

ROXBURY CREEK  
AT ROXBURY, DANE COUNTY

TRIENNIAL STANDARDS REVIEW  
ROXBURY WWTP

APRIL, 1991  
ROGER SCHLESSER, SOUTHERN DISTRICT

BUREAU OF WATER RESOURCES MANAGEMENT  
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

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## SUMMARY

Roxbury Creek (Blums Cr.) below the Roxbury WWTP was originally classified as Limited Aquatic Life, due to low natural stream flow and lack of habitat. The LAL section extended from the WWTP outfall downstream to the north line of the SW 1/4 SE 1/4, Sec. 17, T9N, R7E. From this point extending downstream, and for the remainder of Roxbury Creek, the classification is continuous fish and aquatic life. This review indicates that the section of stream currently classified as LAL should be changed to Limited Forage Fish. The collection of additional data indicates that this section of stream correctly reflects this classification category.

## INTRODUCTION

This paper presents the results of an evaluation of the stream classification for Roxbury Creek, which is the receiving water for the Roxbury WWTP. The evaluation was conducted as part of the Triennial Standards Review. The sites being reviewed are listed in NR 104.05 (Appendix IV). These sites received a variance due to one or more of the following criteria:

- (a) The presence of in-place pollutants,
- (b) Low natural stream flow,
- (c) Natural background conditions, and
- (d) Irretrievable cultural alterations.

## GENERAL DESCRIPTION

Roxbury Creek originates east of the Village of Roxbury and flows west draining approximately 21 square miles of agricultural and wooded land before entering the Wisconsin River. The headwaters of the stream have been extensively ditched and is dry or has limited flow during much of the year. Much of that area has been drained for agricultural purposes. The upper 2/3's of the stream corridor is in agricultural crops and the lower 1/3 is a little more wooded. Parts of the corridor are pastured with the lower reaches pretty much left wild (Mazomanie State Wildlife Area). The transport of nutrients to the stream would primarily come from agricultural runoff.

The reach included in this evaluation is a 1 mile stretch which extends from 50 ft. above the outfall downstream to the start of the fish and aquatic life section. The stream in the vicinity of the outfall has low perennial flow with a USGS computed  $Q_2$  of 0.01 cfs and a  $Q_{10}$  of  $<0.01$  cfs. Flows were taken by USGS at Inama Road. Stream flows generally are low during periods of low precipitation.

Table 1 contains the actual stream flows in Roxbury Creek taken from the publication "Low-Flow Characteristics of Wisconsin Streams at Sewage Treatment Plants".

Table 1: Low-Flow Characteristics, Roxbury Creek

<u>Drainage Area</u> (mi <sup>2</sup> )	<u>Date</u>	<u>Discharge</u> (ft <sup>3</sup> /s)
9.27	July 5, 1972	0.03
	June 25, 1973	0.88
	Aug. 21, 1973	0.90
	Oct. 9, 1975	0.82

STREAM HABITAT

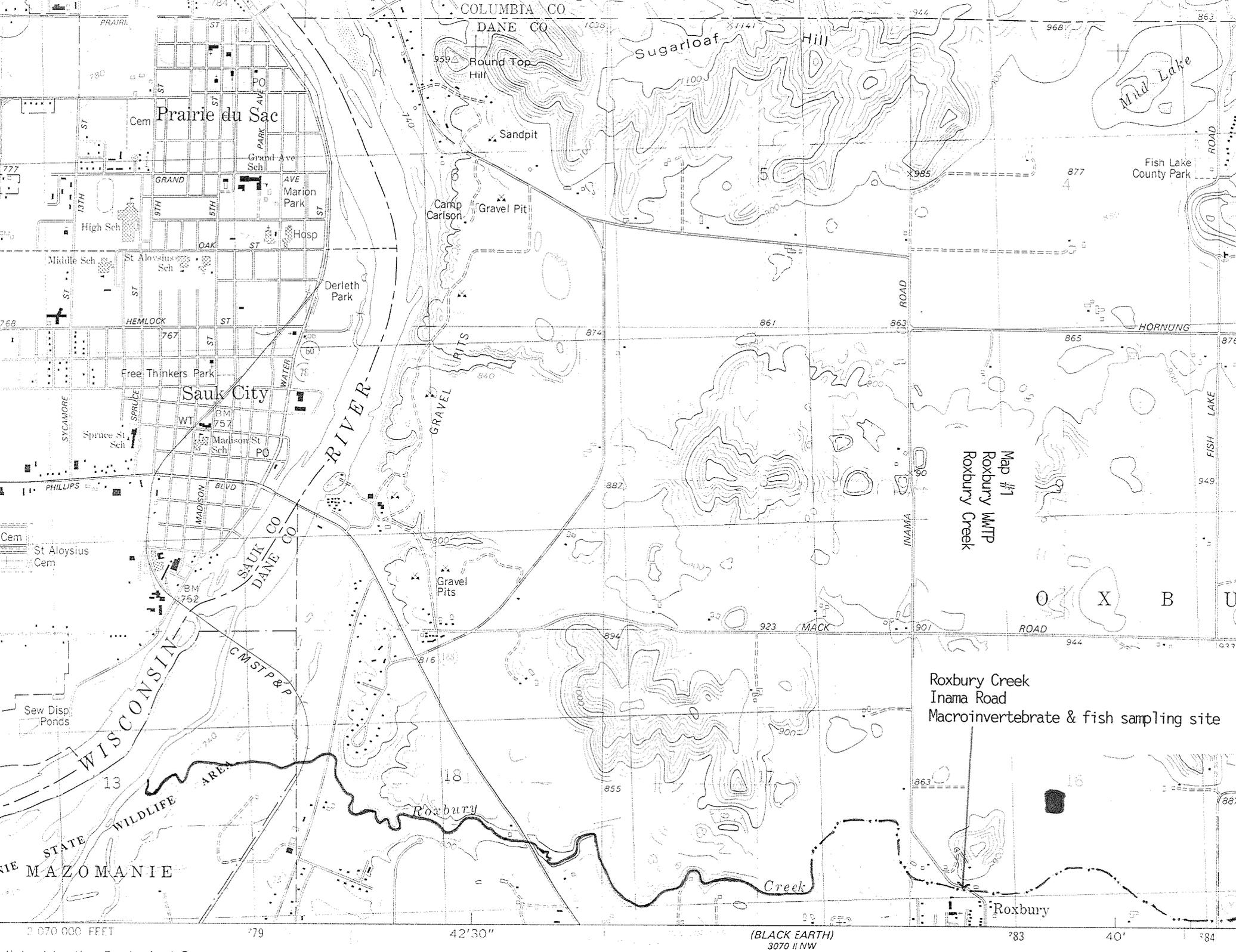
The variance section of Roxbury Creek is best characterized as having low flow, has been extensively ditched and has a lack of deep pools; mostly flat water and poor habitat. Some bank erosion is evident along with sediment entering the stream from agricultural land. The best habitat in this section of stream was below Inama Road. Some sand, gravel, and rubble were present which provided a suitable area to sample for fish and macroinvertebrates. The reach upstream of Inama Road was more typical of this stream section with the bed totally covered by silt-sediment and detritus. The organic and sediment load which originates in this section of stream is carried to the fish and aquatic life section. It undoubtedly has an effect on this part of Roxbury Creek but the stream returns to its natural meander, and has a steeper gradient which would result in better oxygenation. Stream flows also increase and the stream corridor is a little better protected. The "stream system habitat rating form" is contained in Appendix I.

## WATER QUALITY AND BIOLOGY

Currently there is no discharge from the Roxbury WWTP with the secondary pond acting as a seepage cell. Consequently, the conditions we sampled under there was no impact from a discharge.

