The Physical Landscape

"Geologically, the Great Lakes ecosystem is very young and can be thought of as an evolutionary laboratory."

– The Nature Conservancy

The Lake Huron to Lake Erie Corridor's present physical landscape has been profoundly affected by a remarkable geologic event - an ice age. Long ago, glaciers more than a mile (1.6 km) thick covered the entire Great Lakes Region. As they moved from north to south, the glaciers picked up and carried sediments and bedrock, then deposited them to shape landforms throughout the region.

Geologists have studied these landforms as well as sediment types, erosional features and fossils to piece together this area's glacial history. Their findings reveal the crucial role that ice played in the evolution of the biodiversity that exists today.

The Ice Age

For the last two million years, Earth has been in an ice age, characterized by two alternating climatic states known as glacial periods and interglacial periods.

During glacial periods, our planet cooled. Giant sheets of ice expanded and covered 30 percent of the land located at mid to high latitudes in the Northern Hemisphere. These cold, dry glacial periods lasted about 100,000 years.

Interglacial periods begin when Earth abruptly warms and the ice sheets melt. Warm, moist conditions allow soils to develop and life to return to the terrain. Interglacial periods are relatively brief, typically lasting 10,000 to 15,000 years. North America's most recent glacial period is called the Wisconsin Stage. It began about 110,000 years ago and ended about 10,000 years ago when the Holocene Epoch began. During the peak of the Wisconsin Stage about 20,000 years ago, ice completely covered what is now the Great Lakes Basin. The southern edge, or terminus, of this ice sheet extended as far south as the Ohio River.

For the last 10,000 years the Earth has been in a warm interglacial period known as the Holocene Epoch. The timing of natural cycles suggests the Earth should again be heading back to a cold glacial period within the next several thousand years.

Buhr Park Children's Wet Meadow, Ann Arbor, Michigan.

Glacial Processes, Landforms and Sediment Types

In 1840, the famous naturalist Louis Agassiz was one of the first to champion the concept of an ice age. From observations of the processes, landforms and sediments associated with modern mountain glaciers, Agassiz concluded that massive continental ice sheets once existed in Scandinavia and all of northern Europe. The theory that the present is the key to the past is called actualism. It is an important philosophical concept used by geologists to unravel Earth's history. By mapping glacial grooves, sediment types and landforms, geologists can reconstruct the former extent and flow of the ancient continental ice sheets that once covered the Great Lakes Basin. This type of study provides a link between the ice age theory originally described by Agassiz in Europe and the glacial history that defines the landscape of southeastern Michigan and southwestern Ontario.

Glaciers Leave Tracks

Glaciers create unique landforms, sediment types and erosional patterns. They also carry rocks of all sizes for great distances. Many of the glacial rocks found in the Lake Huron to Lake Erie Corridor came from the Canadian Shield north of Lake Huron. These relocated rocks are called glacial erratics. Their surfaces commonly have grooves and facets from being scraped under the ice. The shearing and abrasion by the rock-studded ice also grooves the underlying land surface.

Moraines

Glacial ice results from condensed snow accumulating year after year without melting. When the ice becomes about 66 ft (20 m) thick, it begins to slowly flow under the force of its own weight. As the ice moves, it scrapes and shears the underlying land surface. Moving like a conveyor belt, the glacier picks up rocks and sediments of all types and sizes, and transports them to lower, warmer latitudes. When the edge of the glacial ice melts, it deposits poorly sorted sediment called till.

JOHN M. ZAWISKIE

This is till beneath the lower east side of Detroit. Till is a poorly sorted sediment deposited by melting ice. It contains pebbles, cobbles and boulders set in clay or fine sand. Soils that developed on clay-rich till support beech-maple forests, while better-drained soils developed from sandy till support oak-hickory forests.

Sometimes the rate of melting exactly matches the rate of ice flow, so the glacier's terminus becomes stationary. The flowing ice behind it continues to bring more till, which is deposited on top of the till already at the edge. This creates a ridge or hill, called an end moraine.

When a glacier melts rapidly, the terminus does not pause to build an end moraine. Rather, it deposits sheets of till that form rolling plains called ground moraines.

JOHN M. ZAWISKIE

A glacier in the Queen Alexandria Range of Antarctica forms an end moraine.

A Modern Day Glacier

Pictured is a modern day glacier in southwest Alaska transporting glacial erratics. Glacial erratics are large boulders carried great distances from their original bedrock source by glaciers.

DR. SHARON JOHNSON

USGS DIGITAL DATA SERIES DD921

The low hills in the center of the photo are kames in Greenland.

(INSET) NATURAL RESOURCES CANADA, TERRAIN SCIENCES DIVISION, CANADIAN LANDSCAPES

Kettle

Sometimes a block of melting ice detaches from the glacier and is left on the outwash plain where it becomes buried by sediments. When the ice block melts, it forms a kettle depression, which often fills with melt-water or groundwater and becomes a lake. Kettle lakes and kames commonly are both found on ground moraines; together they form kettle and kame topography. A good example of this is at Stony Creek Metropark near Rochester, Michigan.

