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Lake Superior Basin
Michigan State University Cooperative Extension Service
Michigan SeaGrant
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LAKE SUPERIOR

Lake Superior is the largest of the Great Lakes in surface area and volume. Lake Superior could contain all the other Great Lakes plus three more lakes the size of Lake Erie. Water flows into the lake from many small rivers and streams. The Long Lac and Ogoki diversions in Canada channel water into Lake Superior that would otherwise flow into Hudson Bay. By order of the International Joint Commission, the lake's level, controlled by gates on the St. Marys River at Sault Ste. Marie, may not exceed 602 ft (183 m) above sea level. Each year a small percentage of the lake's water flows out through the St. Marys River, and it takes almost two centuries for the water to be completely replaced (retention time).

The Lake Superior drainage basin is rich in natural resources and scenic beauty. It is sparsely populated and economically dependent on its natural resources, which include metals, minerals, forests and recreation/tourism opportunities such as national lakeshores and national/state/provincial parks. It is particularly known for its clear, cold water and agate beaches. A "circle tour" guides highway travelers around the lakeshore. Many shipwrecks in Lake Superior are now protected in bottomland preserves and accessible to recreational divers.

In 1985, scientists using a submersible vessel descended for the first time to the deepest part (-1,333 ft./-405 m) of Lake Superior near the Pictured Rocks National Lakeshore in Michigan waters.

WATER USE

The Great Lakes provide water for many purposes: residential, commercial and institutional facilities; agricultural operations; industrial processes; electric power generation; navigation; sanitation; recreation; and habitat for fish, waterfowl and other aquatic organisms. In 1987, the Great Lakes states and provinces established at the Great Lakes Commission a regional water use data base for the Great Lakes basin and the individual lakes. However, as of 1989, it was not yet possible to obtain accurate information for all categories of water use in Lake Superior.

LAKE SUPERIOR



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Improvements: In 1985, the Great Lakes states and provinces agreed to clean up and restore the AOCs. Each jurisdiction is developing "remedial action plans" (RAPs) to control and stop existing sources of pollution and restore water quality in its AOCs. The governments will report to the IJC regularly on progress in developing and implementing the RAPs. The Council of Great Lakes Governors has established a Great Lakes Protection Fund to support research on cleaning up toxic contamination.

SPONSORS/INFORMATION SOURCES

MICHIGAN SEA GRANT COLLEGE PROGRAM

Michigan State University
334 Natural Resources Building
East Lansing, MI 48824-1222 (517) 353-9568
or

The University of Michigan
2200 Bonisteel Boulevard
Ann Arbor, MI 48109 (313) 764-1138

International Joint Commission
Great Lakes Regional Office
100 Ouellette Avenue, Eighth Floor
Windsor, ON N9A 6T3 (519) 256-7821
or
P. O. Box 32869
Detroit, MI 48232-2869 (313) 226-2170

CANADA-ONTARIO AGREEMENT

Environment Canada
Communications Directorate
25 St. Clair Avenue East, Room 600
Toronto, ON M4T 1M2 (416) 973-6467
or

Ontario Ministry of the Environment
Public Information Centre
135 St. Clair Avenue West
Toronto, ON M4V 1P5 (416) 323-4321

Great Lakes Commission
The Argus Building II
400 Fourth Street
Ann Arbor, MI 48103-4816 (313) 665-9135

Institute of Water Research

ECONOMIC IMPORTANCE

Mining: Supplies the U.S. with 97 percent of its iron ore.

Forestry: Important pulp, paper, firewood, and lumber producing region of Canada and the United States. Michigan and Minnesota produce approximately \$70 million worth of softwood and hardwood forest products. Michigan is a leading Christmas tree producer.

Shipping: Lake Superior ports ship iron ore, grain, coal and potash.

Fishery: Commercial fishing — Major species: Lake whitefish, lake trout, cisco (lake herring) and rainbow smelt. Value of fish caught in U.S. waters in 1986 was \$1,829,143 (U.S.) for 2,726,861 lb (1,239,482 kg). Lake whitefish was the principal species caught in U.S. waters. Value of fish caught in Canadian waters in 1986 was \$1,360,145 (CDN) for 1,477,140 kg (3,257,094 lb). Lake herring was the principal species caught in Canadian waters. Sportfishing — In 1985, anglers spent more than 2 million days fishing on Lake Superior, primarily for lake trout, salmon and walleye. The estimated economic impact was \$36 million (U.S.) from angling in U.S. waters and \$26 million (CDN) from Canadian waters.

