

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
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STAFF REPORT

BIOLOGICAL ASSESSMENT OF THE CLINTON RIVER WATERSHED
LAPEER, MACOMB, AND OAKLAND COUNTIES, MICHIGAN
JUNE-SEPTEMBER 2009

Qualitative biological sampling of the Clinton River watershed was conducted by staff of the Surface Water Assessment Section (SWAS) between June and September 2009. The objective of this survey was to assess the effects of land use practices, and nonpoint source (NPS) and point source discharges to the biological, physical, and chemical parameters of the rivers.

The Clinton River watershed flows in a southeasterly direction from Oakland County through Macomb County ultimately emptying into Lake St. Clair in Mount Clemens (Figure 1). The majority of the tributaries in the southern and western portion of the watershed flow through heavily developed urban and suburban areas including the cities of Pontiac, Troy, and Sterling Heights (Figure 2). The northern portion of the watershed is currently less developed but is under increasingly heavy development pressures typical of urban sprawl and large and small tract single-family developments. Many tributaries in the northeast drain agricultural land. Designated coldwater stream reaches in the watershed include the Paint and Gallagher Creeks, a portion of East Pond Creek, and the North Branch Clinton River (upstream of 32-Mile Road).

These surveys are within the Southern Michigan Northern Indiana Till Plains ecoregion (Omernik and Gallant, 1988). Surficial geology in the watershed ranges from coarse till in the west/northwest to fines and clays in the east/southeast (Figure 3). Land use follows a similar pattern with agriculture and heavy urbanization in the northeast and southeast, respectively, and mixed suburban in the west/northwest (Figure 2).

Typical of developed watersheds, surveyed locations on all but the more upstream locations showed signs of flashiness, indicative of rapid runoff rates associated with precipitation on relatively impervious urbanized watersheds or agricultural drainage processes, which alter stream flow patterns.

METHODS

Thirty-three of the sites selected for this survey were chosen with a probabilistic monitoring approach, using stratified random site selection to address statewide and regional questions about water quality (MDEQa, Draft).

Qualitative biological and physical habitat surveys were conducted and scored at 36 stations following the methods described in the SWAS Procedure 51 (MDEQ, 1990) and in Creal et al. (1996), respectively, and at one station following the Draft Qualitative Biological and Habitat Survey Protocols for Nonwadeable Rivers (MDEQb, Draft). Water chemistry samples were taken at 10 stations.

The macroinvertebrate and fish communities were scored with metrics that rate water bodies from excellent (greater than +4) to poor (less than -4). Macroinvertebrate and fish ratings from (+4 to -4) are considered acceptable. Negative ratings that are acceptable are indicative of water bodies that are strongly tending toward poor, while positive ratings that are acceptable

indicate slight impairment (Creal et al., 1996). Stream habitat was qualitatively evaluated at each station using a scoring system, which ranged in value from 0 (poor) to 200 (excellent).

SUMMARY

1. The locations of the biological sampling stations, habitat observations, and water samples are shown in Figure 1. Table 1 contains a summary of station locations and qualitative ratings for habitat and biological community for each station. Macroinvertebrate community, fish community, physical habitat, and water chemistry data are presented in Tables 2A, 2B, and 2C; 3A and 3B; 4; and 5, respectively.
2. The macroinvertebrate communities ranged in rating from poor to excellent with total taxa ranging from 11 to 35 (Tables 2A, 2B, and 2C). Stations rating poor and very low acceptable were generally clustered north and west of the Mt. Clemens area and in the Red Run River subwatershed in the Sterling Heights/Warren area; both regions are heavily developed with a mix of agricultural and suburban or urbanized land use. This development pattern combined with the naturally clayey soils of remnant lake plains (Figure 3) result in the potential to be impacted by NPS pollution; particularly storm water leading to a flashy hydrology and low habitat quality (see below).

Macroinvertebrate community sampling results for two stations (41 and 42) on McBride Drain resulted in a poor and very low acceptable rating, respectively. Assessments at both stations found limited in-stream habitat due to siltation and sedimentation and both indicate a stream channel highly disturbed by dredging activities, which likely drives the biology of the system. Other survey stations on Gloede Ditch and Miller Drain (Stations 21 and 22, respectively) found poor macroinvertebrate communities as well. Similar to McBride Drain, Gloede Ditch is a maintained, dredged ditch, which heavily impacts the habitat. The lack of in-stream habitat and silts and soft sediments likely overwhelm and drive the macroinvertebrate community. Additional investigation is warranted at Miller Drain, which appears to be a flashy system displaying heavy siltation and a general lack of in-stream habitat in a widely developed portion of the watershed with predominantly clay soils.

One station (16) on Red Run Drain was found to have a minimally acceptable macroinvertebrate community. Given the continued maintenance activities on this waterway and the limited habitat quality afforded it, as well as the extreme impacts of storm water on the system, continued monitoring is needed to understand the conditions and quality of this water body, particularly given the poor rating at this station in 2004 under the pre-2008 version of Procedure 51 (Goodwin, 2005).

Station 43, sampled using the draft qualitative nonwadeable procedure, found a marginal macroinvertebrate community dominated by chironomidae midges and other tolerant taxa such as worms, leeches, snails, amphipods, and crayfish; not unexpected for a reach of river that is clay-dominated, prone to boat traffic, and with a shoreline that is almost completely developed with docks, residential homes, and steel break-wall (MDEQb, Draft).

Stations rating excellent and high acceptable were found in headwater portions of the Clinton River watershed including East Pond Creek and the North Branch Clinton River near Romeo, the Stony Creek and Paint Creek subwatersheds, and the Sashabaw Creek in the vicinity of Clarkston.

A combination of factors lead to these excellent and high acceptable areas maintaining healthy macroinvertebrate communities. They are typically less intensively developed

with more green space maintained in the subwatershed compared to other portions of the Clinton River watershed. Additionally, the presence of lakes in many areas can buffer flashy flows, often a significant driving force in habitat quality (see 4, below). Surficial geology is coarse to fine glacial tills coinciding with a higher elevation, greater slope, and groundwater inputs. These factors combine to provide opportunity for cooler, well-oxygenated waters with fewer siltation issues providing a more diverse and stable aquatic habitat. However, development pressure continues in these areas threatening the quality of the habitat and biological community through altered flows, increased siltation, and temperature, and lowered habitat complexity.

3. The fish community was sampled at 13 stations during the 2009 monitoring (Tables 3A and 3B). Between 6 and 20 species were found at these sites resulting in communities ranging in rating from poor to excellent. Stations 5 and 6 on Galloway Creek rated poor although habitat scores were good and marginal, respectively, with possible impacts from flashy stream flows at both stations and siltation at Station 6. Additional monitoring is warranted to confirm that these reaches continue to exhibit impacted fish communities and that the 2009 results were representative of conditions.

The low species counts at Stations 32 and 33 on Tupper Brook (7 and 6 taxa, respectively) are likely linked to the brook being a very small and perhaps periodically dry stream (Figure 4). This is reflected in an acceptable rating; the scoring behind which accounts for stream size, among other things. Although this brook runs through predominantly agricultural area, its immediate riparian zone is protected and bank protection was generally good. However, the apparent flashiness of the stream and the low flows during these surveys speak to impacts by surrounding land use and very limited fish habitat during dryer periods.



Figure 4. Station 33, Tupper Brook at 30 Mile.

A unique feature to a number of the fish communities sampled during 2009 was the diversity and density of fish such as darters (*Percidae*) and minnows (*Cyprinidae*), and occasionally various suckers (*Catostomidae*); particularly in some of the mid-sized sites like Stations 3, 14, 25, 35, and 38. A number of these species thrive with cooler water temperatures, higher dissolved oxygen levels, and the presence of habitat diversity supportive of specific feeding (insectivores) and breeding (lithophilic-clean gravel/cobble) needs.

A diverse, well-balanced fish community speaks to the ability to provide consistent breeding, feeding, refuge areas. The fish community at Station 39 is demonstrative of this although the habitat assessment taken alone would not necessarily indicate the same. The flashiness of the system is significant and drives habitat components like bank instability, vegetative protection, sedimentation, and siltation. However, this station had large beds of submerged aquatic vegetation, base flows great enough to continue to keep portions of the cobble/gravel bottomed channel free of silts, and some well connected floodplain near the road crossing; all of which likely serve as habitat and refugia for fish under the range of flows in this reach.

4. Habitat conditions for the 36 stations sampled rated from marginal to excellent (Table 4). Stations rating marginal were spatially overlapped with the macroinvertebrate communities that rated poor or low acceptable and were generally in the heavily agricultural or urban/suburban developed areas north and west of Mt. Clemens and the Red Run River subwatershed in the Sterling Heights/Warren area. Both urban/suburban and agricultural development can have similar effects on in-stream habitat by increasing precipitation-related runoff rates, altering stream hydrology, and increasing flashiness, sediment inputs, and erosion rates. The combination of these impacts often significantly limits the stable in-stream habitat available for colonization by macroinvertebrates and fish.

Stations that rated marginal generally displayed characteristics indicative of hydrologic instability including increased flashiness, homogenization/siltation of in-stream habitat, decreased bank stability and riparian cover, and increased sediment deposition. Additionally, most of these stations were located in the portion of the watershed with very little topographic slope and a predominance of ancient lake plain clays and other fine sediment (Figure 3); a combination predisposed to siltation under erosive/unstable flow regimes.

