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

<u>Manistique</u>

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

SITE WATERBODY LATITUDE LONGITUDE Date Sampled COUNTY TRS STORET Score 2 Kilpecker Creek 46.12938 86.51379 24-Jul-14 Delta 43N18W14 210228 165	Score Score 2014 2009 3 6
2 Kilpecker Creek 46.12938 86.51379 24-Jul-14 Delta 43N18W14 210228 165	3 6
	6
3 Driggs River 46.23227 -86.03689 31-Jul-14 Schoolcraft 44N14W03 770167 134	
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

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

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 Millecoguins 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 and 15) 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

	Kilpeck	er Creek	Drigg	s River	West B	ranch	Indiar	n River
	Federal Fe	rest Road	Driggs R	iver Road	Cals I	Drive	County I	Road 449
ΤΑΥΑ	7/24 Stati	2014 on 2	7/31.	/2014	7/25/2 Static	2014	7/24 Stati	/2014
IAAA	Stat	011 2	Stat	1011 3	Static	JII 3	Stat	1011 9
PORIFERA (sponges)	1							
ANNELIDA (segmented worms)	1				2		5	
ARTHROPODA	1				2		5	
Crustacea								
Amphipoda (scuds)	5		2		3		11	
Arachnoidea			2		5		1	
Hydracarina	21		1		3		3	
Insecta								
Ephemeroptera (mayflies)					_			
Baetiscidae	6		10		3		110	
Caenidae	0		6		9		5	
Ephemerellidae	2		1		1		1	
Ephemeridae			1					
Heptagenudae			6		9		1	
Leptophlebiidae	2				1		2	
Potamanthidae							6	
Odonata								
Anisoptera (dragonflies)			0		17		1	
Gomphidae			5		1/		1	
Libellulidae			1					
Zygoptera (damselflies)								
Calopterygidae			14		8		1	
Plecoptera (stoneflies)			1					
Leuctridae	4							
Nemouridae	13							
Perlidae			1		6		1	
Taenioptervgidae			1		5		10	
Hemiptera (true bugs)					-			
Corixidae			5		1		1	
Gerridae			1		1		1	
Veindae			4		4		1	
Corydalidae (dobson flies)			1		1			
Sialidae (alder flies)	2		1				1	
Trichoptera (caddisflies)								
Brachycentridae	3		133		61		39	
Leptoceridae	4		3		1		42	
Limnephilidae	13		1		2			
Molannidae	1							
Phryganeidae	1		6		12		2	
Polycentropodidae Coleoptera (beetles)	1		3		12		2	
Dytiscidae (total)	1		3		1			
Gyrinidae (adults)			1		1		1	
Hydrophilidae (total)	1				2		1	
Eimidae Gwrinidae (larvae)	1				5		1	
Diptera (flies)								
Athericidae			2		3			
Ceratopogonidae	6		10		1		1	
Culicidae	198		18		26		30	
Dixidae							1	
Simuliidae	4		19		10		38	
Tabanidae	1		1		2		1	
MOLLUSCA Gastropoda (spails)								
Hydrobiidae	1						1	
Physidae	1		1		1		1	
Pelecypoda (bivalves)								
Sphaeriidae (clams)	1				1		3	
Spineriade (calify)							5	
TOTAL INDIVIDUALS	299		389		312		341	
					West B	ranch		
	Kilpeck	er Creek	Drigg	s River	Manistiqu	ie River	Indiar	n River
	Federal Fo	rest Road	Driggs R	iver Road	Cals I	Drive	County I	Road 449
	7/24	2014	7/31	/2014	7/25/2	2014	7/24	/2014
METRIC	Stat Value	on 2	Stat	ion 3	Static	Score	Stat	ION 9 Score
man ARC	value	Score	value	Score	vaide	Bedie	value	5000
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
PERCENT MAYFLY COMP	2 3 34	1	3 6.43	1	3	1	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 SURP. AIR BREATHERS	0.67	1	3.60	1	3.53	1	1.47	1
TOTAL SCORE		3		6		5		5
MACROINV. COMMUNITY RATIN	IG	ACCEPT.		EXCELLEN	T	EXCELLEN	T	EXCELLENT

