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MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
NOVEMBER 2017

STAFF REPORT

A BIOLOGICAL AND PHYSICAL SURVEY OF SITES IN THE MANISTIQUE AND MILLECOQUINS WATERSHEDS ALGER, CHIPPEWA, DELTA, LUCE, MACKINAC, AND SCHOOLCRAFT COUNTIES, MICHIGAN JULY AND SEPTEMBER 2014

INTRODUCTION

Monitoring by Michigan Department of Environmental Quality (MDEQ), Surface Water Assessment Section (SWAS), staff is implemented on a five-year rotating basis with the most recent survey reports for the Manistique and Millecoquins watersheds completed in 2004 (MDEQ, 2005) and 2009 (MDEQ, 2010). Biological and physical habitat conditions of the watersheds were assessed by SWAS staff in July and September 2014. The primary objectives of the 2014 assessments were to:

- Qualitatively evaluate current biological, chemical, and physical habitat conditions
- Evaluate biological integrity and general water quality trends
- Evaluate whether stream segments are attaining or not attaining Michigan Water Quality Standards (MDEQ, 2006)
- Identify possible sources of water quality impairment
- Satisfy monitoring requests submitted by internal and external customers

DESCRIPTION

Manistique

Located in the Upper Peninsula of Michigan, the Manistique watershed (HUC 04060106) drains approximately 1,461 square miles. The majority of land use is forest (37%) and wetland (51%) with a small amount of development, farmland, and grassland (Jin et al., 2013). Historically, the Manistique received wastes from sawmills, a paper mill, small industries, and the municipal wastewater treatment plant. The watershed was also heavily logged and subsequently burned, which contributes to sediment issues in areas of the watershed. The lower part of the river receives navigation for shipping, ferrying, recreational boating, and commercial fishing. The final 1.7 miles of the Manistique watershed from the Paper Mill Dam downstream to Lake Michigan is listed as a federal area of concern (AOC) due to historic problems with PCB-contaminated sediment, sawmills, municipal wastewater treatment plant, and combined sewer overflows (MDEQ, 1987). Most of the work on the AOC has been completed and the site is near completion of the last remaining restoration actions needed to delist the Manistique AOC (EPA, 2015).

Millecoquins

The Millecoquins (HUC 04060107) watershed drains approximately 562 square miles and has 102.5 miles of Lake Michigan coastline. Dominant land use in the watershed is forest (45%) and wetlands (40%), with modest amounts of farm and developed land (Jin et al., 2013). The Hiawatha National Forest makes up a considerable portion of this watershed.

METHODS

The surveys described in this report were conducted according to the SWAS Procedure 51 (MDEQ, 1990). The macroinvertebrate communities were scored with metrics that rate water bodies from excellent (+5 to +9) to poor (-5 to -9). Macroinvertebrate ratings from +4 to -4 are considered acceptable. Negative ratings that are acceptable indicate water bodies that are tending toward poor, while positive ratings that are acceptable indicate slight impairment (Creal et al., 1996). Stream habitat was qualitatively evaluated at each site using a scoring system that ranged from 0 (poor) to 200 (excellent). Scoring sheets for macroinvertebrates and habitat can be found in Appendix A.

Sampling locations are shown in Figure 1.

SUMMARY

Twenty-one locations were sampled in 2014 with scores ranging from 5/“excellent” to 0/”acceptable” (Table 1). Overall scores for the 2 watersheds were relatively high as 16 of the 21 locations scored +5 or +6 as “excellent.” Sand deposition was a common issue in several of the rivers, which had impacts on available in-stream habitat.

SAMPLING RESULTS

Table 1. Location and Assessment Scores for Sites Sampled during 2014 in the Manistique and Millecoquins Watersheds.

SITE	WATERBODY	LATITUDE	LONGITUDE	Date Sampled	COUNTY	TRS	STORET	Habitat Score	Invert Score 2014	Invert Score 2009
2	Kilpecker Creek	46.12938	86.51379	24-Jul-14	Delta	43N18W14	210228	165	3	
3	Driggs River	46.23227	-86.03689	31-Jul-14	Schoolcraft	44N14W03	770167	134	6	
5	West Branch Manistique River	46.13812	-86.17710	25-Jul-14	Schoolcraft	43N15W10	770170	142	5	
9	Indian River	46.09030	-86.41051	24-Jul-14	Schoolcraft	43N17W27	770172	176	5	
10	Indian River	46.18461	-86.49013	24-Jul-14	Schoolcraft	44N18W25	770173	176	5	
12	Walsh Creek	46.31867	-86.11814	31-Jul-14	Schoolcraft	45N15W01	770168	158	6	
14	Driggs River	46.20095	-86.00134	31-Jul-14	Schoolcraft	44N14W24	770166	158	5	
15	West Branch Manistique River	46.16264	-86.19401	25-Jul-14	Schoolcraft	44N15W33	770171	127	6	
16	Indian River	46.18274	-86.59032	26-Jul-14	Schoolcraft	44N18W29	770169	176	5	
2T	Star Creek	46.37216	-86.39305	26-Jul-14	Alger	46N17W23	20124	142	5	5
3T	EB Taquamenon	46.31777	-84.95275	17-Sep-14	Chippewa	45N05W05	170288	153	4	-1
4T	E B Fox River	46.40537	-85.94790	31-Jul-14	Schoolcraft	46N13W04	770090	109	3	2
5T	Kilpecker Creek	46.11363	-86.49210	16-Sep-14	Delta	43N18W24	210305	187	5	3
6T	Mead Creek	46.17510	-85.92783	31-Jul-14	Schoolcraft	44N13W28	770089	171	2	0
7T	Big Murphy Creek	46.07271	-86.46623	24-Jul-14	Schoolcraft	43N17W32	770159	175	5	1
8T	Clear Creek	46.44920	-85.93765	31-Jul-14	Schoolcraft	47N12W21	770108	136	0	4
10T	Milakokia River	46.02832	-85.84404	23-Jul-14	Mackinac	42N13W18	490065	190	5	4
11T	Creighton River	46.24101	-86.24220	26-Jul-14	Schoolcraft	44N16W01	770156	140	5	3
13T	W B Manistque River	46.25295	-86.26227	25-Jul-14	Schoolcraft	45N16W35	770155	155	5	4
14T	W B Manistque River	46.22857	-86.23506	26-Jul-14	Schoolcraft	44N15W07	770160	129	6	3
15T	Little Fox River	46.48530	-86.14864	16-Sep-14	Schoolcraft	47N15W11	770157	171	5	2

Habitat scores (>154-Excellent, 105-154-Good, 56-104-Marginal, <56-Poor)

Invertebrate assessment scores (+5 to +9-Excellent, +4 to -4-Acceptable, -5 to -9-Poor)

STATUS SITES

Nine Sites (2-16) (Table 1) were randomly chosen for, and determination of, the attainment status of the Manistique and Millecoquins Watersheds (status sites). These locations all scored "excellent" (+5 or +6) except 1 location that scored "acceptable" (only slightly lower with +3).