Tourism: A major source of revenue for regional economy. In 1987, the four Canadian and U.S. national parks and lakeshores had more than 650,000 visitors. In 1984, 23,000 people (divers and their companions) who visited the Alger Underwater Preserve added \$6.8 million in gross revenues to the local economy.

RESOURCE ISSUES

Lake Superior is the most pristine Great Lake. Because fewer people live in the region, the lake's resource problems are not as extensive as those of some of the other Great Lakes.

Problem: Shoreline erosion.

Source: Placement of buildings and other structures close to the shoreline, and natural causes such as wave action.

Effects: Aesthetic impacts, destruction of fish spawning beds, property damage, water made unsuitable for fishing and swimming because of soil and debris deposits in nearshore areas.

Improvements: Public education has helped property owners re-examine the advisability of locating structures on erodible shoreline.

Problem: Water quality. Industrial, navigational, municipal and recreational uses of the Great Lakes add pollutants to the ecosystem. Some of them may stay in the water or lake sediments for hundreds of years and affect other uses of the water. Pollution is usually most severe in major population centers on Great Lakes rivers, harbors and connecting channels. The types of problems include: toxic substances in water, sediments and fish; damage to other organisms living in or depending on the water; elevated levels of bacteria; high levels of phosphorus and other nutrients; heavy metals; and aesthetic problems.

The types and severity of water quality problems vary throughout the Great Lakes basin. However, the International Joint Commission (IJC) and Great Lakes jurisdictions have designated 42 "areas of concern" (AOCs) because of their special water quality problems. Eight AOCs are in the Lake Superior basin.

Sources: Primary sources or pathways of pollution include the atmosphere (which brings toxic substances from distant places), pulp and paper mills, municipal wastewater treatment facilities and hazardous waste sites.

Effects: The effects of water quality problems vary with the types of pollutants in the area. However, most Lake Superior AOCs are affected by most of the pollution problems cited above.

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or

The Centre for the Great Lakes Foundation
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Toronto, ON M5S 1W5 (416) 921-7662

Other publications in this series are: Great Lakes Basin (E-1865, MICHU-SG-89-503); Lake Michigan (E-1867, MICHU-SG-89-505); Lake Huron (E-1868, MICHU-SG-89-506); Lake Erie (E-1869, MICHU-SG-89-507); and Lake Ontario (E-1870, MICHU-SG-89-508). For additional copies, contact one of the organizations listed above, your county Extension office, or the MSU Bulletin Office, 10-B Agriculture Hall, East Lansing, MI 48824-1039.

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25 cents (Single copy free to Michigan residents)

FILE: 28.32 or 23.21 (Great Lakes Resource Management)

Lake Superior

Lake Superior is the largest freshwater lake in the world (by surface area).

LAKE SUPERIOR DIMENSIONS

LENGTH	350 mi / 563 km
BREADTH	160 mi / 259 km
DEPTH	489 ft / 149 m average; 1,335 ft / 407 m maximum
VOLUME	2,934 mi ³ / 12,230 km ³
WATER SURFACE AREA	31,700 mi ² / 82,100 km ²
DRAINAGE BASIN AREA	49,300 mi ² / 127,700 km ²
SHORELINE LENGTH	2,726 mi / 4,385 km (including islands)
ELEVATION	600 ft / 183 m
OUTLET	St. Marys River to Lake Huron
RETENTION/REPLACEMENT TIME	191 years
POPULATION	474,150 (U.S.); 155,675 (Canada)

LAND AND SHORELINE USE

The percentages below were calculated in the 1970s, based on information collected by the former Great Lakes Basin Commission. A study group formed by the International Joint Commission began to assemble current shoreline use information in 1987.

