

Region SER County Racine Report Date 10/1996 Classification LAL/LFF
 Water Body: West Branch Root River Canal WWSF(P3)
 Discharger: V of Union Grove WWTP

If stream is classified as Limited Forage Fish (LFF) or Limited Aquatic Life (LAL), check any of the following Use Attainability Analysis factors that are identified in the classification report:

- Naturally occurring pollutant concentrations prevent the attainment of use
- Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met
- Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place
- Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or operate such modification in a way that would result in the attainment of the use
- Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses
- Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact

Supporting Evidence in the report (include comments on how complete/thorough data is)

- Biological Data (fish/invert) good - '96 report
- Chemical Data (temp, D.O., etc.) Chemical data collected for '96 report - not attached
- Physical Data (flow, depth, etc.)
- Habitat Description
- Site Description/Map In 70s report - maps. '96 report has good site description.
- Other: _____

Historical Reports in file:

- 10/96 - S. Galamean
- 197? - unk.

Additional Comments/How to improve report:

- 1970's report does NOT have adequate information to support LAL/LFF class'n's currently proposed.
- 1996 report does a good job of justifying WWSF class'n.

Stream Classification for West Branch Root River Canal
Root River Watershed, Southeastern Wisconsin River Basin. Racine Co
October 10, 1996

Phase 2
WWSE

by Steve Galarnau, Southeast Region

INTRODUCTION

The West Branch of the Root River Canal is located in Racine County and is confluent with the Root River in Milwaukee County. The West Branch Root River Canal originates near the village of Union Grove at T3N R21E sections 24 and 30. The stream flows easterly to T3N R21E S28 SW SE then north to a confluence with the East Branch Root River Canal at T4N R21E S23 NESW (Map 1).

The Village of Union Grove WWTP discharges to the West Branch Root River Canal at T3N R21E S29 NESE, upstream of 67th Drive. C&D Duck - Maple Leaf Farms discharges to the West Branch Root River Canal at T3N R21E S3 SW, downstream of 50th Road (just downstream from the confluence with Yorkville Creek).

The stream classification that currently exist in NR 104 for the West Branch of the Root River Canal is:

1. Headwaters (67th Drive) to CTH C - Limited Aquatic Life
2. CTH C to STH 20 - Limited Forage Fish Communities.
3. STH 20 to confluence with the Root River - Full Fish and Aquatic Life - Warm Water Sport Fish Communities.

This classification conducted in 1975 (WDNR 1975) was proposed without the benefit of any widely accepted and scientifically based stream classification guidelines, or the use of recent biological information (i.e. fish survey results).

Wisconsin Stream Classification System

The Wisconsin Stream Classification System provides a basis for making and supporting water quality management decisions. Surface waters require classification as part of Wisconsin's codified water quality standards so that water quality criteria for specific waters, and point source discharge effluent limits needed to maintain water quality standards, can be designated and regulated. Written guidelines for classifying Wisconsin's streams were first developed in 1982, "Stream Classification Guidelines For Wisconsin". Although these procedures were developed primarily for designating stream uses, they can be applied to any surface water for the purpose of designating water quality standards.

The Wisconsin's Stream Classification system describes the potential biological use of Wisconsin stream's. Although stream's can be used for a variety of uses (i.e. recreation, food production, and wastewater assimilation), only those uses which can be described in terms of biological communities are considered. *Use* is defined by the biological community a surface water has the natural capacity to support. The stream classification system recognizes that not all stream have the capacity to support all forms of fish and other aquatic life communities due to natural limiting factors (i.e. stream size and depth, and water temperature), or culturally irreversible factors (i.e. dams and concrete channels). The differences in natural water quality and habitat can be measured or predicted and,

along with biological data, form the basis for classifying surface waters into their appropriate biological use classifications.

The use classification in this system is also based on a surface water's *potential* to support a community type, (i.e., warm water sport fish), not necessarily on its *existing* biological community. Use classification based only on existing conditions could perpetuate non-attainment of potential uses by allowing continued discharge of inadequately treated effluent, and could inhibit efforts to manage other water quality problems such as nonpoint source sediment and nutrient impacts.

