



US Army Corps
of Engineers
North Central Division

GREAT LAKES LEVELS

Update Letter No. 99

October 1, 1993

The Southwest Passage From Lake Huron to Lake Erie

In the early 1600s, explorers pushed inland from the Atlantic Ocean, learning about the interior as they went, or picking up information from stories told by the Indian bands. Although the St. Lawrence River provided the entrance into the Great Lakes, progress into Ohio Territory was halted by two barriers; the hostile Iroquois Nations and the mighty falls located on the Niagara River (Figure 1). Nevertheless, explorers were able to travel a

thousand miles into the wilderness by following the Ottawa River into Lake Nipissing and French River, eventually reaching Lake Huron through Georgian Bay. Others took northern routes through the Albany and Kenogami Rivers from Hudson Bay to Lake Superior and Georgian Bay. Thus, much of the early history of the Great Lakes was limited to the most northern lakes. As more and more people ventured

inland, it became a hotbed of warfare, fiercely fought by the Indians, the French, the British and frontiersmen. By the end of the 17th Century, many of the interior waterways, which extended as far west as the Mississippi River, had been mapped by the French explorers. To the historians, they left names such as Detroit, Duluth, St. Croix, St. Clair, Prairie du Chien, Dubuque, St. Louis and Vincennes. Figure 2 shows an



Figure 1. Early depiction of Niagara Falls (New York Public Library).

early map of the Great Lakes prepared in the 1700s. It was more than a century later that surveyors were able to accurately define the basin as we now know it.

In a previous Update Letter (No. 88), information was provided on early navigation within the Great Lakes and their connecting channels. This edition of the Update focuses on the middle lake connectors, the St. Clair River, Lake St. Clair and the Detroit River, which join Lakes Michigan-Huron with Lake Erie (Figure 3). Early history of the area, garnered from explorers, missionaries, traders and surveyors, indicates that Lake Michigan was originally known as the Lake of the Illinois and Lake Huron as Lake Orleans. These hardy individuals soon

came to respect the moods of these mighty lakes which could appear glassy and calm, yet could quickly turn into raging seas. This often required the canoeists to navigate close to shore and to seek shelter whenever storms occurred. An early French explorer was Nicolet, and he was convinced that only four major water bodies made up the Great Lakes. Unfortunately, he drowned in the St. Lawrence River in 1642, prior to the discovery of the fifth lake, Lake Erie.

The first commercial vessel to sail the Great Lakes was built by LaSalle, at Niagara in 1679. LaSalle, along with Tonty and Father Hennepin intended to sail the 45-ton Griffin into the upper lakes to bring back a fortune in furs (Figure 4). After crossing the waters of Lake Erie, the vessel

turned northward into the Strait of Detroit. On both sides of the river lay prairies with groves of fruit trees bordered with forests filled with wild game. Hennepin wrote "Those who will one day have the happiness to possess this fertile and pleasant Strait, will be very much obliged to those who have shown them the way." The Griffin continued the voyage across Lake St. Clair and up the St. Clair River, eventually reaching Lake Huron. A month later, the Griffin passed westward into Lake Michigan and anchored near one of the islands at the entrance to Green Bay. An advance party, along with a friendly Potawatomi chief, had collected a large store of furs. LaSalle elected to send the Griffin back to Niagara with the furs to satisfy his creditors. Once the

