WATER RESOURCE APPRAISALS AND STREAM CLASSIFICATIONS FOR THE CEDAR CREEK WATERSHED

Cedarburg Subwatershed

I. Description of the Subwatershed

The Cedarburg Subwatershed is located in Ozaukee County and is the most downstream subwatershed in the Cedar Creek Watershed. The principal surface waters within this subwatershed include Cedar Creek, five impoundments on Cedar Creek, and a few intermittent tributaries. This subwatershed receives drainage from the Horns Corners Subwatershed and ultimately discharges to the Milwaukee River in the Mequon Subwatershed which is located in the Milwaukee River South Watershed.

The City of Cedarburg makes up a significant portion of this subwatershed. Besides having a significant residential development there are some light to moderate heavy industries also present. Beyond the city limits the principal land use is agriculture although residential developments are becoming more and more prevalent.

Cedar Creek flows 10 miles in this subwatershed and has a gradient of 13 feet per mile. The Q7,2 and the Q7,10 for Cedar Creek as measured from the HWY 60 bridge is 3.5 ft3/s and 0.94 ft3/s respectively. There are five impoundments on this section of Cedar Creek and all are within the City of Cedarburg. The most upstream impoundment is the Cedarburg Impoundment, followed by the Ruck, Columbia, Wire and Nail Factory, and finally the Hamilton Impoundment.

There are only three intermittent tributaries which discharge to Cedar Creek within this subwatershed. Most of these have been channelized or modified to facilitate agricultural runoff.

II. Water Resource Conditions

A. Perennial Streams

Cedar Creek

The existing instream and riparian habitat of Cedar Creek in this subwatershed is suitable for sustaining a good sport fish and forage fish population (FAL B). Historic fish surveys support this classification. The overall stream size of Cedar Creek is sufficient to support full body contact recreational activities. The biological potential of Cedar Creek in this subwatershed is only partially being met.

The observed or potential factors or problems limiting the biological potential of this stream include, in-place pollutants, low flow, fish migration barriers, low dissolved oxygen, poor water quality, sedimentation, and urban pollutants. The sources or causes of these pollutants or factors limiting the biological potential of this stream include historic and existing point source discharges, dams, urban and rural nonpoint source pollution.

Fish

The fishery of Cedar Creek in this subwatershed has been extensively surveyed. The results of these surveys are summarized in appendix 1. The sample stations include the free flowing sections as well as the impounded sections in Cedarburg. The results indicate that all sections of Cedar Creek in the Cedarburg Subwatershed support a valuable sport fish population and an intolerant to very tolerant forage fish community. Some of the sample stations had population estimates conducted by Jaeger (1975) while other surveys were qualitative.

Habitat

The instream and riparian habitat of Cedar Creek was surveyed in 1986 using the Bozek (1985) Habitat Evaluation Procedure and Ball's (1982) Stream System Rating Procedure. The habitat upstream of SHY I was considered to range from good for forage fish to good for game fish. The substrate of this reach is a mixture of sand, silt, gravel and rubble with some boulders present. The average water depth and stream width in this section is 1.6 feet and 57 feet respectively. The instream cover was in the form of the channel morphology, over hanging vegetation, and tree roots and logs. The stream banks were considered to be stable and the shading varied from 0 - 50 percent. Aquatic vegetation was also present and covered approximately 20 percent of the substrate.

The instream and riparian habitat downstream of Cedar Creek Rd. was also evaluated. This section of stream had a good mixture of pool, riffle and runs with an average water depth and width of 1.7 feet and 46 feet respectively. The substrate throughout the evaluated section was a mixture of sand, gravel, rubble, with some silt and boulders also present. Deposition was not considered to be significant. The estimated velocity ranged from 0.5 to 2.0 feet per second. The instream cover was primarily in the form of the channel morphology, and rocks and boulders. Overall the cover was considered to range from good for forage fish to good for game fish. Appendix 2 summarizes the available habitat data.

Benthic Macroinvertebrates

Semi-qualitative macroinvertebrate samples were collected at several locations within this subwatershed. These samples were

analyzed using the Hilsenhoff Biotic Index which is used to measure organic pollution. Samples were collected in the spring and fall of 1986. Spring and fall sample results indicated good (5.029 and 5.093) and fair (5.702) water quality respectively. Further downstream at HWY T the spring index values indicated good (5.41 and 5.385) water quality while the fall duplicate samples indicated good to fair (5.651 and 5.221) water quality. Spring and fall samples were also collected downstream of Green Bay Rd. which is located downstream of the Cedarburg sewage treatment plant. The spring sample values were 6.026 and 5.009 indicating good and fair water quality. The fall sample indicated fair water quality (6.648).

