Wellfleet Bay Wildlife Sanctuary

Sensory Trail

Cycles and Changes – Spring/Summer

For All Senses, All Seasons, All People

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.

**1 Butterfly and Hummingbird Garden**

You are at stop 1, the 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 an ecologically sustainable manner. 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.

We planted a wide variety of native flowers and non-invasive horticultural species that were chosen for their colors, nectars, and nutrients to provide food for the sanctuary’s native pollinators. Our flowers attract butterflies, bees, wasps, flies, beetles, and even hummingbird-like sphinx moths. Can you hear the buzzing and

droning of the garden’s pollinators?

Lavender, butterfly bush, and coneflower are favorite plants of butterflies. Common butterflies in the garden include monarch, American lady, spicebush swallowtail, cabbage white, and pearl crescent. We don’t use herbicides and pesticides. Spiders and other predators, including birds and toads, keep caterpillars in check; it’s a natural balancing act.

Ruby-throated hummingbirds zip through the garden and hover in front of flowers to sip nectar, pollinating the plants as they feed. We also attract these tiny, glittering birds with feeders filled with sugar water. Listen for the twitters and chips of the hummingbirds and the high buzz of their wings in flight.

Our jelly-filled feeders draw orioles to the garden. The male Baltimore oriole is bright orange and black; the male orchard oriole is a more subdued chestnut and black.

**2 Wetland Pool and Pergola**

Stop 2 is where the All-Persons Trail officially begins, with a small pool on the left side of the trail and a pergola on the right. Marker 2 faces the pool, a former cellar hole. The farmhouse that once stood here was home to the Austin Ornithological Research Station, which then became Wellfleet Bay’s first nature center. It was demolished in 1993 when the new nature center was built. In the spirit of Dr. Austin’s commitment to improving wildlife habitat, we turned the cellar hole into a small wetland pool. The pool is swarming with aquatic and aerial insect life, which attracts birds, turtles, and frogs. In late March and April, tiny frogs called spring peepers sing their bell-like chorus. Later in spring and summer, listen for the green frog’s banjo-like twang and the bullfrog’s deep “jug-a-rum” call.

Enjoy the dappled shade provided by the trumpet-creeper vines that climb up the pergola. Hummingbirds nectar at the three-inch-long red to orange tubular flowers. Other migrating songbirds have returned to Wellfleet Bay and are vocalizing nearby. Listen for the eastern towhee’s “drink your tea”, the American robin’s familiar “cheerio-cheery-cheery”, and the northern flicker’s loud “kek-kek-kek-kek-kek”. The year-round northern cardinal also has a piercing song. Compare our two resident finches. The house finch’s warbling twitter usually ends with a longer slurred note. Goldfinches have a more clipped, buzzy song that includes a higher-pitched “tweee” and flight calls that sound like “p’tata chip, p’tata chip”.

**3 Whale Bones**

Stop 3 is the display of humpback and minke whale skulls and a fin whale jawbone. Can you guess the size of this whale? 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.

The baleen whales that are commonly found in the waters of Cape Cod and Stellwagen Bank are fin, minke, and humpback whales. The scientific name for humpbacks, *Megaptera novaenglicae*, means “big-winged New Englander” because of their long pectoral fins. Scientists identify individual humpbacks based on the whales’ unique tail fluke patterns and dorsal fin shape.

Endangered right whales swim very close to Cape Cod during their annual migration and spend time here feeding on zooplankton. They feed by grazing along the surface of the water, mouths open, filtering food through their baleen. They can often be seen from Race Point in April. You can recognize them by their V-shaped spouts. Right whales were hunted almost to extinction. They were the “right” whale to catch because they yielded the greatest amount of oil. They were large and slow and floated when killed. Today, there are just over 300 northern right whales in the world. Shipping lanes near Cape Cod and along the East Coast have been redirected from migration routes in order to help protect the remaining whales.

