VILLAGE OF BLACK EARTH

DANE COUNTY
WISCONSIN

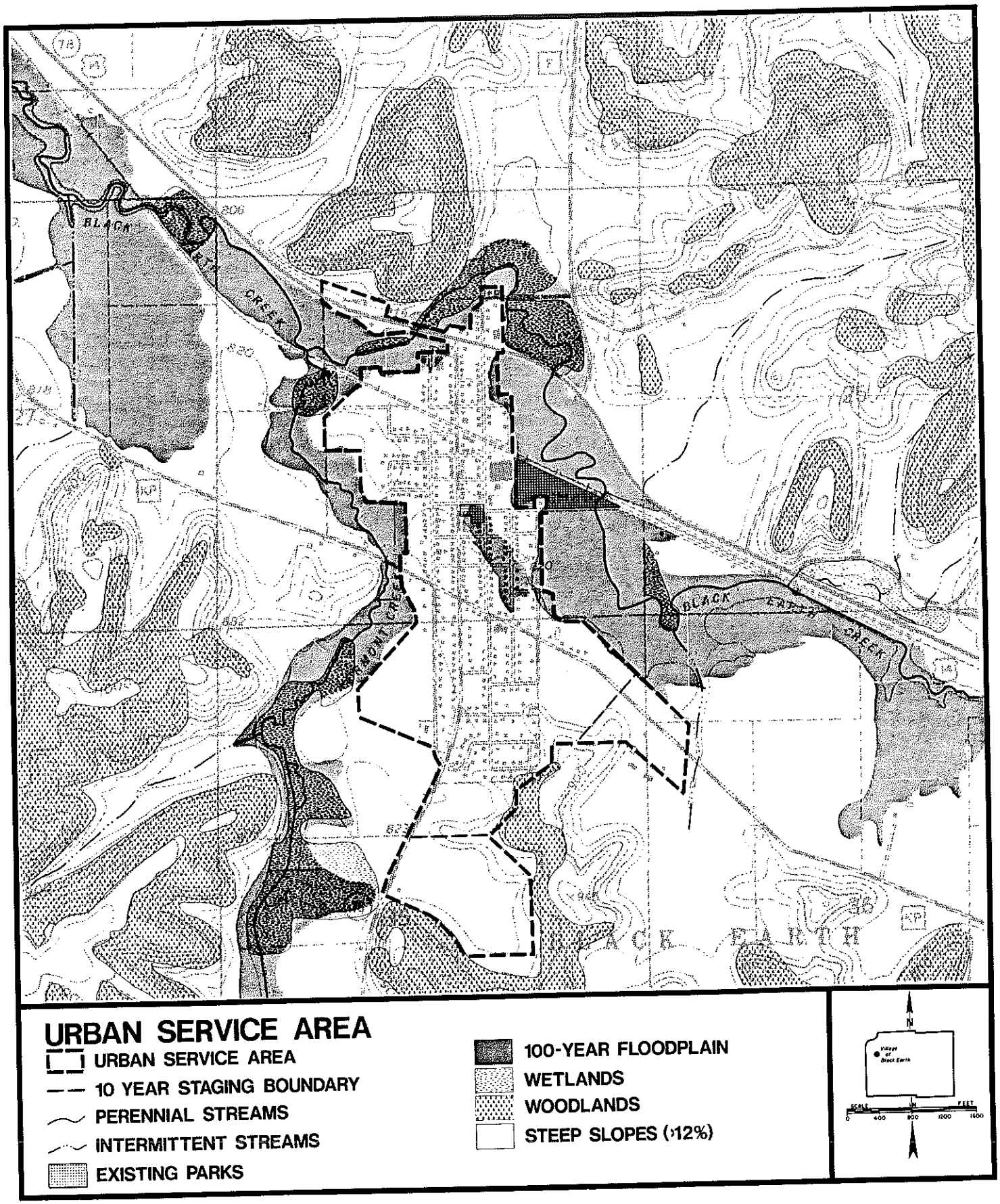

FIGURE 13

Water Resources Conditions

Vermont Creek currently supports a Class III trout fishery in its lower four miles with the potential to improve to a Class II trout fishery. The upstream 2 miles are considered a class II trout fishery at the present time and could be improved to a class I trout fishery. A significant portion of Vermont Creek has been ditched and straightened. A number of springs have been impounded to form ponds. As a result, elevated water temperatures can be problematic in the summer.

