Wellfleet Bay Wildlife Sanctuary

Sensory Trail

Cycles and Changes – Fall/Winter

FOR ALL SENSES, ALL SEASONS, ALL PEOPLE

Mass Audubon
Protecting the Nature of Massachusetts

An audio tour is available at the front desk of the Nature Center. The tour is also available online at www.massaudubon.org where you can download it to your personal audio device prior to your arrival to the sanctuary. Individual copies of the trail map are available in printed or tactile formats, and copies of a printed or Braille guide are available at the Nature Center.

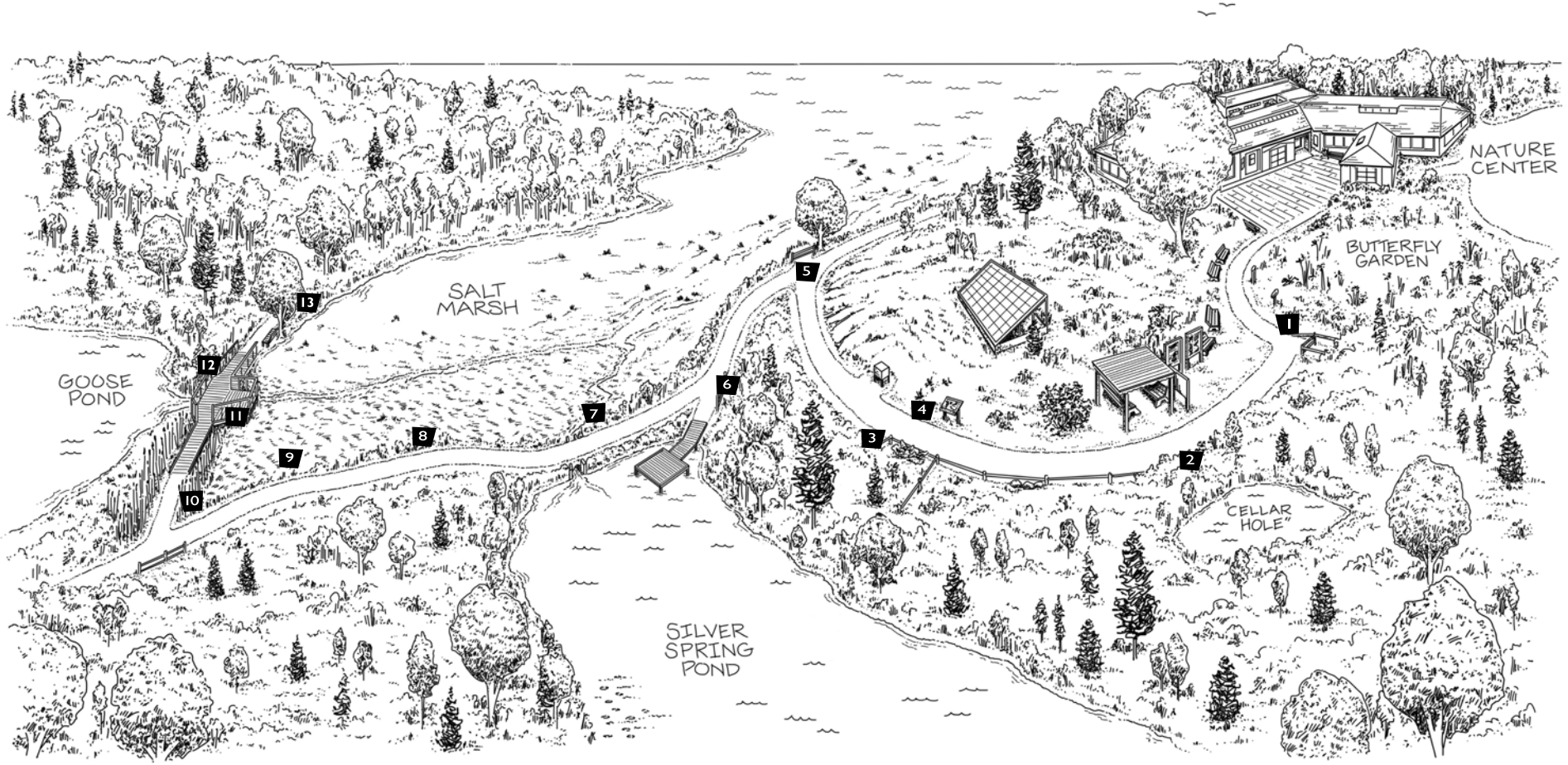
Welcome to Wellfleet Bay Wildlife Sanctuary. This Sensory Trail is here for your enjoyment. Please take only pictures and leave only footprints. Enjoy your walk today and return to experience the trail in different seasons.