TAXA ANNELIDA (segmented worms) Hirudinea (leeches) Oligochaeta (worms) ARTHROPODA Crustacea Amphipoda (scuds) Decapoda (scuds) Isopoda (sovbugs) Arachnoidea Hydracarina	County I 7/24/ Statio	Road 449 /2014 on 10	C3 Poc 7/31/ Statio	01 Road /2014 on 12	Seney 1 7/31/ Statio	Wildlife 2014 on 14	off Cal 7/25/ Static	s Drive 2014 on 15
TAXA ANNELIDA (segmented worms) Hirodinea (leeches) Oligochaeta (worms) ARTIHOPODA Crustacea Amphipoda (scuds) Decapoda (crwfish) Isopoda (sowbugs) Arachnoidea Hydracarina	7/24/ Statio	/2014 on 10	7/31, Statio	/2014 on 12	7/31/ Statio	2014 on 14	7/25/ Statio	2014 >n 15
TAXA ANNELIDA (segmented worms) Hirudinea (teeches) Otigocheate (worms) ARTIROPODA Crustacea Amphipoda (scuds) Decapoda (scuds) Decapoda (scwbugs) Arachnoidea Hydracarina	Station 5	on 10	Stati	on 12	Stati	on 14	Statio	on 15
ANNELIDA (segmented worms) Hirudinea (leeches) Oligochaeta (worms) ARTHROPODA Crustacea Amphipoda (scuds) Decapoda (srayfish) Isopoda (sowbugs) Arachnoidea Hydracarina	5		1					
ANNELIDA (segmented worms) Hirudinea (eeches) Oligochaeta (worms) ARTIROPODA Crustacea Amphipoda (scuds) Decapoda (crwyfish) Isopoda (sowbugs) Arachnoidea Hydracarina	5		1					
Hirudinea (teeches) Odigocheata (worms) ARTIHROPODA Crustacea Amphipoda (scuds) Decapoda (scwfish) Isopoda (sowbugs) Arachnoidea Hydracarina	5		1					
Oligochaeta (woms) ARTHROPODA Crustacea Amphipoda (scuds) Decapoda (crayfish) Isopoda (sowbugs) Arachnoidea Hydracarina	5							
Art InKOPODA Crustacea Amphipoda (scuds) Decapoda (crayfish) Isopoda (sowbugs) Arachnoidea Hydracarina			1					
Amphipoda (scuds) Decapoda (crayfish) Isopoda (sowbugs) Arachnoidea Hydracarina								
Decapoda (crayfish) Isopoda (sowbugs) Arachnoidea Hydracarina	11						1	
Isopoda (sowbugs) Arachnoidea Hydracarina	1		6		1		3	
Arachnoidea Hydracarina					1			
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		/	
Isonychiidae	1		15		1		1	
Potamanthidae			15		2			
Sinhlonuridae	0				2			
Tricorythidae					2		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					
Veludae	1				2		1	
Megaloptera			2					
Stalidae (alder flies)	1		3					
Brochucontridee	20		1		20		08	
Brachycenthdae	39		21		38		98	
Lantocaridae	42		21		120		01	
Lippocentiae	3		2		3		1	
Phryganeidae			1					
Polycentropodidae	2		1		7		4	
Coleontera (heetles)								
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	
1 ipulidae			2		3			
Gastropoda (spaile)								
Hydrobiidae	1				1			
Bhusidee	1		1		1			
Pelecynoda (hivalvec)	1		1					
Pisidiidae	1		1		1			
Sphaeriidae (clams)	3							
-r-merinane (enalis)	3							
TOTALINDIVIDUATS	341		313	<u> </u>	301		308	
10111LINDIVIDUALD			313		301		308	
	Indian	River	Walsh	Creek	Driggs	River	West I	3ranch
	County I	Road 449	C3 Poc	lRoad	Seney V	Wildlife	off Cal	s Drive
	7/24/	2014	7/31/	/2014	7/31/	2014	7/25/	2014
	Statio	on 10	Stati	on 12	Static	on 14	Statio	on 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
	25.22	0	8.31	0	57.81	1	53.25	1
PERCENT CADDISFLY COMP.	32.26	-1	26.84	0	41.86	-1	31.82	-1
PERCENT CADDISFLY COMP. PERCENT DOMINANT TAXON		1	0.64	1	0.66	1	0.00	1
PERCENT CADDISFLY COMP. PERCENT DOMINANT TAXON PERCENT ISOPOD, SNAIL, LEECH	0.59		0107					
PERCENT CADDISFLY COMP. PERCENT DOMINANT TAXON PERCENT ISOPOD, SNAIL, LEECH PERCENT SURF. AIR BREATHERS	0.59	1	1.28	1	1.66	1	1.30	1
PERCENT CADDISFLY COMP. PERCENT DOMINANT TAXON PERCENT ISOPOD, SNAIL, LEECH PERCENT SURF. AIR BREATHERS	0.59	1	1.28	1	1.66	1	1.30	1
PERCENT CADDISFLY COMP. PERCENT DOMINANT TAXON PERCENT ISOPOD, SNAIL, LEECH PERCENT SURF. AIR BREATHERS TOTAL SCORE	0.59	1	1.28	1	1.66	1	1.30	6

