

2012 OVERALL PLAN

BEAR VALLEY WATERSHED

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Bear Valley Watershed

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I. Introduction

This Watershed Management Plan is prepared for the management of the water resources in the Bear Valley Watershed District in Minnesota. It has been assembled by the Board of Managers with the assistance of the Board's advisory committee and other persons who helped delineate the Districts problems and suggest possible solutions.

A. General Objectives

The Bear Valley Watershed District was established with a number of objectives in mind; the attainment of which would be of benefit to the community and individual property owners. Among these were:

1. The control or reduction of damage to soil by sheet erosion and by deposits of sediments on the land and in watercourses;
2. The control or reduction of the damage to soil caused by gully advancement;
3. The reduction of damage to land and public and private improvements caused by flood waters;
4. The improvement of waterways and stream channels for drainage and other purposes;
5. The improvement of habitat and other natural conditions that could benefit wildlife;
6. Providing for sanitation and public health and regulating the use of streams, ditches, or watercourses for the purpose of disposing of waste;
7. Imposition of preventative or remedial measures for the control or alleviation of land and soil erosion and siltation of watercourses or bodies of water affected thereby, and to reduce and prevent soil losses in excess of established soil loss tolerances;
8. Regulating improvements by riparian landowners of the beds, banks, and shores of lakes, streams and marshes by permit or otherwise in order to preserve the same for beneficial use, such as recreation;
9. Protecting or enhancing the quality of water in watercourses or bodies of water;
10. Providing for public health by protecting the quality of groundwater, and to reduce the level of nitrogen entering the groundwater;

11. Care for the land surface in order that the portion of surface water recharging the groundwater directly carries a reduced load of pollutants.

B. Action to Protect Soil Resources

The Bear Valley Watershed District was first homesteaded in about 1850. When homesteading ended in about 1910, farmers, as well as professional agriculturists, generally had not yet recognized the serious soil management problems that were occurring across the midsection of the United States.

There were problems of soil depletion, declining fertility, loss of soil structure, increased runoff, and flooding of small streams caused by water erosion, soil blowing, and poorly adopted cropping systems. Farming practices during these early years generally were exploitative, and most soil management measures were planned on a short-term basis.

The importance of soil stewardship to the well-being of the Nation gained some recognition in the mid - 1920's when Hugh Bennett of the U.S. Department of Agriculture began speaking and writing about the seriousness of the growing soil problem. The drought and dust storms of the 1930's in the Great Plains made the entire Nation aware of the importance of sound soil management.

Out of the dust storm problems of the early 1930's was born a federal policy to protect the soil resources of the Nation. In 1937, the Minnesota Legislature authorized the formation of Soil Conservation Districts. By 1941, soil conservation districts were operating in Wabasha and Goodhue counties to assist farmers in protecting their soil from damage by wind and water erosion.

C. Action to Manage Water Resources

Group action to deal with the flood problems that occurred in 1942, 1943, and 1954, and other problems in the Bear Valley Watershed started in 1954. The Wabasha and North Goodhue Soil and Water Conservation Districts' leaders promoted interest in finding solutions to flood damage and helping land owners organize a steering committee.

This steering committee encouraged interest and participation in proper land treatment and in water management through a community project.

In 1955, educational meetings were held to inform farmers about water problems, possible solutions, and sources of available technical and financial assistance. In 1956, the two Soil and Water Conservation District boards served as sponsors of an application for federal assistance under the Watershed Protection and Flood Prevention Act [P.L. 566]. During 1957 and 1958, farmers continued to apply soil and water conservation measures.

In April 1959, the U.S. Department of Agriculture approved the preparation of a Work Plan to solve the flooding problems. The Soil Conservation Service in Minnesota assisted the local sponsors in developing the Work Plan. The sponsors signed an agreement accepting the Work Plan in early 1961.

In 1960, The Minnesota Water Resource Board received a petition for the establishment of a Watershed District from the Boards of County Commissioners of Goodhue and Wabasha Counties. A hearing was conducted and the Bear Valley Watershed District was established by Order of the Minnesota Water Resources Board on April 27, 1961.

II. Watershed Inventory

A. Location

The Bear Valley Watershed District comprises a portion of the Zumbro River watershed in the southeastern part of Minnesota in Goodhue and Wabasha Counties. The Zumbro River watershed is bounded on the north by the Cannon River watershed and on the south by the Root River watershed.

Southwest of the City of Zumbro Falls the North Fork of the Zumbro River joins the Zumbro River. At this point, the Zumbro River flows generally eastward to the Mississippi River near the City of Kellogg. Emptying into the north side of the Zumbro River, just west of the City of Zumbro Falls, is a tributary called Cold Spring. The land area casting its runoff through Cold Creek to the Zumbro River is the watershed area described as Bear Valley.

The name of the District is taken from the southerly tributary to Cold Creek. In early settlement days a small community called Bear Valley that included a post office was located in section 27 of Chester Township, Wabasha County. In 1996,

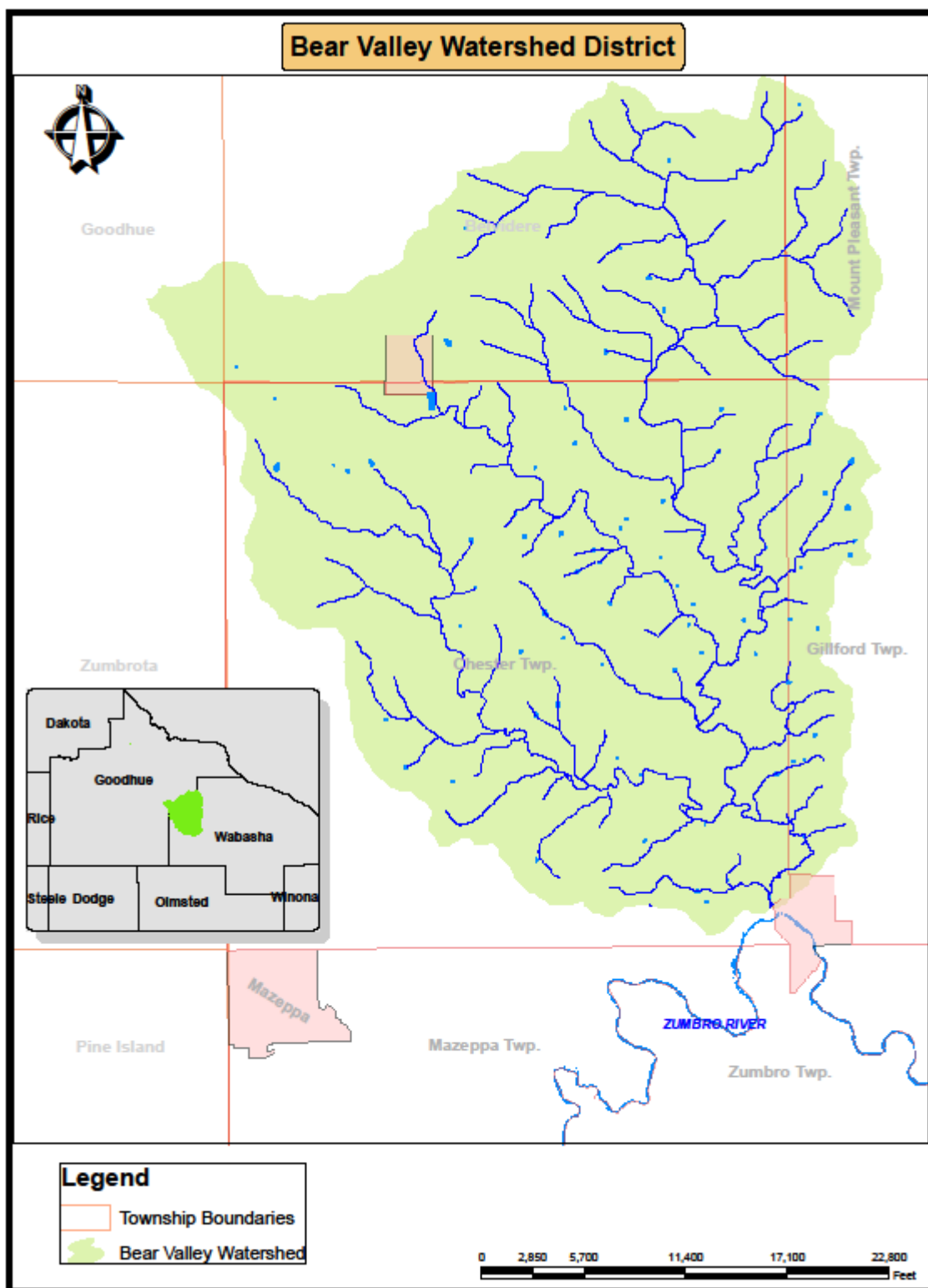
only a church remains at the settlement site. The District is situated about 21 miles north of the City of Rochester. See Map 1.

B. Size and Shape

The watershed is roughly triangular in shape, gradually widening from a point at its outlet on the south to its greatest width at the north. The greatest width is 8 miles and the extreme distance from north to south is about 9 miles. The watershed is bounded on the east by the watershed of Spring Creek, tributary to the Zumbro River near Theilman, and by a small watershed tributary to the Zumbro River at Zumbro Falls. It is bounded on the south and west by the watersheds of small direct tributaries of the Zumbro River. It is bounded on the north by the watershed of Wells Creek, which is tributary to the Mississippi River near the City of Frontenac.

The territory of the watershed comprises an area of 45.8 square miles, or 29,326 acres. Seventy-one percent of the watershed, 20,821 acres, is in Wabasha County and twenty-one percent, 8,505 acres, is in Goodhue County.

Map 1 – Legal Boundary of the Bear Valley Watershed District



C. Geology and Topography

The watershed is within the non-glaciated Wisconsin Driftless Section, which covers southeastern Minnesota, northeastern Iowa, and southwestern Wisconsin. The watershed has moderate relief (slopes to 15 percent) in its upper reaches to strong relief (slopes of 60 percent) in its lower reaches. The elevation of the highest portion of the watershed is 1,200 feet above mean sea level, and the lowest portion is at an elevation of 835 feet.

The watershed was lightly glaciated in its upper reaches where a shallow mantle of glacial till rests on bedrock. The glacial till is overlain by a fifteen-foot blanket of loess material, a wind deposited soil, which extends a short distance down the valley slopes. The bedrock surface is generally reflected in the topography. See Map 2.