(Above inset) A kettle lake ringed by spruce trees and permafrost patterned ground in the Hudson Bay lowlands of Canada.

Kames

Kames are low hills of layered sand and gravel deposited by glacial melt-water. These sediments could come from streams that flow beneath the glacier and emerge as a delta at the ice front, or from river and lake sediments deposited on top of the glacier.

Landforms Beneath Glaciers: Eskers

OAKLAND COUNTY PLANNING & ECONOMIC DEVELOPMENT SERVICES

In some cases, long, winding rivers flow in tunnels beneath a glacier. Sediments deposited into these tunnels form ridges of layered sand and gravel that are left behind when the glacier recedes. These landforms are called eskers. The yellow highlighted portion in the aerial photograph above is an esker in Oakland County, Michigan.

Environments in Front of Glaciers

The great amount of melt-water released by glaciers can result in the formation of rivers in front of the ice. These rivers carry sediments away from the glacier. They deposit the sediments in well-sorted sheets of sand and gravel. These deposits are called outwash.

BALTHAZAR KORAB

Outwash is well-sorted sand and gravel deposited by braided streams. The example featured above was photographed beneath the Cranbrook Institute of Science in Bloomfield Hills, Michigan. This type of sediment is found in outwash plains, kames and eskers. Outwash deposits evolve into extremely well-drained soils which, on uplands, support oak barren, woodland and prairie communities.

THOMAS LOVELL

Pictured is the Exit Glacier in Alaska with moraine and outwash plain (stream deposits.)

Glacial Lakes

Large glacial lakes are created by water that has ponded between the ice front and the previously formed end moraines. Sediments deposited in deeper parts of glacial lakes are typically fine-grained clay and silt. Sand and gravel usually are deposited in long ridges in near-shore sandbars, along beaches and in coastal dunes.

As water drains from a glacial lake, it leaves a flat lakeplain with beach ridges, channels and wave-cut terraces. The topography of Essex County, Ontario, exemplifies the flat landscape left by glacial lakes.

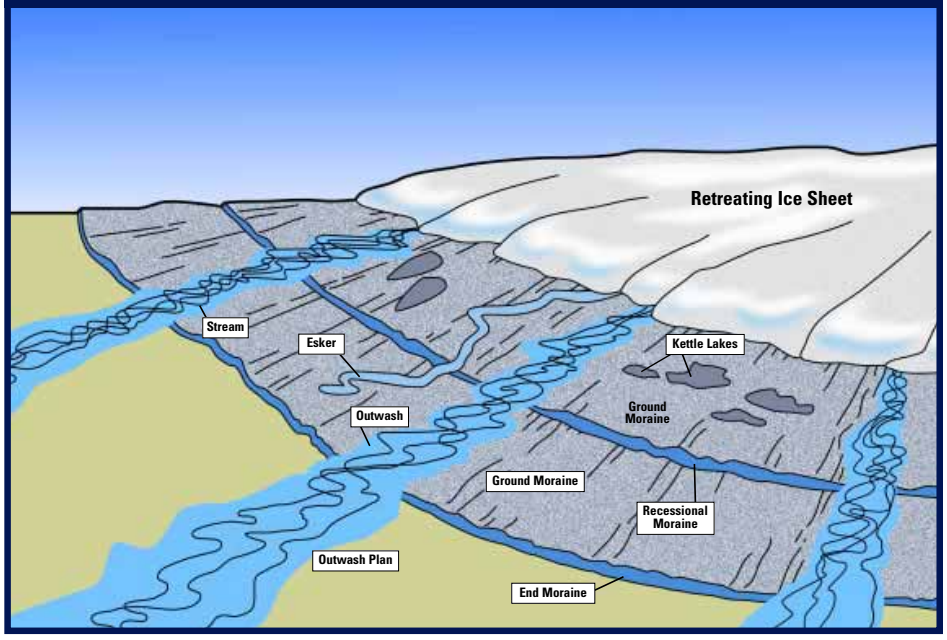
Water-lain moraines are low-lying landforms that develop where the ice meets the glacial lake. In the Corridor, water-lain moraines on the lakeplain were eroded by the glacial lakes and are not easy to identify today. The cities of Mt. Clemens, Detroit and Windsor were built on the Detroit water-lain moraine. The Leamington Moraine is only visible as a high knob west of Leamington, Ontario. Farther east, Ridgetown, Ontario, was named for the morainal deposits on which it sits. Aboriginal people and pioneers traveled along these moraines because they supported forests that were easier to traverse than the surrounding swamps of the lakeplain. One route used by pioneers was the Talbot Trail, which followed a moraine from Essex to Ridgetown, Ontario.