	Federal Fo	orest Road	Off Star Si	ding Road	Arbutus 7	Fruck Trail	M-77 (dov	wnstream)
F A V A	7/26	2014	6/24	2009	9/17	/2014	7/31/	2014
IAXA	State	on 16	Statio	on 21	Stati	on 31	Static	on 41
ANNELIDA (segmented worms)								
Oligochaeta (worms)	1		2		1		1	
ARTHROPODA								
Amphipoda (scuds)	135				1			
Decapoda (crayfish)	2							
Isopoda (sowbugs)							27	
Hydracarina	24		1		11		4	
nsecta								
Ephemeroptera (mayflies)	5		1					
Baetidae	21		1		8		104	
Caenidae	4		7					
Ephemerellidae	3				5		58	
Ephemeridae Hentageniidae	1						1	
Isonychiidae	1							
Leptophlebiidae					64			
Odonata	1							
Anisoptera (dragonflies)								
Aeshnidae	4		3		1			
Cordulegastridae	1		5		1			
Libellulidae	1		,		1			
Macromiidae	1							
Zygoptera (damselflies)			-					
Coenagrionidae	4		3					
Plecoptera (stoneflies)	·							
Chloroperlidae					17			
Leuctridae Nemouridae					1		14	
Peltoperlidae							66	
Perlidae	1		2					
Pteronarcyidae Hemintera (true bugs)	1		1				2	
Corixidae	1		4					
Gerridae	1						1	
Mesoveliidae	3				1			
Veliidae Megaloptera	2						1	
Corydalidae (dobson flies)	1		3				1	
Sialidae (alder flies)	1				14			
Trichoptera (caddisflies)	1						7	
Glossosomatidae	1		3				,	
Helicopsychidae			10					
Hydropsychidae	32		3		1		1	
Hydroptilidae Lepidostomatidae	4		7					
Leptoceridae	13		4					
Limnephilidae			24		1		10	
Molannidae	3		1		2			
Polycentropodidae	2		4		2			
Uenoidae			1					
Coleoptera (beetles)							1	
Gyrinidae (adults)							1	
Hydrophilidae (total)	3							
Dryopidae	-		1					
Eimidae Dintera (flies)	/		5					
Athericidae			1					
Ceratopogonidae	1		1		4			
Chironomidae	66		15		99		18	
Dixidae	5							
Ptychopteridae					4			
Simuliidae	3				1		92	
1 ipunuae MOLLUSCA							1	
Gastropoda (snails)								
Ancylidae (limpets)			1					
Hydrobiidae I ymnaeidae	2							
Physidae	4		4		4			
Pelecypoda (bivalves)								
Pisidiidae	1		-		3		· · ·	
spriaeriidae (clams)	1		3				1	
TOTAL INDIVIDUALS	375		129		246		413	
	Indian Federal Fo	River orest Road	Star Off Star Si	Creek ding Road	East H Arbutus 7	Branch Fruck Trail	East Bra M-77 (dow	nch Fox wnstream)
	7/26	2014 on 16	6/24 Stati	2009 on 2T	9/17	/2014	7/31/	2014 on 4T
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMPER OF TAYA	45	1	29	1	23	1	22	0
THE NUMBER OF TAXA	7	1	2	-1	3	1	4	0
NUMBER OF MAYFLY TAXA		1	2	1	2	1	3	1
VUMBER OF MAYFLY TAXA VUMBER OF CADDISFLY TAXA VUMBER OF STONEFLY TAXA	2	1			21.20	1	30.71	1
VUMBER OF MAYFLY TAXA VUMBER OF CADDISFLY TAXA VUMBER OF STONEFLY TAXA PERCENT MAYFLY COMP.	2 9.60	0	6.20	0	31.50	1	37.11	
VUMBER OF MAYFLY TAXA VUMBER OF CADDISFLY TAXA VUMBER OF STONEFLY TAXA VERCENT MAYFLY COMP. VERCENT CADDISFLY COMP.	2 9.60 14.93	0	6.20 44.19	0	1.63	-1	4.36	0
UMBER OF MAYELYTAXA VUMBER OF CADDISFLYTAXA VUMBER OF STONEFLYTAXA PRCENT MAYFLY COMP. *ERCENT CADDISFLY COMP. *ERCENT CADDISFLY COMP. *ERCENT DOMINANT TAXON *ERCENT DOPOD SNAIL 1FF74	2 9.60 14.93 36.00 2.67	0 0 -1	6.20 44.19 18.60 3.88	0 1 0 1 0 1	1.63 40.24 2.03	-1 -1 1	4.36	0
UNALINAMISE OF MAYELY TAXA VUMBER OF CADDISFLY TAXA VUMBER OF STONFFLY TAXA VUMBER OF STONFFLY TAXA VUMBER OF STONFFLY TAXA VERCENT CADDISFLY COMP. VERCENT DOMINANT TAXON VERCENT ISOPOD, SNAIL, LEECH VERCENT UNF. AIR BREATHERS	2 9.60 14.93 36.00 2.67 2.93	1 0 -1 1 1	6.20 44.19 18.60 3.88 3.10	0 1 0 1 1	1.63 40.24 2.03 2.03	-1 -1 1	4.36 25.18 6.54 0.97	00000
UNHER OF MAYELY TAAA VUMBER OF CADDISFLY TAXA VUMBER OF STONFELY TAXA VUMBER OF STONFELY TAXA FERCENT MAYFLY COMP. FERCENT CADDISFLY COMP. FERCENT CADDISFLY COMP. FERCENT SOPOD, SNAIL, LEECH FERCENT SURF. AIR BREATHERS	2 9.60 14.93 36.00 2.67 2.93	1 0 -1 1 1	6.20 44.19 18.60 3.88 3.10	0 1 0 1 1	1.63 40.24 2.03 2.03	-1 -1 1 1	4.36 25.18 6.54 0.97	00000

