

2004 Baseline Survey of North Fork Juda Branch

Lower Sugar River Watershed (SP11), Sugar/Pecatonica Basin

Green County

September 20, 2004

Jim Amrhein, Watershed Specialist
South Central Region

The North Fork Juda Branch is a 3 mile long stream that joins Juda Branch in the Village of Juda. It is on the state's list of impaired waters and has been historically affected by agricultural nonpoint source pollution and wastewater discharge from Sylvester Whey. While it has the potential to support a diverse forage fishery, it currently only contains a limited number of forage species.

On September 20, 2004 a baseline survey was conducted on the North Fork Juda Branch and Juda Branch. Two sites were surveyed on North Fork Juda Branch: Site 1 was a 132 meter stretch upstream from County Highway S; Site 2 was a 148 meter stretch upstream from the Sylvester Whey effluent ditch; and Site 3 was a 116 meter stretch upstream from CTH S. A habitat and macroinvertebrate evaluation was conducted at Site 1, however the results of these surveys are not yet available. Each fish survey was conducted with a DC backpack shocker. All fish species were collected in order to determine an Index of Biotic Integrity (IBI).

Site 1 – Upstream CTH S

This site is upstream from CTH S and downstream of the Sylvester Whey effluent ditch. The stream is channelized and averages 3.4 meters wide and averages about 0.2 meters deep although the deepest water is within the first 50 meters from the bridge. Upstream from this point, the stream enters a box elder corridor and is fairly wide (3-4 meters) and very shallow (0.1 meters deep). The stream banks are fairly well vegetated in the first 50 meters because they are residential lots where the canopy is open and sunlight aids growth of plants. Beyond that point, the box elders line the stream. The banks are 0.3-1.3 meters tall and raw, with many trees falling into the water. The bottom was mostly silt and clay. The following fish species were collected:

Species	Number
Johnny Darter	30
Creek Chub	2
Brook Stickleback	1
White Sucker	2
Fathead Minnow	1

It should be noted that all of the fish were collected in the first 40 meters of stream, with no fish collected the balance of the segment (another 92 meters). The warm-water IBI was 30 (fair).

Site 2 – Upstream from Sylvester Whey Effluent Ditch

This section is channelized and averages about 2 meters wide and about 0.1 meters deep. It flows through a box elder corridor that is surrounded mostly by row crops in which the buffer varies between 0.5 and 3 meters. Stream banks range from 0.3 to 1.5 meters high and are mostly raw and very susceptible to flashy flows. The bottom is mostly silt but actually has about 20% riffle areas with a gravel and rubble/cobble bottom. There was a high temperature differential between the stream at this point (56°F) and the effluent ditch (80°F). A white, milky substance was noted at the junction of the stream and effluent ditch. The following fish species were collected:

Species	Number
Creek Chub	8
Johnny Darter	5
Fathead Minnow	1

An IBI was not calculated for this section as the minimum number of fish was not found.

Site 3 – Juda Branch, Upstream from CTH S

This stream section was sampled for comparison sake with North Fork Juda Branch. It should be noted that the riparian corridor for these two streams differs greatly in that this portion of the Juda Branch flows through a well buffered wetland area. This section is channelized, but is narrow (1.5 meters wide) and deep (0.6 meters). The bank height varies between 0 and 0.3 meters high and is well vegetated. There is good overhanging vegetation. The bottom is mostly silt up to 0.5 meters deep likely from the heavy agriculture in upper portions of this stream (upstream from CTH KS) and the decomposing vegetation from the wetland area. The following fish species were collected:

Species	Number
White Sucker	27
Creek Chub	6
Johnny Darter	8
Green Sunfish	1
Brook Stickleback	1

Additionally, three brown trout were collected: 13.5", 16.5", 18.0"

The warm-water IBI is 23 (poor). The coldwater IBI is 0 (very poor). It should be noted that the catch rate would have been better if using a stream shocker as many fish were able to elude the backpack shocker.

Summary

The fish assemblage reflects the highly degraded condition of the North Fork Juda Branch. In addition to the poor habitat conditions, it is very likely the fishery is being impacted by point source discharges from Sylvester Whey. An attempt was made to obtain a macroinvertebrate sample from downstream of the effluent discharge: however, a sample of a sufficient number of organisms could not be found. A few *Gammarus* and leaches were noted along with a few gastropods, but the total number was less than 10. Sorting the sample was difficult due to whey product in the benthos. Heavy row crops in the area, with very little buffer and poor bank vegetation make this stream wide and shallow. Box elders prevent much in the way of primary production and add to erosion of the banks.

Juda Branch holds more promise in that the lower area runs though a well buffered wetland area. Depth and overhanging vegetation provide habitat for fish. Still, it was a surprise to find 3 large brown trout in this section. Since Juda Branch is not stocked, these fish are likely coming from Sylvester Creek or the Sugar River. There were no other cold/cool water indicators save for 1 brook stickleback. The bottom was mostly silt, making trout reproduction unlikely. If sediment sources from upstream could be controlled, this small stream might hold a fair number of gamefish.

Management Recommendations

Employ agricultural best management practices in the watershed to mitigate nonpoint source pollution. (Both streams).

Remove box elders from North Fork Juda Branch, slope and stabilize the banks.

Work with wastewater to control discharges from Sylvester Whey to the North Fork Juda Branch.

Conduct another fisheries assessment of Juda Branch using a stream shocker.

Deploy temperature monitoring devices in Juda Branch to determine thermal regime of this stream.

NORTH FORK JUDA BRANCH

AND

JUDA BRANCH AT JUDA

GREEN COUNTY

POINT SOURCE IMPACT STUDY

SYLVESTER WREY

MARCH, 1991

ROGER SCHLESSER, DAVE MARSHALL

SOUTHERN DISTRICT

BUREAU OF WATER RESOURCES MANAGEMENT
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

POINT SOURCE IMPACT STUDY ABOVE AND BELOW SYLVESTER WHEY
ON THE NORTH FORK JUDA BRANCH AND JUDA BRANCH

Conducted by: Roger Schlessler, Dave Marshall, Bob Last, and Steve Fix

March 22, 1991

SUMMARY

On April 10, 1989, a pre-operational point source impact study was conducted on both the North Fork Juda Branch and Juda Branch to characterize water quality conditions prior to wastewater discharge. At that time benthic aquatic invertebrates indicated good to fair water quality at five locations sampled based on the Hilsenhoff Biotic Index. Even though the water quality was good, the representative fish community was dominated by species tolerant of poor habitat conditions; the result of nonpoint sedimentation, stream channelization and low stream flows.

