

Biological and Aquatic Life Use Attainment Study  
Lower Middle Branch  
Nimishillen Creek

2001

Stark County, Ohio

October 29, 2001

OEPA Site Evaluation Report EAS/2001-10-4

prepared for

State of Ohio Environmental Protection Agency  
Division of Emergency and Remedial Response  
Northeast District Office

prepared by

State of Ohio Environmental Protection Agency  
Division of Surface Water  
Lazarus Government Center  
122 South Front Street  
Columbus, Ohio 43215

Bob Taft, Governor  
State of Ohio

Chris Jones, Director  
Environmental Protection Agency

## INTRODUCTION

The IUSI-Union Metal facility located in Canton, Ohio is undergoing an evaluation in the Voluntary Action Program (VAP). As part of this evaluation, a VAP certified professional requested that the Ohio EPA conduct an aquatic ecological assessment of the Middle Branch Nimishillen Creek.

Specific objectives of this evaluation were to:

- 1) Establish biological conditions in the Middle Branch Nimishillen Creek in the vicinity of Union Metal by evaluating fish and macroinvertebrate communities, and
- 2) Determine the aquatic life attainment status of the Middle Branch Nimishillen Creek with regard to the Warmwater Habitat (WWH) aquatic life use designation codified in the Ohio Water Quality Standards.

## SUMMARY

A total of 1.0 mile of the Middle Branch Nimishillen Creek was assessed in 2001 by Ohio EPA. Based on the performance of the biological communities, 0.3 miles were in partial attainment and 0.7 miles were in non-attainment of the Warmwater Habitat aquatic life use (Table 1). The biological integrity of the Middle Branch Nimishillen Creek was generally represented by fair conditions. Sampling during 2001 confirmed the appropriateness of the Warmwater Habitat aquatic life use designation. Biological results in the Middle Branch Nimishillen Creek from 2001 appear to largely reflect the urbanized nature of the lower one mile of stream. It was not apparent from the results that the Union Metal site was influencing biological communities in the Middle Branch Nimishillen Creek.

Table 1. Attainment status of the existing aquatic life use for the Middle Branch Nimishillen Creek based on biological sampling conducted during July and August, 2001.

<b>RIVER MILE Fish/Invert.</b>	<b>IBI</b>	<b>MIwb</b>	<b>ICI</b>	<b>QHEI</b>	<b>Attainment Status</b>	<b>Site Location</b>
<i>M. Br. Nimishillen Creek</i>	<i>Erie Ontario Lake Plain (EOLP) - WWH Use Designation</i>					
0.8 / 0.8	32*	6.2*	26*	63.5	NON	Upstream Union Metal
0.6 / 0.6	35 <sup>ns</sup>	7.1*	26*	54.0	PARTIAL	Adjacent Union Metal
0.3 / 0.3	<u>27*</u>	6.4*	26*	57.0	NON	Downstream Union Metal

\* Significant departure from ecoregion biocriterion; poor and very poor results are underlined.

<sup>ns</sup> Nonsignificant departure from biocriterion ( $\leq 4$  IBI or ICI units;  $\leq 0.5$  MIwb units).

Table 2. Sampling locations in the Middle Branch Nimishillen Creek, 2001. Type of sampling included fish community (F) and macroinvertebrate community (M).

Stream/ River Mile	Type of Sampling	Latitude	Longitude	Landmark
0.8	F,M	40.8189	81.3503	Ust. Union Metal, 19 <sup>th</sup> St.
0.6	F,M	40.8145	81.3510	Adj. Union Metal, upstream old 16 <sup>th</sup> St.
0.3	F,M	40.8111	81.3522	Dst. Union Metal, at old N&W RR bridge

## METHODS

All physical and biological field, laboratory, data processing, and data analysis methodologies and procedures adhere to those specified in the Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices (Ohio Environmental Protection Agency 1989a) and Biological Criteria for the Protection of Aquatic Life, Volumes I-III (Ohio Environmental Protection Agency 1987a, 1987b, 1989b, 1989c), and The Qualitative Habitat Evaluation Index (QHEI): Rationale, Methods, and Application (Rankin 1989, 1995) for aquatic habitat assessment.

Use attainment status is a term describing the degree to which environmental indicators are either above or below criteria specified by the Ohio Water Quality Standards (WQS; Ohio Administrative Code 3745-1). Assessing aquatic use attainment status involves a primary reliance on the Ohio EPA biological criteria (OAC 3745-1-07; Table 7-14). These are confined to ambient assessments and apply to rivers and streams outside of mixing zones. Numerical biological criteria are based on multimetric biological indices including the Index of Biotic Integrity (IBI) and modified Index of Well-Being (MIwb), indices measuring the response of the fish community, and the Invertebrate Community Index (ICI), which indicates the response of the macroinvertebrate community. Three attainment status results are possible at each sampling location - Full, partial, or non-attainment. Full attainment means that all of the applicable indices meet the biocriteria. Partial attainment means that one or more of the applicable indices fails to meet the biocriteria. Non-attainment means that none of the applicable indices meet the biocriteria or one of the organism groups reflects poor or very poor performance. An aquatic life use attainment table (Table 1) is constructed based on the sampling results and is arranged from upstream to downstream and includes the sampling locations indicated by river mile, the applicable biological indices, the use attainment status (*i.e.*, Full, partial, or non), the Qualitative Habitat Evaluation Index (QHEI), and a sampling location description.