	Kilpeck two-track	er Creek off Federal	Mead M-77 (dov	Creek wnstream)	Big Murp County I	hy Creek Road 437	Clear	Creek m M-77
m + 37 +	9/16	2014	7/31/	2014	7/24/	2014	7/31/	2014
TAXA	Statio	on 51	Static	on 61	Statio	on 71	Static	on 81
ANNELIDA (segmented worms)								
Hirudinea (leeches) Oligochaeta (worms)	14		3		2		1	
ARTHROPODA								
Crustacea Amphipoda (scuds)	1		67		1		13	
Decapoda (crayfish)			5		2			
Isopoda (sowbugs) Arachnoidea			1		36		1	
Hydracarina	25		61		3		10	
Insecta Enhamorontom (mouflies)								
Baetiscidae					5			
Baetidae	15		21		14		101	
Heptageniidae	15		3		4		5	
Isonychiidae					1		1	
Leptophlebiidae Sinhlonuridae	14		1					
Tricorythidae					1			
Odonata A nisontem (dragonfligs)								
Ansoptera (dragonnes) Aeshnidae			15		5			
Cordulegastridae					1			
Libellulidae			4		1			
Zygoptera (danselflies)								
Calopterygidae			13		3			
Plecoptera (stoneflies)			15					
Leuctridae	28				1		10	
Perlidae	8				4		21	
Pteronarcyidae					1			
Hemiptera (true bugs) Belostomatidae	2							
Corixidae	2		4				1	
Gerridae	1		1		1		1	
Veliidae			5					
Megaloptera								
Sialidae (alder flies)			10					
Trichoptera (caddisflies)								
Brachycentridae	3				60			
Hydropsychidae	48				85			
Lepidostomatidae	1		16		1			
Limnephilidae	9		3		1		8	
Molannidae	1							
Phryganeidae Polycentropodidae	2		1		2			
Rhyacophilidae	6							
Uenoidae Coleontera (beetles)	1							
Dytiscidae (total)	1		2				1	
Gyrinidae (adults)			2				1	
Elmidae			35		3			
Diptera (flies)								
Ceratopogonidae	4		5		4		3	
Chironomidae	55		35		164		257	
Culicidae	3				1			
Ptychopteridae	1							
Simuliidae	8				1		38	
Tabanidae			3		1		14	
Tipulidae	4							
Gastropoda (snails)								
Ancylidae (limpets)			2		1			
Bithyniidae Lymnaeidae			2				1	
Physidae	1		1		1		2	
Planorbidae Palaaupada (hiyalyas)							1	
Pisidiidae					1			
Sphaeriidae (clams)	9		1		1		9	
Unionidae (mussels)			1					
TOTAL INDIVIDUALS	289		334		422		515	
	Kilpeck	er Creek	Mead	Creek	Big Murp	hy Creek	Clear	Creek
	two-track	off Federal 2014	M-77 (dov 7/31	wnstream) /2014	County I	koad 437 2014	upstreat 7/31/	m M-77 2014
METRIC	Static	on 5T Score	Static	on 6T Score	Statio	on 7T Score	Static	on 8T Score
TOTAL NUMBER OF TAYA	21	1	26	1	27	1		^
NUMBER OF MAYFLY TAXA		0		0	5/	1	23	0
NUMBER OF CADDISFLY TAXA	9	1	4	0	6	1	1	-1
NUMBER OF STONEFLY TAXA	3	1	0	-1	3	1	2 20 70	1
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 PERCENT SURF. AIR BREATHERS	0.35	1	2.10	1	9.00	0	0.97	1
TOT 11 00077								-
TOTAL SCORE		5		2		5		0
MACROINV. COMMUNITY RATIN	G	EXCELLE	T	ACCEPT.		EXCELLEN	T	ACCEPT.