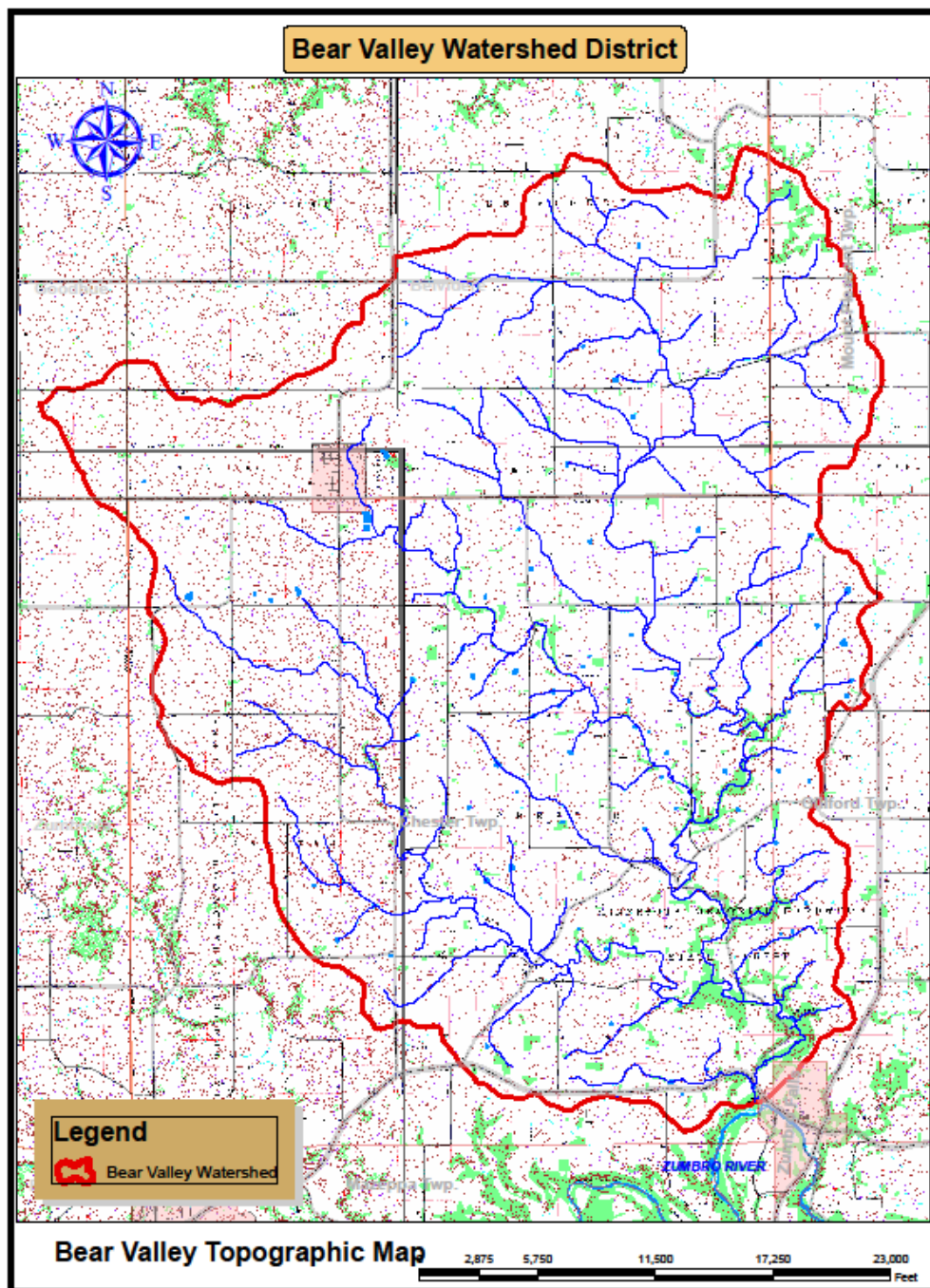
The steep-sided valleys in the middle and lower parts of the watershed have a shallow mantle of soil and rocky overburden.

The bedrock formations are early Paleozoic sandstones and limestone's with some shale. The oldest exposed formation is the Oneota Dolomite and the youngest is the Platteville Limestone. The upper reaches of the watershed are underlain by undifferentiated cretaceous rocks including sandstone, clay, and shale that yields little water (Kr). The lower valleys are underlain by the Prairie Du Chien group, comprised of Shakopee Dolomite, New Richmond Sandstone, and Oneota Dolomite (Opc). Large amounts of water are available from the Oneota Dolomite. See Map 3. Some sinkholes occur in the Shakopee limestone in the northwest portion of the watershed. A sinkhole is a closed, usually circular, depression, which forms in the karst areas. Sinkholes are formed by the removal of material from beneath by underground water flow. Sinkholes provide a direct conduit connecting surface water with underground water.

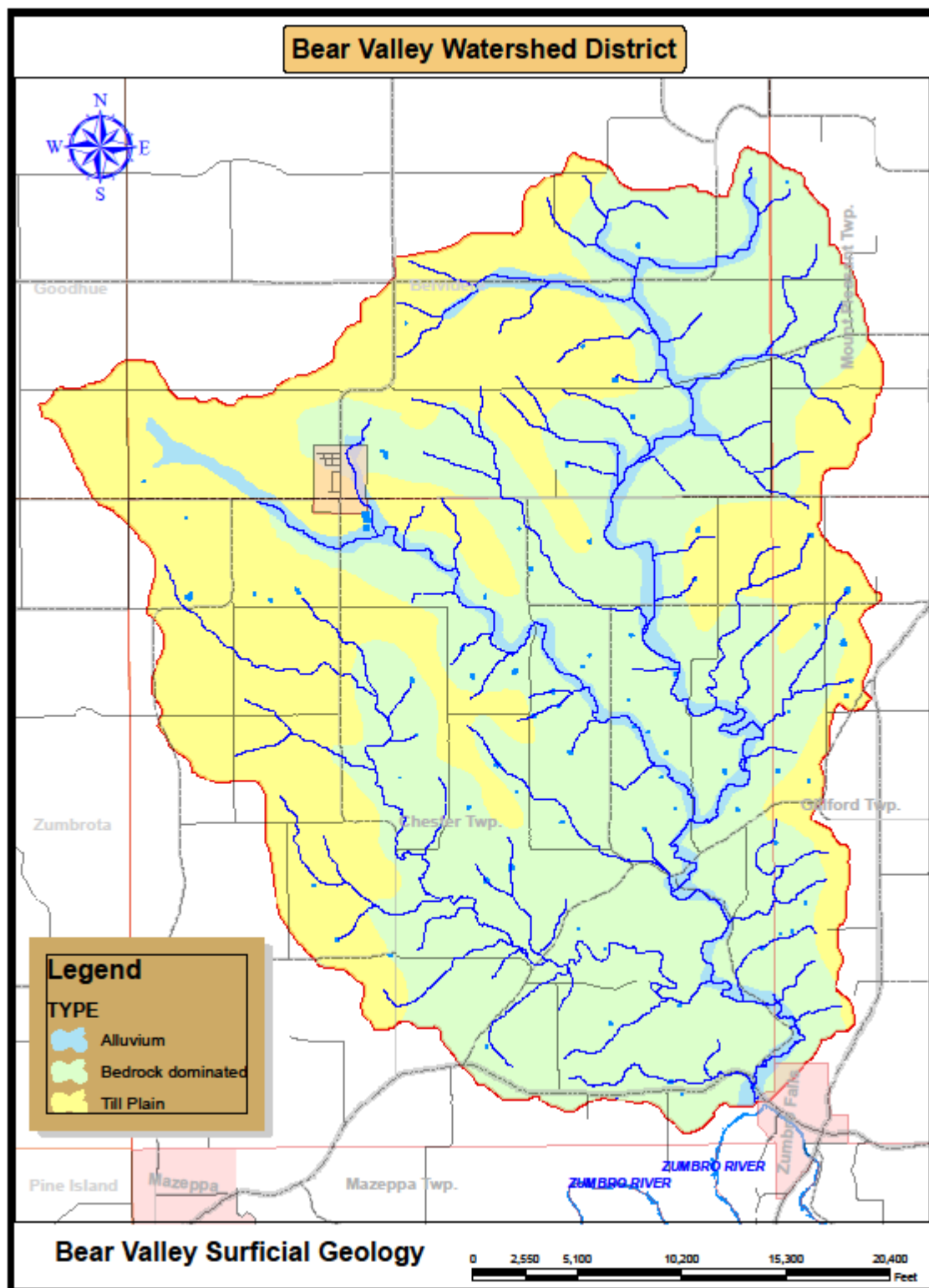
The stream drainage pattern is strongly rectangular and is controlled by pre-glacial geologic erosion paralleling the rectangular joint system in the sandstone and limestone bedrock. The streams have cut wide, moderate gradient valleys in the friable sandstones and narrow, steeper gradient valleys in the limestone formations.

Under storm conditions this relief character and the drainage pattern of the watershed is conducive to the quick accumulation and fast movement of runoff resulting in flash-type floods.

Map 2: Bedrock Surface Contour



Map 3: Bedrock Formations



D. Soils

1. General Description

The soils of the watershed have developed from wind deposited loess (silt) under a forest cover. They are very productive.

Soil surveys of all watershed lands on 4 inches = 1 mile aerial photographs. They are on file at the Wabasha Soil and Conservation District office in Wabasha and Goodhue Soil and Water Conservation District office in Goodhue

Table 2 provides information about the soils in the District.

<u>UPLAND SOILS</u>			
<u>Dominant Soil Series</u>	<u>Description</u>	<u>Acres</u>	<u>% of Area</u>
Mt Carroll (Downs)	Well drained, deep; moderately dark colored medium textured loess soil	3,115	10.6
Renora (Hines) Seaton Complex (Fayette-Hines Complex)	Well drained, deep; light colored, medium textured glacial and loess soils	3,323	11.3
Fayette/Seaton/Timula(Fayette) Dubuque/Elbaville (Deep Dubuque)	Well drained, moderately deep to deep light colored medium textured loess soils	17,842	60.6
Lamoille/Doverton	Well drained, deep; light colored Medium textured soils	867	2.9
Boone, Lilah (Wykoff) Eleva (Hixton)	Well to excessively well drained, droughty, moderately deep to deep; Light colored medium to coarse textured soils	240	0.8
Garwin (Cashton)	Poorly and very poorly drained, deep, Moderately dark colored medium textured soil	966	3.3
Total Upland Soils		26,353	89.5
<u>TERRACE SOILS</u>			
Bertrand (Watopa) Festina (Jackson)	Well drained deep; mostly light colored medium textured soils	483	0.1
Total Terrace Soils		483	0.1
<u>BOTTOMLAND AND WATERWAY SOILS</u>			
Chaseburg-Judson	Well drained and moderately well drained, Deep, light colored medium textured soils	1,578	5.3
Genesee Arenzville (Ray)	Well and moderately well drained, deep, light colored medium textured soils	746	2.5
Non-Agricultural Bottomland Soils		166	2.6
Total Bottomland Soils		2,490	10.4
TOTAL	(TABLE 2)	29,326	100

Soils developed under timber cover tend to be more compact and less permeable than soils developed under grass cover. This decrease in permeability results in higher percentage runoff. Since 90% of the area was developed under timber cover, runoff per acre of watershed land is higher than comparable Southeastern Minnesota watersheds where more of the soils were developed under grass cover.

66 acres, or 3.3% of the watershed area is occupied by soils that are somewhat poorly drained. These soils occur at the upper end of waterways. Additional drainage is needed occasionally in the 1,578 acres of waterway soils; however, they normally have sufficient slope to have good surface drainage even though the subsoil drainage may not be good.

2. Soil Slopes

Fifty-three percent of the watershed has a slope of six percent or less, thirty-one percent has a slope between six and twelve percent, and sixteen percent has a slope greater than twelve percent. **Table 3** gives the acreage of watershed lands by slope classes.