**4 Photovoltaic Array**

Here at stop 4, you can touch a photovoltaic—or PV—panel, a smaller version of the ones in our solar-powered PV arrays. Reach over to the left side of the marker and find the PV panel that is about 3 feet off the ground. Feel the smooth glass surface. Don’t worry; the panel may feel warm, but it will not be too hot to touch.

Beneath the tempered glass 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 kilowatts 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 kilowatt 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 platinum LEED 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**

This is stop 5, the marsh overlook, designated by the split-rail fence. Take a deep breath for a sensory impression of the salt marsh and pine/oak forest edge. How does the air smell: Pine-y? Fragrant? Salty? Organic like sulphur? How does it feel: Moist? Dry? Breezy? Calm?

You are facing west toward an extensive salt marsh, beyond which a flat barrier beach meets the blue waters of Cape Cod Bay. The summer marsh is a vivid green expanse of salt marsh hay. Taller, darker green cord grass fringes the tidal creeks that meander through the marsh. At low tide, salt pannes are exposed. These are bare mud flats where fiddler crabs and mud snails emerge to feed. The incoming tide fills the pannes, turning them into shallow pools for minnows and green crabs. Salt pannes are important feeding and staging habitat for migratory shorebirds.

Two wooded upland islands rise from the flat marsh. Their dark vegetation contrasts with the lighter marsh grasses. Two or three hundred years ago, the islands were surrounded by open water. 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.

Today the hillside is wooded and attracts many birds. You may hear the blue jay’s raucous call and the song sparrow’s melody. The bob-white calls out its name. If you listen carefully you may hear the soft musical trill of the pine warbler, one of our summer migrants, calling from the pitch pines.

You can hear crows just about everywhere on the sanctuary all year long. This familiar caw belongs to the American crow. Compare it to the nasal call of the fish crow, a summer migrant. Young American crows can sound nasal also, but only the fish crow gives a two-syllable “uh-uh” call.

With the fence in front of you, turn toward 3 o’clock and, keeping the fence on your left, take 3 or 4 steps forward. The fence ends and you will be facing a large pitch pine. Reach out in front of you and touch the tree. Examine the bark. This pitch pine, with its rough and deeply furrowed bark, is one of the larger and older pines on the sanctuary, more than a hundred years old.

**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. The Austins created the Silver Spring pond in the 1930s to increase habitat diversity.

Fresh water is essential to most birds and animals. Many different species come to Silver Spring to drink, feed, or nest nearby. Muskrats and river otters are regular visitors. Common grackles are long-tailed, iridescent blackbirds whose croaks and whistles fill the air. Gray catbirds call from the dense shrubs, their songs interspersed with scratchy “meows”. The belted kingfisher’s rattle often signals that it is about to dive into the water for a fish.

The dock is a favorite place for frog and turtle watching because they are so abundant here. Painted turtles paddle in the water or sun themselves on logs. Listen for green frogs and bullfrogs; they often sit camouflaged on the lily pads right in front of the dock. Tadpoles swim in the shallows beneath the lily pads.

The round lily pads belong to the white water lily that flowers in June and July. Can you smell its sweet fragrance? Yellow water lily, or spatterdock, has oval lily pads and no odor. Bees pollinate the violet-blue pickerelweed and magenta water willow. Dragonflies and damselflies are fierce predators, silently hawking for insects over the water. Colorful dragonflies rest with their wings outspread; damselflies are more slender and most keep their wings folded over their backs. Common dragonflies at Silver Spring include slaty skimmers, blue dashers, and eastern amberwings. Eastern and fragile forktails are common damselflies.

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**

Stop here at marker 7 and take another sensory impression. What do you hear? You are standing on the dike directly over the dam and spillway. When you face marker 7, freshwater Silver Spring is behind you and the brackish salt marsh is in front of you. Dr. Austin constructed the dam to maintain Silver Spring as a permanent freshwater pond and to keep tidal saltwater out. Listen to the water flowing down into the marsh in springtime. Sometimes it’s a steady flow; sometimes it’s just a trickle. By summer, it usually dries up.

