

Classification of a
Slough of the
Lower Fox River

Nov. 1985

Introduction

James River Corporation discharges treated wastewater from its mill in Green Bay to a backwater or slough of the lower Fox River located on the east side of the river near its mouth (See Map 1).

District Fish Management believes that this area provides the habitat required for spawning by certain fish species and that game fish should be present in this area at other times of year.

Electrofishing in the slough in July, 1985 produced only a few carp.

Due to Fish Management's concerns Water Resources Management conducted a sampling survey on September 3, 1985 and a dye study on September 4, 1985, to determine the effects of the James River discharge on this slough.

Methods and Materials

Water quality samples were collected at six locations (Map 2) and handled according to quality control procedures. The samples were analyzed by the State Lab of Hygiene. Results are reported in Table 1.

Due to equipment failure temperature and dissolved oxygen readings were not taken during sampling. Readings were taken prior to the dye study using a yellow springs instruments model 54 and results are presented in Table 2.

One quart of 20% Rhodamine wt dye was introduced at the outfall at 09:40 in an attempt to trace the movement of the wastewater stream. Photographs of the dye were taken from the Tower Drive (I-43) bridge throughout the morning and early afternoon and are attached.

Discussion

This is a unique area for the lower Fox River below DePere in that it is the only naturally occurring back water of any size in that stretch and as such provides habitat not available else where.

It is the type of habitat that when found in other river systems affords spawning and nursery habitat at certain times of year and hosts warm water species such as Bass and Northern Pike at other times.

Its undeveloped nature (particularly on the south) is another feature which sets it apart from much of this stretch of the Fox.

On the two days of the study flow in the slough was to the east, away from the river. It is unknown whether this is a constant occurrence or unique to the time of the study, but in effect it holds the discharge in the slough allowing it to exert its full effect on a small quiescent body of water rather than entering the flowing river system. The

easterly flow can be identified visually from the photographs (attached) which show a small amount of dye being carried to the west by the discharge with the remainder moving into the far eastern corner of the slough where it apparently becomes trapped.

Further evidence of this easterly movement and "Trapping" is exhibited by the BOD₅ samples and dissolved oxygen results which show much higher BOD₅ and extremely low D.O.'s in the east end of the slough. These values improve dramatically as the sampling moves to the west, towards the river.

Conclusions

This unique portion of the Fox River is highly impacted by the combined effect of the James River Corporation discharge and the easterly flow in the slough. Although it should be capable of supporting a variety of fish and aquatic life it supports only a few very tolerant species due, in part, to low dissolved oxygen levels.

It is District Water Resources Management's conclusion that this slough is part of the Fox River and as such should be meeting and be classified as Full Fish and Aquatic life. In addition, due to the reverse flows and low assimilative capacity of the slough we feel that this is an inappropriate location for a discharge of this volume and that either the pipe be moved to the main stream of the Fox River or much stricter limits be imposed.

Table 1 Sample Results (mg/l)

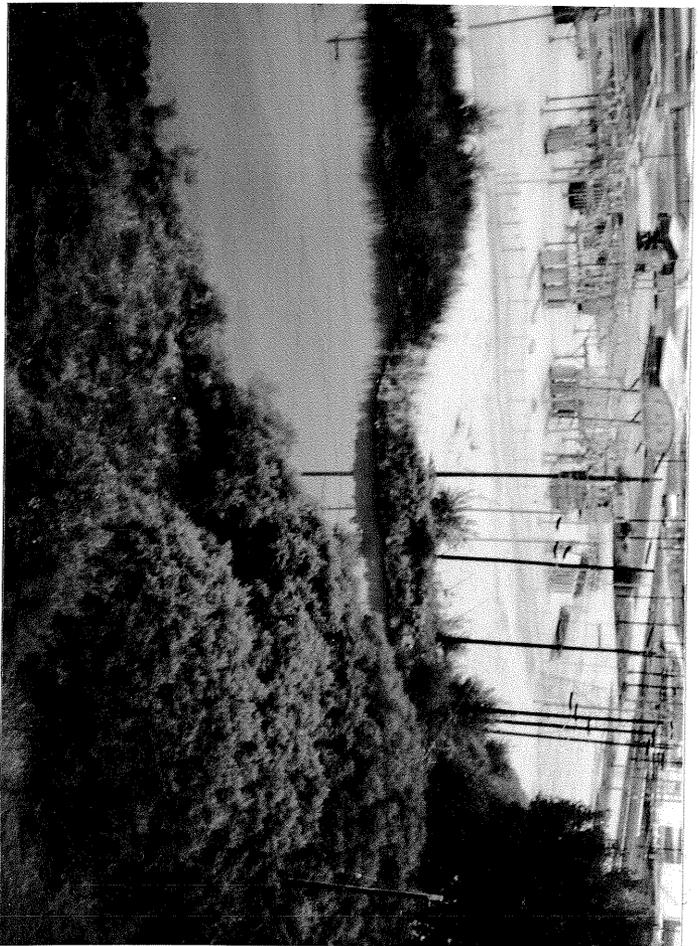
<u>Parameter</u>	<u>Station#</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
BOD ₅		23	52	11	6.1	5.7	5.7
pH		7.6 su	7.3su	7.5su	8.1su	8.0su	8.9su
SS		16	14	12	16	8	26
K-N		1.9	1.5	2.0	1.8	1.6	1.6
NH ₃ N		.02	.02	.07	.18	.10	.02
NO ₂ -NO ₃		.02	.06	.02	.05	.03	.07
Chloride		96	46	100	51	82	17
Conductivity		820	630	830	560	730	350