Stations that rated excellent and good generally displayed more protective, stable riparian and bank areas, more stable flow and channel morphology, and a more diverse and stable in-stream substrate.

5. Water chemistry data was collected from grab samples taken at 10 stations coinciding with some of the biological survey stations, but generally focused on reaches related to specific permitted surface water discharges (Table 5). None of the parameters detected in the water samples were above Michigan's Water Quality Standards (WQS).

Stations sampled on Stony Creek upstream and downstream of Natural Aggregates – Washington (NPDES permit #MIG490256) discharge did not show an increase in total dissolved solids in-stream, nor did either sample show levels that exceeded the WQS of 500 and 750 milligrams per liter monthly average and maximum, respectively (Stations 10 and 11). This facility's outfall is intermittent and was not discharging during, or for approximately 2 years prior to, the sampling event.

Nutrient sampling in East Pond Creek (Stations 28, 29, and 30) showed an increasing concentration of all nutrient parameters with downstream samples (total phosphorus, ortho-phosphate, total kjeldahl nitrogen, and nitrate and nitrites). However, no nuisance conditions with regard to excessive aquatic macrophyte or algal growth were observed at any of the sampling locations. The increase in nutrients is not surprising given the presence of NPDES-permitted dischargers and storm water with possible nutrient inputs in the sampled reach (e.g., Twin Brooks Condominiums (GW1610075), Romeo Wastewater Treatment Plant (WWTP) (MI0021679) and the town of Romeo).

Similar to above, water chemistry samples taken on the North Branch Clinton River (Stations 23, 24, and 26) showed an increasing concentration of all nutrient parameters with downstream samples. No nuisance conditions with regard to excessive aquatic macrophyte or algal growth were observed at any of the sampling locations. This reach of the North Branch Clinton River has one municipal NPDES-permitted discharger (Almont WWTP (MI0020931)) and the potential for nutrient inputs from the surrounding land use as well.

A polychlorinated biphenyl (PCB) sample was taken at Station 23 in response to a 2004 Water Chemistry Monitoring Program sample that detected PCBs. No detectable

concentrations of any of the PCB Arochlors were found in the 2009 sample. Future monitoring will be helpful in providing additional confidence that the presence of PCBs in this reach do not pose a water quality concern.

Water samples were taken from Stations 12 and 13 to gather some information on nutrient levels in these two small tributaries to the Stony Creek Impoundment. The results were unremarkable in their concentrations.

6. Based on the Clinton River watershed surveys, portions of Galloway Creek, Gloede Ditch, McBride Drain, and Miller Drain failed to meet applicable WQS. Additional investigation is needed to confirm the consistency of these assessments, particularly given the lack of additional survey data on these streams as well as to attempt to identify possible causes of their failing, if applicable. Altered hydrology and an almost complete lack of in-stream habitat make it difficult to differentiate between water quality and habitat quality impacts on the macroinvertebrate and/or fish community without further investigation. Although Red Run Drain rated at the low end of acceptable in contrast to past poor ratings, additional monitoring is necessary to confirm any change in attainment status for this historically failing reach given that visits on Red Run Drain continue to indicate a significant problem with habitat quality.
7. Based on the biological survey data, 31 of 33 randomly assigned status sites (94%) in the Clinton River watershed were estimated to be supporting the other indigenous aquatic life and wildlife designated use component of R 323.1100(1)(e) of the Michigan WQS.

NPS POLLUTION SUMMARY

No specific projects associated with NPS pollution were evaluated during the survey of the Clinton River watershed. However, NPS issues related to altered stream hydrology resulting in habitat loss, erosion, and siltation/sedimentation are prevalent in the lower reaches of the larger water bodies (North Branch Clinton and Clinton River) as well as heavily developed and developing portions of the watershed. The higher-quality water bodies in the headwater portions of the Clinton River watershed face growing development pressures, which are likely to place increasing stressors on these systems including a greatly increased storm water runoff rate and volume (and the associated hydrologic changes) and nutrient loading issues, to name a few.

Field Work By: Kevin Goodwin, Aquatic Biologist
Seth Wright, Aquatic Biologist
Matt Wesener, Aquatic Biologist
Dan Rockafellow, Aquatic Biologist
Surface Water Assessment Section
Water Resources Division

Report By: Kevin Goodwin, Aquatic Biologist (Text and Tables)
Seth Wright, Aquatic Biologist (Figures)
Surface Water Assessment Section
Water Resources Division

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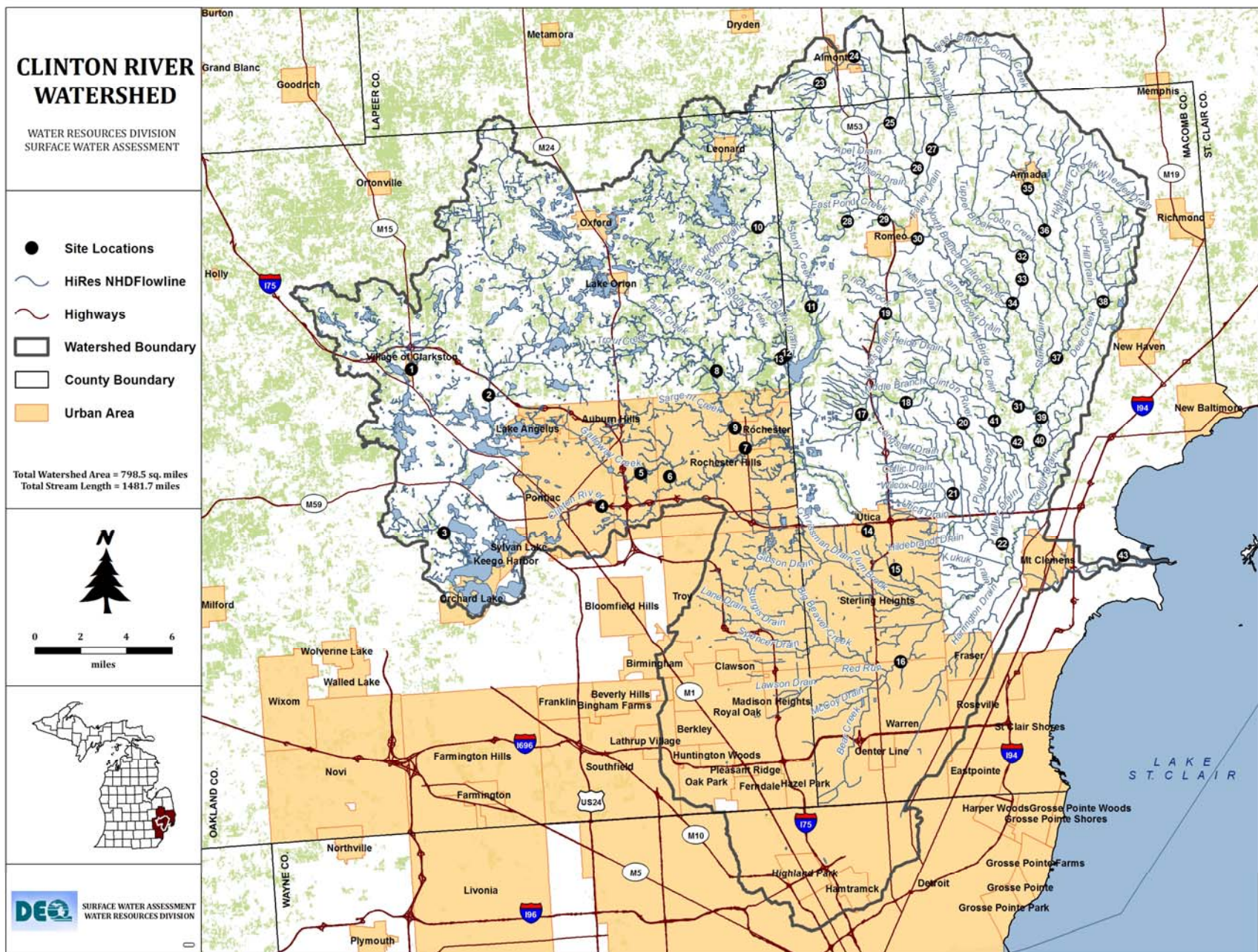


Figure 1. Clinton River Watershed with 2009 Station Locations.