TABLE 3
Soil Slopes

Percent Slope	Acreage	Percent of Slope
0-2	2,742	9.3
2-6	12,871	43.7
6-12	9,036	30.7
12-18	4,042	13.7
18-25	198	0.8
25-35	275	0.9
Above 35	<u>276</u>	<u>0.9</u>
Total	29,440	100.0

3. Erosion

Eighteen point five percent of the area was mapped as having occasional gullies. One point two percent of the area had frequent gullies (three or more per acre of less than 100 feet apart).

The original depth of topsoil was 10 to 12 inches on the upland timbered areas and 12 to 14 inches on the darker colored semi-prairie areas. Steep areas never did have much topsoil.

If an average top-soil depth of 12 inches is used, we can say that up to 1942:

14.5% of the area had lost from 1-3 inches of topsoil;
54.2% of the area had lost from 3-6 inches of topsoil; and
22.3% of the area had lost over 6 inches of topsoil.

Average soil loss in the watershed up to 1942 would be about 3 ½ inches or 3/10 of the average original topsoil depth. **Table 4** shows the erosion conditions that existed at the time of the soil surveys in the 1940s.

TABLE 4

Extent of Sheet Erosion in the Early 1940s

Extent of Sheet Erosion	Acres	Percent of Area
None to Slight (0-25% topsoil removed)	4,269	14.5
Moderate (25-50% of topsoil removed)	15,900	54.2
Severe (50% of topsoil removed)	6,551	22.3
Deposition	2,606	9.0
	29,326	100.0

Current estimates of cropland erosion in the area are 80% under T, 10% above T and 10% above 2T. These can and will vary according to practices applied to the land.

4. Land Capability Classes

Land capability classes reflect the potential long-term use of the land. Class I, II, and III lands are suitable for cropland. Class IV land can occasionally be used for cropland. Class VI and VII lands should be kept in permanent pasture, trees or be used for wildlife land.

D. Surface Water

Cold Creek is situated on the east side of the watershed and its flow is generally north to south to the Zumbro River. From the western part of the watershed, Cold Creek has two major tributaries, which are the Bellechester and Bear Valley tributaries.

A stream flow investigation was made of the Zumbro River on August 10-13, 1971. The discharge during the base flow period at this site was 11 cfs. It is characteristic of the upper reaches of Cold Creek and its tributaries that they are usually dry. With storms of 2" of precipitation or more, the watercourse carries the runoff to the Zumbro River. The lower reach of Cold Creek, beginning in section 25, township 110 North, Range 14 West, is fed by springs and has flowing water throughout the year.

There are no lakes or significant wetland areas in the District. There also are no public drainage systems in the District.

E. Groundwater

Approximately three-quarters of Minnesota's groundwater is contained in aquifers (water-bearing rock formations) underlying southeast Minnesota, which includes the territory of the Bear Valley Watershed District.

1. Groundwater Supply

The groundwater system involves the inter-relationships of water with the thickness, hydrologic characteristics, and aerial extent of the geologic units. The system is continuously recharged in some places and discharged in others, and is always tending to adjust, sometimes in minor degrees, to climatic variations and activities of man.

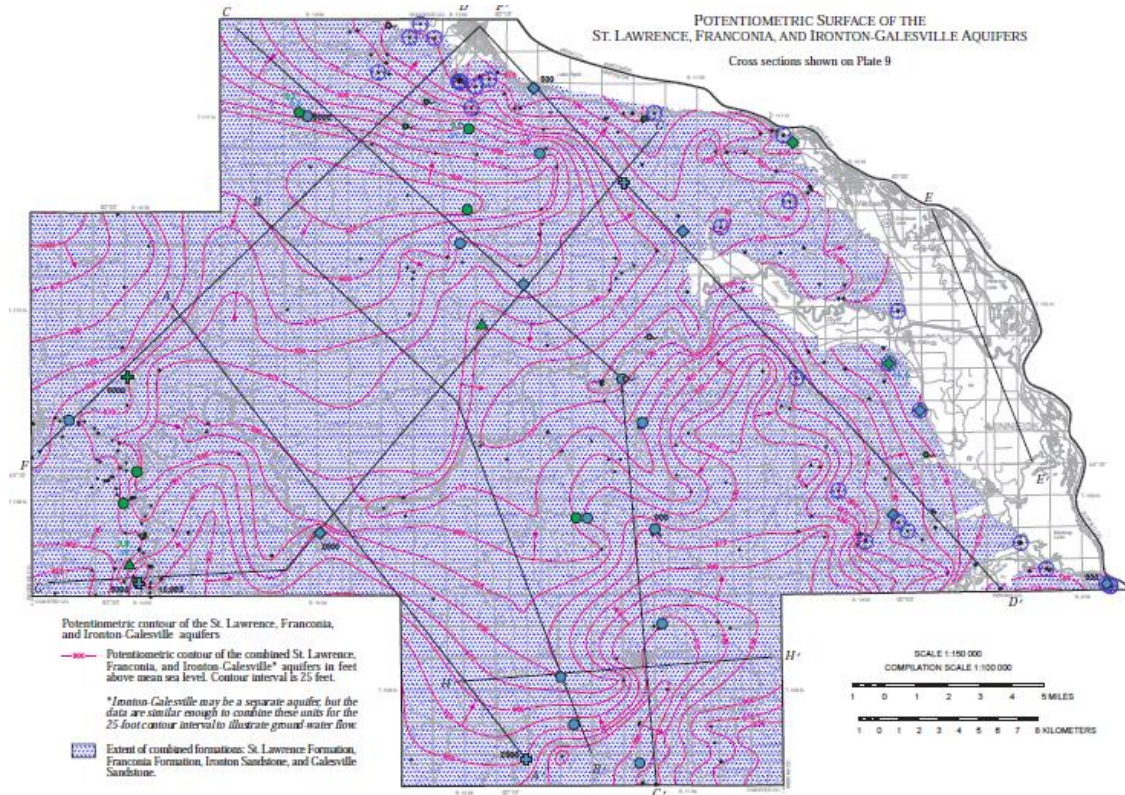
Large water supplies are available from the Jordan aquifer. Water in the bedrock aquifers is generally of acceptable quality for domestic use.

Water supply for domestic use, livestock, and dairy use is supplied by wells in bedrock aquifers.

Water movement in shallow aquifers is toward local drainage features and regionally toward the Mississippi River. See Map 4.

Map 4: Groundwater Movement

COUNTY ATLAS SERIES ATLAS C-14, PART B, PLATE 8 OF 10 Hydrogeology of the Unconsolidated and Bedrock Aquifers



2. Groundwater Quality

An adequate and safe water supply is essential to the production of healthy livestock and poultry. Nitrates are soluble and move with percolating water. Nitrates are found in shallow groundwater. Sources of nitrates in groundwater include nitrogen fertilizers, animal manure or wastes, crop residue, and human wastes. Deep wells are usually nitrate free but an improperly located or improperly constructed deep well can be polluted.

E. coli is the current water quality standard indicator in Minnesota for bacterial contamination as groups of bacteria passed through human and animal fecal material. The presence of these in a river or stream indicates

water contamination by human or animal fecal material. Bacterial contaminants have a direct impact on human and ecosystem health. However, they are difficult to quantify. Vastly variable sources and supporting conditions, monitoring practices and methods all make results highly uncertain. Refer to the Minnesota Pollution Control Agency website, <http://www.pca.state.mn.us/>, for current information on bacterial contaminants in groundwater.

3. Health Concerns

a. Effect on Humans

Water that has elevated nitrate nitrogen content should not be used for drinking or cooking purposes. Water treatment, such as softening, does not remove nitrate and boiling the water only tends to increase the concentration of this chemical in the water.

Water having a nitrate nitrogen concentration of 10 milligrams per liter (10 parts per million) or more should not be used for infant feeding because it can cause an illness known as hemoglobinemia.

The presence pathogens or disease producing bacteria or viruses may be indicative of Fecal coliforms or E. coli. Ear infections, dysentery, typhoid fever, viral and bacterial gastroenteritis, and hepatitis A are all waterborne pathogenic diseases.

b. Effect on Animals

Nitrate level recognition is important to livestock health. Nitrates, themselves, are not particularly toxic. There may be no noticeable difference in animal health resulting from moderate intake other than decreased animal gains and lower feed conversions. However, nitrates can readily change to nitrites in the rumen of cows and sheep microorganisms and result in death. Nitrites are 10 times

more toxic than nitrates. From the animal's stomach the excess nitrites are absorbed into the blood stream and inhibit the absorption of oxygen. Nitrites react with hemoglobin to form methemoglobin, and the animals show symptoms of asphyxiation. A pregnant animal that receives a near fatal dose can abort the fetus. More information can be found on the USDA website, <http://usda.gov/wps/portal/usda/usdahome>.

E-coli is relatively harmless to cattle, but they act as a natural reservoir for the bacteria. They can be infected or re-infected by manure in pastures and feedlots. If left on hides, meat and equipment could be contaminated in packing houses.

4. Waste Disposal

a. Non-point Sites

Domestic waste disposal at scattered rural and non-rural homes in the District is by means of septic tanks and drain fields. Refuse dumps in rural areas may also be sites of potential water contamination.

b. Point Sites --The City of Bellechester

The City of Bellechester is located on County Highway 16 and County Highway 7 in Goodhue and Wabasha Counties. It has a population of approximately 175 residents.

Bellechester's wastewater treatment facility was constructed in 1971 and is located in the Northwest ¼ of Section 4, Township 110 North, Range 14 West. It consisted of two stabilization ponds providing a total detention time of 258 days.

Effluent discharge was delivered via a ditch to Cold Creek, which in turn, discharges into the Zumbro River. The system was designed to treat a flow of 0.0334 MGD with a BOD strength of 262 mg/l, and to discharge effluent with BOD and TSS levels of 25 mg/l and 30 mg/l respectively. Applicable final effluent standards for the

controlled discharge from Bellechester are: 25 mg/l of BOD, 45 mg/l of TSS, 200 MPN/100 ml of fecal coli form. The average 3 year discharge rates were 4.90 mg/l of BOD, 9.44 mg/l of TSS, and 830.65 MPN/100ml of fecal coli form.

Sometime between April 23, 1992 and April 28, 1992, approximately 2.3 million gallons of partially treated wastewater was lost from pond #2 of the wastewater treatment facility. On April 28, six sinkholes were discovered at the treatment facility site.

No measurable amount of wastewater was lost from pond #1, however, some amount of wastewater was lost.

The City of Bellechester reconstructed the existing sanitary waste stabilization pond facility at the existing site and in conformance with current design and construction standards.

It is anticipated that Bellechester's discharge will not violate final effluent standards and that their facility is adequate for future needs and population expansion.

G. Land Use

For a current document regarding land use and land cover classifications reference the USGS website, <http://landcover.usgs.gov/pdf/anderson.pdf>.

With proper watershed treatment, 82.5% of the land is suitable for cropland, 12.8% of the land could be used for cropland occasionally, and 4.5% of the land should be kept in permanent vegetation.

