

Bear Creek Project Summary

The intent of the Bear Creek Watershed Project is to reduce damages in the Watershed, from floodwater and sediment deposits, maintain high quality water in the Bear Creek trout streams, improve recreational opportunities in the area, and protect the watershed from excessive erosion and resource depletion.

Bear Creek Watershed is located in Allamakee and Winneshiek counties in Iowa, and Fillmore and Houston counties in Minnesota. The watershed includes three major coldwater streams: North Bear, South Bear and Middle Bear. North Bear Creek and South Bear streams are classified as class "B"(c)HQ waters, and Middle Bear is classified as "B"(c)HQR water. Middle Bear is a tributary of North Bear Creek.

The watershed totals 34,990 acres of which 24,670 acres are in Winneshiek County. The land use within the watershed is: Cropland - 17,930 acres, Pasture Land - 12,710 acres, Forestland - 3,310 acres, Other - 1,040 acres. Nearly all of the cropland in Iowa and Winneshiek County is HEL. There are 77 livestock operations with 1,700 dairy, 1,800 beef, 6,800 swine, and 150 head of other livestock. Trends in the Watershed area, while not as accelerated as other areas in the County, are leaning towards less livestock operations in more concentrated numbers. As livestock operations decline, crop rotations go to more intensive row crops. Due to the high aesthetic nature of the Watershed area, farm operating units are being bought up as acreages for developmental purposes.

North Bear and South Bear Creeks are managed as put-and-take trout streams and are two of 25 priority streams identified for water quality protection and improvement in the State of Iowa Nonpoint Source Management Program. Middle Bear is managed as a put-and-grow stream.

A state of Iowa Water Quality Assessment Report from 1994 and 1995 included North and Middle Bear Creeks. These waters were assessed as "Fully supported/Threatened", meaning they fully support their designated uses but may not fully support uses in the future because of anticipated sources of pollution or adverse pollution trends.

Improper use and management of the steep, fragile lands found in the Bear Creek watershed are causing excessive soil erosion on cropland, pastureland and forest land. Delivery of sediment during runoff events is degrading the surface water quality of the streams for trout. Natural trout reproduction has been greatly reduced in all parts of Bear Creek due to heavy sedimentation over the natural stream substrate. Sediment and animal waste are the major pollutants delivered to the stream.

Floodwaters cause damages to several categories of resources in the Bear Creek Watershed. It damages cropland, pasture, and other agricultural infrastructure; public roads and bridges; recreational facilities such as campgrounds and parking lots. Floodwaters also degrade habitat used for feeding, cover and reproduction by trout. Flood events also increase turbidity by delivering sediments temporarily stored in the floodplain, detaching soil particles from streambanks, and mobilizing sediments stored in the stream bottom. (See the Bear Creek Watershed Plan and Environmental Assessment previously submitted, for more detail.)

A P.L. 83-566 Watershed Project for Bear Creek Watershed was authorized in February 1999. Work to be completed under this Plan includes the construction of 52 floodwater-retarding structures. These structures, when installed, will control runoff from 40 to 50 percent of the watershed and will greatly reduce flood, sedimentation, and turbidity damages in the Watershed. In order to install these structures, 75% of their drainage areas (Iowa portion of the Watershed) must be adequately treated. Other land treatment practices are also needed in the Watershed to further reduce flooding, sedimentation, stream turbidity and deterioration of the land resource base. In addition the P.L.83-566 program, the Bear Creek Watershed has received funding through the Iowa Watershed Protection Program.

Project partners contributing to the program include the Winneshiek Co. SWCD, the Winneshiek Co. Board of Supervisors, the IDNR, the NRCS and the USFWS. Also sponsoring the over-all Bear Creek PL 83-566 Project (including 10,210 acres in Minnesota) are the Root River SWCD and the Houston County Board of Commissioners.