DR. J. BRIGHAM-GRETTE

A sandy beach ridge with wide-spreading oak trees lies parallel to the Detroit River shoreline in Brownstown Township, Michigan. Pioneer cemeteries often were built on the sandy ridges left by ancient glacial lakes.

(Left) Lacustrine clay and silt are sediments deposited in glacial lakes. The soils that later formed on these deposits are poorly-drained and, generally, support hardwood swamp forests and lakeplain prairie.

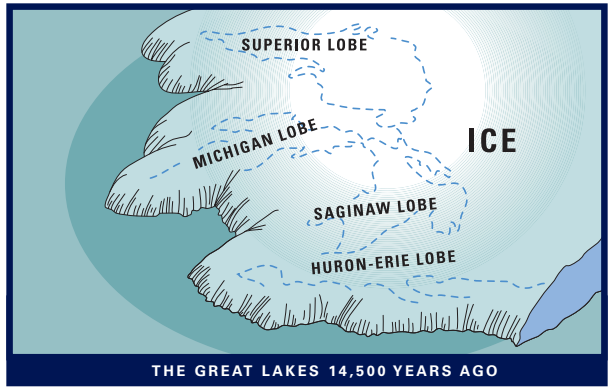
LANDFORMS CREATED BY GLACIERS



The Glacial History of the Lake Huron to Lake Erie Corridor

The Great Lakes were not always as we know them today. Their basins were formed by glacial erosion of pre-existing river valleys, which then filled with melt-water. The lakes have since evolved in shape, size and even the direction in which their waters flow.

***14,500 years before present:** Four glacial lobes covered what is now most of Michigan and all of Ontario. The retreating ice front paused and built the Valparaiso, Charlotte and Fort Wayne Moraines. When the glacial lobes retreated farther, the first glacial lakes began to form.*



THE GREAT LAKES 14,500 YEARS AGO

SOURCE OF GLACIAL POSITIONILLUSTRATIONS: FARRAND, W.R. AND KELLY R.W., 1967 REPRINTED 1987, *THE GLACIAL LAKES AROUND MICHIGAN.* BULLETIN NO. 4, PUBLISHED BY THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, GEOLOGICAL SURVEY DIVISION

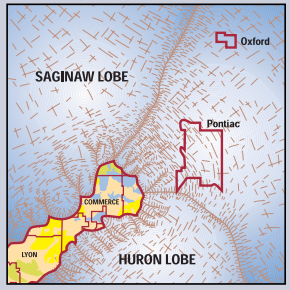
Interlobate Area Between the Saginaw and Huron-Erie Lobe

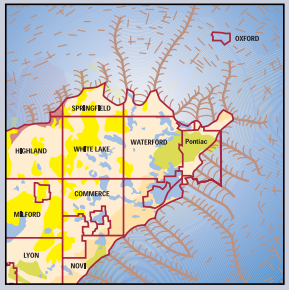
As the Earth warmed and the ice began to quickly retreat, the space between the Saginaw Lobe and the Huron-Erie Lobe widened, which caused a seam, or an "interlobate" area to open. Deposited within the interlobate area were a series of outwash plains with numerous kames, eskers, and kettle lakes flanked by moraines made of till from both lobes. The drawings to the right show the development of the interlobate area between the Huron and Saginaw Lobes between 14,500 to 13,800 years ago.

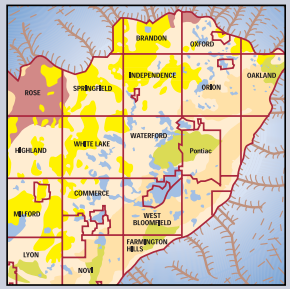
ICE FRONT POSITIONS FROM TWENTER AND KNUTILLA, 1972

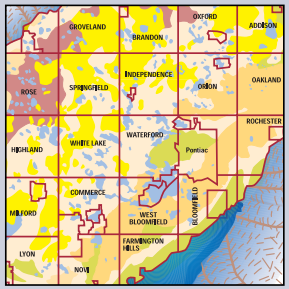
SANDY SHIPLE

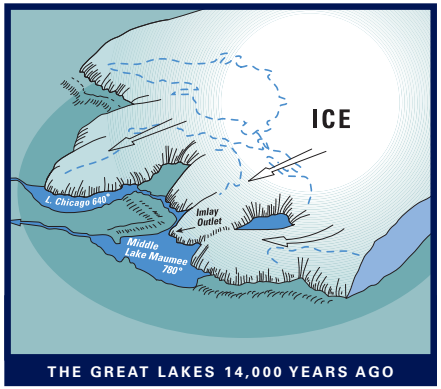
This terminus of a Greenland ice sheet is what Port Huron, Michigan, and Sarnia, Ontario, may have looked like 13,000 years ago.





