

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
WATER RESOURCES DIVISION  
MARCH 2014

STAFF REPORT

A BIOLOGICAL SURVEY OF THE BLACK RIVER WATERSHED  
ALLEGAN AND VAN BUREN COUNTIES, MICHIGAN  
AUGUST 2012

INTRODUCTION

Objective

Qualitative biological surveys of the Black River watershed (Hydrologic Unit Code 04050002) were conducted by staff of the Michigan Department of Environmental Quality (MDEQ), Surface Water Assessment Section (SWAS) during August 2012. The surveys were performed according to the SWAS Procedure 51 (MDEQ 1990; Creal et al., 1996) at ten stations (Figure 1), to evaluate biological communities and physical conditions of selected locations. The specific objectives of the survey were to:

- Assess the current status and condition of individual waters of the state and determine whether Michigan Water Quality Standards are being met.
- Evaluate the effectiveness of Best Management Practices under the MDEQ Nonpoint Source (NPS) program including bank stabilization, bioinfiltration, and wetland construction.

Background and Historical Sampling

The Black River watershed is within the Southern Michigan Northern Indiana Till Plain (SMNITP) ecoregion (Omernik and Gallant, 1988). The SMNITP is characterized by lacustrine clay and silt soils, and historically white oak-white pine forest. The Black River watershed encompasses three counties; however, sampling only occurred in Allegan and Van Buren Counties. The Black River watershed flows primarily through agricultural land and connects with Lake Michigan in the town of South Haven. The South Branch of the Black River has a history of impaired water quality and contaminated sediments downstream of Du-Wel Metal Products that were remediated during 2002-2004 under the supervision of the MDEQ, Remediation and Redevelopment Division (Walterhouse, 2008). This watershed has experienced channelization and dredging of streams and draining of wetlands making it difficult to sustain adequate habitat in various stream locations. Numerous biological surveys have been conducted by MDEQ staff in the Black River watershed including 1992 (Heaton, 1997), 1997 (Cooper, 1999), 2002 (Walterhouse, 2003), and 2007 (Walterhouse, 2008).

The Black River watershed was last sampled by the MDEQ in August and September 2007 using Procedure 51 at 18 stations. Habitat evaluations showed sites to either be Marginal (7 sites) or Good (11 sites) (Walterhouse, 2008). The sites that scored Good had recovered from dredging/channelization with growth of wetland corridors and the presence of large woody debris. Macroinvertebrate communities were rated as Excellent (4 sites) or Acceptable (14 sites) (Walterhouse, 2008). All of the Acceptable sites lacked the presence of Plecoptera, a sensitive order of macroinvertebrates, while Plecoptera was present in all of the Excellent sites.

Three sites were sampled for fish communities and all rated Acceptable. The Other Indigenous Aquatic Life and Wildlife designated use was being met based on Procedure 51 macroinvertebrate communities at all stations where sampling occurred.

Baseline data were collected in 2007 for Haven and Max Lake Drain at Bloomingdale Park for a NPS project involving channel restoration on 1,100 linear feet, 600 linear feet of bank stabilization with tree revetments, and a 1,550 square foot rain garden designed to treat storm water runoff from the site. Nine fish species were collected, all considered tolerant species for degraded environmental conditions. Creek chub were dominant followed by white sucker, central mudminnow, and johnny darter. The Haven and Max Lake Drain habitat score was Marginal (101) and the macroinvertebrate community was Acceptable (3) (Walterhouse, 2008). Follow-up data at this site were collected in 2012. Another NPS site at South Branch Black River and Lyons Park was sampled in 2007 to review the stabilization of the shoreline through native plantings in 2006 and a 3,600 square foot rain garden constructed in 2007 to filter storm water. There was an increase in stream habitat from Marginal (97) in 2002 to Good (133) in 2007 due to increased bank stability and vegetation on stream banks (Walterhouse, 2008). Macroinvertebrate scores stayed constant from 2002 (Acceptable, 2) to 2007 (Acceptable, 2) with a good diversity of taxa (Walterhouse, 2008). The fish community was sampled in 2002 (Acceptable, 3) and 2007 (Acceptable, 4) (Walterhouse, 2008). The site showed a shift from a dominance of centrarchids to cyprinids and still meets its coldwater fisheries designated use in both sampling periods. Sampling for fish communities, habitat, and macroinvertebrate communities was conducted in 2012 at this site to review the progress of the site post-restoration.