**BEAR CREEK WATERSHED EROSION,
FLOOD and WATER QUALITY PROJECT, WSPF 096-2.0
FY01 SECTION 319 COMPONENT
FINAL REPORT**



South Bear Creek

WINNESHIEK COUNTY SOIL & WATER CONSERVATION DISTRICT

*Prepared by
Marc Oylo
Bear Creek Project Technician*

This project is supported in part by the Iowa Department of Agriculture and Land Stewardship, Division of Soil Conservation, through funds of the Watershed Protection Fund, the Iowa Department of Natural Resources, through section 319 funds, and the Watershed Protection and Flood Prevention Program (PL 83-566). Technical assistance is provided by the US Department of Agriculture, Natural Resource Conservation Service.

Agencies & Project Partners

Lead Agency:

WINNESHIEK SOIL & WATER CONSERVATION SERVICE ^{DISTRICT}
in cooperation with the
**Iowa Department of Agriculture and Land Stewardship,
Division of Soil Conservation**

Funding Sources:

**Iowa Department of Agriculture & Land Stewardship/WSPF
Iowa Department of Natural Resources-EPA/Section 319
United States Department of Agriculture/P.L.83-566**

Supporting Agencies:

**USDA-Natural Resources Conservation Service
Iowa Department of Natural Resources-Fisheries and Wildlife
Division
Winneshiek County Board of supervisors
U.S. Fish & Wildlife Service
the Local Chapter of Trout Unlimited
Iowa State University Extension Service
USDA-Farm Service Agency
Hawkeye Tri-County Electric Cooperative**

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I. PROJECT ABSTRACT

The Bear Creek Watershed contains three cold water streams capable of supporting a trout fishery; North Bear, South Bear, and Middle Bear Creeks. The Project area, which ends at the confluence of North and South Bear Creeks, comprises 34,990 acres; of which 24,780 are located in Iowa, primarily Winneshiek County, and 10,210 are located in Minnesota. The planning process for a Project to improve and protect the Bear Creek Watershed began in the late 1980's. It was initially conceived as a P.L.83-566 Watershed Project with the objectives to:

1. Reduce floodwater damages to public and private lands and infrastructure.
2. Reduce environmental damages to land and water resources in the watershed.
3. Improve trout fishery in the Bear Creeks to maximize recreational benefits.

Local sponsors – which include the Winneshiek County Soil and Water Conservation District, the Winneshiek County Board of Supervisors, the Root River Soil and Water Conservation District, the Houston County Board of Board of Commissioners, and the Iowa Department of Natural Resources - of the **Bear Creek PL83-566 Watershed Project** submitted an application for assistance under the PL83-566 program in March of 1989. This application was approved in December 1989. In April 1995 a pre-authorization report was prepared and a request for planning assistance for Watershed activities was submitted. Planning funds were provided during fiscal year 1995. The Bear Creek Watershed Plan & Environmental Assessment was signed September 1998. This plan-assessment recommended the following to meet the sponsor's objectives:

1. Construct fifty-two floodwater-retarding/sediment retention structures through out the watershed to control runoff from 42% of the watershed to reduce flood, sedimentation, and turbidity damages.
2. Implement needed land treatment practices to reduce deterioration of the land resource base, stream sedimentation, and turbidity.

The **Bear Creek PL83-566 Watershed Project** was formally announced February 1999. With funding to be provided as Congressional appropriations permit. An initial allocation of PL83-566 funding was earmarked for upland treatment practices throughout the Watershed in November 1999; one half for use in Iowa and one half for use in the Minnesota portion of the Watershed. Iowa's portion of this initial PL83-566 allocation was commingled with **WSPF** funds for the construction of the first two floodwater-retarding/sediment

retention structures built in the Watershed. Minnesota's portion of the original PL83-566 allocation was eventually put into a co-op agreement between NRCS and the Winneshiek County Soil and Water Conservation District, with the funds to be used for upland treatment practices throughout the entire Watershed. In August of 2000 the **Bear Creek PL83-566 Watershed Project** received a supplemental allocation to again be used for approved upland treatment practices.

