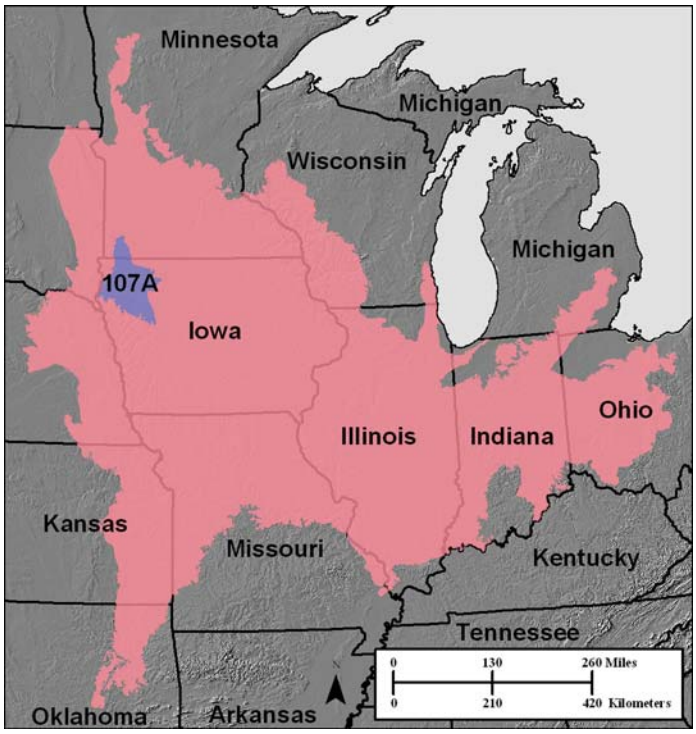

Location of MLRA 107A in Land Resource Region M.

107A—Iowa and Minnesota Loess Hills

This area is in Iowa (89 percent) and Minnesota (11 percent). It makes up about 4,470 square miles (11,590 square kilometers). The towns of Le Mars, Sioux Center, Cherokee, and Spencer, Iowa, and Adrian and Lismore, Minnesota, are in this MLRA. Interstate 90 passes through the northern part of the MLRA. The area has only a few State parks.

Physiography
This area is in the Central Lowland Province of the Interior Plains. The western half of the area is in the Dissected Till Plains Section of the province, and the eastern half is in the Western Lake Section. This MLRA is mostly an undulating to rolling glaciated plain with some nearly level, broad ridgetops and some steep slopes bordering the major stream valleys. Nearly level, broad valley floors are along a few large rivers. The natural drainage network is well established and commonly is described as dendritic, resulting in few lakes and ponds. Elevation ranges from 1,115 feet (340 meters) in the lowest valleys to 1,700 feet (520 meters) on the highest ridges. Local relief is mainly 10 to 100 feet (3 to 30 meters), but valley floors can be 80 to 200 feet (25 to 60 meters) below the adjacent uplands. Also, some upland flats and valley floors have local relief of only 3 to 6 feet (1 to 2 meters).

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Missouri-Little Sioux (1023), 74 percent; Missouri-Big Sioux (1017), 25 percent; and Des Moines (0710), 1 percent. The Rock River, a tributary of the Big Sioux River, and the Little Sioux and Floyd Rivers, tributaries of the Missouri River, drain this MLRA.

Geology
The western half of this MLRA is underlain by pre-Illinoian glacial till, which was deposited more than 500,000 years ago and has since undergone extensive erosion and dissection. The eastern half is underlain by the much younger Wisconsin-age till layer that was deposited between 20,000 and 30,000 years ago. Both till surfaces are covered by about 4 to 20 feet (1 to 6 meters) of loess on the hillslopes and by Holocene alluvium in the drainageways. The Quaternary deposits range from 150 to 450 feet (45 to 135 meters) in thickness and are underlain by Cretaceous bedrock consisting of sandstone and shale.

Climate
The average annual precipitation in this area is 26 to 31 inches (660 to 790 millimeters). Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. About 10 percent of the precipitation occurs as snow in the winter. The average annual temperature is 44 to 48 degrees F (7 to 9 degrees C). The freeze-free period averages about 165 days and ranges from 155 to 175 days.