West Branch Manistique River

Two sites (5 and15) were surveyed on the West Branch Manistique River. Both locations scored "excellent" for invertebrates and "good" for habitat. These sites had issues with sand deposition in the stream channel and along the banks (Figure 2), which limited in-stream habitat and led to lowered scores in the habitat category. In-stream invertebrate habitat consisted mainly of large woody debris and aquatic vegetation.

Indian River

Three sites (9, 10, and 16) were surveyed on the Indian River. All three sites were very similar in structure with sandy bottoms with small areas of gravel. The margins of the river contained depositional areas that were heavily vegetated. This diversity of in-stream habitat is conducive to high macroinvertebrate diversity and abundance. All three locations scored "excellent" for invertebrates and habitat.

Driggs River

Two sites (3 and 14) were sampled on the Driggs River in 2014. Site 14 is located within the Seney Wildlife Refuge and site 3 is located upstream of 14 and just outside of the refuge. Both locations were very similar in structure with sandy bottoms and little to no gravel or cobble. Large woody debris and overhanging riparian vegetation was significant at both sites. Both

locations scored “excellent” for invertebrates as diversity and abundance was very high. Site 3 scored “good” for habitat while site 14 scored “excellent.”

Kilpecker Creek
One location (site 2) was surveyed on Kilpecker Creek. This site was a very sandy and cold small stream located in a dense forest, which created significant large woody debris and overhanging vegetation. Invertebrates scored “good” and habitat scored “excellent.”

Walsh Creek
One site (12) was surveyed on Walsh Creek inside the Seney National Wildlife refuge. Upstream of this location was the focus of a large wetland restoration project conducted within the Seney National Wildlife Refuge (Bork et al., 2013). The survey was conducted downstream of the outlet of the wetland restoration water control structures. Likely due to groundwater or upstream inputs of dissolved iron, significant iron-oxide deposits covered many of the in-stream surfaces (Figure 3). These types of deposits can occur on hot, dry days where flows are sluggish as were the conditions on the day this site was sampled. Invertebrates and habitat scored “excellent.”

TREND SITES

Twelve sites (2T-15T) (Table 1) were sampled as part of trend program, which resamples the same locations every five years in an effort to provide an estimate of water quality trends based on changes in the macroinvertebrate community. Invertebrate scores recorded at these locations during the previous round (2009) are located in Table 1 as well.

Star Creek
One site (2T) was sampled on Star Creek. The culvert at the road crossing was impacted by a beaver dam, which appeared to impound a short section of this stream around the road crossing. The stream was relatively slow moving and became braided a short distance from the road crossing. Invertebrate abundance and diversity was good and the stream scored “excellent.” Habitat was slightly lacking in in-stream cover and scored “good” overall.

East Branch Tahquamenon
This location (3T) was pulled as a replacement for a targeted location that had to be dropped due to site condition changes that were discovered. Although outside of the Manistique and Millecoquins watersheds, this site was completed to satisfy statewide trend goals. Rust colored iron oxide deposits and aquatic macrophytes were significant at this location (Figure 4). The abundance of invertebrates was noted as being relatively low as one-half of the entire sample was sorted before 300 individuals was achieved. Invertebrates scored 4 or “acceptable,” which is higher than in 2009 when it scored -1. Habitat scored “good.”

East Branch Fox River
One location (4T) was sampled on the east branch of the Fox River. Invertebrates scored “good” and habitat scored on the lower end of “good.” Lower scores for habitat were results of the stream having large amounts of sand and lacking in-stream cover diversity as gravel and cobble were lacking.

Kilpecker Creek
One location (5T) was sampled on Kilpecker Creek. As with the status location (2) that was sampled slightly downstream, this site was cold, clear, and scored “excellent” for invertebrates and habitat.

Mead Creek
One location (6T) was sampled on Mead Creek. As in previous years, downstream of the bridge crossing was sampled. The stream was relatively slow moving and lacked in-stream available habitat. Much of the stream bottom was covered in silt, with small areas of gravel in the center channel. A few cobbles were found close to the bridge crossing. Invertebrates scored "acceptable" and habitat score "excellent."

Big Murphy Creek
This location (7T) on Big Murphy Creek was located upstream of a new and adequately sized concrete box culvert. Abundance and diversity of invertebrates was good at this location and available habitat in the stream was diverse. Invertebrates and habitat scored "excellent."

Clear Creek
Clear Creek (8T) was sampled at the M-77 road crossing. Invertebrates scored 0/ "acceptable" and habitat scored "good." In-stream habitat was lacking solid structures and consisted mainly of sand.

Milakokia River
Site 10T on the Milakokia River was sampled at the Batty Doe Lake Road crossing. This site flowed through a cedar swamp and had a very tanic color to the water. Cobble, gravel, and large woody debris were abundant at this location. Invertebrates and habitat scored "excellent."

Creighton River
This site (11T) had heavy sand deposits and the banks showed signs of continued erosion (Figure 5). Large woody debris was relatively abundant providing stable in-stream habitat in areas. Invertebrates scored 5/ "excellent" and habitat scored "good."

West Branch Manistique River
Two locations (13T and 14T) were sampled on the West Branch of the Manistique River. Habitat scored "excellent" on 13T and "good" on 14T. Obvious areas of bank erosion were present at both locations as well as large areas of heavy sand within the river. Invertebrates scored "excellent" at both locations.

Little Fox River
This location (15T) was located downstream of Stanley Lake, which is an impoundment of the Little Fox River. Both invertebrates and habitat scored "excellent" at this location.

FUTURE NEEDS

- MDEQ Nonpoint Source staff will be contacted to determine if sampling is needed for any projects within the Manistique or Millecoquins watersheds.
- MDEQ Fish Contaminant Monitoring Program staff will be contacted to determine if any water bodies in the Manistique or Millecoquins are in need of fish collection.
- The MDEQ will solicit recommendations internally and externally for monitoring efforts within the Manistique and Millecoquins watersheds.

