



Capital Improvement Project

Minnesota Zoo Stormwater Improvement Best Management Practices



Five stormwater improvement practices that capture and treat pollutants meet the Zoo's and partners' water resources goals. The projects reduce nutrients and algae in Main Lake and decrease the amount of water leaving the Zoo via storm and sanitary sewers.

A project completed cooperatively by:

- Minnesota Zoo
- Dakota County Soil and Water Conservation District
- Vermillion River Watershed Joint Powers Organization
- Metropolitan Council

Location



The Minnesota Zoo covers approximately 485 acres in the City of Apple Valley and is owned and operated by the State of Minnesota.

Projects solve multiple water quality problems

Operating since 1978, the Minnesota Zoo reports annual attendance of nearly 1.25 million visitors as of 2015. The Zoo incorporates green practices on its campus, including large-scale recycling and sustainable building practices.

Impervious surfaces (parking lots, rooftops, and paved roads and paths) throughout the Zoo generate large amounts of stormwater runoff during rain or snowmelt events, which carries a variety of pollutants to local water resources, including Main Lake.

The Zoo also contains the largest animal feedlot in the Vermillion River Watershed, which produces manure containing high amounts of nutrients and bacteria. While the stormwater runoff generated within the exhibits may contain manure, it is conveyed via sanitary sewers to treatment facilities at a significant cost to the Zoo. By reducing the volume of stormwater generated from the Zoo's impervious surfaces, and as a result, a reduction of stormwater runoff from the exhibits, the Zoo leaves a greener footprint on local water resources and reduces its sanitary sewer treatment costs.

Five projects focusing on reducing and treating stormwater runoff include:

- Three bioretention (raingarden) practices
- One bioretention practice with iron-enhanced sand filter
- One bioswale



Before



After

The amount of impervious surface (pavement, buildings, and parking lots) and stormwater concerns within the Minnesota Zoo made this area a high priority for stormwater improvements. Main Lake, a major focal point at the Zoo has phosphorus concentrations more than six times higher than the water quality standard.



Vermillion River Watershed Joint Powers Organization

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The Vermillion River is a vital natural resource that is important to public health and recreation, as well as to preserving unique wildlife habitats. It flows from New Market Township in Scott County, through residential and agricultural areas in central Dakota County, and cascades into a 100-foot ravine before it enters the Mississippi River near the Cities of Hastings and Red Wing, Minnesota. Throughout its journey, the river reflects urban and rural life within its 335-square-mile watershed.

Problem:

- A large amount of impervious surface generates stormwater runoff carrying pollutants to Main Lake and other local water resources
- Stormwater runoff from impervious surfaces flows through animal exhibits, carrying additional bacteria-laden water to sanitary sewers
- Sanitary sewer treatment costs are significant as they are based on total volume of water treated
- Flooding is a consistent problem in Main Lake

Actions:

- Reduce the amount of impervious surfaces
- Implement a diversity of stormwater improvement practices, including raingardens, an iron-enhanced sand filter, and a bioswale
- Lower wastewater contribution from exhibits
- Capture and retain stormwater to reduce the potential for flooding of Main Lake

Benefits:

- Reduction of stormwater and pollutants carried to Main Lake
- Reduction of sanitary sewer treatment costs
- Reduce the potential for flooding in Main Lake
- 8.9 acre-feet of runoff per year infiltrated
- 2.2 tons of soil per year saved from traveling downstream
- Reduction of 6.5 pounds of phosphorus per year
- Improved aesthetics of Main Lake for Zoo patrons
- Accomplish goals for multiple organizations

Costs and contributions:

- Vermillion River Watershed: \$45,000 cash, \$27,548 in-kind Main Lake Water Quality Study, and engineering
- Dakota County SWCD: Technical assistance and construction oversight
- Metropolitan Council Environmental Services: \$119,883 Stormwater Grant
- Minnesota Zoo: In-kind staff time
- Clean Water Fund: \$50,000 grant



A grant from the Clean Water Fund, one of four funds established by the Clean Water, Land & Legacy Amendment, supported this project. [Clean Water Stories](#) can be found on the Minnesota Board of Water and Soil Resources website.