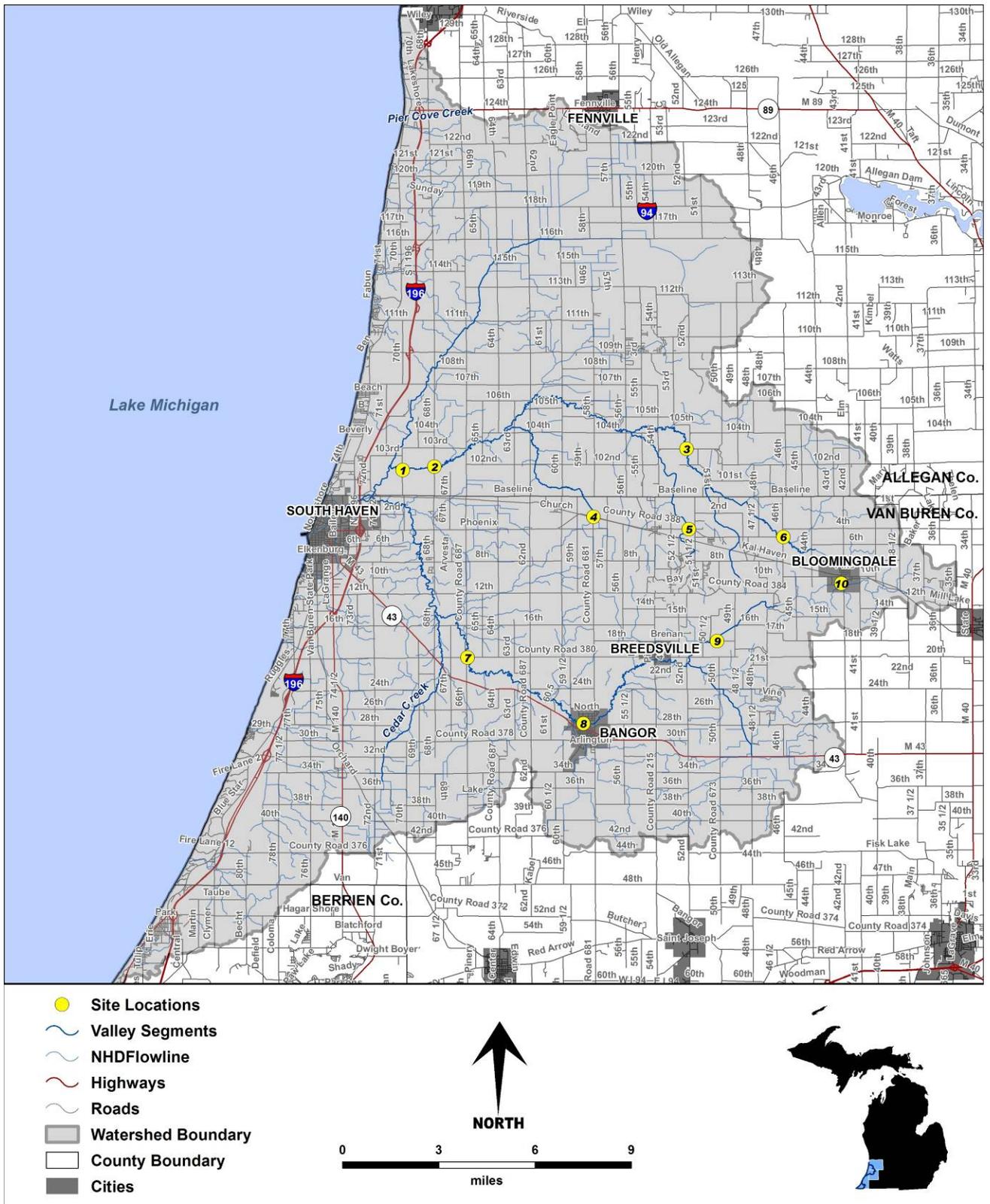


Figure 1. Black River Watershed, 2012 Survey Site Locations.

## METHODS

Procedure 51 describes the methodology for macroinvertebrate, fish, and habitat surveys of wadeable streams, and was used to evaluate the stations. Procedure 51 rates macroinvertebrate communities as Poor (-9 to -5), Acceptable (-4 to +4), and Excellent (+5 to +9), based on the proportions of each taxa found, and the sensitivity of the community assemblage to water quality. Habitat was rated on a scale of Poor (<56), Marginal (56-104), Good (105-154), or Excellent (>154) based on in-stream and riparian characteristics and impairments.

Two site selection methods were used to assess the Black River watershed in 2012: *stratified random* to address statewide, regional, and watershed questions about water quality and *targeted* to address specific areas of interest. There were seven randomly selected status sites and one randomly selected trend site that is now fixed to be sampled every five years (Table 1). The targeted sites were South Branch Black River at Lyons Park and Haven and Max Lake Drain at Bloomingdale Park to address specific areas of interest relating to water quality (Table 1). The two targeted sites were sampled to fulfill specific monitoring requests from the MDEQ, NPS district staff who identified locations that need additional monitoring and/or sampling due to a NPS concern. The targeted sampling assessed water quality using habitat, macroinvertebrates, and fish following bank stabilization, bioinfiltration, and wetland construction. Procedure 51 was used to assess the macroinvertebrates, fish community, and habitat at each random and targeted monitoring site. A target of 300 individual macroinvertebrates was counted at each site.

## RESULTS

### Status and Trend Surveys

Macroinvertebrate communities in wadeable streams were sampled and scored using Procedure 51 (Tables 2A, 2B, and 2C). Two sites had Excellent macroinvertebrate community ratings, while the other eight sites were rated Acceptable. The habitat was sampled and scored using Procedure 51 (Tables 3A and 3B). Two sites had Marginal habitat scores, while the rest had Good habitat scores (Figure 1, Table 1). The fish community at two wadeable sites were scored Excellent and Acceptable (Table 4).



Site 1. Middle Branch Black River at 70th Street.

