



West Beach Succession Trail

This one-mile trail will take you on a journey through time as well as space. Beginning on a bare sand beach and ending in an oak forest, it traces a process in nature that took thousands of years to evolve.

That process, called *succession*, is the means by which a group of plants and animals in a particular place is gradually replaced over time by other, sometimes very different, natural communities.

Succession was a controversial new idea in the early 1900s when University of Chicago Professor Henry Chandler Cowles first brought his students here. Using the area as a natural laboratory to demonstrate how plant succession worked, he achieved worldwide recognition not only for himself but also for this sand dune country on the margin of Lake Michigan. Because of his work, the dunes became known as the birthplace of *ecology*.

Today, the National Park Service continues to study natural dunes succession and has set aside several areas here in the park's West Unit to observe succession. Please do not leave the trail, pick wildflowers, or disturb animal habitats for the benefit of this and future generations.

1

The Beach

Bare of all but sand and sunbathers, the beach seems an unlikely beginning stage for an oak-covered dune. Yet only a few thousand years ago, the shoreline was a mile inland. As climates warmed and the lake receded, the plants and animals advanced, joining the wind and weather to change the shape and texture of the land.

The process that shaped the dunes thousands of years ago is the same process that shapes the dunes today. It begins at the water's edge, where plant and animal debris is washed up by the waves. This debris enriches the soil and provides food for herring gulls, raccoons, bright-colored beetles, and other animals.

Water and wind scour the sand. These forces roll the sand inland along the beach to the first line of plants, which catch and pile up the sand. This process formed the long, narrow *foredune* on which this trail begins.

2

Dune Builders

Among the most important of the dune builders is *marram grass*. It can be seen on dunes all around the Great Lakes and on coastal dunes along both Atlantic and Pacific shores. Marram grass not only survives the barrage of sand, which the lake and wind bring, it thrives on rapid sand burial. The bright green new blades of grass, which appear in May, form the visible part of the plant; but most of its growth takes place in specialized underground stems called *rhizomes*. At least a dozen *internodes*, the sections between each joint of these stems, develop each year. If sand piles up fast, the internodes will be long. But if summer breezes are gentle and the sand piles up slowly, the internodes will be short. In sheltered places where there is no wind or sand buildup, the underground roots poke above ground where they may die from exposure.

The rhizomes and roots of a single marram grass plant may spread up to 20 feet in all directions. A typical dune, such as the one along which you have just walked, is held together beneath the surface by a dense network of these underground threads.

The *cottonwood* tree, by which you are standing, is another important dune builder. Unlike the grass, it needs a low, sheltered spot in order to sprout; but by the time it is a few feet tall, it can also survive sand buildup.

As the tree's stems are buried, they begin to function as roots; and new stems appear above ground. Although many of the cottonwoods on this trail appear short, some may only be the exposed tips of 60 foot tall giants.

3

The Lee Side

You can see new dune grass on the protected lee slopes and in the hollow behind the first dune ridge. The new grass is called *little bluestem*. In most seasons, it is easy to spot from a distance. Look for a subtle change in color between the leaves of little bluestem and marram grass.

Little bluestem grass grows in dry areas, including sand prairies throughout the Midwest. It cannot build dunes, but it grows in thick sturdy clumps and can help hold the dunes in place once they are established. Other typical dune plants that grow here beyond the reach of the wind's main force are *sand cherries*, distinctive *three-leaved hop trees*, and an increasingly varied collection of wildflowers.

Among the most common dune plant is *sand cress*. Its tiny white blossoms and *yellow-flowered puccoon* bloom through most of the summer months. As plants die and decay, their remains produce a richer soil mixture. That, in turn, can produce an environment suitable for even greater varieties of trees, grass, shrubs, and wildflowers.

Marram grass

Sand reed grass

Little bluestem grass

Cottonwood

Hair beak rush

Bladderwort

Wild grape

Poison ivy

Hop tree

4

Jack Pines

This jack pine grove is another dune curiosity, growing in the national lakeshore and along other Great Lakes dunes much farther south than the main part of its range. The first dune jack pine may have flourished here soon after the ice age, when the local climate was much cooler. The ground-hugging *bearberries*, which thrive beneath the pines, are another northern species.

