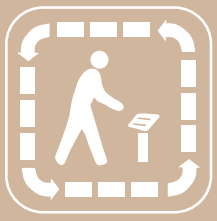
U.S. Fish & Wildlife Service

Parker River

National Wildlife Refuge Hellcat Interpretative Trail Guide



Welcome

The Hellcat Interpretive Trail is located 3.5 miles/5.6 kilometers south of the Refuge entrance at Hellcat Wildlife Observation Area. It meanders 1.4 miles/2.3 kilometers through freshwater marsh, shrub/thicket, swamp, 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.

Poison Ivy

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

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.

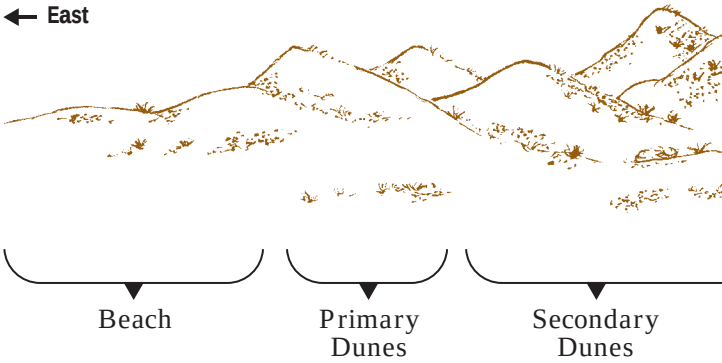
Station 1

A Fork in the Trail
Which Trail to Follow?

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? Clues are all around you. The answer to this question and more of the fascinating ecology of this fragile but beautiful barrier island will be revealed by following the *Dunes Trail, straight ahead!*

Today you're visiting a National Wildlife Refuge, one of a system of more than 500 refuges that span the continent and beyond. National Wildlife Refuges are special places, places where wildlife come first and wildlife come naturally. All is not natural here, however! Discover some of the natural and "unnatural" history of Parker River National Wildlife Refuge by following the *Marsh Trail, bear left!*

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



Dunes Trail

Station 2

Where an Oak Grows Best

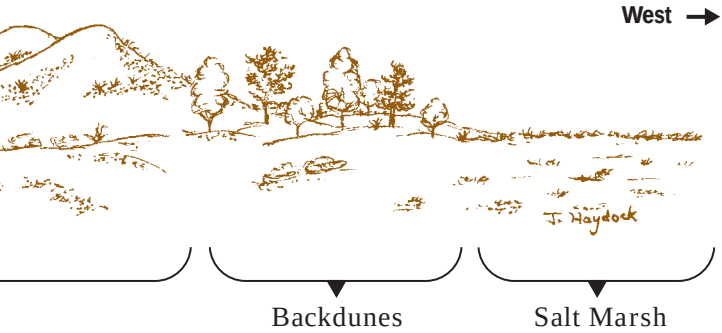
This black oak, *Quercus velutina*, would have difficulty growing in the primary and secondary dunes where the trail will lead you. Here, however, at one of the widest points of the Island, the species finds refuge behind a fortress of high sand dunes that parallel the ocean to the east. These dunes shelter the trees and other plants in this backdune area from the drying effects of strong onshore winds, salt spray and other extreme environmental conditions. Major ecological zones can thus be seen on the Island with fewer but more hardy plant species occurring as you travel west to east.

Station 3

A Swamp Amongst the Dunes

Within the hollows of many Refuge dunes are swamps, a habitat typical of Atlantic coast barrier islands. A swamp is a wetland dominated by woody plants, such as trees or shrubs, capable of tolerating a great degree of soil saturation. Although a wetland, this swamp is not always wet. Here the water table is close to the ground surface and will rise above it with enough rainfall or snowmelt.

Red maple, *Acer rubrum*, also known as swamp maple, is one species of



tree found in this small swamp. The specimen 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, bear left at the trail junction to Station 4.

Station 4

Dune Formation

You are standing at the base of a 50-foot/15-meter dune. Dunes are formed by the slow build-up of wind-blown sand around plants, rocks, or other obstacles. For an interior dune such as this to develop, a major northeaster is usually necessary. The storm's strong winds and powerful surf gouge out a notch at a weak section of the primary dunes. This gap acts as a channel for sand movement to the interior and given the right conditions, a dune is created.

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.

Heavy human foot traffic kills the fragile dune plants and exposes the dunes to erosion, thus the importance of limiting 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. Also referred to as poverty grass due to its ability to grow in nutritionally poor sand,

Beach Heather

beach heather enriches the soil with nitrogen, an element essential to plants. Plants also require water but rainfall and snowmelt quickly percolate through the dune sand and out of reach. To help conserve what water is collected, 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.