If you were here 150 years ago, you'd be in the middle of asparagus and turnip farms, open fields and salt hay meadows. Dairy cows grazed nearby. Wellfleet Bay was also a fishing port. The pre-settlement forests had been cut down long ago and the open bay was filling in to salt marsh. In 1929 when Dr. Oliver Austin arrived, duck hunters had replaced the fishermen. Dr. Austin and his son banded birds instead of hunting them. The Austin Ornithological Research Station became one of the largest private bird-banding stations in the world. Today, the Austin's legacy of conservation lives on. Here at Wellfleet Bay, you can view the largest unditched salt marsh on the lower Cape and walk through woodlands that are transitioning into native pine and oak forests. You may hear the calls of migrating shorebirds as they stop to rest and feed on our beaches and mudflats from mid-July through October. In winter, Canada geese and black ducks call from the marsh and the bay. Throughout the year, you are likely to hear many different birds at our Sanctuary and may observe a wide variety of other wildlife from turtles and frogs and Fowler's toads, to chipmunks and squirrels, to muskrats and fiddler crabs. Renew your spirit through the sound of the wind, the smell of salt air, and the blue waters of Cape Cod Bay.

If you need assistance during Nature Center hours, please ask at the front desk or call 508-349-2615.

Sensory Trail

FOR ALL SEASONS, ALL SENSES, ALL PEOPLE



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1 Butterfly and Hummingbird Garden

Our volunteers planted and maintain the flower garden between this path and the nature center with help from our staff. It covers an area of roughly 2500 square feet – a little larger than a tennis court but shaped more like a kidney. Like our buildings, our garden uses resources in a way that is ecologically sustainable. Rainwater from the roof is collected in four tanks that hold up to 1600 gallons of water, a renewable source that is piped into an underground irrigation system to keep the garden green. We also reuse water from our sinks, dishwasher, and drinking fountains – called graywater – to help irrigate the garden.

Flowers attract hummingbirds and butterflies all spring and summer. On a warm October day, clouded sulphurs and cabbage whites may nectar in late-blooming butterfly bushes and purple asters. Plants that butterflies use attract other insects, too, from bees and wasps to beetles and flies. Goldenrods and asters support more than one hundred different kinds of insects and spiders; native sunflowers and joe-pye weeds more than forty. We don't use herbicides or pesticides, but rely on the garden's natural predators to keep plant-eating pests in check.

To give the insect-based food web a head start for spring, we do not cut back the plants in autumn. Some insects lay eggs on twigs to hatch next spring; others spend the winter as larvae. Many overwinter as adults in leaf litter, hollow stems or under rocks and logs. A balmy day in Indian summer or during January thaw can bring out native bees and flies. Can you hear the subtle droning of insects on a calm, warm day? On cold days, listen to the wind rustling through the ornamental grasses and rattling the flowers' brittle seed heads.

2 Wetland Pool and Pergola

Imagine the rustic farmhouse that once stood here bustling with the activities of ornithologists or day campers. From 1930 to 1957, it was the residence and bird-banding laboratory of the Austin Ornithological Research Station. Dr. Oliver Austin, a surgeon from New York, his son Oliver, Jr. who was an ornithologist, and a team of other scientists netted and banded thousands of birds. They recorded data on bird species and numbers, migration routes, and population trends. They also quantified the effects of human use and misuse of the land and water.