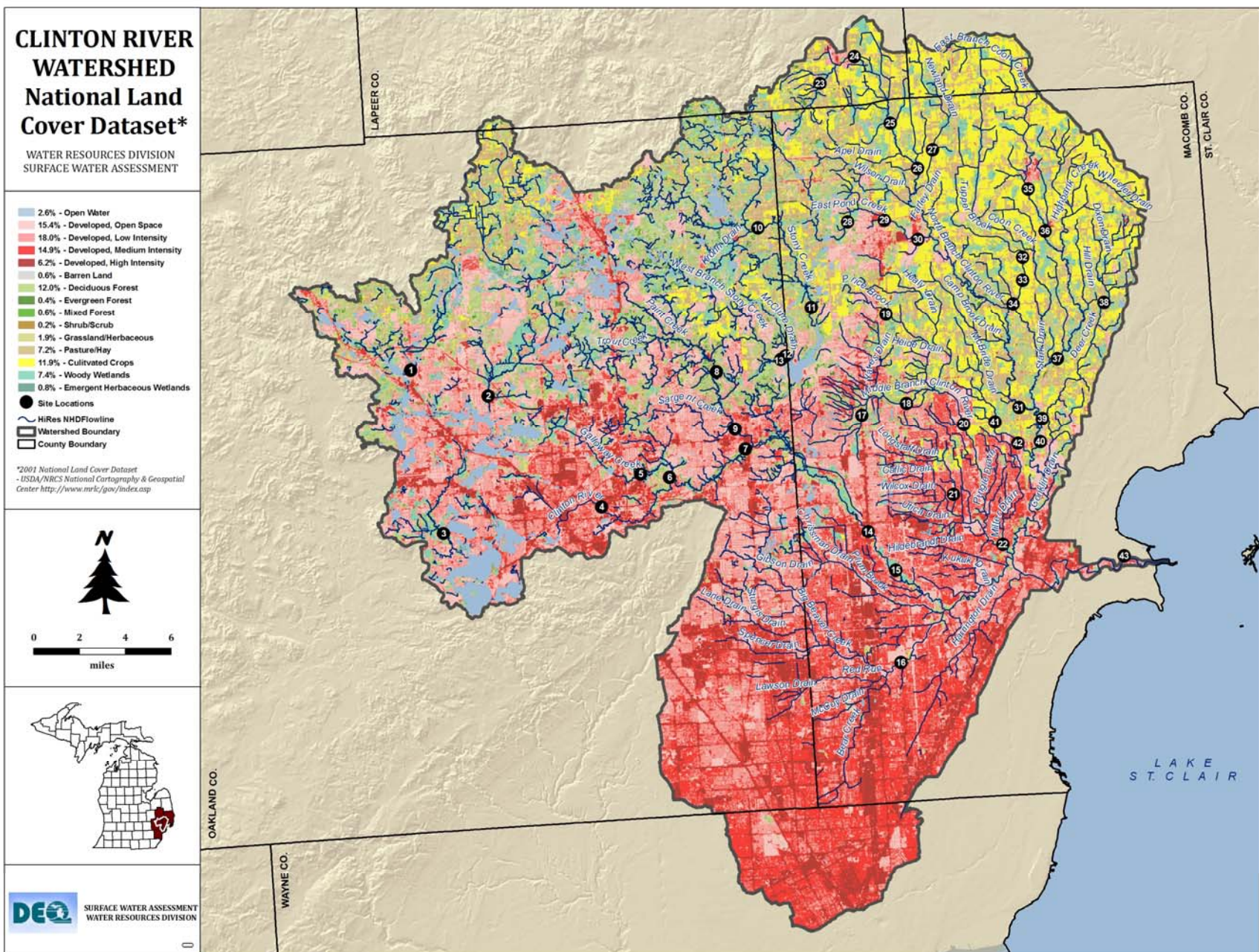


Figure 2. Clinton River Land Use.

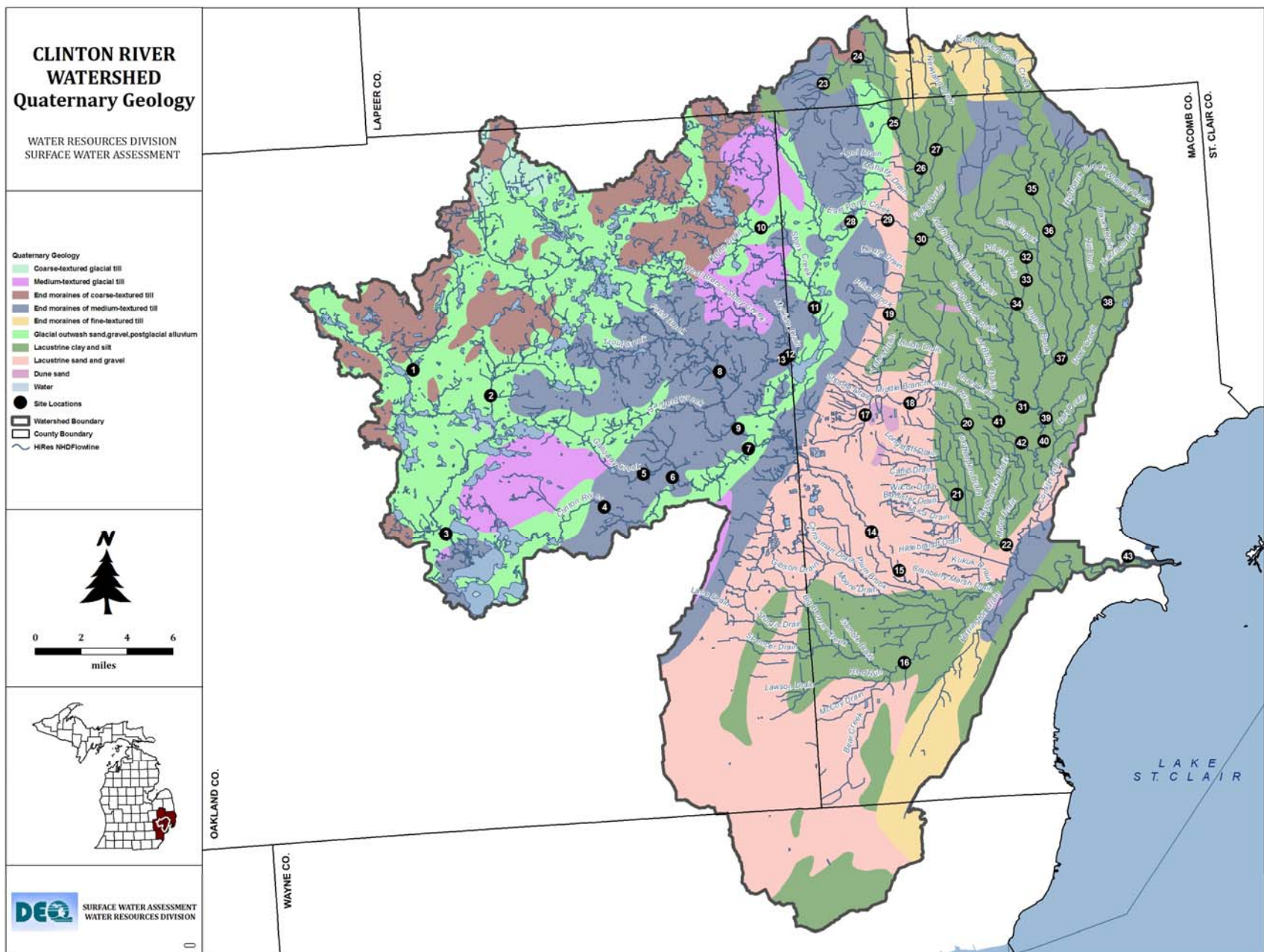


Figure 3. Clinton River Geology.

Table 1. Station summary for the Clinton River watershed, June - September, 2009

<i>Station Number</i>	<i>Stream</i>	<i>Location</i>	<i>Sample Type/Result</i>			
			<i>Macroinvertebrate</i>	<i>Fish</i>	<i>Habitat</i>	<i>Water</i>
1	Unnamed Tributary to Clinton River	Ortonville Road	Acceptable		Good	
2	Sashabaw Creek	Pine Knob Trail	Excellent		Good	
3	Clinton River	Cooley Lake Road	Acceptable	Acceptable	Good	
4	Clinton River	Eastway Drive	Acceptable		Good	
5	Galloway Creek	Deep Wood Lane	Acceptable	Poor	Good	
6	Galloway Creek	Butler Rd	Acceptable	Poor	Marginal	
7	Clinton River	Rochester Road	Acceptable		Good	
8	Paint Creek	Silver Bell Road	Acceptable		Good	
9	Paint Creek	Ludlow Road	Acceptable		Good	
10	Stony Creek	Brewer Road				x
11	Stony Creek	Inwood Road	Acceptable	Acceptable	Excellent	x
12	McClure Drain	Park Road	Acceptable		Good	x
13	West Branch Stony Creek	Park Road				x
14	Clinton River	Earl Memorial Highway	Acceptable		Good	
15	Clinton River	In Dodge Park	Acceptable	Acceptable	Good	
16	Red Run Drain	14 Mile	Acceptable		Marginal	
17	Middle Branch Clinton River	Earl Memorial Highway	Acceptable		Marginal	
18	Middle Branch Clinton River	Schoenherr Road	Acceptable		Good	
19	Price Brook	29 Mile Road	Acceptable		Marginal	
20	Middle Branch Clinton River	24 Mile Road	Acceptable		Marginal	
21	Gloede Ditch	21 Mile Road	Poor		Marginal	
22	Miller Drain	Heydenreich Road	Poor		Marginal	
23	North Branch Clinton River	Hough Rd	Acceptable	Acceptable	Excellent	x
24	North Branch Clinton River	Kidder Road				x
25	North Branch Clinton River	McKay Rd	Acceptable	Acceptable	Good	
26	North Branch Clinton River	Armada Center Road	Acceptable	Acceptable	Good	x
27	Newland Drain	Romeo Plank Road	Acceptable	Acceptable	Good	
28	East Pond Creek	33 Mile Road				x
29	East Pond Creek	McVicar Road				x
30	East Pond Creek	Powell Road				x
31	North Branch Clinton River	Card Road	Acceptable		Marginal	
32	Tupper Brook	31 Mile Road	Acceptable	Acceptable	Good	
33	Tupper Brook	30 Mile Road	Acceptable		Marginal	
34	Tupper Brook	29 Mile Road	Acceptable	Acceptable	Marginal	
35	East Branch Coon Creek	North Rd	Acceptable		Good	
36	East Branch Coon Creek	32 Mile Road	Acceptable	Acceptable	Good	
37	East Branch Coon Creek	Omo Road	Acceptable		Good	
38	Deer Creek	Bates Road	Acceptable		Marginal	
39	North Branch Clinton River	24 Mile Rd	Acceptable	Excellent	Marginal	
40	North Branch Clinton River	23 Mile Road	Acceptable		Marginal	
41	McBride Drain	24 Mile Road	Poor		Marginal	
42	McBride Drain	23 Mile Road	Acceptable		Marginal	
43	Clinton River	Bridgeview Street	Marginal			

Table 2A. Qualitative macroinvertebrate sampling results for the Clinton River watershed, June - September, 2009.

