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April 2009

printed on recycled paper with vegetable based inks

U.S. Fish & Wildlife Service

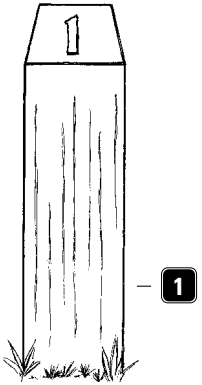
Parker River

National Wildlife Refuge

Guide to the Hellcat Interpretive Trail

Welcome

The **Hellcat Interpretive Trail** is located 3.5 miles (5.6 kilometers) south of the refuge entrance at the Hellcat Wildlife Observation Area. It meanders 1.4 miles (2.3 kilometers) through freshwater marsh, shrub, vernal pools, dune, and maritime woodland habitats. For your convenience and walking pleasure, this boardwalk trail is divided into the 0.6 mile (1.0 kilometer) **Dunes Trail** and the 0.8 mile (1.3 kilometer) **Marsh Trail**. The Dunes Trail consists of ten interpretive stations, is gentle to steep in grade and involves walking up and down many steps. The Marsh Trail consists of five interpretive stations, is of a gentle grade and also involves negotiating many steps. Use this leaflet to help you explore one or both trail sections.



The numbered stations in this guide correspond to numbered posts along the boardwalk.

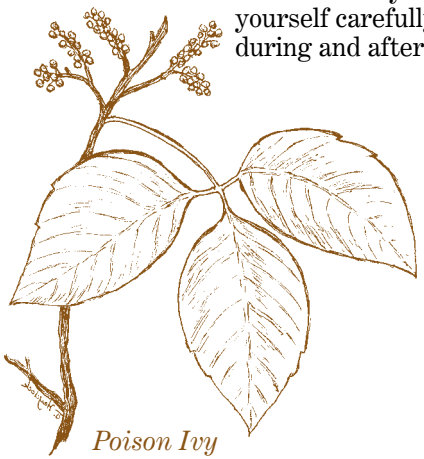
Enjoy your walk!

For Your Information

All plants and animals are protected on the refuge. Please leave them undisturbed.

Poison ivy is common on the refuge and contagious during all seasons.

Ticks transmit serious diseases and can be active year-round. Check yourself carefully for their presence during and after your walk.



Poison Ivy

To reduce disturbance to wildlife, and for your safety, use is restricted to the boardwalk. Beach access is not available from this trail.

The Dunes Trail crosses a sometimes busy road. Please be careful!

For management purposes, the entire trail, or some portions, may sometimes be closed.

Stations

Proceed along the boardwalk until you come to Station 1.

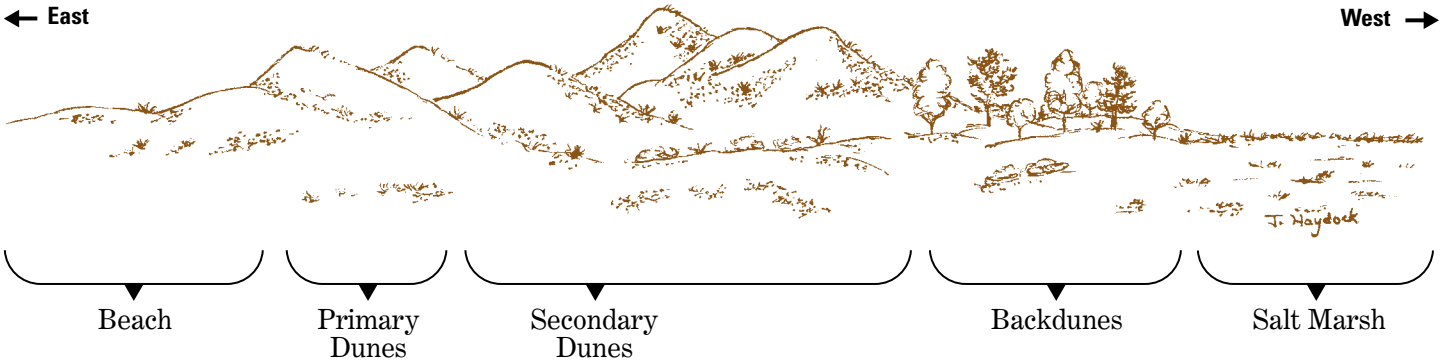
Station **1**

A Fork in the Trail
Which Trail to Follow?