Existing use is defined by the fish and other aquatic life community currently living in a stream. The existing use is dependent upon current habitat and water quality conditions, and any natural or cultural impacts that may or may not be controllable. The existing use may or may not be the same as the classified use depending on the controllability of water quality and habitat impacts. *Potential use* is the fish and other aquatic life community that could exist in a stream following the removal or management of controllable impacts. The potential use can be different from the existing use where controllable impacts have degraded habitat or water quality to the point that few fish and other aquatic life exist in a stream. Potential use is based on a stream's capacity to improve when controllable impacts are removed or properly managed. A stream's potential use is its designated classification and sets the standards for deriving water quality criteria and for calculating effluent limits needed to attain water quality standards *and* the potential use.

METHODS

Habitat Surveys

Stations were surveyed using the habitat protocols developed by Ball (1982) and Simonson et al. (1994). Both stream habitat assessment methods are used for each site because they evaluate different characteristics of the stream ecosystem. The Stream Classification Guidelines for Wisconsin developed by Ball (1982) is an assessment of the whole stream system habitat including the watershed, stream bank, and instream habitat. In conjunction with this assessment, the Fish Habitat Rating (FHR) developed by Simonson, Lyons, and Kanehl (1994) will be determined for each fish survey site as part of this year's basin sampling. The FHR is an assessment of the physical habitat available for fish within a given stream reach. The fish surveys included instantaneous water quality information consisting of temperature, dissolved oxygen, turbidity, pH, and conductivity.

Water Quality

Water chemistry data are being collected this year (1996 field season) in the West Branch Root River Canal as part of the Basin Monitoring. Three stream sites are being sampled for nutrients (total phosphorus, dissolved phosphorus, nitrate plus nitrite, TKN, ammonia), suspended solids, BOD, bacteria, chlorides, hardness, water temperature, dissolved oxygen, turbidity, pH, and conductivity:

1. upstream of Union Grove Wastewater Treatment Plant and their effluent,
2. upstream of Maple Leaf Farms C&D outfall and their effluent,
3. at Fourmile Road.

This sampling is ongoing; hence, the water chemistry data and analysis will be appended to this report upon completion of the Southeastern Wisconsin River Basin Ambient Monitoring.

Fish Surveys

Fish community surveys were conducted using a DC pulsed backpack shocker at the headwater site, upstream of 67th Drive. All other fish surveys were conducted using a DC stream shocker (2 probes). Each survey consisted of a single pass from downstream moving upstream. All fish were collected then identified, enumerated and released. Fish collections were assessed using the Index of Biotic Integrity (IBI) protocol developed by Lyons (1992). Eight fish community surveys have been conducted since 1993 on the West Branch Root River Canal (Table 1).

Table 1. Fish community assessment station locations on the West Branch Root River Canal sampled in 1993, 1994 and 1996.

STREAM	SAMPLE SITE	MONTH/YEAR	RIVER MILE	LEGAL DESCRIPTION
W. Br. Root River Canal	upstream of Threemile Road ¹	6/93 & 6/94	1.4	T4N R21E S35 NW
W. Br. Root River Canal	upstream of Twomile Road	5/96	2.6	T4N R21E S34 SE
W. Br. Root River Canal	upstream of C&D outfall to 50th Road	9/96	3.9	T3N R21E S3 SW
W. Br. Root River Canal	downstream and upstream of CTH C	5/96 (2 surveys)	6.4 / 6.5	T3N R21E S21 NE
W. Br. Root River Canal	downstream and upstream of 67th Drive	5/96 & 10/96	9.3	T3N R21E S29 SE

¹ WDNR Fish Research conducted the habitat and fish community surveys on the W. Br. Root River Canal upstream of Threemile Road in 1993 and 1994 (Wessels and Kanehl 1995). All other surveys identified above were conducted by WDNR Water Resources Management personnel.

RESULTS

Habitat

The West Branch Root River Canal has been historically channelized to drain wetlands and accommodate agricultural land use. The watershed is primarily row crop agricultural uses with an urban (and urbanizing) headwater. The stream banks are primarily grass lined with some woody shrubs. The stream is characterized as a series of riffles (<0.2 ft.) and runs (0.5 - 1.0 ft.). Pools are infrequent and limited to bends and around obstructions to flow. Pools averaged 1.5 ft. and occasional pools downstream of road crossings were greater than 3 ft. deep.