Site 1. This glide/pool station had an Acceptable (4) macroinvertebrate score and a Good (126) habitat score. Large woody debris was present above and below the water line in this reach of stream and sand was the primary substrate. The macroinvertebrate community had a good amount of diversity including mayflies and caddisflies.



Site 2. Middle Branch Black River at 68th Street.

Site 2. This glide/pool site had an Excellent (5) macroinvertebrate score and a Good (126) habitat score. The site was dominated by sand substrate, had extensive root wads, some pool variability, and sediment deposits in the channel. This site would benefit from epifaunal substrate for fish cover. The macroinvertebrate community had excellent diversity and included all three of the most sensitive Ephemeroptera (mayfly), Plecoptera (stonefly), and Trichoptera (caddisfly) (EPT) taxa.



Site 3. Middle Branch Black River at 103rd Avenue.

Site 3. This glide/pool site had an Acceptable (-1) macroinvertebrate community and a Good (140) habitat score. The substrate was dominated by sand with moderate levels of rootwads and large woody debris. The vegetative protection and bank stability provided adequate habitat at this station. This site had a high number of tolerant taxa such as amphipods and few numbers of sensitive taxa.



Site 4. Spicebush Creek at County Road 388.

Site 4. This glide/pool site had an Acceptable (-4) macroinvertebrate score and a Good (129) habitat score. It also had a good vegetation buffer at the banks with scrub/shrub wetland on either side of the creek. There is a soft stream bottom with entirely silt substrate. This site scored at the very low end of acceptable with mostly amphipods and chironomids.



Site 5. Barber Creek at County Road 388.

Site 5. This glide/pool station had an Acceptable (-2) macroinvertebrate community and a Marginal (104) habitat score. This was a recently cleaned ditch that had very little cover and primarily sand substrate. Seventy five percent of the macroinvertebrate sample was amphipods with a few caddisflies and one mayfly.



Site 6. Melvin Creek at 46th Street.

Site 6. This riffle/run site had an Acceptable (1) macroinvertebrate community and a Good (121) habitat score. The site is void of in-stream structure and the substrate is primarily silt. The macroinvertebrate community included high counts of amphipods and chironomids. Sensitive taxa were counted at this site; however, they were not abundant.



Site 7. South Branch Black River at County Road 380/20th Avenue.

Site 7. This glide/pool site had an Excellent (5) macroinvertebrate community and a Good (112) habitat score. It also had primarily sand substrate with moderate amounts of large woody debris within the stream. This site had poor bank stability and steep embankments leading to the river. All three of the EPT taxa were counted at this site.



Site 9. Great Bear Lake Drain at 18th Avenue.

Site 9. This glide/pool station had an Acceptable (-1) macroinvertebrate score and a Marginal (94) habitat score. This is a ditch with soft substrates composed primarily of silt. There are minimal rootwads in the stream for structure, and overall structure is lacking. The macroinvertebrates included high counts of amphipods and elmids beetles.

#### NPS Targeted Monitoring



Site 8. South Branch Black River at Lyons Park in Bangor.

Site 8. This riffle/run station had an Acceptable (4) macroinvertebrate score, a Good (136) habitat score, and an Excellent (6) fish community. The coir bundles that had been placed along the banks were missing and only stakes for the coir bundles were remaining. Half of the substrate is composed of cobble with low percentages of gravel and sand. Macroinvertebrates were composed primarily of mayflies and caddisflies. The fish community consisted primarily of bluegills (30 percent) followed closely by green sunfish (23 percent). Rainbow trout, chinook salmon, and northern pike were also sampled at this location.



Site 10. Haven and Max Lake Drain at Bloomingdale Park.

Site 10. This riffle/run site had an Acceptable (2) macroinvertebrate community, Good (141) habitat score, and a barely Acceptable (-4) fish community. The drain had a 10-foot wide restored riparian zone with parking lots and mowed lawns outside of that buffer zone. It also had overhanging vegetation and large woody debris providing structure to the system. The site had a high caddisfly count and some mayflies. The fish community consisted primarily of creek chubs (33 percent) and white suckers (31 percent).

Table 1. 2012 Sampling Locations in Black Creek Watershed.

Station Number	Stream	Survey Location	County	STORET	Lat	Long	Basis of Survey Trend(T) Status (S) Targeted (NPS)	Sampling Parameters- Fish(F), Bug(B), Habitat(H), Water(W), Sediment(S)	Habitat Evaluation		Macroinvertebrate Community		Fish Community	
1	Middle Branch Black River	70th St	Allegan	030011	42.43081	-86.22634	S	B & H	Good	126	Acceptable	4		
2	Middle Branch Black River	68th St	Allegan	030668	42.4324	-86.207	S	B & H	Good	126	Excellent	5		
3	Middle Branch Black River	103rd Ave	Allegan	030667	42.44060	-86.0531	S	B & H	Good	140	Acceptable	-1		
4	Spicebush Creek	CO Rd 388	Van Buren	800590	42.40988	-86.10995	S	B & H	Good	129	Acceptable	-4		
5	Barber Creek	CO Rd 388	Van Buren	800591	42.40434	-86.05176	S	B & H	Marginal	104	Acceptable	-2		
6	Melvin Creek	46th Street	Van Buren	800571	42.40080	-85.994	S	B & H	Good	121	Acceptable	1		
7	South Branch Black River	CO Rd 380 (20th Ave)	Van Buren	800532	42.34620	-86.1865	T	B & H	Good	112	Excellent	5		
8	South Branch Black River	Lyons Park in Bangor	Van Buren	800469	42.31650	-86.1159	NPS	B, F, H	Good	136	Acceptable	4	Excellent	6
9	Great Bear Lake Drain	18th Ave	Van Buren	800592	42.35381	-86.03454	S	B & H	Marginal	94	Acceptable	-1		
10	Haven & Max Lake Drain	Bloomington Park	Van Buren	800568	42.37978	-85.95882	NPS	B, F, H	Good	141	Acceptable	2	Acceptable	-4