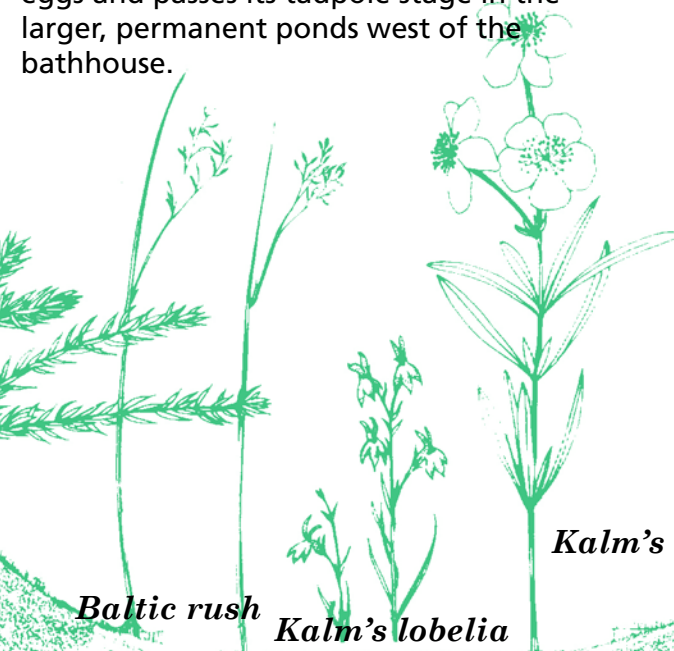


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Intermittent Pond

The water level of this intermittent pond dries up in the summer and changes as the climate varies. It, too, was created by the wind's violent force, carving a channel through a low spot between the dune and lake, and scooping the sand out down to the water table.

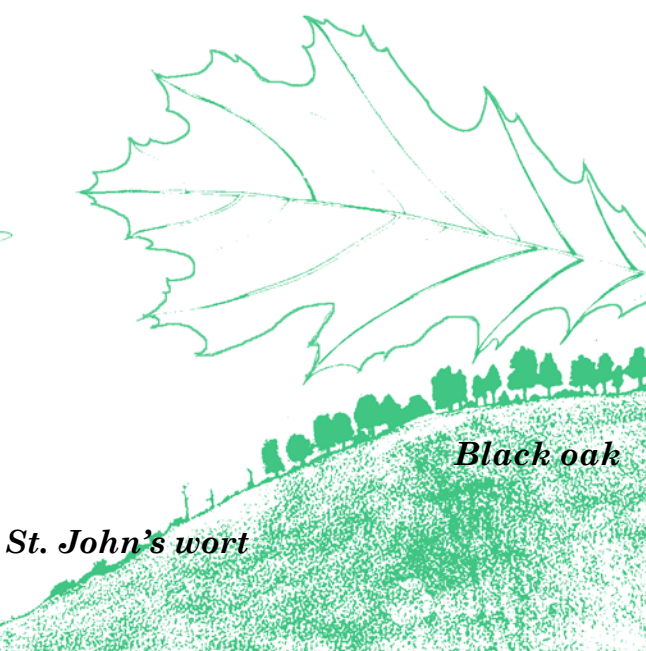
Many of the plants and animals in and around this *intermittent pond* are different from those on the dune slopes but are similar to those in other ponds west of the bathhouse. The *Baltic rush*, *Kalm's lobelia*, and *Kalm's St. John's wort* grow along this intermittent pond's edges, while the *Fowler's Toad* lays its eggs and passes its tadpole stage in the larger, permanent ponds west of the bathhouse.



6

Blowout

This steep-sided valley, called a *blowout*, demonstrates that the process of succession is not always an orderly one. In this case, it has moved backward. The blowout was formed when wind whistled in through a low spot in the dunes and carved out a depression. Heavy human use has worn away more of the protective vegetation in recent years. Thus, many of the plants you see here are the same pioneer dune builders you saw on the first foredune above the beach. Cottonwood tree and marram grass roots are exposed alongside these stairs on the blowout's southern slope.



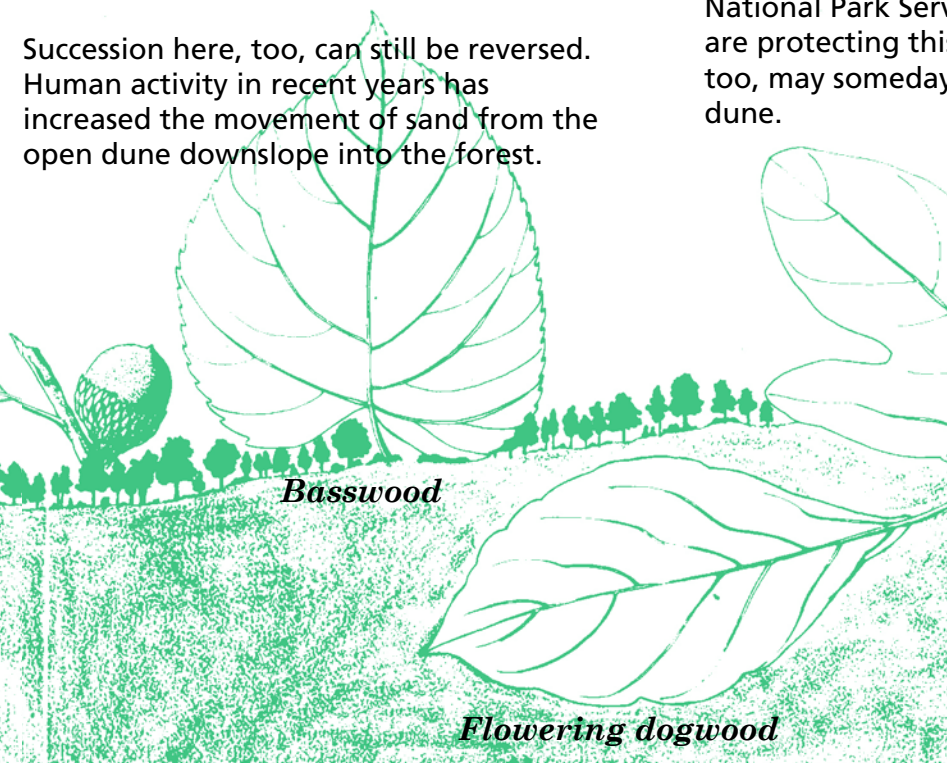
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Wooded Dune

