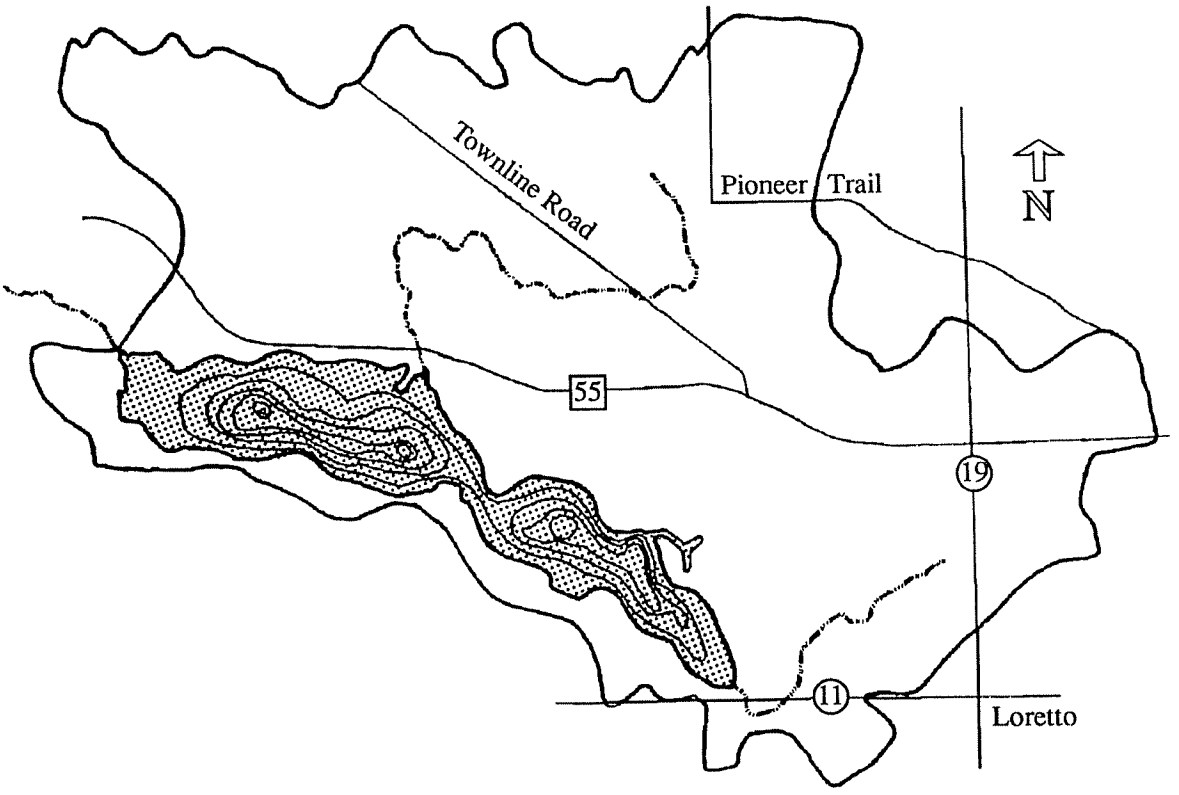
Lake Sarah Project

Phase 1- Diagnostic Study Report



Clean Water Partnership Project

December 1996

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Phase 1 - Diagnostic Study Report

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ACKNOWLEDGMENTS

The Lake Sarah Project has been sponsored by the Pioneer-Sarah Creek Watershed Management Commission in cooperation with the City of Greenfield, City of Independence, Lake Sarah Improvement Association, Suburban Hennepin Regional Park District and the Hennepin Conservation District. Funding was provided through a Minnesota Pollution Control Agency Clean Water Partnership Grant. The majority of the lake and stream monitoring was conducted by Hennepin Parks staff. Staff of the Hennepin Conservation District was responsible for the day-to-day project management, education and communication, data analysis and report preparation. The City of Independence provided the bookkeeping and City of Greenfield provided clerical services for the Steering Committee meetings. The steering committee helped direct the project and was composed of representatives from each contributing sponsor and some landowners. Thank you to all who have contributed to the project.

