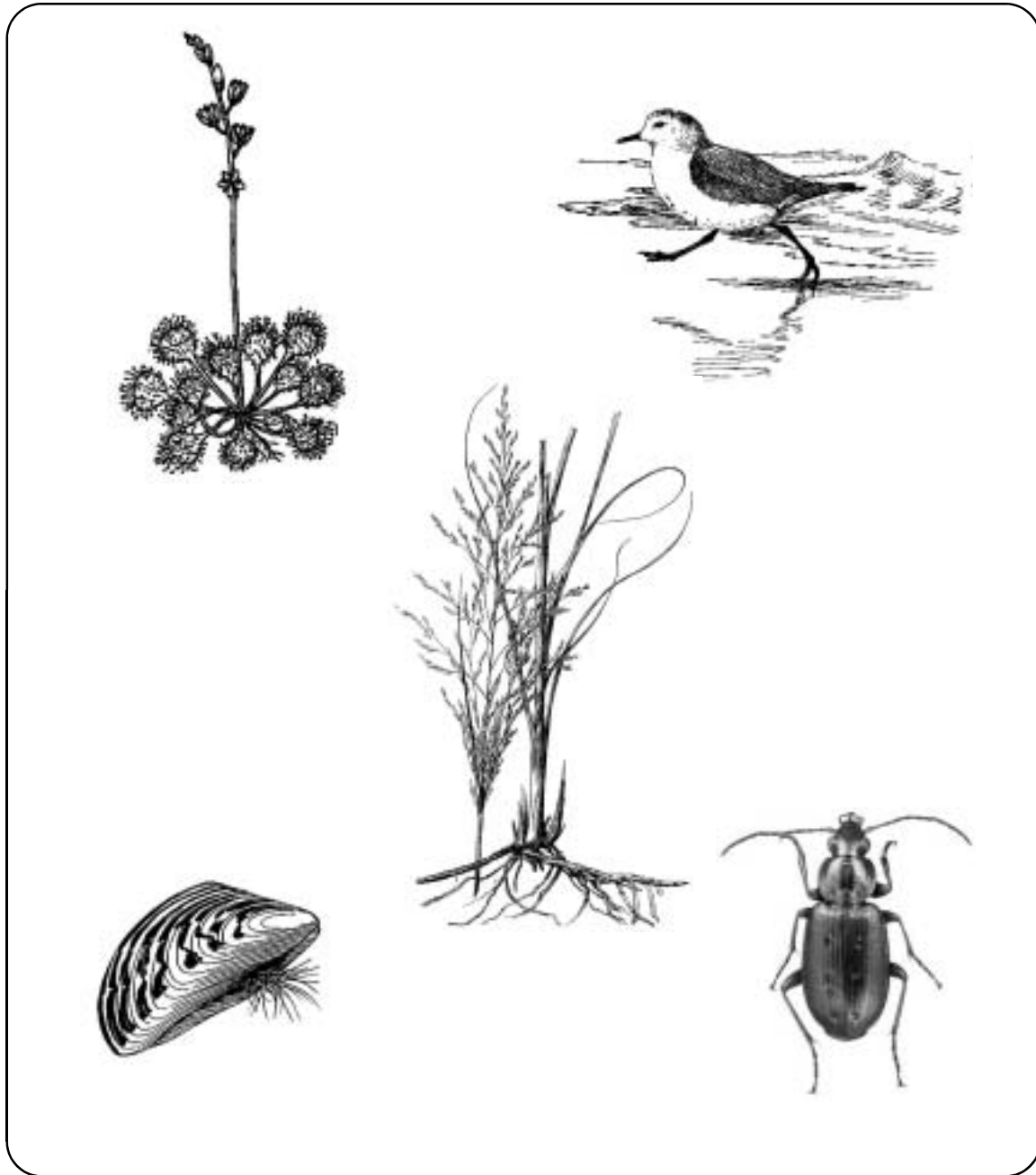


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# A FIELD GUIDE TO THE SAUBLE SAND DUNES

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by  
Peter Seibert**

Friends of Sauble Beach (FSB), organized in 2000, is a nonprofit group of interested people volunteering their talents, time and energy to ensure that the beach environs remain natural and accessible. FSB was incorporated in February of 2002.

The FSB's mission is to preserve, protect, enhance and improve the natural resources and environment of the shoreline at Sauble Beach which encompasses beach and sand dune ecosystems.

For more information about the beach and dunes at Sauble Beach contact: **Friends of Sauble Beach, General Delivery, Sauble Beach Ontario, N0H 2G0** or visit our web site at **[www.friendsofsaublebeach.org](http://www.friendsofsaublebeach.org)**. Join us at our meetings, at the Community Centre in Sauble Beach, on the second Saturday of each month, April - October, at 9.00 a.m.

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## **OVERVIEW**

In order to appreciate the complexities of the sand dune and beach community at Sauble Beach one should attempt to understand the various abiotic and biotic components that make up and influence their creation and existence.

As common as beach sand might seem, sand dunes and associated beaches are found only along the eastern shores of Lake Huron. Even on the eastern shores, dune systems are few. Pinery/Ipperwash, Point Clark, Inverhuron, Saugeen Shores and Sauble Beach are the main dune systems along Lake Huron.

The only shoreline dune complex that is still in a relatively pristine state in Bruce County, is a relatively small one found at Dorcas Bay. The dune complexes at Inverhuron, Saugeen Shores and Sauble Beach have been extensively altered by human activities.

Lake Huron's dune systems represent an extremely small land mass, yet they attract thousands of people each summer. Sand dune complexes, are extremely sensitive to damage by human disturbances. The foredunes are highly disturbed by recreational use. These recreational activities contribute to the erosion of the sand in the dune complexes. If the existing sand is lost, it will take a very long time if ever to replace.



## **LAKE HURON**

Lake Huron is the second largest Great Lake with a surface area 59,600 sq. km./23,000 sq. mi., third largest by volume with 3,540 cubic km./850 cubic mi. of water and is the fifth largest freshwater lake in the world. Lake Huron is hydrologically inseparable from Lake Michigan, joined by the wide Straits of Mackinac and receives flow from both Lake Michigan and Lake Superior. Its outlet is via the St. Clair River to Lake Erie. Lake Huron's retention/replacement time, a measure based on the volume of water in the lake and the mean rate of the outflow, is 22 years. The Huron lakeshore extends 6,157 km./3,827 mi., and is characterized by shallow, sandy beaches and the rocky shores. The lake measures 245 km./183 mi. across and 332 km./206 miles north to south, with an average depth of 59 m./195 ft. (approximately 229 m./750 ft., maximum). Lake Huron's drainage area, 134,100 sq. km./51,700 sq. mi. covers parts of Michigan and Ontario, and is relatively large compared with the other Great Lakes.

Lake Huron experiences three major types of water level fluctuation; seasonal, long-term, and short-term. Seasonal fluctuations are generally expressed for one year; highest in the late spring and early summer, falling to its lowest levels in late fall and winter. The difference is usually 30 to 45 cm./12 to 18 in.. Long-term levels occur over a certain period of time usually ranging from a few to many consecutive years. Short-term fluctuations range from minutes to hours to days. Lake Huron experiences tides in fractions of an inch, compared with the oceans tides of several feet.



## **GEOLOGY**

The bedrock that underlies Sauble Beach is a layer of sedimentary rock consisting of limestone that dips gently to the southwest. Limestone is formed chiefly by the accumulation of organic remains (shells or coral), and consists mainly of a calcium carbonate.

Earth's continents sit on rock plates that are constantly moving and reforming but so slowly individuals cannot observe it. Approximately 400 million years ago, when the sedimentary rocks of this region were deposited, the global location of North America was some 10 to 25 degrees south of the equator in a warm marine environment. This area was covered by a shallow tropical sea, teeming with plant-like animals, crustaceans, living corals and mollusks. It would have looked much like the present-day Great Barrier Reef of Australia.

Today if you beach comb especially at the north end near the Sauble River you occasionally find small pieces of fossilized coral and mollusks, remnants of the life that lived in this ancient seas.

Approximately one million years ago, the climate in the northern latitudes began to cool and the area was scraped and scoured by at least four glaciers that buried the area in sheets of ice, 2 to 3 km./2 mi. thick; during the longer, warmer periods in between each ice age, plants and wildlife returned to the area. The last glacier began retreating around 14,000 years ago.

Although the bedrock is under many feet of overburden at Sauble, one only has to visit Chiefs Point located on the north side of the Sauble River where the river meets Lake Huron to witness the massive limestone pavement that lies in gigantic plates, latticed with cracks and fissures. The area is scoured on a constant basis as storms and winter bring the relentless force of waves and ice to bear on the surface. With all this action you would think that "fines" - the sand silt and grit that are the finely ground products of scoured rock would be present. There is virtually no sand and almost no silt, limestone dissolves slowly but almost completely leaving virtually no residue.

## **GEOMORPHOLOGY**

The dune and beach system at Sauble Beach has developed over a relatively short period of time, geologically speaking. Only 18000 years ago, at the end of the last period of glaciation the Laurentide Ice Sheet covered all of southeastern Canada including Sauble Beach. By about 13000 years ago the ice sheet had receded northward to expose the Great Lakes Basin.

At the height of glacial Lake Algonquin, approximately 10,000 years ago, the entire Bruce Peninsula with the likely exception of some of the Cabot Head bluffs, was submerged. Subsequent post-glacial lakes, particularly Nipissing, also flooded vast portions of the peninsula.

Since these glacial lakes have receded, the landforms at Sauble have been formed. Most of the sand found at Sauble was created during the last ice age, when the glaciers shifted and melted, creating mechanical weathering and abrasion unlike any other time in recorded history. Sand made from rock is produced by the process of mechanical weathering and abrasion. Mechanical weathering is the breakdown of rock into smaller fragments by various physical stresses like ice wedging and wave action.