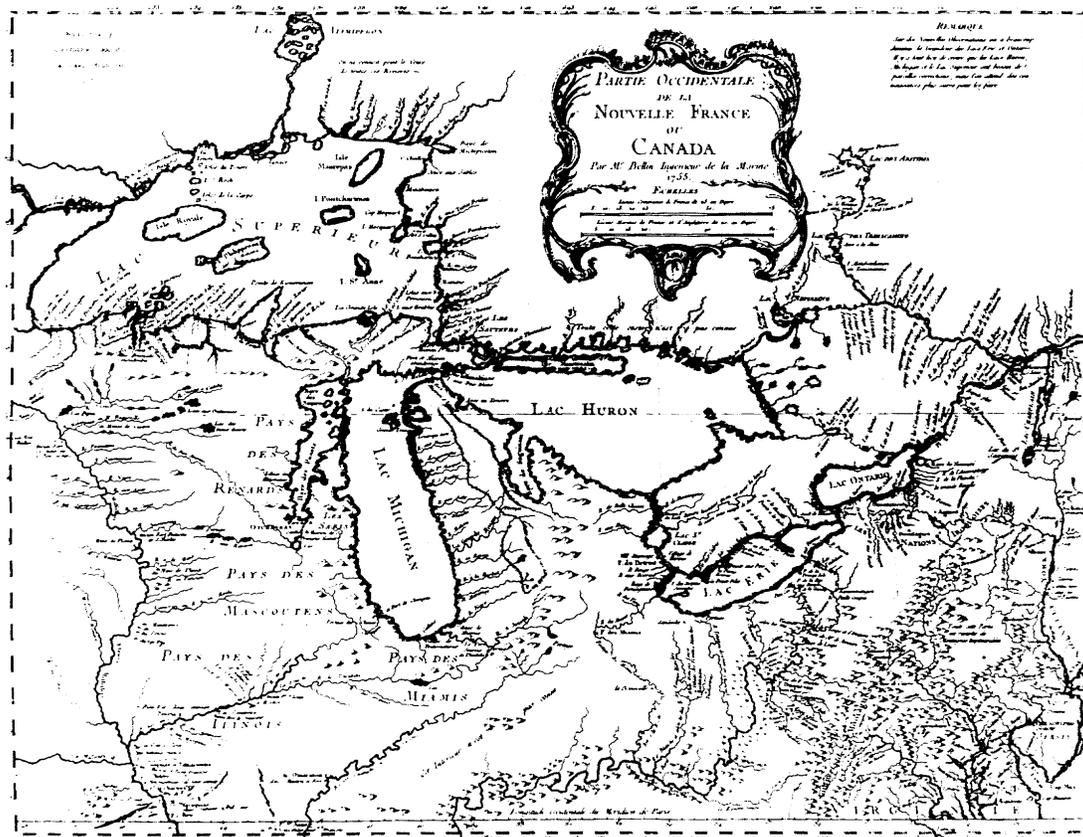


Figure 2. Early Map of Great Lakes (Detroit Public Library)

Griffin returned from Niagara, LaSalle intended to assemble a smaller vessel which he would launch in the Mississippi River. His intention was to follow the Mississippi to its outlet, hoping to eventually reach the West Indies. The Griffin set sail for Niagara on September 18, 1679 and was never seen again, becoming the first of many vessels to be lost on the Great Lakes.

St. Clair River

The St. Clair River has a length of about 39 miles, including the St. Clair Flats at its mouth. In its natural state, the St. Clair River had depths of 20 feet or more throughout most of its length, excluding

shoals. Near its mouth, the river was divided into several winding channels having depths of only four to six feet. Early efforts to colonize the area established a small post called Fort Joseph, near the present site of the Ft. Gratiot lighthouse at the head of the river.

This site was abandoned in 1688 in deference to the establishment of an encampment by Antoine Cadillac, which covered a small part of the ground now occupied by the City of Detroit. Improvements in the South Channel, including construction of the St. Clair Flats Canal, began in 1855, and in 1906, the renovated East and West Channels opened. On August 4, 1900, the Steamer Fontana was wrecked in the narrows at the head of the river and on September 22 of the same year, the Steamer Martin met the same fate. Only the superstructures and machinery of

these vessels were removed. Their hulls still lie on the river bottom near the west shore, buried in sand. In 1908, commercial interests began to remove sand and gravel from the river bed near its mouth. Various dredging projects in the 1920s, 1930s and 1960s led to the creation of the present day 27-foot project for commercial navigation. Today, the river falls about five feet between Lake Huron and Lake St. Clair and its flow averages 183,000 cubic feet per second (cfs). The international boundary splits the river between Canada and the United States. Several of the larger cities located along the banks of the St. Clair River are Sarnia and Point Edward, Ontario, on the Canadian side and Port Huron, Marysville, Marine City, St. Clair and

