U.S. Fish and Wildlife Service

The Long Island Refuge Complex is a group of nine refuges among the almost 500 refuges in the National Wildlife Refuge System administered by the U.S. Fish and Wildlife Service. The National Wildlife Refuge System is a network of lands and waters managed specifically for the protection of wildlife and wildlife habitat and represents the most comprehensive wildlife management program in the world. Units of the system stretch across the United States from northern Alaska to the Florida Keys and include small islands in the Caribbean and South Pacific. The character of the refuges is as diverse as the nation itself.

The Service also manages National Fish Hatcheries, and provides Federal leadership in habitat protection, fish and wildlife research, technical assistance and the conservation and protection of migratory birds, certain marine mammals and threatened and endangered species.

For further information, contact:

Refuge Manager
Long Island National Wildlife Refuge Complex
P.O. Box 21
Shirley, New York 11967
(516) 286-0485

Deaf or hard-of-hearing visitors may contact the New York Relay Center at (800) 421-1220 (Voice) or (800) 662-1220 (TDD)

This project was completed with the assistance of Miriam Rappelt, Long Island University C.W. Post Campus

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

RL-52560 February 1994

Trail Guide

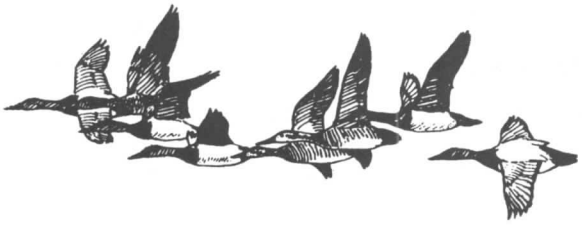
TARGET ROCK National Wildlife Refuge

Lloyd Harbor, New York

Welcome

Welcome to Target Rock National Wildlife Refuge. This 80-acre refuge was once the estate of Ferdinand and Mary Eberstadt. The Eberstadts donated this land to the U.S. Fish and Wildlife Service in 1967 for use as a wildlife refuge and as a site for environmental education. Target Rock is one of nine refuges comprising the Long Island National Wildlife Refuge Complex.

The primary purpose of the national wildlife refuge system is to provide habitat for migratory birds, endangered species and other wildlife in order to preserve the nation's biodiversity. The properties of the Long Island National Wildlife Refuge Complex are within the Atlantic Flyway, one of four major bird migration paths in North America. Numerous species of waterfowl and other birds use these refuges for nesting, wintering and migratory stopovers.



National wildlife refuges are opened to the public only when visitors and wildlife can coexist. Access is often limited to protect the wildlife resource. As such, it is imperative that visitors remain on the designated trails and do not collect or disturb wildlife and plants.

The Target Rock trail is a mile long and takes about one hour to walk. Marked posts match the text in this guide. Please take precautions to guard against ticks and poison ivy - information about both may be found at the kiosk.

Forest

1 Before you is a mixed oak forest stand; the typical forest type of Long Island's North Shore. This forest has reached its climax stage of development. After the last glacier retreated about ten thousand years ago, this area was little more than rock and barren soil. Plants began to colonize the land, beginning with lichens and mosses, followed by grasses, a succession of brush, and then pioneer tree species such as pine, birch and aspen. The final stage in this process of ecological succession is the oak and hickory trees of this forest.

Forest Canopy

2 The top sections of the forest's tallest trees form the canopy. The canopy of hickory, white, red and black oaks is of high value to wildlife. The hickory's nuts and the oak's acorns provide food for gray squirrels, chipmunks, blue jays, grackles, mice and raccoons. Most species of hickory and oak require 20-35 years before they are mature enough to bear fruit, and may require an additional 20 years before they begin to produce abundant crops. The insect community associated with the canopy supports a variety of insectivorous birds.

Below the Canopy

3 The red maple saplings seen here are part of the forest understory, the vegetation layer below the canopy. Plants within the understory and the still lower shrub layer and forest floor must be shade tolerant, as the canopy intercepts most of the sun's rays. In many portions of the forest, the understory is composed primarily of dogwood and sassafras; the shrub layer contains laurel. Decaying logs, leaf litter, mosses, ferns, poison ivy, Virginia creeper, and several wildflower species cover the forest floor.