## **GEOMORPHOLOGY**

Abrasion is the mechanical wearing away of a rock by friction, rubbing and scraping (think of a stone getting rolled around violently by a storm wave)

Sand is being formed all the time through mechanical weathering and abrasion. Nevertheless, a beach isn't created overnight and probably not even during our lifetime. Depending on the type of rock being eroded, it can take thousands of years to create sand.



## **HURON FRINGE**

Sauble Beach is part of a physiographic region known as the Huron fringe, stretching for approximately 320 km./200 mi. along the eastern shore of Lake Huron from Sarnia to Tobermory.

The Huron fringe is a narrow strip of land extending from the water's edge inland an average of 3.5 km./2 mi.. At Sauble Beach the Huron fringe swings inland for a distance of some 11 km./7 mi. to a point east of the Village of Hepworth. Sauble Beach is flanked by sand dunes. The beach gives way to a sand plain. These dunes and sand plain are relicts formed by glacial lakes whose waves and currents re-worked sand deposited by the glaciers. Many of the sand dunes have become unstable since the land was cleared and exhibit blowouts. The dominate features of the Huron fringe are the wave-cut terraces formed by glacial Lake Algonquin and Lake Nipissing. These terraces consist of boulders, gravel bars and sand dunes. An example of these terraces may be seen on Highway 6, as you travel east out of the Village of Hepworth. Shortly after you pass Whispering Pines campground you will climb a large hill that was formed by one of these ancient lakes.

The level of Lake Huron isn't static, often changing with the season and from year to year. At times, the high water level threatens the sand dunes and cottages while in other years the water level is so low that navigation is a concern. This fluctuation in levels is not new, Between 8,000 and 13,000 years ago the level of Lake Huron varied between 216 m./710 ft. and 70m./230 ft. above sea level. By 5,000 years ago Lake Huron was 198m./605 ft., above sea level it has since fallen to its present level of 176 m./577ft.

## ***CLIMATE***

The climatic conditions of the Bruce Peninsula are among the most temperate in Canada. The Great Lakes moderate the region's climate. The lakes act as heat sinks in summer and heat sources in winter and are major reservoirs that help humidify much of the region.

The lakes also create local precipitation belts in areas where air masses are pushed across the lakes by prevailing winds, pick up moisture from the lake surface, and then drop that moisture over land on the other side of the lake.

The Huron fringe is influenced by the moderating effect of Lake Huron and is slightly warmer in the autumn and winter and cooler in the spring and summer than inland. It is susceptible to fog in the early summer and has a slightly higher snowfall.

<b>Climate Normals 1971-2000</b>													
<b>Temp</b>	<b>Jan</b>	<b>Feb.</b>	<b>Mar</b>	<b>Apr.</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>Aug.</b>	<b>Sept</b>	<b>Oct.</b>	<b>Nov.</b>	<b>Dec.</b>	<b>Year</b>
<b>Daily Average (°C)</b>	-6.8	-6.9	-2.2	4.7	10.9	15.6	18.6	18.1	14	8.4	2.6	-3.3	6.1
<b>Daily Maximum (°C)</b>	-2.8	-2.4	2.4	9.5	16.6	21.3	24	23.2	19	12.8	6	0.2	10.8
<b>Daily Minimum (°C)</b>	-11	-11	-6.8	-0.1	5.1	9.8	13.1	12.8	9	4	-0.8	-6.8	1.4
<b>Precipitation:</b>	<b>Jan</b>	<b>Feb.</b>	<b>Mar</b>	<b>Apr.</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>Aug.</b>	<b>Sept</b>	<b>Oct.</b>	<b>Nov.</b>	<b>Dec.</b>	<b>Year</b>
<b>Rainfall (mm)</b>	21.8	20.7	36.6	54.9	74.3	74.4	71.2	85.2	104.3	86.9	77.7	32.4	740.4
<b>Snowfall (cm)</b>	125	74.3	46.4	15.3	1.1	0	0	0	0	4.4	47.7	112.1	426.6
<b>Average Snow Depth (cm)</b>	29	30	12	1	0	0	0	0	0	0	2	14	7
<b>Wind:</b>	<b>Jan</b>	<b>Feb.</b>	<b>Mar</b>	<b>Apr.</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>Aug.</b>	<b>Sept</b>	<b>Oct.</b>	<b>Nov.</b>	<b>Dec.</b>	<b>Year</b>
<b>Speed (km/h)</b>	17.1	14.7	14.6	14.4	11.8	10.5	10.2	10.3	11.9	14.5	15.9	16	13.5
<b>Most Frequent Direction</b>	S	S	S	N	SW	SW	SW	SW	S	S	S	S	S
<b>Sunshine</b>	<b>Jan</b>	<b>Feb.</b>	<b>Mar</b>	<b>Apr.</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>Aug.</b>	<b>Sept</b>	<b>Oct.</b>	<b>Nov.</b>	<b>Dec.</b>	<b>Year</b>
<b>Total Hours</b>	54.7	93.5	147.9	191.7	250.3	274.3	300.1	252.9	177.7	129.3	60.2	46.2	1978.6
<b>Days</b>	17.3	20.6	25.2	27.8	25.9	28.5	30.4	29.7	27	26	19.1	16.6	294

## **THE UPS AND DOWNS OF LAKE HURON**

The water level of Lake Huron can have a significant impact on beach and dune formations by eroding and depositing the sand that forms them. The vegetation that grows in the dunes and the swales that occur between the dunes are also influenced by the rise and fall of the lake.

The water levels of Lake Huron are a greatly talked about subject. Often there are as many theories as people in a room.

Actually Lake Huron experiences three major types of water level fluctuation; seasonal, long-term, and short-term. Seasonal fluctuations are generally expressed for one year and consist of the changing four seasons. Long-term levels occur over a certain period of time usually ranging from a few to many consecutive years in time. Short-term fluctuations range from minutes to hours to days.

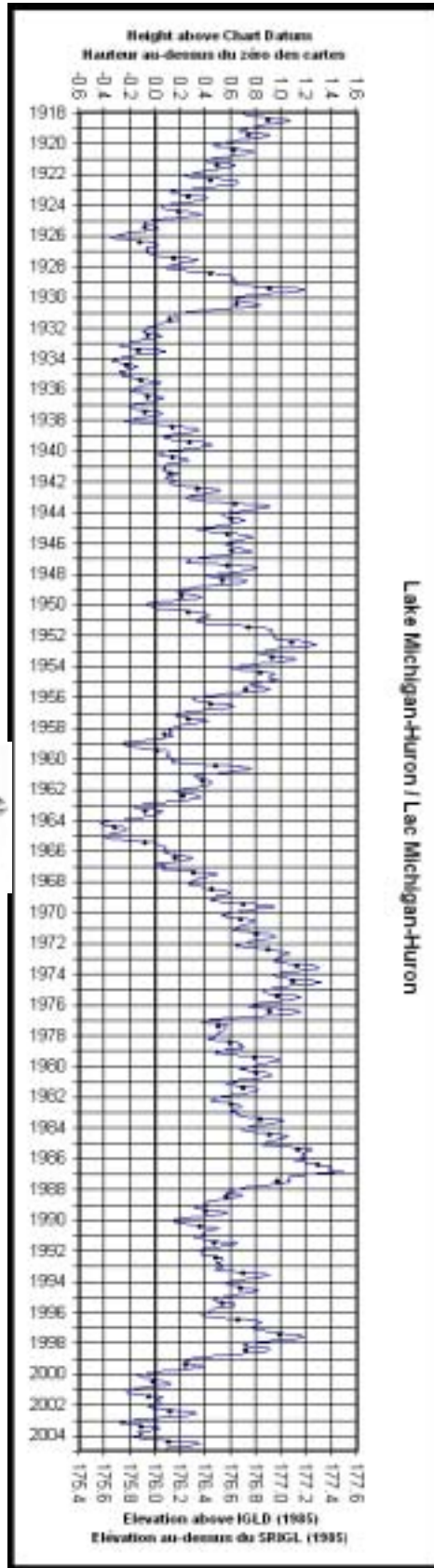
Seasonal variations in water levels are based mainly on changes in precipitation and runoff to the Great Lakes. Generally, the lowest levels occur in winter when much of the precipitation is locked up in ice and snow on land, and dry winter air masses pass over the lakes enhancing evaporation. Levels are highest in summer after the spring thaw when runoff increases.

Long-term levels are the result of the hydrological cycle. Although there are many theories on the frequency of highs and lows of long term levels, there doesn't appear to be a set cycle.

Short-term fluctuations that often occur on Lake Huron are wind set-up/a storm surge, and a phenomenon known as a seiche. A storm surge or wind set-up occurs when high sustained winds from one direction push the water level up at one end of the lake and make the level drop by a corresponding amount at the opposite end. When combined with dramatic changes in atmospheric pressure or a sudden drop in the wind speed, storm surges produce a seiche. A seiche, a French word meaning "to sway back and forth", is a standing wave that oscillates in the lake as a result of seismic or atmospheric disturbances creating huge fluctuations of water levels in just moments. The standing waves slosh back and forth between shores of the lake basin, often referred as tide-like changes.

Many people question if there are tides in Lake Huron. True tides are changes in water levels caused by the gravitational forces of the Sun and Moon. The spring tide, the largest tide on Lake Huron, is less than 5cm./2 in. The *Spring Tide* (the name is not associated with the season of Spring) happens twice a month when the sun, earth and moon are all in a straight line (full moon or new moon). Conversely, when the Moon is at first quarter or last quarter phase (meaning that it is located at right angles to the Earth-Sun line), the Sun and Moon interfere with each other in producing tidal bulges and tides are generally weaker; these are called *Neap Tides*.