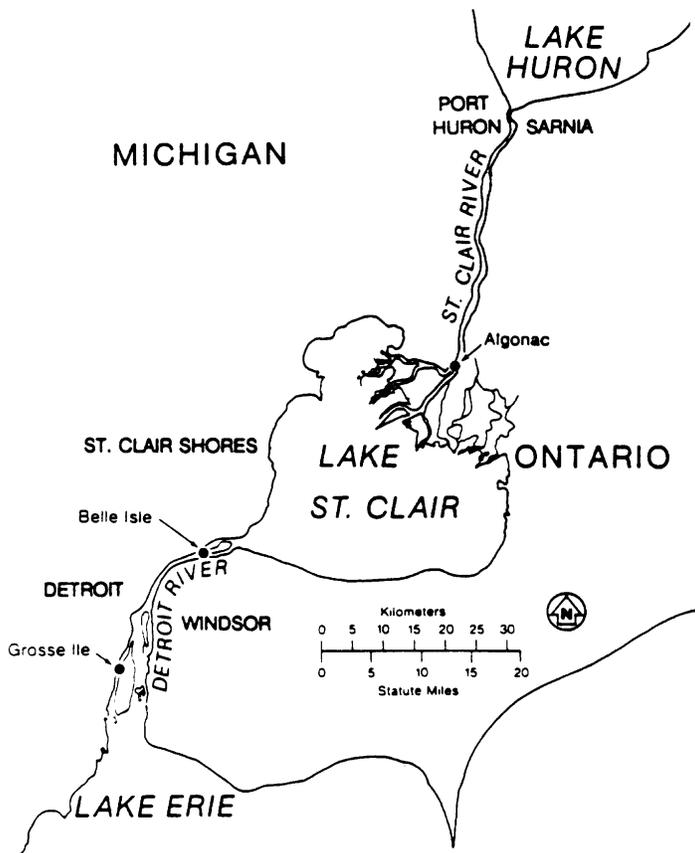


Figure 3. Map of St. Clair and Detroit Rivers.

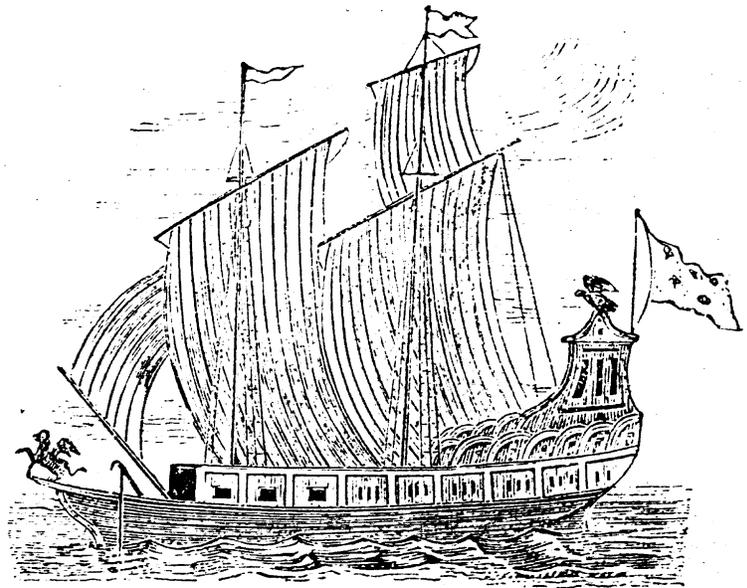


Figure 4. The Griffin.

Algonac, Mich. on the United States side.