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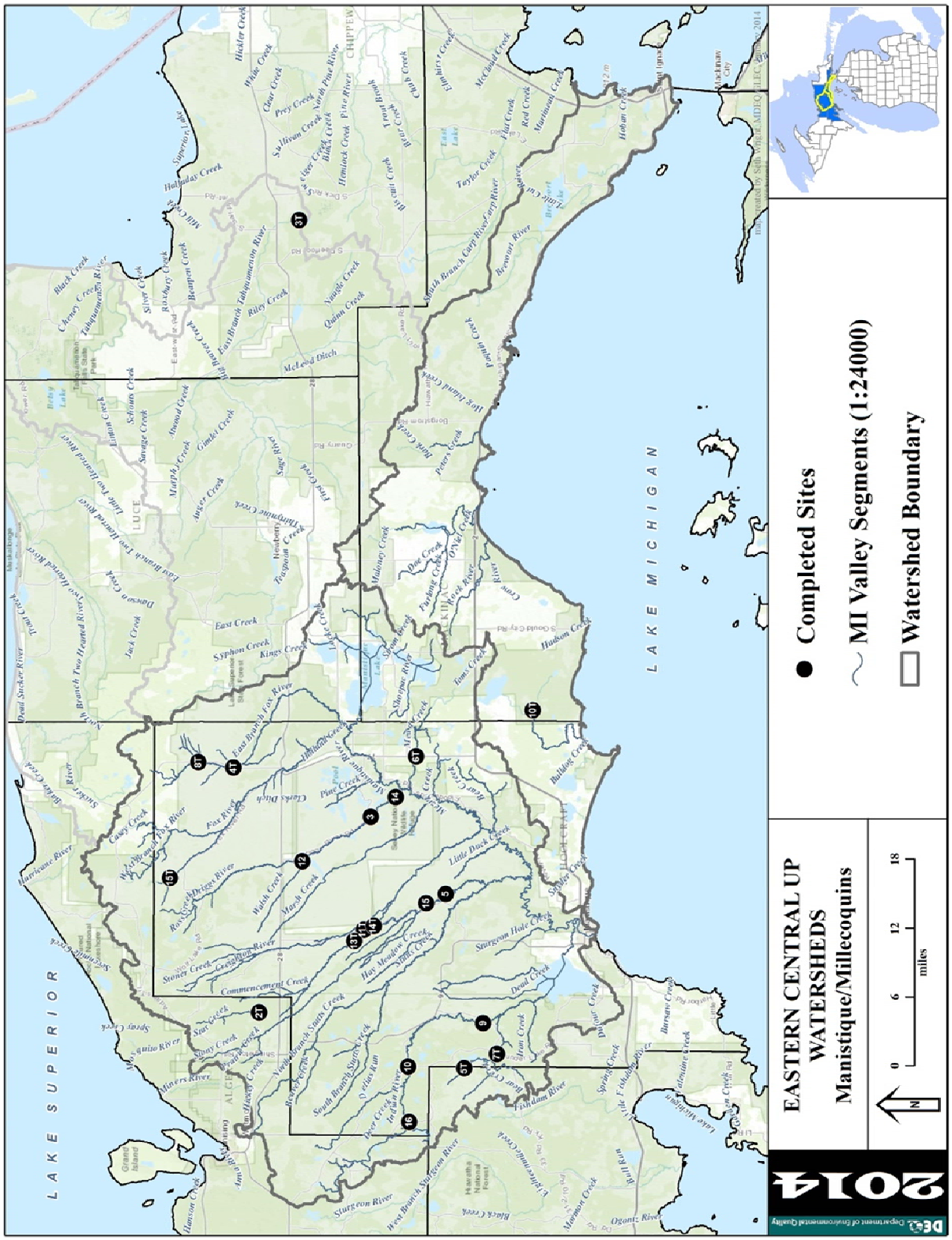

Figure 1. Sites sampled in Manistique and Millecoquins (Eastern Central Upper Peninsula) Watersheds 2014.

Figure 2. Site 15-- West Branch Manistique River sand deposition issues.

Figure 3. Iron-oxide deposits located at Walsh Creek (Site 12).

Figure 4. Iron oxide and aquatic macrophytes located at the site on the East Branch Tahquamenon (3T).

Figure 5. Creighton River (Site 11T) bank erosion.

Appendix A

Macroinvertebrate and Habitat Scores

	Kilpecker Creek	Driggs River	West Branch	Indian River
	Federal Forest Road	Driggs River Road	Cals Drive	County Road 449
	7/24/2014	7/31/2014	7/25/2014	7/24/2014
TAXA	Station 2	Station 3	Station 5	Station 9
PORIFERA (sponges)	1			
ANNELIDA (segmented worms)				
Oligochaeta (worms)	1		2	5
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	5		3	11
Decapoda (crayfish)		2	5	1
Arachnoidea				
Hydracarina	21	1	3	3
Insecta				
Ephemeroptera (mayflies)				
Baetiscidae			3	1
Baetidae	6	10	13	110
Caenidae		6	9	5
Ephemerellidae	2	1	1	1
Ephemeridae		1		
Heptageniidae		6	9	11
Isonychiidae		1		1
Leptophlebiidae	2		1	2
Potamanthidae				6
Odonata				
Anisoptera (dragonflies)				
Aeshnidae		9	17	1
Gomphidae		5	1	1
Libellulidae		1		
Zygoptera (damselflies)				
Calopterygidae		14	8	1
Coenagrionidae		1		
Plecoptera (stoneflies)				
Leuctridae	4			
Nemouridae	13			
Perlidae		1	6	1
Pteronarcyidae		7	5	10
Taeniopterygidae		1	1	
Hemiptera (true bugs)				
Corixidae		5	1	1
Gerridae		1	1	1
Veliidae		4	4	1
Megaloptera				
Corydalidae (dobson flies)		1	1	
Sialidae (alder flies)	2	1		1
Trichoptera (caddisflies)				
Brachycentridae	3	133	61	39
Hydropsychidae	4	119	88	42
Leptoceridae	1	3	1	3
Limnephilidae	13	1	2	
Molannidae	1			
Phryganeidae		6		
Polycentropodidae	1	3	12	2
Coleoptera (beetles)				
Dytiscidae (total)	1	3	1	
Gyrinidae (adults)		1	1	1
Hydrophilidae (total)	1		2	1
Elmidae	1		5	
Gyrinidae (larvae)				1
Diptera (flies)				
Athericidae		2	3	
Ceratopogonidae	6		1	1
Chironomidae	198	18	26	30
Culicidae			1	
Dixidae				1
Simuliidae	4	19	10	38
Tabanidae	1	1	2	1
MOLLUSCA				
Gastropoda (snails)				
Hydrobiidae	1			1
Physidae	1	1	1	1
Pelecypoda (bivalves)				
Pisidiidae	1		1	1
Sphaeriidae (clams)	4			3
TOTAL INDIVIDUALS	299	389	312	341

	Kilpecker Creek		Driggs River		West Branch Manistique River		Indian River	
	Federal Forest Road		Driggs River Road		Cals Drive		County Road 449	
	7/24/2014		7/31/2014		7/25/2014		7/24/2014	
	Station 2		Station 3		Station 5		Station 9	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	27	0	34	1	37	1	36	1
NUMBER OF MAYFLY TAXA	3	0	6	1	6	1	8	1
NUMBER OF CADDISFLY TAXA	6	1	6	1	5	0	4	0
NUMBER OF STONEFLY TAXA	2	1	3	1	3	1	2	1
PERCENT MAYFLY COMP.	3.34	0	6.43	0	11.54	0	40.18	1
PERCENT CADDISFLY COMP.	7.69	0	68.12	1	52.56	1	25.22	0
PERCENT DOMINANT TAXON	66.22	-1	34.19	-1	28.21	-1	32.26	-1
PERCENT ISOPOD, SNAIL, LEECH	0.67	1	0.26	1	0.32	1	0.59	1
PERCENT SURF. AIR BREATHERS	0.67	1	3.60	1	3.53	1	1.47	1
TOTAL SCORE		3		6		5		5
MACROINV. COMMUNITY RATING		ACCEPT.		EXCELLENT		EXCELLENT		EXCELLENT