	Milakok Betty Doe	ia River	Creighto	n River n Truck	West I Hickey Tr	Branch tuck Trail	West I	Branch ton Truck	
	7/23/	2014	7/26/	2014	7/25/	2014	7/26/	2014	
TAXA	Statio	n 10T	Station	n 11T	Statio	n 13T	Statio	n 14T	
ANNELIDA (segmented worms)									
Hirudinea (leeches)	1						1		
ARTHROPODA	1				1				
Crustacea	2				21		12		
Decapoda (crayfish)	4		6		10		12		
Arachnoidea			0		12		0		
Insecta	- 11		9		12		9		
Ephemeroptera (mayflies)									
Baetiscidae	2		21		36		75		
Caenidae	1		5				3		
Ephemerellidae Heptageniidae	46		14		2		2		
Isonychiidae					1				
Leptophlebiidae Potamanthidae	26				1				
Tricorythidae	1		1		1				
Odonata Anisoptera (dragonflies)									
Aeshnidae	20		1		6		7		
Cordulegastridae	12		1		1		1		
Libellulidae	1								
Zygoptera (damselflies)	14		13		12		2		
Coenagrionidae	14		15		12		1		
Plecoptera (stoneflies)					1				
Perlidae	3		1		1		5		
Perlodidae	1								
Hemiptera (true bugs)			1		1		1		
Corixidae	1		8		4		10		
Mesoveliidae			1						
Notonectidae							1		
Veludae Megaloptera	2		8		9		1		
Corydalidae (dobson flies)	3				1		1		
Sialidae (alder flies) Trichontera (caddisflies)	1		1						
Brachycentridae			87		14		70		
Helicopsychidae	1		28		1		29		
Hydroptilidae	10		3		14				
Leptoceridae	5		1		2		1		
Molannidae	1		2		~ ~				
Phryganeidae Palassantas di das	21		13		1		1		
Uenoidae	21		0		,				
Coleoptera (beetles)			2						
Gyrinidae (adults)	1		2		1		1		
Haliplidae (adults)							10		
Elmidae (total)	12		7		8		9		
Gyrinidae (larvae)			3		2		1		
Diptera (flies)			2		1		1		
Athericidae			2				1		
Ceratopogonidae Chironomidae	19		47		15		28		
Culicidae			2		3				
Simuliidae Tabanidae			5		16		8		
Tipulidae	5		1		1				
MOLLUSCA Gastropoda (snails)									
Ancylidae (limpets)			1						
Physidae Palacupoda (biwalwas)							2		
Sphaeriidae (clams)	3		1						
TOTAL INDUZDUALS	272		212		200		212		
TOTAL INDIVIDUALS	512		512		300		512		
	Milakok	ia River	Creighto	n River	West I	Branch	West I	Branch	
	7/23/	2014	7/26/	2014	7/25/	2014	7/26/	2014	
METRIC	Statio	n 10T	Station	n llT	Statio	n 13T	Statio	n 14T	
MEIRIC	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 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 CADDISPLY COMP. PERCENT DOMINANT TAXON	15.44 34.41	-1	45.51 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 SURP. AIR BREATHERS	1.08	1	7.05	0	6.33	0	8.65	0	
TOTAL SCORE		5		5		5		6	
MACDONN COMMENTY DATES	C	EVCELLEN	T	EVCELLEN	T	EVCELLE	UT .	EVCELLEN	T