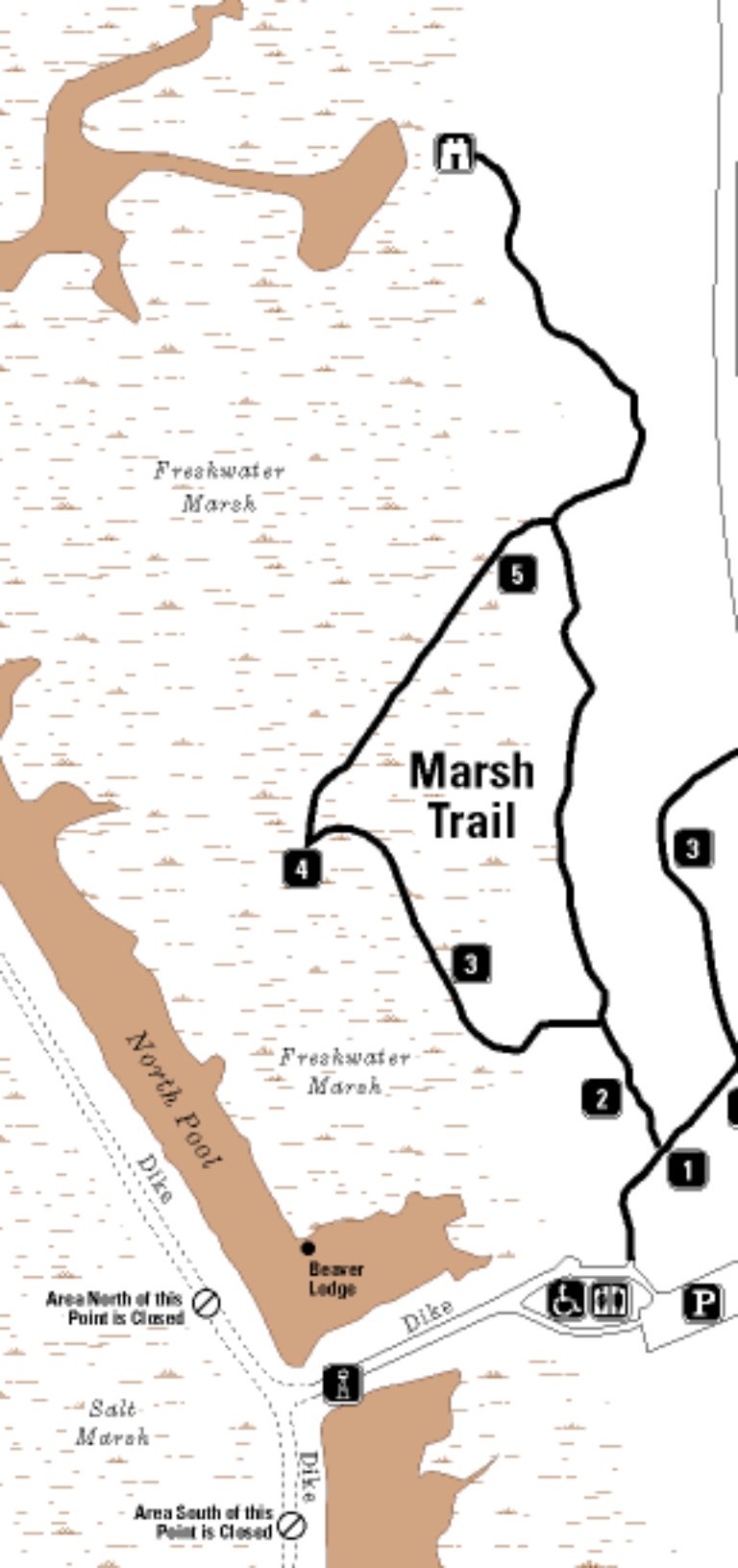
Beach heather plays a major role in dune stabilization. Above the surface it forms a thick carpet, sometimes of an acre/0.4 hectares or more, that impedes sand movement. Below the surface a network of tough rootlets binds the sand together.

Station 7

Introducing the Black Pine

The species of evergreen tree seen in the distance is 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 could be achieved by such methods as planting trees, building seawalls, and erecting dune fences. Modern understanding of the natural processes involved, however, recognizes that the strength of a barrier island lies in its dynamic character, its ability to respond to storms by changing to a more stable form. It's the gaps in the sea-ravaged primary dunes, for example, that allow the development of interior dunes, and it's the guardian nature of the interior dunes that permits a maritime forest to develop.