# LAKE LEVELS



## FLORA

Sand dunes are a very challenging habitat for plant life. The dunes hold plant nutrients very poorly and are constantly subjected to wind and water erosion. Few plants can tolerate the low fertility, unstable conditions, and extreme fluctuations in temperature and moisture found in dunes. Without these plants, though, lakeshore dunes would resemble desert dunes, constantly changing and moving across the landscape. The dune ridges that line the shore of Sauble Beach are stabilized by plants that are specially adapted to the harsh conditions.

Over seventy vascular plant species has been reported living on the dune system.

Along the beachward toe of the foredunes immediately next to the beach, American Beach Grass considered rare in Grey and Bruce Counties, tall wormwood, and shrubby dune willows grow.

American Beach Grass is a tough, coarse grass that may grow to knee height; it spreads by underground runners known as rhizomes. It slows down wind, especially in the first few inches above the surface where most sand movement occurs. In this way American Beach Grass acts as a wind break, much as a snow fence does in the winter.

Not only can American Beach Grass endure the onslaught of the wind, it also thrives under burial by sand. It responds by growing vigorously up through the sand and by starting new rhizomes as the old ones become buried. The successive layers of rhizomes, with fine roots growing from them, form a tight network that holds sand in place, allowing dunes to grow and stabilize.

Wormwood is a biennial plant that grows scattered among the American Beach Grass. It germinates from seed in early summer, producing small, lacy gray-green tufts of vegetative growth as summer progresses. Wormwood is closely related to the ornamental Dusty Miller, and to the sagebrush of the western plains.

Sand Dune Willow and Sand Cherry are two shrubs that are found throughout the dunes. Sand Dune Willow has broad, leathery, heart-shaped leaves densely covered with white hairs. It spreads by rhizomes, forming loose, multi-stemmed colonies that rarely grow more than 1.5-1.8 m./5-6 ft. tall. It grows along the tops of the foredunes, into low interior areas called swales, and even onto stabilized secondary dunes.

Sand Cherry is a low shrub, rarely growing more than .9-1.2 m./3-4 ft. high, and remains vigorous only where sand continues to accumulate. It is most conspicuous in early June when covered with delicate white blossoms. It is easily visible from the beach when in bloom.

As plants become established, they shade the surface, moderating temperature fluctuations and moisture availability. Leaves, that drop each year, decompose and release plant nutrients. Moving sand falls as wind velocity drops, slowed by the vegetation, both wind speed and sand movement decrease behind the first dune.

A variety of plants grow on the interior dunes, including Long-leaved Reedgrass that is classified not only rare in Ontario but also globally rare. Sporadic clumps of White Cedar and five other species of trees are found throughout the dunes.

In the swales that occur between the lines of dunes at least four different varieties of orchids grow. Sundews and Pitcher Plants also grow in these damp areas compensating for the low fertility of the soil by being insectivorous.

Throughout the interior dunes there are a variety of plants classified as prairie species. Hairy Puccoon, Big Bluestem two examples, both considered rare in Ontario are relics of a drier time when prairies and savannahs replaced forests in this part of Ontario.

## FAUNA

### **BEACH FAUNA**

Cover and food are sparse for large mammals, in the dunes and on the beach.

Resident fauna on the beach are mostly arthropods: a variety of mites, beetles, flies, springtails, lice, and small moths. These arthropods feed on washed-up plant, fish, mammal and bird detritus, and fungi that grow on these materials, and each other. Tiny worms are also found in the beach sand. Wolf spiders, resident in the more protected dunes above the beach, forage at night amid the litter. The burrows of predatory wasps are sometimes seen in the fall. Female wasps lay eggs in the burrow, and line the chambers with insects as food for the emerging larvae.

Shorebirds prey on the beach invertebrates; they can be seen running along the water's edge in spring and again from midsummer to late fall. Shorebirds stop to feed during migration, which takes them from their Arctic breeding grounds to South American wintering areas and back each spring. Sanderling, Semipalmated Sandpiper, and Least Sandpipers are seen in substantial numbers. Killdeer nest in the dunes, laying their eggs on the ground in shallow depressions scraped in the sand.

Ring-billed and Herring Gulls congregate on the shore, foraging for bird and fish detritus, occasionally being joined by black-backed gulls. Great squadrons of Double-crested Cormorants commute along the shore to feeding areas on the lake. Caspian and Common Terns rest among the gulls on the shore and fish in the shallows.

Signs of wildlife that can occasionally be found in the beach sand include tracks of White-tailed Deer, Red fox and Raccoon. Among the migrants that follow the shoreline are Monarch Butterflies as well as a great many raptors and Neotropical songbirds.

### **FAUNA OF THE DUNES AND SWALES**

Habitat conditions on primary and low secondary dunes and swales provide more opportunities for food and shelter. Small rodents abound, both in brushy cover and open, herbaceous dunes. They often become prey for Red Fox, that visit the area.

Among the arthropods, there is an abundance of spiders, beetles, ants, solitary bees, robber flies, digger wasps, deer flies, mosquitoes, butterflies, and moths. Antlion nymphs excavate steep, cone-shaped traps 2.5-5 cm./1-2 in. deep in patches of bare sand, then lie in wait just below the surface to snatch unwary prey. The tiger beetle flies about in search of its insect prey.

The abundance of insect prey attracts a variety of breeding birds to the dunes. Yellow Warblers and Song Sparrows nest in shrubby cover on the interior dunes. These and other shrub and cavity nesters supplement their diet with seeds of grasses, goldenrods, and other herbaceous perennials, as well as fruits of shrubs. Bank Swallows and Kingfishers excavate nesting burrows on the sheer sides of blowouts.



## ***WHAT MAKES THE SAUBLE DUNES SPECIAL?***

Only seven significant sand dune communities exist along the shores of Lake Huron: one in the State of Michigan; one on Manitoulin Island; and five along the Huron Fringe. The sand dune community at Sauble Beach is the second largest in size and would appear to have the largest diversity of flora.

At Sauble Beach, dunes have formed over the last 3000 to 4000 years. The bulk of the sand that makes up the beaches and dunes in Sauble Beach is relic material. The glaciers that covered Ontario contained a mix of boulders, cobbles, sand, and clay. During glacial melting, the deposit left is known as glacial drift. The sands were formed from glacial drift along the coast by wave activity and eroded inland deposits that were carried by rivers and streams. This glacial drift is the source of sand in most of Sauble Beach's dunes. In the Port Elgin-Southampton area the Saugeen River discharged a large amount of sand into Lake Huron. It appears that sand from this source was swept northward toward Sauble Beach and Hepworth where it merged with sand brought down by the Sauble River. The beach and dune sand consists largely of quartz (87-94%) and to a lesser degree feldspar (10-18%).

The Sauble River and the Saugeen River no longer contribute significant amounts of sand to the coastal system. There is also no sediment contribution from the north or the south into Sauble Beach. These relic sands have been held in place by the unique configuration of the shoreline. Sauble Beach owes its existence to the topography of the coast. It is a self-contained "pocket beach" which has formed within a large embayment or crenulate ('U' shaped) shoreline, bounded by Chiefs Point and Frenchmans Point. The sand at Sauble Beach is an irreplaceable, non-renewable resource.

Since the composition of the dunes is fine sands, the dunes are particularly vulnerable to natural erosion, from storm waves and from wind. People's indiscriminate use of dunes can also damage or destroy thousands of years of geologic processes in a very short time.

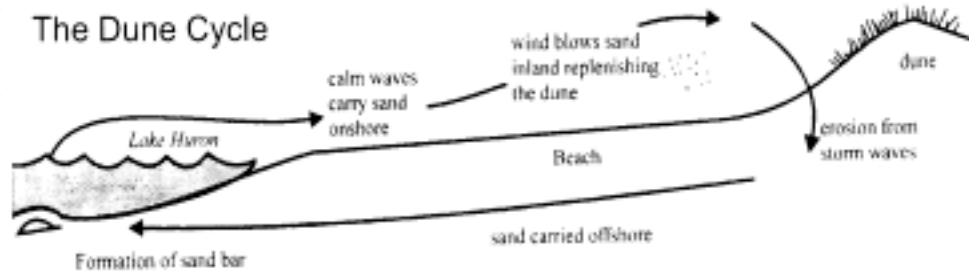
## ***BEACH AND DUNE SYSTEM***

When we talk about dunes, we are really talking about beaches and dunes as a system. Dunes are reliant on the beach for their ongoing sand supply. Likewise, the beach relies on the dunes during periods of high lake levels and storm events to supply sand to maintain its form and function.

Sand is continually being eroded and deposited on the shore by waves. Storm waves will erode the beach, taking the sand offshore, and forming a sand bar. The sand bar acts as a temporary protective berm, absorbing wave energy that would otherwise reach the shore causing even more erosion. Once the storm subsides, gentle waves will gradually bring the sand from the sand bar back to the shore and reattach it to the beach.



## THE DUNE CYCLE



Dunes are formed from beach sand, particularly during low water level periods, and the sand in the dunes is returned to the beach and off shore sand bars during high lake levels and storm events. This process is referred to as the "Dune Cycle".

On shore sand is prone to movement by wind, and can be transported from the beach to the dunes. The lower lake level of recent years is increasing the area of the beach and increasing the amount of sand. A bigger beach requires larger dunes to maintain the sand within the system.

Dunes form when sand is carried by the wind from the beach toward the land. The wind transports the sand in three ways: in *suspension*, by lifting the smaller, lighter fractions into the airstream and carrying them for long distances; by *saltation*, as heavier grains are moved in a series of 'hops' and 'jumps' along the beach surface; and as *surface creep*, in which sand particles are rolled along the surface as a result of wind or the impact of descending saltating particles. Although most sand particles are moved by saltation, surface creep may account for 20-25% of the moved sand. Most of the sand is carried within 0.15 m./6 in. of the ground surface. The very fine sands, light enough to be carried by suspension are usually carried well outside the dune system.