Lake St. Clair

Lake St. Clair is about 26 miles long and 24 miles wide and has an average depth of 11 feet. It is bisected by a 27-foot deep dredged navigation channel from the mouth of the St. Clair River to the head of the Detroit River. The international boundary also transects the Lake, separating the Canadian and United States waters. Descendants of many Indian tribes, including Hurons, Ottawa, Chippewa, Sac and Fox, Miami, Potawatomi, Delawares, and Shawnee, reside on Canadian reservations at Walpole Island in Lake St. Clair and near Chatham, Ontario. The shoreline of the lake is heavily populated, primarily with summer homes and the Canadian cities of Belle River and Tecumseh, Ontario; and New Baltimore, Mount Clemens, St. Clair Shores and the Grosse Pointes in Michigan, on the United States side.

In 1904, Henry Ford took advantage of the fact that Lake St. Clair generally freezes over during the winter to set a new auto world speed record of 93 mph by racing across the ice. This broke the previous record of 60 mph set by his friend and oftentimes driver, Barney Oldfield. The notoriety further enhanced Ford's reputation as a leader in the burgeoning automobile industry.

Detroit River

The Detroit River is about 32 miles long from its head at the Windmill Point Light to its mouth

at the Detroit River Light in Lake Erie. The river falls about three feet in this reach and contains about 15 islands. The upper reach extends from Lake St. Clair to the head of Fighting Island, about 13 miles. In this reach, the river consists of a single channel about half a mile wide, except at its head, where it is divided by Peche Island and Belle Isle. This reach is generally deep. The bottom consists of sand and clay and the channel banks are quite steep. The lower reach is broad (almost four miles wide) with several islands and shallow expanses. In the upper part of this reach, the banks rise with a gentle slope and the bottom consists of sand, clay, boulders and rock. In the six mile stretch from just downstream of Fighting Island to the south end of Bois Blanc Island, the bottom is mainly bedrock and boulders. This has required extensive rock excavation and dredging to provide present day navigation channels of suitable width and depth. Most of this dredging took place from 1910 to 1961. Three major navigation channels are located in the lower river. From the head of Fighting Islands, the Trenton Channel branches west from the main navigation route (Fighting Island Channel) and separates Grosse Ile from the U.S. mainland. River depths at the south end of the Trenton Channel are less than 10 feet and do not permit navigation of deep-draft vessels. Further upstream, at the head of Stony Island, the main navigation route (Ballards Reef Channel) divides into the Livingstone Channel, to accommodate downbound traffic (west of Bois Blanc Island) and the Amherstburg Channel, to

accommodate upbound traffic (between Bois Blanc Island and the Canadian mainland). The international boundary approximately splits this waterway.

Although Father Hennepin described the Strait when he traversed the Detroit River in the Griffin in 1679, historians are not sure who was the first European visitor to Detroit. Some believe that a young French explorer named Adrien Joliet canoed up the Detroit River in 1669, and may possibly have preceded by French *coureurs-de-bois*, or their waterborne counterparts, the *voyageurs* (Figure 5). This hardy breed was more intent on hunting or trading for furs than documenting their travels. The fur trade at this point in time had reached 200,000 pelts per year.

In 1701, a young professional soldier of France, Antoine Laumet de la Mothe Cadillac, was sent by Frontenac, with the blessing of King Louis XIV, to colonize the west on a permanent basis. He believed that the northern Great Lakes region, such as the settlement at Michilimackinac was too cold and barren. He elected to go to a location on the lower lakes where he was told the land was fertile and the waters narrowed and a defense could be made against British intrusion. Many of these stories came from the Indians, who called the region Yondotega (Great Village), Waweatunong (Bend in the River) and Karontaen (Coast of the Straits). Thus, Detroit (the strait), the city on the Detroit River, was established. Cadillac constructed a stockade and called it Fort Ponchartrain, named after one of his officers (Figure 6). It was



Figure 5. Voyageurs (State of Michigan Archives).