## DISCUSSION

After reviewing the status, trends, and targeted monitoring sites in the Black River watershed, it was concluded that all sites were meeting the Other Indigenous Aquatic Life and Wildlife designated use. There were two habitat sites with marginal scores that would benefit from habitat restoration, specifically Barber Creek and Great Bear Lake Drain. Barber Creek had minimal structure due to recent dredging, while Great Bear Lake Drain was composed of soft sediments that covered available structure. Ideally, the substrate would be composed of cobble with large woody debris structure in the stream for fish and macroinvertebrate habitat; however, since the habitat quality is low, the macroinvertebrate scores at these sites are also low. Both sites scored on the low end of acceptable for macroinvertebrates with both sites having mostly amphipods, which are tolerant of pollution and environmental stress. Two sites had Excellent macroinvertebrate scores, including the Middle Branch of the Black River at 68th Street and the South Branch of the Black River at County Road 380. Both of these stations had at least moderate levels of root wads/large woody debris. Overall, each of the sampled sites require additional in-stream structure. Dredging over the years has removed habitat and created a sterile, undiversified stream bottom. This stream environment will not contain high biodiversity of fish or macroinvertebrates without additional habitat.

The two NPS sites sampled in the watershed were South Branch Black River at Lyons Park as well as Haven and Max Lake Drain at Bloomingdale Park. Habitat scores improved at both sites between the 2007 and 2012 sampling. The South Branch Black River scores were comparable from 133 (Good) to 136 (Good) and Haven and Max Lake Drain increased from 101 (Marginal) to 141 (Good). These data show that habitat restoration has been successful for these NPS sites. The macroinvertebrate scores from the South Branch Black River improved from 2 (Acceptable) to 4 (Acceptable). The macroinvertebrate scores at Haven and Max Lake Drain decreased slightly from 3 (Acceptable) to 2 (Acceptable) between 2007 and 2012. The South Branch Black River shows macroinvertebrate community improvement in line with a minimal habitat improvement. Haven and Max Lake Drain showed a substantial increase in habitat although it is not yet reflected in the macroinvertebrate community. The fish community in Haven and Max Lake Drain scored as Acceptable (-4), similar to the 2007 sampling, and lacks biodiversity for a warmwater stream. South Branch Black River at Lyons Park had high fish biodiversity and shifted to mostly centrarchids as seen in 2002. With the improvement of habitat scores due to restoration, the fish community should continue to improve as well. It is recommended that Haven and Max Lake Drain should be sampled again during the next priority watershed year (2017) to assure that the macroinvertebrate and fish communities are rebounding.

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Table 2A. Qualitative macroinvertebrate sampling results for

TAXA	Black River 70th Street 8/22/2012 STATION 1	M. B. Black River 68th Street 8/21/2012 STATION 2	M. B. Black River 103rd Avenue 8/21/2012 STATION 3	Spicebush Creek Baseline Road (CO Road 388) 8/21/2012 STATION 4
NEMATOMORPHA (roundworms)		1		
ANNELIDA (segmented worms)				
Hirudinea (leeches)			1	
Oligochaeta (worms)	1	1	1	1
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	20	8	77	180
Decapoda (crayfish)	4	1	2	2
Isopoda (sowbugs)	7	2		
Arachnoidea				
Hydracarina	4	3		
Insecta				
Ephemeroptera (mayflies)				
Baetidae	21	3		
Caenidae			3	
Ephemeridae			6	
Heptageniidae	9	10	3	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	1	4	3	1
Gomphidae	11	8	1	
Libellulidae		1	2	
Zygoptera (damselflies)				
Calopterygidae	29	53	32	1
Coenagrionidae			2	32
Plecoptera (stoneflies)				
Perlidae		3		
Perlodidae		3		
Hemiptera (true bugs)				
Corixidae			62	14
Gerridae	1	1	1	
Nepidae			3	1
Notonectidae			1	
Pleidae		1		
Veliidae		1		
Megaloptera				
Corydalidae (dobson flies)			2	
Sialidae (alder flies)	4	2	5	
Trichoptera (caddisflies)				
Brachycentridae	76	63	1	
Hydropsychidae	35	54	1	
Leptoceridae	4			
Limnephilidae	2	1	1	
Polycentropodidae	1	1	1	
Coleoptera (beetles)				
Dytiscidae (total)		3	1	
Haliphidae (adults)		1	35	3
Elmidae	6	25	2	2
Diptera (flies)				
Athericidae			2	
Ceratopogonidae		11	2	7
Chironomidae	27	20	41	72
Culicidae	1			
Simuliidae	18	21	3	
Tabanidae	1		4	
Tipulidae				1
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	1		1	
Hydrobiidae			5	
Physidae	1		3	1
Planorbidae			2	1
Pelecypoda (bivalves)				
Sphaeriidae (clams)	6	3	19	6
TOTAL INDIVIDUALS	291	309	331	325

METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	25	1	29	1	35	1	16	0
NUMBER OF MAYFLY TAXA	2	0	2	0	3	0	0	-1
NUMBER OF CADDISFLY TAXA	5	1	4	0	4	0	0	-1
NUMBER OF STONEFLY TAXA	0	-1	2	1	0	-1	0	-1
PERCENT MAYFLY COMP.	10.31	0	4.21	0	3.63	0	0.00	-1
PERCENT CADDISFLY COMP.	40.55	1	38.51	1	1.21	-1	0.00	-1
PERCENT DOMINANT TAXON	26.12	0	20.39	0	23.26	0	55.38	-1
PERCENT ISOPOD, SNAIL, LEECH	3.09	1	0.65	1	3.63	1	0.62	1
PERCENT SURF. AIR BREATHERS	0.69	1	2.27	1	31.12	-1	5.54	1
TOTAL SCORE		4		5		-1		-4
MACROINV. COMMUNITY RATING		ACCEPT.		EXCELLENT		ACCEPT.		ACCEPT.

Table 2B. Qualitative macroinvertebrate sampling results for

TAXA	Barber Creek u/s CO Rd 388 8/21/2012 STATION 5	Melvin Creek CO Rd 390 / 46th St 8/21/2012 STATION 6	S. B. Black River CO Rd 380/20th Ave 8/22/2012 STATION 7	S. B. Black River Lyons Park (d/s old dam) 8/22/2012 STATION 8				
<b>ANNELIDA (segmented worms)</b>								
Hirudinea (leeches)		6		2				
Oligochaeta (worms)	1		5	5				
<b>ARTHROPODA</b>								
<b>Crustacea</b>								
Amphipoda (scuds)	251	113	69	18				
Decapoda (crayfish)	1	1	5	3				
Isopoda (sowbugs)				6				
<b>Insecta</b>								
<b>Ephemeroptera (mayflies)</b>								
Baetidae		12	16	102				
Caenidae		1						
Ephemeridae			1					
Heptageniidae	1	1	14	11				
<b>Odonata</b>								
<b>Anisoptera (dragonflies)</b>								
Aeshnidae	9	3	3					
Gomphidae			4					
Libellulidae		17		1				
Macromiidae		1						
<b>Zygoptera (damselflies)</b>								
Calopterygidae	6	15	40	10				
Coenagrionidae	5	3	2	1				
<b>Plecoptera (stoneflies)</b>								
Perlidae			1					
<b>Hemiptera (true bugs)</b>								
Corixidae			3	3				
Gerridae	2			1				
Mesovelidae	1	1	5	1				
Naucoridae				1				
Nepidae			3					
Notonectidae	1			1				
Pleidae		2						
Veliidae	1			1				
<b>Megaloptera</b>								
Corydalidae (dobson flies)	6		1					
Sialidae (alder flies)	1	5	9					
<b>Trichoptera (caddisflies)</b>								
Brachycentridae	2		10	60				
Hydropsychidae	5	28	32	90				
Hydroptilidae			1					
Leptoceridae			3					
Limnephilidae	2	1	5	3				
Polycentropodidae			1					
<b>Coleoptera (beetles)</b>								
Dytiscidae (total)				1				
Halplidae (adults)		3		2				
Scirtidae (adults)	1							
Elmidae	4	16	11	4				
<b>Diptera (flies)</b>								
Ceratopogonidae	5	8	7	3				
Chironomidae	12	104	12	8				
Culicidae		1	1	2				
Simuliidae			1	1				
Tabanidae	3	2	8					
Tipulidae		2	1	1				
<b>MOLLUSCA</b>								
<b>Gastropoda (snails)</b>								
Ancylidae (limpets)		1						
Physidae	11	18		3				
Pleuroceridae				1				
<b>Pelecypoda (bivalves)</b>								
Sphaeriidae (clams)	2	3	2					
<b>TOTAL INDIVIDUALS</b>	<b>333</b>	<b>368</b>	<b>276</b>	<b>346</b>				
<b>METRIC</b>	<b>Value</b>	<b>Score</b>	<b>Value</b>	<b>Score</b>	<b>Value</b>	<b>Score</b>	<b>Value</b>	<b>Score</b>
TOTAL NUMBER OF TAXA	23	0	26	1	30	1	29	1
NUMBER OF MAYFLY TAXA	1	0	3	0	3	0	2	0
NUMBER OF CADDISFLY TAXA	3	0	2	0	6	1	3	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1	1	1	0	-1
PERCENT MAYFLY COMP.	0.30	-1	3.80	0	11.23	0	32.66	1
PERCENT CADDISFLY COMP.	2.70	-1	7.88	0	18.84	0	44.22	1
PERCENT DOMINANT TAXON	75.38	-1	30.71	0	25.00	0	29.48	0
PERCENT ISOPOD, SNAIL, LEECH	3.30	1	6.79	0	0.00	1	3.47	1
PERCENT SURF. AIR BREATHERS	1.80	1	1.90	1	4.35	1	3.76	1
<b>TOTAL SCORE</b>		<b>-2</b>		<b>1</b>		<b>5</b>		<b>4</b>
<b>MACROINV. COMMUNITY RATING</b>		<b>ACCEPT.</b>		<b>ACCEPT.</b>		<b>EXCELLENT</b>		<b>ACCEPT.</b>

