

Riparian Ecosystems of North Dakota

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More than 20 riverine systems occur in North Dakota, with four major rivers (Figure 1).

These rivers are the Missouri, James, Souris and Red rivers. The Sheyenne River is the longest tributary of the Red River of the North, and the Little Missouri is the longest tributary of the Missouri River. These tributaries and associated riparian ecosystems play an important role in the maintenance of water quality within the primary basin.

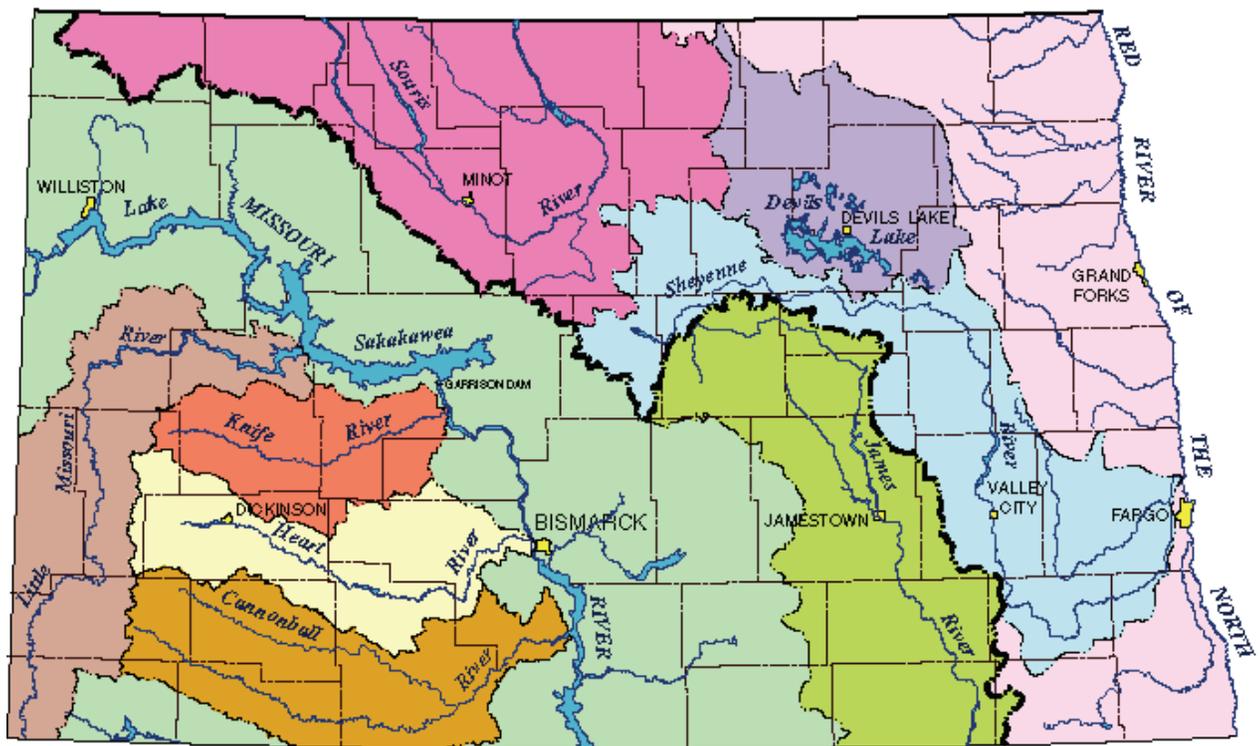


Figure 1. Map depicting major North Dakota river systems, courtesy of the U.S. Geological Survey.

What are Riparian Ecosystems?

Riparian ecosystems are transitional areas between uplands, where water is generally not present, and streams, rivers or lakes, where water is present under normal conditions (Svejcar 1997). Riparian ecosystems consist of the stream channel and flood plain of the stream, where vegetation is influenced by the water table, flooding and water-holding capacity of the soil.

Riparian ecosystems possess unique ecological processes and a diverse assemblage of plant communities, in comparison with the upland plant communities (Gregory et al. 1991, Naiman et al. 1993, Svejcar 1997). Five primary communities are associated with riparian ecosystems: 1) the greenline, which is the line of vegetation on or at the water's edge, 2) woodlands, 3) shrublands, 4) grasslands and 5) wetlands (Figure 2).

The plant communities associated with riparian ecosystems are linked closely to the flow regime of the stream. Sedges and other deep-rooted species dominate the greenline. These species have many growing points, enabling them to produce many stems and roots that help stabilize stream banks (Figure 3).

Riparian Ecosystems and Water Quality

Healthy riparian ecosystems function to improve and maintain water quality and regulate seasonal flow patterns within a watershed (Elmore and Beschta 1987, Lowrance et al. 1984). Riparian vegetation filters water before it reaches streams, lakes or wetlands. Healthy riparian ecosystems have the potential to reduce nonpoint source pollution that might otherwise contaminate streams and rivers in watersheds.