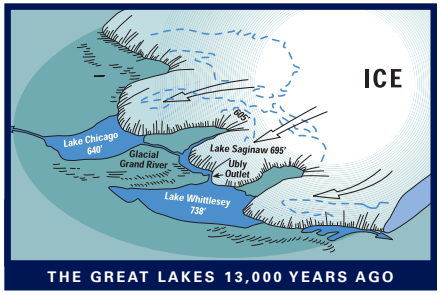






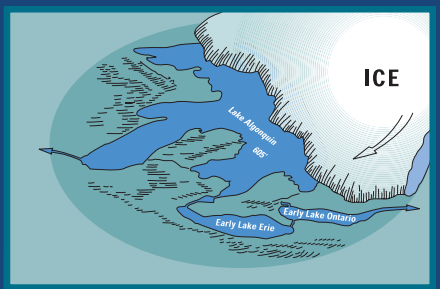
THE GREAT LAKES 14,000 YEARS AGO

***14,000 years before present:** Glaciers formed the Defiance Moraine at the edge of the Huron-Erie Lobe. When the ice melted back from this location, Lake Maumee formed. The lake subsequently changed in shape and size, and created an expansive lakeplain in southeastern Michigan and southwestern Ontario. A series of water-lain moraines formed in the lakeplain as the ice front receded. They include the Detroit, Mt. Clemens, Emmet and southern portion of the Port Huron Moraines in Michigan, and the Wyoming, Leamington and Blenheim Moraines in Ontario.*



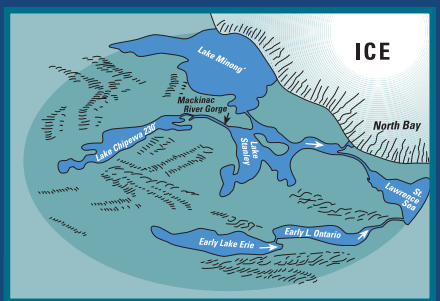
THE GREAT LAKES 13,000 YEARS AGO

***13,000 years before present:** The receding glaciers made a strong readvance. This ice front built the region's most prominent topographic feature, the Port Huron Moraine, which extends almost continuously from Minnesota to New York. Lake Whittlesey, the largest glacial lake to occupy the region, also was formed during this stage. Later, a combination of retreating and re-advancing ice created a series of glacial lakes, each with a different outline and elevation, which occupied parts of the lakeplain area until 11,000 years ago. Due to erosion, only the former shorelines of lakes Maumee, Whittlesey, and Warren can be easily recognized today in the form of low, continuous, sandy ridges within a few kilometers of the Lake Huron to Lake Erie Corridor's shorelines.*



THE GREAT LAKES 11,000 YEARS AGO

***11,000 years before present:** The beginning of the Lake Algonquin Stage. Waters drained south to early Lake Erie, cutting the initial channels of the St. Clair River and Detroit River.*



THE GREAT LAKES 9,500 YEARS AGO

***9,500 years before present:** As the ice front retreated, Great Lakes water began draining into northern Ontario rather than through the St. Clair and Detroit Rivers, resulting in extremely low lake levels. Forests grew on the exposed lakebeds. Evidence of this stage can be found in drowned forests on the floor of Lake Huron today.*

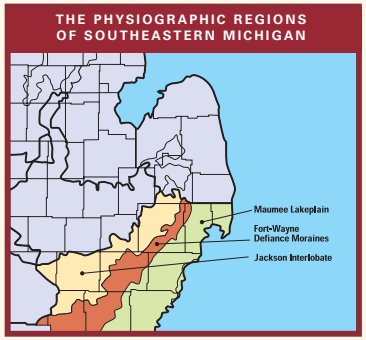
THE GREAT LAKES 6,000-4,000 YEARS AGO

***6,000 to 4,000 years before present:** The Lake Nipissing Stage. The modern drainage patterns of the Great Lakes were established after the last remaining glacial ice retreated toward Canada's northern latitudes. With the ice burden gone, land in the northern part of the region began to rise (a phenomenon known as isostatic rebound), which cut off the North Bay outlet. Downcutting of the St. Clair River lowered lake levels and shut off the Chicago outlet. The Lake Huron to Lake Erie Corridor has remained the dominant outlet for the upper Great Lakes since then.*

The Physiographic Regions of the Lake Huron to Lake Erie Corridor

As a result of their glacial history, the landscape and water bodies of southeastern Michigan can be divided into three major physiographic regions*:

- Interlobate regions are high plains characterized by outwash plains, ground moraines, and kettle and kame topography. The Jackson Interlobate region is a topographically diverse area formed between the retreating Saginaw Lobe and the Huron-Erie Lobe in Michigan. There are steep hills and an incredible number of small lakes and wetlands that extend from north of Pontiac to south of Jackson. A second interlobate region occurs in the upper watershed of the Thames River in Ontario.
- The Fort Wayne-Defiance End Moraines are a series of moraines that form a distinct line of elevation that extends from Romeo, through Ann Arbor to Adrian, Mich.
- The Maumee Lakeplain is the vast plain on the western edge of southern Ontario. In Michigan, it extends from Blissfield in northern Ohio through Detroit into eastern Macomb County and southern St. Clair County. Features on the lakeplain include beach ridges, sand plains and water-lain moraines.