Table 2C. Qualitative macroinvertebrate sampling results for  
 Great Bear Lk Drain 18th Ave 8/22/2012 STATION 9  
 Haven & Max Lk Drain d/s CR665/42nd St 8/22/2012 STATION 10

TAXA	STATION 9	STATION 10
<b>ANNELIDA (segmented worms)</b>		
Oligochaeta (worms)	1	
<b>ARTHROPODA</b>		
<b>Crustacea</b>		
Amphipoda (scuds)	116	46
Decapoda (crayfish)	2	3
Isopoda (sowbugs)	6	1
<b>Arachnoidea</b>		
Hydracarina		1
<b>Insecta</b>		
<b>Ephemeroptera (mayflies)</b>		
Baetidae		20
Heptageniidae	2	12
<b>Odonata</b>		
<b>Anisoptera (dragonflies)</b>		
Aeshnidae		6
Gomphidae	1	
Macromiidae	2	
<b>Zygoptera (damselflies)</b>		
Calopterygidae	22	12
Coenagrionidae	43	1
<b>Hemiptera (true bugs)</b>		
Corixidae	1	
Gerridae		2
Mesoveliidae		1
Notonectidae	1	
Veliidae	3	
<b>Megaloptera</b>		
Sialidae (alder flies)	7	
<b>Trichoptera (caddisflies)</b>		
Hydropsychidae	1	111
Hydroptilidae		2
Leptoceridae	2	
Limnephilidae	1	1
<b>Coleoptera (beetles)</b>		
Dytiscidae (total)		1
Halplidae (adults)	1	1
Elmidae	123	53
<b>Diptera (flies)</b>		
Ceratopogonidae		3
Chironomidae	14	15
Culicidae	1	
Simuliidae		1
Tabanidae	3	1
Tipulidae		1
<b>MOLLUSCA</b>		
<b>Gastropoda (snails)</b>		
Ancylidae (limpets)	1	4
Hydrobiidae	1	
Physidae	2	1
Planorbidae	1	
Pleuroceridae	3	
<b>Pelecypoda (bivalves)</b>		
Sphaeriidae (clams)	1	
<b>TOTAL INDIVIDUALS</b>	<b>362</b>	<b>300</b>

METRIC	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	27	1	24	0
NUMBER OF MAYFLY TAXA	1	-1	2	0
NUMBER OF CADDISFLY TAXA	3	0	3	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1
PERCENT MAYFLY COMP.	0.55	-1	10.67	0
PERCENT CADDISFLY COMP.	1.10	-1	38.00	1
PERCENT DOMINANT TAXON	33.98	0	37.00	0
PERCENT ISOPOD, SNAIL, LEECH	3.87	1	2.00	1
PERCENT SURF. AIR BREATHERS	1.93	1	1.67	1
<b>TOTAL SCORE</b>		<b>-1</b>		<b>2</b>
<b>MACROINV. COMMUNITY RATING</b>		<b>ACCEPT.</b>		<b>ACCEPT.</b>

Table 3A. Habitat evaluation for

	Black River 70th St GLIDE/POOL	M. B. Black River 68th St GLIDE/POOL	M. B. Black River 103rd Ave GLIDE/POOL	Spicebush Creek Baseline Rd (CO Rd 388) GLIDE/POOL	Barber Creek u/s CO Rd 388 GLIDE/POOL
<b>HABITAT METRIC</b>					
<b>Substrate and Instream Cover</b>					
Epifaunal Substrate/ Avail Cover (20)	11	10	12	10	5
Embeddedness (20)*					
Velocity/Depth Regime (20)*					
Pool Substrate Characterization (20)**	8	8	14	8	10
Pool Variability (20)**	18	10	14	8	6
<b>Channel Morphology</b>					
Sediment Deposition (20)	11	10	13	6	4
Flow Status - Maint. Flow Volume (10)	6	6	5	9	9
Flow Status - Flashiness (10)	2	3	5	9	10
Channel Alteration (20)	14	13	14	13	8
Frequency of Riffles/Bends (20)*					
Channel Sinuosity (20)**	9	13	11	10	8
<b>Riparian and Bank Structure</b>					
Bank Stability (L) (10)	8	9	8	9	8
Bank Stability (R) (10)	8	8	8	9	8
Vegetative Protection (L) (10)	9	9	9	10	4
Vegetative Protection (R) (10)	8	9	9	10	4
Riparian Veg. Zone Width (L) (10)	8	9	9	9	10
Riparian Veg. Zone Width (R) (10)	6	9	9	9	10
<b>TOTAL SCORE (200):</b>	<b>126</b>	<b>126</b>	<b>140</b>	<b>129</b>	<b>104</b>
<b>HABITAT RATING:</b>	<b>GOOD (SLIGHTLY IMPAIRED)</b>	<b>GOOD (SLIGHTLY IMPAIRED)</b>	<b>GOOD (SLIGHTLY IMPAIRED)</b>	<b>GOOD (SLIGHTLY IMPAIRED)</b>	<b>MARGINAL (MODERATELY IMPAIRED)</b>

Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).