As PL83-566 funding was not yet available in May of 1999, the Winneshiek County Soil and Water Conservation District submitted a Water Quality Project application to the Iowa Department of Agriculture and Land Stewardship requesting funding for three floodwater- retarding/sediment retention structures. The Project application stated that significant water quality problems were occurring in the Bear Creek Watershed as a result of flooding and the corresponding sediment deposition from sheet, rill, gully and streambank erosion. The project request asserted that the installation of three structures in the Watershed would significantly reduce damages to the Bear Creeks. As these would be structures sited on, and constructed in conjunction with the regrading of County roads, they would serve multiple benefits. They would also be highly visible, and provide a good demonstration to the public of what functions a floodwater-retarding/sediment retention structure does perform.

The project application further stated that subwatershed problems, such as manure runoff into the Creeks will continue to be investigated, and that needed treatment would be implemented as funds become available.

The **Bear Creek Watershed Erosion, Flood and Water Quality Project** was initially approved for funding in the fall of 1999 through the Iowa Watershed Protection Program. The **WSPF** funding provided the impetus to begin activity in the Bear Creek Watershed. The FY00 allocation from the Iowa Watershed Protection Fund was turned over to NRCS to fund the first two (of three requested) floodwater-retarding/sediment retention structures built in the Bear Creek Watershed. These were sites #23 and #25. The first amendment to the **Bear Creek Watershed Erosion, Flood and Water Quality Project** provided the transfer of a portion of the initial **WSPF** monies to be used for accelerated upland treatment in the watershed. In July of 2000 the Project received **WSPF** funding for FY01 for upland treatment practices. In October 2000 the second supplement to the **Bear Creek Watershed Erosion, Flood and Water Quality Project** agreement provided \$100,000 in **Section 319** funding to construct a third floodwater-retarding/sediment retention structure. This project site is #56. In August of 2001 the Project received a FY01 allocation of **WSPF** funds again for upland treatment.

At the time of this writing, the Bear Creek Watershed Project as a whole is far from complete. It is for the completion of the **Section 319** funded component of the Project that this final report is being prepared.

II. PROJECT BACKGROUND INFORMATION

The Bear Creek Watershed is located within the Paleozoic Plateau landform region of northeast Iowa and southeast Minnesota. It includes parts of Allamakee and Winneshiek counties in Iowa, and Fillmore and Houston counties in Minnesota. This region is characterized by deep valleys, high bluffs, abundant rock outcrops, caves and sinkholes. The valleys are incised into members of the Jordan sandstone, Prairie du Chien, and St. Peter sandstone formations. Although caves and sinkholes are located in the dolomites of the Prairie du Chien formation, the major karst areas lie south of the Bear Creek Watershed. The Jordan sandstone is the principal water-bearing unit in the Cambrian-Ordovician aquifer, which includes the Oneota dolomite and New Richmond sandstone members of the Prairie du Chien formation. The thin soil overburden of this region makes the aquifers very susceptible to contamination from human impacts. The watershed includes three major coldwater streams: North Bear, South Bear and Middle Bear. North Bear Creek and South Bear Creek are classified as class "B"(c)HQ waters. Middle Bear Creek is classified as "B"(c)HQR water. Middle Bear is a tributary of North Bear Creek. The Jordan sandstone is the lowest unit exposed at the surface in the watershed and feeds springs in North, Middle, and South Bear Creeks.

The watershed project area totals 34,990 acres of which 24,670 acres are in Winneshiek County, Iowa, 110 acres in Allamakee County, Iowa, 10,160 acres are in Houston County, Minnesota, and 50 acres in Fillmore County, Minnesota. The land use within the watershed is: Cropland - 17,930 acres, Pasture Land - 12,710 acres, Forest land - 3,310 acres, Other - 1,040 acres. Nearly all of the cropland in Iowa and Winneshiek County is HEL. There were 77 livestock operations with 1,700 dairy, 1,800 beef, 6,800 swine, and 150 head of other livestock located in the Project area in 1998. Trends in the Watershed, while not as accelerated as other areas in the County, are leaning towards less livestock operations in more concentrated numbers. As livestock operations decline, crop rotations go to more intensive row crops. Due to the high aesthetic nature of the Watershed area, farm-operating units are being bought up as acreages for developmental purposes.