Water
Following are the estimated withdrawals of freshwater by use in this MLRA:
Public supply—surface water, 8.2%; ground water, 31.2%
Livestock—surface water, 3.6%; ground water, 57.0%
Irrigation—surface water, 0.0%; ground water, 0.0%
Other—surface water, 0.0%; ground water, 0.0%

The total withdrawals average 12 million gallons per day (45 million liters per day). About 88 percent is from ground water sources, and 12 percent is from surface water sources. Precipitation is the principal source of moisture for crops. Sediment, nutrients, and pesticides from agricultural activities impair the major streams and rivers in this area. The surface water, however, is still used for livestock and public

supplies in some parts of the area.

Ground water is obtained from buried channel aquifers, glacial drift aquifers, and alluvial deposits of unconsolidated sand and gravel throughout most of this area. The glacial till is a poor source of ground water; yields to wells are small or negligible, and the water commonly is highly mineralized. The buried channels are sources of moderate or moderately large supplies of generally good-quality water. The mineral content of the water may be high if this aquifer is hydraulically connected to bedrock aquifers beneath it. Alluvial deposits are extensive along the Rock River in the part of this area in Minnesota. This aquifer can be a source of large supplies of generally good-quality water. It has water with a median level of 350 parts per million (milligrams per liter) total dissolved solids. The water in the shallow aquifers in Iowa has a median level of total dissolved solids of about 500 parts per million (milligrams per liter). The ground water in this MLRA is very hard and is used for domestic purposes, livestock, and public supply.

The Cretaceous-age Dakota Sandstone Formation is at a shallow or moderate depth in this area. It is tapped by many domestic and livestock wells. Not very many irrigation wells tap this aquifer. In areas where more shallow aquifers do not occur, a number of communities in northwestern Iowa obtain their public supplies from this aquifer. Locally, the base of the Dakota Formation contains beds of gravel from which moderately large yields of water can be obtained. The water in the aquifer in Iowa has a median level of total dissolved solids of 824 parts per million (milligrams per liter) and is very hard. Other bedrock formations in Iowa are very deep, and wells in these formations generally are not economical. Precambrian Sioux Quartzite is near the surface in the part of this area in Minnesota, and it contains good-quality water where it is not in contact with the Cretaceous sediments. Well yields vary dramatically, depending on how many interconnected joints and fractures are penetrated by the well.

Soils

Nearly all of this area is farmland, and more than four-fifths is cropland, which is used mainly for corn, soybeans, other feed grains, and hay. Much of this area is drained by tile. Extensive drainage ditches provide outlets for the tile drains. The small acreage of woodland in the area is mainly on wet bottom land and on steep slopes bordering stream valleys.

The dominant soil order in this MLRA is Mollisols. The soils in the area dominantly have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed mineralogy. Hapludolls (Annieville, Everly, Galva, McCreath, Primghar, and Sac series) and Endoaquolls (Gillett Grove, Letri, and Marcus series) formed in loess or loess over till on uplands. Hapludolls (Moneta series) also formed in till on steeply sloping valley slopes, and Endoaquolls (Havelock series) also formed in alluvium on flood plains.

Biological Resources

Prairies in this area support tall grasses on moist soils and xeric short grasses on uplands. Grama, muhly, lovegrass, and wheatgrass commonly grow beside the more familiar little bluestem, big bluestem, Indiangrass, and wildrye. The prairie forbs in the area include fragrant false indigo, showy milkweed, woolly milkweed, western prairie fringed orchid, dotted blazing star, Maximilian sunflower, ground plum, and wild prairie onion. Wooded areas have become more extensive in this area, making up 1 percent of the current landscape as compared to 0.2 percent in the mid-1800s. Wooded areas on uplands commonly support bur oak, red oak, and hackberry. Those on bottom land support slippery elm, cottonwood, willow, and plum.

The wildlife species in this MLRA include Great Plains toad, bobcat, prairie rattlesnake, prairie skink, smooth green snake, pygmy shrew, and northern grasshopper mouse on the prairies and blue grosbeak, pine siskin, redbelly snake, and Woodhouse’s toad in the wooded areas.

Land Use

Following are the various kinds of land use in this MLRA:
Cropland—private, 84%
Grassland—private, 7%
Forest—private, 1%
Urban development—private, 4%
Water—private, 1%
Other—private, 3%
The major resource concerns are water erosion, depletion of organic matter in the soils, and poor water quality. Many of the wet soils require artificial drainage for good growth of field crops.

Conservation practices on cropland generally include systems of crop residue management (especially no-till, strip-till, and mulch-till systems), cover crops,

subsurface drainage systems, nutrient and pest management, grassed waterways, terraces, manure management, pasture and hayland planting, and rade-stabilization structures.