* *Albert, Dennis A. 1995. Regional landscape ecosystems of Michigan, Minnesota, and Wisconsin: a working map and classification. Gen. Tech. Rep. NC-178. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. Northern Prairie Wildlife Research Center Home Page. http://www.npwrc.usgs.gov/resource/1998/rlandscp/rlandscp.htm (Version 03JUN98).*

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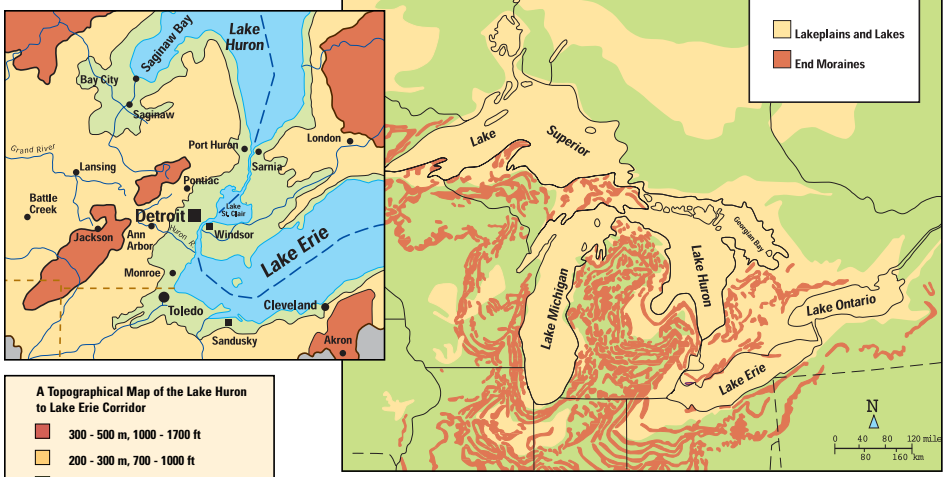


A Topographical Map of the Lake Huron to Lake Erie Corridor

- 300 - 500 m, 1000 - 1700 ft
- 200 - 300 m, 700 - 1000 ft
- 100 - 200 m, 300 - 700 ft

IMAGE REFERENCE: *THE GREAT LAKES ATLAS*, U.S. EPA GREAT LAKES NATIONAL PROGRAM OFFICE

The moraines of the Great Lakes Basin show the immense scale of the ice lobes that flowed over this region during the late phases of the Wisconsin Stage. The lobes came together when glacial coverage peaked about 20,000 years ago. They then retreated in fits and starts, building the pattern of recessional end moraines that define the landscape today.

POST-GLACIAL COMMUNITIES

ABOVE PHOTOGRAPHS COURTESY OF J. SHOSHANI

ILLUSTRATION ARTWORK BY MARGARET PURVES UNDER THE DIRECTION OF J. SHOSHANI

Above is an excavation at the Shelton mastodon site in northern Oakland County, Michigan. This site and others like it provide a record of the transition from the late glacial period to the Holocene Epoch in the Lake Huron to Lake Erie Corridor. The illustration directly above depicts the now-extinct mastodon and Scott's moose that lived in the spruce woodland habitat at the Shelton site 12,000 years ago. Evidence indicates the mastodon community moved into the region with the spruce forests and wet parkland environment that replaced the frigid tundra around 12,500 years ago. Between 11,000 and 10,000 years ago mastodons, mammoths, giant beavers and other large animals became extinct, most likely because of an abrupt global return to a cold, dry glacial climate (known as the Younger Dryas event) and hunting stress by Paleo-Indians who were entering North America. Dramatic warming 10,000 years ago at the end of the last glacial period allowed pine forests to replace spruce. As Earth continued to warm during the early Holocene Epoch, deciduous hardwood forests replaced pine and Archaic Indians moved into the region setting the stage for our modern world.

Soil

Soil may not be the most noticeable part of the scenery, but it is the foundation on which all other life forms depend. Soil gives rise to an incredible variety of natural communities, as different soil types support different kinds of vegetation, which in turn support other life.

To understand the soils of the Lake Huron to Lake Erie Corridor, it is important to understand the sediments deposited by the ancient glaciers. Glacial sediments are the basis, or parent material, from which soils have formed.

The Corridor's soils can be divided into three major classes. Soils that developed from: 1) variably-drained glacial tills; 2) well-drained sediments of outwash plains, eskers, beaches and kames; and 3) poorly-drained sediments of glacial lakes and bogs.