On March 14, 1991, a post-operational impact study was performed on the streams using the same methodology and equipment. Based on aquatic invertebrate samples collected, and calculated Hilsenhoff Biotic Indices, representative species indicated substantial water quality degradation below the discharge point. Consistent with the pre-operational study, reference sites above the discharge on the North Fork Juda Branch and Juda Branch (sites 01 and 05) contained invertebrates intolerant of organic pollution and indicated good water quality.

At the three stations below the point of discharge, invertebrates indicated "very poor water quality" and "severe organic pollution". The entire downstream reach was covered with varying amounts of organic material or sludge which displayed

a strong odor. The largest sludge beds were found in the effluent channel and near CTH "S" bridge. Above the discharge, sediment was primarily inorganic, characteristic of cropland watersheds. The whey processing plant was not discharging at the time of the survey and dissolved oxygen was high at all stations. We did not observe filamentous bacteria (Sphaerotilus sp.) which indicates a continuous discharge had not occurred recently. Based on the lifecycle of the pollution tolerant Chironomus sp., which dominated at sites below the discharge, the highly polluted conditions could have persisted at least six months prior to the survey.

The fish community overall did not change much between the pre and post-operational studies. The major difference was the absence of Johnny darters in the North Fork Juda Branch and the absence of Brown trout in the Juda Branch during the post survey. Fish are very mobile organisms and some species can quickly recolonize a stream after a severely polluted discharge has ceased.

METHODS

Aquatic invertebrates were collected by placing a D-frame net against the stream bottom and disturbing the substrate immediately upstream from the net. Sampling continues until somewhat in excess of 100 arthropods are collected. The sample collected is placed in a shallow pan, mixed, and 100+ arthropods are removed and stored in denatured alcohol. Individuals were identified to either genus or species level. A battery powered backpack DC stream shocker was used to sample fish communities along two approximately 100 yard stretches on the North Fork Juda Branch and Juda Branch. A YSI Model 57 dissolved oxygen-temperature

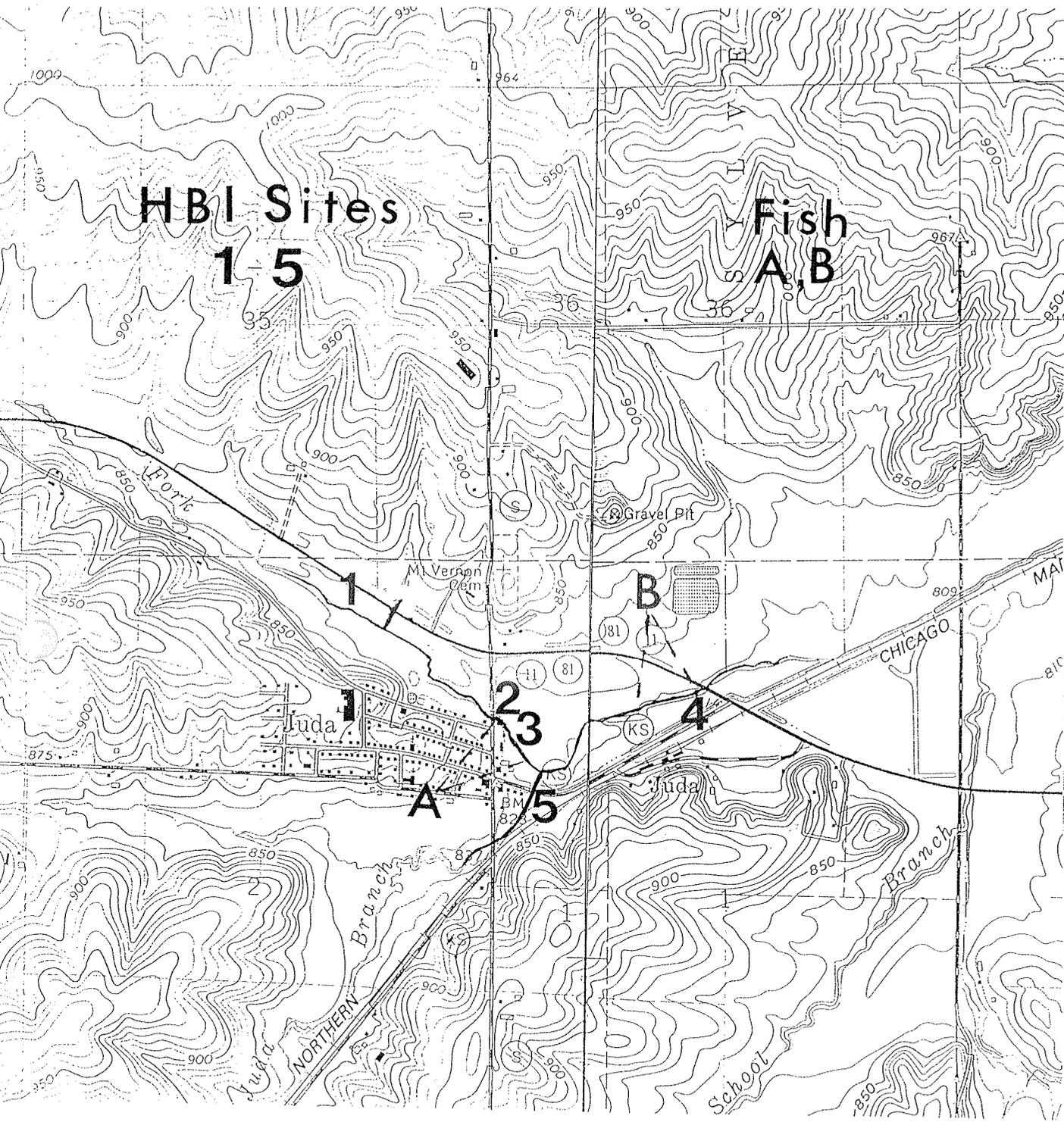
meter was used at each macroinvertebrate sampling site. In addition, an Ekman dredge was used to sample stream sediment above and below the point of discharge. Sample sites are identified on the attached maps.

ARTHROPOD SITE DESCRIPTIONS

The first site sampled (identified as 01) was located 200 feet upstream of the effluent channel on the North Fork Juda Branch. On April 10, 1989 the HBI was 4.16 (Rep.= 4.61) and on March 14, 1991 the HBI was 4.05 (Rep.= 4.46). No significant change was observed between pre and post surveys and the indices indicate "good to very good water quality". The upstream sample was dominated by Gammarus pseudolimnaeus which is an intolerant species. Arthropods present at this site are typical of a stream located in an agricultural watershed.