Freshwater Marsh
Marsh Trail
5
4
3
3
2
1
Freshwater Marsh
North Pool
Dike
Beaver Lodge
Area North of this Point is Closed
Dike
P
Salt Marsh
Dike
Area South of this Point is Closed

Hellcat Interpretive Trail

Parker River National Wildlife Refuge

Ludlow Griscom Memorial

6 7 8 9 10 5 4

Dunes Trail

Refuge Road

Beach

Atlantic Ocean

North

0 200 400 Feet

0 50 100 Meters

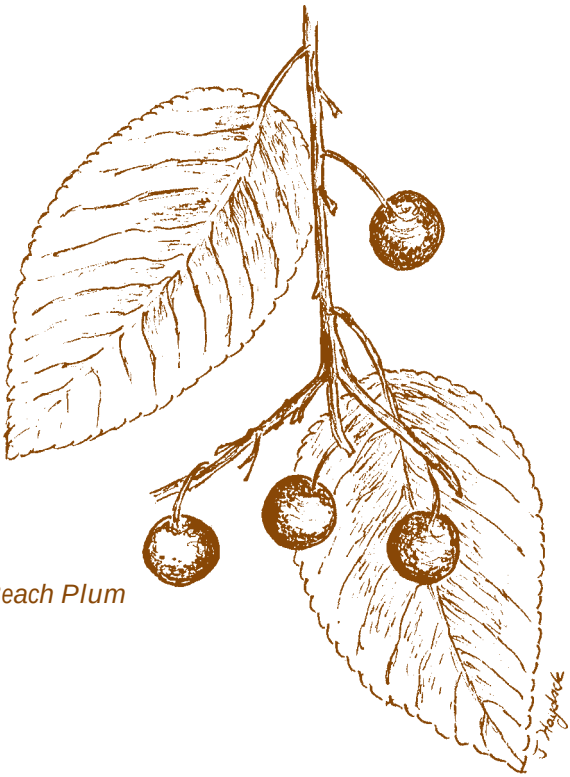
Legend

- Interpretive Trail
- P Parking Area
- Observation Blind
- 1 10 Trail Stations
- Rest Rooms
- Observation Tower
- Marsh
- Dunes

Station 8

Namesake of the Island

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



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 forest of grass above, help anchor the dune in place, thus providing an opportunity for other primary dune plant species, such as beach pea, *Lathyrus maritimus*, to grow. The rhizomes also 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 a minimum of surface to the drying wind and sun, the blades sometimes rolling into tubes which further reduces water loss.

Beach Grass

This pioneer dune builder may also be growing below you. In such open areas the wind often causes some of its blades to create circular impressions in the sand, thus the colloquial name, compass 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. Others, 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; homes and businesses sitting precariously by the sea, where nature eventually wins.

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!

Marsh Trail

Station 2

Beaver Signs

Beaver, *Castor canadensis*, was first observed on the Refuge during the mid-1970s. It is believed these animals were problem beavers, or descendants of those, released in the upper waters of the nearby Parker and Ipswich Rivers by personnel from the Massachusetts Division of Fisheries and Wildlife.

Beaver Tree Cuttings

The beaver is a semi-aquatic rodent, spending much time in the relative safety of the water but also coming ashore to secure woody vegetation for food and dam and lodge building. You're unlikely to see a beaver during your walk due to its nocturnal habits but watch for its signs such as tree cuttings and marsh trails. Also, a lodge can be viewed in the North Pool near the Hellcat observation tower.

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

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. Fish and Wildlife Service created this and two additional freshwater

Common Cattail

marshes on the Refuge to provide feeding, nesting and resting habitat for waterfowl and other birds. These wetlands, with their life-giving waters and unique vegetation, also host a remarkable mosaic of mammals, reptiles, fish, insects, and other wildlife.

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. Lowering water levels in

the spring promotes the growth of certain plants favored as food by various species of ducks. Allowing the levels to rise and cover the mature plants by the fall provides ideal waterfowl feeding conditions. Lowering water levels also exposes mudflats which serve as migratory shorebird feeding and resting areas. In addition, portions of the marshes are sometimes allowed to dry in preparation for a controlled burn. Burning returns nutrients to the soil and promotes new growth by reducing decadent vegetation.

Station 5

The Invaders

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 the 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.

Purple Loosestrife

Despite their weed 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.

Common Reed

At the upcoming junction, a short distance ahead, the boardwalk forks to the left and right. Follow it to the left for 0.15 miles/0.24 kilometers to an observation blind, or to the right to return to your starting point.

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!

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