Bank erosion was limited throughout the stream length. One site was observed to have a significant amount of slumping immediately downstream of the CTH C road crossing. Substrate condition is variable ranging from gravel and cobble in riffle areas to silt and sand over clay in the runs and pools. Substrate scouring and deposition is common and is very significant during high flows. In-stream

shading is infrequent and filamentous algae is often present in the unshaded areas. Average stream widths for the survey sites on the West Branch Root River ranged from 7 to 15 feet.

Fish and aquatic life habitat throughout the West Branch Root River Canal are limited by the effects of past channelization through loss of stream length, pools, riffles and coarse substrate. Stream flows were very low during the summer stream surveys; however, depths in the runs and pools were suitable to sustain a diverse and abundant fish community. Characteristic of channelized streams, the stream has been constrained within a defined channel and is not able to naturally overbank and dissipate energy and flow. Consequently, the stream is flashy and efforts to control stormwater runoff, particularly in the urbanizing headwaters, will be important to sustain and improve the macroinvertebrate community and spawning habitat for fish species indigenous to the West Branch Root River Canal.

Fish Community

The results from the eight fish community surveys conducted since 1993 on the West Branch Root River Canal are shown in Table 2.

Table 2. Number of fish collected during the fish community surveys of the West Branch Root River Canal during 1993, 1994, and 1996. (RM = River mile from the confluence with the East Branch Root River Canal, Map 1).

Fish Species	Threemile Road RM = 1.4 6/93	Threemile Road RM = 1.4 6/94	Twomile Road RM = 2.6 5/96	50th Road RM = 3.9 9/96	CTH C RM = 6.4 5/96	CTH C RM = 6.5 5/96	67th Drive RM = 9.3 5/96	67th Drive RM = 9.3 10/96
Bigmouth Shiner	37	189	22	189	9	10		157
Black Bullhead	1	2	8	12	6	3	1	7
Bluegill	4							40
Bluntnose Minnow	35	40	98	6	14	15		12
Brook Stickleback	1	1	3	3	1	10	2	
Central Mudminnow		17	21	112	10	70	56	18
Common Carp	1	1	2		2			4
Common Shiner	2	8	5		53	108		
Creek Chub	39	306	211	120	25	193	58	421
Fathead Minnow		6	34	15	11	44	50	1510
Golden Shiner	1					2		
Goldfish	3							
Green Sunfish	16	15	9	89	8	64	60	148
Green Sunfish - Pumpkinseed Hybrid	1							
Johnny Darter	5	12	2	31	43	13		6
Largemouth Bass				7				7
Northern Pike		1	2		1			
White Sucker	58	66	61	5	79	169	9	14
Yellow Bullhead	1	1						18

During the fish survey of the West Branch Root River downstream of CTH C on May 2, 1996 we had an equipment malfunction resulting in a fish survey of only 40 feet of stream. The next day we returned to the site and finished the downstream survey by continuing where we left off on May 2nd and shocking for an additional 60 feet for a total of 100 feet. Consequently, the fish survey results are reported here as the greatest number of fish collected for any given fish species for either of the sample days downstream of CTH C (e.g. 25 Creek chubs were collected on May 2nd and 19 Creek chubs on May 3rd; hence, 25 Creek chubs are reported in Table 2 etc.). Furthermore, the fish survey of the West Branch Root River Canal at Twomile Road on May 2, 1996 was conducted with only one of the two probes operating; consequently, the fish collection efficiency for this site was very low.

Eighteen species of fish were collected in the West Branch Root River Canal during the 1993, 1994 and 1996 surveys including six species of sport fish (Green sunfish and hybrid counted as one). As can be seen in Table 2, an abundant and diverse fishery is present throughout the entire length of the stream.

SUMMARY AND RECOMMENDATIONS

A stream classification survey was completed for the West Branch Root River Canal as part of the 1996 Basin Monitoring. The stream classification provides information for establishing water quality criteria and for calculating effluent limits for dischargers to the West Branch Root River Canal. Based on the results of the fish and habitat surveys conducted in 1993, 1994, and the 1996 stream classification survey, the **West Branch Root River Canal is classified as Full Fish and Aquatic Life Stream - Warm Water Sport Fish Communities.**

This stream classification for the West Branch Root River Canal uses recent fish surveys and is based on guidelines developed by Ball (1982). Water Resources Management recommends that this updated stream classification be included in the revision to NR 104.