Site 02 is located 10 feet below CTH "S" on the North Fork Juda Branch. On April 10, 1989 the HBI was 5.88 and on March 14, 1991 the HBI was 10.00. The April 10th HBI indicated "fair water quality" and the March 14th HBI indicated "very poor water quality". On April 10th Gammarus pseudolimnaeus was also a large part of this sample but due to the substrate present, several genera of chironomids made up a significant percentage of the sample. The March 14th sample contained 100% Chironomus sp. which would indicate "severe organic pollution" had occurred at this site. An HBI of 10.00 is indicative of worse case conditions.

Site 03 is located approximately 300 ft. below CTH "S" on the North Fork Juda Branch. On April 10, 1989 the HBI was 5.17 and on March 14, 1991 the HBI was



10.00. The April 10th HBI indicated "good water quality" and the March 14th HBI indicated "very poor water quality". On April 10th Gammarus pseudolimnaeus was the dominant arthropod, but several genera of chironomids were also part of the sample. The March 14th sample at this site contained 100% Chironomus sp. which indicated that this site also had been subjected to "severe organic pollution".

Site 04 is located just upstream of the STH "11" bridge on the Juda Branch. This site is located downstream of the juncture with the North Fork Juda Branch. On April 12, 1989 the HBI was 5.37 (Rep.= 5.54) and on March 14, 1991 the HBI was 9.00 (Rep.= 8.73). The April 12th HBI's indicated "good to fair water quality" and the March 14th HBI's indicated "very poor water quality". The April 12th sample contained a greater diversity of arthropods from the previous sites sampled, including caddisfly larvae, chironomids, Elmids, and Gammarus pseudolimnaeus. The March 14th sample was dominated by Chironomus sp., but also pollution tolerant Simulium vittatum, was present. Arthropods other than Chironomus sp. were present in this sample which reflects increased stream flow and distance from the discharge site. Some dilution and assimilation of the wastewater has occurred at this point on the Juda Branch.

Site 05 is located below CTH "KS" on the Juda Branch and upstream of the juncture with the North Fork Juda Branch. On April 12, 1989 the HBI was 5.64 and on March 14, 1991 the HBI was 5.18. The HBI's at this site indicated "fair to good water quality". A high diversity of intolerant arthropods were present at this site and are typical of a cold water stream in an agricultural watershed.

FISH SITE DESCRIPTIONS

The fish survey site located on the North Fork Juda Branch was located downstream of CTH "S". Species collected on April 10, 1989 and on March 14, 1991 are contained in Table 06 and 07 respectively. The most significant fish community change was the absence of Johnny darters on the post survey. Johnny darters are benthic dwellers and are less mobile as some of the other species. Recolonization of Johnny darters is expected to be slower.

Since contaminated sites are close to upstream reaches, downstream fish migrations are likely once contamination has stopped. Based on the macroinvertebrates (as water quality indicators) in Juda Branch upstream of the North Fork, a healthy forage population would be expected and would likely repopulate the North Fork.

The fish survey site located on the Juda Branch was upstream of the STH "11". The data collected on April 10, 1989 and on March 14, 1991 are contained in Table 08 and 09. The only real change in the two surveys was the absence of brown trout and the shiners. During the recent survey we observed most of the fish were captured in the vicinity of the tile drains. Tile drains are a refuge in times of stress, providing oxygenated fresh water.

SUBSTRATE SAMPLE RESULTS

The stream substrate was sampled at three sites on the North Fork Juda Branch and one site in the effluent channel. Sample #1 and #1R were taken 150 feet

upstream of the wastewater discharge. Both % Volatile Solids and BOD₅ appeared to be relatively low. Sample #2 was taken in the effluent channel before the juncture with the North Fork. The volatile solids were 29% and the BOD₅ was 70000 mg/kg. There was a significant organic increase in this effluent channel compared to the upstream site. Sample #3 was taken 100 paces below the effluent channel and sample #4 was taken just upstream of CTH "S". Elevated levels of organics were found at both sites. Due to recent snow melts some of the organics have probably been scoured out of the stream channel. Sample results from each site are contained on the following page.