The Dunes Trail, directly in front of you, guides you through a cross section of a natural barrier island. Parker River National Wildlife Refuge occupies the southern three quarters of Plum Island. Plum Island is roughly 8.0 miles (12.9 kilometers) in length and varies in width from approximately 0.75 miles (1.2 kilometers) to only 0.25 miles (0.40 kilometers.) Are you standing at a wide or narrow part of the Island? Look around you for clues. You will discover the answer to this question and more of the fascinating ecology of this fragile but beautiful island by following this trail.

The Marsh Trail, to your left, explores a man-made freshwater marsh. Today you're visiting a National Wildlife Refuge, one of a system of more than 540 refuges that span the continent and beyond. National Wildlife Refuges are special places, places where wildlife come first and wildlife come naturally. However, all is not natural here. Discover some of the natural and "unnatural" history of Parker River National Wildlife Refuge by following this trail.

A Cross-section of Major Ecological Zones of Parker River National Wildlife Refuge



Station **2**

Dunes Trail

Where an Oak Grows Best

This black oak, *Quercus velutina*, would have difficulty growing in the primary and secondary dunes where the trail will lead you. Here, however, at one of the widest points of the Island, the species finds refuge behind a fortress of high sand dunes that parallel the ocean to the east. These dunes shelter the trees and other plants in this maritime woodland from the strong onshore winds, salt spray and other extreme environmental conditions. As you travel towards the ocean you will see fewer, but more hardy, plant species that are adapted to these harsh environmental conditions.

Station **3**

A Wetland in the Sand

The refuge dunes are interspersed with wetlands formed when major storm events, like northeasters, break down the interior dunes with strong wind and waves. The storm creates depressions in the sand that are later filled with fresh water from the rain and snow. These vernal pools (seasonal wetlands) can be dominated by moss, cranberries, small shrubs, or mature trees. As the only natural freshwater habitat on barrier islands, vernal pools are very important to all wildlife, especially breeding frogs and salamanders. Since vernal pools dry up later in the summer, no fish are able to survive in them, providing a safe egg-nursery. The refuge's vernal pools are home to the Spadefoot toad, a state-listed threatened species.

Fallen leaves from trees and shrubs, like the red maple, *Acer rubrum*, provide nutrients needed by invertebrates and amphibians found in vernal pools. The red maple before you and that on the opposite side of the boardwalk and down the steps are two of the largest and oldest trees on the Island.

Please be careful crossing the refuge road a short distance ahead! Once on the other side of the road, bear left at the trail junction.

Station **4**

Dune Formation

You are standing at the base of a 50-foot (15-meter) dune. Dunes form by wind-blown sand slowly building up around plants, rocks, or other obstacles. This interior dune was created by major storm events thousands of years ago, and has since stabilized. Protected from strong winds and ocean spray by primary dunes closer to the ocean, complex vegetative communities are able to establish in these back dunes. Notice what types of plants grow in the dunes as you move closer to the ocean.

What are the current wind conditions at this station? Is there a slight breeze, a strong blow, or is there no air movement at all? As you ascend this dune and pass between others, note what changes occur, if any, in the wind's intensity.

Station **5**

The Crooked Cherries

The contortion near the bases of these resilient black cherry trees, *Prunus serotina*, occurred when they were saplings. Sand and snowdrifts were likely the cause, attesting to the locale's frequent windy conditions. While it is in part wind that creates a dune, it is also wind that can destroy it. Without enough plants to stabilize the sand, a dune may simply blow away.

Walking on the dunes kills the fragile dune plants and exposes the dunes to erosion, it is important to limit your travel to the boardwalk. Look ahead for areas where this and the surrounding dunes are weakened by little or no vegetation.

