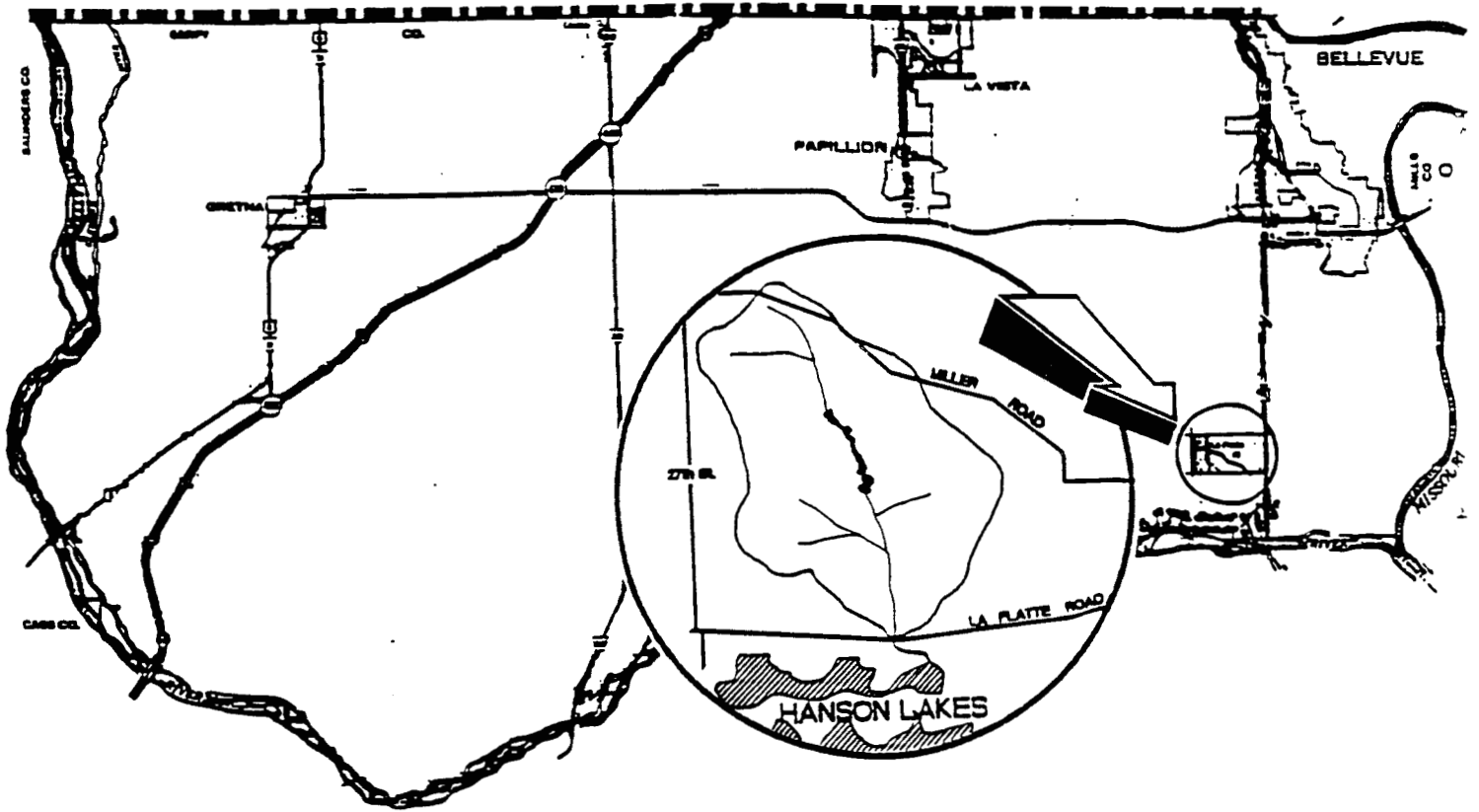


HANSON LAKE NO. 3 SPECIAL WATER QUALITY WORK PLAN



FISCAL YEAR 1992-1995



HANSON LAKE SPECIAL WATER QUALITY PROJECT

Sediment and Erosion Control Work Plan

Hanson Lake is a 43-acre recreational lake adjacent to the Platte River in southeast Sarpy County. Nearly 100 homes are located on the shores of Hanson Lake, with many of the homeowners year-round residents. In 1989, the Hanson Lake property owners requested that the Papio-Missouri River NRD designate the watershed of Hanson Lake a Special Watershed Project with the purpose of solving the water quality and sedimentation problems associated with the watershed. In their request, (a copy of which is included in this work plan) the homeowners state that the water depths in the eastern arm of the lake, the portion of the lake nearest the mouth of the watershed, had decreased from an original depth of 35-40 feet to 8-12 feet. In 1986, the Lake Association contracted to have sediment dredged from the lake, however, only a small portion of the sediment could be removed, and that at a cost of \$45,000. The sediment responsible for the problems in Hanson Lake originates in its 384 acre watershed to the north. Land use in the watershed is divided among cropland, woodland and pasture as shown in the table below.