EXECUTIVE SUMMARY

The Lake Sarah Project originated from a concern about degrading water quality in the lake. The Pioneer-Sarah Creek Watershed Management Commission (Commission) had been monitoring the lake and noticed its water quality was poorer than other area lakes. The Commission and contributing sponsors applied for Minnesota Pollution Control Agency Clean Water Partnership funding to conduct a diagnostic feasibility study. The results of the study are presented in this report.

At one time Lake Sarah was a popular vacation area, with multiple resorts. The resorts have all since been sold off and converted to single family residential homes. The lake is still a popular fishing and boating area. Degrading water quality has severely limited its use for body contact recreation.

As part of the Lake Sarah Project, the lake, its two major inlets and the outlet were monitored for a period of approximately one year form 1990-1991 and additional sampling in 1992. Continuous flow monitoring and sampling using automatic samplers was conducted. The monitoring indicated a high load of phosphorus from the watershed. Loretto contributed 29.3% of the phosphorus load and Dance Hall (Rush) Creek contributed 40.2%. The smaller tributaries and tiles contributed 7.7%. Direct runoff from the area directly around the lake, including septic systems, was estimated to contribute 8.1% of the load. Internal loading from the lake bottom was estimated at 12.3% of the phosphorus load. The lake retains about 89% of the phosphorus that is carried into it.

An implementation plan was developed based upon the identification of the two major tributaries as the largest contributors of phosphorus to the lake. Although, in general, individual pollutant sources were not identified through monitoring, a review of land uses and inspections were used to develop the priorities for implementing best management practices in the watershed. Several potential projects were identified to help reduce pollutant loading to Lake Sarah. They include wetland restorations, feedlot improvements, buffer strip installation, conservation tillage, education and several others. The Commission and Lake Association with assistance from the Hennepin Conservation District have applied for and received grant funds for an education project and stream improvement project. The stream improvement project is for the entire Pioneer and Sarah Creek Watersheds but will also benefit Lake Sarah. The Commission will

SECTION 1
INTRODUCTION AND PROJECT BACKGROUND

1.0 HISTORY

The area surrounding Lake Sarah has a long history of agricultural, recreational and residential use. An 1860 map (Figure 1a) identifies Lake Sarah as Union Lake. According to this map, the Lake Sarah watershed may have been substantially larger, extending north to approximately County Road 10, through a large wetland network. The route of Loretto Creek may have been altered. The historical maps show the creek entering the lake on the south east side. It apparently did not come from the south under County Road 11 as it now does. Greenfield was known as Greenwood at that time. An 1874 map identifies what was Union Lake as Lake Sarah, and still shows the larger watershed area draining to the lake (Figure 1b). Additional subdivision of land occurred in what was still referred to as Greenwood between 1874 and 1890 (Figure 1c).

By the turn of the century the Lake Sarah region was a bustling community, with the majority of its land devoted to agriculture and recreation. Sidney Mitchell--a longtime Lake Sarah resident recalls that during the 1920s the region was "quite a resort lake," with six different resorts occupying a seven mile area (Fobbe, 1990). Lake Sarah was a popular recreation spot. With increasing population pressure, agricultural and recreational land use slowly gave way to residential. In 1971 there was approximately 130 homes or cabins on the lake. By 1973 the number of resorts on Lake Sarah had fallen from six to four, and by the 1980s only one resort remained (Fobbe, 1990). This resort was sold off as individual lots in 1994.

The decade of the 1850s marked the first pronounced and consistent settlement of the region. In 1856 the township of Independence had 92 residents, 91 of which were farmers (Neil and Williams). The area surrounding the lake during this period was "originally heavily timbered, with a magnificent growth of hardwood"(Neil and Williams). Therefore, in order to create suitable farmland, there was an early and earnest effort to clear the land. This conversion of forest to farmland was likely the initiation of accelerated eutropication of Lake Sarah, although the silviculture practices may also have contributed sediment and pollutants to the lake.