TAXA	Unnamed Tributary to Clinton River Ortonville Road 9/2/2009 STATION 1	Sashabaw Creek Pine Knob Trail 6/18/2009 STATION 2	Clinton River Cooley Lake Road 6/29/2009 STATION 3	Clinton River Eastway Drive 8/31/2009 STATION 4
PLATYHELMINTHES (flatworms)				
Turbellaria		1	1	1
BRYOZOA (moss animals)		2		
ANNELIDA (segmented worms)				
Hirudinea (leeches)		1	4	
Oligochaeta (worms)	1	5	4	8
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	70	37	39	38
Decapoda (crayfish)	1	1		1
Isopoda (sowbugs)	3	21	30	2
Arachnoidea				
Hydracarina		1		1
Insecta				
Ephemeroptera (mayflies)				
Baetidae	10	4	5	151
Caenidae	1	1		
Heptageniidae	1			
Tricorythidae	34	25		
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	1	1		
Libellulidae			1	
Zygoptera (damselflies)				
Calopterygidae	21			
Coenagrionidae	4	1	1	16
Plecoptera (stoneflies)				
Perlidae		1		
Hemiptera (true bugs)				
Corixidae			1	
Gerridae		1	1	
Mesoveliidae	2			
Nepidae			1	
Notonectidae	1			
Veliidae	1	1		
Megaloptera				
Sialidae (alder flies)			1	
Trichoptera (caddisflies)				
Brachycentridae		42		
Glossosomatidae		13		
Helicopsychidae	6	16	1	
Hydropsychidae	16	9	17	11
Hydroptilidae	10			2
Leptoceridae			5	
Limnephilidae	26	4	1	
Philopotamidae		1		
Phryganeidae		2		
Uenoidae		1		
Lepidoptera (moths)				
Noctuidae			1	
Coleoptera (beetles)				
Haliplidae (adults)				1
Psephenidae (adults)	1	2		
Elmidae	8	29	5	
Diptera (flies)				
Ceratopogonidae			1	
Chironomidae	90		30	56
Ephyrididae	1			
Simuliidae	10	3	42	12
Tipulidae	1	5		
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	3		1	
Hydrobiidae	1	2		
Lymnaeidae	2		14	
Physidae	33	17	109	2
Planorbidae	1		1	1
Pelecypoda (bivalves)				
Dreissenidae	3			16
Sphaeriidae (clams)	1	26	1	
Unionidae (mussels)		1		
TOTAL INDIVIDUALS	364	277	318	319

Table 2B. Macroinvertebrate metric evaluation of the Clinton River watershed, June - September, 2009.

METRIC	Unnamed Tributary to Clinton River		Sashabaw Creek		Clinton River		Clinton River	
	Ortonville Road		Pine Knob Trail		Cooley Lake Road		Eastway Drive	
	9/2/2009		6/18/2009		6/29/2009		8/31/2009	
	STATION 1		STATION 2		STATION 3		STATION 4	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	31	1	32	1	26	1	16	0
NUMBER OF MAYFLY TAXA	4	1	3	0	1	-1	1	-1
NUMBER OF CADDISFLY TAXA	4	1	8	1	4	0	2	0
NUMBER OF STONEFLY TAXA	0	-1	1	1	0	-1	0	-1
PERCENT MAYFLY COMP.	12.64	0	10.83	0	1.57	-1	47.34	1
PERCENT CADDISFLY COMP.	15.93	0	31.77	1	7.55	0	4.08	0
PERCENT DOMINANT TAXON	24.73	0	15.16	1	34.28	0	47.34	-1
PERCENT ISOPOD, SNAIL, LEECH	11.81	-1	14.80	-1	50.00	-1	1.57	1
PERCENT SURF. AIR BREATHE	1.37	1	1.44	1	0.94	1	0.31	1
TOTAL SCORE		2		5		-2		0
MACROINV. COMMUNITY RATING		ACCEPT.		EXCELLENT		ACCEPT.		ACCEPT.

Table 2A. Qualitative macroinvertebrate sampling results for the Clinton River watershed, June - September, 2009.

	Galloway Creek Deep Wood Lane 6/18/2009	Galloway Creek Butler Rd 6/18/2009	Clinton River Rochester Road 8/31/2009	Paint Creek Silver Bell Road 6/29/2009
TAXA	STATION 5	STATION 6	STATION 7	STATION 8
PORIFERA (sponges)				1
PLATYHELMINTHES (flatworms)				
Turbellaria			10	
BRYOZOA (moss animals)		2		
ANNELIDA (segmented worms)				
Oligochaeta (worms)	16	35	9	30
ARTHROPODA				
Crustacea				
Amphipoda (scuds)			64	1
Decapoda (crayfish)	8	1	6	6
Isopoda (sowbugs)	11	5	10	13
Arachnoidea				
Hydracarina	1	2		3
Insecta				
Ephemeroptera (mayflies)				
Baetidae	16	18	26	6
Caenidae		1		
Heptageniidae				1
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	2		1	3
Libellulidae			1	
Zygoptera (damselflies)				
Calopterygidae	6	2	42	4
Coenagrionidae	2	3	2	
Plecoptera (stoneflies)				
Perlidae				1
Hemiptera (true bugs)				
Corixidae		1		
Gerridae	2	1	3	1
Pleidae		1		
Veliidae			9	
Megaloptera				
Corydalidae (dobson flies)		1		1
Trichoptera (caddisflies)				
Brachycentridae				1
Glossosomatidae				1
Helicopsychidae				10
Hydropsychidae	56	63	41	19
Hydroptilidae		1	6	2
Leptoceridae			1	21
Limnephilidae				3
Uenoidae			1	
Coleoptera (beetles)				
Halipidae (adults)		1		
Hydrophilidae (total)	1			
Elmidae	38	35	26	30
Diptera (flies)				
Athericidae				1
Chironomidae	94	125	16	74
Ephydriidae	1		3	4
Simuliidae	1	11	6	2
Tabanidae				1
Tipulidae	1			
MOLLUSCA				
Gastropoda (snails)				
Lymnaeidae	1			
Physidae		1		4
Planorbidae			2	
Pelecypoda (bivalves)				
Sphaeriidae (clams)	1	5		4
Unionidae (mussels)	1			
TOTAL INDIVIDUALS	259	315	285	248

Table 2B. Macroinvertebrate metric evaluation of the Clinton River watershed, June - September, 2009.

METRIC	Galloway Creek		Galloway Creek		Clinton River		Paint Creek	
	Deep Wood Lane		Butler Rd		Rochester Road		Silver Bell Road	
	6/18/2009		6/18/2009		8/31/2009		6/29/2009	
	STATION 5		STATION 6		STATION 7		STATION 8	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	19	0	21	0	21	0	28	1
NUMBER OF MAYFLY TAXA	1	-1	2	0	1	-1	2	0
NUMBER OF CADDISFLY TAXA	1	-1	2	0	4	0	7	1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	1	1
PERCENT MAYFLY COMP.	6.18	0	6.03	0	9.12	0	2.82	-1
PERCENT CADDISFLY COMP.	21.62	0	20.32	0	17.19	0	22.98	0
PERCENT DOMINANT TAXON	36.29	0	39.68	-1	22.46	0	29.84	0
PERCENT ISOPOD, SNAIL, LEEC	4.63	0	1.90	1	4.21	0	6.85	0
PERCENT SURF. AIR BREATHER	1.16	1	1.27	1	4.21	1	0.40	1
TOTAL SCORE		-2		0		-1		3
MACROINV. COMMUNITY RATING	ACCEPT.		ACCEPT.		ACCEPT.		ACCEPT.	

Table 2A. Qualitative macroinvertebrate sampling results for the Clinton River watershed, June - September, 2009.