Mass Audubon, with its focus on birding and conservation, bought the Austin property in 1958. The farmhouse became Wellfleet Bay's first nature center. When the new nature center was built in 1993, the farmhouse was demolished. In the spirit of Dr. Austin's commitment to improving wildlife habitat, we turned the cellar hole into a small wetland pool. All is quiet now, but in summer the pool is hopping with frogs, turtles, insects, birds, and even a muskrat or two. Across the path from the wetland pool is an open-sided pergola, a great place to sit and listen to nearby birds.

3 Whale Bones

In the North Atlantic, fin, or finback whales grow up to 75 feet long and can weigh from 40 to 80 tons. They are the second largest whales in the sea. They are baleen whales and feed on krill and small fish such as sand lance. Like all baleen whales, female fin whales are larger than the males.

The baleen whales that are commonly found in the waters of Cape Cod and Stellwagen Bank are right, fin, humpback, and minke whales. Endangered right whales swim very close to the Cape during their annual migration. The toothed whales we see most often are harbor porpoises, common dolphins, Atlantic white-sided dolphins, and pilot whales. Unfortunately, in autumn and winter, sometimes dolphins and pilot whales strand themselves on the beaches of Cape Cod Bay. Scientists are baffled by the behavior, but theorize that the strandings may be due to tides, storms, or the shape of Cape Cod, which may confuse the whales and dolphins. The slope of the beach and the turbidity of the water may disorient them.

4 Photovoltaic Array

Beneath the tempered glass of our photovoltaic array or PV panel is a layer of silicon that converts sunlight directly into electricity. When sunlight hits the panels, the silicon releases free electrons that bounce at very high speeds, creating an electrical current. Wires conduct the direct current, or DC, into an inverter box that converts it to alternating current, or AC electricity to power lights and computers, run appliances, and heat water and buildings.

One of our ground-mounted arrays is behind the sample panel. It measures 20 feet by 60 feet and comprises 96 PV panels that produce 18 kilowatts of electric power. A larger installation in the field next to our parking lot is 3,240 square feet in size and comprises 200 panels that produce 41 kilowatts. The small array on the roof of the day camp building is rated at 3 kilowatts. Our three arrays produce 62 killowatts of electric power and meet up to 70% of Wellfleet Bay's needs.

Solar power works even on partly cloudy days, but the stronger the sunlight, the more electricity produced. Sometimes on bright, sunny days, we produce more electricity than we use. Yes, that makes the electric meter run backward. The power that we generate but don't use is sold back to the power grid.

How much electricity do the arrays produce? We started monitoring on December 9, 2010. In the first 16 months, the arrays generated about 60,000 killowatt hours of clean energy. That's enough to meet the electricity needs of an average American house for five and one-half years.

Our Nature Center is LEED platinum certified and is the greenest public building on Cape Cod. LEED stands for Leadership in Energy and Environmental Design, and platinum is the highest of four ratings that the LEED Commission confers. You can learn more about PV arrays and other aspects of our LEED initiative in the Nature Center through a self-guided tour of our Green Building Trail.

5 Salt Marsh Overlook

You are facing west toward an extensive salt marsh, beyond which a low barrier beach meets Cape Cod Bay. The lush greens and blues of the marsh in summer have faded to light browns and golds. The bay waters are gunmetal gray on overcast days or deep sapphire on sunny ones. Close to the marsh edge, dead cattails stand tall. Beyond them, salt marsh grasses have died back, exposing the tidal creeks that lace the marsh. Two wooded upland islands rise from the flat expanse. Pie Island is smaller and wedge-shaped. The larger Try Island housed a "try works" in the 18th and 19th centuries where people rendered whale blubber into oil. A salt works operated on the hill behind you.

If you stood here two or three hundred years ago, you'd be next to an open bay instead of a marsh. Even now, at high tides after a storm or near a winter full moon, the water will flood the entire marsh and will lap at the upland edge. Do you hear wind or water today?

6 Dock at Silver Spring

The split rail fence here at stop 6 leads to the dock at Silver Spring. The long and narrow 8-acre freshwater pond winds through the woods. Oak, red maple, and sassafras dominate the northern side of the pond. A high ridge of oak and pitch pine rises above the southern edge. The Austins created the Silver Spring pond in the 1930s to increase habitat diversity.