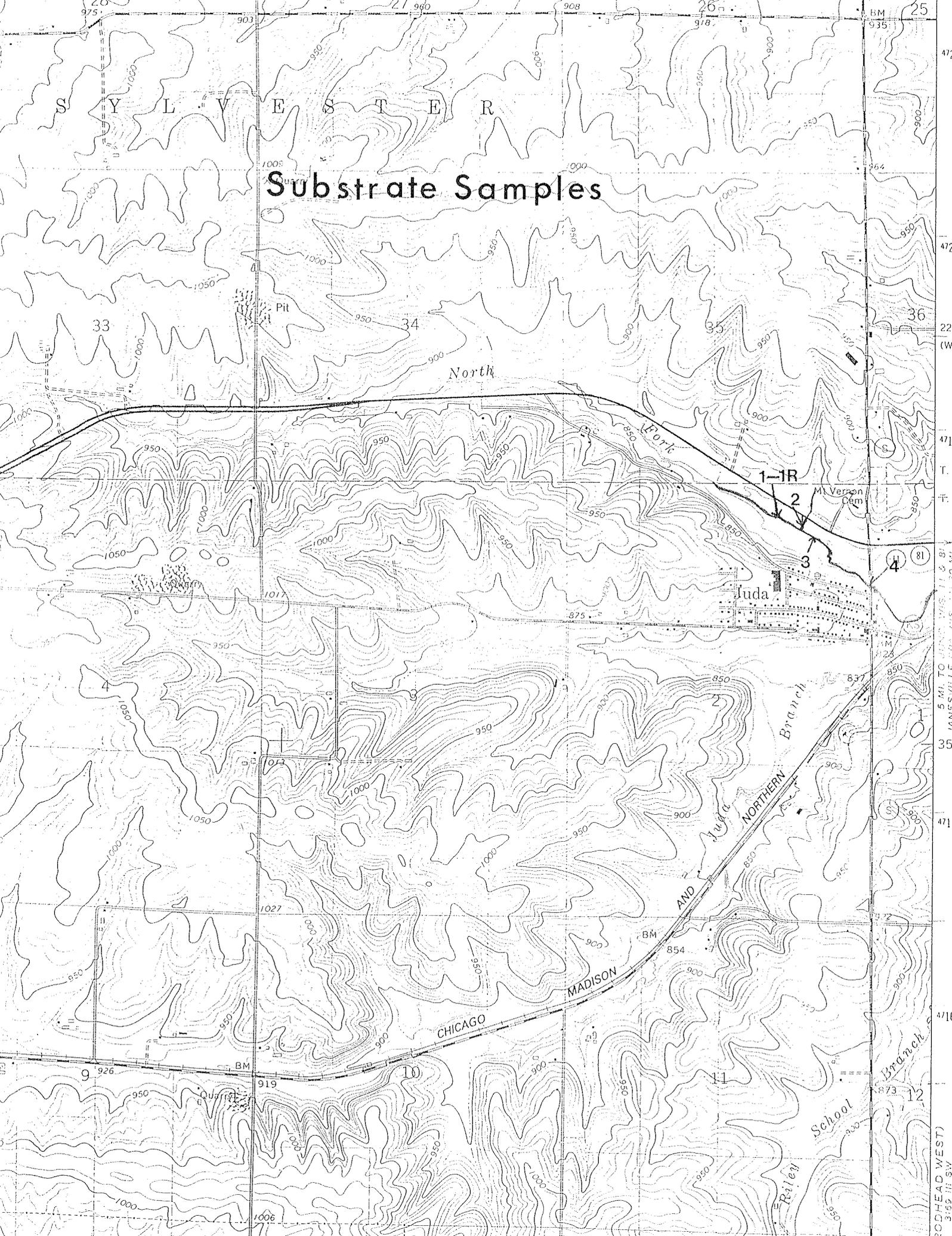
NORTH FORK JUDA BRANCH

SUBSTRATE SAMPLE RESULTS

<u>SITE NUMBER</u>	<u>% MOISTURE</u>	<u>% VOLATILE SOLIDS</u>	<u>BOD₅ DRY WT</u>
# 1	42.2	5.	<1100 mg/kg
# 1R	40.9	6.	<1000 mg/kg
# 2	81.4	29.	70000 mg/kg
# 3	60.3	7.	3100 mg/kg
# 4	56.0	9.	10000 mg/kg

S Y L V E S T E R

Substrate Samples



1-1R

2

3

4

North

Juda

Mt. Vernon Cem

MADISON

CHICAGO

NORTHERN
AND
JUDA

Branch

Riley School

Branch

CD HEAD WEST
3:55 III SW

HILSENHOFF BIOTIC INDEX (1987)

Biotic Index	Water Quality	Degree of Organic Pollution
0.00-3.50	Excellent	No apparent organic pollution
3.51-4.50	Very Good	Possible slight organic pollution
4.51-5.50	Good	Some organic pollution
5.51-6.50	Fair	Fairly significant organic pollution
6.51-7.50	Fairly Poor	Significant organic pollution
7.51-8.50	Poor	Very significant organic pollution
8.51-10.00	Very Poor	Severe organic pollution

TABLE 01 Taxonomic List of Macroinvertebrates for 890410-23-01

Date: 4/10/89 (North Fork Juda Branch above Sylvester Whey at Juda Community Park)

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>BIOTIC INDEX</u>	
		<u>VALUE (a)</u>	<u>a x n</u>
Asellus intermedius	1	8	8
Micropsectra spp.	1	7	7
Gammarus pseudolimnaeus	125	4	500
Cheumatopsyche spp.	1	5	5
Probezzia spp.	1	6	6
Cricotopus spp.	1	7	7
Orthocladus spp.	4	6	24
Prodiamesa spp.	3	3	9
Thienemanniella spp.	1	6	6
Chrysops spp.	1	6	6
TOTAL	139		578

Biotic Index: 4.16; very good, possible slight organic pollution

TABLE 01R Taxonomic List of Macroinvertebrates for 890410-23-01R

Date: 4/10/89 (North Fork Juda Branch above Sylvester Whey at Juda Community Park)

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>BIOTIC INDEX VALUE (a)</u>	<u>a x n</u>
Ceratopsyche slossonae	1	4	4
Sialis spp.	1	4	4
Dubiraphia spp.	1	6	6
Probezzia spp.	12	6	72
Cricotopus spp.	6	7	42
Natarsia spp.	1	8	8
Odontomesa spp.	1	4	4
Orthocladus spp.	2	6	12
Polypedilum spp.	5	6	30
Gammarus pseudolimnaeus	88	4	352
Asellus intermedius	3	8	24
TOTAL	121		558

Biotic Index: 4.61; good, some organic pollution

TABLE 02 Taxonomic List of Macroinvertebrates for 890410-23-02

Date: 4/10/89 (North Fork Juda Branch at Hwy. "S" Bridge)

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>BIOTIC INDEX VALUE (a)</u>	<u>a x n</u>
Hydropsyche betteni	2	6	12
Ceratopsyche slossonae	2	4	8
Optioservus spp. (larvae)	1	4	4
Probezzia spp.	12	6	72
Brillia spp.	1	5	5
Chaetocladius spp.	10	6	60
Chironomus spp.	2	10	20
Cricotopus spp.	11	7	77
Cryptochironomus spp.	1	8	8
Limnohyale spp.	11	8	88
Micropsectra spp.	3	7	21
Orthocladius spp.	3	6	18
Polypedilum spp.	18	6	108
Gammarus pseudolimnaeus	27	4	108
Asellus intermedius	1	8	8
TOTAL	105		617

Biotic Index: 5.88: fair, fairly significant organic pollution

TABLE 03 Taxonomic List of Macroinvertebrates for 890410-23-03

Date: 4/10/89 (North Fork Juda Branch riffle below "S")

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>BIOTIC INDEX</u>	
		<u>VALUE (a)</u>	<u>a x n</u>
Hydropsyche betteni	3	6	18
Ceratopsyche slossonae	1	4	4
Optioservus spp. (larvae)	2	4	8
Optioservus fastiditus	1	4	4
Stenelmis spp. (larvae)	1	5	5
Probezzia spp.	1	6	6
Chaetocladius spp.	5	6	30
Cricotopus spp.	5	7	35
Cryptochironomus spp.	1	8	8
Limnophyes spp.	5	8	40
Nanocladius spp.	1	3	3
Orthocladius spp.	23	6	138
Polypedilum spp.	6	6	36
Thienemanniella spp.	2	6	12
Thienemannimyia "complex"	1	6	6
Gammarus pseudolimnaeus	70	4	280
Asellus intermedius	10	8	80
TOTAL	138		713

Biotic Index: 5.17; good, some organic pollution

TABLE 04 Taxonomic List of Macroinvertebrates for 890412-23-04

Date: 4/12/89 (Juda Branch Hwy. "11" Bridge)

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>BIOTIC INDEX VALUE (a)</u>	<u>a x n</u>
Cheumatopsyche spp.	3	5	15
Hydropsyche betteni	6	6	36
Ceratopsyche slossonae	1	4	4
Optioservus spp. (larvae)	8	4	32
Optioservus fastiditus	1	4	4
Atherix variegata	1	2	2
Chaetocladius spp.	6	6	36
Cricotopus spp.	17	7	119
Limnophyes spp.	3	8	24
Orthocladius spp.	33	6	198
Antocha spp.	1	3	3
Dicranota spp.	1	3	3
Gammarus pseudolimnaeus	32	4	128
Asellus intermedius	1	8	8
Total	114		612