Approximately 300' of Roxbury Creek was sampled with a backpack shocker below Inama Road on two occasions (Map #1). The first survey was in November 1983 (Table II) and the second survey was in April 1991 (Table III). The samples were pretty much dominated by tolerant minnow species; including mudminnows, creek chubs, brook stickleback, and fatheads. For the amount of stream thread surveyed fish were not very abundant.

Macroinvertebrates were sampled in a gravel-rubble riffle directly downstream of Inama Road. HBI's were also taken in November of 1983 and April of 1991. In November the HBI was 5.19 which indicated "good water quality". The April 1991 HBI was 6.35 which indicated "fair water quality". The HBI's are indicative of the conditions present in the stream during various times of the year. The November sample was taken after the open water season and the April sample was taken after snow and ice cover. Due to stream morphology, past sampling has revealed that Roxbury Cr. at Inama Rd. essentially freezes over during the winter. Consequently, the April HBI reflects the low winter time dissolved oxygen levels and tolerant macroinvertebrates. Also the area sampled is some of the better habitat available in this section of stream and should reflect the best biological inhabitants.



Prairie du Sac

Sauk City

Roxbury

Creek

Map #1  
Roxbury WTP  
Roxbury Creek

Roxbury Creek  
Inama Road  
Macroinvertebrate & fish sampling site

TABLE: II List of fish for sampling site: Downstream of Inama Rd.

DATE: 11/01/83 TwN 9N Rng 7E Sec 16 1/4 1/4 SW SW STREAM: Roxbury Cr.

Station mileage: N/A County: 13

SOURCE OF DATA: WRM GEAR: 3 EFFORT: 02

CODE	COMMON NAME	FAMILY	GENUS/SPECIES	# FISH	TOLERANCE LEVEL
K01	CENTRAL MUDMINNOW	UMBRIDAE	Umbra limi	4	Very Tolerant
M05	STONEROLLERS	CYPRINIDAE	Campostoma spp.	8	Intolerant
M14	BRASSY MINNOW	CYPRINIDAE	Hybognathus hankinsoni	2	
M46	FATHEAD MINNOW	CYPRINIDAE	Pimephales promelas	2	Very Tolerant
M50	CREEK CHUB	CYPRINIDAE	Semotilus atromaculatus	1	Tolerant
U01	BROOK STICKLEBACK	GASTEROSTEIDAE	Culaea inconstans	14	Tolerant

TABLE: III List of fish for sampling site: Downstream of Inama Rd.

DATE: 4/17/91 TwN 9N Rng 7E Sec 16 1/4 1/4 SW SW STREAM: Roxbury Cr.

Station mileage: N/A County: 13

SOURCE OF DATA: WRM GEAR: 3 EFFORT: 02

CODE	COMMON NAME	FAMILY	GENUS/SPECIES	# FISH	TOLERANCE LEVEL
K01	CENTRAL MUDMINNOW	UMBRIDAE	Umbra limi	4	Very Tolerant
M43	SOUTHERN REDBELLY DACE	CYPRINIDAE	Phoxinus erythrogaster	1	Intolerant
M46	FATHEAD MINNOW	CYPRINIDAE	Pimephales promelas	2	Very Tolerant
M50	CREEK CHUB	CYPRINIDAE	Semotilus atromaculatus	2	Tolerant
U01	BROOK STICKLEBACK	GASTEROSTEIDAE	Culaea inconstans	4	Tolerant
W05	GREEN SUNFISH	CENTRARCHIDAE	Lepomis cyanellus	1	Sport Fish

TABLE: IV. Taxonomic List of Macroinvertebrates for 831101-13-01

Date: 11/01/83 Location: Roxbury (Blums) Cr. below Inama Rd.

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>B.I. VALUE (a)</u>	<u>a x n</u>
Simulium vittatum	1	7	7
Baetis flavistriga	2	4	8
Stenacron interpunctatum	1	7	7
Calopteryx spp.	1	5	5
Dubiraphia quadrinotata	3	5	15
Dubiraphia spp. (larvae)	1	6	6
Optioservus fastiditus	1	4	4
Optioservus spp. (larvae)	31	4	124
Hydropsyche betteni	30	6	180
Cheumatopsyche spp.	17	5	85
Ceratopsyche sparna	6	1	6
Tipula spp.	2	4	8
Thienemannimyia complex	3	6	18
Natarsia spp.	1	8	8
Hyallolela azteca	2	8	16
Asellus intermedius	9	8	72
<b>TOTAL</b>	<b>111</b>		<b>569</b>

Biotic Index: 5.13; good, some organic pollution.

TABLE: V. Taxonomic List of Macroinvertebrates for 910417-13-01

Date: 4/17/91 Location: Roxbury (Blums) Cr. below Inama Rd.

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>B.I. VALUE (a)</u>	<u>a x n</u>
Simulium vittatum	55	7	385
Tipula spp.	3	4	12
Stenelmis spp. (larvae)	4	5	20
Stenelmis crenata	5	5	25
Asellus intermedius	1	8	8
Gammarus pseudolimnaeus	3	4	12
Chrysops spp.	1	6	6
Orthocladius spp.	30	6	180
<b>TOTAL</b>	<b>102</b>		<b>648</b>

Biotic Index: 6.35; fair, fairly significant organic pollution.

## WWTP

The Roxbury WWTP consists of a two cell lagoon system. The secondary pond has acted as a seepage cell with no discharge currently occurring to Roxbury Creek.

## CLASSIFICATION

Based on this review of available physical and biological data, Roxbury Creek from the outfall downstream to the north line of the SW 1/4 SE 1/4, Section 17, T9N, R7E should be reclassified to a "Limited Forage Fish Community". From this point downstream, and for the remainder of Roxbury Creek the classification should remain fish and aquatic life. This is based on the available habitat and the quality and quantity of the fish and macroinvertebrate community present.



Roxbury Creek;  
Downstream of Inama  
Road, fish and  
macroinvertebrate  
sampling area.



Roxbury Creek; Upstream  
of Inama Road.



Roxbury Creek; Upstream  
of Inama Road.



Roxbury Creek; Upstream  
of Inama Road, below  
Roxbury WWTP outfall.

APPENDIX I

Stream Rosbury Cr. Reach Location East & West of Inama Road Reach Score/Rating 223/Poor  
 County Dane Date 4/17/91 Evaluator R. Schlessner Classification LFF