Other than roads, there is no other land within the watershed owned public agencies. A good system of well-maintained county, township, and private roads exist in the watershed. These facilities lead to two good state all-weather highways. U.S. Highways No. 63 is near the east edge of the watershed and Minnesota Highway No. 60 is along the southern boundary.

The community of Bellechester, located in the upper reaches, occupies about 60 acres. The City of Zumbro Falls is located just outside the District boundary downstream of the outlet of Cold Spring.

There has not been an influx of persons who have built separate housing facilities along the road system. On the other hand, as farm units have been consolidated, farm houses on the original farmsteads have provided housing for non-rural families.

Electric power lines and telephone lines serve the residents of the District. There are no rail facilities in the District.

H. Climate

The climatic data is based on records from the State Climatology Office, St. Paul, Minnesota. Current and historical climate information is available from the State Climatology Office website, <http://climate.umn.edu/>.

I. Population

In March 1961, the Soil Conservation Service estimated the population of the District at 1,000 persons. At the time of writing this plan, estimated population of the watershed is 175. Current and detailed population and demographic information is available from the State Demographers Office website, <http://www.demography.state.mn.us/>. A census was done in 2010 and that information is not yet available specific to cities. However, the population of Bellechester increased by 56.4% from 1990 to 2000.

J. Economy

At the time of the 2000 Census, the top occupations in the area were Production, Transportation and Material Moving Occupations; Service Occupations; Management, Professional and Related Occupations; and Sales and Office Occupations. The most prevalent industries of employment were Manufacturing; Education, Health, and Social Services; and Other Services. <http://censtats.census.gov/pub/Profiles.shtml>. The median household income at the time was \$33, 333.

K. Wildlife Resources

After many years of intensive farming, good wildlife habitat is limited within the watershed. With both CRP and RIM acres, habitat has increased in the District. Other habitat is confined to small woodlots, roadside brush, stream bank cover, and rough sites along the lower reaches.

Wildlife species which afford some local hunting opportunities are squirrels, pheasants, turkeys, cottontail rabbits, jack rabbits, raccoons, and white-tailed deer.

It is believed that the lower reaches of Cold Creek once supported good populations of trout and other game fish. Due to flooding, erosion, and sedimentation, the fishery resources in Cold Creek did become limited at some point. Currently the creek provides a cold stable environment and there is a healthy brown and brook trout population.

III. Water Management Projects Completed

A. Bear Valley Watershed District and Wabasha and Goodhue Soil and Water Conservation District

In March of 1961, a Work Plan for Watershed Protection and Flood Prevention for the Bear Valley Watershed was completed by the Goodhue and Wabasha Soil and Water Conservation Districts assisted by the SCS and Forest Service of the U.S. Department of Agriculture. The Work Plan was prepared under the authority of the Watershed Protection and Flood Prevention Act, PL-566 (83rd Congress).

To reduce soil losses, damage to property from sediment, land voiding, undercutting of fences and road structures, and the destruction of terrace outlets and waterways, a system of grade stabilization structures was developed to stabilize those areas that could not be controlled by land treatment measures. The program consisted of seven box inlets added to existing bridges or culverts; five straight drop

spillways; three drop inlets; and 4.75 miles of structural waterways. See Map 7 and figures 3, 4, and 5.

In addition to providing gully stabilization, three drop inlets with conservation pools (S-16, S-21, and S-22) provide temporary storage for flood reduction downstream of these structures. They provide temporary storage of 93 acre feet and a 90 percent reduction in outflow for a 25-year design storm from an area of 1,196 acres (4.1% of the watershed). The S-6 structure located in Section 6, Belvidere Township, Goodhue County, has not been installed.

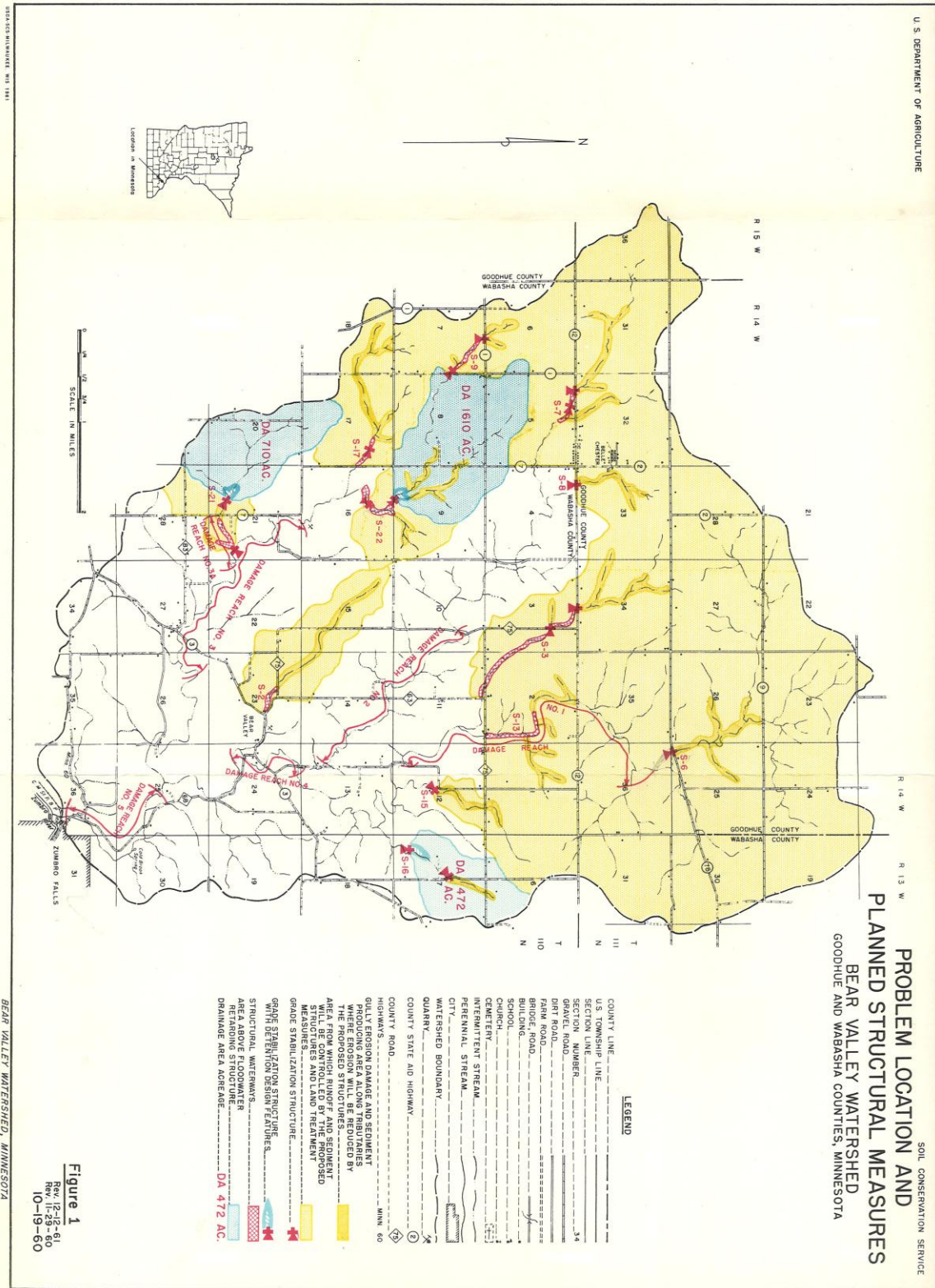
The necessary land easements were obtained from each land owner for \$1.00. Other local costs were payments to the managers for their administrative and supervisory work.

The above structures were installed in the period 1962-1964 at a total federal cost of approximately \$165,000. See Table 13.

In September, 1964, the sponsoring agencies and the District held a Dam-O-Rama event marking the completion of the installation of the Work Plan. The headquarters for the celebration was the Matt Miller farm near Bellechester.