Biotic Index: 5.37; good, some organic pollution

TABLE 04R Taxonomic List of Macroinvertebrates for 890412-23-04R

Date: 4/12/89 (Juda Branch Hwy. "11" bridge)

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>BIOTIC INDEX VALUE (a)</u>	<u>a x n</u>
Hydropsyche betteni	3	6	18
Optioservus spp. (larvae)	10	4	40
Optioservus fastiditus	1	4	4
Brillia spp.	2	5	10
Chaetocladius spp.	3	6	18
Cricotopus spp.	21	7	147
Eukiefferiella spp.	1	8	8
Limnophyes spp.	9	8	72
Orthocladius spp.	18	6	108
Polypedilum spp.	2	6	12
Gammarus pseudolimnaeus	38	4	152
Asellus intermedius	4	8	32
Total	112		621

Biotic Index: 5.54; fair, fairly significant organic pollution

TABLE 05 Taxonomic List of Macroinvertebrates for 890412-23-05

Date: 04/12/89 (Juda Branch above confluence with North Fork)

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>BIOTIC INDEX</u>	
		<u>VALUE (a)</u>	<u>a x n</u>
Cheumatopsyche spp.	2	5	10
Hydropsyche betteni	3	6	18
Ceratopsyche slossonae	17	4	68
Optioservus spp. (larvae)	6	4	24
Optioservus fastiditus	2	4	8
Stenelmis crenata	1	5	5
Brillia spp.	1	5	5
Chaetocladius spp.	14	6	84
Cricotopus spp.	18	7	126
Eukiefferiella spp.	2	8	16
Limnophyes spp.	8	8	64
Micropsectra spp.	1	7	7
Nanocladius spp.	1	3	3
Orthocladius spp.	35	6	210
Paratendipes spp.	1	8	8
Polypedilum spp.	11	6	66
Rheotanytarsus spp.	3	6	18
Gammarus pseudolimnaeus	18	4	72
Total	144		812

Biotic Index: 5.64; fair, fairly significant organic pollution

TABLE 01 Taxonomic List of Macroinvertebrates for 910314-23-01

Date: 3/14/91 (North Fork Juda Branch above Sylvester Whey at Juda Community Park)

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>BIOTIC INDEX</u>	
		<u>VALUE (a)</u>	<u>a x n</u>
Asellus intermedius	1	8	8
Microsectra spp.	1	7	7
Optioservus spp. (larvae)	5	4	20
Gammarus pseudolimnaeus	103	4	412
Cheumatopsyche spp.	1	5	5
Sialis spp.	1	4	4
Dicranota spp.	2	3	6
TOTAL	114		462

Biotic Index: 4.05; very good, possible slight organic pollution

TABLE 01R Taxonomic List of Macroinvertebrates for 910314-23-01R

Date: 3/14/91 (North Fork Juda Branch above Sylvester Whey at Juda Community Park)

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>BIOTIC INDEX VALUE (a)</u>	<u>a x n</u>
Asellus intermedius	11	8	88
Cheumatopsyche spp.	1	5	5
Chironomus spp.	1	10	10
Gammarus psuedolimnaeus	96	4	384
Hydropsyche betteni	1	6	6
Limnophila spp.	1	3	3
Optioservus spp. (larvae)	1	4	4
TOTAL	112		500

Biotic Index: 4.46; very good, possible slight organic pollution

TABLE 02 Taxonomic List of Macroinvertebrates for 910314-23-02

Date: 3/14/91 (North Fork Juda Branch at Hwy. "S" Bridge)

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>BIOTIC INDEX VALUE (a)</u>	<u>a x n</u>
Chironomus spp.	101	10	1010
TOTAL	101		1010

Biotic Index: 10.00: very poor, severe organic pollution

TABLE 03 Taxonomic List of Macroinvertebrates for 910314-23-03

Date: 3/14/91 (North Fork Juda Branch riffle below "S")

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>BIOTIC INDEX VALUE (a)</u>	<u>a x n</u>
Chironomus spp.	114	10	1140
TOTAL	114		1140

Biotic Index: 10.00; very poor, severe organic pollution

TABLE 04 Taxonomic List of Macroinvertebrates for 910314-23-04

Date: 3/14/91 (Juda Branch at STH. "11" riffle just upstream from STH. "11" bridge)

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>BIOTIC INDEX VALUE (a)</u>	<u>a x n</u>
Asellus intermedius	1	8	8
Chironomus spp.	75	10	750
Gammarus pseudolimnaeus	5	4	20
Optioservus spp. (larvae)	1	4	4
Simulium vittatum	22	7	154
TOTAL	104		936

Biotic Index: 9.00; very poor, severe organic pollution

TABLE 04R Taxonomic List of Macroinvertebrates for 910314-23-04R

Date: 3/14/91 (Juda Branch at STH. "11" riffle just upstream from STH. "11" bridge)

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>BIOTIC INDEX VALUE (a)</u>	<u>a x n</u>
Asellus intermedius	3	8	24
Chironomus spp.	79	10	790
Gammarus pseudolimnaeus	6	4	24
Simulium vittatum	40	7	280
TOTAL	128		1118

Biotic Index: 8.73; very poor, severe organic pollution

TABLE 05 Taxonomic List of Macroinvertebrates for 910314-23-05

Date: 3/14/91 (Juda Branch above North Fork Juda Branch riffle below bridge)

<u>GENUS/SPECIES</u>	<u>INSECTS (n)</u>	<u>BIOTIC INDEX VALUE (a)</u>	<u>a x n</u>
Asellus intermedius	12	8	96
Ceratopsyche slossonae	17	4	68
Dicranota spp.	1	3	3
Gammarus pseudolimnaeus	51	4	204
Hydropsyche betteni	17	6	102
Optioservus fastiditus	3	4	12
Orthocladus spp.	1	6	6
Simulium vittatum	21	7	147
Tipula spp.	1	4	4
TOTAL	124		642

Biotic Index: 5.18; good, some organic pollution

TABLE: 06 List of fish for sampling site: Downstream of GTH "S"