Rating Item	Category			
	Excellent	Good	Fair	Poor
Watershed Erosion	No evidence of significant erosion. Stable forest or grass land. Little potential for future erosion. 8	Some erosion evident. No significant "raw" areas. Good land mgmt. practices in area. Low potential for significant erosion. 10	Moderate erosion evident. Erosion from heavy storm events obvious. Some "raw" areas. Potential for significant erosion. 14	Heavy erosion evident. Probable erosion from any run off. 16
Watershed Nonpoint Source	No evidence of significant source. Little potential for future problem. 8	Some potential sources (roads, urban area, farm fields). 10	Moderate sources (small wetlands, tile fields, urban area, intense agriculture). 14	Obvious sources (major wetland drainage, high use urban or industrial area, feed lots, impoundment). 16
Bank Erosion, Failure	No evidence of significant erosion or bank failure. Little potential for future problem. 4	Infrequent, small areas, mostly healed over. Some potential in extreme floods. 8	Moderate frequency and size. Some "raw" spots. Erosion potential during high flow. 12	Many eroded areas. "Raw" areas frequent along straight sections and bends. 20
Bank Vegetative Protection	90% plant density. Diverse trees, shrubs, grass. Plants healthy with apparently good root system. 6	70-90% density. Fewer plant species. A few barren or thin areas. Vegetation appears generally healthy. 9	50-70% density. Dominated by grass, sparse trees and shrubs. Plant types and conditions suggest poorer soil binding. 12	<50% density. Many raw areas. Thin grass, few if any trees and shrubs. 18
Lower Bank Channel Capacity	Ample for present peak flow plus some increase. Peak flow contained. W/D ratio <7. 8	Adequate. Overbank flows rare. W/D ratio 8-15. 10	Barely contains present peaks. Occasional overbank flow. W/D ratio 15-25. 12	Inadequate, overbank flow common. W/D ratio >25. 16
Lower Bank Deposition	Little or no enlargement of channel or point bars. 6	Some new increase in bar formation, mostly from coarse gravel. 9	Moderate deposition of new gravel and coarse sand on old and some new bars. 15	Heavy deposits of fine material, increased bar development. 18
Bottom Scouring and Deposition	Less than 5% of the bottom affected by scouring and deposition. 4	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools. 8	30-50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 16	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. 18
Bottom Substrate/ Available Cover	Greater than 50% rubble, gravel or other stable habitat. 2	30-50% rubble, gravel or other stable habitat. Adequate habitat. 7	10-30% rubble, gravel or other stable habitat. Habitat availability less than desirable. 17	Less than 10% rubble gravel or other stable habitat. Lack of habitat is obvious. 22
Avg. Depth Riffles and Runs	Cold >1' 0 Warm >1.5' 0	6" to 1' 6 10" to 1.5' 6	3" to 6" 18 6" to 10" 18	<3" 24 <6" 24
Avg. Depth of Pools	Cold >4' 0 Warm >5' 0	3' to 4' 6 4' to 5' 6	2' to 3' 18 3' to 4' 18	<2' 24 <3' 24
Flow, at Rep. Low Flow	Cold >2 cfs 0 Warm >5 cfs 0	1-2 cfs 6 2-5 cfs 6	.5-1 cfs 18 1-2 cfs 18	<.5 cfs 24 <1 cfs 24
Pool/Riffle, Run/Bend Ratio (distance between riffles ÷ stream width)	5-7. Variety of habitat. Deep riffles and pools. 4	7-15. Adequate depth in pools and riffles. Bends provide habitat. 8	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 16	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 20
Aesthetics	Wilderness characteristics, outstanding natural beauty. Usually wooded or un-pastured corridor. 8	High natural beauty. Trees, historic site. Some development may be visible. 10	Common setting, not offensive. Developed but uncluttered area. 14	Stream does not enhance aesthetics. Condition of stream is offensive. 16
Column Totals:	0	0	95	128

Column Scores E 0 +G 0 +F 95 +P 128 = 223 = Score

APPENDIX II

Roxbury Sanitary District #1  
Dane County

August 3, 1978

Blums Creek

The village of Roxbury has a two cell stabilization pond. Discharge to Blums Creek is infrequent and at the time of the survey the final cell was completely dry. Waste water is transferred from the lagoons to Blums Creek via an effluent pipe.

Blums Creek at this point has a  $Q_{710}$  of less than .01 cfs. The watershed has been intensively farmed which has led to the ditching and straightening of the upper portion of Blums Creek. The characteristics of the stream in this section is one of low gradient, sluggish flow, excessive turbidity and heavy siltation. The stream bed has heavy macrophyte growth consisting of rushes, sedges, cattails and potamogeton spp. Macroinvertebrates are limited and no fish were observed during the survey.

The stream remains this way until approximately the north line of the SW $\frac{1}{4}$ SE $\frac{1}{4}$ , Section 17, T. 9 N., R. 7 E. In this section the stream begins to make a morphological change. The gradient increases significantly, the substrate gradually changes to one of rock rubble, the natural meander returns and the flow begins to increase.

By the time the stream reaches Hwy. 12, water quality has significantly improved and a good population of caddis and mayflies are present.

At Hwy. 78 the flow has more than doubled and an abundance of minnows were observed. The substrate in this section is one of sand interspersed with silt and a good diversity of aquatic macrophytes were present.

Blums Creek is presently not managed as a sport fishery and probably only forage fish are present. Some spawning of northern pike and other species of fish may occur in the vicinity of the Wisconsin River.

A winter survey of the stream showed 2-2 $\frac{1}{2}$  feet of ice being present at the discharge site and at Hwy. 12. Stream flow was minimal at these two sites but at Hwy. 78 there was no ice cover and the stream had good flow.

Recommendations

From the point of discharge to the north line of the SW $\frac{1}{4}$  SE $\frac{1}{4}$ , Sec. 17, T9N, R7E, the classification should be non-continuous marginal surface waters. From this point and for the remainder of Blums Creek the classification should be continuous fish and aquatic life.

The above recommendations represent a concurrence of opinion of the stream classification team who are as follows:

George Osipoff, District Engineer  
Cliff Brynildson, Area Fish Manager  
Tom Bainbridge, District Biologist  
Roger Schlessner, Environmental Specialist

Respectfully submitted,

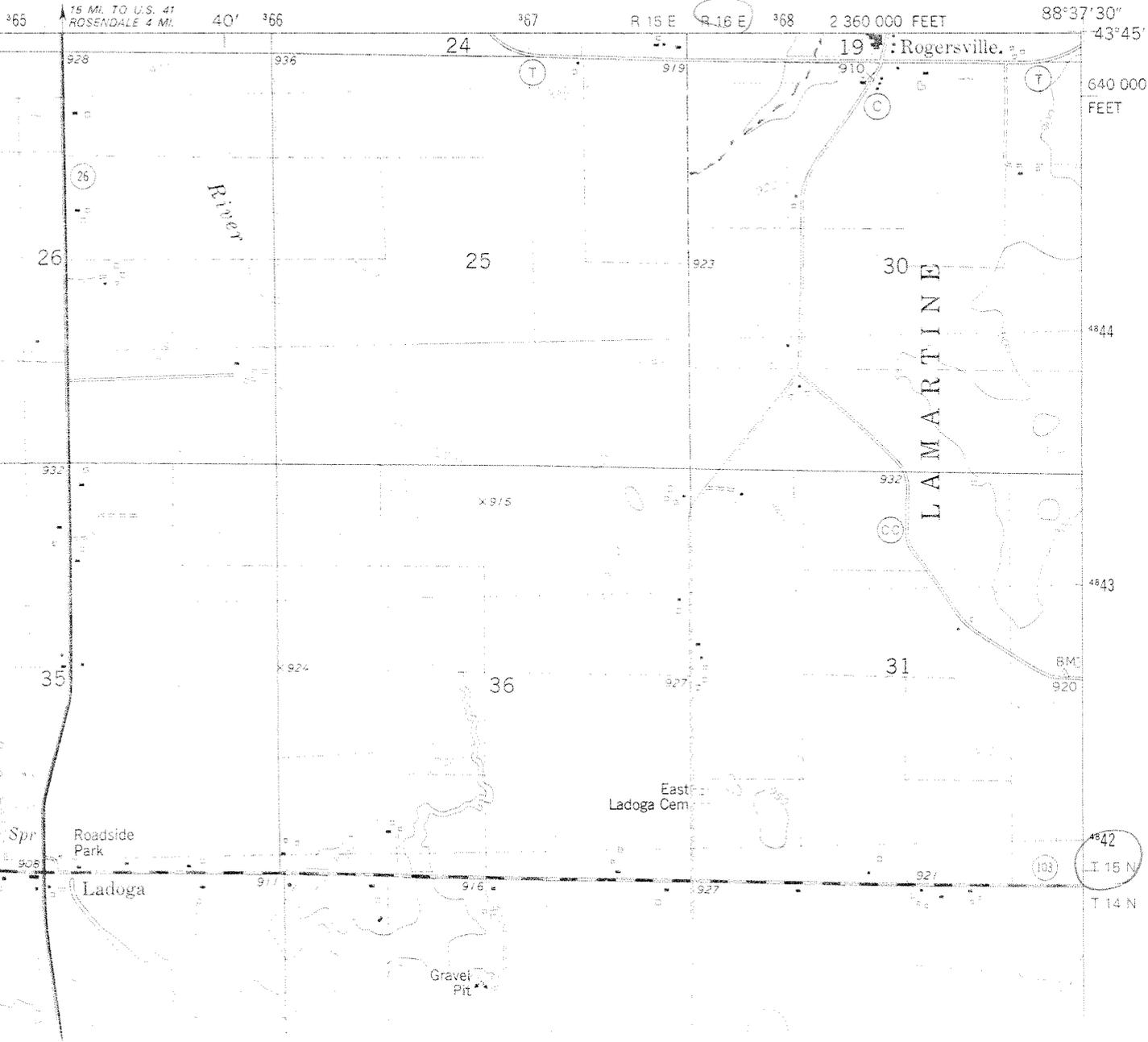
*Roger Schlessner*  
Roger Schlessner  
Water Quality Specialist

