

# ***GEOLOGY***

## **Physiographic Region**

The Platte River basin lies entirely within the Dissected Till Plains of the Central Lowlands physiographic province of Missouri (Fenneman 1938). This area is part of the Glaciated Plains Natural Division (Thom and Wilson 1980) ( Figure nd ). The upland areas range from rolling hills to nearly flat areas. Numerous draws and gullies ensure thorough drainage, but the rate of soil erosion is often high. Upland areas in this region are generally in cultivation. The bottom land areas are usually quite flat and are in cultivation. Flood plains in these areas range from 0.5 to 1.5 miles in width, and due to their flatness, the entire floodplain is frequently inundated.

## **Geology and Soils**

Pennsylvanian age bedrock underlies the Platte River basin. Bedrock within the basin consists primarily of shale beds, limestone, and sandstone (MDNR 1995) ( Figure ge ). In general, progressively older formations are exposed from west to east within the Platte River basin.

The overlying soils within the basin (i.e., glacial till and loess) share their origin from the Pleistocene. Four major ice advances occurred during this time and had profound effects on northwestern Missouri. The first glacial advance, known as the Nebraskan, occurred 1.7 to three million years ago, and it leveled the topography of northern Missouri. Two hundred and fifty thousand years after the retreat of this glacier the final continental glaciation, the Kansan, covered earlier deposits with till as it retreated and further leveled the landscape. The last two ice advances, the Illinoian and Wisconsinian had no direct physical presence in northwestern Missouri, but a thick layer of windblown silt, called loess, from these two glaciers was added to the deposits of glacial till already present. The ice advances of the Pleistocene were the major factors that deposited and leveled the highly erodible soils that are present in the basin today (Committee on Public Works, 1965). The low gradient, turbid prairie streams that characterize the Platte River basin developed after the last glacier retreated.

## **Watershed Area**

The Platte River basin covers 2,419 square miles (USDA-SCS 1982), of which, 786 square miles (32.5%) are in Iowa and 1,633 square miles (67.5%) are in Missouri. The basin has a long and narrow shape, draining north to south. The basin is about 124 miles long, with a mean width of about 19 miles. The Platte River basin is bordered by the Grand River basin on the eastern side, the Nodaway River basin on the northwestern side, and various minor tributaries of the Missouri River on the southwestern border.

## **Channel Gradient**

Gradient information for fourth order and larger streams within the Platte River basin was obtained from U.S. Geological Survey (USGS) 7.5 minute topographic maps. Gradient plots for each of these streams are provided in Appendix A (Contact authors for Appendix A information). The Platte River is a low gradient stream, having an average slope of 3.1 feet per mile. The other large streams within the basin (orders six and seven) also have relatively low gradients, ranging from 2.7 feet per mile on the 102 River to 7.8 feet per mile on the Little Third Fork of the Platte

River (Appendix A). Smaller order streams (orders four and five) have higher variability in gradients, ranging from 5.4 feet per mile for Castile Creek to 64.8 feet per mile for Pinhook Creek (Appendix A).