TAXA	Paint Creek Ludlow Road 6/29/2009 STATION 9	Stony Creek Inwood Road 9/1/2009 STATION 11	McClure Drain Park Road 9/1/2009 STATION 12	Clinton River Earl Memorial Highway 8/31/2009 STATION 14
ANNELIDA (segmented worms)				
Oligochaeta (worms)	15	4	1	13
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	1	40	278	34
Decapoda (crayfish)	3	1	1	1
Isopoda (sowbugs)	4	8	2	4
Arachnoidea				
Hydracarina	1	3		
Insecta				
Ephemeroptera (mayflies)				
Baetidae	16	24		49
Heptageniidae		29		
Isonychiidae	1			
Tricorythidae		1		
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	1	4	4	3
Gomphidae				1
Zygoptera (damselflies)				
Calopterygidae		21	3	18
Coenagrionidae		7		1
Plecoptera (stoneflies)				
Perlidae	1			
Hemiptera (true bugs)				
Belostomatidae		1		
Corixidae		6		
Gerridae		1	1	1
Mesoveliidae			2	
Nepidae		1		
Pleidae		2		
Veliidae		5		1
Megaloptera				
Corydalidae (dobson flies)		1	1	
Sialidae (alder flies)		1		
Trichoptera (caddisflies)				
Brachycentridae		1		
Glossosomatidae	1			
Helicopsychidae		12		
Hydropsychidae	135	32	4	59
Hydroptilidae		1		1
Leptoceridae	1	7	1	7
Limnephilidae			1	
Philopotamidae		1	4	
Phryganeidae	11			
Polycentropodidae		1		
Uenoidae		4		
Coleoptera (beetles)				
Hydrophilidae (total)		1	1	2
Elmidae	16	53	7	14
Diptera (flies)				
Chironomidae	68	28	5	36
Ephydriidae	1			1
Simuliidae	23	27	2	30
Tabanidae			1	
Tipulidae	1		1	
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)		14		
Lymnaeidae		1		
Physidae	2	1	1	
Pelecypoda (bivalves)				
Sphaeriidae (clams)		1	6	
TOTAL INDIVIDUALS	302	345	327	276

Table 2B. Macroinvertebrate metric evaluation of the Clinton River watershed, June - September, 2009.

METRIC	Paint Creek		Stony Creek		McClure Drain		Clinton River	
	Ludlow Road		Inwood Road		Park Road		Earl Memorial Highway	
	6/29/2009		9/1/2009		9/1/2009		8/31/2009	
	STATION 9		STATION 11		STATION 12		STATION 14	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	19	0	35	1	21	1	19	0
NUMBER OF MAYFLY TAXA	2	0	3	0	0	-1	1	-1
NUMBER OF CADDISFLY TAX.	4	0	8	1	4	1	3	0
NUMBER OF STONEFLY TAXA	1	1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	5.63	0	15.65	0	0.00	-1	17.75	0
PERCENT CADDISFLY COMP.	49.01	1	17.10	0	3.06	-1	24.28	0
PERCENT DOMINANT TAXON	44.70	-1	15.36	1	85.02	-1	21.38	0
PERCENT ISOPOD, SNAIL, LEE	1.99	1	6.96	0	0.92	1	1.45	1
PERCENT SURF. AIR BREATHE	0.00	1	4.93	1	1.22	1	1.45	1
TOTAL SCORE		3		3		-1		0
MACROINV. COMMUNITY RATING	ACCEPT.		ACCEPT.		ACCEPT.		ACCEPT.	

Table 2A. Qualitative macroinvertebrate sampling results for the Clinton River watershed, June - September, 2009.

TAXA	Clinton River In Dodge Park 8/31/2009 STATION 15	Red Run Drain 14 Mile 6/30/2009 STATION 16	Middle Branch Clinton River Earl Memorial Highway 7/1/2009 STATION 17	Middle Branch Clinton River Schoenherr Road 7/1/2009 STATION 18
PLATYHELMINTHES (flatworms)				
Turbellaria		1		1
ANNELIDA (segmented worms)				
Hirudinea (leeches)		3	1	2
Oligochaeta (worms)	12	158	10	18
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	4	1	49	90
Decapoda (crayfish)	1		3	15
Isopoda (sowbugs)	4		1	3
Arachnoidea				
Hydracarina	1			
Insecta				
Ephemeroptera (mayflies)				
Baetidae	54		3	19
Caenidae				2
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	1			8
Gomphidae	1			
Zygoptera (damselflies)				
Calopterygidae	31		2	7
Coenagrionidae	3	1		1
Hemiptera (true bugs)				
Belostomatidae		1		
Corixidae		1		
Gerridae				1
Notonectidae		1		
Veliidae	1			
Trichoptera (caddisflies)				
Hydropsychidae	64		68	32
Hydroptilidae			10	5
Leptoceridae	5			
Limnephilidae	1			
Coleoptera (beetles)				
Haliplidae (adults)		1		1
Elmidae	13		1	35
Diptera (flies)				
Ceratopogonidae		1		
Chironomidae	24	171	52	25
Ephydriidae	1			
Simuliidae	21		57	4
Tipulidae			1	9
MOLLUSCA				
Gastropoda (snails)				
Physidae				5
Viviparidae			1	
Pelecypoda (bivalves)				
Corbiculidae		2		
Sphaeriidae (clams)		10	7	10
TOTAL INDIVIDUALS	242	352	266	293

Table 2B. Macroinvertebrate metric evaluation of the Clinton River watershed, June - September, 2009.

METRIC	Clinton River		Red Run Drain		Middle Branch Clinton River		Middle Branch Clinton River	
	In Dodge Park		14 Mile		Earl Memorial Highway		Schoenherr Road	
	8/31/2009		6/30/2009		7/1/2009		7/1/2009	
	STATION 15		STATION 16		STATION 17		STATION 18	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	18	0	13	0	15	0	21	0
NUMBER OF MAYFLY TAXA	1	-1	0	-1	1	0	2	0
NUMBER OF CADDISFLY TAXA	3	0	0	-1	2	0	2	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	22.31	1	0.00	-1	1.13	-1	7.17	0
PERCENT CADDISFLY COMP.	28.93	1	0.00	-1	29.32	1	12.63	0
PERCENT DOMINANT TAXON	26.45	0	48.58	-1	25.56	0	30.72	0
PERCENT ISOPOD, SNAIL, LEEC	1.65	1	0.85	1	1.13	1	3.41	1
PERCENT SURF. AIR BREATHER	0.41	1	1.14	1	0.00	1	0.68	1
TOTAL SCORE		2		-4		1		1
MACROINV. COMMUNITY RATING	ACCEPT.		ACCEPT.		ACCEPT.		ACCEPT.	

Table 2A. Qualitative macroinvertebrate sampling results for the Clinton River watershed, June - September, 2009.

TAXA	Price Brook 29 Mile Road 6/30/2009 STATION 19	Middle Branch Clinton R 24 Mile Road 9/1/2009 STATION 20	Gloede Ditch 21 Mile Road 9/1/2009 STATION 21	Miller Drain Heydenreich Road 9/1/2009 STATION 22
PLATYHELMINTHES (flatworms)				
Turbellaria		3	1	2
ANNELIDA (segmented worms)				
Hirudinea (leeches)		1		7
Oligochaeta (worms)	7	5	52	43
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	1	85	1	1
Decapoda (crayfish)	2	1		
Isopoda (sowbugs)		14		26
Arachnoidea				
Hydracarina		1		4
Insecta				
Ephemeroptera (mayflies)				
Baetidae		5		
Caenidae			1	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae		3	2	1
Zygoptera (damselflies)				
Calopterygidae	4	41	1	23
Coenagrionidae	1	25	118	6
Hemiptera (true bugs)				
Belostomatidae	1	1		1
Corixidae		1	30	20
Gerridae	1		1	6
Mesoveliidae			1	
Nepidae		1		
Notonectidae				1
Pleidae		1	2	
Veliidae				2
Trichoptera (caddisflies)				
Hydropsychidae	22	5		18
Hydroptilidae	1			
Coleoptera (beetles)				
Dytiscidae (total)	2	1		
Halplidae (adults)		1	15	1
Hydrophilidae (total)			1	
Elmidae	44	8		
Halplidae (larvae)	1			
Diptera (flies)				
Athericidae	2			
Ceratopogonidae			1	
Chaoboridae	26			
Chironomidae	40	46	108	62
Culicidae		1	2	
Ephydriidae		1		
Simuliidae	35	4		9
Stratiomyidae		1		
Tipulidae	117	3		
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)		2	1	3
Lymnaeidae			1	
Physidae	3	12	18	
Planorbidae			1	
Viviparidae				2
Pelecypoda (bivalves)				
Sphaeriidae (clams)		1	5	21
TOTAL INDIVIDUALS	310	274	363	259

Table 2B. Macroinvertebrate metric evaluation of the Clinton River watershed, June - September, 2009.