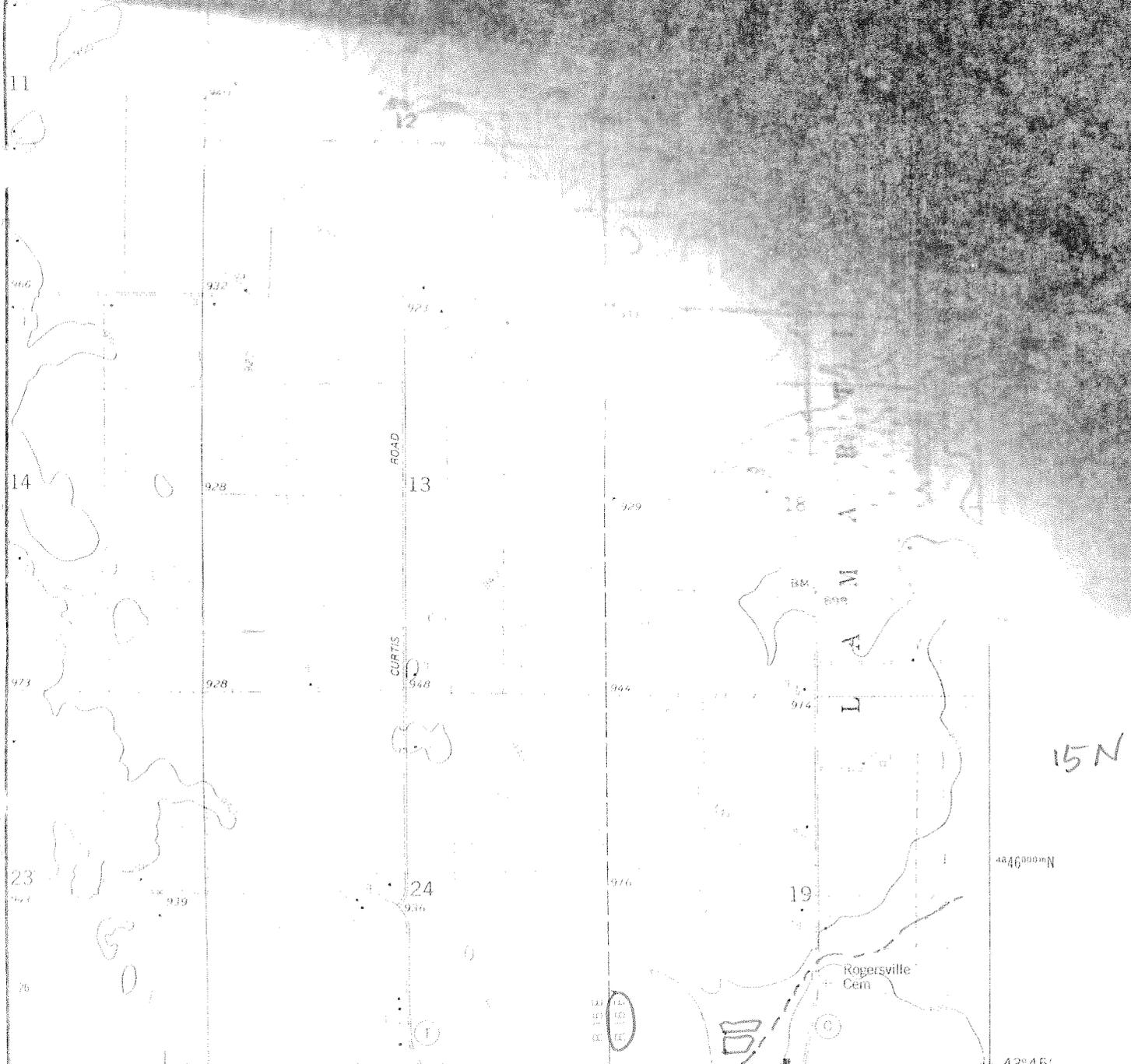
APPENDIX III

WAUPUN NORTH QUADRANGLE  
WISCONSIN  
7.5 MINUTE SERIES (TOPOGRAPHIC)

NW/4 WAUPUN 15' QUADRANGLE

3271 / SE  
(ELDORADO)





C. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting until March 31, 1989, the permittee is authorized to discharge to the dry run to Roxbury Creek, outfall serial number 001.

Samples taken in compliance with the monitoring requirements specified below shall be taken during the discharge to Roxbury Creek.

There shall be no discharge of visible or floating solids in other than trace amounts.

During any 30 consecutive days, the average effluent concentrations of BOD<sub>5</sub> and of total suspended solids shall not exceed 15% of the average influent concentrations, respectively.

EFFLUENT PARAMETERS	EFFLUENT LIMITATIONS					MONITORING REQUIREMENTS	
	Quantity-kg/day(lbs/day)		Other Limitations (Specify Units)			Sample	Sample
	Average <sup>1</sup>	Maximum	Minimum	Average	Maximum	Frequency	Type
Flow	-	-	-	-	-	Daily	Total Daily
BOD <sub>5</sub> (monthly)	1.51(3.34)	-	-	20 mg/l	-	3x Weekly	Grab <sup>2</sup>
BOD <sub>5</sub> (weekly)	2.27(5.00)	-	-	30 mg/l	-	3x Weekly	Grab <sup>2</sup>
Suspended Solids(monthly)	1.51(3.34)	-	-	20 mg/l	-	3x Weekly	Grab <sup>2</sup>
Suspended Solids (weekly)	2.27(5.00)	-	-	30 mg/l	-	3x Weekly	Grab <sup>2</sup>
pH (daily)	-	-	6.0	-	9.0	Daily	Grab
Fecal Coliforms(monthly)	-	-	-	#/100 ml	-	1x Weekly	Grab
Dissolved Oxygen(daily)	-	-	4.0 mg/l	-	-	3x Weekly	Grab <sup>2</sup>

<sup>1</sup>Based on a design flow of .020 MGD.

<sup>2</sup>If the period of discharge is less than one week, at least 3 grab samples shall be collected during the duration of the discharge.

<sup>3</sup>At such time as effluent limitations for fecal coliform and residual chlorine are finally promulgated in the Wisconsin Administrative Code, this permit may be modified to incorporate either the final limitations or interim limitations and a compliance schedule to achieve the final limitations.

<sup>4</sup>The pond contents shall be sampled prior to any discharge to assure that adequate stabilization has taken place. The Southern District Headquarters shall be notified as to the analysis results of such sampling and the proposed dates of each proposed drawdown operation.

