



Location of MLRA 93B in Land Resource Region K.

93B—Superior Stony and Rocky Loamy Plains and Hills, Eastern Part

This area is in Michigan (86 percent) and Wisconsin (14 percent). It makes up about 6,900 square miles (17,880 square kilometers). The cities of Hurley and Mellen, Wisconsin, and Munising, Marquette, Houghton, Baraga, and Ironwood, Michigan, are in this MLRA. U.S. Highways 2, 41, and 45 cross the area. The K.I. Sawyer Air Force Base is in this area. The L'Anse, Keweenaw Bay, and Lac Vieux Desert Indian Reservations are in the part of the area in Michigan. The MLRA includes parts of the Ottawa and Hiawatha National Forests and parts of the Escanaba River, Copper Country, Baraga, and Lake Superior State Forests in Michigan; the Chequamegon National Forest in Wisconsin; and Isle Royale National Park, which is offshore in Lake Superior.

Physiography

This area is almost entirely in the Superior Upland Province of the Laurentian Upland. The eastern end of the area is in the Eastern Lake Section of the Central Lowland Province of the Interior Plains. This area has many glacial landscape features and is dissected by numerous streams and rivers. It is characterized by a mixture of high-relief bedrock-controlled moraines, end moraines, and ground moraines and nearly level areas of glaciofluvial deposits. Elevation generally ranges from 600 to 1,970 feet (185 to 600 meters). Mt. Arvon, the highest point in Michigan, rises to an elevation of 1,979 feet (603 meters). The peaks of some bedrock-

controlled moraines in the steeper areas rise more than 300 feet (90 meters) above the adjacent lowlands.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Southern Lake Superior-Lake Superior (0402), 67 percent; Northwestern Lake Michigan (0403), 20 percent; Western Lake Superior (0401), 11 percent; and Chippewa (0705), 2 percent. Numerous rivers drain this MLRA, and many of the rivers, such as the Escanaba, Paint, Michigamme, and Fence Rivers in Michigan, empty into Lake Michigan. The Chocolay, Sturgeon, Ontonagon, Montreal, and Presque Isle Rivers in Michigan drain into Lake Superior.

Geology

This area is underlain dominantly by Precambrian igneous or metamorphic bedrock that contains significant amounts of commercially valuable iron and copper. A smaller percentage of the area is underlain by Cambrian or Precambrian sandstone.

The surface of the area is covered by glacial till derived from these bedrock types, glaciofluvial deposits of very diverse origin, and organic deposits.

Climate

The average annual precipitation ranges from 30 to 38 inches (760 to 965 millimeters) in most of this area. It is 26 to 30 inches (660 to 760 millimeters) just inland from Chequamegon Bay in Wisconsin and Keweenaw Bay in Michigan. About two-thirds of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. Snow is common in winter. The average annual snowfall is more than 200 inches (510 centimeters) in the areas adjacent to Lake Superior. The average annual temperature is 38 to 43 degrees F (3 to 6 degrees C). The freeze-free period averages about 140 days and ranges from 100 to 180 days. It is longest adjacent to Lake Superior and shortest in inland areas that are farthest from the Great Lakes, in the part of the MLRA in Michigan.

Water

Following are the estimated withdrawals of freshwater by use in this MLRA:

Public supply—surface water, 73.0%; ground water, 8.3%

Livestock—surface water, 8.6%; ground water, 10.1%

Irrigation—surface water, 0.0%; ground water, 0.0%

Other—surface water, 0.0%; ground water, 0.0%

The total withdrawals average 6 million gallons per day (23 million liters per day). About 18 percent is from ground water sources, and 82 percent is from surface water sources. Lake Superior and the numerous inland lakes and streams in this MLRA are the sources of surface water. This water is of good quality and is suitable for almost all uses.

Ground water can be obtained from glacial deposits in most of this area, except for a large part of the northern half. The water is in sand and gravel outwash, in silty and sandy glacial lake sediments, and in buried sand and gravel lenses within the glacial till. The water is of good quality and is suitable for almost all uses with minimal treatment. It typically has about 200 to 250 parts per million (milligrams per liter) total dissolved solids. The water from some wells has very high levels of iron, especially in the southern half of the area.

A Precambrian Sandstone aquifer occurs south and west of Keweenaw Bay, in the part of this area in Michigan. Little water-quality data are available for this aquifer. The Lake Superior Sandstone and Precambrian lava flow aquifers occur in the southwestern part of this area, in Wisconsin. Water from these aquifers is very similar in quality to the water in the glacial deposits.

Soils

The dominant soil orders in this MLRA are Histosols and Spodosols. The soils in the area dominantly have a frigid soil temperature regime, an aquic or udic soil moisture regime, and mixed or isotic mineralogy. They are shallow to very deep, excessively drained to very poorly drained, and sandy to clayey.

Haplorthods (Amasa, Sundog, Pence, Padus, and Channing series) formed in loess over outwash on outwash plains, valley trains, and kames.

Fragiorthods (Gogebic, Munising, Wabeno, Champion, and Schweitzer series) formed in till or loess over till on till plains and moraines.

Haplorthods formed in sandy glacial deposits on

outwash plains, valley trains, and moraines (Kalkaska, Karlin, Crosswell, Au Gres, and Rubicon series), in till or loess over till (Saron series), in till over igneous or metamorphic bedrock (Peshekee, Michigamme, Dishno, and Arcadian series), and in sandy eolian deposits (Rousseau and Deer Park series) on dunes and lake plains. Haplosaprists (Carbondale, Cathro, Lupton, Markey, and Tawas series) formed in organic material in depressions on lake plains, outwash plains, and till plains.

Biological Resources

The soils on uplands in this area support natural stands of mixed northern hardwoods and pine. Sugar maple, oak, white ash, elm, yellow birch, white pine, jack pine, and red pine are the principal tree species. Lowland areas support both mixed hardwoods and conifers. Elm, soft maple, black ash, black spruce, tamarack, and northern white-cedar are the major species.

Some of the major wildlife species in this area are white-tailed deer, black bear, red fox, raccoon, muskrat, cottontail rabbit, snowshoe hare, squirrel, pheasant, ruffed grouse, woodcock, mallard, blue-winged teal, and wood duck. Fishing occurs in Lake Superior, in other lakes, and in streams and rivers. The species of fish in the area include lake trout, rainbow trout, brook trout, walleye pike, largemouth bass, smallmouth bass, bluegill, black crappie, yellow perch, and northern pike.

Land Use

Following are the various kinds of land use in this MLRA:

Cropland—private, 2%

Grassland—private, 1%

Forest—private, 68%; Federal, 20%

Urban development—private, 2%

Water—private, 3%; Federal, 2%

Other—private, 2%

Almost nine-tenths of this MLRA is forested, and nearly four-fifths of the forestland is privately owned. Feed grains and hay are the chief crops grown on the limited acreage used as cropland. Much of the grain is fed to dairy cattle and other livestock on the farms where it is grown. The rest of the farmland in the area is about equally divided between pasture and farm woodlots. Recreation is an important land use, especially along the major streams and on sites bordering Lake Superior.

The major soil resource management concerns are water erosion, soil wetness, soil fertility, and soil tilth. Conservation practices on cropland generally include crop rotations, conservation tillage systems (especially no-till systems), contour farming, contour stripcropping, and grassed waterways. A combination of surface and subsurface drainage systems is needed in most areas of poorly drained soils.