Formal Gardens

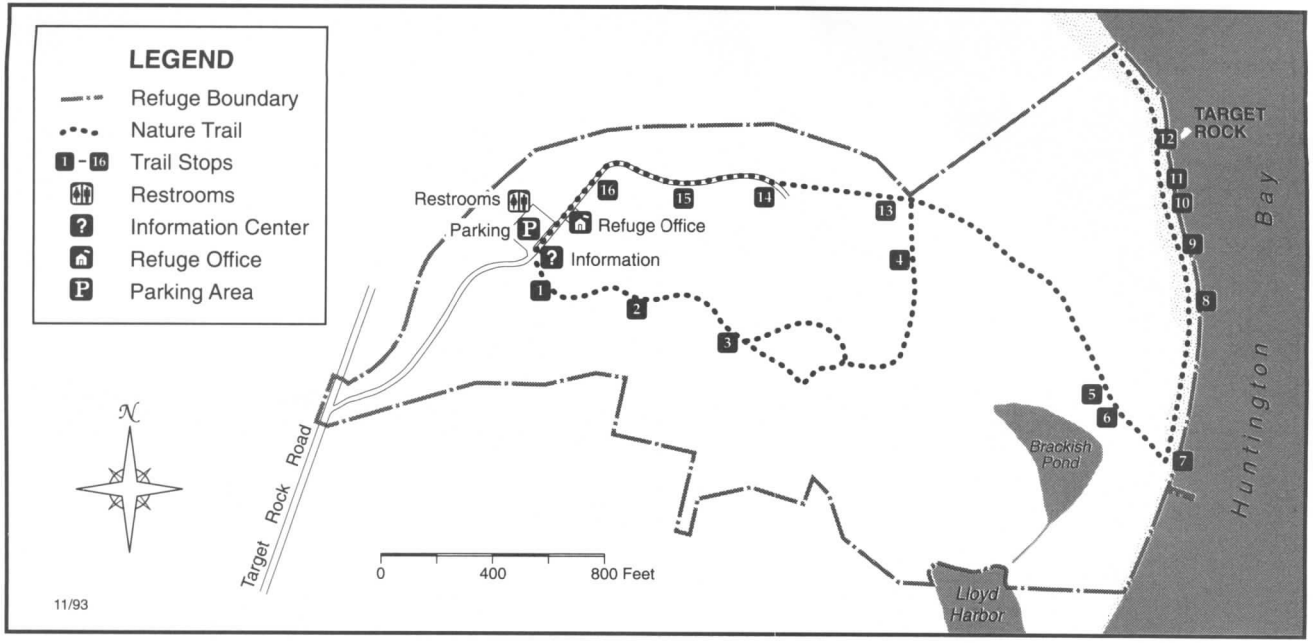
4 This area was once part of the Eberstadt estate's formal gardens and was called the wild garden. Robust stands of azaleas and rhododendrons provide cover for a variety of songbirds such as catbirds, cardinals, common yellowthroats, and Carolina wrens. Mayapples, of which almost all parts are poisonous, wood ferns, Solomon's seal and ivy carpet the ground. Twenty different varieties of ivy were planted at the estate. Further down the trail, other ornamental plantings such as spruce, redwood, ginkgo and others may be seen.

Brackish Pond - Wildlife

5 Please move quietly–you are approaching a brackish pond. Tidal saltwater from the Bay floods this pond on a daily basis and mixes with fresh water from the surrounding watershed, resulting in a pond with a salinity lower than that of the Bay. Microscopic plants and animals such as copepods, isopods and mosquito larvae inhabit the pond and serve as food for other invertebrates and for small fish. Black ducks and other puddle ducks feed on the invertebrates and aquatic vegetation. Herons and egrets stalk the water's edge and prey on fish.

Brackish Pond - Vegetation

6 Lining the pond is a ring of smooth cordgrass. This grass was once used by colonists to thatch their roofs. The roots of cordgrass are adapted to filter out salt from absorbed water and, like other marine grasses, can secrete excess salt water through leaf pores. As the land becomes drier, cordgrass gives way to high tide bush, a woody plant which produces distinctive white flowers in early autumn. Red cedar, an evergreen, borders the upland edge of the pond. This cedar is a sun-loving species whose bluish berries provide food for robins, catbirds, mockingbirds, pheasants and others.



Red Cedar

7 This stand of eastern red cedar serves as home to one of Long Island's larger populations of Olive Hairstreak butterflies. The Olive Hairstreak is recognized by the bright green color and white and red-brown markings on its bottom wings. Adults lay their eggs on the cedars, and the hatched caterpillars feed on and are protected by these trees. There are two age classes of adults that take flight each year: one in mid-May, the other in mid-July to early August. Olive Hairstreaks can often be seen in early morning resting on the damp sand of the beach.

Upper Beach

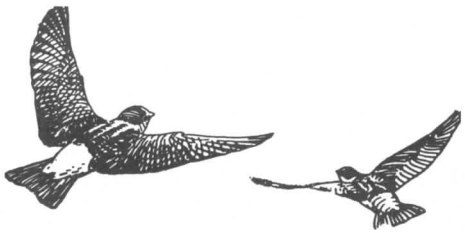
8 Observe the plant life that is found on the upper beach, or foredune area, flanking the path to the water. Many of these plants lie low to the ground in response to the constant wind and have thick, leather-like leaves to resist desiccation. Some of these hardy seashore residents are beach grass, seaside goldenrod, dusty miller, winged sumac and prickly pear cactus. More sheltered areas further inland support the salt spray rose which produces pink or white blooms throughout the summer. Note also the dense system of string-like roots extending from the dune plants that serves to secure the sand and minimize beach erosion.