Map 7

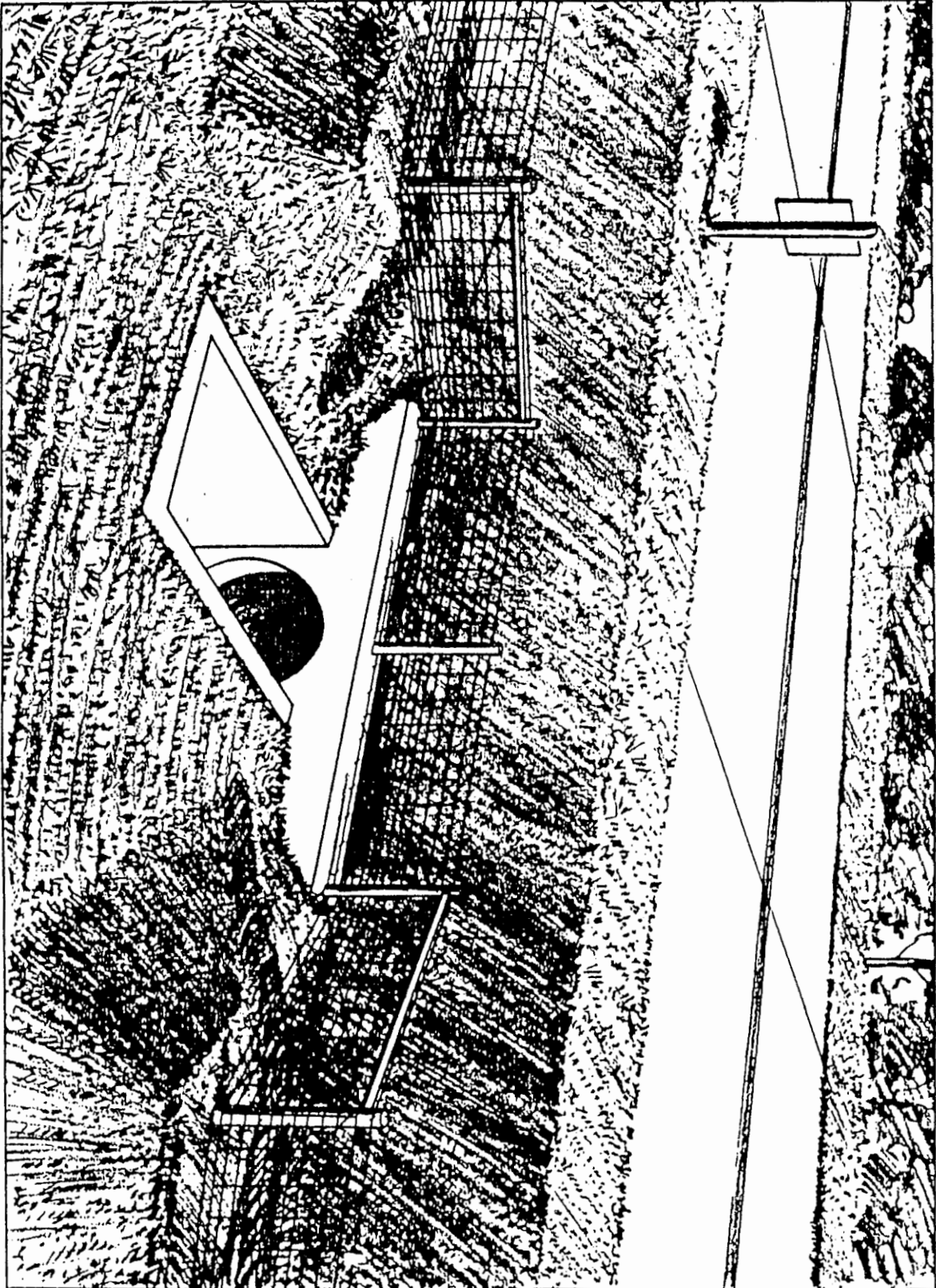
Work Plan Improvements



Culvert box inlet picture

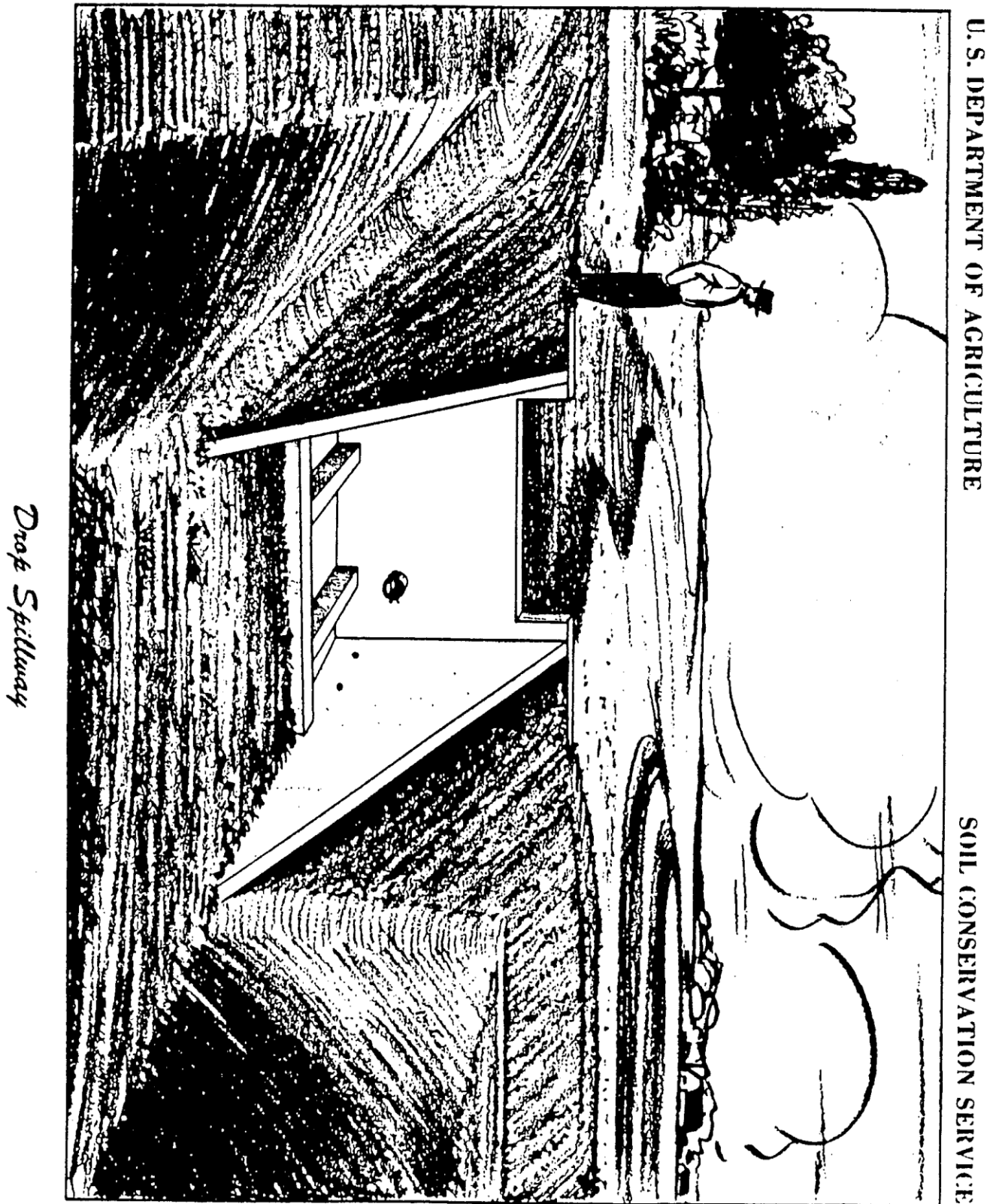
U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE



Culvert box inlet.

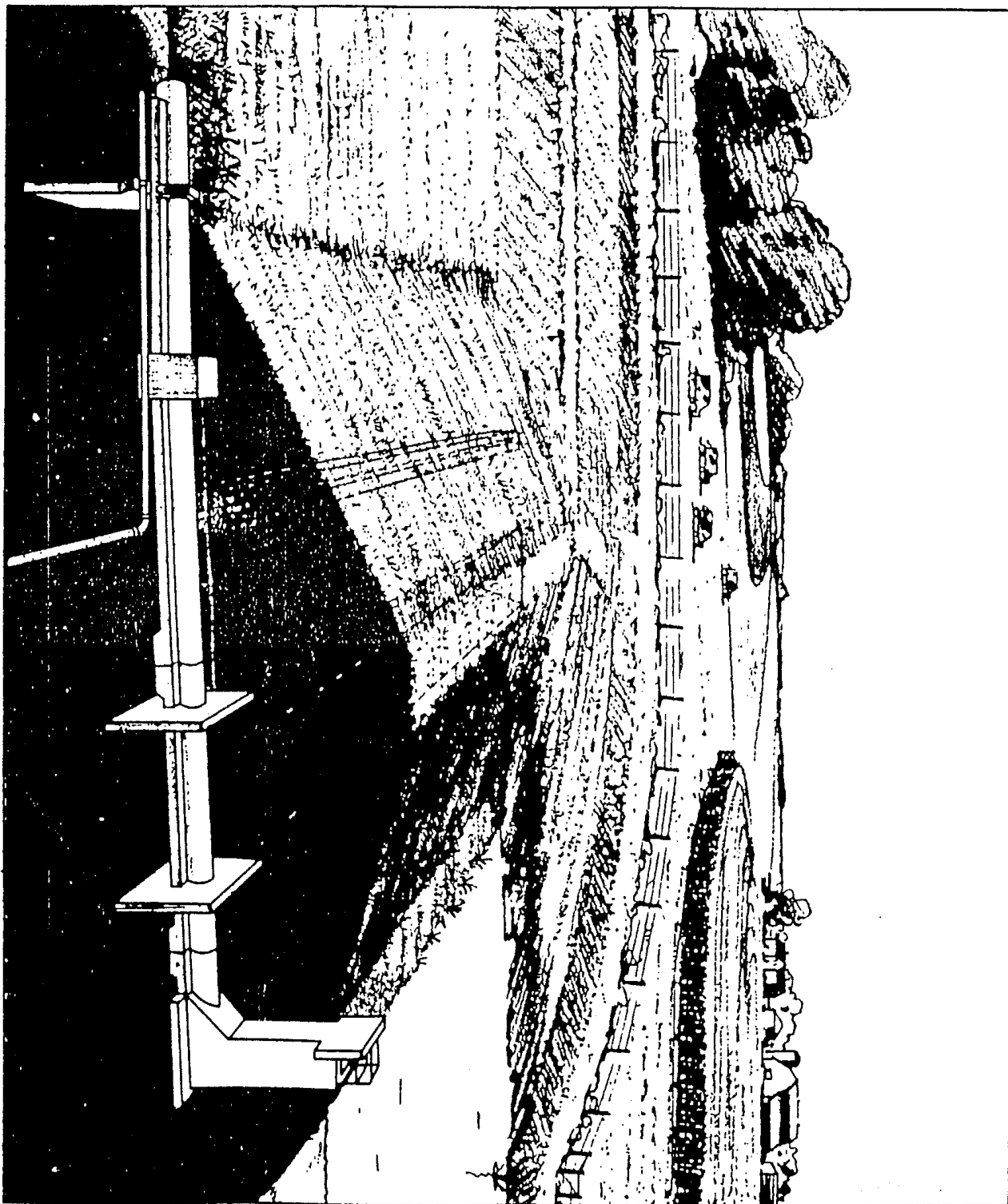
Drop Spillway Picture



Earth fill dam with concrete drop inlet and conservation pool

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SOIL CONSERVATION SERVICE



Earth fill dam with concrete drop inlet and conservation pool.

TABLE 13 ESTIMATED PROJECT INSTALLATION COST					
ITEMS	UNIT	# APPLIED	PL 566	OTHER	\$ TOTAL
Contour Stripcropping	Ac.	5000		15000	15000
Diversions	Mi.	6		1800	1800
Farm Ponds	No.	35		31500	31500
Grade Stabilization Structures	No.	48		42600	42600
Gradient Terraces	Mi.	150		22500	22500
Grassed Waterways	Ac.	300		45000	45000
Pasture Planting	Ac.	250		7875	7875
Wildlife Area Treatment	Ac.	25		875	875
Technical Assistance			30000	10416	40416
SCS SUBTOTAL			30000	177566	207566
Livestock Exclusion	Ac.	50		100	100
Protection from Overcutting and Damaging Logging	Ac.	60		30	30
Tree Planting	Ac.	75		2625	2625
Technical Assistance			444	425	869
FS SUBTOTAL			444	3180	3624
TOTAL LAND TREATMENT			30444	180746	211190
Structural Measures SCS Grade Stabilization Groups	No.	11	111373	0	111373
TOTAL CONSTRUCTION COST			111373	0	111373
Installation Services SCS Engineering Services			26180	0	26180
Other			8909	0	8909
TOTAL INSTALLATION SERVICES			35809		35809
Land, Easements, Right-of-Ways				3280	3280
Administration of Contracts				3466	3466
TOTAL OTHER COSTS				6746	6746
TOTAL INSTALLATION STRUCTURES			146462	6746	153208
GRAND TOTAL			176906	187492	364398
SUMMARY					
Total SCS			176462	184312	360774
Total FS			444	3180	3624
TOTAL PROJECT			176906	187492	364398

B. Wabasha County

In 1971, two concrete culverts were installed on County Highway No. 3. The location of the structure is in Section 27, Chester Township.

In 1976, a new culvert was installed on County Highway No. 68 at a site in Section 13, Chester Township.

In 1983, Chester Township constructed a new bridge at a cost of \$120,000 on a township road located in Section 13.

In 1986, Old Bridge No. L-1114 in Section 21 of Chester Township was replaced with New Bridge No. 96957. (Precast Concrete Box Culvert)

In 1990, Old Bridge No. L-1124 in Section 23 of Chester Township was replaced with New Bridge No. 96958. (Precast Concrete Box Culvert)

In 1990, Old Bridge No. 1118 in Section 12 of Chester Township was replaced with New Bridge No. 96959. (2 Precast Concrete Box Culverts)

In 1990, Old Bridge No. L-1122 in Section 10 of Chester Township was replaced with New Bridge No. 96960. (Reinforced Concrete Pip-Arch Culvert)

In 1993, Old Bridge No. 954 in Section 24 of Chester Township was replaced with New Bridge No. 79539. (65' Long Prestressed Concrete Beam Span)

The Bear Valley Watershed District is incorporated in the Wabasha and Goodhue County Comprehensive Local Water Plan. The Water Plans will work with and incorporate the Bear Valley Watershed District rules and plans along with providing assistance with implementation of the plan.