Date:	8/22/2012	8/21/2012	8/21/2012	8/21/2012	8/21/2012
Weather:	Sunny	Sunny	Sunny	Sunny	Sunny
Air Temperature:	56 Deg. F.	75 Deg. F.	75 Deg. F.	70 Deg. F.	72 Deg. F.
Water Temperature:	59 Deg. F.	63 Deg. F.	66 Deg. F.	56 Deg. F.	58 Deg. F.
Ave. Stream Width:	45 Feet	45 Feet	20 Feet	10 Feet	10 Feet
Ave. Stream Depth:	0.75 Feet	0.8 Feet	2 Feet	1.4 Feet	0.08 Feet
Surface Velocity:	0.75 Ft./Sec.	0.8 Ft./Sec.	0.2 Ft./Sec.	0.1 Ft./Sec.	0.5 Ft./Sec.
Estimated Flow:	25.3125 CFS	28.8 CFS	8 CFS	1.4 CFS	0.4 CFS
Stream Modifications:	None	Dredged	Dredged	None	Dredged
Nuisance Plants (Y/N):	N	N	N	N	N
Report Number:					
STORET No.:	30011	30668	30667	800590	800591
Stream Name:	Black River	M. B. Black River	M. B. Black River	Spicebush Creek	Barber Creek
Road Crossing/Location:	70th St	68th St	103rd Ave	Baseline Rd (CO Rd 388)	u/s CO Rd 388
County Code:	03	03	03	80	80
TRS:	01N16W32	01N16W33	01N15W27	01S15W06	01S15W10
Latitude (dd):	42.43081	42.4324	42.4406	42.40988	42.40434
Longitude (dd):	-86.22634	-86.207	-86.0531	-86.10995	-86.05176
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Coldwater	Coldwater	Warmwater	Coldwater	Coldwater
USGS Basin Code:	4050002	4050002	4050002	4050002	4050002

\* Applies only to Riffle/Run stream Surveys

\*\* Applies only to Glide/Pool stream Surveys

Table 3B. Habitat evaluation for

	Melvin Creek CO Rd 390 / 46th St RIFFLE/RUN	S. B. Black River CO Rd 380 / 20th Ave GLIDE/POOL	S. B. Black River Lyons Park (d/s old dam) RIFFLE/RUN	Great Bear Lk Drain 18th Ave GLIDE/POOL	Haven & Max Lk Drain d/s CR665/42nd St RIFFLE/RUN
<b>HABITAT METRIC</b>					
<b>Substrate and Instream Cover</b>					
Epifaunal Substrate/ Avail Cover (20)	11	10	11	3	16
Embeddedness (20)*	15		15		16
Velocity/Depth Regime (20)*	13		11		15
Pool Substrate Characterization (20)**		10		8	
Pool Variability (20)**		13		5	
<b>Channel Morphology</b>					
Sediment Deposition (20)	8	12	11	5	11
Flow Status - Maint. Flow Volume (10)	6	8	9	9	8
Flow Status - Flashiness (10)	8	2	4	3	8
Channel Alteration (20)	11	14	13	10	13
Frequency of Riffles/Bends (20)*	8		15		13
Channel Sinuosity (20)**		11		5	
<b>Riparian and Bank Structure</b>					
Bank Stability (L) (10)	8	3	9	6	9
Bank Stability (R) (10)	5	3	9	6	9
Vegetative Protection (L) (10)	5	9	9	8	7
Vegetative Protection (R) (10)	5	2	9	8	9
Riparian Veg. Zone Width (L) (10)	9	5	9	9	1
Riparian Veg. Zone Width (R) (10)	9	10	2	9	6
<b>TOTAL SCORE (200):</b>	<b>121</b>	<b>112</b>	<b>136</b>	<b>94</b>	<b>141</b>
<b>HABITAT RATING:</b>	<b>GOOD (SLIGHTLY IMPAIRED)</b>	<b>GOOD (SLIGHTLY IMPAIRED)</b>	<b>GOOD (SLIGHTLY IMPAIRED)</b>	<b>MARGINAL (MODERATELY IMPAIRED)</b>	<b>GOOD (SLIGHTLY IMPAIRED)</b>

Note: Individual metrics may better describe conditions directly affecting the biological community while the Habitat Rating describes the general riverine environment at the site(s).