Significant sand movement will take place when the wind speed measured at a height of 1 m./3 ft. above ground level exceeds 12 knots /6 m. per sec.). Initiation of sand movement occurs at 5m. per second. Onshore winds will dry the sand and selectively pick up the smaller grains of sand 0.08-0.5 mm. and move them toward the land. Sand grain sizes in dunes are therefore finer than that on beaches.

This is important because fine sand deposits have greater water retention capacity than coarse sands and are therefore more suitable for vegetation growth. Moist sand is moved less easily by the wind than dry sand since moisture promotes surface adhesion. The threshold shear velocity (the wind strength needed to initiate movement) is higher for moist sand. At Sauble Beach, wet beaches predominate during periods of high lake levels. Less wind movement of sand can be expected during high lake levels.

Winds with the greatest intensity and duration on the eastern shores of Lake Huron tend to be during the late fall, winter and early spring months.



## **THE DUNE CYCLE**

While wind strength is important, the quantity of sand moved is also influenced by how long the wind is blowing from a particular direction. Wind duration is an important consideration, and knowing the prevailing wind directions at certain times of the year can help with determining management strategies for dune conservation and restoration efforts. Generally, winds of the greatest intensity occur during the fall (Sept-Dec.) and winter (Jan.-Mar.). Winds during this period, on average, prevail from the south, southwest and west.

As well as wind speeds and duration, the prevailing water level plays a significant role in how much sand transportation will take place. During high water levels, more of the beach is submerged and the width of the dry beach is less. As a result, less beach is exposed to wind erosion. Conversely, during lower water levels, more beach is exposed and greater wind erosion of the beach is possible. Most of the dune building occurs during lower water levels. Periods of natural dune erosion tend to occur during high lake levels when storm waves erode the base of the dune and carry that sand to offshore bars. What is fundamental to understand is that sand dunes and beaches must be managed as one system. Dunes depend on beach sand for their formation, particularly during low water level periods, and beaches need the sand reserve held in the dunes during high lake levels and storm events. The physiography of the dunes varies from narrow, steep dunes in the south end of the beach, to wide expanses of more gradually sloping dunes. Where dunes have been affected by human activity, sand erosion from the dunes is carried leeward of the dunes, across Lakeshore Blvd. An exception is the dunes south of the Sixth St. washrooms. Here, impacts to the foredune have led to erosion, but the eroding sand has caused the dune to build upward, creating some of the highest section of dunes at Sauble Beach.

## **DUNE & BEACH LIFE ZONES**

The dune and beach ecosystem is made of several zones with very different physical characteristics.

**Beaches** are zones where water meets land. The constant movement of sand by the wind, pounding storm waves, and winter ice and snow makes this a formidable habitat for any living thing. Consequently, few plants or animals live on the beach. Most wildlife are just visitors. Among these visitors are scavengers ranging in size from small flies and beetles to shore birds, Herring Gulls, and even Bald Eagles. The remains of fish, birds, and insects washed ashore provide food.

Mammals that venture down to the beach include the Raccoon, Skunk and Red Fox, which wait until dark to search the shoreline for food.



## **DUNE & BEACH LIFE ZONES**

The **foredune** is the first ridge behind the beach. Although foredunes are above wave action most of the time, they are regularly subject to storm waves.

Like the beach, life in the foredune is a daily struggle against shifting sand, scarcity of nutrients, rapid water drainage, high evaporation rates, and storms. Out of the reach of waves, a few hardy plants, such as American Beach Grass and Long-leaved Reed Grass, can survive. These grasses known as pioneer species, are one of the first plants to become established, and create habitat for other plants. Stabilizing the soil with their extensive root systems, they increase the soil's capacity to retain water and nutrients. American Beach Grass spreads quickly by sending stems to the surface to form new plants. As drifting sand accumulates in the American Beach Grass, the central stem continues to grow, keeping the plant's leaves exposed to the sun and air. This keeps the grass from being buried and increases the height of the foredune.

A foredune stabilized by these grasses can host a wide variety of wildflowers and shrubs. They include beautiful clusters of the Hairy Puccoon, the Common Milkweed, Beach Pea, Smooth Rose, Bearberry, Poison Ivy, Riverbank Grape and Sand Cherry. Foredunes will remain stable as long as the vegetation is undisturbed.

Unlike plants, animals can escape the extreme temperatures and harsh conditions. Most birds migrate seasonally or retreat daily to the cover of heavy vegetation. Many animals are nocturnal and are most active during the cooler nighttime hours. Like the plants, animals that live on the grass-covered foredune have special adaptations that help them survive the extreme temperatures of summer and winter. Surface temperatures on the open dunes can reach 49°C./120°F.. The Wolf Spider is adapted to extreme temperatures by living in a burrow deep under the sand. Its sandy brown color also helps it blend into its surroundings when leaving its burrow home.

**Interdunal wetlands or swales** are shallow ponds or pools located between dunes. The dunes modify or even prevent normal drainage toward the lake forming long narrow wet areas. They typically are found between low dunes or sand spits created when water levels drop or as shoreline currents change. Ponds may vanish during dry periods.

**Dune forests** can be found on stabilized dunes protected from intense wind erosion. The dominant forest type varies as one travels north along the coastline. Dune forests are dominated by beech, maple and hemlock. The uniqueness of dune forests stems from the fact that they develop on steep, barren sand slopes that are a short distance from open dunes. The contrast between the cool, shaded dune forest and the extreme temperatures and intense sunlight of the open dune can be striking. Though thin and slow to accumulate, the topsoil of dune forests supports a variety of spring wildflowers and woodland plants.



## **THE IMPORTANCE OF NATIVE LANDSCAPES**

Almost two-thirds of the 2,794 flowering plant species found in Ontario are referred to as **native**. They migrated northward from the unglaciated parts of the continent; after the last period of glaciation about 14,000 years ago. The remaining one-third came to Ontario from elsewhere. These are the **introduced** species, most of which were brought by Europeans, either intentionally as garden or agricultural plants, or inadvertently in the mud on people's shoes, in animal fodder, or in ships' ballast. Some introduced species have arrived from other parts of North America by way of railroads and highways. Introduced species that grow and reproduce unassisted by humans are described as **naturalized**. Introduced species whose spread begins to threaten the existence of native species are said to be **invasive**.

Native plants are plants that have evolved in a particular region over many thousands of years. Therefore, they have adapted to the climate, geography and animal populations of the region. Native plants provide habitat and a source of food for animals, such as birds, butterflies and mammals. The majority of the plants found in the sand dunes at Sauble are native.

Native landscaping makes an effort to reestablish native plant populations to a certain area, whether it is as small as your backyard or as large as a nature preserve.

### **Native plants provide a diverse landscape**

Because native plants are part of a community that includes other plants and animals, a natural balance has developed between the living organisms. Therefore, single species of native plants don't dominate a landscape, like the non-native plants do. Native plants also promote biodiversity; therefore, a landscape full of native plants provides many different shapes, sizes, textures and colors.

### **Native plants help the animals**

Native plants provide shelter and food to birds, butterflies and other wildlife, promoting biodiversity. In contrast, mowed lawns are of little use to most wildlife. Because many animal habitats today are being lost to urban development, consciously creating or maintaining a habitat full of native plants can be of great help and relief to animals looking for a home.

Native plants are historical, with many playing a significant role in Native American culture and European exploration.



## **DUNES A DIVERSE ECOSYSTEM**

Dunes offer many microenvironments varying in temperature, moisture, and light intensity within a relatively small area making them the most diverse ecosystem in the Great Lakes.

Lichens, fungi, mosses, grasses, wildflowers, shrubs and trees all are part of a dunescape. All dune plants must adjust their survival to the harsh environment. Drying winds; low soil moisture and fertility; intense sunlight; and open areas within the dune system regularly reaching 50°C./ 120°F. and may reach 80°C./180°F. Along with blowing sand are conditions that affect the growth of dune vegetation. In the most active parts of the dune, only a few species of grass and shrubs can survive; on more protected areas, forests become established.

Dune plants have evolved special adaptations to the harsh environment. Some are gray green and covered with tiny hairs that act like a reflective blanket, reflecting light to prevent heat loss and aiding in transpiration. Others have fleshy stems that hold moisture and/or root systems that can withstand continual wave action at the shoreline.

As sturdy as they seem, dune plants are especially sensitive to human disturbance. Walking or driving all-terrain vehicles on them may cause destruction of the surface vegetation and the roots to die. This exposes a dune to wind erosion, allowing the sand to move or open channels in its form. Without sand dune plants, the integrity and preservation of a stable dune complex cannot exist.

Many fundamental concepts of plant succession and ecology were first identified because of studies made on sand dunes. The struggle of plant communities to pioneer and evolve on barren sand is a complex process known as succession, in which natural communities replace each other. Each stage of plant succession creates different microenvironments. These microenvironments are created by changes in temperature, moisture, and light intensity caused by plants and animals occupying the site.

Dune systems are well suited for the study of succession and ecological change because of the rapid changes that occur. For example, when drops in lake levels expose sand spits or create new foredunes, these features are rapidly colonized by beach grass. Within one or two human generations the vegetation can change from beach grass to shrubs to trees. Storms and high lake levels can cause an even more rapid change in plant communities.

Beaches along Lake Huron act as navigational pathway for migrating insects and birds and can supply much-needed minerals lost during migration, which collect in sand from evaporating water.

Dune forests are important for migrating species by acting as thermally protected areas and food sources.