Physical habitat was evaluated using the Qualitative Habitat Evaluation Index (QHEI) developed by the Ohio EPA for streams and rivers in Ohio (Rankin 1989, 1995). Various attributes of the habitat are scored based on the overall importance of each to the maintenance of viable, diverse, and functional aquatic faunas. The type(s) and quality of substrates, amount and quality of instream cover, channel morphology, extent and quality of riparian vegetation, pool, run, and riffle

development and quality, and gradient are some of the habitat characteristics used to determine the QHEI score which generally ranges from 20 to less than 100. The QHEI is used to evaluate the characteristics of a stream segment, as opposed to the characteristics of a single sampling site. As such, individual sites may have poorer physical habitat due to a localized disturbance yet still support aquatic communities closely resembling those sampled at adjacent sites with better habitat, provided water quality conditions are similar. QHEI scores from hundreds of segments around the state have indicated that values greater than 60 are *generally* conducive to the existence of warmwater faunas whereas scores less than 45 generally cannot support a warmwater assemblage consistent with the WWH biological criteria. Scores greater than 75 frequently typify habitat conditions which have the ability to support exceptional warmwater faunas.

## RESULTS

### **Physical Habitat For Aquatic Life**

Physical habitat was evaluated in the Middle Branch Nimishillen Creek at each fish sampling location. Qualitative Habitat Evaluation Index (QHEI) scores are detailed in Table 3. Gravel and sand predominated the bottom substrates in the study area, with small amounts of boulders and cobbles. Silt was a predominating substrate at RM 0.6, the site adjacent to Union Metal. Prior channel modifications were evident at each location assessed, although some recovery to natural channel conditions has occurred. Instream channel development was fair, with a mixture of pool, riffle, glide and run habitats. Maximum pool depths at the three sites varied between 75 and 120 centimeters, with deeper pool areas (greater than 70 cm) important for supporting diverse fish communities. Moderate to heavy silt conditions and extensive embeddedness of the substrates was evident at the three sampling locations. QHEI scores for the Middle Branch Nimishillen Creek ranged between 54.0 and 63.5. These scores are indicative of fair to marginally good stream habitat.

### **Fish Community Assessment**

Fish communities were assessed at three Middle Branch Nimishillen Creek sites on July 11 and August 24, 2001 (Figure 1). The three sites were located at 19<sup>th</sup> Street (RM 0.8), adjacent to Union Metal at old 16<sup>th</sup> Street (RM 0.6) and on the downstream end of Union Metal (RM 0.3). The fish communities were sampled at each site twice using pulsed DC electrofishing equipment, with sampling distances at each site 200 meters in length. Fish were processed in the field, and included identifying each individual to species, measuring the weight of fish, and recording any external abnormalities.

A fair fish community was noted at the location sampled in the Middle Branch Nimishillen Creek upstream (RM 0.8) from the Union Metal property (Table 4). Both the IBI and MIwb scores (32 and 6.2, respectively) were in the fair range, and not achieving the ecoregional biocriteria established for Warmwater Habitat (WWH) streams and rivers in Ohio. An improvement in the fish community was observed at the site adjacent to the Union Metal property (RM 0.6), with both the IBI and MIwb (35 and 7.1, respectively) increasing in value. Although an improvement was documented, only the IBI was achieving the WWH biocriterion, and the fish community was reflective of fair to marginally good conditions. The downstream site in the Middle Branch Nimishillen Creek was reflective of poor to fair conditions, with the lowest IBI score (27) of all three sites sampled. Numerous sewer