The closeness of these values indicated that there was good consistency at the stations and that there was no significant change in the level of organic pollution throughout the surveyed section, and this includes the discharge from the sewage treatment plant at Cedarburg. Appendix 3 summarizes the available benthic macroinvertebrate information.

In-Place Pollutants

An important water quality problem that is severely impacting the fisheries of Cedar Creek and may also be adversely impacting the water quality and fishery of the Milwaukee River downstream of the confluence is the presence of highly contaminated sediment in the four most downstream impoundments in Cedarburg (Ruck, Columbia, Wire and Nail Factory, and Hamilton). The sediments and fish are contaminated with polychlorinated biphenyls (PCB) and have resulted in a health advisory. The advisory states that no one should consume any fish caught from the area downstream of the Cedarburg Impoundment.

A survey of the contaminated impoundments was conducted in 1986 by the WDNR to determine the concentration of PCB's in the sediment and to determine the horizontal and vertical distribution of PCB's in the contaminated area. A report entitled "DISTRIBUTION OF POLYCHLORINATED BIPHENYLS IN CEDAR CREEK SEDIMENTS AT CEDARBURG, OZAUKEE COUNTY, WISCONSIN" is available for the results and additional information on this survey. Several historic and existing sources were identified in the report. The Department has approached the responsible parties and have begun to pursue all alternatives for remediation of the contaminated site.

Bacteria

In 1986 a bacteriological survey of Cedar Creek and it's tributaries was conducted to determine the extent of bacterial contamination.

Samples were analyzed for membrane filtered fecal coliform, E. coli, Fecal strep., and Enterococcus. Results of the survey were compared to the bacteriological guidelines established in NR

102.04 (5)(a) which states:

...The membrane filter fecal coliform count may not exceed 200 per 100 ml as a geometric mean based on not less than 5 samples per month, nor exceed 400 per 100 ml in more than 10% of all samples during any month.

Water samples were collected at four locations within this subwatershed. The most upstream station was located at CHY I followed by SHY 60, Adlai Horn Park in Cedarburg, and Green Bay Rd. in the Village of Hamilton. Appendix 2 summarizes the bacteriological results. The results indicate that the level of bacteria contamination at all four stations exceeded the established guidelines.

Water Quality

A water quality monitoring station was located on Cedar Creek at HWY 60 in this subwatershed. The station was maintained by the U.S. Geological Survey up until 1979. Water quality samples were collected at this station once a month along with stage height information. Appendix 5 summarizes this data.

B. Intermittent Streams

Unnamed Intermittent Tributary CG004 (T10N R21E S11 NESW)

This intermittent tributary to Cedar Creek is approximately 1.0 mile long and has been partially channelized to facilitate agricultural runoff.

No detailed biological or habitat data is available however the general physical features were observed during a recent reconnaissance survey and examined with the aid of existing aerial photographs. This tributary is expected to be capable of supporting spawning northern pike. No formal stream classification can be given at this time due to the lack of detailed biological or physical information.

The observed or potential problems or factors which are limiting the biological potential of this tributary include low flow, loss of instream and riparian habitat, elevated water temperature, sedimentation, and excessive algae or aquatic vegetation. The sources or causes of these limiting factors include channelization, loss of overhead cover, upland and bank erosion, and excessive nutrient loading.

Unnamed Intermittent Tributary CG010 (T10N R20E S26 NESE)

This intermittent tributary to Cedar Creek is approximately 0.8 mile long and was channelized to facilitate agricultural runoff. More recent urban development adjacent to this tributary has increased the amount of urban runoff reaching the stream. No detailed biological or habitat data is available for this

intermittent tributary. No formal stream classification can be given at this time due to the lack of detailed biological and physical information.

The observed or potential problems or factors which are limiting the biological potential of this tributary include low flow, loss of instream and riparian habitat, elevated water temperature, sedimentation, and excessive algae or aquatic vegetation. The sources or causes of these limiting factors include channelization, loss of overhead cover, upland and bank erosion, and excessive nutrient loading.

Unnamed Intermittent Tributary CG013 and CG015 (T10N R21E S35 SESE)

No biological or habitat information is available for these intermittent tributaries. Due to the lack of detailed biological and physical data these streams can not be formally classified.