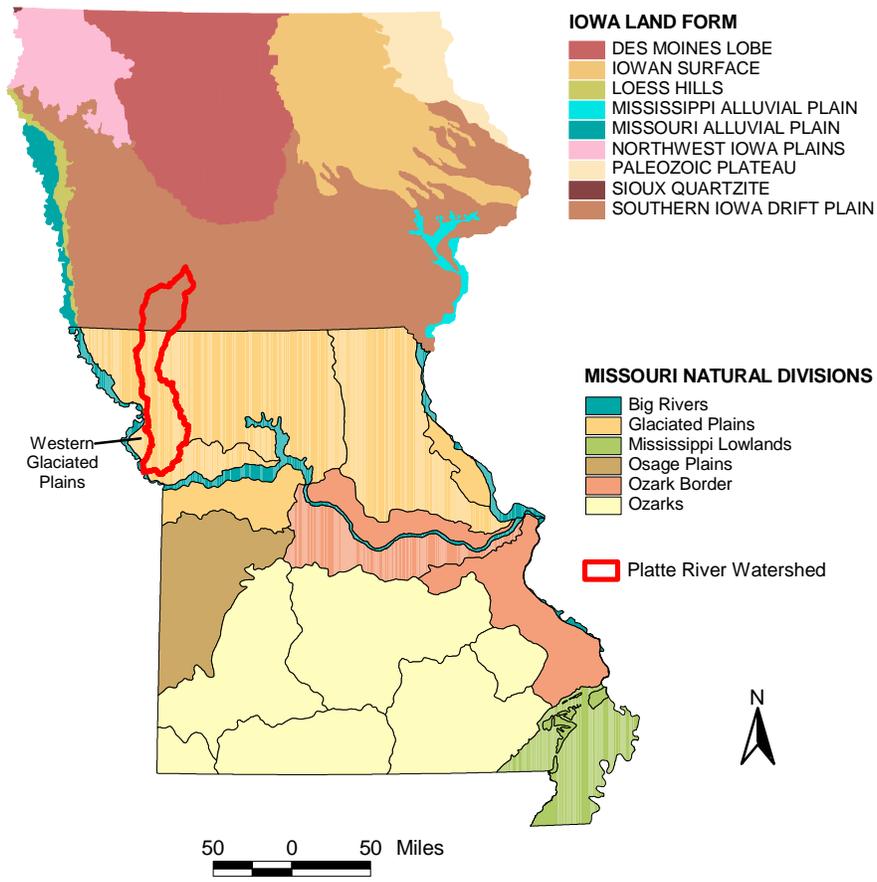


Figure nd. Location of the Platte River watershed within the natural divisions of Missouri.

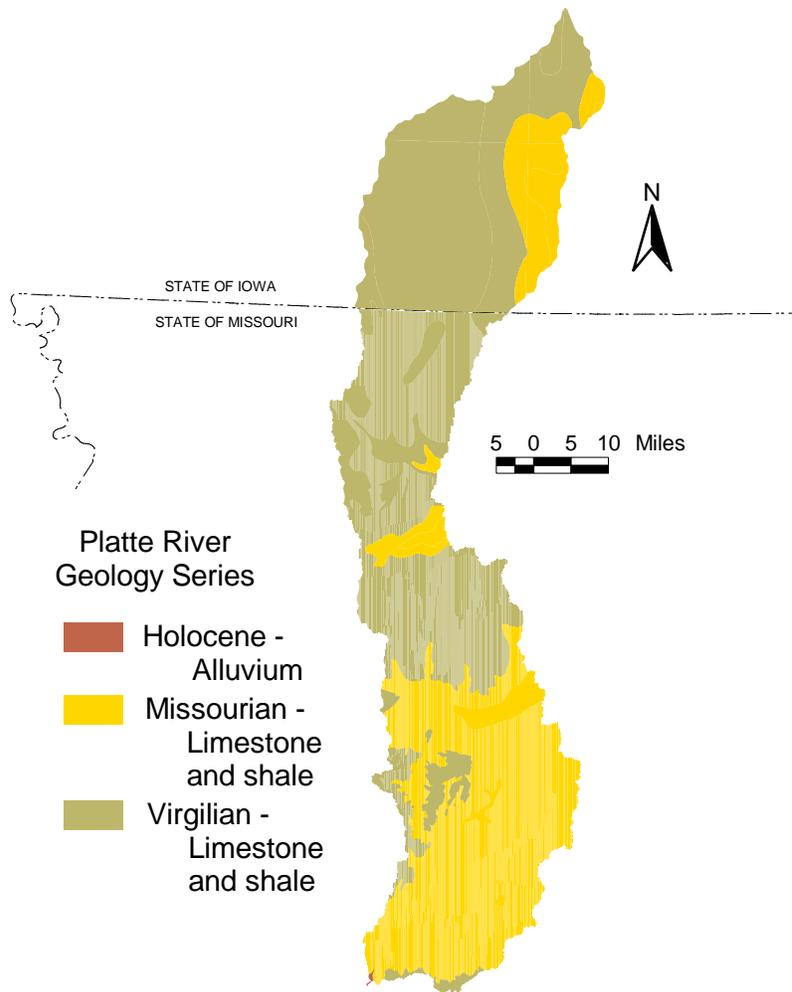


Figure ge. Geology within the Platte River watershed.