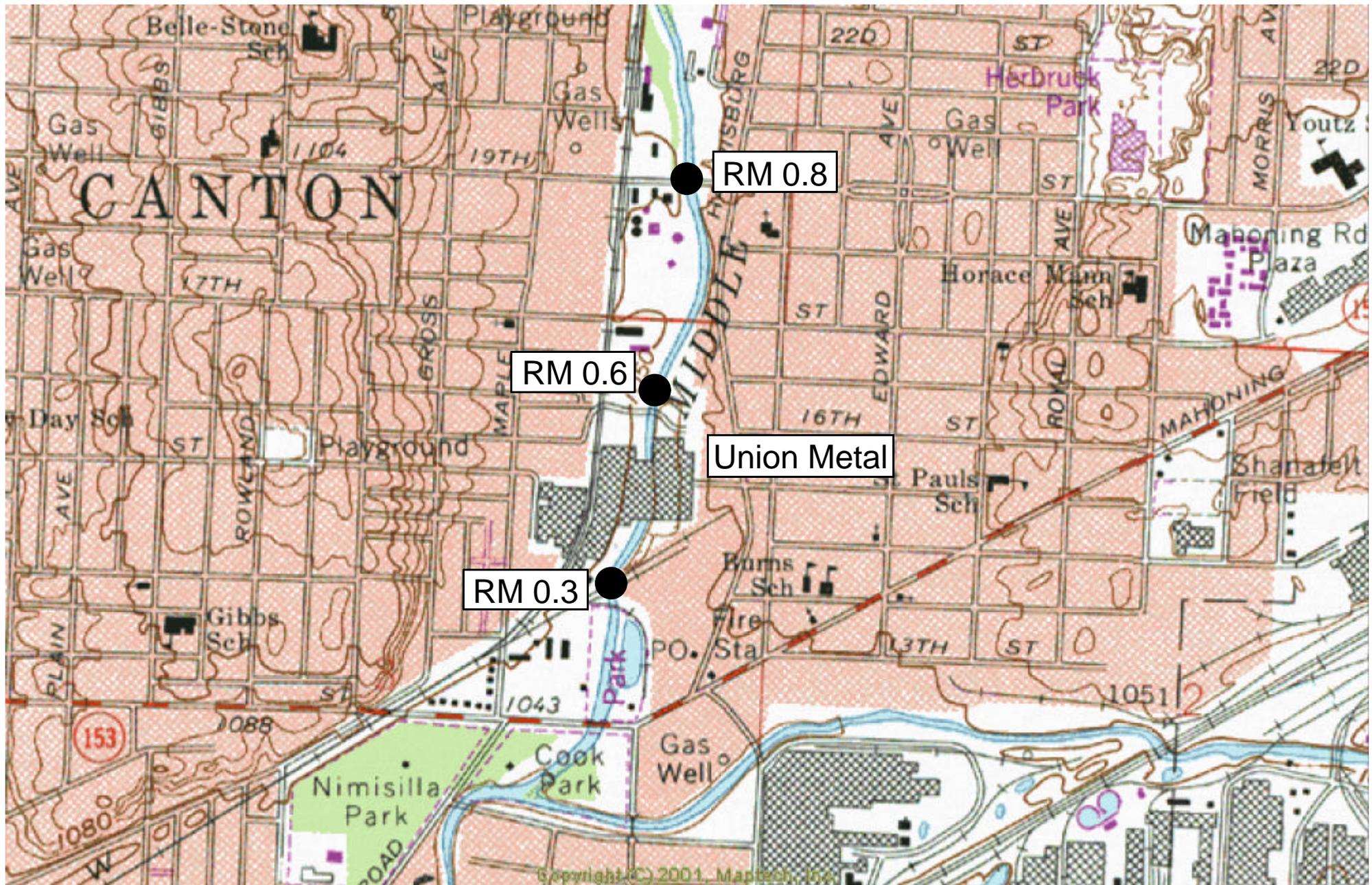


Figure 1. Map of the Middle Branch Nimishillen Creek showing biological sampling locations, 2001.



pipes outflow into the lower mile of stream, influencing biological communities. Pool areas supported an impressive rock bass population at each sampling location. The low number of pollution sensitive darter species, along with lower than expected numbers of pollution intolerant species, largely contributed to the reduced IBI scores. At the most downstream site, agitated sediments released oil to the surface of the water.

Table 4. Fish community summaries based on pulsed DC electrofishing sampling conducted by Ohio EPA in the Middle Branch Nimishillen Creek from July and August, 2001. Relative number and weight are per 0.3 km for wading sites.

Stream/ River Mile	Mean Number of Species	Total Number Species	Mean Relative Number	Mean Relative Weight (kg)	QHEI	Mean Modified Index of Well Being	Mean Index of Biotic Integrity	Narrative Evaluation
<i>Middle Branch Nimishillen Creek (2001)</i>								
0.8	13.5	14	346.5	20.32	63.5	6.2*	32*	Fair
0.6	12.5	14	322.5	8.69	54	7.1*	35 <sup>ns</sup>	Fair/Marg. Good
0.3	13.0	16	334.5	8.21	57	6.4*	<u>27*</u>	Fair/Poor

Ecoregion Biocriteria: Erie Ontario Lake Plain (EOLP)

<u>INDEX</u>	<u>WWH</u>	<u>EWH</u>	<u>LRW</u>
IBI-Wading	38	50	18
MIwb - Wading	7.9	9.4	4.0

\* Significant departure from ecoregional biocriterion (>4 IBI units); poor and very poor results are underlined.