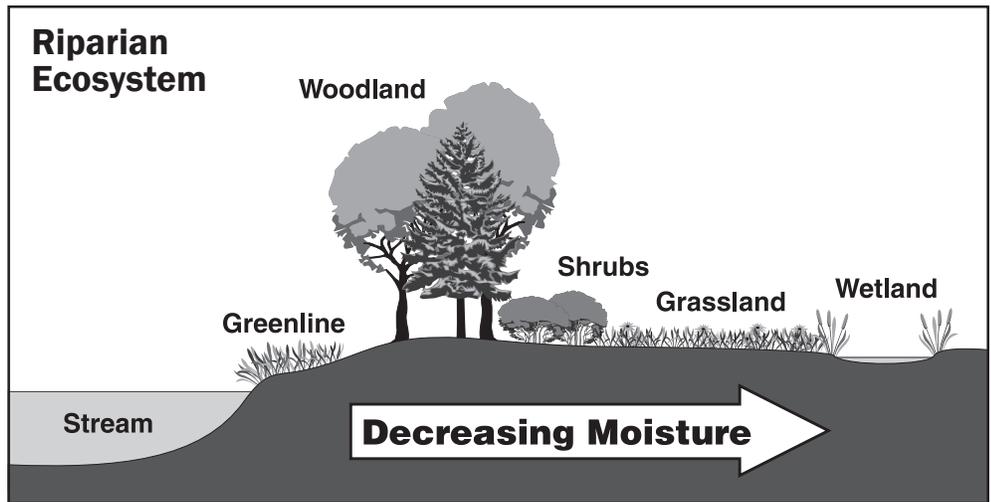


Figure 2. Illustration of the moisture gradient in a typical riparian ecosystem of the northern Plains.

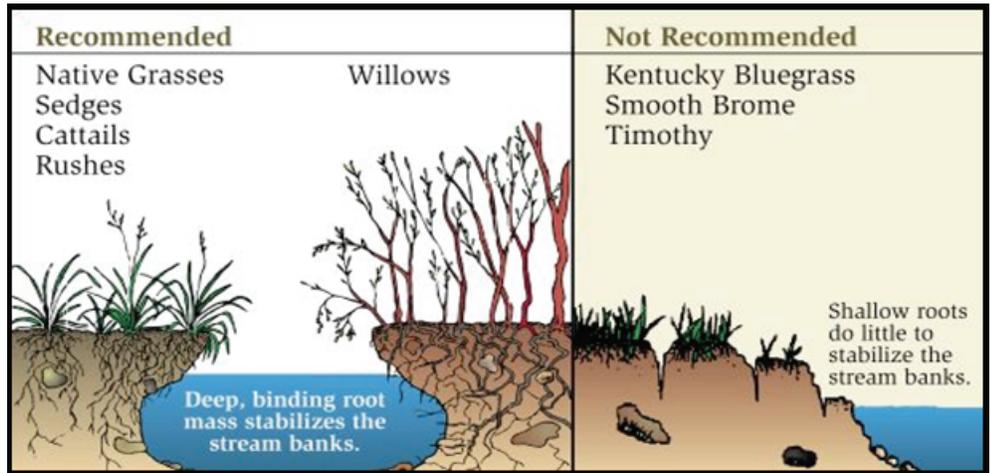


Figure 3. Illustrations of desirable and undesirable riparian vegetation and stream bank function.

(Courtesy of Cows and Fish: Alberta Riparian Habitat Management Society)

Riparian zones act as buffers or filters for contaminants from uplands that may be farmed or improperly grazed, making maintenance of a proper functioning riparian zone critical. This is especially vital to riparian ecosystem such as the Middle Sheyenne River, where uplands are managed for crop production and other agricultural uses.

Healthy, properly functioning riparian ecosystems store water, enhance groundwater recharge and reduces the impacts of spring flooding. When water is stored in the groundwater system during peak spring flows, it can be released back to the stream as groundwater recharge, minimizing fluctuations in stream flow.

Riparian Ecosystems and Wildlife

Despite the fact that riparian ecosystems make up a small portion of the landscape – about 2 percent of the land area in North Dakota – they are a valuable source of habitat for wildlife. The large proportion of the edge of riparian ecosystems associated with the assemblage of plant communities helps make these ecosystems desirable habitat for a variety of wildlife species.

Riparian ecosystems are an especially critical source of habitat in North Dakota because more than half of the state's woodlands are part of a riparian ecosystem. Thus, riparian ecosystems are a critical source of cover and biotic diversity.

Riparian Ecosystems and Livestock

Livestock often are attracted to riparian systems due to the availability of forage, water, shade and smooth terrain. Riparian ecosystems are extremely productive, with some providing 81 percent of the summer forage utilized by grazing livestock (Roath and Krueger 1982).

However, changes in riparian vegetation induced by grazing can result in decline in soil health, loss of biotic diversity, degradation of wildlife habitat, reduced water quality and alterations in stream hydrology (Blanks et al. 2006).

In retrospect, grazing has been found to be important for the proper functioning of many riparian zones. Implementation of proper grazing management practices is required to prevent degradation by livestock and improve riparian health and proper function.

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