	Indian River		Walsh Creek		Driggs River		West Branch	
	County Road 449		C3 Pool Road		Seney Wildlife		off Cals Drive	
	7/24/2014		7/31/2014		7/31/2014		7/25/2014	
TAXA	Station 10		Station 12		Station 14		Station 15	
ANNELIDA (segmented worms)								
Hirudinea (leeches)			1					
Oligochaeta (worms)	5		1					
ARTHROPODA								
Crustacea								
Amphipoda (scuds)	11						1	
Decapoda (crayfish)	1		6		1		3	
Isopoda (sowbugs)					1			
Arachnoidea								
Hydracarina	3		6		1		6	
Insecta								
Ephemeroptera (mayflies)								
Baetiscidae	1						1	
Baetidae	110		13		9		61	
Caenidae	5		5		2		2	
Ephemerellidae	1		4		1		1	
Ephemeridae			1					
Heptageniidae	11		84		4		7	
Isonychiidae	1				1		1	
Leptophlebiidae	2		15					
Potamanthidae	6				2			
Siphlonuridae					2			
Tricorythidae							1	
Odonata								
Anisoptera (dragonflies)								
Aeshnidae	1		16		6		6	
Cordulegastridae					1			
Gomphidae	1				2		1	
Libellulidae			3					
Zygoptera (damselflies)								
Calopterygidae	1		6		7		4	
Coenagrionidae			6					
Plecoptera (stoneflies)								
Leuctridae							1	
Perlidae	1		1		3		2	
Pteronarcyidae	10		1		1		1	
Hemiptera (true bugs)								
Corixidae	1				1			
Gerridae	1		1				1	
Mesoveliidae			2					
Veliidae	1				2		1	
Megaloptera								
Sialidae (alder flies)	1		3					
Trichoptera (caddisflies)								
Brachycentridae	39		1		38		98	
Hydropsychidae	42		21		126		61	
Leptoceridae	3							
Limnephilidae			2		3		1	
Phryganeidae			1					
Polycentropodidae	2		1		7		4	
Coleoptera (beetles)								
Dytiscidae (total)					1		1	
Gyrinidae (adults)	1				1			
Haliplidae (adults)			1					
Hydrophilidae (total)	1							
Elmidae					1		2	
Gyrinidae (larvae)	1		1				1	
Diptera (flies)								
Athericidae							1	
Ceratopogonidae	1		3		1			
Chironomidae	30		74		41		32	
Culicidae							1	
Dixidae	1		1					
Simuliidae	38		28		30		4	
Tabanidae	1						1	
Tipulidae			2		3			
MOLLUSCA								
Gastropoda (snails)								
Hydrobiidae	1				1			
Physidae	1		1					
Pelecypoda (bivalves)								
Pisidiidae	1		1		1			
Sphaeriidae (clams)	3							
TOTAL INDIVIDUALS	341		313		301		308	

	Indian River		Walsh Creek		Driggs River		West Branch	
	County Road 449		C3 Pool Road		Seney Wildlife		off Cals Drive	
	7/24/2014		7/31/2014		7/31/2014		7/25/2014	
	Station 10		Station 12		Station 14		Station 15	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	36	1	33	1	31	1	30	1
NUMBER OF MAYFLY TAXA	8	1	6	1	7	1	7	1
NUMBER OF CADDISFLY TAXA	4	0	5	0	4	0	4	0
NUMBER OF STONEFLY TAXA	2	1	2	1	2	1	3	1
PERCENT MAYFLY COMP.	40.18	1	38.98	1	6.98	0	24.03	1
PERCENT CADDISFLY COMP.	25.22	0	8.31	0	57.81	1	53.25	1
PERCENT DOMINANT TAXON	32.26	-1	26.84	0	41.86	-1	31.82	-1
PERCENT ISOPOD, SNAIL, LEECH	0.59	1	0.64	1	0.66	1	0.00	1
PERCENT SURF. AIR BREATHERS	1.47	1	1.28	1	1.66	1	1.30	1
TOTAL SCORE		5		6		5		6
MACROINV. COMMUNITY RATING		EXCELLENT		EXCELLENT		EXCELLENT		EXCELLENT

	Indian River		Star Creek		East Branch		East Branch Fox	
	Federal Forest Road		Off Star Siding Road		Arbutus Truck Trail		M-77 (downstream)	
	7/26/2014		6/24/2009		9/17/2014		7/31/2014	
TAXA	Station 16		Station 2T		Station 3T		Station 4T	
ANNELIDA (segmented worms)								
Hirudinea (leeches)	1				1			
Oligochaeta (worms)	1		2		1		1	
ARTHROPODA								
Crustacea								
Amphipoda (scuds)	135				1			
Decapoda (crayfish)	2							
Isopoda (sowbugs)							27	
Arachnoidea								
Hydracarina	24		1		11		4	
Insecta								
Ephemeroptera (mayflies)								
Baetiscidae	5		1					
Baetidae	21				8		104	
Caenidae	4		7					
Ephemerellidae	3				5		58	
Ephemeridae							1	
Heptageniidae	1						1	
Isonychiidae	1							
Leptophlebiidae					64			
Tricorythidae	1							
Odonata								
Anisoptera (dragonflies)								
Aeshnidae	4		3		1			
Cordulegastridae			5		1			
Gomphidae	1		9					
Libellulidae	1				1			
Macromiidae	1							
Zygoptera (damselflies)								
Calopterygidae	1		3					
Coenagrionidae	4							
Plecoptera (stoneflies)								
Chloroperlidae					17			
Leuctridae					1			
Nemouridae							14	
Peltoperlidae							66	
Perlidae	1		2					
Pteronarcyidae	1		1				2	
Hemiptera (true bugs)								
Corixidae	1		4					
Gerridae	1						1	
Mesoveliidae	3				1			
Veliidae	2						1	
Megaloptera								
Corydalidae (dobson flies)	1		3				1	
Sialidae (alder flies)	1				14			
Trichoptera (caddisflies)								
Brachycentridae	1						7	
Glossosomatidae			3					
Helicopsychidae			10					
Hydropsychidae	32		3		1		1	
Hydroptilidae	4							
Lepidostomatidae			7					
Leptoceridae	13		4					
Limnephilidae			24		1		10	
Molannidae	3		1					
Phryganeidae	1				2			
Polycentropodidae	2		4					
Uenoidae			1					
Coleoptera (beetles)								
Dytiscidae (total)							1	
Gyrinidae (adults)							1	
Hydrophilidae (total)	3							
Dryopidae			1					
Elmidae	7		5					
Diptera (flies)								
Athericidae			1					
Ceratopogonidae	1		1		4			
Chironomidae	66		15		99		18	
Culicidae	1							
Dixidae	5							
Ptychopteridae					4			
Simuliidae	3				1		92	
Tipulidae							1	
MOLLUSCA								
Gastropoda (snails)								
Ancylidae (limpets)			1					
Hydrobiidae	2							
Lymnaeidae	4							
Physidae	3		4		4			
Pelecypoda (bivalves)								
Pisidiidae	1				3			
Sphaeriidae (clams)	1		3				1	
TOTAL INDIVIDUALS	375		129		246		413	