North Bear and South Bear Creeks are managed by the IDNR as put-and-take trout streams and are two of 25 priority streams identified for water quality protection and improvement in the State of Iowa Nonpoint Source Management Program. Middle Bear is managed as a put-and-grow stream. A state of Iowa

Water Quality Assessment Report from 1994 and 1995 included North and Middle Bear Creeks. These waters were assessed as "Fully Supported/Threatened", meaning they fully support their designated uses but may not fully support uses in the future because of anticipated sources of pollution or adverse pollution trends.

Improper use and management of the steep, fragile lands found in the Bear Creek watershed are causing excessive soil erosion on cropland, pastureland and forest land. Sediment and animal waste are the major pollutants delivered to the stream. Due mainly to the topography of the drainage basin, frequent flooding has caused impairments to several categories of resources in the Bear Creek Watershed. It has damaged cropland, pasture, and other agricultural infrastructure; public roads and bridges; recreational facilities such as campgrounds and parking lots. Delivery of eroded upland sediment during major runoff events is downgrading the water quality of the Bear Creeks for trout, by degrading habitat used for feeding, cover and reproduction. Flood events also increase turbidity in the streams by delivering sediments temporarily stored in the floodplain, detaching soil particles from streambanks, and mobilizing sediments stored in the stream bottom. Natural trout reproduction has been greatly reduced in all parts of Bear Creek due to heavy sedimentation over the natural stream substrate.

III. PROJECT DISCRPTION

The **Bear Creek Watershed Erosion, Flood and Water Quality Project** is sponsored by the Winneshiek Soil & Water Conservation District, in cooperation with the Iowa Department of Agriculture and Land Stewardship and the Natural Resources and Conservation Service. It was initially approved for **WSPF** funding in the fall of 1999, and received **Section 319** funding in October 2000.

The **Bear Creek Watershed Erosion, Flood and Water Quality Project** is a complement to a **P.L.83-566 Watershed Project** that was authorized in February 1999. Work to be completed under the P.L.83-566 Plan includes the construction of 52 floodwater-retarding/sediment retention structures. These structures when installed will control runoff from 40 to 50 percent of the watershed and will greatly reduce flood, sedimentation, and turbidity damages in the Watershed. In order to install these structures, 75% of their drainage areas in the Iowa portion of the Watershed and 50% in the Minnesota portion must be adequately treated. Other upland treatment practices needed in the Watershed to further reduce flooding, sedimentation, stream turbidity and deterioration of the land resource base will be installed as well. The objectives

of the **Bear Creek Watershed Erosion, Flood and Water Quality Project** are basically the same as that of its companion P.L.83-566 Project:

1. Reduce flood water damages to public and private lands and infrastructure.
2. Reduce environmental damages to land and water resources in the Watershed.
3. Improve trout fishery to maximize recreational benefits.

The intent of the overall Project is to reduce damages in the Watershed from floodwater and sediment deposits, maintain high quality water in the Bear Creeks, improve recreational opportunities in the local area, and protect the Watershed from excessive erosion and resource depletion.

The funding received through the **WSPF** has/will be used to compliment funds that become available through the **P.L. 83-566** program and to accelerate implementation of upland treatment in the Bear Creek Watershed. Practices targeted with **WSPF** funding include: terraces, grade stabilization structures, manure management systems and grassed waterways.

The intent of the sediment control portion of the Project is to expedite the reduction of sediment delivery from all sources to the Bear Creeks. This portion of the plan includes land where erosion is controlled at a level to protect the soil resource. Examples of this strategy include trapping sediment from adequately treated land in grade stabilization structures, applying additional land treatment to control erosion on land with excessive erosion, and applying land treatment measures to further reduce erosion below tolerable limits.

Land treatment to adequately control erosion will be required on 75 percent of the drainage area above each flood water-retarding structure in the Iowa portion of the Watershed constructed with P.L.83-566 funds. If all planned structures are built, the installation of the prerequisite upland treatment practices will result with approximately 25,800 additional acres having soil loss at or below the tolerable rate. This will result in a projected 39% increase of land properly treated in the Watershed. Anticipated land treatment measures on 11,750 acres will reduce erosion from all sources by about 115,580 tons annually, or 52 %. Increased cost-share assistance will be made available to all landowners in the Watershed for accelerated land treatment.