<sup>ns</sup> Nonsignificant departure from biocriterion (≤4 IBI units; ≤0.5 MIwb units).

### Macroinvertebrate Assessment

Macroinvertebrates were collected from artificial substrates and from the natural habitats of three Middle Branch Nimishillen Creek sites on August 24, 2001. The three sites were located at 19<sup>th</sup> Street (RM 0.8), adjacent Union Metal (RM 0.6) and at the downstream end of Union Metal (RM 0.3). The artificial substrate collection provided quantitative data and consisted of a composite sample of 5 modified Hester-Dendy multiple-plate samplers colonized for six weeks. At the time of the artificial substrate collection, a qualitative multihabitat composite sample was also collected. This sampling effort consisted of an inventory of all observed macroinvertebrate taxa from the natural habitats at each site with no attempt to quantify populations other than notations on the predominance of specific taxa or taxa groups within major macrohabitat types (e.g., riffle, run, pool, margin). Total collecting time at a site ranged from 40 to 60 minutes. Invertebrate Community Index (ICI) scores were calculated from the sampling results and, along with the composition of taxa collected, were used to assess the

status of the designated Warmwater Habitat (WWH) aquatic life use designation of Middle Branch Nimishillen Creek.

The macroinvertebrate communities from the three sampling locations were very similar (Table 5). All three sites had an ICI score of 26. This score is less than the codified ecoregional biocriterion established for Warmwater Habitat (WWH) streams and rivers in Ohio. Although none of the sites attained the designated WWH use, there were no apparent site related impacts on the macroinvertebrate community from the upstream to the adjacent and downstream Union Metal sites.

Table 5. Summary of macroinvertebrate data collected from artificial substrates (quantitative sampling) and natural substrates (qualitative sampling) in the Middle Branch Nimishillen Creek, July - August, 2001.

Stream/ River Mile	Density Number/ft <sup>2</sup>	Total Taxa	Quantitative Taxa	Qualitative Taxa	Qual. EPT <sup>a</sup>	ICI	Narrative Evaluation
<i>Middle Branch Nimishillen Creek (2001)</i>							
0.8	227	51	40	35	6	26*	Fair
0.6	539	59	40	39	4	26*	Fair
0.3	401	50	37	34	6	26*	Fair

Ecoregion Biocriteria: Erie Ontario Lake Plain (EOLP)

<u>INDEX</u>	<u>WWH</u>	<u>EWH</u>	<u>LRW</u>
ICI	34	46	8

<sup>a</sup>EPT=total Ephemeroptera (mayflies), Plecoptera (stoneflies), & Trichoptera (caddisflies) taxa richness.

\*Significant departure from ecoregion biocriterion (>4 ICI units); poor and very poor results are underlined.

<sup>ns</sup>Nonsignificant departure from ecoregion biocriterion (≤4 ICI units).

## REFERENCES

- Ohio Environmental Protection Agency. 1987a. Biological criteria for the protection of aquatic life: Volume I. The role of biological data in water quality assessment. Division of Water Quality Monitoring and Assessment, Surface Water Section, Columbus, Ohio.
- \_\_\_ 1987b. Biological criteria for the protection of aquatic life: Volume II. Users manual for biological field assessment of Ohio surface waters. Division of Water Quality Monitoring and Assessment, Surface Water Section, Columbus, Ohio.
- \_\_\_ 1989a. Ohio EPA manual of surveillance methods and quality assurance practices, updated edition. Division of Environmental Services, Columbus, Ohio.
- \_\_\_ 1989b. Addendum to biological criteria for the protection of aquatic life: Users manual for biological field assessment of Ohio surface waters. Division of Water Quality Planning and Assessment, Surface Water Section, Columbus, Ohio.
- \_\_\_ 1989c. Biological criteria for the protection of aquatic life: Volume III. Standardized biological field sampling and laboratory methods for assessing fish and macroinvertebrate communities. Division of Water Quality Planning and Assessment, Columbus, Ohio.
- Rankin, E.T. 1995. The qualitative habitat evaluation index (QHEI), *in* W.S. Davis and T. Simon (eds.). Biological Assessment and Criteria: Tools for Risk-based Planning and Decision Making. CRC Press/Lewis Publishers, Ann Arbor. (in press).
- Rankin, E.T. 1989. The qualitative habitat evaluation index (QHEI): rationale, methods, and application. Division of Water Quality Planning and Assessment, Columbus, Ohio.