The dam and pond area offer glimpses of the geology of the sanctuary. Twenty-five thousand years ago, New England was covered by mile-high ice of the Pleistocene glaciation. The Laurentide ice sheet deposited tons of sand and gravel to form the Outer Cape by the time it receded about ten thousand years ago. As the ice retreated, meltwater streams created channels such as the Silver Spring area. The current water source is runoff from the Eastham/Wellfleet highlands.

The dock is a favorite place for frog and turtle watching from early spring until late October. In winter these ectothermic, or cold-blooded, animals burrow under the mud. Bullfrog tadpoles, which take a couple of years to metamorphose, remain active under water. In winter, Silver Spring attracts mallards and hooded mergansers.

The Silver Spring area is a good place for muskrats and river otters, both of which are active all year. Muskrats are rodents that eat cattails and aquatic plants, but will occasionally eat mussels, small fish and frogs. They are much smaller than otters. River otters are members of the weasel family. They eat fish, frogs, snakes, turtles, and even small mammals. Otters like to hunt at the mouths of rivers and streams where there's a plentiful food supply, and we find their trails here. Their scat, filled with fish scales, is evidence that the otters cross the spillway often. Muskrats and otters den in and along the banks of Silver Spring.

7 Silver Spring Spillway

Dr. Austin constructed the dam you are standing on to maintain Silver Spring as a permanent freshwater pond and to keep tidal saltwater out. Listen to the water flowing down into the marsh. Sometimes it trickles quietly, other times, it's a steady flow.

Enough fresh water flows from Silver Spring into the salt marsh to dilute the salinity here, allowing a fringe of cattails to grow along the upland edge of the salt marsh. Cattails are plants of freshwater wetlands and do not tolerate typical salt marsh conditions.

In winter, this portion of the trail is exposed to the prevailing northwest wind that whips across the bay and the open marsh. How many wind sounds can you hear? The wind hisses through the cattails, rattles the bare branches of nearby scrub oak, and howls around our heads. Sometimes, even the crows and gulls have trouble flying in a blustery wind.

8 Woodland in Transition

The habitat that you enter at stop 8 is a woodland in transition. Dr. Austin planted thousands of trees in the 1930s to transform the barren, sandy ground into habitat that would attract more birds. He planted many non-native species, including European red pine, Scotch pine and Norway spruce, according to the conventional wisdom of that time. Many of the trees in this European red pine plantation are dead or dying now, due to both old age and infestations of native insects. The woodland is changing to one of native pitch pine, white pine, and oak.

We don't remove dead trees unless, of course, they are a safety hazard, because dead trees play an important role in the ecology of the forest. They provide food and shelter to a wide variety of organisms from fungi and insects to birds and mammals. In turn, fungi, bacteria, insects, and rain all work to decompose the wood.

Colonized by bark beetles, carpenter ants and termites, upright snags are a major food source for flickers and red-bellied, downy, and hairy woodpeckers. Other than their larger size, hairys look like downys. With their sharp, chisel-like beaks, woodpeckers can excavate nest holes in the hard wood of healthy trees as well as in dead or diseased trees. Other cavity-nesting birds use discarded woodpecker holes, but they can also make nest holes in soft, decayed wood. Squirrels and raccoons take shelter in larger cavities.

Eventually, a dead tree becomes so riddled with rot that it falls to the ground where it continues to decay. Rotting logs on the forest floor and the soil beneath them are teeming with a decomposer-based food web. Isopods, millipedes, and earthworms are some of the scavengers. Their predators include centipedes, daddy-long-legs, and salamanders. It takes about twenty years for a dead tree to disintegrate into soil from which new plants will grow. Nature is the original recycler.

9 Pine and Oak Woodland

In pre-colonial times, Cape Cod was covered with hardwood forests and lofty white pines. European settlers chopped down the original forests for homesteading, agriculture, and fuel. Deforestation led to erosion of the topsoil by wind and rain, exposing the nutrient-depleted sand beneath. By 1800, the forests were long gone; what remained were hardscrabble farms and barren ground.