III. Water Resource Management Objectives

A. Perennial Streams

Cedar Creek

1. Protect and enhance the sport and forage fish community by protecting and enhancing the habitat and water quality required by indigenous species.

a. Deny any future dredging or water control projects which would result in a decrease in the available instream or riparian habitat. An exception to this recommendation would be the area located in Cedarburg that is contaminated with PCB's. This area may require dredging or other water control activities that would allow removal of contaminated sediment.

b. Reduce upland erosion in accordance with the nonpoint source control plan by implementing best management practices.

c. Eliminate and or detoxify the inplace pollutants in the Cedarburg impoundments.

d. Protect the water quality of Cedar Creek by requiring all future residential and commercial developments to design and implement a stormwater management plan.

2. Protect the human health and recreational uses of Cedar Creek.

a. Reduce or eliminate fecal bacterial loadings from pastures and feedlots. Reduce bacteria contamination of Cedar Creek to levels that will support full body contact recreational activities.

B. Intermittent Streams

1. Protect and enhance the forage fish community by protecting and enhancing the water and habitat quality required by intolerant to very tolerant forage fish or benthic macroinvertebrates.

a. Deny any future channelization or dredging applications or water control projects which would result in a decrease in the available instream and riparian habitat needed by tolerant and very tolerant forage fish.

b. Protect the hydraulic integrity of the stream by requiring all new residential and commercial development to design and implement a stormwater management plan.

c. Protect the hydraulic integrity of the intermittent streams by denying all future wetland dredging, filling or ditching projects.

d. Reduce NPS sediment loadings to these intermittent tributaries in accordance with the nonpoint source control plan.

e. Reduce nutrient loadings to the surface waters in accordance with the nonpoint source control plan by installing best management practices.

2. Protect the human health and recreational uses of Cedar Creek and it's tributaries.

a. Reduce or eliminate fecal bacterial loading from pastures, feed lots and loafing areas. Bacteria levels should be reduced to levels that support partial body contact recreational activities.

Table 1. Waterbodies of the Cedar Creek Watershed.

SUBWATERSHED WATERBODY	LENGTH MILES	CURRENT USES USE/MILES	POTENTIAL USES USE/MILES	POTENTIAL USES FULL	POTENTIAL USES PART	POTENTIAL USES NO* MILES	PROBLEMS OR THREATS TO POTENTIAL USES	POLLUTANTS OR LIMITING FACTORS CAUSING PROBLEMS OR THREATS	OBSERVED OR POTENTIAL SOURCES	PRELIMINARY MANAGEMENT RECOMENDATIONS
CEDARBURG SUBWATERSHED										
Perennial Streams										
Cedar Creek CG016 T10N R21E S36 NWNE	8.6	FAL-B/8.6	FAL B/8.6		8.6		In-place Pollutants	PCB's	Point sources	Eliminate and/or Detoxify
							Limited Habitat	Low flow	Natural	Uncontrollable
								Fish Migration Barrier	Dam	Eliminate or Modify
							Sedimentation	Sediment	Nonpoint sources	Reduce NPS sediment sources
							Water Quality	low dissolved oxygen	Natural	Uncontrollable
								Other Pollutants	Urban runoff	Control urban NPS sources
		FBC/8.6	FBC/8.6			8.6	Bacteria	Bacteria	Barnyard and livestock access	Reduce barnyard runoff and restrict access to stream
Intermittent Streams										
CG004 T10N R21E S11 NESW	1.0	UNK/1.0	UNK/1.0		1.0		Limited Habitat	Low flow	Natural	Uncontrollable
								Channelization	Agricultural use	Prohibit future channelization
							Sedimentation	Sediment	Agricultural runoff	Reduce NPS sediment sources
							Nuisance vegetation	Nutrients	Nonpoint sources	Reduce NPS nutrient sources
							Water Quality	Elevated water temperature	Loss of overhead cover	Prohibit future channelization
		PBC/1.0	PBC/1.0		1.0		Stream size	Natural	Natural	Uncontrollable
CG010 T10N R21E S26 NESE	0.8	UNK/3.3	UNK/3.3		3.3		Limited Habitat	Low flow	Natural	Uncontrollable
								Channelization	Agricultural use	Prohibit future channelization
							Sedimentation	Sediment	Agricultural runoff	Reduce NPS sediment sources
CG013	0.8	" "	" "				Nuisance vegetation	Nutrients	Nonpoint sources	Reduce NPS nutrient sources
CG014	1.0	" "	" "				Water Quality	Elevated water temperature	Loss of overhead cover	Prohibit future channelization
CG015	0.7	" "	" "				Stream size	Natural	Natural	Uncontrollable
T10N R21E S35 NESE		PBC/3.3	PBC/3.3		3.3					