METRIC	Price Brook		Middle Branch Clinton River		Gloede Ditch		Miller Drain	
	29 Mile Road		24 Mile Road		21 Mile Road		Heydenreich Road	
	6/30/2009		9/1/2009		9/1/2009		9/1/2009	
	STATION 19		STATION 20		STATION 21		STATION 22	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	18	1	28	1	21	0	21	0
NUMBER OF MAYFLY TAXA	0	-1	1	-1	1	-1	0	-1
NUMBER OF CADDISFLY TAXA	2	1	1	-1	0	-1	1	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	0.00	-1	1.82	-1	0.28	-1	0.00	-1
PERCENT CADDISFLY COMP.	7.42	0	1.82	-1	0.00	-1	6.95	0
PERCENT DOMINANT TAXON	37.74	-1	31.02	0	32.51	0	23.94	0
PERCENT ISOPOD, SNAIL, LEECH	0.97	1	10.58	-1	5.79	0	14.67	-1
PERCENT SURF. AIR BREATHER	9.68	0	2.92	1	14.33	0	11.97	0
TOTAL SCORE		-1		-4		-5		-5
MACROINV. COMMUNITY RATING	ACCEPT.		ACCEPT.		POOR		POOR	

Table 2A. Qualitative macroinvertebrate sampling results for the Clinton River watershed, June - September, 2009.

	North Branch Clinton River Hough Rd 8/20/2009	North Branch Clinton River McKay Rd 8/20/2009	North Branch Clinton River Armada Center Road 8/20/2009	Newland Drain Romeo Plank Road 6/30/2009
TAXA	STATION 23	STATION 25	STATION 26	STATION 27
PLATYHELMINTHES (flatworms)				
Turbellaria			1	
ANNELIDA (segmented worms)				
Hirudinea (leeches)		1	1	9
Oligochaeta (worms)	2	6	3	4
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	1	43	1	12
Decapoda (crayfish)	1	11	1	5
Isopoda (sowbugs)		16		3
Arachnoidea				
Hydracarina	7	2		
Insecta				
Ephemeroptera (mayflies)				
Baetidae	21	2	37	3
Caenidae		1	11	3
Heptageniidae		3	6	
Tricorythidae			1	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	2	4	3	1
Gomphidae		2		
Zygoptera (damselflies)				
Calopterygidae	6	16	24	1
Coenagrionidae		5		
Hemiptera (true bugs)				
Belostomatidae		1		
Corixidae		4	7	1
Gerridae	1	1	1	1
Nepidae		1		
Pleidae		7		
Veliidae			16	
Megaloptera				
Corydalidae (dobson flies)	1			
Sialidae (alder flies)		1		
Trichoptera (caddisflies)				
Brachycentridae			1	
Hydropsychidae	129	6	53	43
Leptoceridae		1		
Limnephilidae	1	3	1	1
Philopotamidae	13			
Polycentropodidae		2		
Uenoidae	1		19	
Coleoptera (beetles)				
Dytiscidae (total)		2	1	
Haliplidae (adults)		2		
Hydrophilidae (total)	1			
Elmidae	23	60	53	15
Diptera (flies)				
Chironomidae	49	17	22	160
Simuliidae	23		18	17
Tabanidae	3	4	2	
Tipulidae			1	
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)			3	
Physidae	1	5	1	4
Pelecypoda (bivalves)				
Sphaeriidae (clams)	6	18	55	6
Unionidae (mussels)	1	1		
TOTAL INDIVIDUALS	293	248	343	289

Table 2B. Macroinvertebrate metric evaluation of the Clinton River watershed, June - September, 2009.

METRIC	North Branch Clinton River		North Branch Clinton River		North Branch Clinton River		Newland Drain	
	Hough Rd		McKay Rd		Armada Center Road		Romeo Plank Road	
	8/20/2009		8/20/2009		8/20/2009		6/30/2009	
	STATION 23		STATION 25		STATION 26		STATION 27	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	21	1	31	1	27	1	18	0
NUMBER OF MAYFLY TAXA	1	0	3	0	4	1	2	0
NUMBER OF CADDISFLY TAXA ^A	4	1	4	0	4	0	2	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	7.17	0	2.42	-1	16.03	0	2.08	-1
PERCENT CADDISFLY COMP.	49.15	1	4.84	0	21.57	0	15.22	0
PERCENT DOMINANT TAXON	44.03	-1	24.19	0	16.03	1	55.36	-1
PERCENT ISOPOD, SNAIL, LEECH	0.34	1	8.87	0	1.46	1	5.54	0
PERCENT SURF. AIR BREATHER	0.68	1	7.26	0	7.29	0	0.69	1
TOTAL SCORE		3		-1		3		-2
MACROINV. COMMUNITY RATING	ACCEPT.		ACCEPT.		ACCEPT.		ACCEPT.	

Table 2A. Qualitative macroinvertebrate sampling results for the Clinton River watershed, June - September, 2009.

	North Branch Clinton River Card Road 9/8/2009	Tupper Brook 31 Mile Road 6/30/2009	Tupper Brook 30 Mile Road 8/19/2009	Tupper Brook 29 Mile Road 6/30/2009
TAXA	STATION 31	STATION 32	STATION 33	STATION 34
ANNELIDA (segmented worms)				
Hirudinea (leeches)		7		7
Oligochaeta (worms)	8	6	3	7
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	9	2	1	27
Decapoda (crayfish)				2
Isopoda (sowbugs)	17	2	5	
Arachnoidea				
Hydracarina				1
Insecta				
Ephemeroptera (mayflies)				
Baetidae	16	1	1	13
Caenidae	1			
Ephemeridae	1			
Heptageniidae	1			
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	1		1	
Gomphidae	1			
Libellulidae		1	3	1
Zygoptera (damselflies)				
Calopterygidae	13		1	
Coenagrionidae	13			1
Lestidae				1
Plecoptera (stoneflies)				
Perlidae		1		
Hemiptera (true bugs)				
Belostomatidae				1
Corixidae	59	1		17
Gerridae	4	1		1
Pleidae	2			
Trichoptera (caddisflies)				
Brachycentridae			4	
Hydropsychidae	1		2	
Phryganeidae	2			1
Polycentropodidae			1	
Coleoptera (beetles)				
Dytiscidae (total)	1	2	2	4
Haliplidae (adults)		1		8
Hydrophilidae (total)			1	
Dryopidae		1		
Elmidae	13		4	1
Haliplidae (larvae)				31
Diptera (flies)				
Ceratopogonidae	1		1	4
Chironomidae	70	86	20	21
Culicidae				2
Dixidae				1
Simuliidae			9	
Stratiomyidae	1		3	
Tabanidae	2	5	1	
Tipulidae		2	1	1
MOLLUSCA				
Gastropoda (snails)				
Lymnaeidae	1	38	69	336
Physidae	3	93	45	297
Planorbidae		2	79	59
Pelecypoda (bivalves)				
Sphaeriidae (clams)	12	13	5	
TOTAL INDIVIDUALS	253	265	262	845

Table 2B. Macroinvertebrate metric evaluation of the Clinton River watershed, June - September, 2009.

METRIC	North Branch Clinton River		Tupper Brook		Tupper Brook		Tupper Brook	
	Card Road		31 Mile Road		30 Mile Road		29 Mile Road	
	9/8/2009		6/30/2009		8/19/2009		6/30/2009	
	STATION 31		STATION 32		STATION 33		STATION 34	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	25	1	19	0	23	1	24	1
NUMBER OF MAYFLY TAXA	4	1	1	0	1	0	1	0
NUMBER OF CADDISFLY TAXA	2	0	0	-1	3	1	1	-1
NUMBER OF STONEFLY TAXA	0	-1	1	1	0	-1	0	-1
PERCENT MAYFLY COMP.	7.51	0	0.38	-1	0.38	-1	1.54	-1
PERCENT CADDISFLY COMP.	1.19	-1	0.00	-1	2.67	-1	0.12	-1
PERCENT DOMINANT TAXON	27.67	0	35.09	0	30.15	0	39.76	-1
PERCENT ISOPOD, SNAIL, LEECH	8.30	0	53.58	-1	75.57	-1	82.72	-1
PERCENT SURF. AIR BREATH	26.48	-1	1.89	1	2.29	1	3.91	1
TOTAL SCORE		-1		-2		-1		-4
MACROINV. COMMUNITY RATING	ACCEPT.		ACCEPT.		ACCEPT.		ACCEPT.	

Table 2A. Qualitative macroinvertebrate sampling results for the Clinton River watershed, June - September, 2009.

	East Branch Coon Creek North Rd (u/s Armada WWTP) 8/19/2009	East Branch Coon Creek 32 Mile Road 8/19/2009	East Branch Coon Creek Omo Road 8/19/2009	Deer Creek Bates Road 8/19/2009
TAXA	STATION 35	STATION 36	STATION 37	STATION 38
PLATYHELMINTHES (flatworms)				
Turbellaria	2		1	
ANNELIDA (segmented worms)				
Hirudinea (leeches)	4	3		
Oligochaeta (worms)	25	4	2	4
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	8	1	14	6
Decapoda (crayfish)	14	6	4	11
Isopoda (sowbugs)			7	33
Arachnoidea				
Hydracarina				1
Insecta				
Ephemeroptera (mayflies)				
Baetidae	9	23	25	1
Caenidae	5	1	27	
Heptageniidae	12	7	21	44
Tricorythidae	1			
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	7	28	1	2
Gomphidae			1	
Libellulidae				3
Zygoptera (damselflies)				
Calopterygidae	11	32	9	8
Coenagrionidae	8		8	1
Hemiptera (true bugs)				
Belostomatidae		1	1	
Corixidae	2	7	30	7
Gerridae		3	5	14
Notonectidae	1			1
Pleidae				1
Veliidae		1	2	
Megaloptera				
Corydalidae (dobson flies)				1
Trichoptera (caddisflies)				
Hydropsychidae	51	37	13	
Hydroptilidae	1			
Leptoceridae	1			
Limnephilidae		1	4	8
Phryganeidae			1	
Uenoidae	1			
Coleoptera (beetles)				
Dytiscidae (total)	1	2		
Halipidae (adults)	1	3	1	6
Hydrophilidae (total)	1	1		
Dryopidae	1			
Elmidae	45	41	15	28
Gyrinidae (larvae)			1	
Diptera (flies)				
Ceratopogonidae	2			
Chironomidae	62	32	23	23
Culicidae		1	1	
Dixidae	1			6
Simuliidae	4	2	1	
Tabanidae		6		
Tipulidae	1	5		
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)		1	2	5
Physidae	13	8	31	9
Planorbidae			2	1
Pelecypoda (bivalves)				
Sphaeriidae (clams)	3	10	7	20
TOTAL INDIVIDUALS	298	267	260	244

Table 2B. Macroinvertebrate metric evaluation of the Clinton River watershed, June - September, 2009.