APPENDICES

Middle Branch Nimishillen Creek, 2001

River Mile	Type	Date	Drainage area (sq mi)	Number of					Percent of Individuals					Rel.No. minus tolerants /(0.3km)	IBI	Modified Iwb	
				Total species	Sunfish species	Sucker species	Intolerant species	Darter species	Simple Lithophils	Tolerant fishes	Omni-vores	Top carnivores	Insect-ivores				DELT anomalies
M Br Nimishillen Cr. - (17462)																	
Year: 2001																	
0.80	E	07/11/2001	45	13(3)	4(5)	2(3)	1(1)	2(1)	33(3)	43(3)	38(1)	30.7(5)	27(3)	1.0(3)	170(1)	32	6.2
0.80	E	08/24/2001	45	12(3)	4(5)	2(3)	1(1)	2(1)	27(3)	60(1)	47(1)	16.4(5)	31(3)	0.0(5)	159(1)	32	6.1
0.60	E	07/11/2001	45	13(3)	3(3)	2(3)	1(1)	2(1)	13(1)	21(5)	16(5)	60.9(5)	17(1)	0.0(5)	225(3)	36	6.7
0.60	E	08/24/2001	45	12(3)	3(3)	2(3)	1(1)	2(1)	20(3)	35(3)	23(3)	40.3(5)	21(1)	0.0(5)	236(3)	34	7.4
0.30	E	07/11/2001	46	12(3)	3(3)	1(1)	1(1)	2(1)	6(1)	28(3)	23(3)	66.2(5)	8(1)	0.0(5)	167(1)	28	5.8
0.30	E	08/24/2001	46	14(3)	6(5)	2(3)	1(1)	2(1)	14(1)	49(1)	41(1)	36.6(5)	13(1)	2.5(1)	225(3)	26	7.0

na - Qualitative data, Modified Iwb not applicable.

▲ - IBI is low end adjusted.

\* - < 200 Total individuals in sample

\*\* - < 50 Total individuals in sample

● - One or more species excluded from IBI calculation.

# Species List

River Code: <b>17-462</b> River Mile: <b>0.80</b>	Stream: <b>Middle Branch Nimishillen Creek</b> Basin: Muskingum River Time Fished: 4906 sec    Drain Area: 45.0 sq mi Dist Fished: 0.40 km    No of Passes: 2	Sample Date: <b>2001</b> Date Range: 07/11/2001 Thru: 08/24/2001 Sampler Type: E
------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	I	S	M	20	15.00	4.33	0.34	1.65	22.30
White Sucker	W	O	S	T	35	26.25	7.58	0.65	3.19	24.71
Common Carp	G	O	M	T	7	5.25	1.52	15.19	74.74	2,892.86
Creek Chub	N	G	N	T	20	15.00	4.33	0.10	0.48	6.45
Bluntnose Minnow	N	O	C	T	156	117.00	33.77	0.41	2.01	3.48
Yellow Bullhead		I	C	T	20	15.00	4.33	0.44	2.14	29.00
Rock Bass	S	C	C		46	34.50	9.96	2.60	12.78	75.28
Largemouth Bass	F	C	C		58	43.50	12.55	0.25	1.22	5.70
Green Sunfish	S	I	C	T	5	3.75	1.08	0.09	0.43	23.00
Bluegill Sunfish	S	I	C	P	6	4.50	1.30	0.06	0.31	14.00
Pumpkinseed Sunfish	S	I	C	P	3	2.25	0.65	0.05	0.25	22.67
Yellow Perch			M		6	4.50	1.30	0.01	0.07	3.00
Greenside Darter	D	I	S	M	9	6.75	1.95	0.06	0.27	8.22
Banded Darter	D	I	S	I	71	53.25	15.37	0.10	0.47	1.79
<i>Mile Total</i>					462	346.50		20.32		
<i>Number of Species</i>					14					
<i>Number of Hybrids</i>					0					

# Species List

River Code: <b>17-462</b> River Mile: <b>0.60</b>	Stream: <b>Middle Branch Nimishillen Creek</b> Basin: Muskingum River Time Fished: 4982 sec    Drain Area: 45.0 sq mi Dist Fished: 0.40 km    No of Passes: 2	Sample Date: <b>2001</b> Date Range: 07/11/2001 Thru: 08/24/2001 Sampler Type: E
------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Mudminnow		I	C	T	1	0.75	0.23	0.00	0.05	6.00
Northern Hog Sucker	R	I	S	M	11	8.25	2.56	0.74	8.57	90.18
White Sucker	W	O	S	T	34	25.50	7.91	1.79	20.59	70.15
Creek Chub	N	G	N	T	2	1.50	0.47	0.00	0.05	3.00
Bluntnose Minnow	N	O	C	T	52	39.00	12.09	0.17	2.00	4.46
Yellow Bullhead		I	C	T	34	25.50	7.91	1.31	15.13	51.54
Rock Bass	S	C	C		73	54.75	16.98	3.82	43.94	69.73
Smallmouth Bass	F	C	C	M	2	1.50	0.47	0.05	0.60	34.50
Largemouth Bass	F	C	C		137	102.75	31.86	0.46	5.33	4.51
Bluegill Sunfish	S	I	C	P	5	3.75	1.16	0.05	0.60	14.00
Pumpkinseed Sunfish	S	I	C	P	3	2.25	0.70	0.07	0.77	29.67
Yellow Perch			M		48	36.00	11.16	0.16	1.86	4.48
Greenside Darter	D	I	S	M	5	3.75	1.16	0.02	0.18	4.20
Banded Darter	D	I	S	I	23	17.25	5.35	0.03	0.35	1.74
<i>Mile Total</i>					430	322.50		8.69		
<i>Number of Species</i>					14					
<i>Number of Hybrids</i>					0					