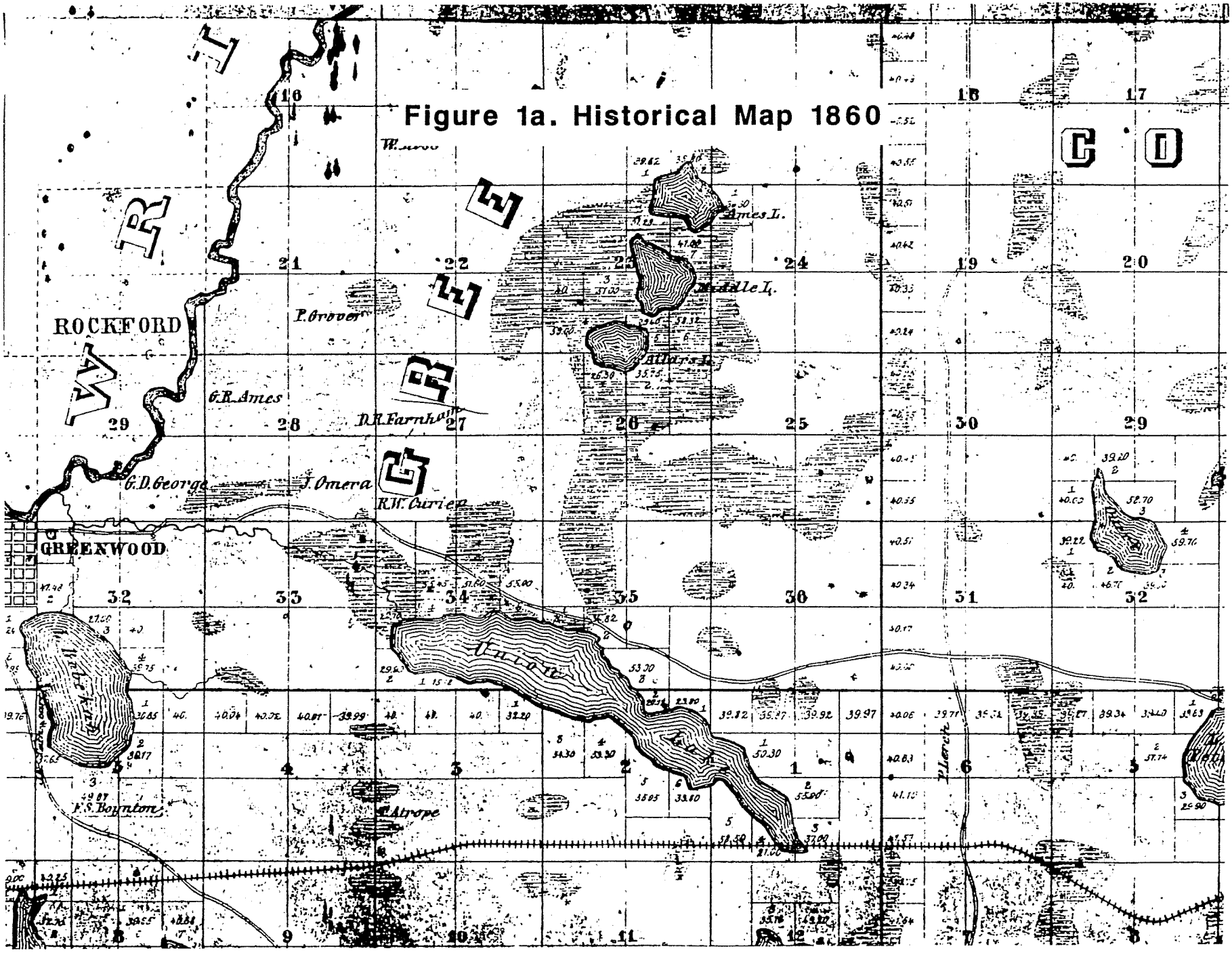

Figure 1a. Historical Map 1860