APPENDIX IV

Chapter NR 104

INTRASTATE WATERS — USES AND  
DESIGNATED STANDARDS

NR 104.01	General (p. 33)	NR 104.07	Variances and additions applicable in the Lake Michigan district (p. 44)
NR 104.02	Surface water classifications and effluent limitations (p. 34)	NR 104.08	Variances and additions applicable in the north central district (p. 48)
NR 104.03	Classification of surface waters and antidegradation (p. 37)	NR 104.09	Variances and additions applicable in the west central district (p. 49)
NR 104.04	Provision for changes (p. 38)	NR 104.10	Variances and additions applicable in the northwest district (p. 52)
NR 104.05	Variances and additions applicable in the southern district (p. 38)		
NR 104.06	Variances and additions applicable in the southeast district (p. 41)		

Note: Chapter NR 104 as it existed on September 30, 1976 was repealed and a new chapter NR 104 was created effective October 1, 1976.

NR 104.01 General. (1) "It is . . . the goal of the state of Wisconsin that, wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish and wildlife and provides for recreation in and on the water be achieved by 1983. . . s. 147.01(1)(b), Stats. The long-range goal of Wisconsin water quality standards is, therefore, to permit the use of water resources for all lawful purposes. Surface waters which because of natural conditions are not conducive to the establishment and support of the complete hierarchy of aquatic organisms shall not be degraded below present levels, but shall be upgraded as necessary to support assigned uses. Most surface waters within the state of Wisconsin already meet or exceed the goals specified above. However, certain waters of the state may not meet these goals for the following reasons:

- (a) The presence of in-place pollutants,
- (b) Low natural streamflow,
- (c) Natural background conditions, and
- (d) Irretrievable cultural alterations.

(1m) Where it is determined that one or more of these factors may interfere with the attainment of the statutory objectives, a variance from the criteria necessary to achieve those objectives is provided.

(2) Surface waters within the boundaries of the state shall meet the standards for fish and aquatic life and recreational use with the variances and additions listed below in ss. NR 104.05 to 104.10. A system is provided within which small streams and other surface waters which cannot support high quality uses are granted a variance from the high quality criteria.

(3) Effluent limitations specified in this chapter shall be achieved by industrial, private and municipal dischargers by July 1, 1983 unless an earlier date is otherwise provided in a permit issued under s. 147.02, Stats. Municipal dischargers eligible for state or federal grant-in-aid

shall achieve the specified effluent limitations upon completion of construction or modification of facilities approved by the department of natural resources subsequent to adoption of this chapter unless otherwise provided in a permit issued under s. 147.02, Stats.

History: Cr. Register, September, 1976, No. 249, eff. 10-1-76; am. (1), Register, December, 1977, No. 264, eff. 1-1-78.

NR 104.02 Surface water classifications and effluent limitations. (1) HYDROLOGIC CLASSIFICATION. "Surface waters" as defined in s. NR 102.01(7), may be classified according to their hydraulic or hydrologic characteristics. For purposes of this chapter, surface waters will be classified by the department into one of the following categories:

(a) *Lakes or flowages*. This classification includes bodies of water whose current is more or less stagnant or which lacks a unidirectional current.

(b) *Diffused surface waters*. This classification includes any water from rains, intermittent springs or melting snow which flows on the land surface, through ravines, etc., which are usually dry except in times of runoff. This category does not include waters at the land surface in the vicinity of agricultural or wastewater irrigation disposal systems.

(c) *Wetlands*. This classification includes areas where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which have soils indicative of wet conditions.

(d) *Wastewater effluent channels*. This classification includes discharge conveyances constructed primarily for the purpose of transporting wastes from a facility to a point of discharge. Drainage ditches (including those established under ch. 88, Stats.) constructed primarily for the purposes of relieving excess waters on agricultural lands shall not be construed as effluent channels. Modifications made to natural watercourses receiving wastewater effluents for the purpose of increasing or enhancing the natural flow characteristics of the stream shall not be classified as effluent channels.

(e) *Noncontinuous streams*. This classification includes watercourses which have a defined stream channel, but have a natural 7-day  $Q_{\cong}$  flow of less than 0.1 cfs and do not exhibit characteristics of being perpetually wet without wastewater discharges.

(f) *Continuous streams*. This classification includes watercourses which have a natural 7-day  $Q_{\cong}$  flow of greater than 0.1 cfs or which exhibit characteristics of a perpetually wet environment, are generally capable of supporting a diverse aquatic biota and flow in a defined stream channel.

Note: The application of this classification system is not dependent on the the navigability properties of the watercourse, but is dependent upon the quantity-quality relationships of the surface water.

(2) WATER QUALITY CLASSIFICATION. (a) Whenever the goals as specified in s. 147.01(1)(b), Stats., cannot be attained because of conditions enumerated in s. NR 104.01(1), a variance may be provided. Variances from a specific water quality criteria may be given in s. NR 104.05 et. seq. or a variance under one of the categories provided in this chapter may be specified.

Register, October, 1985, No. 358

(b) Practices attributable to municipal, industrial, commercial, domestic, agricultural, land development, or other activities shall be controlled so that waters, regardless of their hydrologic and water quality classifications meet the general aesthetic and acute toxicity conditions in s. NR 102.02(1).

(3) VARIANCE CATEGORIES. (a) Surface waters not supporting a balanced aquatic community (intermediate aquatic life):

1. Applicability. This category of variance may be applied to either the continuous or noncontinuous stream hydrologic classification.

2. Surface water criteria. The following water quality criteria shall be met in all surface waters included in this variance category:

a. Dissolved oxygen shall not be less than 3 mg/l.

b. Ammonia nitrogen (as N) at all points in the receiving water shall not be greater than 3 mg/l during warm temperature conditions nor greater than 6 mg/l during cold temperatures to minimize the zone of toxicity and to reduce dissolved oxygen depletion caused by oxidation of the ammonia.

c. The pH shall be within the range of 6.0 to 9.0.

d. Other substances may not exceed concentrations determined in accordance with s. NR 102.02(1).

3. Effluent criteria. a. The effluent limitations determined necessary to meet the surface water criteria listed above are enumerated in table 1.

Parameter	Monthly Average (mg/l)	Daily	Weekly Average (mg/l)	Other (mg/l)
		Maximum (mg/1)		
BOD <sub>5</sub>	15	30	-	-
Total Suspended Solids	20	30	-	-
NH <sub>3</sub> -N (May-October)	-	-	3	-
NH <sub>3</sub> -N (November-April)	-	-	6	-
Dissolved Oxygen	-	-	-	4 (minimum)

b. Unless otherwise specified in table 1 above, effluent limitations for sewage treatment works shall be as adopted in ch. NR 210.

c. In addition to the effluent limitations enumerated in table 1 above, effluent limitations for these and any other substance necessary to protect assigned uses shall be met.

(b) Marginal surface waters: 1. Applicability. This variance category may be applied to the continuous or noncontinuous stream hydrologic classification, except that it shall be applied to all surface waters classified as effluent channel, wetland or diffuse surface water.

2. Surface water criteria. The following surface water quality criteria shall be met in all surface waters included in this variance category:

a. Dissolved oxygen shall not be less than 1 mg/l.

b. The pH shall be within the range of 6.0 to 9.0.

c. Other substances may not exceed concentrations determined in accordance with s. NR 102.02(1).

3. Effluent criteria. a. The effluent limitations determined necessary to meet the surface water criteria listed above are enumerated in table 2.

Parameter	Table 2		Other (mg/l)
	Monthly Average (mg/l)	Weekly Average (mg/l)	
BOD <sub>5</sub>	20	30	-
Total Suspended Solids	20	30	-
Dissolved Oxygen	-	-	4 (minimum)

b. Unless otherwise specified in table 2 above, effluent limitations for sewage treatment works shall be as adopted in ch. NR 210.

c. In addition to the effluent limitations enumerated in table 2 above, effluent limitations for these and any other substance necessary to protect assigned uses shall be met.