	8/21/2012	8/22/2012	8/22/2012	8/22/2012	8/22/2012
Date:	8/21/2012	8/22/2012	8/22/2012	8/22/2012	8/22/2012
Weather:	Partly Cloudy	Sunny	Sunny	Sunny	Sunny
Air Temperature:	74 Deg. F.	82 Deg. F.	75 Deg. F.	70 Deg. F.	66 Deg. F.
Water Temperature:	66 Deg. F.	64 Deg. F.	64 Deg. F.	65 Deg. F.	58 Deg. F.
Ave. Stream Width:	10 Feet	30 Feet	28 Feet	14 Feet	10 Feet
Ave. Stream Depth:	0.6 Feet	2 Feet	2 Feet	2 Feet	0.5 Feet
Surface Velocity:	0.1 Ft./Sec.	0.6 Ft./Sec.	0.7 Ft./Sec.	0.1 Ft./Sec.	0.3 Ft./Sec.
Estimated Flow:	0.6 CFS	36 CFS	39.2 CFS	2.8 CFS	1.5 CFS
Stream Modifications:	Dredged	None	Bank Stabilization	Dredged	Bank Stabilization
Nuisance Plants (Y/N):	N	N	N	N	N
Report Number:					
STORET No.:	800571	800532	800469	800592	800568
Stream Name:	Melvin Creek	S. B. Black River	S. B. Black River	Great Bear Lk Drain	Haven & Max Lk Drain
Road Crossing/Location:	CO Road 390 / 46th St	CO Road 380 / 20th Ave	Lyons Park (d/s old dam)	18th Avenue	d/s CR665/42nd St
County Code:	80	80	80	80	80
TRS:	01S14W07	01S16W33	02S16W01	01S15W27	01S14W17
Latitude (dd):	42.4008	42.34631	42.31631	42.35381	42.37978
Longitude (dd):	-85.994	-86.18678	-86.11496	-86.03454	-85.95882
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Coldwater	Coldwater	Warmwater	Warmwater
USGS Basin Code:	4050002	4050002	4050002	4050002	4050002

\* Applies only to Riffle/Run stream Surveys

\*\* Applies only to Glide/Pool stream Surveys

Table 4. Qualitative fish sampling results for

TAXA	S. B. Black River Lyons Park (d/s old dam) 9/27/2012 STATION 1		Haven & Max Lake Drain d/s CR665/42nd St 9/27/2012 STATION 2	
	Petromyzontidae (lampreys)			
<i>Ichthyomyzon castaneus</i> (Chestnut lamprey)	1			
Salmonidae (trouts)				
<i>Oncorhynchus mykiss</i> (Rainbow trout)	21			
<i>Oncorhynchus tshawytscha</i> (Chinook salmon)	14			
Umbridae (mudminnows)				
<i>Umbra limi</i> (Central mudminnow)	1		40	
Esocidae (pikes)				
<i>Esox lucius</i> (Northern Pike)	6			
Cyprinidae (minnows and carps)				
<i>Cyprinus carpio</i> (Carp)	15			
<i>Semotilus atromaculatus</i> (Creek chub)			103	
<i>Notemigonus crysoleucas</i> (Golden shiner)	1			
<i>Cyprinella spilopterus</i> (Spotfin shiner)	3			
<i>Rhinichthys atratulus</i> (Blacknose dace)			30	
Catostomidae (suckers)				
<i>Catostomus commersoni</i> (White sucker)	42		96	
<i>Minytrema melanops</i> (Spotted sucker)	6			
<i>Moxostoma erythrurum</i> (Golden redhorse)	10			
Ictaluridae (Bullhead, Catfish)				
<i>Noturus flavus</i> (Stonecat)	1			
Centrarchidae (sunfish)				
<i>Ambloplites rupestris</i> (Rock bass)	2			
<i>Lepomis cyanellus</i> (Green sunfish)	96		1	
<i>Lepomis gibbosus</i> (Pumpkinseed sf)	24			
<i>Lepomis macrochirus</i> (Bluegill sf)	129		17	
<i>Pomoxis nigromaculatus</i> (Black crappie)	1			
<i>Micropterus salmoides</i> (Largemouth bass)	17			
Percidae (perch)				
<i>Etheostoma nigrum</i> (Johnny darter)	4		22	
<i>Percina maculata</i> (Blackside darter)	2			
Gobiidae (gobies)				
<i>Proterorhinus marmoratus</i> (Tubenose)	22			
TOTAL INDIVIDUALS	418		309	
Number of hybrid sunfish	0		0	
Number of anomalies	0		0	
Percent anomalies	0.000		0.000	
Percent salmonids	8.373		0.000	
Reach sampled (ft)	1,200		450	
Area sampled (sq ft)	33,600		3,600	
Density (# fish/sq ft)	0.012		0.086	
Gear	ss		ss	
METRIC	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	21	1	7	0
NO. OF DARTER, SCULPIN, MADTOM TAXA	3	0	1	0
NUMBER OF SUNFISH TAXA	5	1	2	1
NUMBER OF SUCKER TAXA	3	1	1	0
NUMBER OF INTOLERANT TAXA	6	1	0	-1
PERCENT TOLERANT	38.04	0	94.50	-1
PERCENT OMNIVOROUS TAXA	14.11	1	87.06	-1
PERCENT INSECTIVOROUS TAXA	71.05	1	12.94	-1
PERCENT PISCIVOROUS TAXA	5.98	0	0.00	-1
% SIMPLE LITHOPHILIC SPAWNER TAXA	14.35	0	40.78	0
TOTAL SCORE		6		-4
FISH COMMUNITY RATING		EXCELLENT		ACCEPT.