



Location of MLRA 107B in Land Resource Region M.

107B—Iowa and Missouri Deep Loess Hills

This area is in Iowa (53 percent), Missouri (32 percent), Nebraska (12 percent), and Kansas (3 percent). It makes up about 14,410 square miles (37,335 square kilometers). It includes the cities or towns of Atlantic, Council Bluffs, and Sioux City, Iowa; St. Joseph, Kansas City, Independence, and Marshall, Missouri; Atchison, Leavenworth, and Kansas City, Kansas; and Omaha, Nebraska. Interstates 29, 35, 70, and 80 cross different parts of this area. Fort Leavenworth Military Reservation and parts of the Winnebago and Omaha Indian Reservations are in this MLRA. A number of State parks are throughout the area, and a number of national wildlife refuges are in the area, especially along the Missouri River.

Physiography

This area is almost entirely in the Dissected Till Plains Section of the Central Lowland Province of the Interior Plains. The farthest southern part of the area in Missouri is in the Osage Plains Section of the same province and division. Slopes are mostly rolling to hilly, but some broad ridgetops are nearly level to undulating. Slopes bordering the major stream valleys are steep. Nearly level, broad valley floors are along a few large rivers. Elevation ranges from 600 feet (185 meters) where the Missouri River exits the area to 1,565 feet (475 meters) on the highest ridges. Local relief is mainly 10 to 100 feet (3 to 30 meters),

but valley floors can be 80 to 300 feet (25 to 90 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-Nishnabotna (1024), 45 percent; Missouri-Little Sioux (1023), 33 percent; Lower Missouri (1030), 15 percent; Des Moines (0710), 2 percent; Platte (1020), 2 percent; Chariton-Grand (1028), 2 percent; and Missouri-Big Sioux (1017), 1 percent. A small part of the Kansas (1027) and Elkhorn (1022) Hydrologic Unit Areas also occur in this MLRA. The Missouri River forms the “centerline” of this MLRA. The major tributaries that join the Missouri River in this area include, from north to south, the Floyd, Little Sioux, Soldier, Boyer, Platte (Nebraska), Nishnabotna, Little Nemaha, Tarkio, Big Nemaha, Nodaway, Platte and Little Platte (Missouri), Kansas, Grand, and Thompson Rivers.

Geology

This area includes the Missouri Alluvial Plain, the Loess Hills, and part of the Southern Iowa Drift Plain landform regions of Iowa. Most of the area is overlain by loess deposits that reach a thickness of 65 to 200 feet (20 to 60 meters) in the Loess Hills and thin to about 20 feet (6 meters) in the eastern part of the area. The loess is underlain by pre-Illinoian till, which was deposited more than 500,000 years ago and has since undergone extensive erosion and dissection. In the Loess Hills, Holocene cycles of erosion and deposition, or “cut and fill,” have produced deeply incised gullies and fine grained alluvial deposits. The Quaternary overburden ranges from 150 to 450 feet (45 to 135 meters) in thickness throughout most of the area, but it is generally less than 150 feet (45 meters) thick in the southeastern part of the area. The glacial materials are underlain by Pennsylvanian and Cretaceous bedrock, which consists of shale, mudstones, and sandstones.

Climate

The average annual precipitation in this area is 26 to 41 inches (660 to 1,040 millimeters). Most of the rainfall occurs as convective thunderstorms during the growing season. About 10 percent of the precipitation occurs as snow in the winter. The average annual temperature is 46 to 56 degrees F (8 to 13 degrees C). The freeze-free period averages about 190 days and ranges from 155 to 220 days.

Water

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

Public supply—surface water, 5.1%; ground water, 1.8%

Livestock—surface water, 0.2%; ground water, 0.4%

Irrigation—surface water, 0.4%; ground water, 1.7%

Other—surface water, 89.1%; ground water, 1.3%

The total withdrawals average 4,210 million gallons per day (15,935 million liters per day). About 5 percent is from ground water sources, and 95 percent is from surface water sources. Sediment, nutrients, and pesticides from agricultural activities impair many of the major streams and rivers in this area (not including the Missouri River). The surface water is used mainly for cooling thermoelectric power plants along the Missouri River. The Missouri River also provides most of the municipal and industrial water for the major cities in the area. Other streams and rivers provide some surface water for livestock, irrigation, and public supplies in parts of the area.

The principal sources of ground water in the area are glacial drift, alluvial aquifers along the major streams, buried valley aquifers, the Dakota Sandstone, and Paleozoic rocks. Glacial drift aquifers supply many rural homeowners with domestic water. 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 across the broad flood plain along the Missouri River. This aquifer is used for public supplies in Missouri. It has very hard water that contains a median level of 467 parts per million (milligrams per liter) total dissolved solids. The other shallow aquifers in Iowa have water very similar in quality to that in the Missouri River alluvium. They provide water for domestic use, livestock, some irrigation, and public supply.