	Indian River		Star Creek		East Branch		East Branch Fox	
	Federal Forest Road		Off Star Siding Road		Arbutus Truck Trail		M-77 (downstream)	
	7/26/2014		6/24/2009		9/17/2014		7/31/2014	
	Station 16		Station 2T		Station 3T		Station 4T	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	45	1	29	1	23	1	22	0
NUMBER OF MAYFLY TAXA	7	1	2	-1	3	1	4	0
NUMBER OF CADDISFLY TAXA	7	1	9	1	3	0	3	0
NUMBER OF STONEFLY TAXA	2	1	2	1	2	1	3	1
PERCENT MAYFLY COMP.	9.60	0	6.20	0	31.30	1	39.71	1
PERCENT CADDISFLY COMP.	14.93	0	44.19	1	1.63	-1	4.36	0
PERCENT DOMINANT TAXON	36.00	-1	18.60	0	40.24	-1	25.18	0
PERCENT ISOPOD, SNAIL, LEECH	2.67	1	3.88	1	2.03	1	6.54	0
PERCENT SURF. AIR BREATHERS	2.93	1	3.10	1	2.03	1	0.97	1
TOTAL SCORE		5		5		4		3
MACROINV. COMMUNITY RATING		EXCELLENT		EXCELLENT		ACCEPT.		ACCEPT.

	Kilpecker Creek		Mead Creek		Big Murphy Creek		Clear Creek	
	two-track off Federal		M-77 (downstream)		County Road 437		upstream M-77	
	9/16/2014		7/31/2014		7/24/2014		7/31/2014	
TAXA	Station 5T		Station 6T		Station 7T		Station 8T	
ANNELIDA (segmented worms)								
Hirudinea (leeches)			1					
Oligochaeta (worms)	14		3		2		1	
ARTHROPODA								
Crustacea								
Amphipoda (scuds)	1		67		1		13	
Decapoda (crayfish)			5		2			
Isopoda (sowbugs)			1		36		1	
Arachnoidea								
Hydracarina	25		61		3		10	
Insecta								
Ephemeroptera (mayflies)								
Baetiscidae					5			
Baetidae	15		21		14		101	
Ephemerellidae	15		4		4		5	
Heptageniidae	1		3		4			
Isonychiidae					1		1	
Leptophlebiidae	14							
Siphlonuridae			1					
Tricorythidae					1			
Odonata								
Anisoptera (dragonflies)								
Aeshnidae			15		5			
Cordulegastridae					1			
Gomphidae			4		1			
Libellulidae			2		1			
Zygoptera (damselflies)								
Calopterygidae			1		3			
Coenagrionidae			13					
Plecoptera (stoneflies)								
Leuctridae	28				1			
Nemouridae	8						16	
Perlidae	6				4		21	
Pteronarcyidae					1			
Hemiptera (true bugs)								
Belostomatidae	2							
Corixidae			4				1	
Gerridae	1		1		1		1	
Nepidae			1					
Veliidae			5					
Megaloptera								
Corydalidae (dobson flies)			1					
Sialidae (alder flies)			10					
Trichoptera (caddisflies)								
Brachycentridae	3				60			
Glossosomatidae					1			
Hydropsychidae	48				85			
Lepidostomatidae	1							
Leptoceridae			16		1			
Limnephilidae	9		3				8	
Molannidae	1							
Phryganeidae	2		1		2			
Polycentropodidae	1		1		2			
Rhyacophilidae	6							
Uenoidae	1							
Coleoptera (beetles)								
Dytiscidae (total)	1		2				1	
Gyrinidae (adults)							1	
Haliplidae (adults)			2					
Elmidae			35		3			
Diptera (flies)								
Athericidae					2		9	
Ceratopogonidae	4		5		4		3	
Chironomidae	55		35		164		257	
Culicidae					1			
Dixidae	3							
Ptychopteridae	1							
Simuliidae	8				1		38	
Syrphidae	1							
Tabanidae			3		1		14	
Tipulidae	4							
MOLLUSCA								
Gastropoda (snails)								
Ancylidae (limpets)			2		1			
Bithyniidae							1	
Lymnaeidae			2					
Physidae	1		1		1		2	
Planorbidae							1	
Pelecypoda (bivalves)								
Pisidiidae					1			
Sphaeriidae (clams)	9		1		1		9	
Unionidae (mussels)			1					
TOTAL INDIVIDUALS	289		334		422		515	

	Kilpecker Creek		Mead Creek		Big Murphy Creek		Clear Creek	
	two-track off Federal		M-77 (downstream)		County Road 437		upstream M-77	
	9/16/2014		7/31/2014		7/24/2014		7/31/2014	
	Station 5T		Station 6T		Station 7T		Station 8T	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	31	1	36	1	37	1	23	0
NUMBER OF MAYFLY TAXA	4	0	4	0	6	1	3	0
NUMBER OF CADDISFLY TAXA	9	1	4	0	6	1	1	-1
NUMBER OF STONEFLY TAXA	3	1	0	-1	3	1	2	1
PERCENT MAYFLY COMP.	15.57	0	8.68	0	6.87	0	20.78	0
PERCENT CADDISFLY COMP.	24.91	0	6.29	0	35.78	1	1.55	-1
PERCENT DOMINANT TAXON	19.03	0	20.06	0	38.86	-1	49.90	-1
PERCENT ISOPOD, SNAIL, LEECH	0.35	1	2.10	1	9.00	0	0.97	1
PERCENT SURF. AIR BREATHERS	2.08	1	4.49	1	0.47	1	0.78	1
TOTAL SCORE		5		2		5		0
MACROINV. COMMUNITY RATING		EXCELLENT		ACCEPT.		EXCELLENT		ACCEPT.