REFERENCES

- Ball, Joseph. 1982. Stream Classification Guidelines for Wisconsin. Technical Bulletin. Wisconsin Department of Natural Resources, Madison, Wisconsin.
- Lyons, John. 1992. Using the Index of Biotic Integrity (IBI) to Measure Environmental Quality in Warmwater Streams of Wisconsin. North Central Forest Experiment Station, Forest Service - U.S. Department of Agriculture. St. Paul, MN.
- Simonson, T., J. Lyons and P. Kanehl. 1994. Guidelines for Evaluating Fish Habitat in Wisconsin Streams. U.S. Dept. of Agriculture, Forest Service, North Central Forest Experimental Station. General Technical Report NC-164. St. Paul, MN.
- Wessels, M. and P. Kanehl. 1995. Sampling of the North Branch of the Pike River, the Pike River, the South Branch of the Pike River, and the West Branch of the Root River Canal, Racine and Kenosha Counties, by Fisheries Management, Water Resources, and Fish Research Personnel During June 1994. Wisconsin Department of Natural Resources Memorandum dated February 2, 1995. Madison, Wisconsin.
- Wisconsin Department of Natural Resources. 1975. Union Grove, Racine County, Root River Drainage Basin Stream Classification. Water Resources Management File, Milwaukee, WI.

Union Grove, Racine County
Root River Drainage Basin

The effluent from the Union Grove Wastewater Treatment Plant is discharged to the West Branch of the Root River Canal, which has a $7Q_{10}$ of 0.03 cfs. The effluent is discharged directly into an underground tile which also transports the effluent from the Southern Wisconsin Colony and Training School. The tile runs east for approximately one mile before discharging to the stream. The West Branch of the Root River Canal originates approximately 0.5 miles above the outfall and flows southeast for less than a mile before heading north.

The stream channel has been altered and flows through open cultivated fields and occasional semi-wooded areas. The substrate throughout much of the stream consists largely of muck. Dense algal blooms can be found at many points upstream of STH 20.

An electrofishing survey conducted by Department of Natural Resources personnel in September, 1975 at Hwy. "C" collected the following fish: green sunfish, central mudminnows, creek chubs, and fathead minnows.

The Des Plaines River flows along the southern margin of Union Grove.