(4) OTHER CLASSIFICATIONS AND EFFLUENT CRITERIA. (a) *Surface waters significant to the environmental integrity of the state or region.* Under all hydrologic categories, the department reserves the right to require other effluent limitations, including allocation of wasteloads for organic material, toxicants and chlorine residuals if it is determined that the specified surface water is important to the overall environmental integrity of the area. In waters identified as trout streams, located in scientific areas or wild and scenic areas, providing endangered species habitat or of high recreational potential, effluent criteria will be evaluated on a case-by-case basis.

(b) *Surface waters classified for fish and aquatic life.* 1. Streams. Where flowing streams or rivers are specified to achieve fish and aquatic life criteria, wasteload allocation for organic material, toxicants and chlorine residuals shall determine effluent criteria necessary to achieve that standard.

2. Lakes and flowages. Effluent characteristics for discharges to lakes or flowages shall be based upon an evaluation of water quality necessary to protect fish and aquatic life taking into account mixing zone and nutrient removal criteria.

3. Minimum effluent criteria. If it can be reasonably demonstrated that the quality of the surface water is independent of a wastewater discharge, effluent limitations established under ss. 147.04 and 147.06, Stats., shall apply.

(c) *Wastewater treatment lagoons.* Effluents from fill-and-draw wastewater treatment lagoons or domestic waste stabilization ponds discharging to waters receiving a variance in this chapter may be permitted to vary from the limitations specified in table 1 or 2 provided the following conditions are met:

1. The discharge occurs only during the spring and fall of the year when the flow in the receiving water is normally high, and the temperature is low. The rate of discharge shall not exceed that specified in a permit under s. 147.02, Stats., or where no rate is indicated, the allowable discharge quantities shall be determined by the department based upon current evaluation of the receiving water.

2. In lieu of the previous conditions, the discharge from a fill-and-draw lagoon may occur at any time provided the rate does not exceed the assimilative capacity of the receiving water as specified in a permit under s. 147.02, Stats.

3. The dissolved oxygen in the effluent is maintained at a level greater than or equal to 4 mg/l, and the permitted rate of discharge shall be such that the dissolved oxygen and ammonia nitrogen criteria necessary to sustain fish and aquatic life are maintained in the stream during the period of discharge.

4. The effluent limitations do not exceed those established under ss. 147.04 and 147.06, Stats.

(5) CHANGES IN CLASSIFICATION. Surface waters which exhibit changing hydrologic and quality characteristics shall be classified accordingly. Effluent criteria for upstream discharges shall be based upon the most critical downstream classification and shall be specified by the department either on the basis of justified inference or by the application of a wasteload allocation analysis. Any subsequent changes in a stream's morphology or potential may necessitate the reevaluation of the classification.

History: Cr. Register, September, 1976, No. 249, eff. 10-1-76; am. Tables 1 and 2, (2), (3) (a) 2a and d, (3) (b) 2a and c, (4) (c), Register, December, 1977, No. 264, eff. 1-1-78; am. (3) (a) 2a, Register, June, 1978, No. 270, eff. 7-1-78; am. (1) (c), Register, June, 1984, No. 342, eff. 2-1-84; r. (3) (a) 2. b. to d., (b) 2. b. and c., renum. (3) (a) 2. e. to g. and (3) (b) 2. d. and e. to be (3) (a) 2. b. to d. and (3) (b) 2. b. and c. and am (3) (a) 2. g. and (3) (b) 2. c., am. (3) (a) 3. a. and (3) (b) 3. a., Register, October, 1986, No. 370, eff. 11-1-86.

NR 104.03 Classification of surface waters and antidegradation. In no case shall the effluent criteria specified herein cause degradation of surface water quality below present levels. Surface waters which, because of their hydrologic classification, are permitted to receive a new effluent of a quality specified in NR 104.02 shall not receive such effluent unless it has been affirmatively demonstrated to the department that such degradation is necessary to protect the public health or to maintain or restore the environmental integrity of a higher value resource. In no case shall a new effluent interfere with or become injurious to any assigned uses made of or presently possible in any surface water.

History: Cr. Register, September, 1976, No. 249, eff. 10-1-76; am. Register, December, 1977, No. 264, eff. 1-1-78.

NR 104.04 Provision for changes. The surface waters specified in this chapter are not intended to be an exclusive listing nor do the specified effluent criteria purport to meet the 1983 water quality goals set forth in ch. 147, Stats. Additions to or deletions from these listings may be made based upon the accumulation of information necessary to make such determination and in accordance with the requirements of ch. 227, Stats.

History: Cr. Register, September, 1976, No. 249, eff. 10-1-76.

NR 104.05 Variances and additions applicable in the southern district. Subject to the provision of NR 104.04, intrastate surface waters in the southern district counties of Columbia, Dane, Dodge, Grant, Green, Iowa, Jefferson, Lafayette, Richland, Rock and Sauk shall meet the criteria for fish and aquatic life and recreational use with exceptions and additions as follows:

Register, October, 1986, No. 370

(1) ADDITION. The public water supply standard shall be met on the Wisconsin river in section 8, township 10 north, range 7 east.

(2) VARIANCE. Surface waters in the southern district subject to a variance under NR 104.02(3) are listed in table 3.

TABLE 3  
SOUTHERN DISTRICT

Surface Water (Facility Affected)	Reach Description	Hydrologic Classification	Applicable Criteria (1)	Effluent Limitations (2)
1. Goose Lake Tributary (Arlington)	Tributary upstream from Goose Lake	Noncontinuous	II	Effluent limitations to be determined
2. Tributary - East Branch Pecatonica River (Barneveld)	From the Barneveld STP downstream to the East Branch Pecatonica River	Noncontinuous	II	B
3. Williams Creek (Blue Mounds)	From the Blue Mounds STP downstream to the east line of Sec. 14, T6N, R5E	Noncontinuous	I	A
4. Sanders Creek (Boscobel)	From the Boscobel STP downstream to the Wisconsin River	Continuous	I	A
5. Allen Creek (Brooklyn)	Upstream from Butts Corner Road	Continuous	I	A
6. Kummel Creek (Brownsville)	From Brownsville STP downstream to CTH "HH"	Noncontinuous	I	A
7. Spring Brook and Tributary (Clinton)	Tributary from the Clinton STP to Spring Brook	Effluent ditch	II	B
8. Tributary - Dead Creek (Clyman)	Spring Brook in Clinton Township	Continuous	II	NA
9. West Branch Pecatonica River (Cobb)	Tributary from Clyman STP downstream to Dead Creek	Noncontinuous	II	B
10. Door Creek (Cottage Grove)	From the Cobb STP downstream to confluence with an unnamed tributary NE¼, NW¼, Sec. 2, T5N, R1E.	Continuous	I	A
11. Coon Branch (Cuba City)	Door Creek upstream from STH 12 & 18	Noncontinuous	I	A
	From STH 12 & 18 downstream to Lake Kegonsa	Continuous	I	NA
	Upstream from westerly tributary approximately 1 mile above STH "11"	Noncontinuous	II	B
	Downstream from above tributary to confluence with Galena River	Continuous	I	NA
12. Mud Creek and Tributary (Deerfield)	Tributary from Deerfield STP to confluence with Mud Creek	Effluent ditch	II	B
	Mud Creek from above tributary downstream to confluence with Koshkonong Creek	Continuous	I	