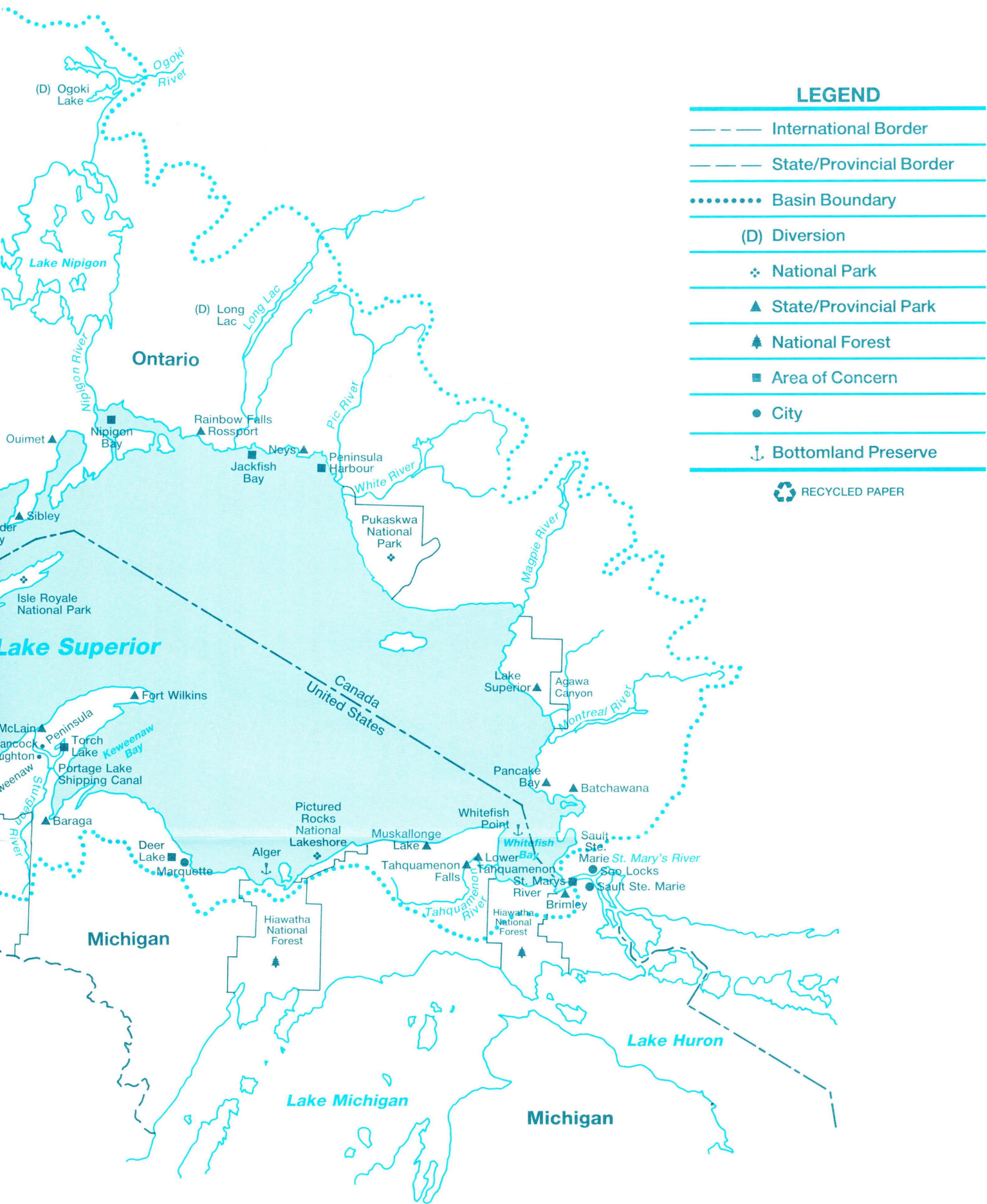
LAND USE (Percent of total)

	Canada	U.S.	Basin
Agricultural	.5	6	3
Residential/industrial	.1	3	1
Forest	98.7	87	91
Other	.7	11	5

SHORELINE USE (Percent of total)

Information not available





LEGEND

- — — International Border
 - — — State/Provincial Border
 - Basin Boundary
 - (D) Diversion
 - ❖ National Park
 - ▲ State/Provincial Park
 - ▲ National Forest
 - Area of Concern
 - City
 - ⚓ Bottomland Preserve
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