					West Branch			
					Manistique			
	Kilpecker Creek		Driggs River		River		Indian River	
	Pederal Porest		Driggs River		Cale Drive		440	
	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		3		3		10	
Emanuel Alteration (20)	20		20		20		20	
Channel Sinuosity (20)**	15		17		19		9	
Riparian and Bank Structure			17		10			
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	
	Charles I Party		0000		0000		DAGES I PAR	
TABITAT KATING	ACELLENT		(SUCUTI V		(SLICUTI V		ACELLENT	
	(NUN-		(SLIGHTLY IMPAIRED)		(SLIGHTLY IMPAIRED)		(NUN-	
	IMI AIRLD)		IMI AIRLD)		IMI AIRED)		IMI AIRLD)	
Note: Individual metrics may better describe of	onditions directly	affecting	the biological con	munity w	hile the Habitat R	ating		
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	6/	Feet	57	Feet
Ave. Stream Deptn:	1.05	Feet	1./1	Feet	1.3222	Feet	1.68	Peet
Surface velocity:	0.732	CEE	1.436	CDC	0.965	CDE	2.304	CDE
Stream Modifications:	None	CI 5	None	cr5	07.0014142 None	0.5	220.05104 None	cr3
Nuisance Plants (V/N):	N		N		N		N	
Report Number:								
STORET No.:	210228		770167		770170		770172	
					West Branch			
					Manistique			
Stream Name:	Kilpecker Creek		Driggs River		River		Indian River	
Road Crossing/Location:	Federal Forest R	oad 2717	Driggs River Ros	id	Cals Drive		County Road 44	9
County Code:	21		77		77		77	
TRS:	43N18W14		44N14W03		43N15W34		43N17W27	
	46.10000				46.12777			
Latitude (dd):	46.12955		46.23227		46.13812		46.0903	
Longitude (dd):	-86.51395		-86.03689		-86.1771		-86.41051	
Ecolegion:	NLAP		NLAF		NLAP		NLAP	
sueam rype:	w armwater						Coldwater	
USOS Basin Code:	4060106		4060106		4060106		4060106	
e t r - 1 - 1 - 1 - 7								
* Applies only to Rittle/Run stream Surveys								
- A DUREN ON N TO LINGE/POOL STREAM SURVEYS								

	Indian River		Walsh Creek		Driggs River		West Branch Manistique River	
	449		C3 Pool Road		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		17				10	
Channel Sinuosity (20)**			1/		16		19	
Riparian and Bank Structure	10		0		0		-	
Bank Stability (L) (10)	10		8		8		3	
Dank Stability (K) (10)	10		7		8		3	
Vegetative Protection (L) (10)	10		10		7		4	
Provide View Concerning (K) (10)	10		10		10		- 4	
Riparian Veg. Zone Width (L) (10)	10		10		10		10	
Ripanan veg. Zone w kitii (R) (10)	10		10		10		10	
TOTAL SCORE (200):	176		158		158		127	
HABITAT RATING	EXCELLENT		EXCELLENT		EXCELLENT		GOOD	
	(NON-		(NON-		(NON-		(SLIGHTLY	
	IMPAIRED)		IMPAIRED)		IMPAIRED)		IMPAIRED)	
describes the general riverine environment at Date:	the site(s). 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	Pt./Sec.	2.02	Ft./Sec.	1.48	Ft./Sec.
Estimated Flow:	220.63104	CFS	0.399399	CFS	112.5847	CFS	105.26774	CFS
Stream Modifications:	None		Impounded		None		None	
Nuisance Fiants (1/N):	IN IN		1		IN		IN	
Report Number.								
STORFT No :	770172		770168		770166		770171	
Stream Name:	Indian River		Walsh Creek		Driggs River		West Branch Manistique River	
	County Road				Seney Wildlife			
Road Crossing/Location:	449		C3 Pool Road		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								