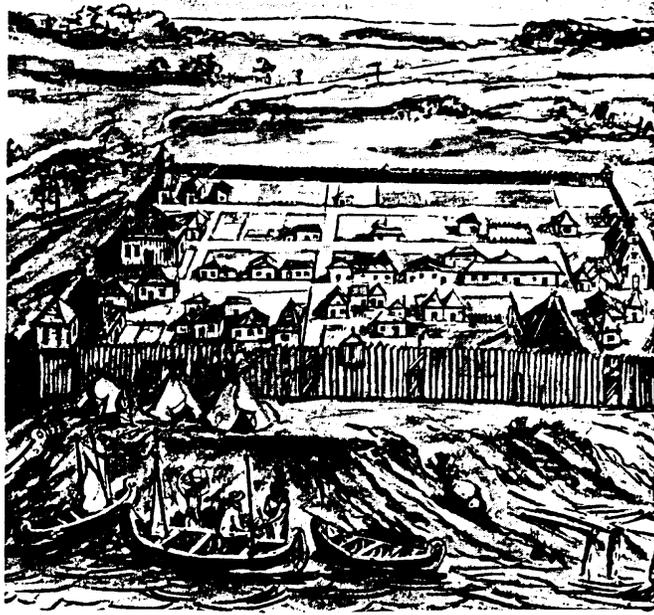


Figure 6. Fort Ponchartrain (Detroit Public Library).

located approximately where downtown Detroit now exists. Following the battle on the Plains of Abraham at Quebec City and the capitulation of the French in 1760, Detroit and all remaining French possessions were turned over to the British. In the ensuing years, Detroit withstood several violent skirmishes with Indian tribes and was an important bastion during the Revolutionary War. It took another 15 years after the end of that war before it was finally turned over to the United States in 1796. The British garrison left the fort and crossed the Detroit River and located at Fort Malden near Amherstburg, Ontario. Many Detroit residents of British descent, not wishing to become U.S. citizens, also moved across the Detroit River to what is now Windsor, Ontario. Detroit withstood the Great Fire of 1805 and the War of 1812, and by the 1820s and 1850s, became a port of debarkation for thousands of new settlers who pushed into the interior. Michigan was admitted to the Union as the twenty-sixth State in 1837. With the advent of the automobile, and Detroit's enviable location to natural resources, transportation links and skilled workers, it quickly became known as the Motor City, and played an important part in both World Wars. Following the opening of the St Lawrence Seaway in the late 1950s, Detroit became not only an important Great Lakes' port but also a vital link in overseas transport. The St. Clair River-Lake St. Clair-Detroit River system remains an important connector in the Great Lakes region for both commerce and recreation transiting the

2,000 miles from Duluth, Minnesota to the Atlantic Ocean.

When describing the Great Lakes, we sometimes provide a yardstick for comparative purposes. For example, the Great Lakes are often described as possessing 20 percent of the world's surface fresh water. In that vein, following are facts on the Detroit River:

*It takes about 21 hours for one drop of water to travel the length of the river.

*About 120 billion gallons of water flow past the Ambassador Bridge between Detroit-Windsor, every day.

*More than four million people in Michigan and Ontario depend on the river for their drinking water.

*At least 65 species of fish inhabit the river's waters, including many game fish. More than 300 species of birds have been identified in the Detroit, Michigan-Windsor, Ontario area.

*An estimated three million birds pass through the area and stop for feeding and rest during semi-annual migrations.

Great Lakes Precipitation and Levels

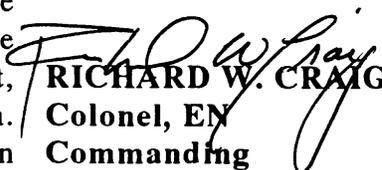
Precipitation on the Great Lakes basin has varied widely so far this year. The cumulative precipitation, however, was above normal for the overall Great Lakes Basin.