METRIC	East Branch Coon Creek North Rd (u/s Armada WWTP)		East Branch Coon Creek 32 Mile Road		East Branch Coon Creek Omo Road		Deer Creek Bates Road	
	8/19/2009		8/19/2009		8/19/2009		8/19/2009	
	STATION 35		STATION 36		STATION 37		STATION 38	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	30	1	27	1	29	1	25	1
NUMBER OF MAYFLY TAXA	4	1	3	0	3	0	2	0
NUMBER OF CADDISFLY TAXA	4	0	2	0	3	0	1	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	9.06	0	11.61	0	28.08	1	18.44	0
PERCENT CADDISFLY COMP.	18.12	0	14.23	0	6.92	0	3.28	-1
PERCENT DOMINANT TAXON	20.81	0	15.36	1	11.92	1	18.03	1
PERCENT ISOPOD, SNAIL, LEEC	5.70	0	4.49	0	16.15	-1	19.67	-1
PERCENT SURF. AIR BREATHEI	2.01	1	7.12	0	15.38	0	11.89	0
TOTAL SCORE		2		1		1		-2
MACROINV. COMMUNITY RATING	ACCEPT.		ACCEPT.		ACCEPT.		ACCEPT.	

Table 2A. Qualitative macroinvertebrate sampling results for the Clinton River watershed, June - September, 2009.

TAXA	North Branch Clinton River 24 Mile Rd 9/2/2009 STATION 39	North Branch Clinton River 23 Mile Road 9/2/2009 STATION 40	McBride Drain 24 Mile Road 9/8/2009 STATION 41	McBride Drain 23 Mile Road 9/8/2009 STATION 42
PLATYHELMINTHES (flatworms)				
Turbellaria		1		38
ANNELIDA (segmented worms)				
Hirudinea (leeches)	1		2	12
Oligochaeta (worms)	4	20	283	53
ARTHROPODA				
Crustacea				
Amphipoda (scuds)		2	22	
Decapoda (crayfish)	4	1	2	1
Isopoda (sowbugs)	6	19	1	40
Arachnoidea				
Hydracarina	4	1	1	
Insecta				
Ephemeroptera (mayflies)				
Baetidae	37	4	9	1
Caenidae	2	7	3	1
Heptageniidae	22	3		
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	1	1	1	1
Gomphidae	2	1		
Libellulidae			27	
Zygoptera (damselflies)				
Calopterygidae	41	34	1	1
Coenagrionidae	8	9	120	101
Hemiptera (true bugs)				
Belostomatidae			4	1
Corixidae		74	195	1
Gerridae	1	2		
Notonectidae		1	1	
Pleidae	1		1	
Veliidae	11	4	1	
Trichoptera (caddisflies)				
Hydropsychidae	25	13		
Leptoceridae	3	3		
Limnephilidae		1		
Phryganeidae		7		
Coleoptera (beetles)				
Dytiscidae (total)		1	13	
Gyrinidae (adults)		2		
Haliplidae (adults)	1	1	75	1
Hydrophilidae (total)	1			
Elmidae	25	8		
Haliplidae (larvae)			2	
Diptera (flies)				
Ceratopogonidae		3		1
Chironomidae	37	43	6	31
Simuliidae	9			
Tabanidae		2		
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)	6	5	5	
Lymnaeidae				2
Physidae		1	78	
Planorbidae			1	
Pelecypoda (bivalves)				
Sphaeriidae (clams)	5	1	45	
TOTAL INDIVIDUALS	257	275	899	286

Table 2B. Macroinvertebrate metric evaluation of the Clinton River watershed, June - September, 2009.

METRIC	North Branch Clinton River		North Branch Clinton River		McBride Drain		McBride Drain	
	24 Mile Rd		23 Mile Road		24 Mile Road		23 Mile Road	
	9/2/2009		9/2/2009		9/8/2009		9/8/2009	
	STATION 39		STATION 40		STATION 41		STATION 42	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	24	0	31	1	24	0	16	0
NUMBER OF MAYFLY TAXA	3	0	3	0	2	0	2	0
NUMBER OF CADDISFLY TAXA	2	0	4	0	0	-1	0	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	23.74	1	5.09	0	1.33	-1	0.70	-1
PERCENT CADDISFLY COMP.	10.89	0	8.73	0	0.00	-1	0.00	-1
PERCENT DOMINANT TAXON	15.95	1	26.91	0	31.48	0	35.31	0
PERCENT ISOPOD, SNAIL, LEEC	5.06	0	9.09	0	9.68	0	18.88	-1
PERCENT SURF. AIR BREATHER	5.84	1	30.91	-1	32.26	-1	1.05	1
TOTAL SCORE		2		-1		-5		-4
MACROINV. COMMUNITY RATING	ACCEPT.		ACCEPT.		POOR		ACCEPT.	

Table 2C. Qualitative macroinvertebrate sampling results for the non-wadeable portion of the Clinton River watershed, July 17, 2009.

	Clinton River Bridgeview St. 7/17/2009 Station 43
TAXA	
ANNELIDA (segmented worms)	
Hirudinea (leeches)	60
Oligochaeta (worms)	21
ARTHROPODA	
Crustacea	
Amphipoda (scuds)	50
Decapoda (crayfish)	48
Insecta	
Odonata	
Anisoptera (dragonflies)	
Libellulidae	1
Trichoptera (caddisflies)	
Hydroptilidae	62
Diptera (flies)	
Chironomidae	779
MOLLUSCA	
Gastropoda (snails)	
Hydrobiidae	62
Physidae	15
Planorbidae	6
Pelecypoda (bivalves)	
Pisidiidae	6

	Clinton River Bridgeview St. Station 43
METRIC	Value
TOTAL ABUNDANCE	1110
TOTAL RICHNESS	11
NUMBER OF EPHEMEROPTERA FAMILIES	0
NUMBER OF PLECOPTERA FAMILIES	0
NUMBER OF TRICHOPTERA FAMILIES	1
NUMBER OF DIPTERA TAXA	1
TRICHOPTERA ABUNDANCE	62
ABUNDANCE OF DOMINANT TAXON	779
SHREDDER ABUNDANCE	50
SCRAPER ABUNDANCE	145
COLL-FILTERER ABUNDANCE	0
COLL-GATH ABUNDANCE	854
PREDATOR ABUNDANCE	61

<u>Metric Calculations (possible points)</u>	<u>Metric Score</u>
FFG Diversity (25)	8
Habitat Stability FFG Surrogate (25)	8
% Trichoptera (20)	14
EPT Richness (8)	0
Total Richness (7)	0
Diptera Richness (5)	0
Plecoptera Richness (5)	0
% Dominance (5)	0
<i>Marginal</i>	30

Table 3A. Qualitative fish sampling results for the Clinton River watershed, June - September, 2009.

TAXA	Clinton River	Galloway Creek	Galloway Creek	Stony Creek
	Cooley Lake Road	Deep Wood Lane	Butler Rd	Inwood Road
	6/29/2009	6/18/2009	6/18/2009	9/1/2009
	STATION 3	STATION 5	STATION 6	STATION 11
Amiidae (bowfins)				
<i>Amia calva</i> (Bowfin)	3			
Umbridae (mudminnows)				
<i>Umbra limi</i> (Central mudminnow)	51			
Esocidae (pikes)				
<i>Esox lucius</i> (Northern Pike)	8			
Cyprinidae (minnows and carps)				
<i>Campostoma anomalum</i> (Central stoneroller)		3		
<i>Nocomis biguttatus</i> (Horneyhead chub)	7			
<i>Semotilus atromaculatus</i> (Creek chub)		52	75	
<i>Luxilus cornutus</i> (Common shiner)		1		
<i>Pimephales promelas</i> (Fathead minnow)		6		
<i>Pimephales notatus</i> (Bluntnose minnow)				4
<i>Rhinichthys atratulus</i> (Blacknose dace)		2		
Catostomidae (suckers)				
<i>Catostomus commersoni</i> (White sucker)		13	23	3
<i>Hypentelium nigricans</i> (Northern hog sucker)	1			13
Ictaluridae (Bullhead, Catfish)				
<i>Ameiurus natalis</i> (Yellow bullhead)	3			2
Centrarchidae (sunfish)				
<i>Ambloplites rupestris</i> (Rock bass)	43			7
<i>Lepomis cyanellus</i> (Green sunfish)			1	
<i>Lepomis gibbosus</i> (Pumpkinseed sf)	2			3
<i>Lepomis macrochirus</i> (Bluegill sf)	16		2	9
<i>Micropterus salmoides</i> (Largemouth bass)	7	1	2	1
<i>Micropterus dolomieu</i> (Smallmouth bass)	1			
Percidae (perch)				
<i>Etheostoma caeruleum</i> (Rainbow darter)		19	15	12
<i>Etheostoma blennioides</i> (Greenside darter)	1			
<i>Etheostoma flabellare</i> (Fantail darter)	5			14
<i>Etheostoma nigrum</i> (Johnny darter)	23	10	50	5
<i>Percina caprodes</i> (Logperch)	4			
<i>Perca flavescens</i> (Yellow perch)	30			
TOTAL INDIVIDUALS	205	107	168	73
Number of hybrid sunfish	0	0	0	0
Number of anomalies	0	0	0	0
Percent anomalies	0.000	0.000	0.000	0.000
Percent salmonids	0.000	0.000	0.000	0.000
Reach sampled (ft)			165	
Area sampled (sq ft)				
Density (# fish/sq ft)				
Gear	ss		bps	bps

Table 3B. Fish metric evaluation of the Clinton River watershed, June - September, 2009.