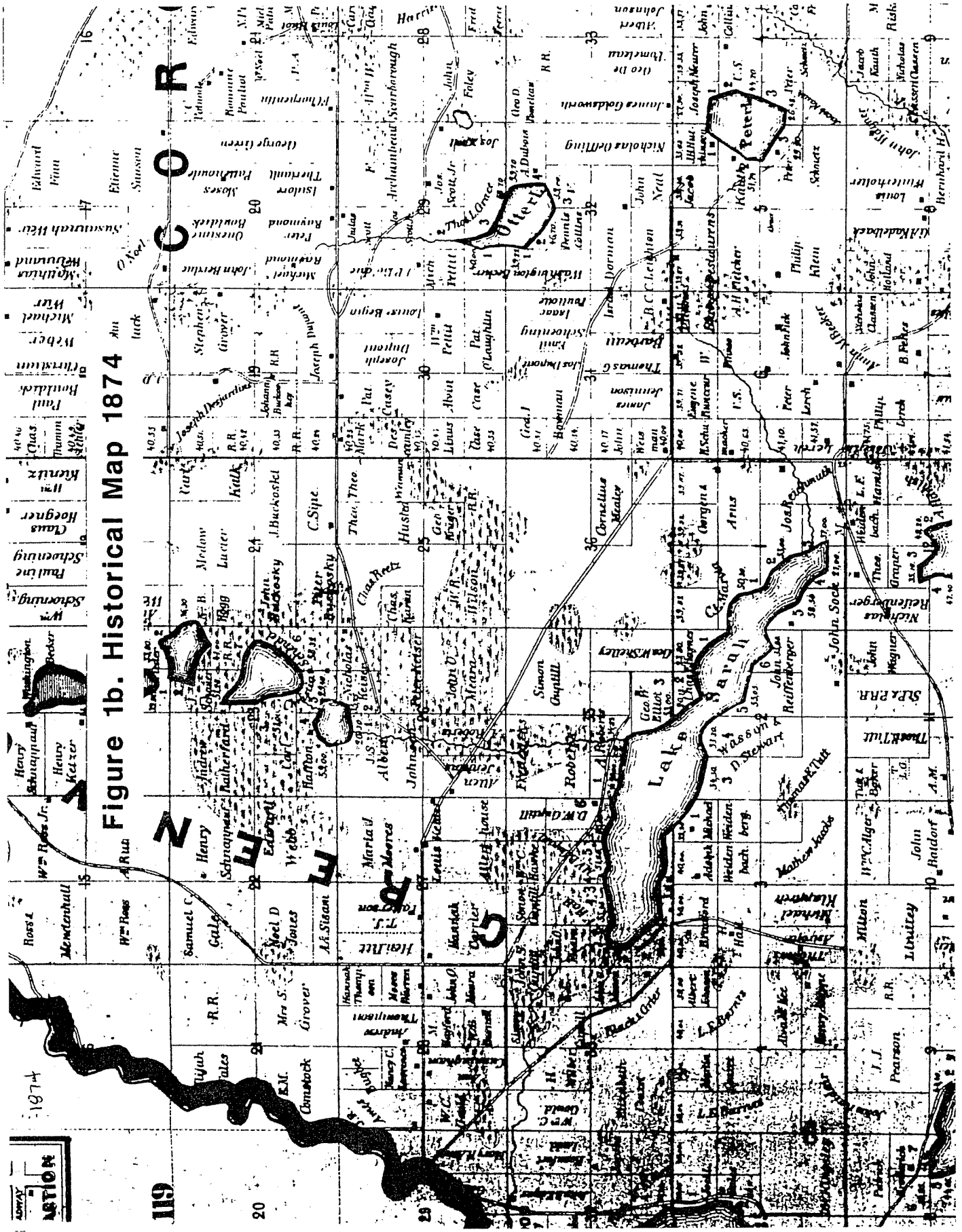
Figure 1b. Historical Map 1874
Lake Sarah
1874