For this plan, the habitat segments are numbered I through IV from upstream to downstream. In segment I, the creek has fair to good water quality, however significant deposition of soft sediments has occurred on the stream bottom. Low flow appears to limit trout in this segment. Many small farm ponds are located in this stream segment. Department water resources and fisheries management staff suspect these impoundments decrease trout habitat and increase water temperatures. Removal of these ponds should be evaluated to estimate the water quality and fishery benefits that could be expected by this effort.

In segment II, stream flow increases, however raw banks, pasture and thick trees are found along the stream bank. There is a public fishing area in this segment which needs brushing. Again silt deposition is common in Segment II. Segment III runs approximately from Vermont Church Road to CTH JJ. This segment has undergone extensive hydrologic modifications. Significant silt deposition is found on the stream beds and turbidity is high in the stream in this segment.

Segment IV continues from CTH JJ to Black Earth Creek. Again hydrologic modification and significant sedimentation characterize this stream segment. In addition, overgrazing and high water temperatures limit trout potential in Segment IV. In spite of its limited potential for trout production compared to Black Earth Creek, Vermont Creek has remained a popular fishing spot with many anglers.(7)

Water Resources Objectives

To attain Vermont Creek's full use potential of FALT (A) Class II in stream miles 0-4 and FALT (A) Class I in stream miles 4-6.

To meet these objectives the following needs to be achieved:

1. Decrease sediment and oxygen demanding matter (manure) load entering the stream by 50%.

2. Protect cold water sources including removal of impoundments of some of the springs where feasible.

3. Control eroding stream banks and install fish habitat improvements.

4. Increase maintenance activities such as brushing in the public fishing segment.

Pollutants from Nonpoint Sources

Eroding Croplands (sediment and nutrients). Over 90% of the sediment reaching Vermont Creek subwatershed is from eroding croplands. Based on soil erosion estimates, Table 12 shows that about 88% is from croplands with very high erosion rates (greater than about 10 tons/acre/year) and about 3% is from croplands with high erosion rates (greater than about 7-to-10 tons/acre/year). Table 12 also shows that these very high/high erosion cropland fields comprise about 43% of the croplands. Locations of these critical croplands are shown on Figure 12. Overall, they comprise about 23% of the area of the subwatershed.

Eroding and Trampled Stream Banks (sediment and direct habitat impairment).

Stream bank erosion occurs on numerous locations along Vermont Creek. At some of the locations, the bank erosion is due to cattle access. At other locations, the bank erosion is due to the stream cutting of the toe of the bank as the stream continues to meander.

TABLE 12. Cropland Soil Erosion in Vermont Creek Subwatershed.

Erosion Rate	Tons/year	%
> 10 tons/acre/yr.	63,183	88
7-to-10 tons/acre/yr.	2,050	3
4-to-7 tons/acre/yr.	1,945	3
< 4 tons/acre/yr.	4,233	6
totals	71,411	100

Erosion Rate	Acres	%
> 10 tons/acre/yr.	1,937	39
7-to-10 tons/acre/yr.	221	4
4-to-7 tons/acre/yr.	337	7
< 4 tons/acre/yr.	2,467	50
totals	4,962	100

Animal Lots (oxygen demand and nutrients). Manure from animal lots and winter spread fields are the most probable source of oxygen demanding substances. Table 13 shows the number of animal lots and pollutant loads by range of phosphorus load. Locations of these animal lots are shown on Figure 12.

Winter Spread Manure (oxygen demand and nutrients). Winter spread manure was not analyzed. However, based on the erodibility of the soils and the steepness of slopes, it is likely a number of the 14 livestock operations in this subwatershed are sources of manure to the stream from winter spread sites.

TABLE 13. Animal Lot Pollutant Loads for Vermont Creek Subwatershed.

Phosphorus Load Range	Operations	Lbs.*	%
> 20 lbs. phosphorus **	2	85	46
15-to-20 lbs. phosphorus	3	52	28
10-to-15 lbs. phosphorus	2	22	12
5-to-10 lbs. phosphorus	1	10	5
< 5 lbs. phosphorus	6	15	8
Total	14	183	100

* Pounds for a 10-year, 24-hour storm

** Phosphorus is used as an indicator of the amount of manure reaching streams. The amount of BOD or COD is proportional to the amount of phosphorus.

Nonpoint Source Control Needs to meet the Water Resources Objectives

To achieve the water resources objectives identified for Vermont Creek, the nonpoint sources identified below must be controlled. Each type of source and its control need is briefly described and discussed.

1. Cropland Management Needs:

   Erosion needs to be controlled on an estimated 2158 acres of cropland.