Station **6**

A Magic Carpet of Heather

The low-growing plant directly before you is false or beach heather, *Hudsonia tomentosa*, one of the dominant vegetation types of the secondary dune area. Beach heather is also referred to as poverty grass due to its ability to grow in nutritionally poor sand, thus creating better growing conditions for other plants. Plants also require water, but rainfall and snowmelt quickly percolate through the dune sand and out of reach. To help conserve what water it collects, beach heather's scaly leaves are covered with fine, hair-like structures that insulate against wind-accelerated moisture loss and act like mirrors to reflect the drying, hot rays of the sun.

Beach Heather

Beach heather plays a major role in dune stabilization. Above the surface it forms a thick carpet, sometimes of an acre (0.4 hectares) or more, that impedes sand movement. Below the surface its network of tough rootlets binds the sand together.

Station **7**

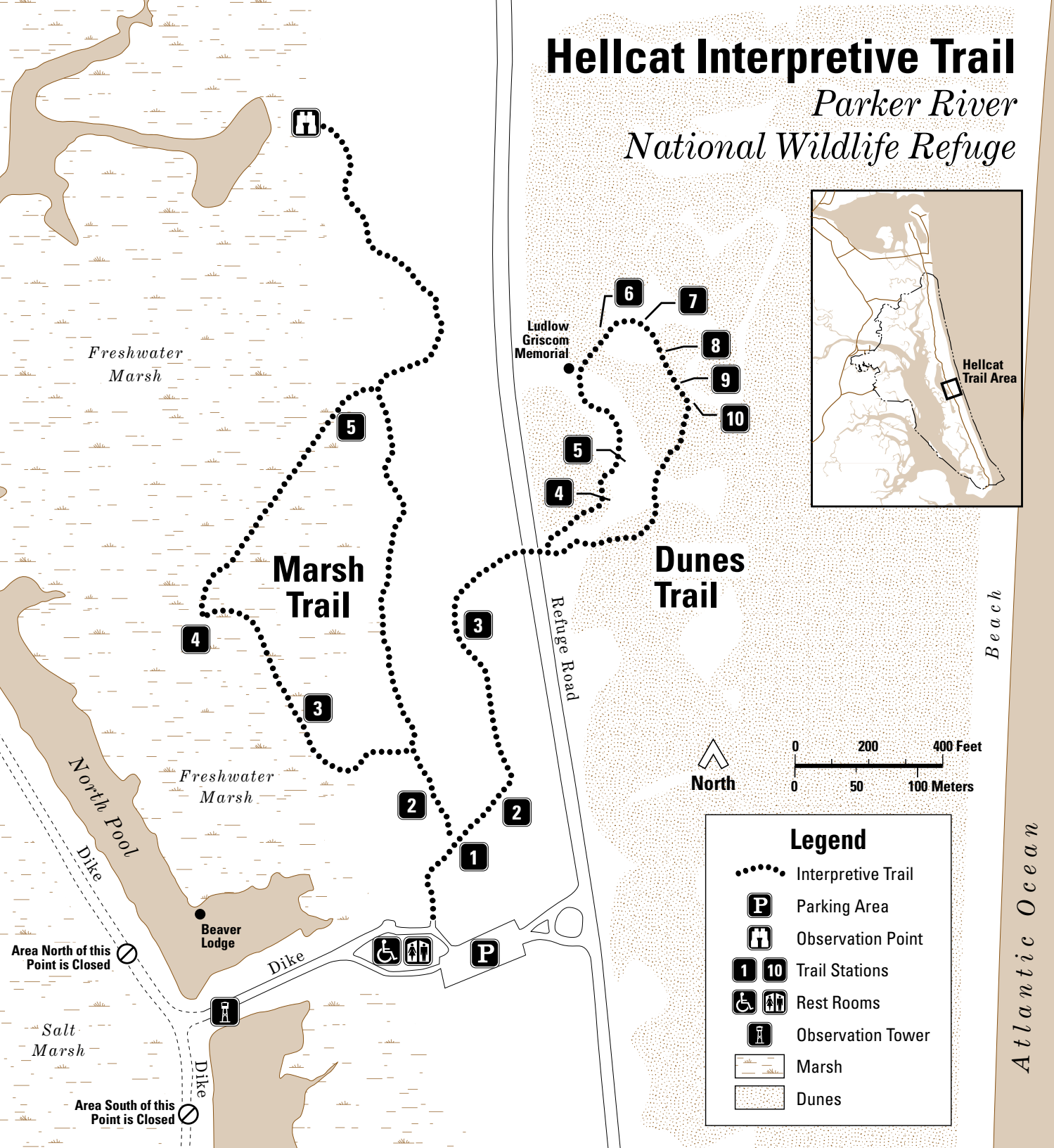
Introducing the Black Pine

The evergreen trees that you see in the distance are black pine, *Pinus nigra*. In the fall of 1953, refuge personnel secured 6,500 black pine seedlings from the U.S. Soil Conservation Service and planted them in the dunes for stabilization purposes. Also known as Austrian pine, this hardy species is native to certain rugged mountainous regions of Europe with similar harsh growing conditions.

Early concepts of barrier island management viewed total protection as the desired goal. This was achieved by such methods as planting trees, building seawalls, and erecting dune fences. Modern understanding of the natural ecological processes, however, recognizes that the strength of a barrier island lies in its dynamic character. It is the natural movement of the sand dunes that allows such important habitat as the vernal pools and the maritime woodland to develop.

Hellcat Interpretive Trail

Parker River National Wildlife Refuge



Station **8**

Namesake of the Island

Plum Island was named for one of its native, maritime plants: the beach plum, *Prunus maritima*. Along with bayberry, *Myrica pensylvanica*, poison ivy, *Toxicodendron radicans*, and other maritime shrubs and vines, it forms tangled thickets within relatively sheltered areas amongst the dunes. These thickets contribute to dune stabilization and provide food and shelter for various wildlife species. Beach plums are a favorite food of the red fox.

Beach Plum