## **LIST OF PLANT SPECIES FOR THE SAUBLE DUNES**

NOTE: The following is the result of an inventory of plant species observed in the dunes at Sauble Beach during the course of the 2003-2005 growing season (May-Sept). This is not an exhaustive list, but is representative of the main species growing in Sauble's dunes

### **Deciduous Trees**

- |    |                            |                           |
|----|----------------------------|---------------------------|
| 1. | <i>Acer negundo</i>        | <b>Manitoba Maple</b>     |
| 2. | <i>Betula papyrifera</i>   | <b>Paper Birch</b>        |
| 3. | <i>Fraxinus americana</i>  | <b>White Ash</b>          |
| 4. | <i>Populus balsamifera</i> | <b>Balsam Poplar</b>      |
| 5. | <i>Populus alba L.</i>     | <b>White Poplar</b>       |
| 6. | <i>Populus deltoides</i>   | <b>Eastern Cottonwood</b> |

### **Coniferous Trees**

- |     |                           |                      |
|-----|---------------------------|----------------------|
| 7.  | <i>Larix laricina</i>     | <b>Tamarack</b>      |
| 8.  | <i>Picea abler</i>        | <b>Norway Spruce</b> |
| 9.  | <i>Pinus sylvestris</i>   | <b>Scots Pine</b>    |
| 10. | <i>Thuja occidentalis</i> | <b>White Cedar</b>   |

### **Shrubs**

- |     |                                |                           |
|-----|--------------------------------|---------------------------|
| 11. | <i>Arctostaphylos uva-ursi</i> | <b>Bearberry</b>          |
| 12. | <i>Cornus stolonifera</i>      | <b>Red-Osier Dogwood</b>  |
| 13. | <i>Hypericum kalmianum</i>     | <b>St. John's Wort</b>    |
| 14. | <i>Juniperus communis</i>      | <b>Common Juniper</b>     |
| 15. | <i>Physocarpus opulifolius</i> | <b>Common Ninebark</b>    |
| 16. | <i>Potentilla fruticosa</i>    | <b>Shrubby Cinquefoil</b> |
| 17. | <i>Prunus pumila</i>           | <b>Sand Cherry</b>        |
| 18. | <i>Salix myricoides</i>        | <b>Blueleaf Willow *</b>  |
| 19. | <i>Salix cordata</i>           | <b>Sand Dune Willow</b>   |
| 20. | <i>Salix spp.</i>              | <b>Willow</b>             |
| 21. | <i>Vitis riparia</i>           | <b>Riverbank Grape</b>    |

### **Grasses**

- |     |  |                                |
|-----|--|--------------------------------|
| 22. | <i>Ammophila hreveligulata</i>               | <b>American Beech Grass **</b> |
| 23. | <i>Andropogon gerardil</i>                   | <b>Big Bluestem *</b>          |
| 24. | <i>Schizachyrium scoparium (Michx.) Nees</i> | <b>Little Bluestem</b>         |
| 25. | <i>Calamovilfa longifolia var. magna</i>     | <b>Sand Reed Grass ***</b>     |
| 26. | <i>Panicum virgatum</i>                      | <b>Switch Grass *</b>          |

### **Herbaceous**

- |     |                             |                               |
|-----|-----------------------------|-------------------------------|
| 27. | <i>Achillea millefolium</i> | <b>Yarrow</b>                 |
| 28. | <i>Arabis lyrata</i>        | <b>Lyre-leaved Rock Cress</b> |
| 29. | <i>Artemisia campestris</i> | <b>Wormwood</b>               |
| 30. | <i>Asclepias syriaca</i>    | <b>Common Milkweed</b>        |
| 31. | <i>Calopogon tuberosus</i>  | <b>Grass Pink</b>             |
| 32. | <i>Campanula aparinoid</i>  | <b>Marsh bellflower</b>       |

\* RARE IN ONTARIO    \*\* RARE IN GREY-BRUCE    \*\*\* RARE IN ONTARIO; GLOBALLY RARE

## LIST OF PLANT SPECIES FOR THE SAUBLE DUNES

### Herbaceous

- |  |   |
|--|---|
| <p>33. <i>Castilleja coccinea</i></p> <p>34. <i>Cypripedium calceolus</i></p> <p>35. <i>Daucus carota</i> L.</p> <p>36. <i>Drosera rotundifolia</i> L.</p> <p>37. <i>Echium vulgare</i> L.</p> <p>38. <i>Epipactis helleborine</i></p> <p>39. <i>Equisetium hyemote</i></p> <p>40. <i>Equisetum variegatum</i> Schleicher</p> <p>41. <i>Erigeron philadelphicus</i> L.</p> <p>42. <i>Eupatorium maculatum</i> L.</p> <p>43. <i>Eupatorium perfoliatum</i></p> <p>44. <i>Euphorbia</i> spp.</p> <p>45. <i>Fragaria virginiana</i></p> <p>46. <i>Gentiana procera</i> Holm.</p> <p>47. <i>Gentianopsis virgata</i> (Raf.) Holub</p> <p>48. <i>Hemerocallis fulva</i></p> <p>49. <i>Hypericum perforatum</i></p> <p>50. <i>Iris lacustris</i></p> <p>51. <i>Juncus</i> spp.</p> <p>52. <i>Lathyrus japonicus</i></p> <p>53. <i>Lilium michiganense</i></p> <p>54. <i>Lilium philadelphicum</i></p> <p>55. <i>Lithospermum carolinense</i></p> <p>56. <i>Lobelia puberula</i></p> <p>57. <i>Lobelia kalmii</i></p> <p>58. <i>Lythrum salicari</i></p> <p>59. <i>Melilotus alba</i></p> <p>60. <i>Oenothera biennis</i> L.</p> <p>61. <i>Parnassia glauca</i></p> <p>62. <i>Physostegia virginiana</i> L.</p> <p>63. <i>Potentilla anserina</i></p> <p>64. <i>Primula mistassinica</i></p> <p>65. <i>Rosa blanda</i></p> <p>66. <i>Sarracenia purpurea</i> L.</p> <p>67. <i>Sisyrinchium montanum</i></p> <p>68. <i>Smilacina racemosa</i></p> <p>69. <i>Solidago hispida</i> Muhl. ex Willd. var. <i>huronensis</i> Semple</p> <p>70. <i>Solidago ohioensis</i>.</p> <p>71. <i>Solidago nemoralis</i></p> <p>72. <i>Spiranthes cernua</i> (L.) Rich.</p> <p>73. <i>Tofieldia glutinosa</i></p> <p>74. <i>Tradescuntia ohioensis</i></p> <p>75. <i>Typha latifolia</i> L.</p> <p>76. <i>Zigadenus elegans</i></p> | <p><b>Indian Paintbrush</b></p> <p><b>Yellow Lady Slipper</b></p> <p><b>Queen Anne's Lace</b></p> <p><b>Round-leaved Sundew</b></p> <p><b>Common Vipers bugloss</b></p> <p><b>Helleborine</b></p> <p><b>Field Horsetail</b></p> <p><b>Variegated Scouring Rush or Horsetail</b></p> <p><b>Philadelphia Fleabane</b></p> <p><b>Spotted Joe-Pye Weed</b></p> <p><b>Boneset</b></p> <p><b>Spurge</b></p> <p><b>Wild Strawberry</b></p> <p><b>Fringed Gentian</b></p> <p><b>Smaller Fringed Gentian</b></p> <p><b>Day lily</b></p> <p><b>Common St. Johnswort</b></p> <p><b>Dwarf Lake Iris ***</b></p> <p><b>Rush</b></p> <p><b>Beach Pea *</b></p> <p><b>Michigan Lily **</b></p> <p><b>Wood Lily</b></p> <p><b>Hairy Puccoon *</b></p> <p><b>Downy Lobelia</b></p> <p><b>Brook Lobelia</b></p> <p><b>Purple Loosestrife</b></p> <p><b>White Sweet Clover</b></p> <p><b>Common Evening Primrose</b></p> <p><b>Grass of Parnassus</b></p> <p><b>False Dragonhead, Obedient Plant</b></p> <p><b>Silverweed</b></p> <p><b>Bird's-eye Primrose</b></p> <p><b>Smooth Wild Rose</b></p> <p><b>Pitcher Plant</b></p> <p><b>Common Blue Eyed Grass</b></p> <p><b>False Solomon's Seal</b></p> <p><b>Lake Huron Hairy Goldenrod****</b></p> <p><b>Ohio Goldenrod</b></p> <p><b>Gray Goldenrod</b></p> <p><b>Nodding Ladies tresses</b></p> <p><b>False Asphodel</b></p> <p><b>Spiderwort</b></p> <p><b>Common Cattail</b></p> <p><b>White Camass</b></p> |
|--|---|

\* RARE IN ONTARIO    \*\* RARE IN GREY-BRUCE    \*\*\* RARE IN ONTARIO; GLOBALLY RARE

\*\*\*\* ENDEMIC, ONLY FOUND ALONG THE ONTARIO SHORELINE OF LAKE HURON ON THE DUNES

## ***RARE PLANTS FOUND IN THE SAUBLE DUNES***

### ***Ammophila breviligulata***

#### **AMERICAN BEACH GRASS**



**Scientific name meaning:** *Ammophila*: Greek *amos* for "sand" and *fileiu* for love. *breviligulata*: *brevis* for "short"; *ligula* for "tongue".

**Description:** Perennial, hardy to zone 5. The flowers are hermaphrodite (have both male and female organs) and are pollinated by the wind. It cannot grow in the shade. It requires dry or moist soil and can tolerate drought. Grows best when slightly buried by sand.

**Height:** .45 cm.-1m./1.5-3.5ft.

**Leaves:** Narrow, dark green

**Flower:** Tall, stiff pale yellow or purplish flower.

**Flowering:** July - September.

**Fruit:** Brown.

**Native/Introduced:** Native.

**Comments:** Rare in Grey-Bruce. Beachgrass produce long, underground rhizomes that generate further stems and, consequently, a single clone is capable of rapidly colonizing large areas of open beach. This rapid vegetative growth, and its apparent low production of fertile seed have led to the assumption that many populations of Beachgrass consist of one to a few clones.