The cropland analysis estimated over 90% of the erosional tons occurs on fields with very high or high erosion rates (greater than 10-to-15 tons/acre/year and 7-to-10 tons/acre/year). These very high/high erosion rates occur on about 2158 acres.

2. Stream Bank Management Needs:

   Stream bank erosion due to cattle access and stream meandering need to be controlled.

Eroding stream banks add to the degradation of the fish habitat in Vermont Creek. Since the stream is small and narrow, conventional stream bank stabilization such as fencing, shaping and seeding and riprapping will improve habitat. No other habitat improvements are anticipated.

3. Animal Lot Management Needs:

   The amount of manure from animal lot runoff needs to be reduced on 8 of the 14 operations.

Based on the simulation of runoff controls, it is estimated that a 60% reduction can be achieved by reducing the amount of phosphorus on the 8 of 14 operations with estimated amounts of 5 or more pounds.

4. Manure Spreading Management Needs:

   Manure spreading management plans need to be prepared for the 14 livestock operations to minimize the amount of manure entering the stream.

Although the amount of manure could not be quantified and significant sites could not be identified, the very high oxygen demand levels during trout hatch periods warrants control of this type of nonpoint source.

Fishery Management and Other Resource Needs

1. Habitat Improvement Needs:

   Stream bank stabilization described above is needed to improve the fish habitat. No special habitat improvement needs have been identified.

2. Land Acquisition Needs:

   Specific lands adjoining Vermont Creek within this subwatershed need to be acquired to protect the trout waters.

Land acquisition along Vermont Creek has been a ongoing activity for many years. A number of parcels have been identified for acquisition by fee simple purchase, rent or easement. These parcels rank fourth in priority for lands within Black Earth Creek watershed.

BLACK EARTH CREEK - VERMONT TO HALFWAY PRAIRIE SUBWATERSHED - VH

Subwatershed Description

Black Earth Creek, between Vermont Creek and Halfway Prairie Creek, has a 7.1 square mile drainage area. No major tributaries enter Black Earth Creek in this subwatershed, so the main water resource of concern in this subwatershed is Black Earth Creek itself. This section of the creek is below the classified trout water.

This subwatershed is rural. Overall the land use is:

agriculture	54%
woodlands	35%
wetlands	1%
incorporated (urban)	<1%
other	8%

Other includes roads and scattered residences.

Water Resources Conditions

Presently, this portion of Black Earth Creek is classified as a warmwater sports fishery (FAL(B)). Many anglers have commented on the improved fishery through this segment. A mixture of warmwater and coldwater species are caught here. Some anglers have pulled out larger trout in this segment than further upstream. The Department fish manager does not believe this segment can support a smallmouth bass fishery which has been suggested at times by others. The lack of pools and riffles; the very shallow water; and water temperatures greatly limit the potential of this segment.

Water quality problems, however, do exist in this segment. Macrophytes are abundant in this segment. Cattle pasturing is extensive along the stream banks in this section of the creek.(8)

Water Resources Objectives

The objective is to maintain or improve the warmwater fishery. Upstream improvements in pollutant control should improve the water quality conditions to a limited degree. No specific pollutant load reductions are identified.

Pollutants from Nonpoint Sources

Eroding Croplands (sediment and nutrients). Generally, the soil erosion in this subwatershed is slightly lower than upstream subwatersheds. Most of the sediment reaching Black Earth Creek from this subwatershed is from eroding croplands. However, sediment from eroding stream banks is also significant. Based on cropland soil erosion estimates, Table 14 shows about 79% is from croplands with very high erosion rates (greater than about 10 tons/acre/year) and about 2% is from croplands with high erosion rates (greater than about 7-to-10 tons/acre/year). Table 14 also shows that these very high/high erosion cropland fields comprise about 27% of the croplands. Locations of these critical croplands are shown on Figure 14. Overall, they comprise about 15% of the area of the subwatershed.

Eroding and Trampled Stream Banks (sediment and direct habitat impairment).

Stream bank erosion is extensive along this segment of Black Earth Creek. There are more than 45 eroding stream bank sites in this subwatershed. The fine sediment without much of any aggregate is easily eroded. Bank erosion is due to both cattle access and cutting of the toe of the bank by the stream itself as it continues to meander. Analysis of the amount of sediment entering the stream from the eroding banks estimates the banks produce 10-to-15% of the sediment from this subwatershed. Croplands are the source of most of the sediment.

Animal Lots (oxygen demand and nutrients). Manure from animal lots and winter spread fields are the most probable source of oxygen demanding substances. Table 15 shows the number of animal lots and pollutant loads by range of phosphorus load.