

5.0 Lake Edith Subwatershed

5.1 Location, General Description and Drainage Patterns

The Lake Edith Subwatershed is within the Lower St. Croix Valley Watershed District (formerly Valley Branch Watershed District). Lake Edith (DNR #82-4P), also known as May's Lake, is located in subwatershed EDI-1, between Indian Trail South and Stagecoach Trail South, in the City of Afton. The lake has a surface area of approximately 75 acres and a maximum depth from 35 to 40 feet. The lake consists of a north basin connected by a narrow channel to a smaller south basin. The tributary area of the lake is 1,234 acres, consisting of subwatersheds EDI-1, EDI-2, EDI-4, and EDI-5, most of which is undeveloped. All but approximately 70 acres of the tributary area is located within the City of Afton. Other than a strip of industrial development planned along the I-94 corridor, the planned land use in the tributary area is limited to rural residential development. Almost half of the Lake Edith tributary area drains to a large wetland area (Metcalf Marsh, DNR #82-464W) approximately 3/4 mile upstream (west) of Lake Edith. This marsh area is characterized by many springs, which contribute water to the marsh and wetland. Lake Edith overflows to the south to Valley Creek (also known as Valley Branch Creek), through a 24-inch diameter culvert under Indian Trail. This culvert has an invert elevation of 795.8. (See Figure 1)

The LSCVWD collected and analyzed water quality samples from Lake Edith in 1973, 1979, 1984, 1992, and 1997. The water quality of Lake Edith has been very good, especially in the northern basin where the lake is distinctly stratified. The most recent water quality data from 1997 show an average summer total phosphorus concentration of 20 µg/L, Secchi disc transparency of 2.6 meters, and chlorophyll-a concentration of 5.2 µg/L. Based on this data, Lake Edith would be assigned a trophic status of mesotrophic (moderately productive).

Current use of the lake is limited to area residents, who use the lake for a variety of recreational activities, including swimming, fishing and canoeing. The City of Afton's shoreland ordinance allows only non-motorized craft on the lake, with the exception of small electric motors. Prior to the ordinance, the lake residents agreed among themselves to the same restriction. The current water quality of Lake Edith is very good and is consistent with its use. The water quality of the lake is suitable for all kinds of recreational uses, including swimming. Preservation of Lake Edith's water quality is also important in maintaining the water quality of Valley Creek.

5.2 Landscape Units

The Lake Edith Subwatershed contains several landscape units. These Landscape Units include significant portions of 1-3 and 10. Further description and analysis of these landscape units are contained in the landscape portion of the NRI report.

5.3 Water Quality Management Goals

The LSCVWD plan classifies Lake Edith as a Category I water body, based on its existing water quality and existing and desired recreational uses. This designation results in a high surface water quality ranking for Lake Edith. (See Figure 2) Further description of this classification is included in

Appendix A. The LSCVWD's management goal is to protect and possibly restore Lake Edith's water quality. Restoration may be necessary because the lake has experienced more frequent algae blooms than would be expected. This results in possible conflicts between the water quality and recreational use of Lake Edith. The LSCVWD will continue to monitor Lake Edith's water quality once every five years. If it appears that restoration is necessary to maintain Category I water quality levels, the LSCVWD will complete hydrologic and nutrient budgets for Lake Edith. The LSCVWD will use the water quality monitoring and budget results to determine future actions.

The water quality of Lake Edith is unlikely to change, due to its small undeveloped watershed. The presence of large areas of wetlands in the watershed makes additional development unlikely. Area residents, however, will be encouraged to update aging septic systems to minimize phosphorus loading to the lake.

5.4 Groundwater Recharge/Infiltration/Permeability

The groundwater recharge/infiltration ranking in the Lake Edith subwatershed varies. (See Figure 3.) (Section 1.4 describes the methodology used to determine the ranking levels.) Generally, the rankings move from high to the west to moderate and low to the east. The majority of the EDI-4 subwatershed has a high groundwater recharge/infiltration ranking, while the EDI-1 and EDI-2 subwatersheds have a mixture of high, moderate, and low groundwater recharge/infiltration rankings. (See Figure 3)

5.5 Erosion Index Ranking

The Lake Edith subwatershed cluster as a whole receives a moderate soil erosion index (EI) ranking of 6.59. All of the subwatersheds receive a moderate EI ranking, with values ranging from 4.03 for EDI-5 and 7.71 for EDI-3. The erosion potential of all the subwatershed clusters is fairly consistent, therefore distinguishing trends are not evident. (See figure 6e1-6e5 and table 2).

6.0 Bailey Lake Subwatershed

6.1 Location and General Description

The Bailey Lake Watershed is within the South Washington Watershed District (SWWD). This subwatershed area of Afton is located within portions of the west half of Sections 19, 30, and 31 and drains to the west into Woodbury. The subwatershed drains to DNR-protected waterbodies #82-96w and to #82-455w, both in Sec. 25, of Woodbury. (See **Figure 1**) The runoff subsequently drains west into Bailey Lake (#82-456w) located approximately 2.5 miles away in Section 27, Woodbury. Bailey lake has historically had fluctuating water levels, and had been a series of isolated wetlands. Due to landlocked conditions and development upstream, runoff has increase to the basin and caused it to become one large open waterbody. North and South Bailey Lake is approximately 80 acres at a water level elevation of 870 feet.

Bailey lake is anticipated to have a total future watershed of 12,600 acres. The approximately 750 acres of watershed in Afton contributing to Bailey Lake is in agriculture.

6.2 Landscape Units

The Bailey Lake subwatershed is one unmapped Landscape Unit. Further description and analysis is contained in the landscape portion of the NRI report.

6.3 Water Quality Management Goals

The water quality management goals for the Bailey Lake subwatershed, according to the SWWD rules, is stormwater use. This means that the lake is limited it its ability to support a sustained quality fishery due to depth and contributing subwatershed size, and are best suited for flood control, aesthetic viewing, limited recreation, and wildlife habitat. As a result, the Bailey Lake Subwatershed receives a water quality ranking of low. (See **Figure 2**)

The trophic state of the lake is categorized as hypereutrophic due to stormwater drainage and the shallow condition. Bailey Lake serves as a regional flood storage area. The target phosphorous standard is 10% below predevelopment runoff concentrations, with a targeted uses of wildlife and waterfowl habitat, fishery, and recreation.

Very limited water quality testing has been done on Bailey Lake. One grab sample was collected in 1994.

6.4 Groundwater Recharge/Infiltration/Permeability

The Bailey Lake subwatershed within Afton is almost entirely composed of a moderate groundwater sensitivity ranking. Small pockets of low sensitivity ranking are present. (See **figure 3**) No trends are evident for this subwatershed.

6.5 Erosion Index Ranking

The Bailey Lake subwatershed receives a moderate erosion potential ranking with an EI value of 4.58. This value is the second lowest of any subwatershed within Afton. (See **figure 6f**)