	Milakokia River	Creighton River	West Branch	West Branch
	Betty Doe Lake Rd	Creighton Truck	Hickey Truck Trail	off Crieghton Truck
	7/23/2014	7/26/2014	7/25/2014	7/26/2014
TAXA	Station 10T	Station 11T	Station 13T	Station 14T
ANNELIDA (segmented worms)				
Hirudinea (leeches)	1			1
Oligochaeta (worms)	1		1	
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	2		21	12
Decapoda (crayfish)	4	6	10	11
Arachnoidea				
Hydracarina	11	9	12	9
Insecta				
Ephemeroptera (mayflies)				
Baetiscidae			3	1
Baetidae	2	21	36	75
Caenidae	1	5		3
Ephemerellidae		3	3	1
Heptageniidae	46	14	2	2
Isonychiidae			1	
Leptophlebiidae	26		1	
Potamanthidae			1	
Tricorythidae	1	1	1	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	20	1	6	7
Cordulegastridae	1		1	1
Gomphidae	12	1	1	
Libellulidae	1			
Zygoptera (damselflies)				
Calopterygidae	14	13	12	2
Coenagrionidae				1
Plecoptera (stoneflies)				
Leuctridae			1	
Perlidae	3	1	1	5
Perlodidae	1			
Pteronarcyidae		1	1	1
Hemiptera (true bugs)				
Corixidae	1	8	4	10
Gerridae		1		
Mesoveliidae		1		
Notonectidae				1
Veliidae	2	8	9	1
Megaloptera				
Corydalidae (dobson flies)	3		1	1
Sialidae (alder flies)	1	1		
Trichoptera (caddisflies)				
Brachycentridae		87	14	70
Helicopsychidae	1		1	
Hydropsychidae	16	28	8	29
Hydroptilidae		3	14	
Leptoceridae	5	1		
Limnephilidae	4	2	2	1
Molannidae	1			
Phryganeidae		13	1	1
Polycentropodidae	21	8	9	
Uenoidae	2			
Coleoptera (beetles)				
Dytiscidae (total)		2	2	3
Gyrinidae (adults)	1		1	1
Haliplidae (adults)				10
Hydrophilidae (total)				1
Elmidae	12	7	8	9
Gyrinidae (larvae)		3	2	1
Haliplidae (larvae)		2	1	1
Diptera (flies)				
Athericidae		2		1
Ceratopogonidae	19		15	1
Chironomidae	128	47	70	28
Culicidae		2	3	
Simuliidae		5	16	8
Tabanidae		2	3	
Tipulidae	5	1	1	
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)		1		
Physidae				2
Pelecypoda (bivalves)				
Sphaeriidae (clams)	3	1		
TOTAL INDIVIDUALS	372	312	300	312

	Milakokia River		Creighton River		West Branch		West Branch	
	Betty Doe Lake Rd		Creighton Truck		Hickey Truck Trail		off Crieghton Truck	
	7/23/2014		7/26/2014		7/25/2014		7/26/2014	
	Station 10T		Station 11T		Station 13T		Station 14T	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	34	1	36	1	39	1	33	1
NUMBER OF MAYFLY TAXA	5	1	5	1	8	1	5	1
NUMBER OF CADDISFLY TAXA	7	1	7	1	7	1	4	0
NUMBER OF STONEFLY TAXA	2	1	2	1	3	1	2	1
PERCENT MAYFLY COMP.	20.43	0	14.10	0	16.00	0	26.28	1
PERCENT CADDISFLY COMP.	13.44	0	45.51	1	16.33	0	32.37	1
PERCENT DOMINANT TAXON	34.41	-1	27.88	-1	23.33	0	24.04	0
PERCENT ISOPOD, SNAIL, LEECH	0.27	1	0.32	1	0.00	1	0.96	1
PERCENT SURF. AIR BREATHERS	1.08	1	7.05	0	6.33	0	8.65	0
TOTAL SCORE		5		5		5		6
MACROINV. COMMUNITY RATING		EXCELLENT		EXCELLENT		EXCELLENT		EXCELLENT

	Kilpecker Creek		Driggs River		West Branch Manistique River		Indian River	
	Federal Forest Road 2717		Driggs River Road		Cals Drive		County Road 449	
	RIFFLE/RUN		GLIDE/POOL		GLIDE/POOL		RIFFLE/RUN	
	Station 2		Station 3		Station 5		Station 9	
HABITAT METRIC								
Substrate and Instream Cover								
Epifaunal Substrate/ Avail Cover (20)	8		8		10		15	
Embeddedness (20)*	9						16	
Velocity/Depth Regime (20)*	18						18	
Pool Substrate Characterization (20)**			10		11			
Pool Variability (20)**			15		13			
Channel Morphology								
Sediment Deposition (20)	16		7		5		18	
Flow Status - Maint. Flow Volume (10)	10		8		10		10	
Flow Status - Flashiness (10)	9		5		5		10	
Channel Alteration (20)	20		20		20		20	
Frequency of Riffles/Bends (20)*	15						9	
Channel Sinuosity (20)**			17		18			
Riparian and Bank Structure								
Bank Stability (L) (10)	10		6		7		10	
Bank Stability (R) (10)	10		6		7		10	
Vegetative Protection (L) (10)	10		6		8		10	
Vegetative Protection (R) (10)	10		6		8		10	
Riparian Veg. Zone Width (L) (10)	10		10		10		10	
Riparian Veg. Zone Width (R) (10)	10		10		10		10	
TOTAL SCORE (200):	165		134		142		176	
HABITAT RATING:	EXCELLENT		GOOD		GOOD		EXCELLENT	
	(NON-IMPAIRED)		(SLIGHTLY IMPAIRED)		(SLIGHTLY IMPAIRED)		(NON-IMPAIRED)	

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:	7/24/2014		7/31/2014		7/25/2014		7/24/2014	
Weather:	Sunny		Sunny				Sunny	
Air Temperature:	65	Deg. F.	70	Deg. F.	70	Deg. F.	70	Deg. F.
Water Temperature:	58	Deg. F.	66	Deg. F.	66	Deg. F.	62	Deg. F.
Ave. Stream Width:	11.264	Feet	42	Feet	67	Feet	57	Feet
Ave. Stream Depth:	1.05	Feet	1.71	Feet	1.3222	Feet	1.68	Feet
Surface Velocity:	0.752	Ft./Sec.	1.458	Ft./Sec.	0.983	Ft./Sec.	2.304	Ft./Sec.
Estimated Flow:	8.8940544	CFS	104.71356	CFS	87.0814142	CFS	220.63104	CFS
Stream Modifications:	None		None		None		None	
Nuisance Plants (Y/N):	N		N		N		N	
Report Number:								
STORET No.:	210228		770167		770170		770172	
Stream Name:	Kilpecker Creek		Driggs River		West Branch Manistique River		Indian River	
Road Crossing/Location:	Federal Forest Road 2717		Driggs River Road		Cals Drive		County Road 449	
County Code:	21		77		77		77	
TRS:	43N18W14		44N14W03		43N15W34		43N17W27	
Latitude (dd):	46.12955		46.23227		46.13812		46.0903	
Longitude (dd):	-86.51395		-86.03689		-86.1771		-86.41051	
Ecoregion:	NLAF		NLAF		NLAF		NLAF	
Stream Type:	Warmwater						Coldwater	
USGS Basin Code:	4060106		4060106		4060106		4060106	

* Applies only to Riffle/Run stream Surveys
** Applies only to Glide/Pool stream Surveys