					East Branch Tahquamenon		East Branch Fox	
	Indian River Federal Forest		Star Creek Off Star Siding		River Arbutus Truck		River M-77	
	Road 2258		Road		Trail CUDE/DOOL		(downstream)	
	Station 16		GLIDE/FOOL		Station 2T		KIFFLE/KUN	
IIA DITA T MITDIC	Station 16		Station 21		Station 51		Station 41	
HABITAT METRIC								
Substrate and Instream Cover	12		10		0		0	
Epitaunai Substrate/ Avail Cover (20)	12		10		8		8	
Embeddedness (20)*							3	
velocity/Depth Regime (20)*	10						8	
Pool Substrate Characterization (20)**	15		11		11			
Pool variability (20)**	10		8		8			
Channel Morphology	10		0		10			
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	10		0		0		0	
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 SCOPE (200):	176		142		152		109	
TOTAL SCOKE (200).	170		142		155		109	
HABITAT RATING:	0		0		0		0	
	0		0		0		0	
	IMPAIRED)		IMPAIRED)		IMPAIRED)		IMPAIRED)	
Note: Individual metrics may better describe co	onditions directly	affecting	the biological con	munity w	hile the Habitat Rat	ing		
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	
					East Branch Tahquamenon		East Branch Fox	
Stream Name:	Indian River		Star Creek		River		River	
	Federal Forest		Off Star Siding		Arbutus Truck		M-77	
Road Crossing/Location:	Road 2258		Road		Trail		(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		NIAF		NLAF	
Stream Type:	Coldwater		Coldwater		Coldwater		Coldwater	
21								
USGS Basin Code:	4060106		4060106		4020202		4060106	
* Applies only to Riffle/Run stream Surveys								
** Applies only to Glide/Pool stream Surveys								

Kilpe two-trac		'reek Federal	Mead Cre M-77 (downs	ek tream)	Big Murphy County Roa	Creek d 437	Clear Creek upstream M-77	
	RIFFLE/R	UN	GLIDE/PC	OL	RIFFLE/R	UN	RIFFLE/R	UN
	Station 5	т	Station 6	ST	Station 7	т	Station	8T
HABITAT METRIC		_		_		_		
Substrate and Instream Cover	10		12		12			
Ephadian Substrate/ Avail Cover (20)	19		15		15		15	
Embeddedness (20)*	1/				15		15	
Velocity/Depth Regime (20)*	18				1/		8	
Pool Substrate Characterization (20)**			14					
Pool variability (20)-*			11					
Channel Morphology	17		19		15		6	
Flow Status Maint Flow Values (10)	1/		18		13		10	
Flow Status - Maint, Flow Volume (10)	10		10		10		10	
Channel A terration (20)	20		20		20		20	
Emguancy of Pifflas (20)	16		20		15		20	
Channel Sinuosity (20)**	10		17		15		0	
Dimmine and Bank Structure			17					
Dark Stekän (L) (10)	10		0		10		10	
Bank Stability (R) (10)	10		9		10		10	
Vagatativa Protection (L) (10)	10		10		10		10	
Vegetative Protection (P) (10)	10		10		10		9	
Rinarian Veg. Zone Width (L) (10)	10		10		10		10	
Dimension Van Zone Wildth (D) (10)	10		10		10		10	
Ripanan veg. Zone wittin (K) (10)	10		10		10		10	
TOTAL SCORE (200)-	197	-	171		175		126	
TOTAL SCORE (200):	18/		1/1		1/3		130	
HADELAT DATING	EXCELLENT		EVCELLENT		EVCELLENT		0000	
NABITAT KATING	EACELLENT		EACELLENT		EACELLENT		GOOD	
	(INOIN-		(INOIN-		(INOIN-		(SLIGHTLT	
	IMPAIRED)		IMPAIRED)		INFAIRED)		INFAIRED)	
	Per Prod							
Note: individual metrics may better describe of	onditions directly	affecting	the biological con	munity v	mie the Habitat R	iting		
describes the general riverine environment at	the site(s).							
B .	0/1//2014		7/21/2014		7/0//001/		7/21/201/	
Date:	9/16/2014		// 51/2014		// 24/ 2014		//51/2014	
weather.	Sunny	D D	Sunny	D D	Sunny	D F	Sumy	D D
Air Temperature:	60	Deg. F.	60	Deg. F.	/5	Deg. F.	/5	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:	1.55	PL/Sec.	0.298	PL/Sec.	1.38	PL/Sec.	0.824	PL/Sec.
Estimated Flow:	19.05476076	CFS	4.852964	CFS	/1.5806	CFS	14.65424	CFS
Stream Modifications:	None		None		None		None	
Nuisance riants (1/18):	IN		IN		in		in	
Report Number.								
STODET No	210205		770080		770150		770108	
STORET NO.:	210505		770089		Die Muerku		770108	
Stram Nama	Kilnaskar Craak		Maad Cmak		Big Mulphy Cmak		Char Crack	
Stream Name:	Kilpecker Creek		wieau Cieek		CIECK		Crear Creek	
	two-track on							
Prod Consistent anti-	Pederal Polest		N1-//		427			
County Code:	Ru 2456		(downstream)		457		upsticalit M-77	
TDC.	42N193V24		44N123720		42N1179122		47N123V21	
1 No.	431N16W 24		441N15W28		451N17W32		4/1N15W21	
Latituda (dd):	46 11205		46 17494		46.07281		46.44029	
Lanaude (dd):	40.11595		95.02751		40.0/281		40.44928	
Econgrique (du):	-80.49214 NLAE		-63.92/51		-00.4009 NLAE		-63.93/28	
Stmam Tuna:	Coldwater		Warmuster		Colductor		Coldwarter	
Sucan rype:	Couwater		w armwater		Conwater		Conster	
USGS Basin Code:	4060106		4060106		4060106		4060106	
* Applies only to Riffle/Run stream Surveys								
** Applies only to Glide/Pool stream Surveys								

