CHAPTER 4: POINT SOURCES

Chapter 3 discussed the water quality conditions of Black Earth Creek and its tributaries and the nonpoint sources degrading water quality. These water quality conditions are not entirely due to pollutants from urban and rural nonpoint sources; point sources also contribute to those conditions. The purpose of this chapter is to present a summarize the point source control status and any concerns over the control that may exist. This chapter also summarizes point source control activities conducted with the development of the Black Earth Creek Watershed plan. Municipal wastewater treatment plants, industrial dischargers and landfills comprise the point sources in this watershed.

MUNICIPAL WASTEWATER TREATMENT PLANTS

Cross Plains

The Cross Plains wastewater treatment plant, located on the west side of the village, was upgraded in 1983. It provides secondary treatment, and has effluent requirements of 30 mg/l for BOD and 30 mg/l for suspended solids. Phosphorus removal is not required. In normal operation, the BOD concentration in the effluent is about 10 mg/l and the suspended solids concentration is about 10-to-20 mg/l. The wastewater treatment plant has adequate design capacity to serve the anticipated growth of the community for at least ten years. Zanders Creamery and Plastic Ingenuity discharge process water to the Cross Plains wastewater treatment plant. The current permit expires September 30, 1988. It is anticipated the reissuing of the permit will be delayed until June 1989. The reissued permit will probably expire in 1994.

Two concerns arose during the development of this management plan. The first was the malfunctioning of the plant. The second is the amount of phosphorus being discharged to Black Earth Creek from the Cross Plains wastewater treatment plant.

Malfunctioning of the Wastewater Treatment Plant. In the spring of 1985, the Cross Plains wastewater treatment plant experienced a number of malfunctions. When a return sludge pump broke, a larger backup pump was in use for about six weeks while waiting for repair parts. With the larger pump being throttled down for use, clogging occurred causing sludge to spill into the

final effluent. Effluent concentrations of up to 108 mg/l of suspended solids and 43 mg/l of BOD were reported during the malfunctions. An assessment of the plant was prepared as part of the University of Wisconsin's Water Resources Management Workshop Report. (16)

In response to this malfunction problem, and as a follow-up to the University's report, DNR's Southern District wastewater staff conducted a study of the operation. A report was submitted to the village in January 1986. The report made recommendations for improving the operation of the plant and having backup parts on hand.

Phosphorus Discharge. Due to the dense aquatic vegetation in the stream, the Lower Wisconsin Areawide Water Quality Management Plan identified the Cross Plains wastewater treatment plant as a location where the phosphorus discharge may be adversely impacting the stream. As part of this project, DNR and USGS determined the phosphorus concentrations upstream and downstream of the treatment plant during baseflow conditions. In addition, the University of Wisconsin's Water Resources Management Workshop evaluated the potential for the abundant macrophytes and filamentous algae to respond to reductions in phosphorus discharged from the plant.

From April through September of 1985, USGS collected water samples every two weeks at six sites on Black Earth Creek. As shown in Figure 19, three of the sites were upstream and three of the sites were downstream of the wastewater treatment plant. DNR collected samples of the effluent from the plant. All samples were analyzed by the State Laboratory of Hygiene for total and soluble phosphorus.

Table 4-1 and Figure 19, show the average phosphorus concentrations of the effluent from the Cross Plains wastewater treatment plant and for the sites on Black Earth Creek upstream and downstream of the wastewater treatment plant. The total phosphorus concentrations double downstream of the Cross Plains wastewater treatment plant. It also shows the soluble phosphorus concentrations increase four times.

Although the increase in phosphorus concentrations downstream of the Cross Plains wastewater treatment plant is clear, the relationship between the phosphorus concentrations and the growth of aquatic vegetation is not. The report of University of Wisconsin's Water Resources Management program on Black Earth Creek concluded:

1. Macrophyte growth is probably controlled by dynamics other than phosphorus limitation.