The Jackson Interlobate and Fort Wayne and Defiance Moraine regions have soils that developed from glacial till, outwash plains, eskers and kames. These soils range from excessively well-drained to loam (a rich soil composed of clay, sand and organic matter.) In contrast, the Maumee Lakeplain has poorly-drained loamy and clay soils that evolved from deposits of fine silts and clays left by the glacial lakes. Hardwood swamps normally occupy the flat, poorly-drained lakeplain. However this lakeplain also has ancient beaches and sand deposits that support tallgrass prairie and oak savanna. The development of soils also can be affected by the glacial landforms upon which they are built. For example, soils found at the top of a hill are different from those found at its base. Topography, climate and vegetation all affect the development of soils over time.

LINDSEY MSHLER

This farm in Livingston County sits atop outwash deposits that have very well-drained soils.

ROBERT STEWART

Urban centers like the City of Detroit act as heat sinks. Their large expanses of concrete hold heat, resulting in higher average temperatures in these areas.

Climate

The Great Lakes influence the climate of the Lake Huron to Lake Erie Corridor. The lakes moderate conditions on the land around them because their water warms and cools more slowly than inland areas in response to temperature changes. This results in a relatively long annual frost-free growing period of 160 to 180 days per year.

Average July temperatures range from 68 to 77 ºF (20 to 25 ºC) and average January temperatures range from 18.5 to 27.5 ºF (-7.5 to -2.5 ºC.) Precipitation averages 23.6 to 27.6 in (600 to 700 mm) per year.

A photograph from space of the Lake Huron to Lake Erie Corridor taken by NASA.

IMAGE COURTESY OF EARTH SCIENCES AND IMAGE ANALYSIS LABORATORY, NASA JOHNSON SPACE CENTER, HTTP://EOL.JSC.NASA.GOV

The Connecting Channels

The Lake Huron to Lake Erie Corridor links the upper Great Lakes with the lower Great Lakes.

The Lake Huron to Lake Erie Corridor, nearly 100 mi (160 km) long, is a pivotal link in the flow of water through the Great Lakes Basin. Water from the upper, colder Great Lakes – Superior, Michigan and Huron – funnels into the St. Clair River, passes through Lake St. Clair and flows through the Detroit River to enter the warmer, lower Great Lakes–Erie and Ontario.

Technically, because they do not have the traditional characteristics of river systems, the St. Clair River and the Detroit River are not rivers. Rather they, along with Lake St. Clair, form a connecting channel, or strait, that accepts water, nutrients and sediments from Lake Huron and delivers them to Lake Erie.

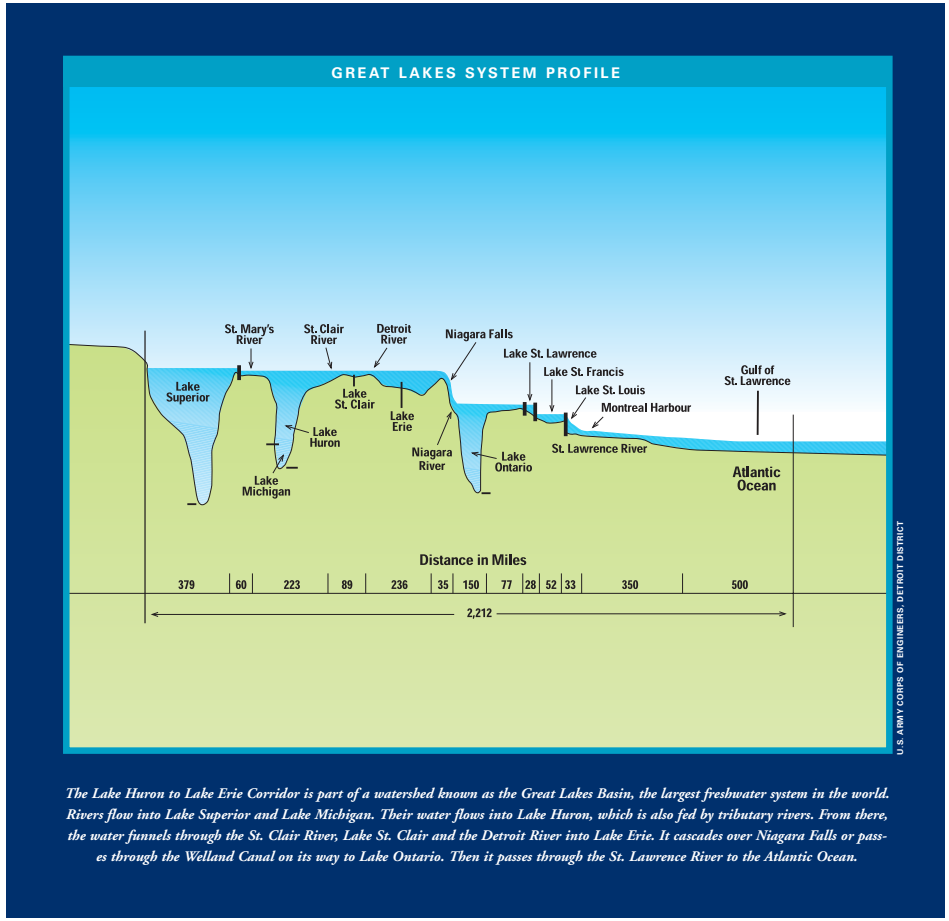
A map of the Lake Huron to Lake Erie Corridor

