

The Coastal Dune Ecosystem: Part I

By Julie McDonnell, Minnesota Department of Natural Resources. Prepared in consultation with DNR staff.

We are all in this together

Minnesota Point is a relatively young and distinctive landform in Minnesota. This seven-mile stretch of sand that separates the Duluth Harbor and Superior Bay from Lake Superior formed about 1,200¹ years ago. The land we recognize today as Minnesota Point formed by deposition from longshore currents. People have inhabited the area for centuries. The unique dunes of Minnesota Point are well loved, used and enjoyed by thousands of people every year, yet the natural resource features and concerns are often not widely understood by residents and visitors. The dunes of Minnesota Point function as a barrier, protecting homes from coastal storms. Staff from the Minnesota Department of Natural Resources (DNR) and City of Duluth are working together to share information with you, readers of *The Breeze*, residents, landowners, visitors, and land managers. Whether or not we realize it, all of us are coastal “managers”. Your participation is essential for protecting and restoring the unique natural resources of Minnesota Point. We will continue sharing natural resource information in the coming months and hope to engage you in our common goals of natural resource stewardship of Minnesota Point.

Regardless of your current knowledge or experience, we hope you will collaborate in effective stewardship of Minnesota’s only coastal dune ecosystem. Understanding the function, value and best practices to protect and restore the coastal dune ecosystem is a first step in building our common knowledge of the resources we all enjoy.

Sand Dunes: Shifting Sands and Moving Plants

A sand dune is a mound, hill or ridge of sand that lies landward, beyond the beach. Dunes are dynamic systems, formed of windblown sand deposits. You may have heard about the recent “Sahara sunset,” an enhanced view made possible by westerly winds carrying fine particles (dust) from the Sahara Desert in Africa, and prompting consideration of dune impermanence. Globally, dunes may take up a new location somewhere overnight, and some dunes may even be gone in a day. It is common to find dunes in beach settings where there is sand, water levels fluctuate and distribute or scour grains, and winds pick up and deposit sand. Locally, the ecosystem arises when plants, such as beach grass, colonize areas of open sand and become established. The dune increases in size and decreases in mobility when vegetation or other

¹ Swenson, J.B. (2020, March). *Drowned, Starved, and Battered: Long View of Minnesota Point*. Presentation to Twin Ports Climate Conversation. Duluth, MN.

2016. Breckenridge, A., Kremmin, T., Dott, E., Mossberger, I. Duluth harbor geologic history boat cruise – Pleistocene to Anthropocene. Institute for Lake Superior Geology Field Trip Guidebook v. 62: 160-187

stationary objects trap more sand. Dune grasses anchor the dunes with their roots, holding them temporarily in place, while their leaves trap sand promoting dune expansion. Wind and waves constantly influence form and location of dunes. Vegetation is a critical factor of dune formation and (relative) stability. The coastal dune ecosystem of Minnesota Point functions as a reservoir of sand for the beach and protection from coastal storms.

Minnesota Point dunes provide a line of defense to inland areas from storm surges, floodwater, and wind and wave action that can erode shoreline and damage property. Coastal dunes are part of an essential ecosystem on Minnesota Point, providing habitat for unique flora and fauna. For example, healthy dune ecosystems provide nesting and foraging habitat for coastal bird species, including migratory birds. The many native plants present on Minnesota Point are important to healthy dune ecosystem function, including some protected by law.

All components of the coastal dune ecosystem are necessary for preservation of both rare and common species and maintaining ecosystem functions.

High water levels and storm events in recent years have caused erosion to the dune system. Activities on or near the dunes may exacerbate erosion, further destabilizing the dune ecosystem. Development, tourism, foot traffic, and removal of plants could have unintended consequences. If you have spent much time observing the dunes on the Point, you have likely seen increasing erosion and degradation of the dune itself. What you may not have noticed is loss of dune habitat and function of buffering property from coastal storms. Coastal sand dunes are dynamic systems where sand movement is a natural process. Enhanced natural restoration and protection of this dune system is imperative for these magnificent dunes of Minnesota Point. Now, more than ever, we need to protect the dunes so they may protect your homes. Recognizing the ways our activities can influence the dunes and their function is a first step in protecting what we love.

Recommendations for Stewardship

Beachgrass and other species found in the dune ecosystem are adapted to the constantly shifting sands. Native plants stabilize existing dunes and increase dune build-up by catching more sand from wind (deposition). There are many things happening in the dunes at any given time. Our actions in and adjacent to dunes affect the dune ecosystem. Here are some best practices for living and recreating near dunes.