## **RARE PLANTS FOUND IN THE SAUBLE DUNES**

### ***Lathyrus japonicus***

#### **BEACH PEA**



**Scientific name meaning:** *Lathyrus*: from the Greek lathyros, an old name for “pea,” *japonicus*: of Japan.

**Description:** a low, sprawling plant. It grows along the shores of the Great Lakes. Beach pea can be recognized by its alternate leaves that are divided into several segments and the clusters of purple to blue pea-like blossoms.

**Height:** 30-60cm./1-2ft., creeping to 101cm./40in.

**Leaves:** pinnately divided into 3-6 pairs of leaflets; slightly fleshy; leaf like appendages at base of the stalk, symmetrical.

**Flower:** purple to blue, five parted; head branched clusters of 5-10 flowers.

**Flowering:** June-August.

**Fruit:** Flat, long pod.

**Native/Introduced:** Native.

**Comments:** Rare in Grey and Bruce Counties. The flowers attract bees and butterflies. Seed pods contain small peas eaten by birds and rodents. Beach pea pods resemble those of garden peas, but the beach pea is NOT edible. The beach pea has tough roots, that help to bind the sand and add nitrogen to the soil.

## ***RARE PLANTS FOUND IN THE SAUBLE DUNES***

### ***Andropogon gerardii***

#### **BIG BLUESTEM, TURKEY- FOOT**



**Scientific name meaning:** *Andropogon*: from Greek *andros*, meaning "man's," and *pogon*, meaning "beard," probably because of the hairy appearance produced by the seed heads by the sterile glumes *gerardii*: for Louis Gerard, French botanist from late 1700's to early 1800's who was the first to describe this species technically.

**Description:** Big Bluestem, is a native, perennial, warm season grass that occurs from the shortgrass prairie region to the Atlantic Ocean. It is tufted, forms sod, and has short, scaly rhizomes. It is very leafy at the base, with some leaves carried up on the stem. The seed heads normally have 3 spikelets that appear like a 'turkey foot.'

**Height:** 1.5-2.5 m./5-8 ft.

**Leaves:** Leaf blades are flat, smooth below and rough above.

**Flower:** Purplish or yellowish.

**Flowering:** August to October.

**Fruit:** Brown.

**Native/Introduced:** Native.

**Comments:** Rare in Ontario. Big Bluestem, is often referred to as the "King of Grasses." Big bluestem once dominated the tall-grass prairies of North America, forming rippling waves of amber, taller than a man on horseback, from the Rocky Mountains to the eastern forests.

## ***RARE PLANTS FOUND IN THE SAUBLE DUNES***

### ***Calamovilfa longifolia var. magna***

#### **LONG-LEAVED REED GRASS**



**Scientific name meaning:** *Calamovilfa*: from Greek mythological figure Kalamos, the son of Maiandros (aka Meander), god of the Meander River and *vilfa*, an early name applied to a genus of grass ***longifolia***: *longus* for "long, extended"; *folius* for "leaves".

**Description:** This dune plant spreads through rhizomes but reproduces primarily from seeds. The plant is also well adapted to withstand low moisture and higher temperature conditions of the foredunes. As a dune stabilizes, the reed grass takes over from American Beachgrass (*ammophila brevigulata*) and becomes the dominant species.

**Height:** 2 m./6 ft.

**Leaves:** Leaf blades have long, slender tips. The basal portion is keeled and the margins are rough to the touch.

**Flower:** The flower head is long and narrow to open. Spikelets are pale green or purplish.

**Flowering:** From July to September.

**Fruit:** Brown.

**Native/Introduced:** Native.

**Comments:** Rare in Ontario; globally rare. Long leaved reed grass is restricted in distribution in Canada to the shore of Lake Huron, where it grows, often abundantly, in the sand dunes from Point Edward in Lambton County, to Sauble Beach in Bruce County.

## ***RARE PLANTS FOUND IN THE SAUBLE DUNES***

### ***Salix myricoides***

#### **BLUELEAF WILLOW**



**Scientific name meaning:** Latin name for the willow and meaning "to leap or spring" in reference to its fast growth *myricoides*: with leaves like *Vaccinium myrtillus* (Bilberry).

**Description:** Willows are recognized by their winter buds and flowers: their buds are covered by a single, cap-like scale, flowers are very small, and are borne in catkins. Identification of willows is complicated.

**Height:** 3 m./10 ft., occasionally a small tree to 5 m./16 ft.

**Leaves:** green above and bluish-white beneath.

**Flower:** Ovule (plant structure that develops into a seed ) bearing flowers with dark-tipped floral bracts and smooth ovaries.

**Flowering:** May.

**Fruit:** Capsules.

**Native/Introduced:** Native.

**Comments:** Rare in Ontario. Willows are notoriously difficult and time-consuming to identify because their distinguishing characteristics are numerous and one must observe a number of these characteristics through the growing season to precisely identify the species.

## ***RARE PLANTS FOUND IN THE SAUBLE DUNES***

### ***Iris lacustris***

#### **DWARF LAKE IRIS**



**Scientific name meaning:** dwarf lake iris. *Iris*: named for the Greek goddess of the rainbow  
*lacustris*: of or pertaining to lakes.

**Description:** Dwarf Lake Iris can be distinguished from other native iris species by its very small size, and its thin, shallow, yellow rhizomes or underground stems. The slender rhizomes produce fans of flattened leaves.

**Height:** 15 cm./6 in.

**Leaves:** The leaves are light green and usually not more than 1 cm./5 in. wide.

**Flower:** Showy, deep blue flowers are produced singly on short stems, below the height of the leaves.

**Flowering:** Mid May to early June.

**Fruit:** Small, oblong, green capsules on short stalks.

**Native/Introduced:** Native.

**Comments:** Rare in Ontario; Globally Rare. This miniature iris grows nowhere else in the world but on the northern Great Lakes shoreline of Lakes Michigan and Huron. It grows only on the Bruce Peninsula, Manitoulin Island, Michigan, and the Door Peninsula of Wisconsin.

## ***RARE PLANTS FOUND IN THE SAUBLE DUNES***

### ***Lilium michiganense***

#### **MICHIGAN LILY**



#### **Scientific name meaning:**

***Lilium***: derived from Greek lirion , "a lily"

***michiganense***: from Michigan.

**Description:** The petals are curled back, completely disclosing the stamen. The leaves are smooth to the touch, lance shaped and in whorls on the stem. Stems arise from a scaly bulb. The bulbs are made up of fleshy scales and are not enclosed in a protective coating like those of the tulips.

**Height:** 2m./6.5 ft.

**Leaves:** Typically whorled, to 12cm/8 in. long, 5cm./2 in. broad, lanceolate elliptic, glabrous above. Under-surface and margins with tiny teeth. Leaves sometimes alternate just below inflorescence and at the very base of stem.

**Flower:** One to +5 nodding flowers, 6 petals, mostly red with a yellow base and brown speckles.

**Flowering:** June - July.

**Fruit:** Capsules with plump seeds.

**Native/Introduced:** Native.

**Comments:** Rare in Grey-Bruce. The Michigan lily is often confused with the more southerly Turk's Cap lily. This is an easily recognized lily which is often cultivated.. The lilies do best in direct sunlight (very shade intolerant) and need soil conditions that are perfect in both composition and temperature. Without the right conditions the lilies will not survive.

## ***RARE PLANTS FOUND IN THE SAUBLE DUNES***

### ***Lithospermum caroliniense***

#### **HAIRY PUCCOON**



**Scientific name meaning:** *Lithospermum*: from Greek *lithos*, "stone," and *sperma*, "seed" *caroliniense*: from Carolinas.

**Description:** Herbaceous perennial from a deep taproot. Stem and leaves coarsely hairy. Erect very leafy; to very hairy; stems often as many as 12+; usually unbranched; sometimes branched at top; roots stout, woody.

**Height:** Plant 10- 64 cm./6-24 in.

**Leaves:** Leaves broadest in the middle, tapering at either end, and outer margin smooth.

**Flower:** Flowers large (up to 1 inch in diameter) yellow-orange with 5 petals and basal parts of petals fused into a long corolla tube.

**Flowering:** May-July.

**Fruit:** July, August, a small fruit similar to a nut, white, smooth, shiny.

**Native/Introduced:** Native.

**Comments:** Rare in Ontario. The plant requires well-drained soil preferring, dry; prairies, woods, and inland sands. It cannot grow in the shade.

## ***RARE PLANTS FOUND IN THE SAUBLE DUNES***

### ***Solidago hispida Muhl. ex Willd. var. huronensis Semple***

#### **HAIRY GOLDENROD**



**Scientific name meaning:** *Solidago*: from Latin *solido*, meaning "to make whole or heal" and a reference to the supposed, medicinal qualities of these plants *hispida*: fine-hairy.

**Description:** Plant slender, wandlike. Flowers showy, arising from the leaf axils, but most strongly concentrated in a terminal, elongate clump. Leaves and stem very hairy, small and ovate except near the base. Basal leaves ovate with a strong petiole. Plant 1 to 3 feet in height.

**Height:** 10-101 cm./4-40 in.

**Leaves:** Leaves and stem very hairy, small and ovate except near the base.

**Flower:** Head yellow, 7 parted; inflorescence 25 cm./10 in. spiral branched cluster, elongated head of stalked flowers, blooming from the bottom up.

**Flowering:** July-October.

**Fruit:** Seeds

**Native/Introduced:** Native.

**Comments:** Endemic, only found along the Ontario shoreline of Lake Huron on the dunes. Goldenrod is often unfairly blamed for causing hay fever in humans. The pollen causing this allergy problem, is mainly produced by Giant Ragweed (*Ambrosia trifida*), blooming at the same time as the goldenrods. Actually, goldenrod pollen is too heavy and sticky to be blown far from the flowers. Furthermore, goldenrods are pollinated mainly by insects.