	Indian River		Walsh Creek		Driggs River		West Branch Manistique River	
	County Road 449		C3 Pool Road		Seney Wildlife Refuge 4 Road		off Cals Drive	
	RIFFLE/RUN		GLIDE/POOL		GLIDE/POOL		GLIDE/POOL	
	Station 10		Station 12		Station 14		Station 15	
HABITAT METRIC								
Substrate and Instream Cover								
Epifaunal Substrate/ Avail Cover (20)	15		16		10		7	
Embeddedness (20)*	16							
Velocity/Depth Regime (20)*	18							
Pool Substrate Characterization (20)**			11		14		13	
Pool Variability (20)**			15		15		17	
Channel Morphology								
Sediment Deposition (20)	18		14		16		6	
Flow Status - Maint. Flow Volume (10)	10		8		9		9	
Flow Status - Flashiness (10)	10		6		8		5	
Channel Alteration (20)	20		16		20		20	
Frequency of Riffles/Bends (20)*	9							
Channel Sinuosity (20)**			17		16		19	
Riparian and Bank Structure								
Bank Stability (L) (10)	10		8		8		3	
Bank Stability (R) (10)	10		7		8		3	
Vegetative Protection (L) (10)	10		10		7		4	
Vegetative Protection (R) (10)	10		10		7		4	
Riparian Veg. Zone Width (L) (10)	10		10		10		7	
Riparian Veg. Zone Width (R) (10)	10		10		10		10	
TOTAL SCORE (200):	176		158		158		127	
HABITAT RATING:	EXCELLENT (NON-IMPAIRED)		EXCELLENT (NON-IMPAIRED)		EXCELLENT (NON-IMPAIRED)		GOOD (SLIGHTLY IMPAIRED)	

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:	7/24/2014		7/31/2014		7/31/2014		7/25/2014	
Weather:	Sunny		Sunny		Sunny		Sunny	
Air Temperature:	70	Deg. F.	70	Deg. F.	70	Deg. F.	70	Deg. F.
Water Temperature:	62	Deg. F.	68	Deg. F.	65	Deg. F.	66	Deg. F.
Ave. Stream Width:	57	Feet	5.25	Feet	35.5	Feet	90.5	Feet
Ave. Stream Depth:	1.68	Feet	0.364	Feet	1.57	Feet	0.771	Feet
Surface Velocity:	2.304	Ft./Sec.	0.209	Ft./Sec.	2.02	Ft./Sec.	1.48	Ft./Sec.
Estimated Flow:	220.63104	CFS	0.399399	CFS	112.5847	CFS	103.26774	CFS
Stream Modifications:	None		Impounded		None		None	
Nuisance Plants (Y/N):	N		Y		N		N	
Report Number:								
STORET No.:	770172		770168		770166		770171	
Stream Name:	Indian River		Walsh Creek		Driggs River		West Branch Manistique River	
Road Crossing/Location:	County Road 449		C3 Pool Road		Seney Wildlife Refuge 4 Road		off Cals Drive	
County Code:	77		77		77		77	
TRS:	43N17W27		45N15W1		44N14W24		44N15W33	
Latitude (dd):	46.0903		46.31867		46.20095		46.16264	
Longitude (dd):	-86.41051		-86.11814		-86.001		-86.19401	
Ecoregion:	NLAF		NLAF		NLAF		NLAF	
Stream Type:	Coldwater						Coldwater	
USGS Basin Code:	4060106		4060106		4060106		4060106	

* Applies only to Riffle/Run stream Surveys
** Applies only to Glide/Pool stream Surveys

	Indian River		Star Creek		East Branch Tahquamenon River		East Branch Fox River	
	Federal Forest Road 2258		Off Star Siding Road		Arbutus Truck Trail		M-77 (downstream)	
	GLIDE/POOL		GLIDE/POOL		GLIDE/POOL		RIFFLE/RUN	
	Station 16		Station 2T		Station 3T		Station 4T	
HABITAT METRIC								
Substrate and Instream Cover								
Epifaunal Substrate/ Avail Cover (20)	12		10		8		8	
Embeddedness (20)*							3	
Velocity/Depth Regime (20)*							8	
Pool Substrate Characterization (20)**	15		11		11			
Pool Variability (20)**	16		8		8			
Channel Morphology								
Sediment Deposition (20)	18		8		10		6	
Flow Status - Maint. Flow Volume (10)	10		9		9		10	
Flow Status - Flashiness (10)	10		8		10		6	
Channel Alteration (20)	20		20		20		20	
Frequency of Riffles/Bends (20)*							3	
Channel Sinuosity (20)**	15		14		19			
Riparian and Bank Structure								
Bank Stability (L) (10)	10		9		9		9	
Bank Stability (R) (10)	10		9		9		9	
Vegetative Protection (L) (10)	10		8		10		7	
Vegetative Protection (R) (10)	10		8		10		5	
Riparian Veg. Zone Width (L) (10)	10		10		10		6	
Riparian Veg. Zone Width (R) (10)	10		10		10		9	
TOTAL SCORE (200):	176		142		153		109	
HABITAT RATING:	0		0		0		0	
	0		0		0		0	
	IMPAIRED)		IMPAIRED)		IMPAIRED)		IMPAIRED)	

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:	7/26/2014		6/24/2009		9/17/2014		7/31/2014	
Weather:	Sunny		Sunny		Partly Cloudy		Sunny	
Air Temperature:	70	Deg. F.	75	Deg. F.		Deg. F.	70	Deg. F.
Water Temperature:	65	Deg. F.	62	Deg. F.	51	Deg. F.	50	Deg. F.
Ave. Stream Width:	41	Feet	18	Feet	6.99	Feet	24	Feet
Ave. Stream Depth:	1.72	Feet	1.5	Feet	0.52	Feet	2.31	Feet
Surface Velocity:	1.62	Ft./Sec.	0.33	Ft./Sec.	0.39	Ft./Sec.	1.98	Ft./Sec.
Estimated Flow:	114.2424	CFS	8.91	CFS	1.417572	CFS	109.7712	CFS
Stream Modifications:	None		None		None		None	
Nuisance Plants (Y/N):	N		N		Y		N	
Report Number:								
STORET No.:	770169		20124		170288		770090	
Stream Name:	Indian River		Star Creek		East Branch Tahquamenon River		East Branch Fox River	
Road Crossing/Location:	Federal Forest Road 2258		Off Star Siding Road		Arbutus Truck Trail		M-77 (downstream)	
County Code:	77		02		17		77	
TRS:	44N18W29		46N17W23		45N05W05		46N13W05	
Latitude (dd):	46.18274		46.37216		46.3177		46.40607	
Longitude (dd):	-86.59032		-86.39325		-84.9527		-85.94795	
Ecoregion:	NLAF		NLAF		NLAF		NLAF	
Stream Type:	Coldwater		Coldwater		Coldwater		Coldwater	
USGS Basin Code:	4060106		4060106		4020202		4060106	

* Applies only to Riffle/Run stream Surveys
** Applies only to Glide/Pool stream Surveys