HANSON LAKE #3 WATERSHED
LAND USE

Cropland Acres	144 acres
Pastureland Acres	108 Acres
Woodland Acres	120 Acres
Farmsteads	7 Acres
Roads	5 Acres
 Total Watershed	 384 Acres

- Treated Acres Including Cropland, Woodland, Pasture -- 300 Acres

Many of the cropland acres are protected from erosion by conservation measures. Because of the steepness of the land, gully erosion is responsible for more than one half of sediment deposited downstream. Thus, in order to solve the water quality and sedimentation problems in Hanson Lake, this project must address gully erosion as well as sheet and rill erosion. Included in this work plan is a Cooperative Extension Service publication "Effects of Agricultural Runoff on Nebraska Water Quality" that provides details regarding the water quality problems associated with agricultural runoff and how soil and water conservation practices help solve these problems.

The Soil Conservation Service has developed a land treatment plan that includes terraces, terrace outlets and small grade stabilization/erosion control dams, as well as a major grade stabilization/sediment retention structure. This structure would be the key element in the work plan since the SCS estimates that a 57% reduction in sedimentation would result from its construction. This larger structure, along with the smaller ones, would control sediment from 110 of the 144 total cropland acres in the watershed. Protection of the cropland acres is particularly important because these acres would be those most likely to contribute to water quality problems in Hanson Lake. Not only because of the

sediment itself, but because of the agricultural chemicals and fertilizers that are carried with the sediment. Depending upon the contaminant, these pollutants could have quite detrimental effects on the water quality as well as on the flora and fauna of Hanson Lake.

As stated earlier, Hanson Lake is a recreational lake that is used for swimming and other water contact sports, as well as fishing. Thus, it is important to the homeowners to maintain good water quality. In 1982, the Department of Environmental Control did water water quality sampling at Hanson Lake and at two adjacent sand pit lakes. They found that all three lakes were rich in nutrients and high in biotic productivity; a condition called eutrophic. A highly eutrophic lake is undesirable because this condition can lead to algae blooms which give the water a "pea green color" and can result in decreased oxygen concentrations which cause fish kills. Also these lakes have at times had high bacterial levels that constitute a health hazard for full body contact use (swimming). Surface runoff was identified in the DEC report as potential source of bacterial contamination.

Because improving the water quality of Hanson Lake is of great importance to them, the Hanson Lake Homeowners Association has agreed to provide some of the funding for the project. Their funds would be applied to the construction of the large sediment retention dam. To provide the incentive to landowners to apply the necessary conservation practices, a cost-sharing rate of 80% will be used except in the case of the large sediment retention dam. For this structure the landowners will provide the necessary land rights and the District and Hanson Lake homeowners association will pay all costs associated with building the structure. The estimated cost of the structure is \$120,000 - \$150,000. The Hanson Lake homeowners will pay 20% of the cost; \$24,000 - \$30,000 (not to exceed \$30,000).

Plan of Action

1. Install land treatment measures to control sheet and rill erosion on cropland
 - A. Date of completion -- November, 1993
2. Construct smaller grade stabilization dams to trap sediment and control gully erosion
 - A. Date of completion -- March, 1994
3. Construct large grade stabilization dam to trap sediment and control grade
 - A. Date of Completion -- June, 1995

Structural Conservation Needs

	<u>Unit Needs *</u>	<u>Estimated Total Cost</u>
Terraces/Tile Outlets	10,620 feet	\$ 24,426.00
Diversions	1,600 feet	6,080.00
Waterways	1 acre	688.00
Sediment Basins	8 each	22,000.00
Permanent Seeding	7 acres	1,050.00
Grade Stabilization Dam	1 each	<u>120,000.00 - \$150,000.00</u>
Total Cost		<u>\$174,244.00 - \$204,244.00</u>

• To reach 80% land treatment

Funding Sources

Papio-Missouri River NRD	\$139,395.00 - \$163,396.00
Hanson Lake Watershed Landowners	10,849.00
Hanson Lake Homeowners	<u>24,000.00 - \$ 30,000.00</u>
Total	\$174,244.00 - \$204,244.00

PLATTE VIEW ROAD

HANSON LAKE WATERSHED SUMMARY

TOTAL WATERSHED ACRES	384 Acres
ACRES ADEQUATELY TREATED	300 Acres
PLANNED LAND TREATMENT	67 Acres