In summer, the temperature in these woods is often as much as 10°F lower than the open slope on which you just walked. Most of the tallest, or canopy, trees here are black oaks; but there are also hickories, basswoods, and ashes.

Beneath the tall oaks are slimmer sassafras and dogwoods, witch hazel shrubs, and ironwood trees. These variety of trees indicates that this dune is far enough from the lake to be protected from wind and winter storms. It is also a sign that the dune is at least 2,000 years old.

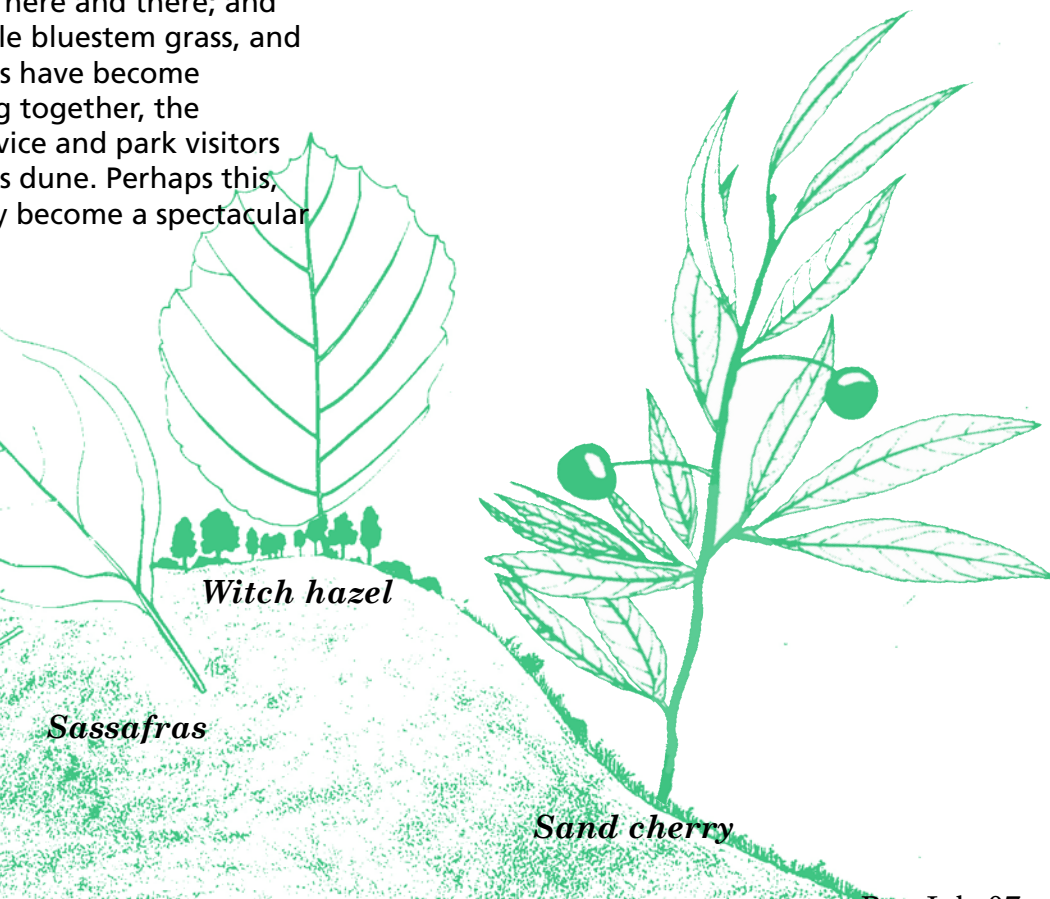
Succession here, too, can still be reversed. Human activity in recent years has increased the movement of sand from the open dune downslope into the forest.



8

Sandmine Succession

The flat landscape, which stretches west from this stairway, once contained rolling dunes like those that you have just hiked. Sandminers leveled and hauled away the dunes before this area became a national lakeshore. Because many years have passed since sand was removed from this site, it too has begun a process of succession. Small mounds of sand are building here and there; and marram grass, little bluestem grass, and sand cherry shrubs have become common. Working together, the National Park Service and park visitors are protecting this dune. Perhaps this, too, may someday become a spectacular dune.



We hope you have enjoyed your walk through time. To learn about other Indiana Dunes National Lakeshore trails, please visit with park rangers at the Dorothy Buell Memorial Visitor Center that is located at U.S. Highway 20 and Indiana 49.