The Wabasha County Water Plan is set to expire at the end of 2012. The new Water Plan revision will address current and new issues and priorities for the next decade. Goodhue County's Water Plan was updated in 2010 and will be revised again in 2020. The main issues of concern addressed in the Goodhue Water Plan include Urban/Residential water quality and Rural/Agriculture water quality. The more specific issues include erosion and sediment control, septic system compliance, groundwater protection, impaired waters, feedlot water quality improvement, and nutrient management. The main issues of concern addressed in the current Wabasha Water Plan include soil erosion, nutrient and manure management, septic systems and ground water protection, forest and pasture land, and impaired waters.

In 1991, the Minnesota Legislature enacted the Wetland Conservation Act (WCA). This law regulates the draining and filling of wetlands in Minnesota with an overall objective of no-net-loss of wetlands. In Wabasha and Goodhue Counties, the authority and administration of WCA has been delegated to both the Wabasha and Goodhue Soil and Water Conservation Districts. Projects that may impact wetlands are presented to the SWCD for approval. The WCA administrator then works to first avoid wetland impacts through an alternative plan. If avoidance is not an option, then work is done to minimize the impacts to the wetlands. Finally, if there is no other alternative, replacement of the Wetland may be required. In Wabasha and Goodhue Counties, a Technical Evaluation Panel (TEP) reviews replacement plans and makes final recommendations to the SWCD Board.

C. Municipality of Bellechester

In 1971, the City installed its present wastewater treatment facility. After a failure of the system, the structures were reconstructed in 1995. The City has two municipal wells.

D. State of Minnesota (DNR)

1. Trout Streams

To date the Department of Natural Resources is not stocking the lower reaches of Cold Spring with trout.

2. Protected Waters

Pursuant to Minnesota Statutes 105.391, Subd. 1, the Commissioner of the Department of Natural Resources has published a final inventory of Protected (Public) Waters of Wabasha County.

Cold Creek from Section 12 in Chester Township to its entry into the Zumbro River in Section 36, Chester Township, being a natural watercourse, is protected waters. Bear Valley tributary from a point in Section 26 to its entry into Cold Creek in Section 25 is also protected waters.

E. Soil and Water Conservation Districts

The Bear Valley Watershed is located in both the Goodhue and Wabasha Soil and Water Conservation Districts. Approximately one third of the watershed district is located in the Goodhue District with the remaining two thirds in the Wabasha District.

Landowners of the District since the early 1940s have cooperated with their soil and water conservation leaders in conserving the soil resources, protecting wood lots, and providing habitat and food for wildlife. Land conservation practices have been applied to land by farm operators, supported by state and federal cost-sharing funds.

Not all land surfaces in the watershed are properly treated and attention must be given to untreated farm land.

F. U.S. Department of Agriculture – NRCS – 1984

In the fall of 1984, the U.S.D.A. undertook a program to evaluate the PL-566 Watershed Protection and Flood Prevention Program. The elements of the 1965 PL-566 Work Plan installed in the District's one of 60 sample projects in the United States to be evaluated. The study compared the original estimates of project benefits to the damage reduction benefits that have actually accrued.

At the time of the District's annual inspection in August 1984, technicians concerned with the evaluation of the PL-566 Program accompanied the managers and other interested people.

The NRCS has an operation and maintenance requirement to inspect certain structures every 5 years. The Bear Valley Board inspects their project installations annually and they may also request NRCS to accompany them on occasion.

G. State of Minnesota – Department of Agriculture

The Department of Agriculture typically tests water supplies of Grade A dairy farms once every three years. In recent years, Grade B dairy farms have also been tested. The latest version of the "Pasteurized Milk Ordinance" can be referenced at the FDA website, <http://www.fda.gov>.

V. Watershed Problems

A. Erosion

1. Prior to Installation of the PL-566 Project

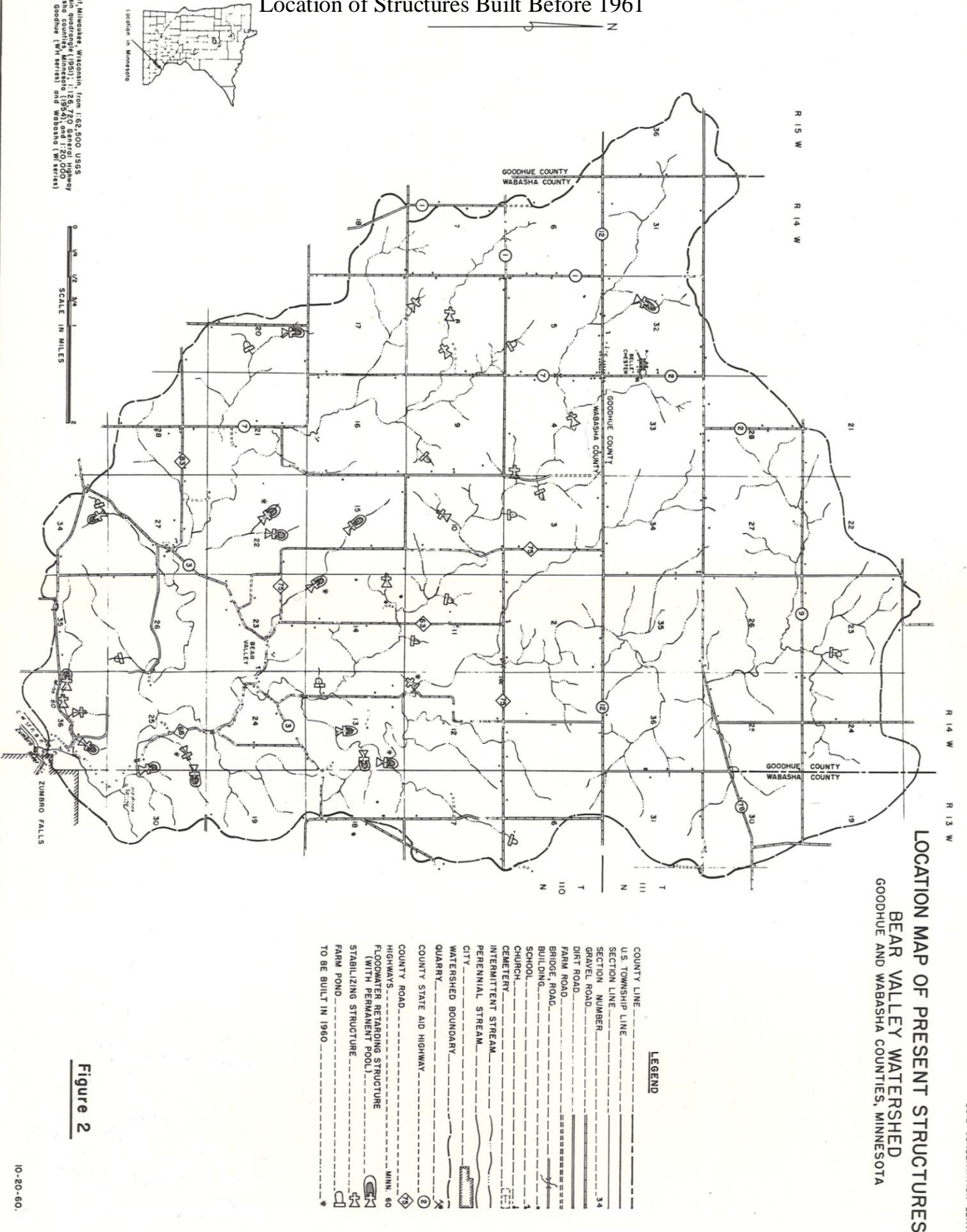
The soils in the watershed are mainly silt loams very subject to sheet erosion. In 1961, the annual rate of soil loss was estimated at 7.6 tons per acre. This represented an average loss of one inch of topsoil every 20 years. Upland sheet erosion had produced excessive amounts of silt, which the streams were not able to carry out of the watershed. This excess silt was deposited in channels and floodplains and would fill most channels of drainage area up to 1,000 acres in size. Most of the gullies were advancing

through highly productive land. If not controlled by structures, these gullies would have advanced well into the upland drainage ways. This advancement would have caused the loss of considerable land and depreciation in productivity of adjoining areas. This would have lowered farm income and adversely affected community interests.

Sediment produced by advancing gullies causes damage to land, roads, and bridges, and reduces watercourse capacity. Gullies, when extended, prevent establishment of needed land treatment measures. Map 8 shows the location of small structures built before 1961.

Map 8

Location of Structures Built Before 1961



2. After Installation of the PL-566 Project

Since the 1950s, land operators have applied many practices for soil erosion control to their land assisted by the Soil and Water Conservation Districts. The installation in the 1960s of flood control structures under Public Law 566 required the acceleration of the installation of land treatment practices on land above the structures. This was done by affected landowners. Thus the soil erosion condition existing in the watershed in the 1950s has been changed considerably. Currently, 85% of the District's cropland is considered to be adequately treated according to NRCS compliance standards. The Cold Creek watershed land treatment programs can be described as a success. There are, however, some locations of erosion that are of concern to the managers as noted below.

Severe stream bank cutting continues to be a problem in the lower three miles of the main floodplain and is the main source of sediment in the perennial flowing section below. Recent and more damaging floods have caused serious erosion and sedimentation that is passed along to the Zumbro River.

B. Floodwater

Recent flood events have damaged crop and pasture land, fences, bridges, road crossings, and other agricultural improvements.

C. Sediment

Roads, culverts, bridges, and some farm land has been damaged by sediment deposition. Much of this originates from sheet erosion in the upper reaches of the upland drainage ways.

D. Drainage

Some upland waterways are poorly drained and need to have tile installed. Generally this problem can be taken care of on individual farms.

E. Wildlife and Recreation

Intensive farming has limited wildlife habitat within the watershed. Cover is limited to the relatively small acreage of woodland, roadside brush, and some cover along stream banks. Lack of winter cover and food restricts populations of squirrels, rabbits, pheasants, raccoons, deer, and small mammals.

Cold Creek is rated potentially as the best trout stream in Wabasha County. It is currently provides a cold stable environment for brown and brook trout.

Recreation facilities are limited within the watershed. There are no parks or lakes. There is a small parking area adjacent to Cold Creek at the junction of County Road 68 and State Highway 60, established by the Minnesota DNR.

VI. What is Planned?

A. Erosion Control

1. Land Treatment

It is expected that the proper treatment of privately owned land to reduce the problems of excessive runoff and erosion will be taken care of primarily through the programs of the Goodhue and Wabasha County Soil and Water Conservation District. This consists of assisting landowners and operators with development of resource management systems in the form of farm conservation plans and establishment of the land treatment practices. Permanency of practices is desired and important to the managers.

The measures and practices to be applied include proper land use, recommended crop rotations, contour strip cropping, terraces, diversions, grass waterways, farm ponds, and some “on farm” stabilizing structures. Good management of land used for pasture will be important.

