dune & swale complex

A dune and swale complex is a series of roughly parallel, sandy ridges and low, wet swales formed from irregular cycles of high and low water levels. Dune and swale complexes are also commonly known as linear dunes, beach ridge complexes or shore parallel dune ridges. These natural communities are significant for their high concentration of biodiversity in a small area.

Complex System of Hills & Valleys

Linear dunes are the high points above the valleys of swales in the dune and swale complex systems. These dunes also consist of four zones: beach and foredune, open interdunal swales, forested dune ridges, and forested swales.

Open marsh with grasses, sedges, and ferns dominate the lower part, or swale, of the system. Cattails typically associated with wetlands do not occur in swales since the water level is too low and intermittent to sustain the viability of the plant.

Location:

This globally rare natural community only occurs along the Great Lakes shoreline. West of Mackinaw City, the Michigan Wilderness State Park has 108 ridges that create a two-mile wide complex, the most diverse dune and swale complex in Michigan.

A 2,600-acre dune and swale complex can be found near Platte Bay in the Sleeping Bear Dunes National Lakeshore. Pointe Aux Chenes on Lake Michigan mixes hundreds of dunes and wetlands to create one of the largest examples in the world of a dune and swale complex.

Receding glaciers during the Ice Age helped create many of the dune and swale complex systems in Michigan, including this interdunal swale at Grand Mere State Park.

Globally Rare, Locally Found

Water levels of the nearby Lake Michigan often affect the swale, depending on the height of the dune ridge in relation to the water below. While swales closer to the shoreline become flooded as water rises over the top of the ridge, inland lakes flood more often because of groundwater rolling down from hills and other drainage. Wind and weather also play integral roles in the formation of the dunes and swales.

Threatened & Endangered Species Found Along Dunes & Shoreline

Lake Huron tansy

Michigan's remarkable shoreline provides an amazing diversity of plant and animal life, and the dunes and swale complexes are no exception. Birds thrive around the important wetlands in these areas. The high sand mounds atop shallow pools of water create idyllic conditions for many bird species to breed, rest, and search for food.

Lake Huron locust

The sandy beaches of Lake Michigan in the south mixed with the cobble areas in the north provide some of the best nesting habitat in Michigan for the piping plover. This beautiful little shorebird was once nearly extinct, with only 17 breeding pairs left when it was finally listed in 1986 on the federally endangered list. Today, as many as 52 breeding pairs have been counted including 16 nests in the northern Lower Peninsula.

The ridges commonly found along the Lake Michigan shoreline host a great variety and abundance of plants, reptiles and amphibians. Rare insects that can be found here include the Lake Huron locust, spittlebug, and the dune cutworm.

These insects live primarily off the plants found in the area, many of which are rare and endangered themselves. The yellow flower of the Lake Huron tansy blooms in mid to late summer, dotting the tops of the green vegetation growing on shorelines.

The Michigan Department of Natural Resources organizes a "Piping Plover Patrol" every year to coordinate volunteers helping to protect the birds' nesting grounds on state land.

Pitcher's thistle is a threatened species, meaning it is likely to become endangered in the near future (endangered refers to a species being dangerously close to extinction). This native Michigan plant grows on the shores of our Great Lakes and is typically a white or silvery color, with the exception of its creamy pink flowers that bloom sometime after the plant reaches its fifth birthday. This blossom is the only time the thistle releases its seed which is then pollinated by insects, mostly bees.

Pitcher's thistle before and after (below) its only bloom.

What can YOU do to help save our coastal dune system?

Michigan's dune system has been here for thousands of years, but that does not necessarily mean they will last through the next millennium, or even this century, without our help. You can make a difference by following any or all of these suggestions.

- ▲ When visiting a park or nature preserve, stay on the path.
- ▲ Take only pictures, leave only footprints.
- ▲ Wash your shoes after a hike to avoid spreading invasive species.
- ▲ Volunteer for beach clean-up, piping plover patrol and/or stewardship work days.
- ▲ If you own property on or near the shore, consider placing a conservation easement on your land to restrict future development in perpetuity.
- ▲ Donate land or money to your favorite conservation organization!
- ▲ Participate in Sand Dune Day every May!
- ▲ Learn more and tell others about the importance of Michigan's dunes and shoreline.

This project was funded in part under the Coastal Zone Management Act of 1972, as amended, Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration, U.S. Department of Commerce and the Michigan Coastal Management Program, Michigan Department of Environmental Quality.

Photo credits: Southwest Michigan Land Conservancy, Archives of The Nature Conservancy, Betty Darling Cottrille, Matthew Bohan.