The Great Lakes generally experienced a trend of well above average levels except, for Lake Superior which was only slightly above average and Lakes Michigan-Huron which were moderately above average. The lakes also experienced their

seasonal peaks at the usual time with the exception of Lakes Erie and Ontario which peaked more than a month earlier than normal

Lake Ontario Regulation

During February through August, the International Joint Commission approved implementation of Criterion (k) to help alleviate the riparian flooding conditions on Lake Ontario. The extraordinary overdischarge actions by the Board, taken during this period, reduced the Lake Ontario level peak by 51 centimetres (20 inches). Currently, the outflows for the weekly regulation of Lake Ontario are generally those of the Regulation Plan 1958-D.


RICHARD W. CRAIG
Colonel, EN
Commanding

Great Lakes Basin Hydrology

With the exception of Lake Superior, precipitation on the basins of the Great Lakes was above average for September. For the second month in a row, below average precipitation fell on the Lake Superior basin, contrasting with the above average tenor seen so far in 1993. The above average precipitation on the Lakes Michigan-Huron, Erie and Ontario basins was in keeping with the year's higher trend. For the year to date, precipitation is about 10% above average for the entire Great Lakes basin. In September, the net supply of water to each of the Great Lakes was below average. Table 1 provides September precipitation and water supply information for all of the Great Lakes.

In comparison to their long-term (1900-1992) averages, the September monthly mean water levels of Lakes Superior, Michigan-Huron, St. Clair and Erie were 3, 10, 15 and 12 inches, respectively, above average, while Lake Ontario was at its average level. Shoreline residents on Lakes St. Clair and Erie, and to a lesser extent Lakes Michigan-Huron, are cautioned to continue to be alert to adverse weather conditions, as these could compound an already high lake level situation. Further information and advice will be provided by the Corps of Engineers should conditions worsen.

**Table 1
Great Lakes Hydrology¹**

PRECIPITATION (INCHES)								
BASIN	SEPTEMBER				YEAR-TO-DATE			
	1993 ²	Average (1900-1991)	Diff.	% of Average	1993 ²	Average (1900-1991)	Diff.	% of Average
Superior	3.2	3.5	-0.3	91	24.9	23.0	1.9	108
Michigan-Huron	3.9	3.5	0.4	111	27.3	24.1	3.2	113
Erie	5.0	3.1	1.9	161	28.3	26.7	1.6	106
Ontario	3.6	3.2	0.4	112	27.0	26.0	1.0	104
Great Lakes	3.8	3.4	0.4	112	26.7	24.4	2.3	109

LAKE	SEPTEMBER WATER SUPPLIES ³ (CFS)		SEPTEMBER OUTFLOW ⁴ (CFS)	
	1993 ²	Average (1900-1991)	1993 ²	Average (1900-1991)
Superior	15,000	73,000	84,000	84,000
Michigan-Huron	-7,000	31,000	204,000 ⁵	194,000
Erie	-34,000	-18,000	219,000 ⁵	203,000
Ontario	0	5,000	278,000	247,000

¹Values (excluding averages) are based on preliminary computations.

²Estimated.

³Negative water supply denotes evaporation from lake exceeded runoff from local basin.

⁴Does not include diversions.

⁵Reflects effects of ice/weed retardation in the connecting channels.

CFS = cubic feet per second.

For Great Lakes basin technical assistance or information, please contact one of the following Corps of Engineers District Offices:

For NY, PA, and OH:
COL Walter C. Neitzke
Cdr, Buffalo District
U.S. Army Corps
of Engineers
1776 Niagara Street
Buffalo, NY 14207-3199
(716) 879-4200

For IL and IN:
LTC David M. Reed
Cdr, Chicago District
U.S. Army Corps
of Engineers
River Center Bldg (6th Flr)
111 North Canal Street
Chicago, IL 60606-7206
(312) 353-6400

For MI, MN, and WI:
COL Brian J. Ohlinger
Cdr, Detroit District
U.S. Army Corps
of Engineers
P.O. Box 1027
Detroit, MI 48231-1027
(313) 226-6440 or 6441