Woodland practices should be used on the remaining timber land. This would include the planting of trees, their protection, and wise harvesting.

Proper treatment measures would improve conditions for wildlife. Increases in wildlife populations will require special treatment of some areas for wildlife purposes. Land treatment practices installed from 1999 to 2011 are shown in Table 14.

Table 14

Land Treatment Within Bear Valley Watershed District		
Years 1999 to 2011		
Practice	Unit	Number Installed
Animal Mortality Facility	#	2
Contour Buffer Strips	#	9
Contour Farming	ac	1308
Strip Cropping	ac	400
Grassed Waterways	#	12
Prescribed Grazing	#	13
Water and Sediment Control Basins	#	2
Restoration of Declining Habitats	#	7
Grade Stabilization Structures	#	4
Buffer Strips	ac	12
Tree Planting	#	1
Conservation Cover/CRP	ac	555.1
(2011 NRCS Generated Report)		

The trend among land owners is the increased use of conservation tillage and traditional erosion control structures. Farm ownership stability has remained stable in the District. Consequently, past land treatment measures remain in place and continue to function. Farm ponds continue to be an important part of water management. Overall interest in soil conservation remains strong.

2. Structural Measures

Problems that cannot be controlled by land treatment alone shall have the additional protection of specially designed structures. This will include structures to control further advance of gullies and establishment of major grassed waterways.

If suitable sites are available for storage of floodwaters, retarding structures will be installed. Should these be of sufficient capacity, they will be considered for recreational and wildlife development. The Bear Valley Watershed Managers will continue to monitor structures and work on clean-up and repair of existing ponds. They also intend to watch for indicators of sinkholes and work with landowners to repair those.

3. Intergovernmental Cooperation

The managers believe the proper use, care, and protection of the soil resources of the Bear Valley Watershed District are important to current land occupiers and even more important to future generations. The Watershed seeks the cooperation and assistance of the two soil and water conservation district boards of supervisors and their employees in maintaining and accelerating their programs of assistance to land occupiers. Assistance is also received through the Counties of Goodhue and Wabasha, through their Local Water Plan by supporting conservation practices that control erosion upland. The managers will support land treatment, installation of structures, and a project to reduce stream bank erosion along

Cold Creek. They will also support the Zumbro Valley Watershed in plans to reduce sedimentation and pollutants entering the Zumbro River.

4. Adoption of Rules

The managers have adopted rules to protect soil and water of the District to assist current and new land operators in their management of soil and water so that downstream watercourses are not overloaded with runoff or sediment, within or outside the District.

B. Fishery Habitat Improvement

Habitat improvements were completed during the 1980's and in 1990 in the lower reaches of Cold Creek by fishery managers. Projects included brushing, bank sloping, riprapping and seeding banks, adding cover and deflectors, removing log jams and repairing flood damage of habitat improvement structures. Habitat improvements that were completed in 1985 were evaluated again in 1991. Fall biomass of brown trout increased after habitat improvements and brook trout biomass did not change significantly.

Currently, the Department of Natural Resources (DNR), does not stock the stream and would assess Cold Creek to provide a cold stable environment for both brown and brook trout.

The Hiawatha chapter of Trout Unlimited is currently working with the DNR on planning a habitat improvement project in Cold Creek. They plan to clear and grub non-native species and remove debris left from flooding, restore and reshape the slope of the bank to create pooling places, and work to reduce sedimentation.

It is the position of the managers to cooperate with the area fisheries managers in maintaining and improving trout fisheries in Cold Creek.

C. Control of Groundwater Pollution

1. Abandoned Wells

The managers believe there are some abandoned wells in the District. The proper code procedures for abandonment will be followed. The County Health Department of Goodhue and Wabasha County is responsible for proper sealing of wells.

2. Sinkholes

There are active sinkholes in the District. The managers, working with NRCS, have repaired sinkholes in and near district structures. Other sinkholes in the district have not been repaired. Some small sinkholes have developed in agricultural fields. Immediate filling with soil has been effective in stabilizing them. The managers desire to cooperate with landowners and agencies to properly manage sinkholes to minimize potential groundwater contamination.

3. Livestock Production

There has been a reduction in unconfined livestock operations. Both dairy and hog confinement operations have increased in the District. Wabasha County and Goodhue County have adopted the Feedlot Program. The District wishes to work with the county feedlot officer and MPCA to enforce the rules of the district.

4. Household Wastes

Over a year's time, each rural household generates considerable quantities of waste. Rural residences are served by individual sewage treatment systems. Septic tanks must be maintained and periodically cleaned out. Malfunctioning treatment systems need to be repaired immediately. The managers will not allow running a pipe to a ditch or watercourse to solve the problem of a plugged system. The Health Department of Goodhue and

Wabasha County is responsible to see that these systems are properly maintained.

5. Well Testing

All wells should to be tested once a year for bacteria and nitrate contents. At this time, well testing is done on a voluntary basis.

VII. Policies of the District

A. Land Treatment

It will be the policy of the Board of Managers to encourage the installation of sound land treatment practices throughout the District to aid in the reduction of runoff and control of soil loss.

While the land above flood retarding structures receives no direct benefit from their installation, proper land treatment in the drainage areas above these structures is critical to their proper functioning and will be a high priority of the District.

Proper land treatment will mean management of cropland, pasture, and woodland. The managers will expect the Goodhue County and Wabasha County Soil and Water Conservation Districts to continue to furnish their assistance to landowners with the planning, application, and maintenance of sound land treatment practices.

B. Group Jobs

Flood conditions may be caused by obstruction of stream flow due to poorly designed private and public works. The managers will exercise control over any stream improvement, stream bank structure, or other works affecting the flow of surface waters.

Any local, state, or federal agency operating a program of assistance for cooperative water management will need to obtain the approval of the managers through a permit process authorizing a project.

The managers agree with Wabasha County Local Work Group Plan of starting upland with erosion control measures and installation of conservation practices to reduce sedimentation and pollutants entering streams and tributaries and they are willing to cooperate as requested.

C. Operation and Maintenance

The managers will accept the responsibility of operation and maintenance of structural measures to manage water, installed with public funds, whether existing or to be installed within the District. These structures will be inspected by the managers annually or at such times as may be necessary to ensure their successful operation. As to the Work Plan project the managers have inspected this project annually and have made necessary repairs.

D. Petitions for Projects

Approval of a petition for works of improvement will not be granted by the managers unless the following criteria are met:

1. That the proposed improvement is for the public interest and welfare as defined by the Minnesota Watershed Act;
2. That it is practicable, and in conformity with the overall plan;
3. That the total benefits are greater than the total estimated cost and damages; and
4. That the proposed project is in compliance with the provisions and purposes of the Minnesota Watershed Act.

Before any major construction projects are undertaken, necessary permits for work in the beds of public watercourses will be secured from the Department of Natural Resources as required by law.

E. Working with Other Organizations

It shall be the policy of the managers to fully cooperate with and utilize all administrative, technical, and financial help available from any State Agency or any public or private corporation or any person.

Among the agencies or organization that may be able to assist the managers are: County officials and employees; municipal and township officials; Soil and Water Conservation Districts; University of Minnesota Climatology Center; Natural Resource Conservation Service; Farm Service Agency; Pollution Control Agency; Minnesota Department of Natural Resources; U.S. Geological Survey; U.S. Weather Bureau; Minnesota Board of Water and Soil Resources; and others.

The managers will become acquainted with all existing water problems and programs, and shall secure maximum assistance so as to reduce costs to local residents.

F. Recreation and Fish and Wildlife Habitat

Improvement of habitat for game and fish, and improved conditions for recreational facilities will be given consideration in all proposed works of improvement.

G. Ground Water Protection

Use of watercourses within the District for disposal of waste will be permitted by the District when it meets the requirements of the Minnesota Pollution Control Agency.

H. Environmental Considerations

In April of 1980, major amendments to the Minnesota Environmental Policy Act (Chapter 116D) were signed into law. This legislation delegated authority and responsibility for environmental review to the local governmental unit most closely

involved with a project. 'Project' means a governmental action, the result of which would cause physical manipulation of the environment directly or indirectly. The determination of whether a project required environmental documents shall be made by reference to the physical activity to be undertaken and not by the governmental process of approving the project.

The managers believe that understanding the impact a proposed project will have on the environment is important. Environment is defined as meaning "...physical conditions existing in the area which may be affected by a proposed project. It includes land, air, water, minerals, flora, fauna, ambient noise, energy resources, and man-made objects or natural features of historic, geologic, or aesthetic significance."

Environmental documents shall contain information that address the significant effects of a proposed project. The managers can provide forms and assistance about these documents. Environmental documents shall neither be used to justify a decision, nor shall indications of adverse environmental effects necessarily require that a project be disapproved.

Gathering environmental information shall be done shortly after a project is proposed so that this data is available to the managers and residents early in the decision-making process.

Environmental effects shall be considered in the District's permit program and in carrying out other responsibilities of Chapter 112 to avoid or minimize adverse environmental effects and to restore and enhance environmental quality.

I. Water Scarcity

Although this Plan directs its attention towards the management of adequate water supply, its quality, and even the abundance of water supply, the managers are

mindful that serious water scarcity problems occur periodically in the District. These problems are caused by drought conditions, water system failures, and source contamination. The 1976-77 record draught affected more than 20 states and dramatized the impact of water scarcity.

Drought occurrences focus attention on the vital importance of water, but they are seemingly transitory crises and are usually followed by a return to patterns of steadily increasing water use.

In the view of the managers, water conservation needs should be emphasized. The District supports the County Comprehensive Local Water Plan, and will work with both counties in both water quantity and water quality issues. Conservation measures need to be taken to ensure that surface and groundwater supplies meet basic needs during critical periods.

Surface water is not the principal source of water supply in the District. Farm ponds used for livestock watering would dry up under drought conditions. Ground water supplies are adequate for the needs of the people in the District. Dependent upon location, size, and needs under drought conditions, some changes in well depth and sizes may have to be made.

J. Agricultural Programs

United States farmers increased harvested crop acreage from 290 million acres in the late 1960's to 365 million acres in 1982. That increase in harvested acreage contributed to excess agricultural production. In 1986, a new federal program, Conservation Reserve Program (CRP), was introduced. CRP was developed to remove highly eroding land out of production and establish a permanent cover. It requires a 10 year land retirement for an annual fee, bid by farmers. The Environmental Quality Incentives Program (EQIP) was established in the 1996 Federal Farm Bill to provide a single, voluntary conservation program for farmers and ranchers. EQIP combines the best features of the former Agriculture

Conservation Program (ACP) and the Water Quality Incentives Program. This program offers the opportunity to implement traditional approaches, but also to use less traditional, alternative practices to protect our soil, water, and related resources. The State of Minnesota passed the Reinvest in Minnesota (RIM) Program in 1986.

One of the four programs under the “RIM umbrella” was the RIM Reserve Program which focused on retiring marginal lands from crop rotation via conservation easements. These marginal lands include; sensitive groundwater area, riparian lands, wetland restoration areas, marginal agricultural cropland areas, pastured hillsides, living snow fence areas, woodlots on agricultural land, abandoned building sites on agricultural land, and replacement wetlands. A RIM easement prohibits cropping or grazing while maintaining a planned cover, which protects the land from erosion and creates or improves wildlife cover for the duration of the easement. An easement payment is paid to the owner when the easement is recorded and a practice payment is paid when the planned cover is planted. The landowner is required to maintain cover.