DATE: 4/10/89 TwN 1N Rng 8E Sec 01 STREAM: North Fork Juda Branch

Station mileage: N/A County: 23

SOURCE OF DATA: WRM GEAR: 3 EFFORT: 06

CODE	COMMON NAME	FAMILY	GENUS/SPECIES	# FISH	TOLERANCE LEVEL
M50	CREEK CHUB	CYPRINIDAE	<i>Semotilus atromaculatus</i>	4	Tolerant
N09	WHITE SUCKER	CATOSTOMIDAE	<i>Catostomus commersoni</i>	2	Tolerant
U01	BROOK STICKLEBACK	GASTEROSTEIDAE	<i>Culaea inconstans</i>	3	Tolerant
X12	JOHNNY DARTER	PERCIDAE	<i>Etheostoma nigrum</i>	22	Tolerant
Z99	UNIDENTIFIED MINNOW SPECIES			2	

TABLE: 07 List of fish for sampling site: Downstream of CTH "S"

DATE: 3/14/91 Twn 1N Rng 8E Sec 01 STREAM: North Fork Juda Branch

Station mileage: N/A County: 23

SOURCE OF DATA: WRM GEAR: 3 EFFORT: 06

CODE COMMON NAME FAMILY GENUS/SPECIES # FISH TOLERANCE LEVEL

M50	CREEK CHUB	CYPRINIDAE	<i>Semotilus atromaculatus</i>	5	Tolerant
N09	WHITE SUCKER	CATOSTOMIDAE	<i>Catostomus commersoni</i>	2	Tolerant
U01	BROOK STICKLEBACK	GASTEROSTEIDAE	<i>Culaea inconstans</i>	12	Tolerant

TABLE: 06 List of fish for sampling site: Upstream of STH "11"

DATE: 4/10/89 TwN 1N Rng 8E Sec 01 STREAM: Juda Branch

Station mileage: N/A County: 23

SOURCE OF DATA: WRM GEAR: 3 EFFORT: 06

CODE	COMMON NAME	FAMILY	GENUS/SPECIES	# FISH	TOLERANCE LEVEL
I21	BROWN TROUT	SALMONIDAE	Salmo trutta	2	Sport fish
M28	COMMON SHINER	CYPRINIDAE	Notropis cornutus	1	Tolerant
M36	SPOTFIN SHINER	CYPRINIDAE	Notropis spilopterus	1	Tolerant
M50	CREEK CHUB	CYPRINIDAE	Semotilus atromaculatus	13	Tolerant
N09	WHITE SUCKER	CATOSTOMIDAE	Catostomus commersoni	7	Tolerant

TABLE: 09 List of fish for sampling site: Upstream of STH "11"

DATE: 3/14/91

Twn 1N Rng 8E Sec 01

STREAM: Juda Branch

Station mileage: N/A

County: 23

SOURCE OF DATA: WRM

GEAR: 3

EFFORT: 06

CODE	COMMON NAME	FAMILY	GENUS/SPECIES	# FISH	TOLERANCE LEVEL
M50	CREEK CHUB	CYPRINIDAE	<i>Semotilus atromaculatus</i>	12	Tolerant
N09	WHITE SUCKER	CATOSTOMIDAE	<i>Catostomus commersoni</i>	11	Tolerant
U01	BROOK STICKLEBACK	GASTEROSTEIDAE	<i>Culaea inconstans</i>	3	Tolerant
X12	JOHNNY DARTER	PERCIDAE	<i>Etheostoma nigrum</i>	1	Tolerant

State Laboratory of Hygiene
University of Wisconsin Center for Health Sciences
465 Henry Mall, Madison, WI 53706

R.H. Laessig, Ph.D., Director

S.L. Inhorn, M.D., Medical Director

Environmental Science Section

(608) 262-3458

DNR LAB ID 113133790

Inorganic chemistry (#111 of 140 on 05/11/89, unseen)

Id: 23MISC Point/Well/...: 180 Field #: 1 Route: WR12
Collection Date: 04/10/89 Time: 12:05 County: 23 (Green)
From: STREAM SAMPLE PRIOR TO ZIMMS CHEESE DISCHARGE N FORK JUDA BRANCH
Description: CTH S
To: MARSHALL

DNR

Source: Surface Water

FITCHBURG

Account number: WR049

Collected by: MARSHALL

Date Received: 04/11/89

Labslip #: I9074208

Reported: 05/10/89

ALKALINITY	301.	MG/L
AMMONIA-N, DISSOLVED, HIGH RANGE	<0.1	MG/L
Remark: Y		
BOD 6 DAY	<3	MG/L
CALCIUM, ICP	69.	MG/L
CHLORIDE	24.	MG/L
CONDUCTIVITY (AT 25 DEG C)	683.	UMOHS/CM
DISSOLVED OXYGEN FIELD	16.0	MG/L
HARDNESS, CALCULATION METHOD	350.	MG/L
MAGNESIUM, ICP	44.	MG/L
NITRATE PLUS NITRITE-N DISSOLVED, HIGH RANGE	4.7	MG/L
PH LAB	8.20	SU
SUSPENDED SOLIDS	9.	MG/L
TEMPERATURE FIELD	4.0	C
TOTAL KJELDAHL NITROGEN	0.3	MG/L

STREAM CLASSIFICATION OF NORTH FORK
JUDA BRANCH, GREEN COUNTY

General Information

Drainage Basin: 180 - Sugar River
Stream Length: 3.1 miles
Gradient: 37 ft./mile
Base Discharge: 2.8 CFS

North Fork Juda Branch arises SE 1/4, Section 34, T2N, R8E and flows southeast to the confluence with Juda Branch in Juda. It is a small stream with surrounding land use consisting of intensive crop and pasture lands. Consequently, good habitat is limiting due to a combination of low stream flows, streambank erosion and severe siltation.

On June 24, 1988, a stream classification survey was performed from the County S Bridge downstream to the confluence with Juda Branch during low flow conditions. Average width-depth profile was 4 feet and <6 inches respectively and the flow was estimated at .5 CFS. Substrate was predominately deep silt with occasional rock exposed above the silt. Stream velocities ranged from slow to moderate. Sago pondweed was the only aquatic plant observed but was scarce. Fish identified during the stream shocking survey consisted mostly of Johnny darters, but creek chubs and suckers were common as well. Becker (1983) characterized the Johnny darter as very successful in "disturbed streams." No gamefish or intolerant forage fish were identified during this survey or during the 1975 DNR Bureau of Research Fish Distribution Survey. Gammarus pseudolimneaus was the most abundant benthic macroinvertebrate found, a species intolerant to organic pollution. Along with Gammarus, the qualitative D-frame net collections revealed the presence of other species intolerant of low dissolved oxygen levels as well. Based on the representative fish and macroinvertebrate communities, low flows and habitat degradation appear to be primary factors limiting the diversity of aquatic life in North Fork Juda Branch and not organic pollution.