The St. Clair River, Lake St. Clair and Detroit River System

The St. Clair River is about 44 miles (70 km) long with very few bends. Its width ranges from 833 ft (250 m) at its narrowest point at the Blue Water Bridge to about 3,000 ft (900 m) before widening further near the St. Clair River Delta. The river's only islands are Fawn and Stag Islands, which are located in the upper channel. Water from Lake Huron enters the St. Clair River at a flow rate of nearly 200,000 gal (760,000 l) per second. It takes about 20 hours for water to travel from Lake Huron to Lake St. Clair.

The St. Clair River's outflow into Lake St. Clair slows considerably as the water moves around the many islands and through the bays and distribution channels of the St. Clair River Delta. Sediments have formed, and continue to shape, this delta which is a transitional environment between the St. Clair River and Lake St. Clair.

Lake St. Clair, shaped like a heart, is the shallowest and youngest of the Great Lakes. Its maximum natural depth is only 21.3 ft (6.5 m) Its greatest width is about 25 mi (40 km.)It covers a total area of 432 sq mi (1,115 sq km.) Depending on the wind, water stays in Lake St. Clair for two to 30 days, averaging nine days, before flowing into the Detroit River.



The Lake Huron to Lake Erie Corridor is part of a watershed known as the Great Lakes Basin, the largest freshwater system in the world. Rivers flow into Lake Superior and Lake Michigan. Their water flows into Lake Huron, which is also fed by tributary rivers. From there, the water funnels through the St. Clair River, Lake St. Clair and the Detroit River into Lake Erie. It cascades over Niagara Falls or passes through the Welland Canal on its way to Lake Ontario. Then it passes through the St. Lawrence River to the Atlantic Ocean.

The Detroit River is 32 mi (51 km) long, of varying width and occupied by numerous islands. Near the head of the river at Lake St. Clair are Belle Isle and Peche Island. From these islands, water flows along a single channel whose width ranges from 2,333 to 3,333 ft (700 to 1,000 m). In the lower Detroit River, the water flow spreads into several channels that wind around its many islands. The river gradually widens to more than 3.75 miles (6 km) as it empties into Lake Erie. The natural depth of the Detroit River ranges from 20 to 25 ft (6 to 7.6 m). Its flow rate is similar to that of the St. Clair River. On average, it takes about 20 hours for water to travel from Lake St. Clair to Lake Erie.

Construction of the St. Lawrence Seaway system in the 1950s resulted in creation of commercial navigation channels that altered the depth of the Lake Huron to Lake Erie Corridor. In the late-1950s, a 28 ft (8.3 m) channel was created in the St. Clair River, followed by one in Lake St. Clair. The channel through the Detroit River was completed in 1969.

The St. Clair River Delta is one of the largest deltas in the world.

The St. Clair Delta has three distinct depositional regions: The pre-modern delta was created 3,500 to 5,000 years ago during the Lake Nipissing Stage, when Lake St. Clair levels were about five ft (1.5 m) higher. The modern delta has formed, and continues to form, since that time. The pro-delta deposits are on the lake bottom; they provide the foundation for current sediments accumulated at and above the water line.

St. Clair River Delta

The St. Clair River Delta is the most significant landform of the Lake Huron to Erie Corridor and is a unique feature in the Great Lakes Basin. A delta is a geological formation that occurs when significant amounts of sediment are carried by a river and deposited into a receiving basin, in this case Lake St. Clair.

The sandy shorelines of southern Lake Huron are thought to be the main source of the sand and gravel that have created the St. Clair River Delta. The swift current of the St. Clair River is strong enough to carry these sediments to Lake St. Clair.

The bird's-foot shape of the St. Clair River Delta is similar to that of the Mississippi River Delta. It also shares many attributes with marine deltas because of its numerous islands, bays and distributary channels.

The St. Clair River Delta is always changing. While the river continuously carries more sediment to the delta, wind and water erosion constantly shape older deposits as they are exposed or submerged by changing water levels.

The St. Clair River Delta's many islands, bays and distribution channels have created a huge surface area of coastline that supports one of the largest coastal wetland systems in the Great Lakes.

The lower Detroit River's many islands provide valuable habitat for wildlife.

