

Geology/Geomorphology

Physiographic Region/Geology/Soils

The Wyaconda River basin lies within the eastern section of the Glaciated Plains Natural Division (Thom and Wilson 1980), also known as the Dissected Till Plains (Fenneman 1938). These plains were formed by glaciers that deposited glacial till which consisted of mostly clay and some rock. Over time, wind-blown soil (loess) was deposited atop of these soils left by the receding glaciers. Across most of the basin, this loess ranges from zero to eight feet deep, atop 100-200 feet of glacial till. Pennsylvanian aged rock lies beneath the soils of the upper basin and it shifts to Mississippian aged rock in the lower basin (MDNR 1984). This stratification of layers limits the amount of water that infiltrates into groundwater. The large amount of clay and many shale and coal deposits also limits the vertical movement of water within the basin (MDNR 1984). Therefore, most of the stream flow within in the basin is only supported by surface run-off. Also, there are no significant springs within the basin, causing poor baseflow during extended dry periods.

Because of the glacial till, the soils in the upper basin differ dramatically from the lower basin. The upper basin is characterized as the Deep Loess and Drift general soil association (Algood and Persinger 1979). The topography is rolling to hilly with some wide, nearly level ridge tops and bottom land adjacent to streams. The soils were formed under mostly tall grass prairie vegetation and are of the Edina, Kilwinning, Lamoni, or Armster soil associations. These soils range in slope from 0-20 percent with clayey subsoils and are all highly susceptible to erosion (SCS 1975). The lower basin soils are characterized as the Central Mississippi Valley Wooded Slopes (Algood and Persinger 1979). The uplands in this area have soils from the Winfield, Lindley, and Keswick soil associations, which are deep, well drained, and gently sloping to steep (SCS 1992). These upland soils are also highly susceptible to erosion. Soils in the floodplains are from the Arbela, Fatima, and Blackoar soil associations and are deep, nearly level, and poorly to moderately drained.

Stream Channel Gradients

Stream channel gradients (slopes) were determined for all third-order and larger streams by using USGS 7.5-minute topographic maps and digitizing software (Appendix A). The overall gradient in the Wyaconda River was very low at 2.7 ft/mile. The North and South Wyaconda rivers had a somewhat higher gradient at 5.6 and 6.9 ft/mile, respectively. The average gradient of fourth order streams in the basin was 4.85 ft/mile and ranged from 4.3 to 5.4 ft/mile. Third order streams in the basin had an average gradient of 12.9 ft/mile and ranged from 4.8 to 33.3 ft/mile. The highest gradient stream was an unnamed tributary that enters just upstream of the mouth of the Wyaconda River and drains higher uplands in the Central Mississippi Valley Wooded Slopes. Most of the lower gradient streams were in the upper and middle reaches of the basin.