Currently the Bear Creeks do not meet their full potential as trout fisheries; due largely to flooding and the corresponding siltation. Flood waters also damage several other categories of resources in the Watershed. They damage

crops, pastures, and other agricultural infrastructure; recreational facilities such as campgrounds and parking lots; public roads and bridges, including stocking trails used by IDNR vehicles for stream access. Floodwaters degrade and impair in-stream structures that provide habitat for feeding, cover and reproduction by trout. Major flooding in the Bear Creek Watershed generally occurs up to four times per year. Even with the accelerated upland treatment, flooding problems in the Watershed cannot be totally curtailed. Also, nonpoint source pollution problems affecting the water quality of the Creeks are difficult to totally contain at their point of origin. Suspended sediments from rainwater and snow-melt runoff, fertilizers, pesticides and other nutrients attached to soil particles washed off cropped fields, and runoff from animal wastes can not be totally controlled at their source. Therefore 52 floodwater-retarding/sediment retention structures are planned for construction through out the Watershed. These structures will reduce floodwater damage and trap sediment run-off and attached pollutants. They will provide control to 40-50% of the Watershed. The **Section 319** component of this Project entails the construction of one of these floodwater-retarding/sediment retention structures.

The floodwater-retarding structures built in the Watershed will meet NRCS specifications. The land treatment practices installed under this Project will be based upon conservation plans prepared according to standards and specifications as described in the NRCS field office technical guide. Some elements of this Project will be installed and coordinated with other on-going federal and state cost-share programs.

Livestock operations will be evaluated with the use of the IDNR form "Animal Waste Management Systems Open Lot System Evaluation". Operations identified as high priority sites will be addressed with the use of animal waste storage structures.

Engineering services are to be performed by the NRCS. This includes design surveys, investigations, design, preparation of drawings and specifications for project measures, and construction inspection.

IV. PROJECT RESULTS

The initial Water Protection Project application submitted in May 1999 requested funding for the construction of 3 floodwater-retarding/sediment retention structures. The second application submitted in April of 2000 included a budget requesting 3 years of funding for upland treatment practices. Specifically, the funds were to be used to construct 16,200 feet of terrace, 12 grade stabilization structures, install 6 manure management systems, and construct 3,000 feet of waterways at crucial locations throughout the

construct 3,000 feet of waterways at crucial locations throughout the Watershed in a 3 year period.

In the Fall of 1999 this project received its first **WSPF** funding.

This FY00 funding was used to construct two floodwater-retarding/sediment retention structures (site #23 & site #25), accelerate the treatment of upland erosion concerns, and address sediment run-off problems in sub-watersheds.

The 2 flood water-retarding/sediment detention structures constructed utilizing WSPF funds control 400 acres of Drainage. In addition to the flood retardant function these structures serve, they will reduce the amount of sediments delivered annually to North and Middle Bear Creeks by approximately 900 tons annually.

Other practices completed with FY00 **WSPF** funds include: 8 grade stabilization structures, 8,300 feet of terraces, and 1,500 feet of grassed waterway. With the installation of these practices an annual reduction of 700 tons of sediment delivered to the Bear Creeks is expected to occur.

Practices installed with FY01 **WSPF** include: 3,400 feet of terraces, 9 grade stabilization structures and 2 manure management systems. As a result of the installation these practices, a soil loss reduction of approximately 1,000 tons/year has occurred, with an estimated 300-ton reduction of sediment delivered to the Bear Creeks. A reduction of approximately 15 ton/year of animal waste delivered to the stream is another result of project work completed in FY00.

In October of 2000, **Section 319** funding became available to the Project for the installation of an additional flood water- retarding/sediment retention structure (site #56). This structure is an on-road structure built in cooperation with the Winneshiek County Board of Supervisors. Being highly visible it provides an ideal demonstration site to show the public what a flood water-retarding/sediment detention structure is, and how it functions.