Recommendation

Based on habitat assessment and representative fish populations, the classification for North Fork Juda Branch should be Intermediate Fish and Aquatic Life (INT-D). The classification changes to Full Fish and Aquatic Life (FAL-B) at the confluence with Juda Branch. In the future, if land use practices are substantially improved to enhance the habitat of N.F. Juda Branch, the intermediate variance classification should be re-evaluated. The potential for supporting intolerant forage fish populations and FAL-C classification would occur only after implementation of intensive NPS abatement practices.

Respectively Submitted,

David Marshall

David Marshall
Water Resources Biologist

Stream North Fork Juda Br. Reach Location CTH'S' downstream to mouth Reach Score/Rating 239 / Poor
 County Green Date 6-24-88 Evaluator Marshall Classification INT-D

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. 16	Many eroded areas. "Raw" areas frequent along straight sections and bends. 18 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. 15	<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. 14	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. 20
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	6" to 1'	6 18
	Warm >1.5'	0	10" to 1.5'	6 18
Avg. Depth of Pools	Cold >4'	0	3' to 4'	6 18
	Warm >5'	0	4' to 5'	6 18
Flow, at Rep. Low Flow	Cold >2 cfs	0	1-2 cfs	6 18
	Warm >5 cfs	0	2-5 cfs	6 18
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:

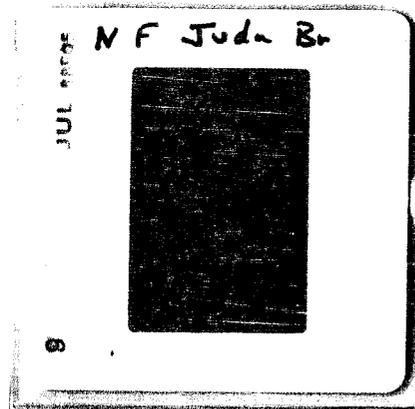
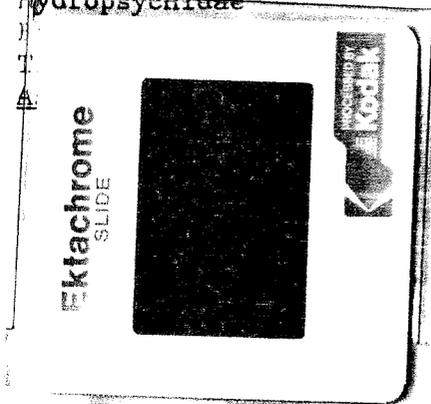
Column Scores E _____ + G _____ + F _____ + P _____ = 239 = Score

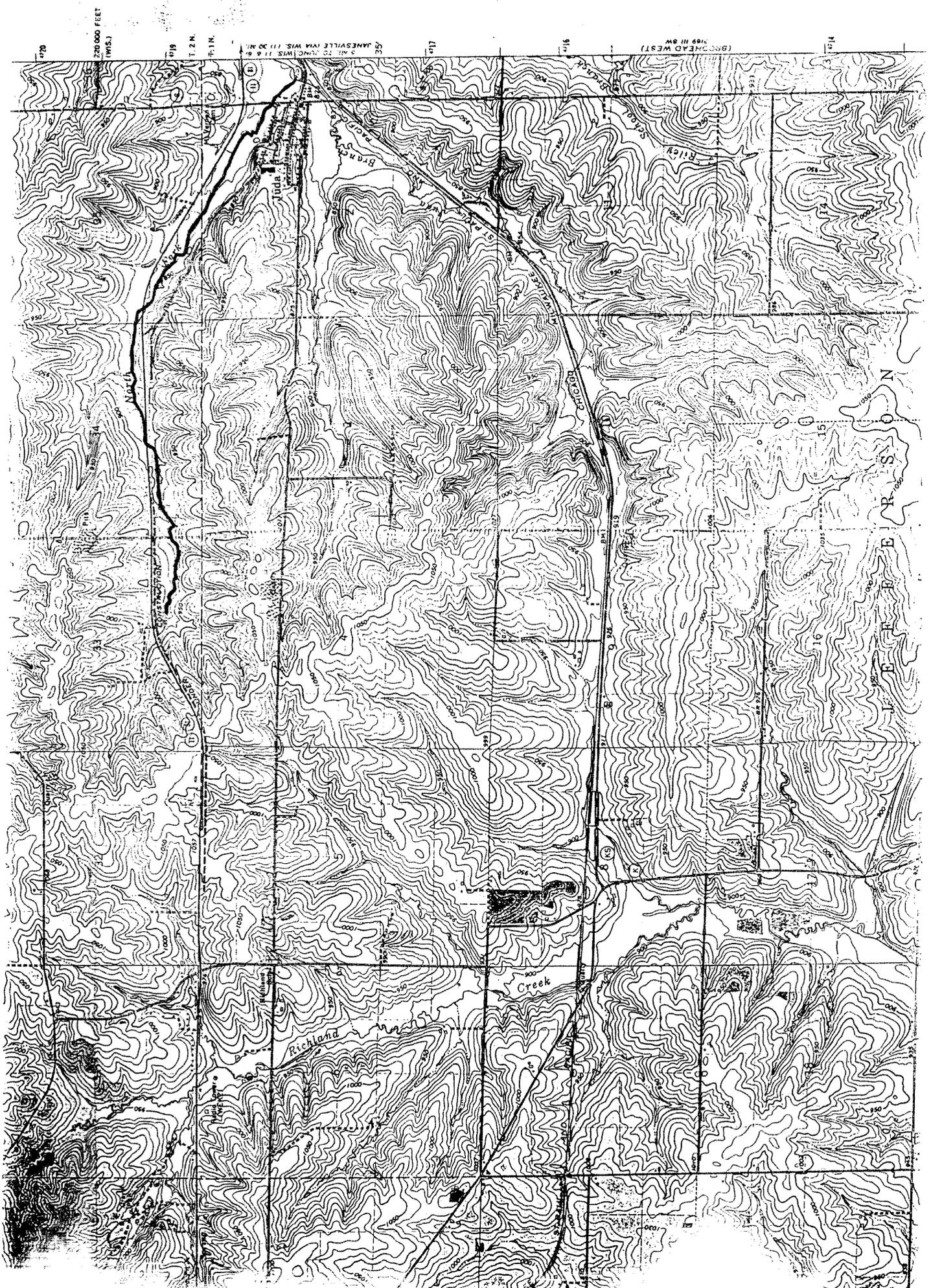
Fish Monitoring - June, 1988

<u>Species</u>	<u>Water Quality Evaluation</u>	<u>Occurrence</u>
Johnny Darters	Tolerant	Abundant
Creek Chubs	Tolerant	Common
Sucker sp.	Tolerant	Common
Fathead Minnows (Fago, 1981)	Tolerant	Present
Creek Chubs	Tolerant	5
Brook Sticklebacks	Tolerant	1

Macroinvertebrates - June, 1988

<u>Gammarus pseudolimneus</u>	Intolerant	Abundant
Chironomidae (red bodied)	Tolerant	Common
<u>Hydropsychidae</u>	Intolerant	Present
	Intolerant	Present
	Intolerant	Present
	Tolerant	Present





20 000 FEET
(W.S.)