The bare, sandy landscape hadn't changed much when Dr. Austin arrived in Wellfleet in 1930. He planted trees to augment reforestation, but even without him, pioneer species such as eastern red cedar and pitch pine would have initiated field-to-forest succession. An early and vigorous colonizer of dry, open ground, pitch pine is the dominant tree on the Cape today. As pitch pines and cedars grow, they create a cooler and shadier habitat, so oaks can move in. Eventually, the oaks will grow tall enough to form a forest canopy that shades out the pioneer species. We are also seeing the return of eastern white pine, which was one of dominant native trees on Cape Cod in pre-settlement forests. Succession appears to be heading toward an oak and white pine forest in the future.

10 Edge of the Marsh

You are at the edge of the salt marsh again. On warm autumn days and during January thaw, you may smell the organic sulphur-like odor of active decomposition in the marsh. For most of the winter, the dominant smell is the crisp, cold air of Cape Cod Bay.

What type of plant do you think is rustling in the wind? The wind is blowing through a stand of very robust grass called phragmites. With its distinctive feathery plumes, phragmites, or giant reed, is the largest member of the grass family in New England, growing up to 12 feet high. Both native and non-native species of phragmites occur in New England. The phragmites at Wellfleet Bay is the introduced species, which rapidly colonizes disturbed sites. Although it provides protective cover to some animals of the marsh, it tends to be invasive. When you turn the corner and walk along the path on the right, you'll pass a stand of phragmites. Reach over the right side of the trail about shoulder level and touch the hollow stems and plumy seed heads of these tall grasses. Are they taller than you?

11 The Salt Marsh

Wellfleet Bay's expansive marsh is the only unditched salt marsh on outer Cape Cod. The Austins did not participate in the federal government's mosquito control campaign that ditched more than 90% of the salt marshes along the East Coast. Their farsightedness created a valuable ecological legacy. Our salt marsh is an important place for conservation research because it is one of the few naturally functioning tidal marsh ecosystems left in the region.

Salt marshes are coastal grasslands that are cyclically flooded by ocean tides. They are among the most important and productive ecosystems in the world because they function as nurseries for the young of a wide variety of marsh and marine species of fish, shellfish and crustaceans. The salt marsh is so productive because the mixing of fresh and salt water creates a nutrient-rich environment. The tidal fluctuations of the creeks facilitate nutrient exchange. Twice daily, the tide inundates the marsh with minerals and oxygen that help salt marsh plants grow. Bacteria and fungi decompose dead salt marsh plants and tidal wrack into tiny particles of organic matter called detritus. The microbe-laden detritus is the basis of the salt marsh's tremendous food web. Salt marshes are always changing, never static.

The northern harrier, formerly called marsh hawk, glides low over the marsh looking for mice, voles, and other small mammals and birds. Harriers hunt by sound as well as sight. The stiff feathers around their face form an owl-like facial disk that helps concentrate sound toward their ears. Unlike most raptors, the sexes have different plumage. The larger females are brown above and buff below, with dark underwings. Males are gray above and pale below with black wingtips. Juveniles are brown above and rusty orange below. All harriers show a white rump patch in flight that is unmistakable.

12 The Goose Pond

A hundred years ago, a barrage of gun shots would have greeted you here. Goose Pond and the salt marsh behind you were prime territory for hunting deer, waterfowl, and shorebirds. Hunting has been prohibited at Wellfleet Bay since 1930 when Dr. Austin established the banding station.

The Austins reinforced the dam at Goose Pond to create diverse habitat. Today, we use the dam to actively manage water levels at Goose Pond. From July through September we draw down water levels, exposing mudflats in order to maximize feeding and resting habitat for fall migrating shorebirds and wading birds. When the birds have gone, we restore pond-like conditions.

Goose Pond is brackish, a salt and fresh water mix that fluctuates on a yearly salinity cycle. The water is saltiest in late summer when water levels are lowest and dry periods create a "sea" of mud. Most years, winter snowmelt and annual rains fill Goose Pond to its highest and freshest in early spring. Occasional astronomic high tides bring salt water into the pond.