Due to the severity of their environment, the specimens before you will never grow much larger than they are. Yet when located away from the winds and salt spray and/or in soil more nutritionally favorable, beach plum may grow into a small tree 10 feet (3 meters) or more in height!

Station **9**

The Genius of Beach Grass

Looking east towards the ocean you can see the primary dunes, the first line of dunes along the beach. Here trees and shrubs are conspicuously absent and beach grass, *Ammophila breviligulata*, dominates. *Ammophila*, or "lover of sand," is supremely adapted to the harsh and unstable conditions of the primary dunes. Stimulated by the shifting sand, root-like rhizomes extend horizontally under the surface while sending new shoots above. This interlocking maze of subsurface runners, combined with a carpet of grass above, helps anchor the dune in place. This stabilization provides an opportunity for other primary dune plant species, such as beach pea, *Lathyrus maritimus*, to grow. The rhizomes collect moisture but are supplemented by a series of vertically-growing tap roots up to 40 feet (12 meters) in length. Above ground, *Ammophila's* long and narrow stems and blades expose minimum surface area to the drying wind and sun. Ammophila's blades sometimes roll into tubes which further reduces water loss.

Look at the beach grass growing beside the boardwalk. Do you see any circular lines a few inches away from the base of the grass? In open areas the wind often causes grass blades to create circular impressions in the sand, thus the colloquial name, compass grass.

Beach Grass

Station **10**

Behold a Barrier Island

From this vantage point on a clear day, you can truly appreciate the meaning of the term "barrier island." To the east is the mighty and ever advancing Atlantic Ocean. To the west across the salt marsh and Plum Island Sound lies the mainland. It is only this narrow, fragile island of beach and vegetated dunes that serves as a buffer for the mainland. It is this island that absorbs the forces of hurricanes, northeasters, and other storms, softening the impact to inland areas.

In all, some 650 miles (1,046 kilometers) of barrier islands lie along the Atlantic coast. Some, such as the 6 miles (9.7 kilometers) of Parker River National Wildlife Refuge, remain as wild edges of our continent. Most, however, have been developed. A trip to the northern part of Plum Island, for example, will reveal the loss of 2 miles (3.2 kilometers) of grass-, shrub-, and tree-covered dunes to homes and businesses. These buildings sit precariously by the sea, where the wind and ocean will eventually take their toll. Despite all human efforts, the true nature of the island is to change.