T. 2 N.
R. 1 E.

3 MILES TO JUNCTION WIS. 11 & 6
JAMESVILLE WIS. 11 & 6

(BROCKHEAD WEST)
1893 III SW

N
S
E
W
R
I
C
H
L
A
N
D

Richland

Creek

References

- Ball, Joseph. 1981. Stream Classification Guidelines for Wisconsin. WI DNR.
- Becker, George C. 1983. Fishes of Wisconsin, University of Wisconsin Press.
- Bush, Donald M. R. Cornelius, D. Engel, C.L. Brynildson. 1980. Surface Water Resources of Green County. WI DNR.
- Fago, Don. 1981. Wisconsin Fish Distribution Study. DNR-Bureau of Research fish distribution data.
- Hilsenhoff, William A. 1988. Using A Biotic Index to Evaluate Water Quality in Streams. DNR Tech. Bull. 132.

JUDA SANITARY DISTRICT
GREEN COUNTY

October 15, 1976

Juda Branch - Surface Acres = 7.9, Miles = 6.5, Gradient = 15.4 feet per mile

Flows east-northeast into the Sugar River via Sylvester Creek. An estimated 80 percent of the stream has been ditched and channeled for drainage. Drains flat land. Managed for forage fish. At one time this stream maintained trout. Now it carries a heavy silt load through open agricultural land and wetland. Five acres of wetland still remain along the stream.

Recommendations

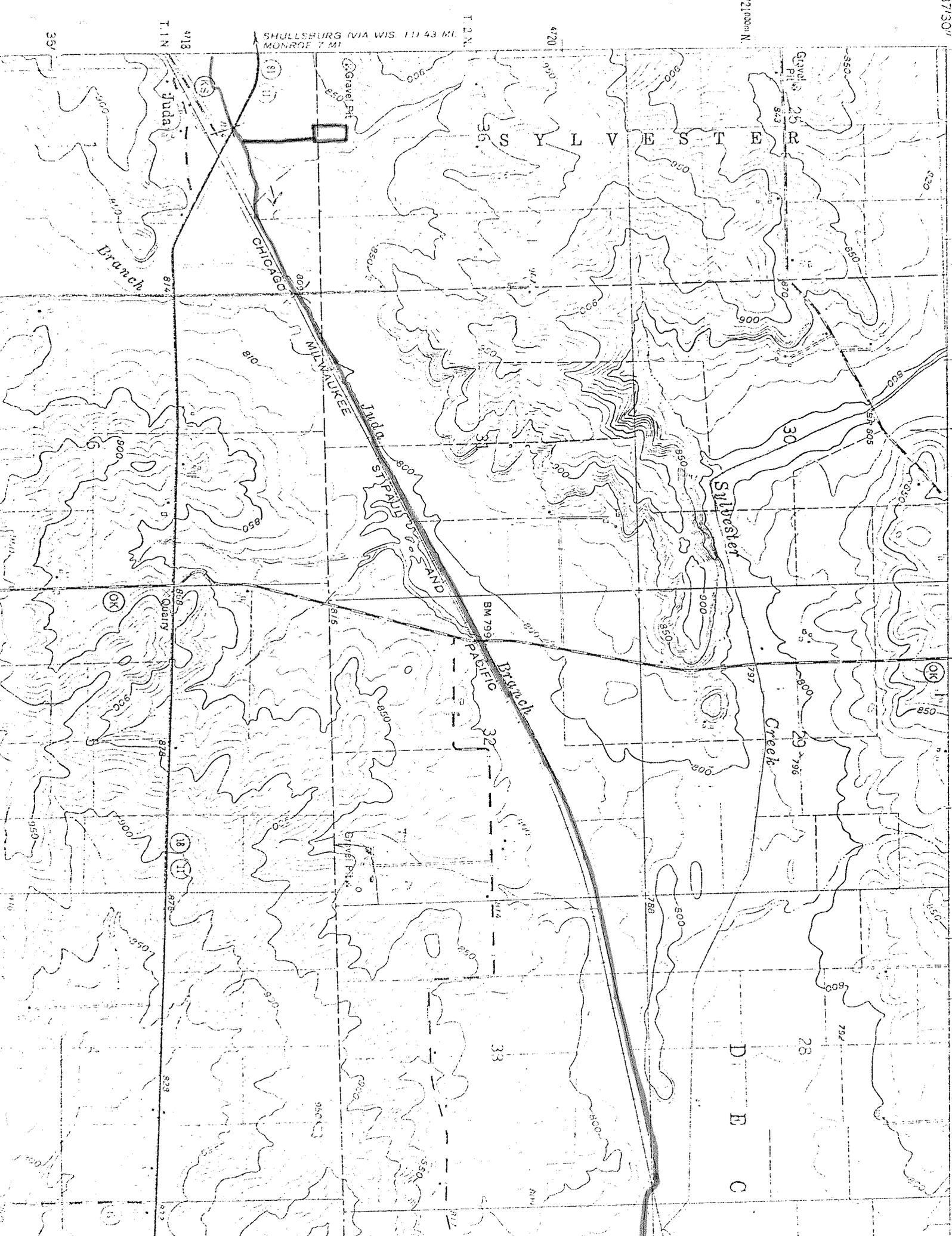
From the Juda Sanitary District outfall and for the remainder of Juda Branch, the classification should be continuous fish and aquatic life.

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

Gerald Friederichs	District Engineer
Clifford Brynildson	Area Fish Manager
Tom Bainbridge	Stream Classification Coordinator
Roger Schlessler	Natural Resources Technician


Thomas Bainbridge
Stream Classification Coordinator

RS:lg



39

4718
T. 1 N

SHULLSBURG (VIA WIS.) 43 MI.
MONROE 7 MI

T. 2 N

4720

2100 feet N

7130'

Gravel Pt. 25
843

SYLVESTER

Juda Branch

CHICAGO

MILWAUKEE

INDIA S. PALM UT. 6.0

PACIFIC

Branch

Sylvester

Creek

Oquir

8

8

8

8

BM 799

33

28

D E C

6

6

6