Table 2
Dissolved Oxygen & Temperature

<u>Station#</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
D.O.	.4	2.3	2.3	7.9	.3	7.2
Temp.	23	36	29	26	28	25.5



10:25



10:25



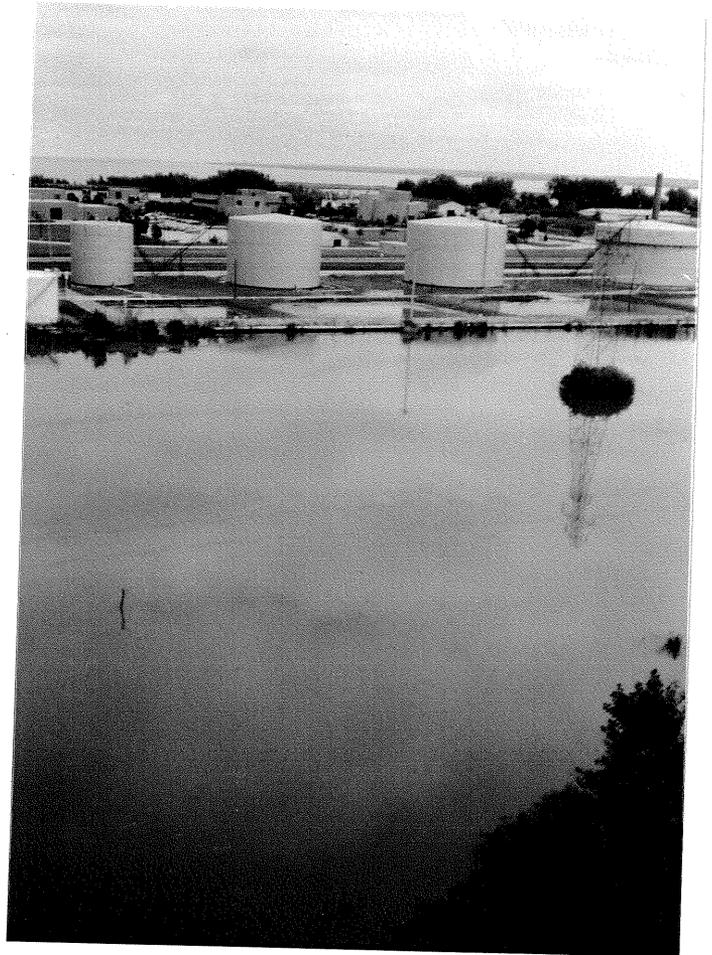
09:46



10:25



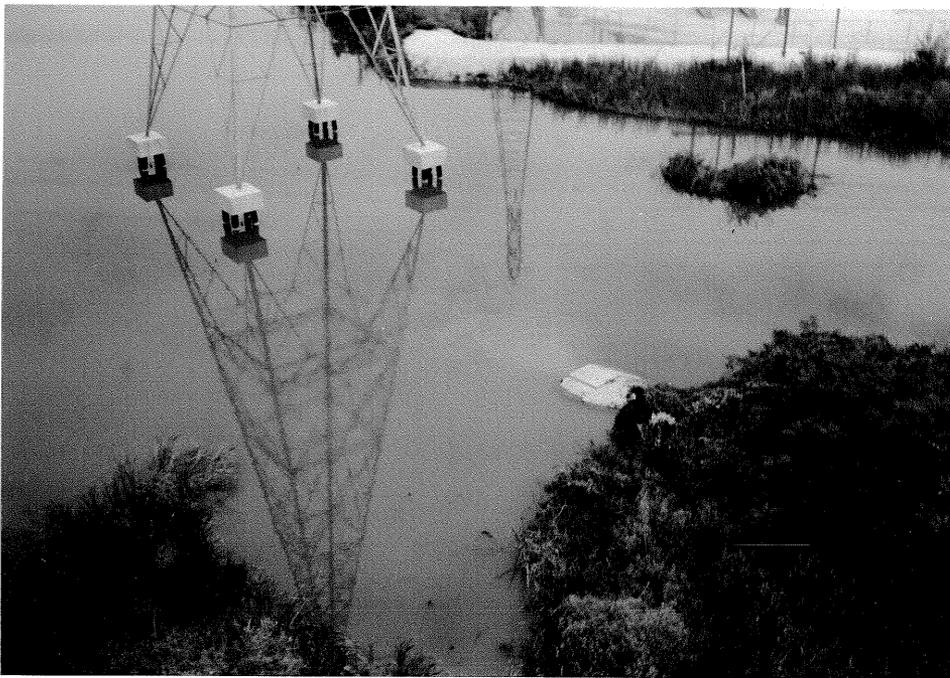
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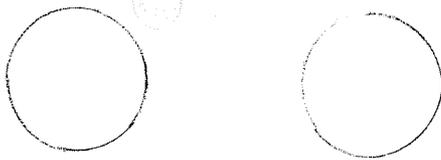


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TANK FARM

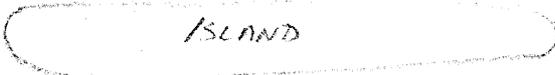


QUINCY ST.

Fox R.

⑥

⑤



ISLAND

④

③

②

OUTFALL

①

STATION LOCATIONS