We hope you have enjoyed walking the Hellcat Interpretive Trail. The boardwalk will lead you back to your starting point. Please be careful crossing the refuge road ahead! If you have no further need for this leaflet, kindly return it to the trailhead dispenser or the refuge entrance gatehouse when staffed. Thank you!

Station **2**

Marsh Trail

The maritime woodland you have just walked through is a perfect example of how people have changed the natural state of the barrier island. Some of the trees and bushes you passed are native to Plum Island, such as the bayberry in front of you and the cherry tree behind you. Other species, such as the abundant bush with bright red berries that lines most of this trail - the honeysuckle, are non-native (exotic) plants that were introduced to the United States from all over the world. Exotic plants can be detrimental to natural habitat. Since wildlife have not evolved alongside exotic plant species they are not adapted to eating or using them. Exotic plant species often out-compete native plant species for growing space, thus depleting the important plants wildlife need to survive. Though birds do eat the attractive honeysuckle berries, they gain little nutitional value from them. The saplings of the bay berry, cherry, and other native plant species, that would eventually provide berries with more nutritional value, are unable to survive because of the dense shade created by the early-leafing honeysuckle.

Bayberry

At the next intersection, a short distance ahead, bear left to Station 3.

Honeysuckle

Station **3**

Man-made Marsh

Here you are surrounded by a freshwater marsh. A marsh is a wetland dominated by non-woody plants such as grasses and cattails. During the 1940s and '50s, the U.S.

Common Cattail

Fish and Wildlife Service created this and two additional freshwater marshes on the refuge to provide feeding, nesting and resting habitat for waterfowl and other birds. Freshwater wetlands host a remarkable mosaic of mammals, birds, reptiles, fish, and insects. The freshwater wetlands on the refuge were created by separating the dug-out pools from the bay with large dikes.

In addition to their wildlife values, wetlands improve water quality by their filtering action, provide flood protection through the absorption of runoff, afford educational and recreational opportunities, and serve as important spawning and nursery grounds for many commercial and sport species of fish and shellfish. Unfortunately, more than 50 percent of our nation's wetlands have been lost to human development and other activities.

Station **4**

A Wetland Sometimes Dry

The water levels of this and other refuge freshwater marshes are often controlled for wildlife management purposes. Each wetland impoundment has a large water gate in the dike that refuge staff open and close to regulate water levels. Lowering water levels in the spring promotes the growth of certain plants favored as food by various species of ducks. Lowering water levels also exposes mudflats which serve as migratory shorebird feeding and resting areas. Raising the water levels to cover newly germinated plants in the fall provides ideal waterfowl feeding conditions. In addition, portions of the marshes are sometimes allowed to dry in preparation for mowing or controlled burns. Burning returns nutrients to the soil and promotes new growth by reducing robust vegetation.

Station **5**

The Invaders

Purple Loosestrife

Common Reed

Purple loosestrife, *Lythrum salicaria*, and common reed, *Phragmites australis*, are plants that have invaded this and other wetlands of the Northeast. These invasions have diminished the wildlife food and protective cover values of marsh habitats by displacing native plant species. Refuge measures to control these aggressive pest plants include the use of herbicides and the release of plant-eating insects. The refuge has worked towards controlling the exotic plants in this wetland since 1959. From 1996 to 2000 refuge staff released purple loosestrife eating beetles and weevils in this wetland. Today you can see diverse species of plants growing where only a few years ago a dense stand of purple loosestrife grew. The refuge has had less luck in the control of the common reed, but scientists around the country are researching the use of more effective control methods.

Despite their exotic status, both plant species remain protected on the refuge from visitor disturbance. While it may be tempting to pick purple loosestrife for its beautiful flowers or common reed for its showy tassels, doing so could further their expansion.

At the upcoming junction, a short distance ahead, the boardwalk forks to the left and right. Follow the left fork for 0.15 miles (0.24 kilometers) to an observation point to enjoy a good view of the entire wetland, or proceed to the right to return to the parking lot.

We hope you have enjoyed walking the Hellcat Interpretive Trail. If you have no further need for this leaflet, please return it to the trailhead dispenser or the refuge entrance gatehouse when staffed. Thank you!