How does the air smell: Salty? Fragrant? Pungent? The sulphuric rotten-egg odor is that of organic decomposition, a natural process that is the keystone to salt marsh productivity. 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.

Flowering shrubs at the upland edges of the marsh and Silver Spring are more pleasantly fragrant. In June and July, the pink flowers of swamp rose smell sweet and delicate. Mid-July through mid-August, you will notice the spicy-sweet heavy perfume of the small white spikes of sweet pepperbush. Later in August, the maroonish-brown flowers of the groundnut vine bloom with a subtle sweet and sour aroma.

**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 and is referred to as plant succession.

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. It takes about twenty years for a dead tree to disintegrate into soil from which new plants will grow. Nature is the original recycler.

Colonized by bark beetles, carpenter ants, and termites, upright snags, or dead trees, are a major food source for woodpeckers. Other than their larger size, hairy woodpeckers look like downy woodpeckers.

Not all of the sounds of the forest are birdsong. A nasal sound, almost like a bleating sheep, belongs to the Fowler’s toad. Frequently, you’ll hear a continual, loud chipping. Any idea who makes that call? It’s a chipmunk. Chipmunks gather acorns and other nuts and seeds for winter, filling their cheek pouches until they bulge. They hoard a large food supply in underground burrows where they remain dormant for much of the winter.

Gray squirrels are active throughout the year. They gather nuts for winter and bury them in shallow, individual holes. Excluding their bushy tails, squirrels are roughly twice as long as chipmunks but weigh 5-6 times more. It’s fairly easy to distinguish between the gentle rustling of chipmunks and the loud crashing of gray squirrels as they travel through the woods.

Red squirrels are highly territorial. They warn off intruders with their gutteral chittering. Red squirrels feed on buds and flowers in spring and on fruits, nuts and pinecones in summer and fall. They often feed in the same place every day, leaving a large midden, or pile, of nutshells and pinecone debris below.

As you walk through the woodland, be aware of the variety of sounds. How many can you identify?

**9 Pine and Oak Woodland**

You’ve been walking through a pine and oak woodland. Now take a sensory impression of the woods here at stop 9. How has the temperature changed? Do you feel wind, sun, dappled light? Are the woods quiet or bustling with life? How many different birds do you hear?

Our resident songbirds include black-capped chickadees, tufted titmice, and white-breasted and red-breasted nuthatches. One of the easiest songs to recognize is the “chickadeedeedee” of the black-capped chickadee, our state bird. The titmouse has a “cheeva cheeva cheeva” song. Both nuthatches give nasal “yank-yank” calls.

One of the summer migrants that you are most likely to hear is the common yellowthroat, a small warbler that nests in thickets by the water. The male is drab olive except for his black facemask and bright yellow throat and chest. His song is a distinctive “witchity-witchity-witchity”.

**10 Edge of the Marsh**

Stop 10 is where the trail transitions from the woodland to a different habitat. Take a deep breath for a sensory check here. Does the air feel breezy? Hot and humid? Refreshing? Does it smell different from the woods? Where do you think you are heading? You are at the edge of the salt marsh again. Do you recognize its combination of smells? Can you tease out the odor of organic decomposition? The tangy-salty air?

Another classic scent of Cape Cod is bayberry. This native shrub grows 3–8 feet tall, thrives in poor, sandy soil, and tolerates salt spray. Its tiny, blue fruits have a grayish-white waxy coating that is used to make scented candles and soap. The leaves are also aromatic. On your right near the marker, there are some three to four foot tall bayberry shrubs. Reach over and rub one or more oval leaves between your fingers to release the scent. In August or September, you can feel one of the small, hard fruits that grow along the twig below the leaves. Do you like the smell of bayberry?