# Species List

River Code: <b>17-462</b> River Mile: <b>0.30</b>	Stream: <b>Middle Branch Nimishillen Creek</b> Basin: Muskingum River Time Fished: 4942 sec     Drain Area: 46.0 sq mi Dist Fished: 0.40 km     No of Passes: 2	Sample Date: <b>2001</b> Date Range: 07/11/2001 Thru: 08/24/2001 Sampler Type: E
------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	I	S M	6	4.50	1.35	0.03	0.42	7.67
White Sucker	W	O	S T	38	28.50	8.52	1.82	22.23	64.00
Creek Chub	N	G	N T	2	1.50	0.45	0.00	0.04	2.00
Bluntnose Minnow	N	O	C T	119	89.25	26.68	0.35	4.23	3.88
Yellow Bullhead		I	C T	25	18.75	5.61	1.37	16.68	73.00
White Crappie	S	I	C	2	1.50	0.45	0.01	0.09	5.00
Rock Bass	S	C	C	78	58.50	17.49	3.86	46.99	65.92
Smallmouth Bass	F	C	C M	1	0.75	0.22	0.00	0.02	2.00
Largemouth Bass	F	C	C	129	96.75	28.92	0.34	4.09	3.47
Warmouth Sunfish	S	C	C	1	0.75	0.22	0.01	0.16	17.00
Green Sunfish	S	I	C T	1	0.75	0.22	0.01	0.16	18.00
Bluegill Sunfish	S	I	C P	6	4.50	1.35	0.11	1.36	24.67
Pumpkinseed Sunfish	S	I	C P	6	4.50	1.35	0.12	1.46	26.67
Green Sf X Bluegill Sf				2	1.50	0.45	0.07	0.90	49.00
Yellow Perch			M	24	18.00	5.38	0.08	1.02	4.67
Greenside Darter	D	I	S M	2	1.50	0.45	0.01	0.10	5.50
Banded Darter	D	I	S I	4	3.00	0.90	0.01	0.07	2.00
<i>Mile Total</i>				446	334.50		8.21		
<i>Number of Species</i>				16					
<i>Number of Hybrids</i>				1					

Middle Branch Nimishillen Creek, 2001

River Mile	Drainage Area (sq mi)	Number of				Percent:					Qual. EPT	Eco-region	ICI
		Total Taxa	Mayfly Taxa	Caddisfly Taxa	Dipteran Taxa	Mayflies	Caddis-flies	Tany-tarsini	Other Dipt/NI	Tolerant Organisms			
<b>Middle Branch Nimishillen Creek (17-462)</b>													
<b>Year: 2001</b>													
0.80	45.0	40(6)	2(0)	3(4)	15(4)	8.3(2)	0.4(2)	1.3(2)	80.6(0)	7.9(4)	6(2)	3	26
0.60	45.0	40(6)	2(0)	2(4)	19(4)	3.3(2)	0.2(2)	4.2(2)	89.2(0)	5.6(6)	4(0)	3	26
0.30	46.0	37(4)	2(0)	4(6)	14(4)	1.1(2)	0.8(2)	2.9(2)	91.9(0)	7.7(4)	6(2)	3	26

**Ohio EPA/DSW Ecological Assessment Section  
Macroinvertebrate Collection**

Collection Date: 08/24/2001 River Code: 17-462 River: Middle Branch Nimishillen Creek RM: 0.80