This structure was designed to handle a 50 yr. Storm that would result in a peak discharge of 591 cfs. The structure's primary spillway has a 30" outlet pipe that will reduce the peak flow discharge to 66 cfs. Most storm events will not rise the water level in the structure high enough to run through the primary spillway, but rather will be discharged through a secondary 18" draw down pipe. Peak discharge through this 18" draw down pipe will be 18 cfs. The structure has an estimated 80% sediment trap efficiency. Over it's 50 year life it will trap 36,028 tons or 23.4 acre feet of sediment. An annual reduction of 600 tons of sediment delivered to South Bear Creek is expected.

FY02 **WSPF** funds received are planned to be put towards the installation 7,000 feet of terraces, 3 grade stabilization structures, 2 manure management systems, and 1,000 feet of grassed waterways. While FY02 is less than half over at the time of this writing, we have completed 4 grade stabilization structures,

1800 feet of terrace, 600 feet of waterway, and one ag waste storage structure.

See appendix C for a complete Project accomplishment breakdown.

Educational and outreach activities to date include; 5 quarterly newsletters distributed to Watershed Landowners, a program for local Ag lenders, a program for a multi-county land improvement contractors meeting, 2 program review/tours of the Watershed area, a news release and articles in the District annual report.

V. CONCLUSIONS

The funds provided by the **WSPF** and **Section 319** provided a needed catalyst to get the **Bear Creek PL83-566 Watershed Project** started. The funding requested and received through the initial Water Quality Project application has been used to compliment funds as they become available through the P.L. 83-566 program, and to accelerate the implementation of upland treatment in the Bear Creek Watershed. While it will take a long time to meet the objectives of the Bear Creek Watershed Plan and Environmental Assessment the final results will have a dramatic effect on the overall health of the Watershed. The completion of 52 floodwater-retarding/sediment retention structures and the supporting upland treatment practices needed will take many years. Upon completion of the P.L.566 component of the Project a significant portion of total treatment of the Watershed will be complete. However much other work needs to be done.










Numerous issues need to be addressed in the Watershed to meet the Project's intended outcome. Due to the steep topography of much of the landscape and the thin layer of soils throughout much of the Watershed, alternative land uses to the current heavy dependence on continuous row crop farming have to be promoted. Intensive cropping is not an environmentally acceptable alternative for much of the landmass in the Watershed. Strategies need to be developed that will promote conversions of land use. Alternatives such as crop rotations based primarily on close grown crops, and conversion of steep shallow cropland to pasture land and or woodland need to be encouraged. C.R.P. waterways, filter strips and riparian buffers will be strongly promoted for their benefits of sediment delivery reduction and corridor protection. As this Project evolves, much remains to be accomplished.