## **RARE PLANTS FOUND IN THE SAUBLE DUNES**

### ***Panicum virgatum***

#### **SWITCH GRASS**



**Scientific name meaning:** *Panicum*: from latin *panus* probably meaning "an ear of millet"  
*virgatum*: Latin for "wand-like".

**Description:** a warm-season grass; grows a clump of arching leaves that produce airy, seed heads in late summer; plant turns yellow in fall. Switch Grass grows on a wide variety of soils.

**Height:** 1.2 -1.8 m./4 - 6ft.

**Leaves:** Its leaves are flat and rough, reaching 4 to 25 inches (10-60 cm) in length, with a triangular patch of hairs at the base.

**Flower:** Yellow, pink, red or purple flowers.

**Flowering:** August - September.

**Fruit:** Tiny red seeds.

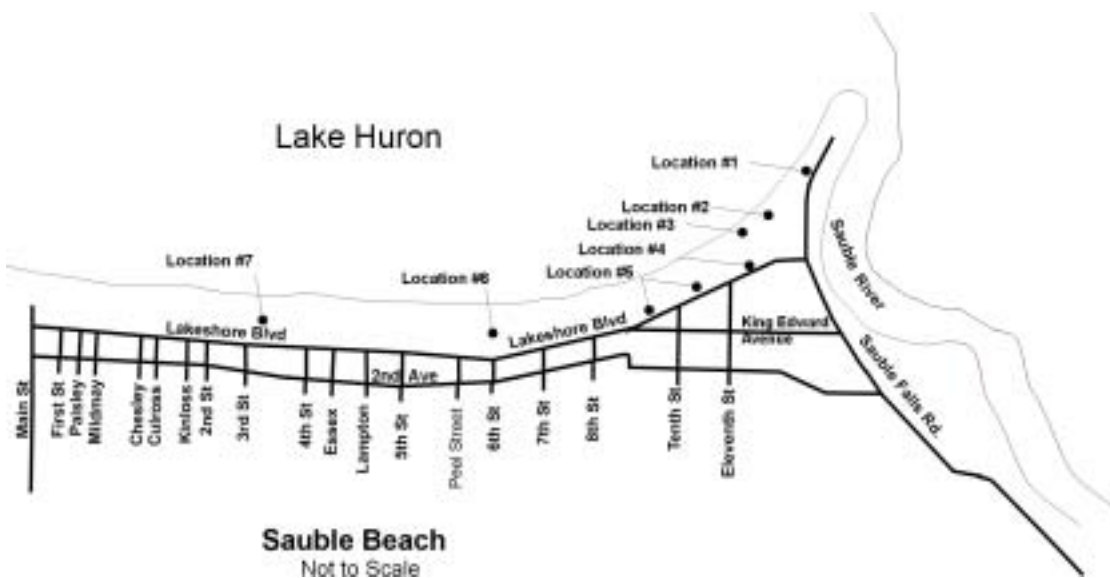
**Native/Introduced:** Native.

**Comments:** Rare in Ontario. It is a tough and adaptable plant that grows successfully in either dry or moist conditions. Birds enjoy the seeds, and in large plantings it serves as wildlife habitat.

## ***FIELD TRIP***

This section outlines a field trip covering parts of the Sauble beach and dune system. The trip covers areas that display significant biotic and abiotic features. They have been selected to provide textbook examples of phenomena that are featured in this guide and can be used to understand the dynamics of the beach and dune system. The trip covers a 4 kilometre (2.5 mi.) stretch of beach and dunes stretching from Main Street to the Sauble River and can be undertaken on foot, bicycle or motorized vehicle. Due to the fact that a portion of Lakeshore Blvd is one way, it is recommended that one begins the trip near the river and proceed in a southerly direction.

**Obtain permission before entering private lands. Do not collect specimens and restrict travel through the dunes to beach access points.**



### **LOCATION #1; New Dunes**

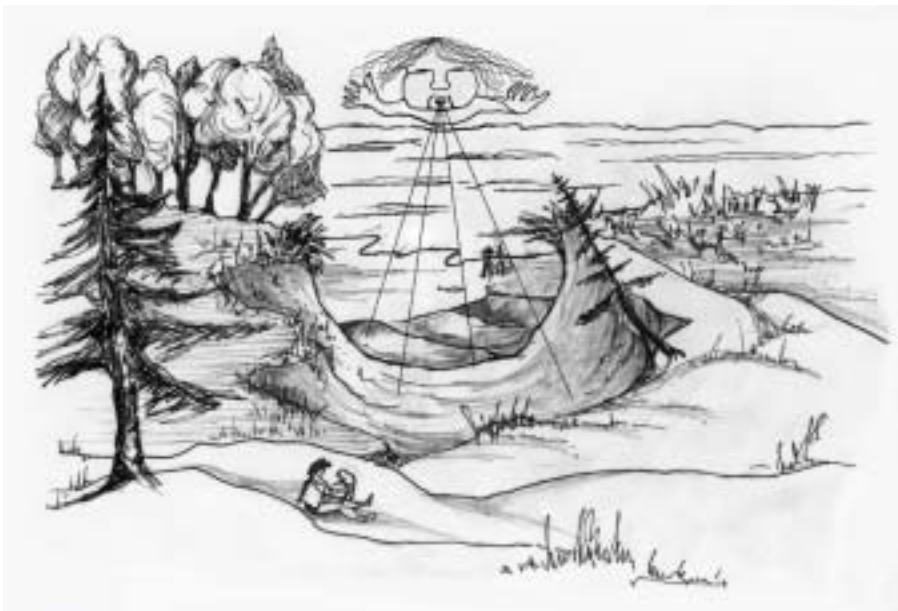
Follow Sauble Falls Rd toward the Lake. Just before it turns north toward the river, park your car in the designated parking area and walk out onto the beach. Face north toward the river and look closely at the dune system that runs parallel to the road. This series of dunes is relatively new and has been in existence only since the late 1980's. These dunes were created after the Township of Amabel staff erected a sand fence along the beach on the lake side of the dunes and parallel to the road. These dunes were created in response to the high water levels of the mid to late 1980's when the road was being threatened to be washed out. The fence trapped the sand and the dunes were born. Today the fence is no longer visible. Look at how well plants have become established. The plants dissipate the force of the wind, and when it slows, the sand it is carrying drops to the ground and starts to build new dunes. The plants are doing the job of the fence.

## **FIELD TRIP**

### **LOCATION #2: Blowout**

The next stop is just a few hundred metres south of the series of dunes described at Location #1. As you first walk south along the beach and look inland you'll notice that the dunes are relatively high with vegetation extending out from them onto the beach. A little farther down a significant gap with very little vegetation known as a blowout exists in the dunes.

Trampling by beach goers destroys the vegetation. Studies have shown that it can take as few as 10 footsteps through the same area to destroy American Beach Grass. American Beach Grass, is important as a dune stabilizer. It can withstand burial within a shifting dune by sending up vertical rhizomes that produce new emerging stems. This plant's root mat runs both horizontally and vertically, knitting a dune together. One of the first plants to appear where sand dunes are forming on a shoreline. As sand builds up around the new grass, the stems grow higher. Old stems become roots which can eventually extend as much as 3-6 m/20 ft. below the top of a sand dune. Destruction of the vegetation makes the dunes unstable, and allows the wind to carry sand from the exposed area. The continual loss of sand deepens the blowout. The sand blows inland, often outside of the beach-dune system. When it does this, it represents a loss to the system.



This inland migration of sand can result in substantial maintenance costs to the Town as it forms drifts on the roads, covers lawns and gardens, and clogs storm drains. A blowout also represents a breach of the dune's shore protection capability. This breach can allow storm waves to erode much larger segments of the shore than would otherwise be the case.

Blowouts found along the Sauble shoreline need to be stabilized. Obstacles, such as sand fence need to be installed and/or native vegetation such as American Beach Grass need to be planted, to reduce wind speed, causing sand to accumulate. As sand accumulates, plants adapted to the beach environment emerge, stabilizing the surface and promoting further dune formation.

## **FIELD TRIP**

### **LOCATION #3: Tennis Court Beach Access**

The next area is located where the tennis court beach access meets the beach. By foot it can be reached by continuing south along the beach until you reach the access . By vehicle it will be necessary to travel east on Sauble Falls Road until you reach Lakeshore Blvd., turn right and proceed south a short distance until you come to the tennis courts. The beach access is just to the north of the courts.

Walk along the access to the beach, keeping your eyes open for plants that are unique to this type of environment as this is one of the better accesses that transect the dune community. Along the route you will be able to see Sand Cherry, Eastern White Cedar, Willow and a variety of other plants. Closer to the lake, Wormwood and Beach Pea are found.

When you reach the area where the dunes meet the beach look to the north. The predominate plant found here is Beach Grass a plant that thrives in this environment. Beach Grass acts as a wind break causing the velocity of the on shore winds to decrease. When the wind slows, the sand it is carrying drops to the ground and starts to build new dunes. The sand buries the Beach Grass in the process. Not only is the grass able to tolerate being buried, it actually thrives and grows best when slightly buried by sand.

One usually thinks of sandy areas as barren wastelands where nothing lives. Animals, although present in the dunes are not as apparent as the plants. Often you will have to be satisfied to look for their signs.

Galls that resemble pine cones are present on willows in the dunes. Small wasplike flies lay an egg into developing plant tissues, and at the same time inject chemicals formed in its body into the plant. The chemicals stimulate the plant cells causing rapid and abnormal division and growth in the immediate vicinity of the egg. The egg, as it hatches and develops into a larva also secretes fluids from its body cells, causing further abnormal growth.

Two other fascinating creatures adapted to the sandy habitats of the dunes and beach are the ant-lions and tiger beetles.

The larval ant-lion is well adapted to its existence in the sand, dwelling at the bottom of a cone like depression where it lies in ambush to seize crawling insects such as ants. The ant-lion waits patiently at the bottom hidden under the sand with only its large,



curved jaws protruding.