Use the trail, and please don't make a new one!

- Attempting to create a permanent trail to the lake could actually create more erosion problems for landowners. Any paths created across the dunes, perpendicular to the water line, weaken the surface integrity of the dune by creating channels for wind to funnel landward. Constructed paths increase erosion and potential for "blow-out" areas.

- As tempting as it may be to have individual paths to the beach, the DNR and City of Duluth strongly encourage use of established entry points to avoid unnecessary impacts to the vulnerable and dynamic dune area. Creating new paths can negatively affect natural processes, increase loss of habitat, and further endanger state-protected species.
- If your usual point of entry near your property is too steep from the face of the dune to the beach, consider temporary, lower-impact ways to reach the beach such as a combination path/roll out ladder or rollout path.

Care for native plants of the dune systems.

- Revegetation of sandy areas that have become barren can contribute to dune build-up and help control further wind erosion. However, it is important to establish native species that are adapted to dune habitat and do not pose a threat of competitive spread.
- Use only native, local sources of plant material appropriate for revegetation in this coastal dune ecosystem. Contact DNR staff for species lists and local sources of plant material.
- Get to know American beach grass! This plant is a pioneer colonizer of barren sand dunes and has adapted to the dynamic nature of this system. A little bit of sand movement/sand accretion will stimulate growth in this species. American beach grass, seemingly abundant, is a state-protected (status threatened) species in Minnesota. Minnesota Point is the unique home for the westernmost communities found (of this genotype) of American beach grass. These native plants are essential components of the coastal dune ecosystem, functioning to keep the sand in place, as reservoir for beach sand, and (mostly) out of homes and off the street.
- Know that a DNR rare species permit is required for any activity that involves disruption or impact to state-protected plants including (but not restricted to) American beach grass and beach heather. You may submit a request to the DNR to have a project reviewed for potential impacts. More information can be found online at: https://files.dnr.state.mn.us/eco/nhnrp/nhis_data_request.pdf
- Please do not import beach grass into Minnesota. There is a moratorium against it. When you order beach grass from commercial sources, the genotypes are coming from other states and may even be cultivars. There are multiple concerns regarding importation of beach grass material into a threatened population on the edge of the species range. Thus, Minnesota has placed restrictions on beach grass.

Be aware of property lines.

- Recognize the beach and significant portions of the dunes on Minnesota Point are public property. Talk with City of Duluth staff about dune management on public property.
- Any activity affecting the dune or beach sand on Minnesota Point, between the Lake Superior shoreline and the ordinary high water level (OHWL) may require a permit for work in the bed of DNR public water. For Lake Superior, the OHWL is where water from storm wave run-up and lake water levels has resulted in evidence on the landscape.

Contact DNR Area Hydrologist, Patricia Fowler with questions related to OHWL and shoreland alterations on the Lake Superior side of Minnesota Point.

Help manage invasive species. This is no small task...

- Learn to recognize invasive species. Do you know baby's breath and bouncing bet are invasive species and a threat to healthy coastal dune ecosystems? Be extremely cautious about using mixed seed packets and use native plants whenever you can.
- Assess your site for any existing invasive species. If necessary, make a plan for managing invasive species in your yard and neighborhood. It is helpful to work with others in your community to address invasive species.
- Natural resource managers need your help to report and deter invasive species using a common reporting system called EDDMapS. Their app called Great Lakes Environmental Detection Network (GLEDN) is free to all smart-phone users in the App Store. We recommend and use this tool in the protection of native plant communities from invasive plants in Minnesota and across the Great Lakes. Increased public participation will amplify results of protecting native plant communities in Minnesota.

www.eddmaps.org

For more information, please contact:

For guidance regarding potential disruption of plants: DNR Regional Plant Ecologist, Brooke Haworth, brooke.haworth@state.mn.us.

Duluth Cooperative Invasive Species Management Area (CISMA) CISMA Coordinator, Lori Seele, lori@stewardshipnetwork.org <https://www.facebook.com/DuluthCISMA/>

Questions regarding public property and shoreland alterations: City of Duluth Planning Department, Kyle Deming, kdeming@duluthmn.gov

For inquiries related to public waters permitting and construction adjacent to Lake Superior: DNR Area Hydrologist, Patricia Fowler, patricia.fowler@state.mn.us