Beyond the bayberries, fringing the marsh and Goose Pond, phragmites rustle in the wind. 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. Red-winged blackbirds nest in the phragmites next to Goose Pond on the left. As you walk on the boardwalk to Goose Pond, be prepared: sometimes the male birds squawk and swoop near people because they are defending nearby nests.

**11 The Salt Marsh**

At stop 11, you’re facing the salt marsh and Goose Pond is behind you. You are on the deck directly over the dam that maintains Goose Pond’s water level. At low tide you can hear water dripping out of the dam from Goose Pond into the creek.

When the tide is out, fiddler crabs emerge to feed on the exposed mud. They’re called fiddler crabs because the males have one greatly enlarged front claw that seemingly resembles a fiddle. They wave this claw to attract females and to warn other males away from their territory. If a male loses his larger claw, the smaller one will grow. Fiddler crabs are a favorite food of whimbrels, the signature bird of Wellfleet Wildlife Sanctuary.

Whimbrels are large shorebirds easily identified by their long, down-curved bills. You can frequently hear them calling in the evening as they fly over the marsh to the bay. They pass through Wellfleet on their fall migration south, usually arriving around mid-July and staying until October. Whimbrels roost at Monomoy Island at night. They spend their days feeding between Monomoy and Wellfleet Bay. Another large shorebird with a distinctive call is the willet; it says its own name. Willets breed in the salt marsh at Wellfleet Bay. In flight, their wings show a distinctive black-and-white pattern, but at rest they are plain and nondescript birds.

Ospreys return to Cape Cod every summer to breed. Fish-eating raptors, they are often seen flying across the marsh to their nests with a large fish in their talons.

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.

Wellfleet Bay’s expansive marsh is the only unditched salt marsh on outer Cape Cod. It is an important place for conservation research because it is one of the few naturally functioning tidal marsh ecosystems left in the region. 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. Ditches drain out creeks and pools, change vegetation patterns, and reduce wildlife value of a salt marsh. Ditching is now illegal. One natural form of mosquito control is provided by the minnows that eat mosquito larvae as they live in waters of the marsh.

**12 The Goose Pond**

At stop 12, you are facing Goose Pond. Goose Pond is brackish, a mix of salt and fresh water. This bridge is a busy spot in the summer, bustling with birders and day-campers. Often a trail naturalist is stationed here.

The Austins reinforced the dam at Goose Pond to create diverse habitat. Today, we use the dam to actively manage water levels. 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.

During the summer, biodiversity is high at Goose Pond. Sheepshead minnows, the most abundant fish in the pond, share the water with mummichogs, killifish, small eels, and even painted turtles. Some years, Goose Pond is a nursery for Fowler’s toads. When the tadpoles metamorphose and leave the pond in August, we often find tiny toads all over the trails.

Crustaceans and macro-invertebrates attract many species of shorebirds. The small shorebirds, that we call peeps, run and feed on the exposed flats. These include semi-palmated sandpipers, least sandpipers, and semi-palmated plovers. Farther out, where the water deepens, greater and lesser yellowlegs feed. These large sandpipers really do have bright yellow legs. Snowy egrets and green herons prey on fish in Goose Pond. The green herons also spend time resting on posts and logs in the middle of the pond.

Kingfishers hover overhead before plunging into water for fish; they often perch in nearby trees or on a post in the pond. Eastern phoebes catch insects from their perches on phragmites and small shrubs. They make a “feebee” call. Note that it is much less musical than the chickadee’s melodic “feeee-beeee”. You can hear many red-winged blackbirds calling from the phragmites. Listen for the red-wing’s raspy “conk-la-rees”.

Muskrats, too, are attracted to phragmites. Sometimes, young ones will feed on grasses right here off the side of the boardwalk, oblivious to people, and you can hear them munching.

**13 Eastern Red Cedar**

Marker 13 is on the right side of the path. With your back to the marker, find the bench immediately to your right. Follow the bench to the end. Just beyond the bench, there is a large, evergreen cedar tree on the right. Reach up and touch it. 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 that they helped 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.