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
00401	<i>Spongillidae</i>	+	93900	<i>Elimia sp</i>	5 +
01320	<i>Hydra sp</i>	14	95100	<i>Physella sp</i>	14 +
01801	<i>Turbellaria</i>	59 +	96120	<i>Menetus (Micromenetus) dilatatus</i>	2
03600	<i>Oligochaeta</i>	52 +	96264	<i>Planorbella (Pierosoma) pilsbryi</i>	1
04666	<i>Helobdella triserialis</i>	2	96900	<i>Ferrissia sp</i>	12
04935	<i>Erpobdella punctata punctata</i>	+	97601	<i>Corbicula fluminea</i>	+
05800	<i>Caecidotea sp</i>	108 +	98200	<i>Pisidium sp</i>	13
06201	<i>Hyalella azteca</i>	77 +			
06700	<i>Crangonyx sp</i>	42 +	<b>No. Quantitative Taxa: 40</b>		<b>Total Taxa: 51</b>
08260	<i>Orconectes (Crockerinus) sanbornii sanbornii</i>	+	<b>No. Qualitative Taxa: 35</b>		<b>ICI: 26</b>
11125	<i>Pseudocloeon frondalis</i>	+	<b>Number of Organisms: 1135</b>		<b>Qual EPT: 6</b>
16700	<i>Tricorythodes sp</i>	18 +			
17200	<i>Caenis sp</i>	76 +			
22001	<i>Coenagrionidae</i>	57 +			
22300	<i>Argia sp</i>	7 +			
23501	<i>Aeshnidae</i>	1			
52200	<i>Cheumatopsyche sp</i>	2 +			
52530	<i>Hydropsyche depravata group</i>	1 +			
53800	<i>Hydroptila sp</i>	1			
59550	<i>Oecetis inconspicua complex sp A (sensu Floyd, 1995)</i>	+			
65800	<i>Berosus sp</i>	14 +			
68700	<i>Dubiraphia sp</i>	7			
68901	<i>Macronychus glabratus</i>	13 +			
69400	<i>Stenelmis sp</i>	8 +			
74100	<i>Simulium sp</i>	+			
74501	<i>Ceratopogonidae</i>	4			
77500	<i>Conchapelopia sp</i>	93			
77800	<i>Helopelopia sp</i>	73 +			
78600	<i>Pentaneura inconspicua</i>	86 +			
78655	<i>Procladius (Holotanypus) sp</i>	+			
80420	<i>Cricotopus (C.) bicinctus</i>	12 +			
81650	<i>Parametriocnemus sp</i>	6			
82700	<i>Chironomus sp</i>	6			
82820	<i>Cryptochironomus sp</i>	1 +			
83002	<i>Dicrotendipes modestus</i>	14 +			
83040	<i>Dicrotendipes neomodestus</i>	13			
84210	<i>Paratendipes albimanus or P. duplicatus</i>	13			
84300	<i>Phaenopsectra obediens group</i>	13 +			
84450	<i>Polypedilum (P.) flavum</i>	+			
84470	<i>Polypedilum (P.) illinoense</i>	+			
84540	<i>Polypedilum (Tripodura) scalaenum group</i>	178 +			
84800	<i>Tribelos jucundum</i>	2			
85800	<i>Tanytarsus sp</i>	15 +			
93200	<i>Hydrobiidae</i>	+			

**Ohio EPA/DSW Ecological Assessment Section  
Macroinvertebrate Collection**

Collection Date: 08/24/2001 River Code: 17-462 River: Middle Branch Nimishillen Creek RM: 0.60

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	143 +	84470	<i>Polypedilum (P.) illinoense</i>	1 +
03600	<i>Oligochaeta</i>	28 +	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	184 +
04666	<i>Helobdella triserialis</i>	1	84700	<i>Stenochironomus sp</i>	14
05800	<i>Caecidotea sp</i>	185 +	84800	<i>Tribelos jucundum</i>	1
06201	<i>Hyaella azteca</i>	547 +	85800	<i>Tanytarsus sp</i>	86 +
06700	<i>Crangonyx sp</i>	107	85821	<i>Tanytarsus glabrescens group sp 7</i>	28
08260	<i>Orconectes (Crockerinus) sanbornii sanbornii</i>	+	92613	<i>Cipangopaludina chinensis malleata</i>	+
08601	<i>Hydracarina</i>	+	93200	<i>Hydrobiidae</i>	4 +
13400	<i>Stenacron sp</i>	+	93900	<i>Elimia sp</i>	+
16700	<i>Tricorythodes sp</i>	17 +	95100	<i>Physella sp</i>	65 +
17200	<i>Caenis sp</i>	71 +	96120	<i>Menetus (Micromenetus) dilatatus</i>	32
22001	<i>Coenagrionidae</i>	23 +	96264	<i>Planorbella (Pierosoma) pilsbryi</i>	+
22300	<i>Argia sp</i>	11 +	97601	<i>Corbicula fluminea</i>	+
23700	<i>Anax sp</i>	+	98001	<i>Sphaeriidae</i>	18
27610	<i>Epitheca (Tetragoneuria) cynosura</i>	+	99820	<i>Villosa iris iris</i>	+
43300	<i>Ranatra sp</i>	+			
47600	<i>Sialis sp</i>	1	<b>No. Quantitative Taxa: 40</b>		<b>Total Taxa: 59</b>
52200	<i>Cheumatopsyche sp</i>	3	<b>No. Qualitative Taxa: 39</b>		<b>ICI: 26</b>
52530	<i>Hydropsyche depravata group</i>	+	<b>Number of Organisms: 2693</b>		<b>Qual EPT: 4</b>
53800	<i>Hydroptila sp</i>	2			
60900	<i>Peltodytes sp</i>	+			
65800	<i>Berosus sp</i>	33 +			
68601	<i>Ancyronyx variegata</i>	+			
68702	<i>Dubiraphia bivittata</i>	1 +			
68901	<i>Macronychus glabratus</i>	12 +			
69400	<i>Stenelmis sp</i>	4 +			
74100	<i>Simulium sp</i>	+			
74501	<i>Ceratopogonidae</i>	+			
77750	<i>Hayesomyia senata or Thienemannimyia norena</i>	14			
77800	<i>Helopelopia sp</i>	603			
78350	<i>Meropelopia sp</i>	+			
78600	<i>Pentaneura inconspicua</i>	239 +			
78655	<i>Procladius (Holotanypus) sp</i>	+			
80420	<i>Cricotopus (C.) bicinctus</i>	15 +			
80490	<i>Cricotopus (Isocladius) intersectus group</i>	14			
81632	<i>Parakiefferiella n.sp 2</i>	28			
82730	<i>Chironomus (C.) decorus group</i>	42			
82820	<i>Cryptochironomus sp</i>	14			
82882	<i>Cryptotendipes sp 2</i>	+			
83002	<i>Dicrotendipes modestus</i>	72 +			
83040	<i>Dicrotendipes neomodestus</i>	14			
84210	<i>Paratendipes albimanus or P. duplicatus</i>	14			
84450	<i>Polypedilum (P.) flavum</i>	1			
84460	<i>Polypedilum (P.) fallax group</i>	1			