The other ferocious denizen of red, brown, or green and often

all black and those that live on white sand are almost all white, so when at rest they blend into their surroundings. Tiger beetles capture their prey with long curved mandibles and when handled carelessly they can administer a painful bite. The larval tiger beetle is as ferocious as the adult, and spends its days at the entrance of a vertical burrow. There it awaits in ambush with its large jaws wide open ready to seize unwary insects passing by.

the sand, is the tiger beetle. It may be has a metallic sheen. Some are nearly

## **FIELD TRIP**

### **LOCATION # 4: Swale**

On either side of the tennis court beach access between Lakeshore Blvd and the dunes is an area known as a swale. Swales are long narrow wetlands, influenced by short-term variations in lake levels. They form in parallel bands between the linear sandy beach ridges.

The vegetation found in the swales is different from that found in the dunes. Prairie grasses, orchids and insectivorous plants are found here.

Visit the area in the spring and early summer and you may find one of the many orchids including the Yellow Lady Slipper, Rose Pogonia and Grass Pink that grow in this environment. This area is also home to the Pitcher Plant and Round Leaf Sundew, two insectivorous plants that compensate for the lack of nutrients in the soil by adding insects to their diet. Wood lily and Indian paintbrush also dot the landscape.

There is often the temptation to transplant these flowers. Many however have exacting requirements and moving them often means a slow and malingering death for the plant. Indian paintbrush for example is a hemiparasite (acquiring nourishment from other plants but meeting part of its requirements through autonomous photosynthesis). If transplanted, it may last for a number of years but will usually decline and eventually die. The roots of the yellow lady slipper form an association with soil fungi to enhance mineral absorption and because of this they do not transplant well.

The abundance of wildflowers also attracts an impressive numbers of butterfly species.

Fall is a particularly appealing time to visit this area. The wildflowers are at their finest in September. Look for sky-blue aster and showy goldenrod blooming amid the tall prairie grasses. Closer to the ground, visitors may find delicate, purple fringed gentians, Grass of Parnassus and occasionally white ladies' tresses orchids.

A series of swales and the linear sandy beach ridges existed inland for a considerable distance before the area was built up. Today urban development has destroyed many of these features, levelling the beach ridges, filling in the swales and often replacing the native flora with lawns.

Walker Woods Nature Preserve, 13.6 ha./34ac. in size which runs parallel to the Lake Huron shoreline is a remnant of this type of natural feature. Access to Walker Woods is from the west side of Sauble Falls Parkway, just north of Main Street. You have to hunt to find the access as parking is along the highway and signage is limited. Pedestrian trails will lead you through this unique area of swales and dunes.



## **FIELD TRIP**

### **LOCATION # 5: Living Museum**

As you drive south along Lakeshore Blvd., stop from time to time and observe the vegetation, growing in the dunes. Many of the plants found growing here are relics of a bygone era.

Plants such as American Beach Grass, grow on the shores of the Atlantic as well the Great Lakes. For many shore species, it makes no difference whether the nearby water is fresh or salt; they are simply adapted to a habitat of loose sand. Today their ranges are disjunct, found growing along both coasts but not between. From about 12,000 to 10,000 years before present, the Champlain Sea was formed when ice blocked the St Lawrence valley. Flooding a vast region of eastern Canada, it created a shore environment stretching from the Atlantic to Lake Ontario that was suitable for American Beach Grass.

When Southern Ontario was exposed by the melting of the Wisconsin glacier about 12,000 years ago it was evidently first colonized by tundra, spruce parklands and grasslands.

Beginning about 8,000 years ago, and lasting until about 4000 years before present, when the climate was warmer and drier than today, tall grass prairie and savanna covered vast expanses of eastern central North America. This included a north-eastward projection through Illinois and into southern Ontario, known as the "prairie peninsula." Many of the plants that exist in the inner dunes are warm-season grasses including Big Bluestem, Little Bluestem, and Switch Grass. Warm-season grasses grow well during the hot and dry weather of July and August, well suited to the growing conditions found in the dunes. There are also many colourful prairie "forbs," non-woody wildflower plants that are neither grasses nor grass-like found in the dunes, including, Hairy Puccoon, Indian Paintbrush and members of the aster and the pea families.

Gradually, about 4000 years before present the climate became slightly cooler and wetter which allowed for some re-invasion of forest, leaving the mosaic of prairie and savanna that were encountered by the first European explorers.

Fluctuations in the levels and extent of the Great Lakes and their precursors provided opportunities at various times for species from the south, east and west to extend their ranges into southern Ontario. The unique shoreline habitats provided a situation for the survival of relic and endemic plants.

Relic populations of prairie species remain to this day in dune, alvar, savannah and wetland habitats. Remnants tend to be found in areas that experience warmer than average microclimates, such as south-facing slopes and sandy sites near lakes and rivers.



## **FIELD TRIP**

### **LOCATION # 6: 6<sup>th</sup> Street**

At 6<sup>th</sup> Street walk towards the lake, through centre opening in the washroom complex towards the lake and stop. This is roughly mid way between Sauble Falls Rd and Main St. and provides an excellent view of the beach and dune complex.

Sauble Beach owes its existence to the topography of the coast. It is a self-contained "pocket beach" which has formed within a large embayment or crenulate ('U' shaped) shoreline, bounded by Chiefs Point to the north and Frenchman's Point to the south.

Not only is this a great place to gain an overview of Sauble Beach, but it is also a good place to watch for bird life. During the summer the predominant gull is the Ring Bill, with the occasional Herring Gull intermixed. In the fall Great Black-backed Gulls visit these shores.

Terns can also be seen diving for fish, and Ospreys and Kingfishers can be seen from time to time although often they seem to stay closer to the river. In the fall, the occasional Bald Eagle can be sighted patrolling the shore.

Resident fauna on the beach are mostly arthropods: a variety of mites, beetles, flies, springtails, lice, and small moths. These arthropods feed on washed-up plant, fish, mammal and bird detritus, and fungi that grow on these materials, and each other. Tiny worms are also found in the beach sand. The spring and fall are also excellent times to watch for shorebirds that prey on these beach invertebrates; they can be seen running along the water's edge in spring and again from midsummer to late fall. Shorebirds stop to feed during migration, which takes them from their Arctic breeding grounds to South American wintering areas and back each spring. Sanderlings, Semipalmated Sandpipers, and Least Sandpipers can be seen in substantial numbers.

The 6th Street lookout also provides a view of the raking of the beach by municipal staff. Raking has the effect of aerating the sand, causing it to dry out more quickly. The fine, dry sands are then prone to erosion, even under moderate breeze conditions. If left unraked, the normally damp beach would provide some natural cohesion, making the beach more resistant to erosion.

Raking also has the effect of destroying any plant species which would normally help to anchor the sands from wind effect erosion. Raking is especially problematic adjacent to the dunes, where normally, dune species would be growing and capturing wind blown sand. Dunes normally expand lakeward during low lake level conditions, building up sand reserves to protect against the next high lake level condition.

6th street is approximately half way between Main Street and the Sauble River. It is also significant with respect to the overall health of the dune and beach community. To the north, the dunes are significantly wider and less impacted by human activity. These wider dunes possess an impressively diverse number of dune species. This greater diversity of plant life is indicative of a more healthy, sustainable dune system. The dunes south of here are more extensively impacted by people.

## **FIELD TRIP**

### **LOCATION #7:**

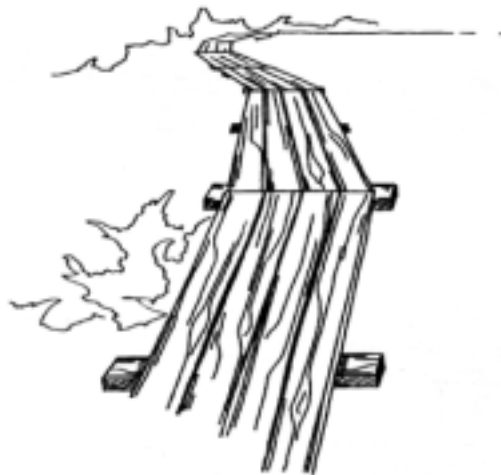
Proceeding south along Lakeshore Blvd stop from time to time and look at the dunes.

Between 6<sup>th</sup> and 5<sup>th</sup> Streets the dunes are privately owned. Dating back to when the area inland was farmed, this section of the dunes and beach was privately deeded, so that livestock would have access to water.

The width of the dunes between the street and the beach become narrower, as one proceeds south. The number of pedestrian paths from the road through the dunes to the beach also increases as well as the number of people using the beach. Currently there are nearly 400 pathways cut into the dunes, the majority being found between 6<sup>th</sup> Street and Main St.

One of the biggest threats to the stability of the dune system at Sauble Beach is the damage to key stabilizing plants. A major factor is the trampling effect caused by people crossing over the dunes on their way to the beach. Only a few passes can kill the vegetation. Within six weeks, two people per day entering the dunes and returning to the beach along the same path can severely damage the vegetation. As few as 25 round trips on a path over one summer can destroy half the vegetation in the path. Damage to these plants can remove their protective function, leaving the dune vulnerable to wind erosion. As sand erodes, blowouts, or deep depressions in the dune, can occur. A number of blowouts can be seen along the dunes.

An attempt to focus pedestrian traffic through beach access points using boardwalks, bollards and rails has been made. Beach users are encouraged to use the beach accesses through signage and education programs.



On a more positive note, perhaps one of the most important dune plants at Sauble Beach can be seen along this section of dunes, Long-leaved Reed Grass (*Calamovilfa longifolia*). This beach grass is a provincially rare species. It can also be considered a uniquely “Lake Huron” dune plant since, in Canada, it is only found along the shores of Lake Huron. Long-leaved Reed Grass grows in abundance at Sauble Beach, and is the primary dune stabilizer.

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