The Cretaceous-age Dakota Sandstone is at a shallow or moderate depth in the northern half of this area. It is tapped by many domestic and livestock wells. A few irrigation wells tap this aquifer. In areas where more shallow aquifers do not occur, a number of communities obtain their public supplies from this aquifer. Locally, the base of the Dakota Sandstone has beds of gravel from which moderately large yields can be obtained. The median level of total

dissolved solids in the aquifer in Iowa and Nebraska is 824 and 840 parts per million (milligrams per liter), respectively, and the water is very hard.

The Jordan aquifer is the most extensively used aquifer in Iowa. It consists of Ordovician-Cambrian sandstone and dolomite beds. Its water has a median level of total dissolved solids that exceeds 800 parts per million (milligrams per liter) and may contain levels of radium that exceed the national standards for drinking water. Some communities in the part of this area in Iowa depend on this aquifer for public supplies, even though the wells are very deep. Paleozoic units serve as aquifers in the parts of this area in southeastern Nebraska and northwestern Missouri. Water from these aquifers has a median level of total dissolved solids of 1,300 parts per million (milligrams per liter) in Nebraska. Many farmers and communities in Missouri have abandoned wells in these units because of high levels of dissolved salts.

Soils

The dominant soil orders in this MLRA are Mollisols and, to a lesser extent, Alfisols and Entisols. The soils in the area dominantly have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed mineralogy. They generally are very deep, well drained or moderately well drained, and silty or loamy. Well drained and moderately well drained, gently sloping to strongly sloping Hapludolls (Marshall and Monona series) formed on loess-mantled uplands. Well drained, strongly sloping Alfisols (Knox series) formed in loess. Well drained, strongly sloping Udorthents on side slopes (Steinauer series) and Argiudolls (Shelby series) formed in clay loam glacial till. Somewhat excessively drained and well drained, strongly sloping to very steep Udorthents (Hamburg and Ida series) on uplands formed in thick layers of loess bordering the Missouri River. Well drained and moderately well drained Udifluvents (Haynie and McPaul series) and Hapludolls (Keg, Kennebec, Napier, and Salix series), somewhat poorly drained or poorly drained Fluvaquents (Onawa and Albaton series), and poorly drained or very poorly drained Haplaquolls (Colo, Luton, and Wabash series) formed in alluvium on bottom land.

Biological Resources

Prairies in this area support tall grasses on moist soils and xeric short grasses on uplands. Within the prairies, grama, muhly, lovegrass, and wheatgrass

commonly grow beside the more familiar little bluestem, big bluestem, Indiangrass, and wildrye. The most common forbs are eared milkweed, Missouri milkvetch, prairie tea, western prairie fringed orchid, yucca, Baldwin ironweed, painted cup, pale gentian, silky aster, and skeletonweed (in the loess hills).

The wooded areas on uplands commonly support red oak, white oak, hackberry, shagbark hickory, and bitternut hickory. The wooded areas on bottom land commonly support mulberry, sycamore, cottonwood, willow, elms, green ash, silver maple, and American elder.

The wildlife species in the prairies include barn and long-eared owls; broad-winged hawk; Leonard's, Pawnee, Ottoe, and dusted skippers; wild indigo and sleepy dusky wings; and zebra swallowtail, Great Plains toad, plains leopard frog, plains spadefoot, massasauga rattlesnake, prairie skink, ornate box turtle, six lined racerunner, bobcat, black-tailed jackrabbit, plains pocket mouse, and least shrew. The wildlife species in the wooded areas include blue grosbeak, great crested flycatcher, western meadowlark, western fox snake, western worm snake, and Woodhouse's toad. This area has 47 threatened or endangered species or species of special concern, including piping plover, blacknose and Topeka shiners, pallid sturgeon, least tern, small white lady's slipper, bog buckbean, yellow monkey flower, and spring ladies-tresses.

Land Use

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

Cropland—private, 69%

Grassland—private, 11%; Federal, 1%

Forest—private, 7%

Urban development—private, 8%

Water—private, 2%

Other—private, 2%

Historically, 92 percent of this MLRA was prairie. Forests made up 4 percent of the area; savannas, 2 percent; rivers and streams, 1 percent; wetlands, 1 percent; ponds and lakes, 0.2 percent; and shrub land, 0.2 percent. The increase in the forested acreage from 4 percent of the historic landscape to 7 percent of the current landscape occurred mainly on the loess hills, where the forested acreage increased significantly because of fire suppression.

Farms currently make up nearly all of this area. They

produce cash and grain crops and livestock. The major resource concerns are water erosion, depletion of organic matter in the soils, and poor water quality. Conservation practices on cropland generally include systems of crop residue management (especially no-till, strip-till, and mulch-till systems), cover crops, pest and nutrient management, grassed waterways, terraces, manure management, pasture and hayland planting, and grade-stabilization structures.