Recommendations

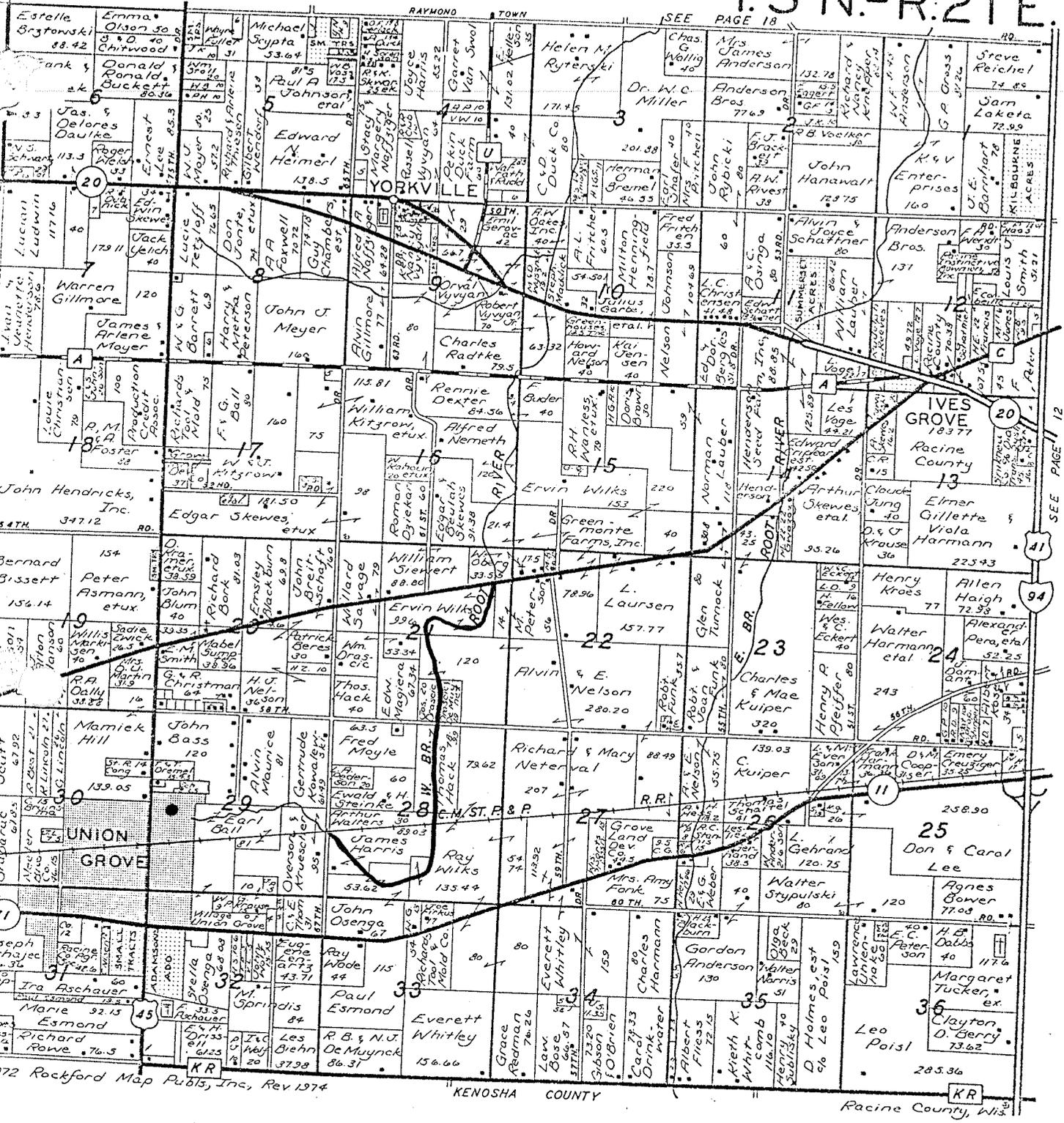
The section of the West Branch of the Root River Canal above the outfall shall be classified as diffuse surface water. The reach of stream below the outfall to CTH "C" shall be classified as a non-continuous agricultural stream. The reach of stream from CTH "C" to STH 20 shall be classified as a non-continuous intermediate aquatic life stream. The West Branch of the Root River Canal downstream of STH 20 shall be classified as a continuous fish and aquatic life stream.

SOUTHEAST DISTRICT

Surface Water (Facility Affected) <i>Reach</i>	Reach Description	Hydrologic Classification	Applicable Criteria (1)	Effluent Limitations (2) <i>10</i>
	SOUTHERN COLONY TILE TO OUTLET 100 YDS WEST OF 67th Street.	EFFLUENT RPE	EFF. DAB.	
	W. BR. ROOT RIV. CANAL ABOVE TILE OUTFALL	(0) DIFFUSE SEC. H ₂ O	DIFFUSE SEC. H ₂ O	
	TILE OUTFALL TO CTH "C" W. BR. R. RIV. CANAL	(0.03) NON-CONTINUOUS	AGR. ← II	N/A
WEST BRANCH ROOT RIV. CANAL UNION GROVE WWTP, RACINE	W. BR. ROOT RIVER CANAL FROM CTH "C" TO STH "20"	NON-CONT.	INT. AG. I	(A)
	W. BR. ROOT RIVER CANAL FROM STH "20" ON UP down STH	CONTINUOUS	FISH AG.	

YORKVILLE

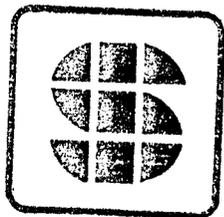
T.3 N.-R.21 E.



1972 Rockford Map Publs, Inc., Rev 1974

KENOSHA COUNTY

Racine County, Wis.



State Bank of UNION GROVE

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MEMBER FDIC