	Kilpecker Creek		Mead Creek		Big Murphy Creek		Clear Creek	
	two-track off Federal		M-77 (downstream)		County Road 437		upstream M-77	
	RIFFLE/RUN		GLIDE/POOL		RIFFLE/RUN		RIFFLE/RUN	
	Station 5T		Station 6T		Station 7T		Station 8T	
HABITAT METRIC								
Substrate and Instream Cover								
Epifaunal Substrate/ Avail Cover (20)	19		13		13		6	
Embeddedness (20)*	17				15		15	
Velocity/Depth Regime (20)*	18				17		8	
Pool Substrate Characterization (20)**			14					
Pool Variability (20)**			11					
Channel Morphology								
Sediment Deposition (20)	17		18		15		6	
Flow Status - Maint. Flow Volume (10)	10		10		10		10	
Flow Status - Flashiness (10)	10		10		10		6	
Channel Alteration (20)	20		20		20		20	
Frequency of Riffles/Bends (20)*	16				15		8	
Channel Sinuosity (20)**			17					
Riparian and Bank Structure								
Bank Stability (L) (10)	10		9		10		10	
Bank Stability (R) (10)	10		9		10		10	
Vegetative Protection (L) (10)	10		10		10		9	
Vegetative Protection (R) (10)	10		10		10		8	
Riparian Veg. Zone Width (L) (10)	10		10		10		10	
Riparian Veg. Zone Width (R) (10)	10		10		10		10	
TOTAL SCORE (200):	187		171		175		136	
HABITAT RATING:	EXCELLENT (NON-IMPAIRED)		EXCELLENT (NON-IMPAIRED)		EXCELLENT (NON-IMPAIRED)		GOOD (SLIGHTLY IMPAIRED)	
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:	9/16/2014		7/31/2014		7/24/2014		7/31/2014	
Weather:	Sunny		Sunny		Sunny		Sunny	
Air Temperature:	60	Deg. F.	60	Deg. F.	75	Deg. F.	75	Deg. F.
Water Temperature:	48	Deg. F.	62	Deg. F.	65	Deg. F.	49	Deg. F.
Ave. Stream Width:	14.217	Feet	15.9	Feet	45.5	Feet	16	Feet
Ave. Stream Depth:	0.876	Feet	1.02	Feet	1.14	Feet	1.11	Feet
Surface Velocity:	1.53	Ft./Sec.	0.298	Ft./Sec.	1.38	Ft./Sec.	0.824	Ft./Sec.
Estimated Flow:	19.05476076	CFS	4.832964	CFS	71.5806	CFS	14.63424	CFS
Stream Modifications:	None		None		None		None	
Nuisance Plants (Y/N):	N		N		N		N	
Report Number:								
STORET No.:	210305		770089		770159		770108	
Stream Name:	Kilpecker Creek		Mead Creek		Big Murphy Creek		Clear Creek	
Road Crossing/Location:	two-track off Federal Forest Rd 2438		M-77 (downstream)		County Road 437		upstream M-77	
County Code:	21		77		77		77	
TRS:	43N18W24		44N13W28		43N17W32		47N13W21	
Latitude (dd):	46.11395		46.17484		46.07281		46.44928	
Longitude (dd):	-86.49214		-85.92751		-86.4669		-85.93728	
Ecoregion:	NLAF		NLAF		NLAF		NLAF	
Stream Type:	Coldwater		Warmwater		Coldwater		Coldwater	
USGS Basin Code:	4060106		4060106		4060106		4060106	
* Applies only to Riffle/Run stream Surveys								
** Applies only to Glide/Pool stream Surveys								

	Milakokia River		Creighton River		West Branch Manistique River		West Branch Manistique River	
	Betty Doe Lake Rd		Creighton Truck Trail		Hickey Truck Trail		off Crieghton Truck Trail	
	RIFFLE/RUN		GLIDE/POOL		GLIDE/POOL		GLIDE/POOL	
	Station 10T		Station 11T		Station 13T		Station 14T	
HABITAT METRIC								
Substrate and Instream Cover								
Epifaunal Substrate/ Avail Cover (20)	19		7		9		8	
Embeddedness (20)*	18							
Velocity/Depth Regime (20)*	15							
Pool Substrate Characterization (20)**			13		15		15	
Pool Variability (20)**			16		17		15	
Channel Morphology								
Sediment Deposition (20)	20		7		14		5	
Flow Status - Maint. Flow Volume (10)	10		10		10		8	
Flow Status - Flashiness (10)	10		3		8		4	
Channel Alteration (20)	20		20		20		20	
Frequency of Riffles/Bends (20)*	18							
Channel Sinuosity (20)**			20		19		20	
Riparian and Bank Structure								
Bank Stability (L) (10)	10		4		5		4	
Bank Stability (R) (10)	10		4		6		4	
Vegetative Protection (L) (10)	10		8		6		5	
Vegetative Protection (R) (10)	10		8		6		5	
Riparian Veg. Zone Width (L) (10)	10		10		10		6	
Riparian Veg. Zone Width (R) (10)	10		10		10		10	
TOTAL SCORE (200):	190		140		155		129	
HABITAT RATING:	EXCELLENT (NON-IMPAIRED)		GOOD (SLIGHTLY IMPAIRED)		EXCELLENT (NON-IMPAIRED)		GOOD (SLIGHTLY IMPAIRED)	
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:	7/23/2014		7/26/2014		7/25/2014		7/26/2014	
Weather:	Sunny		Sunny		Sunny		Sunny	
Air Temperature:	78	Deg. F.	70	Deg. F.	76	Deg. F.	70	Deg. F.
Water Temperature:	76	Deg. F.	68	Deg. F.	64	Deg. F.	66	Deg. F.
Ave. Stream Width:	20.92	Feet	42	Feet	31.5	Feet	68	Feet
Ave. Stream Depth:	0.299	Feet	1.76	Feet	0.58	Feet	0.748	Feet
Surface Velocity:	0.824	Ft./Sec.	0.7	Ft./Sec.	1.136	Ft./Sec.	1.41	Ft./Sec.
Estimated Flow:	5.15418592	CFS	51.744	CFS	20.75472	CFS	71.71824	CFS
Stream Modifications:	None		None		None		None	
Nuisance Plants (Y/N):	N		N		N		N	
Report Number:								
STORET No.:	490065		770156		770155		770160	
Stream Name:	Milakokia River		Creighton River		West Branch Manistique River		West Branch Manistique River	
Road Crossing/Location:	Betty Doe Lake Rd		Creighton Truck Trail		Hickey Truck Trail		off Crieghton Truck Trail	
County Code:	49		77		77		77	
TRS:	42N12W18		44N16W01		45N16W35		44N15W07	
Latitude (dd):	46.02832		46.24108		46.25291		46.22857	
Longitude (dd):	-85.84404		-86.24185		-86.26238		-86.23506	
Ecoregion:	NLAF		NLAF		NLAF		NLAF	
Stream Type:	Warmwater		Warmwater		Warmwater		Warmwater	
USGS Basin Code:	4060107		4060106		4060106		4060106	
* Applies only to Riffle/Run stream Surveys								
** Applies only to Glide/Pool stream Surveys								