Goose Pond is gradually filling in due to tidal deposits and accumulation of decomposing seaweeds and vegetation. You may find geese here occasionally during the winter, but they prefer the marsh and creeks. Mallard ducks still frequent Goose Pond. Listen for their familiar quacking. Mallards are herbivores. They eat plants, not fish. If they swim near enough, you may hear the click-clack of their beaks as they dabble for vegetation. Mallards belong to the group dabbling ducks, which feed by tipping their bodies to reach vegetation in shallow waters. The eider and scoter that winter down at the bay are diving ducks. They eat shellfish, particularly blue mussels.

13 Eastern Red Cedar

The eastern red cedar here at stop 13 is one of the largest on the Goose Pond Trail, about 20 feet wide and 30 feet tall. Instead of smooth, thin, pine-like needles, this conifer has branched sprays of tiny, flat scales that feel a bit prickly. Eastern red cedars belong to the juniper family. In the fall, they bear blue, waxy berries that smell like gin when crushed. Feel around for a small hard berry to crush. If you can't find a berry, gently rub some of the needles between your thumb and fingers, which may release a faint gin-like aroma. Cedar berries are one of the favorite foods of cedar waxwings and are an especially important winter food source for a variety of birds. This tree is also a favorite perch of red-tailed hawks. From the top branches, they scan the marsh for prey.

Eastern red cedars grow in upland habitats of dry fields and open woods. Like pitch pine, they are one of the first colonizers of old fields in the process of field to forest succession. Cedars are sun-loving trees. They die out when the woodland they helped to create becomes too shady for them. They are replaced by oak and white pine. This tree grew so large because of its sunny, open location.

Summary

You have now reached the end of the Sensory Trail. You are welcome to spend some time on the bench here at stop 13 before you return to the Nature Center. You have the option of continuing along the Goose Pond Trail for at least a quarter of a mile to the boardwalk and Cape Cod Bay – if the trail is dry, which depends on the tide. The rest of the Goose Pond Trail is sandy and smooth, but not as hard-packed as the all-person's trail, and it is not ADA compliant.

We hope that you have enjoyed your exploration of this portion of the Goose Pond Trail, and that this guide enabled you to make some new connections to the history of Wellfleet Bay and to the nature of our sanctuary in fall and winter. We also have a spring and summer version of the sensory trail guide. We invite you to return and explore our sanctuary on other days and in other seasons. There is always something new to experience.

You can return to the Nature Center by retracing your steps. Please return any maps and any equipment to the Nature Center before you leave. Thank you for coming.

THANK YOU

Mindy Todd
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INSTITUTE of Museum and Library SERVICES

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The Sensory Trail overlays the Goose Pond Trail and the Robert R. Read All-Persons Pathway which increases accessibility for all visitors.

Wellfleet Bay Wildlife Sanctuary

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Nature Center/Trail Hours:
Nature Center:
Memorial Day to Columbus Day: Daily, 8:30 a.m. to 5 p.m.
Columbus Day to Memorial Day: Tuesday through Sunday, 8:30 a.m. to 5 p.m.
Trails: Open every day, 8 a.m. to dusk (8 p.m. in the summer).

Mass Audubon works to protect the nature of Massachusetts for people and wildlife. Together with more than 100,000 members, we care for 35,000 acres of conservation land, provide school, camp, and other educational programs for 225,000 children and adults annually, and advocate for sound environmental policies at local, state, and federal levels. Founded in 1896 by two inspirational women who were committed to the protection of birds, Mass Audubon has grown to become a powerful force for conservation in New England. Today we are respected for our sound science, successful advocacy, and innovative approaches to connecting people and nature. Each year, our statewide network of wildlife sanctuaries welcomes nearly half a million visitors of all ages, abilities, and backgrounds and serves as the base for our work. To support these important efforts, call 800-AUDUBON (800-283-8266) or visit www.massaudubon.org.

Mass Audubon
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