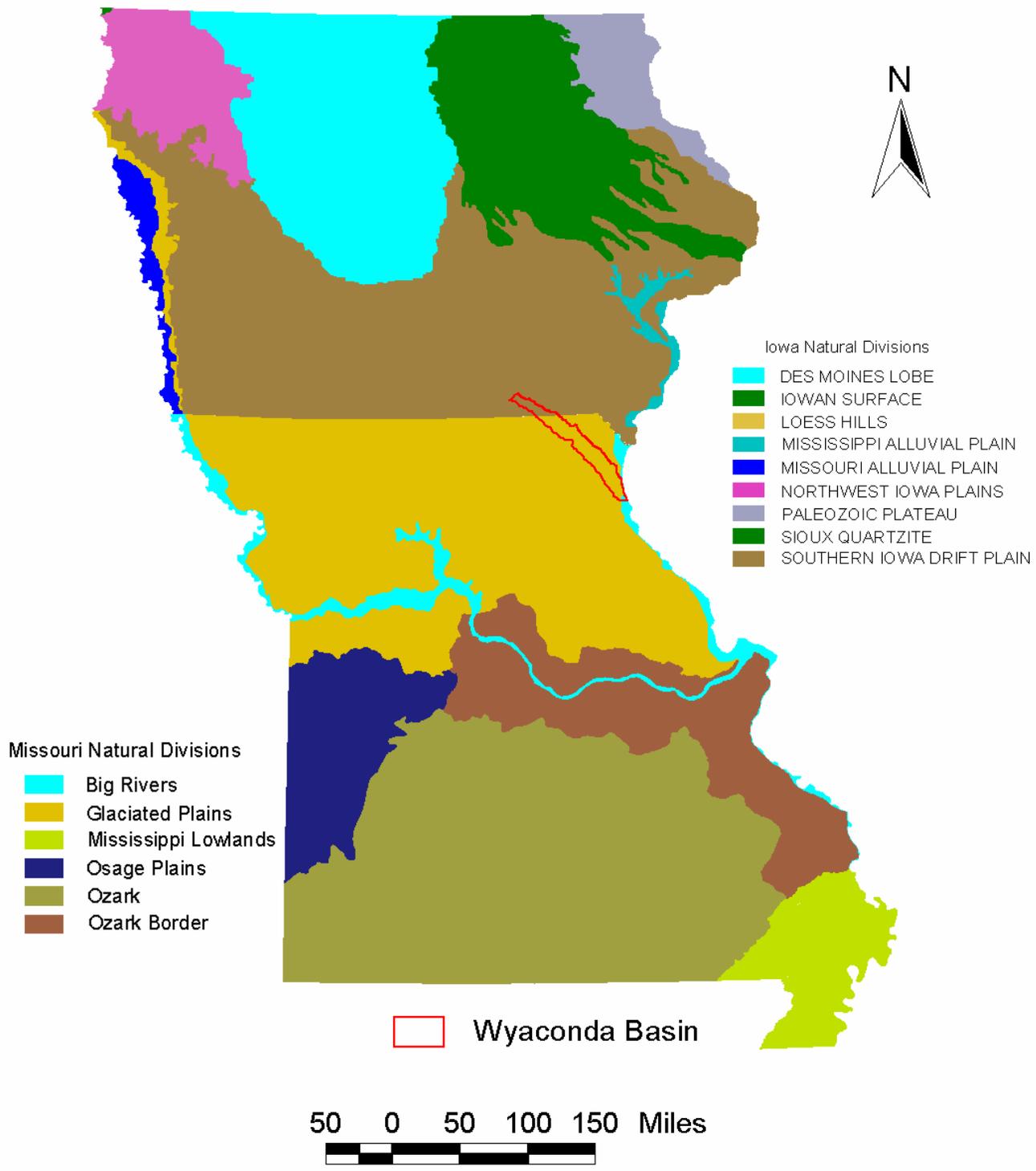


Figure nd. Location of the Wyaconda River Basin within the natural divisions of Missouri and Iowa.

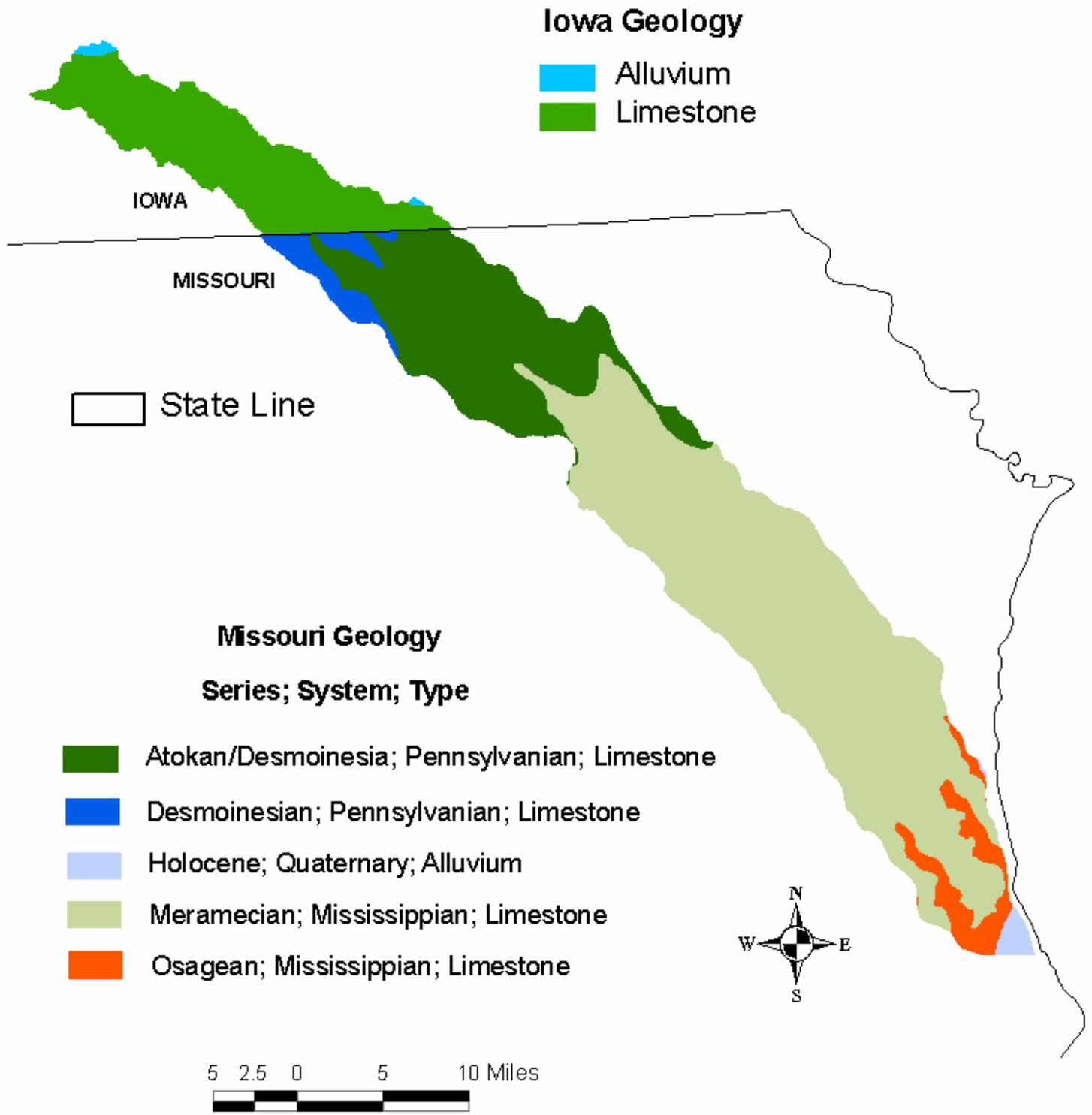


Figure ge. Geological formations of the Wyaconda River Basin, in Missouri and Iowa.