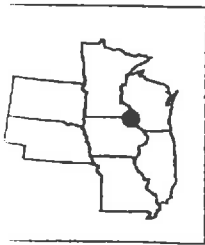
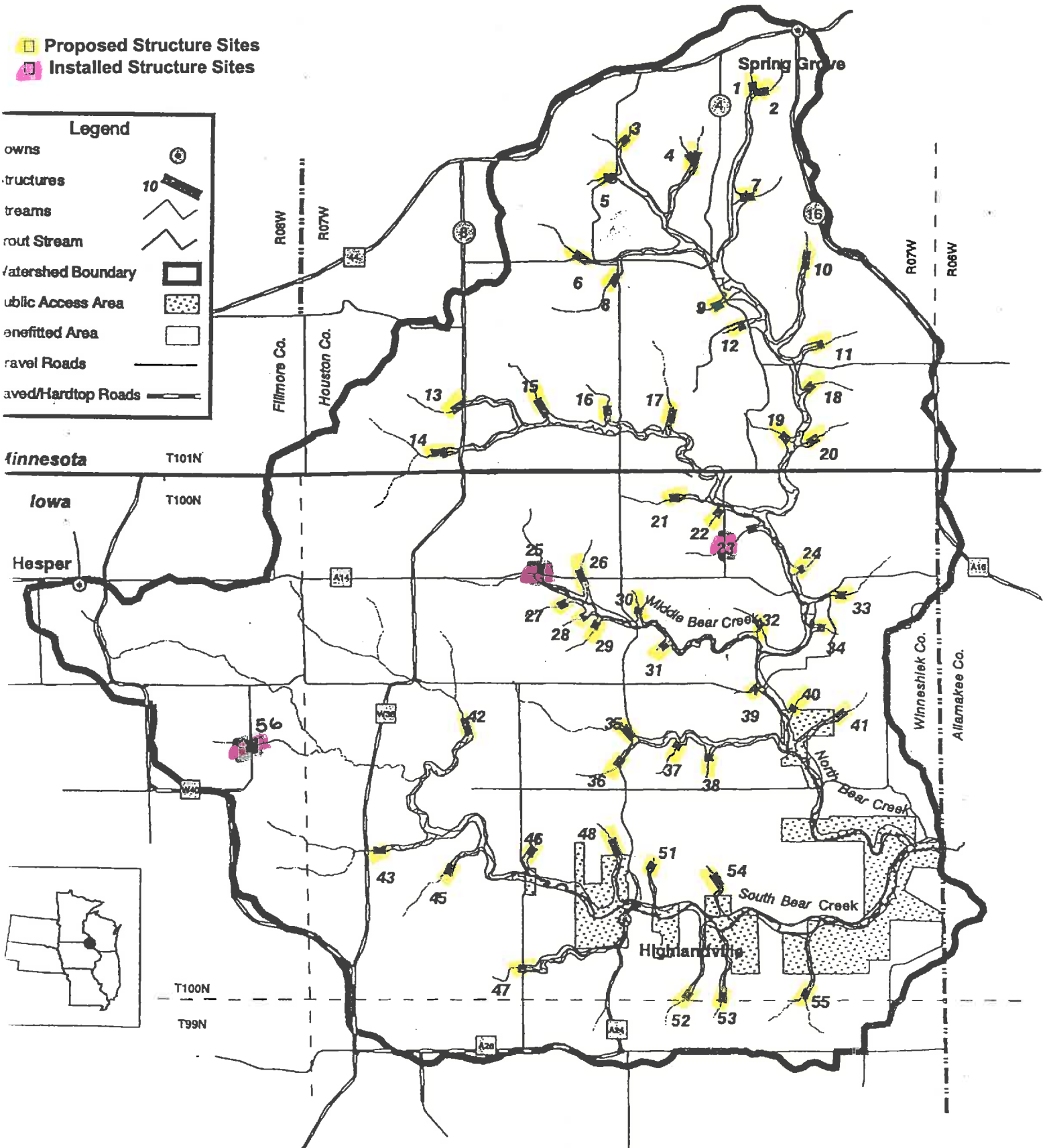
Bear Creek Watershed Project Map

Allamakee & Winneshiek Counties, Iowa
 Fillmore & Houston Counties, Minnesota

 Proposed Structure Sites
 Installed Structure Sites

Legend

-  Towns
-  Structures
-  Streams
-  Outlet Stream
-  Watershed Boundary
-  Public Access Area
-  Benefitted Area
-  Gravel Roads
-  Paved/Hardtop Roads



Structure locations along streams/tributaries are represented by highlighted areas which may be considered as a possible structure location. Considerations for geology and site design determine final location of each structure.



Project Funding Received to Date

Watershed Protection Funds

\$167,000	Fall 1999	\$117,000 used for 2 floodwater retarding structures, \$50,000 switched with PL83-566 funding for upland treatment.
\$21,000	May 2000	Supplemental allocation for upland treatment practices.
\$113,125	July 2000	Allocation for FY01 for upland treatment practices.
\$12,000	Nov. 2000	Supplemental allocation for upland treatment.
\$112,238	Aug. 2001	Allocation for FY02 for upland treatment practices.

\$425,363 total received to date

Section 319 Funding

\$100,000	Oct. 2000	Allocation for construction of one floodwater retarding structure.
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PL83-566 Funding

\$100,000	Nov. 1999	Allocation for upland treatment in Iowa and Minnesota. Iowa's \$50,000 was swapped to put towards the first two floodwater retarding Structures.
\$57,725	Aug. 2000	Supplement to be used for upland treatment practices throughout the whole Watershed

\$157,725 total received to date