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13. Indian Creek and Tributary (Dickeyville)	Tributary from Dickeyville STP to confluence with Indian Creek	Noncontinuous	II	NA
	Indian Creek from above tributary downstream to confluence with Platte River	Continuous	I	A
14. Dodge Branch (Dodgeville)	Upstream from a point approximately 3,500 feet downstream from STH "191"	Noncontinuous	I	A
15. Tributary - North Branch Crawfish River (Fall River)	Tributary from the Fall River STP downstream to the North Branch Crawfish River	Noncontinuous	II	Effluent limitations to be determined
16. Gregory Branch (Fennimore)	Upstream from STH "61"	Continuous	I	A
17. Tributary - Rock River (Hidden Meadows Mobile Home Park)	Tributary from the Hidden Meadows Mobile Park STP discharge downstream to the Rock River	Noncontinuous	II	B
18. Big Spring Branch (Highland)	Upstream from the North line of Sec. 19, T7N, R1E	Noncontinuous	I	A
19. Pedler Creek (Iowa Co. Nursing Home)	From the Iowa Co. Nursing Home STP downstream to the confluence with an unnamed tributary, SE¼, SE¼, Sec. 34, T6N, R2E	Noncontinuous	I	A
20. Tributary - Wildcat Creek (Iron Ridge)	From the Iron Ridge STP downstream to Wildcat Creek	Noncontinuous	II	B
21. Tributary & Rock River Tributary  (Ixonia San. Dist.)	From the Ixonia San. Dist. STP downstream to the juncture with the Rock River Tributary	Noncontinuous	II	B
	Rock River Tributary from above tributary to confluence with Rock River	Continuous	II	NA
22. Tributary - Menominee River (Jamestown San. Dist. #2)	From Jamestown San. Dist. #2 STP to the Menominee River	Diffused surface water	II	B
23. Dead Creek (Juneau)	Upstream from CTH "M"	Effluent ditch	II	B
	From CHT "M" to St. Helena Rd.	Continuous	I	NA
24. Sinnipee Creek (Kieler San. Dist. #1)	From Kieler lagoon outfall to Bluff Road	Continuous	I	A
25. Rock Creek (Lake Mills)	From the Lake Mills STP downstream to CTH "V"	Noncontinuous	I	A
	From CTH "V" to Harper's Mill Pond	Continuous	I	NA
26. Tributary - Pigeon Creek (Lancaster)	Tributary from Lancaster STP downstream to south line of section 10	Continuous	II	Effluent limitations to be determined
	Tributary from above point downstream to confluence with Pigeon Creek	Continuous	I	determined
27. Tributary - Baker Creek (Lebanon San. Dist.)	From Lebanon STP downstream to Baker Creek	Noncontinuous	II	B
28. Little Platte River (Livingston)	From Livingston STP downstream to New California Road	Noncontinuous	I	A
29. Tributary-East Branch Rock River (Lomira)	Tributary upstream from confluence with East Branch Rock River.	Noncontinuous	I	A
30. (Madison Metro Sewerage Commission)	From the STP outfall aerator to the Oregon Branch	Effluent ditch	II	Effluent limitations to be determined

31. Brewery (Furnance) Creek (Mineral Point)	Brewery Creek upstream from confluence with Mineral Point Branch	Continuous	II	B (Note: the above limitation shall remain in effect until significant nonpoint source problems can be corrected)
32. Tributary - Blue River (Montfort)	From the Montfort STP downstream to the Blue River	Continuous	I	A
33. Little Grant River (Mount Hope)	From the Mt. Hope STP downstream to the west boundary of Sec. 10, T5N, R4W	Noncontinuous	I	A
34. West Branch Sugar River (Mt. Horeb)	From Mt. Horeb STP downstream to CTH "JG".	Continuous	I	A
35. Tributary - Austin Branch (Orchard Manor)	Drainage from Orchard Manor outfall to Austin Branch	Diffused surface waters	II	Effluent limitations to be determined
36. Oregon Branch - Badfish Creek (Oregon)	From the Oregon outfall downstream to juncture with the Madison Met effluent ditch	Noncontinuous	II	Effluent limitations to be determined
	From this point downstream to CTH "A"	Continuous	I	
37. Swan Creek and Tributary (Orfordville)	Tributary from Orfordville STP outfall to Swan Creek.	Effluent ditch	II	NA
	Swan Creek from confluence with above tributary to Dicky Road.	Noncontinuous	I	A
38. Tributary - Blake Fork (Patch Grove)	Tributary from the Patch Grove STP downstream to Blake Fork	Noncontinuous	I	A
39. Tributary - Honey Creek (Plain)	From the Plain STP downstream to Honey Creek	Continuous	I	Effluent limitations to be determined
40. Randolph Branch - Tributary Beaver Creek (Randolph)	From the Randolph STP downstream to Beaver Creek Tributary	Noncontinuous	II	Effluent limitations to be determined
	Tributary to Beaver Creek upstream from Beaver Creek	Noncontinuous	I	A
41. Tributary-Beaver Dam River (Reeseville)	Tributary from Reeseville STP to confluence with Beaver Dam River	Noncontinuous	I	A
42. Conley - Smith Creek (Ridgeway)	From the Ridgeway STP downstream to the south boundary of Sec. 14, T6N, R4E	Noncontinuous	I	Effluent limitations to be determined
43. Tributary - Rocky Run Creek (Rio)	From the Rio STP downstream to Rocky Run Creek	Noncontinuous	II	B
44. Tributary - Narrows Creek (Sauk Co. Health Care Center)	From the Sauk County Health Care Center STP downstream to Narrows Creek	Noncontinuous	I	A
45. Duck Creek and Tributary (Sullivan)	Tributary from the Sullivan STP to Duck Creek	Effluent channel	II	Effluent limitations to be determined
	Duck Creek from the effluent ditch downstream juncture with northerly drainage ditch in Sec. 5, T6N, R16E	Noncontinuous	I	
46. Koshkonong Creek (Sun Prairie)	Koshkonong Creek upstream from first bridge above Sun Prairie STP	Noncontinuous	II	Effluent limitations to be determined
	Koshkonong Creek from above location to CTH "T".	Continuous	II	
47. Badger Mill Creek (Verona)	Badger Mill Creek from road at Verona STP downstream to STH "69".	Continuous	I	A

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48. Tributary - Mur- Tributary from Oakwood State Camp Noncontinuous II B  
 phy Creek (Wis- STP downstream to Murphy Creek  
 consin  
 Department of  
 Health & Social  
 Services - Oak-  
 wood State  
 Camp)

- (1) Criteria I requires the maintenance of surface water criteria specified in NR 104.02(3)(a)2.  
 Criteria II requires the maintenance of surface water criteria specified in NR 104.02(3)(b)2.  
 (2) Effluent limitation A requires those limits specified in NR 104.02(3)(a)3.  
 Effluent limitation B requires those limits specified in NR 104.02(3)(b)3.  
 NA—Not applicable

History: Cr. Register, September, 1976, No. 249, eff. 10-1-76; am. table 3, r. (3), Register, December, 1977, No. 264, eff. 1-1-78.

NR 104.06 Variances and additions applicable in the southeast district. Subject to the provisions of NR 104.04, intrastate surface waters in the southeast district counties of Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington and Waukesha shall meet the criteria for fish and aquatic life and recreational use with exceptions and additions as follows.

(1) VARIANCE. Surface waters in the southeast district subject to a variance under NR 104.02(3) are listed in table 4.

(2) OTHER VARIANCES. (a) The following surface waters in the southeast district shall meet the standards for fish and aquatic life except that the dissolved oxygen shall not be lowered to less than 2 mg/l at any time, nor shall the membrane filter fecal coliform count exceed 1,000 per 100 ml as a monthly geometric mean based on not less than 5 samples per month nor exceed 2,000 per 100 ml in more than 10% of all samples during any month:

1. Underwood creek in Milwaukee and Waukesha counties below Juneau boulevard.
2. Barnes creek in Kenosha county.
3. Pike creek, a tributary of Pike river, in Kenosha county.
4. Pike river in Racine county.
5. Indian creek in Milwaukee county.
6. Honey creek in Milwaukee county.
7. Menomonee river in Milwaukee county below the confluence with Honey creek.
8. Kinnickinnic river in Milwaukee county.
9. Lincoln creek in Milwaukee county.