	Milakokia F	River	Creighton F	River	West Branch M River	anistique	West Branch M River	lanistiqu
	Betty Doe La	ike Rd	Creighton Tru	ck Trail	Hickey Truc	k Trail	off Crieghton T	ruck Trai
	RIFFLE/R	UN	GLIDE/PC	OL	GLIDE/PC	OOL	GLIDE/PC	OOL
	Station 1	OT	Station 1	IT	Station 1	3T	Station 1	4T
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	20							
Sediment Deposition (20)	20		/		14		5	
Flow Status - Maint, Flow Volume (10)	10		10		10		8	
Channel A hearting (20)	10		3		0		4	
Channel Alteration (20)	20		20		20		20	
Channel Sinuccity (20)**	18		20		10		20	
Dimension and Bank Structure			20		19		20	
Pank Stability (1) (10)	10		4				4	
Bank Stability (E) (10) Bank Stability (E) (10)	10		4		6		4	
Vagatativa Protection (1) (10)	10		4		6		4	
Vegetative Protection (E) (10)	10		8		0		5	
Rinarian Veg. Zone Width (1) (10)	10		10		10		6	
Ripanan Veg. Zone Width (E) (10)	10		10		10		10	
Ripanan veg. Zone w kitii (R)(10)	10		10		10		10	
TOTAL SCORE (200):	190		140		155		129	
UADITAT DATING	EVCELLENT		COOD		EVCELLENT		(200D	
	(NON-		(SLIGHTLY		(NON-		(SLICHTLY	
	IMPAIRED)		(MPAIRED)		IMPAIRED)		IMPAIRED)	
describes the general riverine environment at	7/22/2014		7/26/2014		7/25/2014		7/26/2014	
Westher	Suppy		Suppy		Suppy		Suppy	
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	
					West Branch		West Branch	
Stream Name:	Milakokia River		Creighton River		Manistique River		Manistique River	
	Betty Doe Lake		Creighton Truck		Hickey Truck		off Crieghton	
Road Crossing/Location:	Rd		Trail		Trail		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		Warnwater		Warmwater	
USOS Basin Code:	4060107		4060106		4060106		4060106	
* Applies only to Riffle/Run stream Surveys ** Applies only to Glide/Pool stream Surveys	5							