Intertidal Zone

9 The area of the beach alternately covered by high tide and exposed at low tide is called the intertidal zone. Organisms living within this zone must be adapted to withstand rapid changes in temperature, wave action, alternate wetting and drying, and exposure to predators. Residents of the intertidal zone include smooth periwinkles, barnacles, blue mussels, isopods, and marine worms. Other organisms normally found elsewhere but which occasionally wash ashore include spider crabs, lady and other crabs, oysters, clams, and slipper shells. The most common algae or seaweed found in this area include sea lettuce, the air-bladder laden rockweed or sea wrack, and the red algae - Irish moss.

Geology

10 As you gaze upon this rocky beach, the waters of Huntington Bay, and the hills of Eaton's Neck to the east, you are witnessing remnants of glacial action. Four different glacial ice masses visited the area. The last glacier - the Wisconsonian - formed most of the features that characterize Long Island today. The band of hills stretching along the North Shore of Long Island was formed when the glacier came to a stop and deposited a load of sand, gravel and boulders in a formation known as a terminal moraine. The rocky beaches of the North Shore are the result of glacial deposits, as are the large boulders dotting this beach. These boulders, called erratics, often have grooves and scratches etched into their sides as a result of abrasion by glaciers.



Bank Swallows and Piping Plovers

11 The high exposed bank is nesting habitat for belted kingfishers and frequently a colony of the smallest of swallows - the bank swallow. A bank swallow uses its feet and bill to excavate a two to three foot tunnel into the bank and lines the end with grass to form a nest. The beach serves as nesting habitat for piping plovers, a federally designated threatened species. Less than five thousand pairs of this species are estimated to remain in North America. Plovers dig shallow nests called scrapes in the sand, and often ring them with shells and other materials. Parents attempt to lead intruders away from the scrapes by focusing attention on themselves by pretending to be injured.

To protect piping plovers, bank swallows and other wildlife at Target Rock, this area is closed to public access from April through August.

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Target Rock

12 Legend has it that this fourteen-foot high rock was used for target practice by the British Royal Navy during the Revolutionary War and during the War of 1812. The U.S. Navy allegedly also got its "shot" at the rock in 1879, when a captain moored his ship in the Bay and used the rock to demonstrate his crew's marksmanship for a Fourth of July celebration.

Target Rock, once embedded in the bluff, now serves as the resting place for masses of barnacles and serves as a convenient roost for gulls, cormorants and shorebirds.

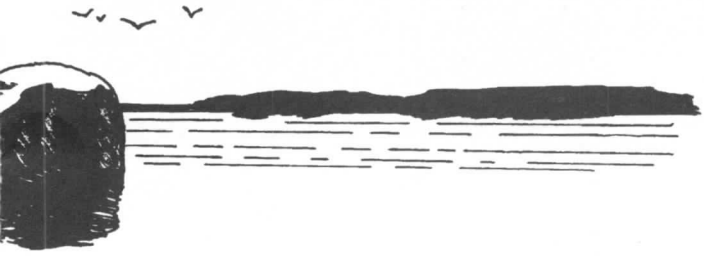
Vernal Pond

13 Near here are two vernal ponds. Vernal ponds form during spring runoff, when water collects in depressions. Generally, these ponds only last through the spring, however, the pond before you has been dammed in order to extend its life.

Vernal ponds are important habitat for many animals. Thrushes, warblers and doves drink pond water and feed on the many insects that breed and congregate near these shallow waters. Raccoons may also scour the waters looking for food. Vernal ponds are often selected as breeding sites by spring peepers. Listen for shrill croaking to confirm the presence of frogs such as peepers in the spring.

Spruce

14 This stand of Norway spruce was planted by the Eberstadt family. This non-native tree is easily distinguished by its drooping branches and branchlets. Note its dense canopy which results in the absence of a woody understory. A thick



carpet of ferns dominates the ground layer. The leaves, twigs and seeds of spruce provide forage for rabbits, squirrels, chipmunks and seed-eating birds. Insectivorous birds feed among the foliage and along the bark. Like many conifer stands, this stand provides good winter cover for several species of wildlife. A great horned owl can occasionally be observed in the upper canopy during the colder months.

Vegetable Garden

15 This area was once the Eberstadt Family's vegetable and cutting garden. Many of the plants seen along this road and the beach trail may be escapees from this garden. For example, the wisteria vine climbing in the trees to the west of this area is a likely descendant of the garden's former inhabitants. Now overgrown with briars and brambles, the garden serves as an example of old field succession. If left undisturbed, an oak and hickory forest will eventually become established here.

Farmhouse

16 This building once was the home of the Eberstadt family. The family purchased Target Rock Farm in 1928 and this farmhouse was built and occupied a year later. In 1937, the Eberstadt family moved to a mansion on the property which was designed by the noted architect William Adams Delano. In 1952, a portion of the farmhouse was removed to construct Pebble Cottage, the building behind you. Pebble Cottage and Paddock Cottage (near the refuge's entrance), both residences, were designed for the Eberstadt's children. The dog kennel and the cow barn that lie to the west of the farmhouse were constructed during the 1930s.