(b) The following surface waters in the southeast district shall meet the standards for fish and aquatic life except that the dissolved oxygen shall not be lowered to less than 2 mg/l at any time, nor shall the membrane filter fecal coliform count exceed 1,000 per 100 ml as a monthly geometric mean based on not less than 5 samples per month nor exceed 89DF at any time at the edge of the mixing zones established by the department under s. NR 102.03 (4):

**Region** SCR **County** Dane **Report Date** 4/1991 **Classification** LFF  
**Water Body:** Roxbury Creek  
**Discharger:** Roxbury 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)
- Chemical Data (temp, D.O., etc.)
- Physical Data (flow, depth, etc.)
- Habitat Description
- Site Description/Map
- Other: slides, photos

**Historical Reports in file:**

- 4/1991 - Roger Schlessler
- 8/3/78 - Roger Schlessler

**Additional Comments/How to improve report:**

- no strong justification for LFF - is it flow? Check w/region.
- data is good.

Roxbury Sanitary District #1  
Dane County

August 3, 1978

*Roxbury*  
Blums Creek

The village of *Roxbury* has a two cell stabilization pond. Discharge to ~~Blums~~ *Roxbury* Creek is infrequent and at the time of the survey the final cell was completely dry. Waste water is transferred from the lagoons to Blums Creek via an effluent pipe.

Blums Creek at this point has a  $Q_{7-10}$  of less than .01 cfs. The watershed has been intensively farmed which has led to the ditching and straightening of the upper portion of Blums Creek. The characteristics of the stream in this section is one of low gradient, sluggish flow, excessive turbidity and heavy siltation. The stream bed has heavy macrophyte growth consisting of rushes, sedges, cattails and potamogeton spp. Macroinvertebrates are limited and no fish were observed during the survey.

The stream remains this way until approximately the north line of the SW $\frac{1}{4}$ SE $\frac{1}{4}$ , Section 17, T. 9 N., R. 7 E. In this section the stream begins to make a morphological change. The gradient increases significantly, the substrate gradually changes to one of rock rubble, the natural meander returns and the flow begins to increase.

By the time the stream reaches Hwy. 12, water quality has significantly improved and a good population of caddis and mayflies are present.

At Hwy. 78 the flow has more than doubled and an abundance of minnows were observed. The substrate in this section is one of sand interspersed with silt and a good diversity of aquatic macrophytes were present.

Blums Creek is presently not managed as a sport fishery and probably only forage fish are present. Some spawning of northern pike and other species of fish may occur in the vicinity of the Wisconsin River.

A winter survey of the stream showed 2-2 $\frac{1}{2}$  feet of ice being present at the discharge site and at Hwy. 12. Stream flow was minimal at these two sites but at Hwy. 78 there was no ice cover and the stream had good flow.

#### Recommendations

From the point of discharge to the north line of the SW $\frac{1}{4}$  SE $\frac{1}{4}$ , Sec. 17, T9N, R7E, the classification should be non-continuous marginal surface waters. From this point and for the remainder of Blums Creek the classification should be continuous fish and aquatic life.

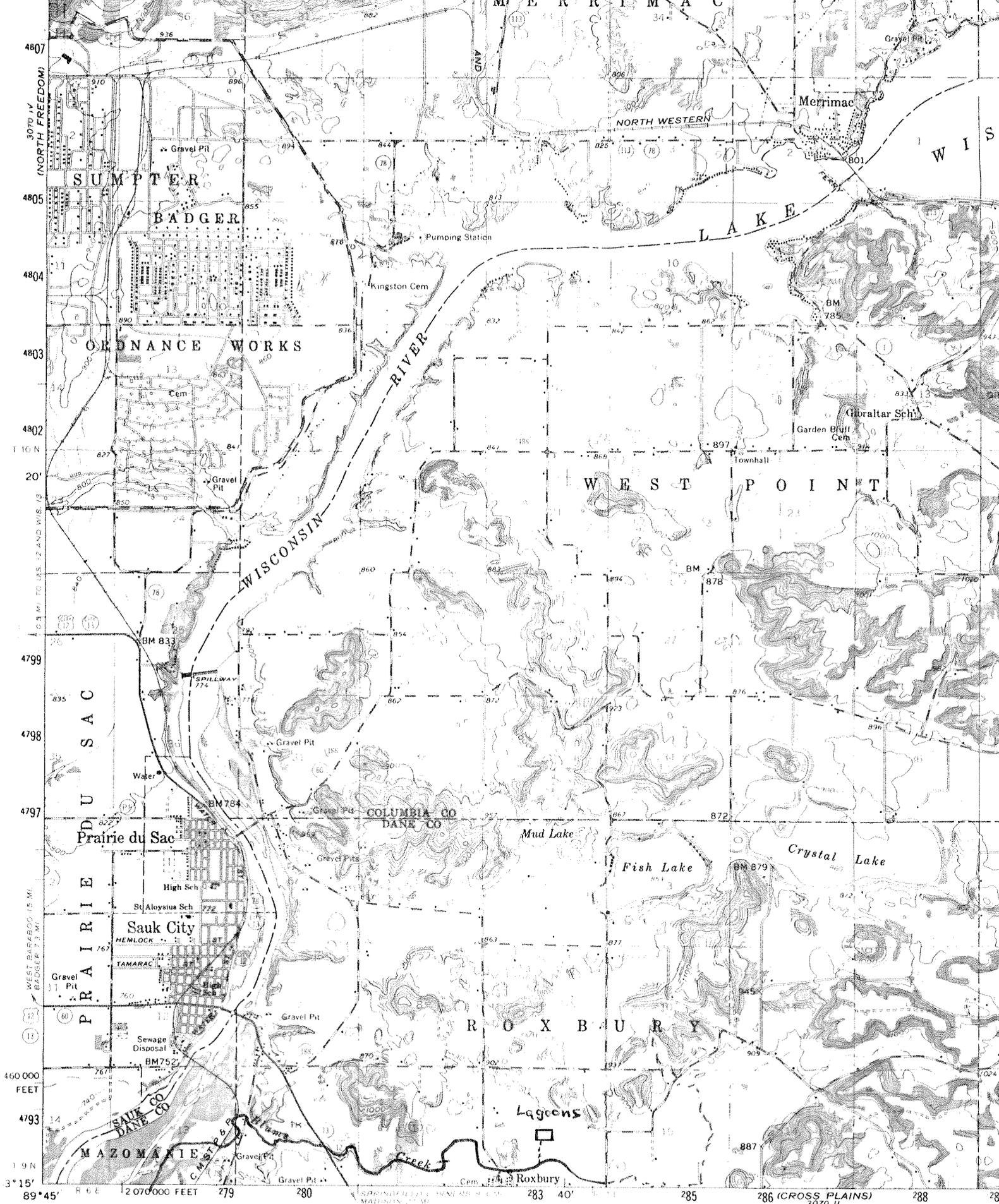
The above recommendations represent a concurrence of opinion of the stream classification team who are as follows:

George Osipoff, District Engineer  
Cliff Brynildson, Area Fish Manager  
Tom Bainbridge, District Biologist  
Roger Schlessler, Environmental Specialist

Respectfully submitted,

*Roger Schlessler*

Roger Schlessler  
Water Quality Specialist



Mapped, edited, and published by the Geological Survey in cooperation with State of Wisconsin agencies

Control by USGS and USC&GS

Topography from aerial photographs by photogrammetric methods  
Aerial photographs taken 1956 and 1957; check 1959

Polyconic projection. 1927 North American datum  
10,000-foot grid based on Wisconsin coordinate system



CONTOUR INTERVAL 20 FEET  
DATUM IS MEAN SEA LEVEL