VIII. Appendix

A. Maintenance

In a review of the District’s operations, the managers put forth the following statements about the extent to which the purposes for establishing the District have been accomplished.

The reduction of damage to land and improvements caused by high intensive runoff was an objective of the District in 1962.

By 1964, with the installation of most of the structures called for in the PL-566 Work Plan, damage to land by the erosion force of water; damage to public improvements such as roads, bridges, and culverts; and damage to fences and other private investments has been greatly reduced. Protection of land and facilities from high intensity storm runoff has been provided to land in the watershed district.

On May 27, 1970, the watershed was subjected to a 10-12” rainfall. All the structures worked well, though there was a need for minor repairs to some of the structures. More recently, the structures held up well in heavy flooding rains in 2007 and 2010 and required minimal repairs

Not accomplished by the 1964 project was the improvement of the Cold Spring channel from section 24 to its entry into the Zumbro River S-6, a structure located in section 25, Belvidere Township, Goodhue County, was not installed. The placement of a structure at this site is still a goal of the managers and is needed for protection of a county road.

In the installation of the structures of the 1964 project, the required percentage of soil conservation practices, above the structures, were in place.

The managers, since 1964, have annually inspected all of the elements of the PL-566 Work Plan project and caused repairs to be made when necessary.

Table 15 is a record of expenditures to repair units of the project from 1964 to 2009.

TABLE 15
Expenditures for Maintenance of Structures Installed 1961-1963

Date	Expenditures*	Maintenance
1964	\$785.00	Corrected eroded channel in waterway.
1965	\$307.50	Corrected eroded channel in waterway.
1966	\$550.00	Corrected eroded channel in waterway.
1970	\$2,373.08	Box structures undermined; refilled and packed damaged area.
1974	\$69.00	End of outlet pipe repaired.
1975	\$50.00	Reseeding part of a waterway.
1976	\$432.80	Repair of waterway, removal of trees.
1977	\$1,193.07	Repair of S-3; waterway.
1979	\$1,401.28	Repair of S-3 and S-9; some earth moving and tiling near S-9.
1980	\$896.00	Repair of S-9; spraying young tree growth.
1984	\$630.00	Repair of S-3.
1985	\$62.50	Spraying of trees.
1986	\$4,846.50	Repair of S-13; reshape waterway and seed.
1988	\$2,005.00	Repair of S-16; repair of sinkhole in structure.
1990	\$625.00	Sinkhole repair.
1991	\$5,046.97	Repair of S-9; dropbox and installed tile.
1992	\$1,792.80	Reshape S-9; and sinkhole repair.
1994	\$637.55	Repair of S-7; begin cleanout of waterway.
1995	\$7,416.50	Repair of S-21; cleanout structure. S-22; spray trees.
1996	\$105.00	Repair of S-13; repair structure.
1997	\$60.00	Repair S-9.
1999	\$5,607.00	Tiling of S-21
2000	\$11,673.57	Repair of S-22. Repair of S-22. Tiling of S-22
2001	\$768.50	Repair drop box S-7.
2003	\$5,655.64	Cleaning of S-22 pond. Tiling of S-22
2005	\$7,715.67	Nardinger Pond. Repair of S-3. Repair of S-16.
2006	\$540.50	Repair of S-16. Tiling of S-3.
2007	\$170.00	Repair of S-22B.
2009	\$9,806.84	Seed and drill rental for S-16. Tile repair of S-9 and S-22. Sink hole repair at S-16.

For the 45-year period of 1964 to 2009, the District expended \$73,277.27 for the maintenance of structures built with local and federal public money. The average annual maintenance expenditures for the period have been \$1,628.38. The 1960 Work Plan estimated the average annual operation and maintenance cost of the proposed structure measures to be \$1,280.00.

The Board of Managers estimates that the cost of maintenance will rise over the next ten years because of the age of the structures. Also, damage can occur because of heavy rains that cannot be anticipated.

The cost of maintenance over the past four years has risen to approximately two thousand dollars. And, the administrative cost has risen to approximately twelve hundred dollars annually. The Board of Managers will continue to set a budget on an annual basis.

The managers have carried out the agreement with the U.S. Government to properly maintain the structures built in 1961-1963.

B. Rules

The managers have promulgated rules as authorized by chapter 112. Rules were adopted, after public hearing, on the January 7th, 1991, annual meeting, by the Board of Managers. A copy of the rules is attached as part of the overall plan.

Rules and Regulations
Of
Bear Valley Watershed District

I. Introduction:

The following rules and regulations of the Bear Valley Watershed District and any subsequent rules and regulations supplementary there to are adopted to effectuate the purpose of M.S. Chapter 112 and the authority of the managers therein prescribed and to thereby implement and make more specific the law administered by them. It is the intention of the managers that no person shall be deprived of divested of any previously established beneficial use or right by any rule or regulation of the district without due process of law and that all rules and regulations of the district shall be construed according to said intention; and by the rules and regulations to assist in the orderly use and conservation of the waters of the district. If any rule or regulation is inconsistent with the provisions of M.S. Chapter 112 or other applicable law, the provisions of said Chapter 112 or other applicable law shall govern.

II. Rules and Regulations:

1. Surface water shall not be artificially removed from upper land to and across lower land without adequate provision being made on the lower land for its passage, nor shall the natural flow of surface water be artificially obstructed so as to cause an overflow onto the property of others.
2. Water inlets, culvert openings, and bridge approaches shall have adequate should and bank protection in order to minimize land and soil erosion.

Plans and specifications relating to the matters covered by this paragraph shall be submitted to the managers for their consideration and approval prior to construction and installation of any of the foregoing works.

3. In the interest of sanitation and public health and to prevent pollution to the waters of the district, all septic tanks and drain fields, which outlet directly or indirectly into the waters of the district shall be constructed and maintained in accordance with the rules and recommendations of the State Board of Health and the Minnesota Pollution Control Agency as modified by the appropriate zoning ordinance of Goodhue and Wabasha Counties. No septic tank or other waste disposal facility shall outlet directly into any lake, watercourse, or public or private drainage system.
4. No reservoir for the impoundment of water may be constructed, removed, or abandoned without a permit from the managers, nor shall any dam be constructed to impound water without a permit from the managers.
5. No bridge or culvert and no drain from the disposal of storm waters, public or private, shall be constructed, reconstructed, laid or maintained in, to, or across any streams or public or private drain unless it has an adequate waterway opening. No bridge, culvert, or drain for the disposal of storm water shall be constructed, reconstructed, or laid without the approval of the managers as to its location, dimensions of the waterway opening, its base elevation and a permit for the installation thereof from the managers. Plans and specifications for a bridge, culvert, or drain for the disposal of storm water shall be submitted to the managers when an application for a permit is filed.
6. To prevent obstruction to flood waters a permit shall be required from the managers for the construction of any building within the flood plain of Bear Valley. All plans for the construction of any building of any kind within the flood plain shall be submitted to the managers for their approval when an application for the permit is made.
7. In the interest of sanitation and public health and to prevent pollution of the waters of the district, no owner of land, their agent or tenant, and no municipality or community, incorporated or unincorporated, and no other entity or group of persons

shall dispose of any waste, human, animal, or industrial by casting such waste directly or indirectly into any lake or stream, public or private drainage system, or road ditch within the district, and thereby pollute the waters of the district. In addition to the foregoing, the applicable rules and regulations of the State Board of Health and of the Minnesota Pollution Control Agency as modified by the appropriate zoning ordinance of Goodhue and Wabasha Counties are, by reference there to herein, hereby adopted as rules and regulations of the district within limits of the statutory granted to the managers.

8. In order to preserve the same for beneficial use;
 - (a) No person, partnership, association, private or public corporation, shall change or diminish the course, current or cross-section of any public waters within the watershed district without a permit from the Commissioner of Natural Resources as provided by M.S. sec., 105.42 and a permit from the Watershed District.
 - (b) No person, partnership, association, private or public corporation, shall alter, change, enlarge, diminish, straighten, deepen or otherwise dig in or interfere with the beds, banks, and shores of any stream or watercourse within the watershed district without a permit from the Managers of the Watershed District.
9. In the interest of sanitation and public health, and to assist in regulating and conserving the flow of streams and watercourses in the district, no person, partnership, association, private or public corporation, shall abandon, deposit or dispose of any waste, litter, garbage, junk, or debris from any source of whatsoever composition, natural or artificial, directly or indirectly, into the waters of the streams of the district, not to deposit and abandon the same in such a place and manner that it is capable of entering or being cast into said waters by any natural or artificial means.
10. All applications for a permit shall be substantially in the following form:

APPLICATION FOR PERMIT

To the Board of Managers of the Bear Valley Watershed District

Your applicant, _____

With residence at _____

Post Office address _____

Phone Number _____ represents: _____

1. That said person, is the owner of _____

Situated in _____

2. That said person, proposes to do the following work; _____

3. That said work is necessary because _____

4. The attached hereto is all pertinent information relative thereto.

5. That said work is in accordance with the purposes and overall plan of the district.

6. That said person hereby applies for a permit to proceed with said work.

Dated _____

PERMIT
BEAR VALLEY WATERSHED

The following permit is hereby granted to _____

To do the following work of improvement to be located _____

The work for which this permit is granted consists of _____

This permit is subject to the following conditions:

1. That the permittee and their agents conform to all legal and other statutory requirements.

2. _____

3. _____

4. _____

Dated _____

Board of Managers

Bear Valley Watershed District

By _____

IX. References

References

1. January 1986, Overall Plan Bear Valley Watershed District, and all references listed.
2. January 1998, Overall Plan Bear Valley Watershed District, and all references listed.
3. Goodhue County well test, Bellechester wastewater spill report, May 7, 1992.
4. Climatology of the United States No. 81.
5. Hirsh, S. 1986. Memo to DNR Fisheries Section, St. Paul.
6. Kramer, Q. 1991. Cold Spring Brook H.I. note. Lake City Trout stream files.
7. Report of Optional Long Term Methods of Wastewater Treatment for the city of Bellechester.
8. Goodhue County Water Plan, 1997.
9. Wabasha County Water Plan, 1995.
10. <http://www.pca.state.mn.us/>
11. <http://www.pca.state.mn.us/index.php/view-document.html?gid=8201>
12. <http://www.pca.state.mn.us/index.php/view-document.html?gid=7296>
13. http://www.aphis.usda.gov/animal_health/nahms/feedlot/downloads/feedlot99/Feedlot99_is_WaterQuality.pdf
14. <http://usda.gov/wps/portal/usda/usdahome>
15. <http://www.ars.usda.gov/is/pr/2011/110519.htm>
16. <http://www.demography.state.mn.us/>
17. <http://landcover.usgs.gov/pdf/anderson.pdf>
18. <http://climate.umn.edu/>
19. <http://censtats.census.gov/pub/Profiles.shtml>
20. <http://www.fda.gov>