**Ohio EPA/DW Ecological Assessment Section  
Macroinvertebrate Collection**

Collection Date: 08/24/2001 River Code: 17-462 River: Middle Branch Nimishillen Creek RM: 0.30

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	397 +	95100	<i>Physella sp</i>	12 +
03600	<i>Oligochaeta</i>	62 +	96120	<i>Menetus (Micromenetus) dilatatus</i>	22
05800	<i>Caecidotea sp</i>	1 +	96900	<i>Ferrissia sp</i>	8
06201	<i>Hyalella azteca</i>	65 +	97601	<i>Corbicula fluminea</i>	+
06700	<i>Crangonyx sp</i>	10	98200	<i>Pisidium sp</i>	15 +
08260	<i>Orconectes (Crokerinus) sanbornii sanbornii</i>	+	99100	<i>Pyganodon grandis</i>	+
08601	<i>Hydracarina</i>	12 +			
11001	<i>Baetidae</i>	8	<b>No. Quantitative Taxa: 37</b>		<b>Total Taxa: 50</b>
11200	<i>Callibaetis sp</i>	+	<b>No. Qualitative Taxa: 34</b>		<b>ICI: 26</b>
13400	<i>Stenacron sp</i>	+	<b>Number of Organisms: 2005</b>		<b>Qual EPT: 6</b>
17200	<i>Caenis sp</i>	14 +			
22001	<i>Coenagrionidae</i>	12 +			
22300	<i>Argia sp</i>	2 +			
27610	<i>Epitheca (Tetragoneuria) cynosura</i>	+			
52200	<i>Cheumatopsyche sp</i>	12 +			
52530	<i>Hydropsyche depravata group</i>	+			
53800	<i>Hydroptila sp</i>	2			
54300	<i>Oxyethira sp</i>	1			
59310	<i>Mystacides sepulchralis</i>	1 +			
60900	<i>Peltodytes sp</i>	+			
65800	<i>Berosus sp</i>	22 +			
68702	<i>Dubiraphia bivittata</i>	1 +			
68901	<i>Macronychus glabratus</i>	2 +			
69400	<i>Stenelmis sp</i>	27			
72501	<i>Culicidae</i>	+			
77500	<i>Conchapelopia sp</i>	366			
77800	<i>Helopelopia sp</i>	99			
78600	<i>Pentaneura inconspicua</i>	394 +			
78655	<i>Procladius (Holotanypus) sp</i>	+			
80420	<i>Cricotopus (C.) bicinctus</i>	72 +			
81231	<i>Nanocladius (N.) crassicornus or N. (N.) "rectinervis"</i>	36			
82800	<i>Cladopelma sp</i>	+			
82820	<i>Cryptochironomus sp</i>	12			
83002	<i>Dicrotendipes modestus</i>	12 +			
83040	<i>Dicrotendipes neomodestus</i>	35			
84000	<i>Parachironomus sp</i>	12			
84315	<i>Phaenopsectra flavipes</i>	2			
84450	<i>Polypedilum (P.) flavum</i>	132 +			
84540	<i>Polypedilum (Tripodura) scalaenum group</i>	59 +			
85625	<i>Rheotanytarsus exiguus group</i>	47			
85800	<i>Tanytarsus sp</i>	12			
92613	<i>Cipangopaludina chinensis malleata</i>	+			
93200	<i>Hydrobiidae</i>	7 +			
94400	<i>Fossaria sp</i>	+			