The shoreline of the St. Clair River Delta near Walpole Island.

The Movement of Water

Water Flows Downhill

Water flows downhill, from higher elevations to lower elevations, from land to waterways, from small streams into larger rivers, bays and lakes. It is important to remember that water and land connect. How we treat the land impacts the water.

The land surrounding a waterway is called a watershed, which means land from which water is shed. Some watersheds are large, covering hundreds of square kilometers and encompassing an entire river system. The drainage area of a single tributary or creek is known as a subwatershed.

TRISH BECKJORD

Water Also Rises

While water as a liquid or solid flows downhill, water as a vapor goes up.

The circulation of water is known as the hydrologic cycle. The hydrologic cycle has three primary parts: precipitation, evaporation and transpiration.

Precipitation is water that falls from the sky as rain, snow, sleet or hail. Precipitation that stays above ground is known as surface water. If surface water flows across the land, it is called runoff. Some runoff flows into puddles, streams, rivers and lakes. Other runoff is absorbed into the ground and becomes groundwater. Groundwater is drawn by gravity through cracks in the dirt until it reaches a zone of saturation, also known as an aquifer.

Evaporation is the change of water into a gas, or vapor. It then rises into the atmosphere. Most evaporation involves the water in bodies of water.

Transpiration is another way in which water re-enters the atmosphere, through vegetation.

Trees and other plants draw up water from the ground through their roots to feed on the nutrients. They release, or transpire, some of that water through their leaves back into the air.

The cycle continues: Water that evaporates and transpires will return to Earth again as precipitation.

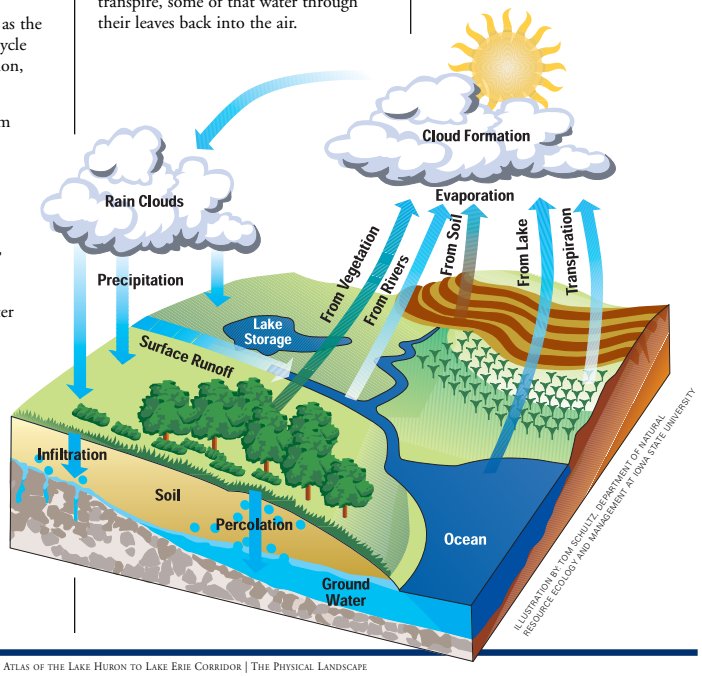


ILLUSTRATION BY TOM SCHULTZ, DEPARTMENT OF NATURAL RESOURCE ECOLOGY AND MANAGEMENT AT IOWA STATE UNIVERSITY

The details in these maps show how the moraines left by the glaciers bound the watersheds of southeastern Michigan that drain into the Lake Huron to Lake Erie Corridor.

Tributaries of the Lake Huron to Lake Erie Corridor

Tributaries are rivers, creeks and streams that flow into larger water bodies. In the St. Clair River, Lake St. Clair and Detroit River system, only a small percentage of water comes from tributaries. Nevertheless, the tributaries are important connections between these larger water bodies and the watersheds in which they exist.

Rivers and streams, as well as wetlands that border them, are known as riverine systems. In southeastern Michigan and southwestern Ontario, riverine systems also include many man-made ditches and drains. Various creeks flow directly into lower Lake Huron, the St. Clair River, Lake St. Clair, the Detroit River and upper Lake Erie.

River	Watershed Area		Primary Watershed Land Use
Black River	1,940 km2	(746 mi2)	Agriculture
Pine River	351 km2	(135 mi2)	Agriculture
Belle River	2,525 km2	(971 mi2)	Agriculture
Sydenham River	2,439 km2	(938 mi2)	Agriculture
Thames River	5,807 km2	(2,234 mi2)	Agriculture and Urban
Clinton River	1,976 km2	(760 mi2)	Urban, Suburban, and Rural
Rouge River	1,214 km2	(467 mi2)	Urban
Huron River	2,340 km2	(900 mi2)	Urban, Suburban, and Rural
Raisin River	2,782 km2	(1,070 mi2)	Agriculture