysters, the soft slippery mud and watch for tidal changes. When you are finished at the Shoals return to pick up the trail here.

The mud flat is alternately submerged and exposed by the tides. Rapid changes in temperature and salinity occur as the shallow waters heat and evaporate in the sun or become diluted with rain water. Therefore, many of the organisms living here burrow into the mud where conditions are more stable and they are not visible to predators. Among these are a large number of marine worms, such as the acorn worms and lug-worms responsible for the numerous small "volcanoes" you see when the flats are exposed. Both species "eat" the sediments, digesting organic matter wedged between the sand grains.



clam worm

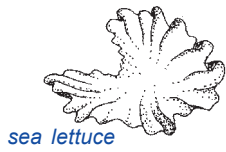
A wide variety of shorebirds often can be seen probing the mud. Ruddy Turnstone, Willet, Short-billed dowitcher and Sanderling are a few of the common species. The bill of each species is specially adapted to feed on worms and other invertebrates found hidden in the mud.



ruddy turnstone

sanderling

In some areas, you may see large beds of sea lettuce particularly in the spring. These thin, bright green sheets are actually seaweed, a kind of algae. The far end of the flats are sandier and support beds of eelgrass, a flowering plant. The eelgrass grows in shallow water and provides cover for a wealth of marine life, including scallops, crabs, fish and snails.



sea lettuce



eel grass

The higher sandy areas beyond the mud flat provides a resting place for birds even at high tide when the mud flat is flooded. In the fall it is possible to see hundreds of Black Skimmers on this shoal. This is usually a good place for collecting sea shells, but be sure not to collect anything that is living.



black skimmer

Head back across the mud flat to trail marker #12.

12 Notice the shape of the shrub thicket to your right. It almost appears to have been cut at an angle. This shape is due to the salt-laden winds and is called "salt spray canopy." The thicket is composed of a variety of trees and shrubs which are adapted to the salt spray.

13 The shrub thicket provides refuge for mammals, such as raccoons and gray foxes and many types of birds.

14 Species in the thicket include wax myrtle and red cedar. There are also many types of vines such as greenbrier and poison ivy. This shrub thicket, developed on the more stable areas of the sand ridge above the tidal zone, now provides stability to the island by buffering the force of the winds and holding the soil in place.



red cedar



live oak



wax myrtle

15 At the edge of the shrub thicket on your right is a round muddy hole about three feet across with trails leading back into the thicket. This is one of the watering holes maintained by the horses. You may watch the horses and photograph them. But remember they are wild animals. Do not get so close that they feel that they are threatened – mares are particularly nervous when they have young foals – and do not keep them from their watering holes.

16 Alongside the tidal creek you will notice lush stands of salt marsh cordgrass. Unlike the cordgrass you have been walking through, this is ungrazed. The mud in this area is too soft for the horses to easily cross, so the cordgrass grows in its natural form.



saltmarsh cordgrass

17 Looking ahead, you will notice the oysters clumped together in the muddy sand. Microscopic oyster larvae float freely in the estuary, but once settled on a hard substrate, they begin building their shell and never move again. In this area the first hard surface for oyster larvae might have been a piece of driftwood or empty clam shell.



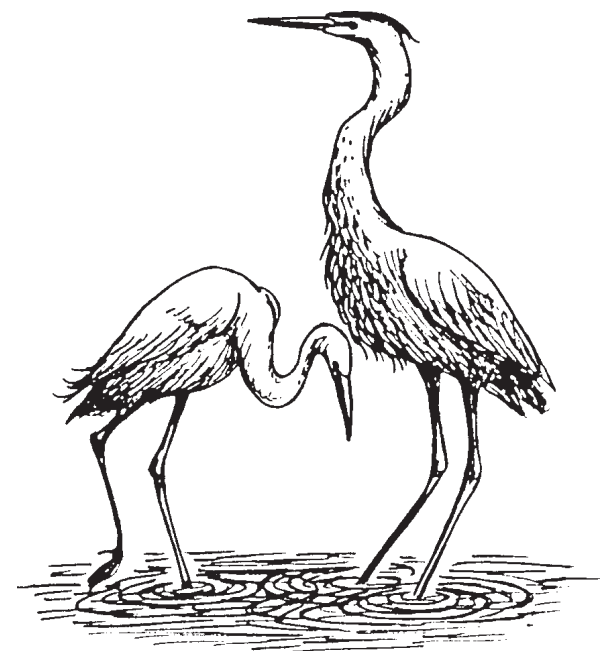
clam



oyster

18 Shallow brackish ponds provide a good feeding area for long legged wading birds such as herons and egrets. The birds feast on fiddler crabs and snails found in this area. The ponds are formed when extremely high tides overwash the sandy berm.

Continue along the shoreline and look for trail marker #19 on the right.



great egret

great blue heron

19



marsh elder

As you cross back over the sandy ridge, you will notice many of the same plants encountered when you first crossed the island. The dredged material here is older, as evidenced by more types of vegetation and less bare sand. Succession is beginning to take place.

20

As you descend the dredge "dune" notice how the plants change with the change in elevation. Even a small difference in height above sea level and distance from the estuarine waters makes for a change in habitat and the plants and animals that live there.

Continue back to the beach.



osprey