METRIC	Clinton River		Galloway Creek		Galloway Creek		Stony Creek	
	Cooley Lake Road		Deep Wood Lane		Butler Rd		Inwood Road	
	6/29/2009		6/18/2009		6/18/2009		9/1/2009	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	16	1	9	-1	7	-1	11	0
NO. OF DARTER, SCULPIN, MADTOM TAXA	4	1	2	0	2	0	3	0
NUMBER OF SUNFISH TAXA	3	0	0	-1	2	0	3	0
NUMBER OF SUCKER TAXA	1	-1	1	-1	1	-1	2	0
NUMBER OF INTOLERANT TAXA	3	0	1	-1	1	-1	3	0
PERCENT TOLERANT	39.02	0	77.57	-1	88.69	-1	19.18	1
PERCENT OMNIVOROUS TAXA	26.34	0	68.22	-1	58.33	-1	12.33	1
PERCENT INSECTIVOROUS TAXA	28.78	-1	28.04	-1	40.48	0	76.71	1
PERCENT PISCIVOROUS TAXA	30.24	1	0.93	-1	1.19	0	10.96	0
% SIMPLE LITHOPHILIC SPAWNER TAXA	2.44	0	32.71	0	22.62	0	38.36	0
TOTAL SCORE		1		-8		-5		3
FISH COMMUNITY RATING	ACCEPT.		POOR		POOR		ACCEPT.	
Comments:								
Shocked 35 mins.					Fish shocked 9-9-09			

Table 3A. Qualitative fish sampling results for the Clinton River watershed, June - September, 2009.

TAXA	Clinton River	North Branch Clinton River	North Branch Clinton River	North Branch Clinton River
	In Dodge Park	Hough Rd	McKay Rd	Armada Center Road
	8/31/2009	8/20/2009	8/20/2009	8/20/2009
	STATION 15	STATION 23	STATION 25	STATION 26
Umbridae (mudminnows)				
<i>Umbrina limi</i> (Central mudminnow)		9	9	1
Esocidae (pikes)				
<i>Esox lucius</i> (Northern Pike)	2			2
Cyprinidae (minnows and carps)				
<i>Camptostoma anomalum</i> (Central stoneroller)		1		19
<i>Nocomis biguttatus</i> (Horneyhead chub)	6		21	13
<i>Semotilus atromaculatus</i> (Creek chub)		19	11	1
<i>Luxilus cornutus</i> (Common shiner)			10	72
<i>Pimephales promelas</i> (Fathead minnow)		1		
<i>Pimephales notatus</i> (Bluntnose minnow)	1		1	15
<i>Rhinichthys atratulus</i> (Blacknose dace)		32		
Catostomidae (suckers)				
<i>Catostomus commersoni</i> (White sucker)	6		6	1
<i>Hypentelium nigricans</i> (Northern hog sucker)	15			
Ictaluridae (Bullhead, Catfish)				
<i>Ameiurus natalis</i> (Yellow bullhead)	1			
Centrarchidae (sunfish)				
<i>Ambloplites rupestris</i> (Rock bass)	18		1	5
<i>Lepomis cyanellus</i> (Green sunfish)	5		2	1
<i>Lepomis gibbosus</i> (Pumpkinseed sf)	1			
<i>Lepomis macrochirus</i> (Bluegill sf)		1	3	1
<i>Micropterus salmoides</i> (Largemouth bass)		2	2	4
Percidae (perch)				
<i>Etheostoma caeruleum</i> (Rainbow darter)		13	11	111
<i>Etheostoma blennioides</i> (Greenside darter)	1	1	3	17
<i>Etheostoma flabellare</i> (Fantail darter)		45		
<i>Etheostoma nigrum</i> (Johnny darter)	2	9	21	14
<i>Percina caprodes</i> (Logperch)	5			
<i>Perca flavescens</i> (Yellow perch)	10			
Gobiidae (gobies)				
<i>Neogobius melanostomus</i> (Round goby)	80			
TOTAL INDIVIDUALS	153	133	101	277
Number of hybrid sunfish	0	0	0	0
Number of anomalies	0	0	0	0
Percent anomalies	0.000	0.000	0.000	0.000
Percent salmonids	0.000	0.000	0.000	0.000
Reach sampled (ft)	800			
Area sampled (sq ft)				
Density (# fish/sq ft)				
Gear	ss	bps	bps	

Table 3B. Fish metric evaluation of the Clinton River watershed, June - September, 2009.

METRIC	Clinton River		North Branch Clinton River		North Branch Clinton River		North Branch Clinton River	
	In Dodge Park		Hough Rd		McKay Rd		Armada Center Road	
	8/31/2009		8/20/2009		8/20/2009		8/20/2009	
	STATION 15		STATION 23		STATION 25		STATION 26	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	14	1	11	1	13	1	15	1
NO. OF DARTER, SCULPIN, MADTOM TAXA	3	0	4	1	3	0	3	0
NUMBER OF SUNFISH TAXA	3	0	1	0	3	0	3	0
NUMBER OF SUCKER TAXA	2	0	0	-1	1	-1	1	-1
NUMBER OF INTOLERANT TAXA	2	-1	1	0	2	0	2	-1
PERCENT TOLERANT	9.80	1	52.63	0	49.50	0	11.91	1
PERCENT OMNIVOROUS TAXA	5.23	1	45.86	0	26.73	0	6.50	1
PERCENT INSECTIVOROUS TAXA	75.16	1	51.88	0	70.30	1	82.67	1
PERCENT PISCIVOROUS TAXA	13.07	0	1.50	0	2.97	0	3.97	0
% SIMPLE LITHOPHILIC SPawner TAXA	16.99	0	33.83	0	26.73	0	66.43	1
TOTAL SCORE		3		1		1		3
FISH COMMUNITY RATING		ACCEPT.		ACCEPT.		ACCEPT.		ACCEPT.
Comments:			Comments:		Comments:		Comments:	
Fish shocked 9/18/09, 40 minutes			Shocked 25 minutes		Stream a bit wide for good bps efficiency			

Table 3A. Qualitative fish sampling results for the Clinton River watershed, June - September, 2009.

	Newland Drain Romeo Plank Road 6/30/2009 STATION 27	Tupper Brook 31 Mile Road 6/30/2009 STATION 32	Tupper Brook 29 Mile Road 6/30/2009 STATION 34	East Branch Coon Creek 32 Mile Road 8/19/2009 STATION 36
TAXA				
Umbridae (mudminnows)				
<i>Umbra limi</i> (Central mudminnow)	8		7	
Cyprinidae (minnows and carps)				
<i>Campostoma anomalum</i> (Central stoneroller)	1			55
<i>Semotilus atromaculatus</i> (Creek chub)	16	77		27
<i>Luxilus cornutus</i> (Common shiner)	16			16
<i>Pimephales promelas</i> (Fathead minnow)				1
<i>Pimephales notatus</i> (Bluntnose minnow)				7
<i>Rhinichthys atratulus</i> (Blacknose dace)	2			5
Catostomidae (suckers)				
<i>Catostomus commersoni</i> (White sucker)	11	43	29	8
Gasterosteidae (sticklebacks)				
<i>Culaea inconstans</i> (Brook stickleback)	11	2		
Centrarchidae (sunfish)				
<i>Lepomis cyanellus</i> (Green sunfish)	3	44	23	
<i>Lepomis macrochirus</i> (Bluegill sf)		3	12	
<i>Micropterus salmoides</i> (Largemouth bass)		2	10	2
Percidae (perch)				
<i>Etheostoma caeruleum</i> (Rainbow darter)	14			32
<i>Etheostoma exile</i> (Iowa darter)		9	18	
<i>Etheostoma blennioides</i> (Greenside darter)	1			3
<i>Etheostoma nigrum</i> (Johnny darter)	89			30
<i>Percina maculata</i> (Blackside darter)				2
TOTAL INDIVIDUALS	172	180	99	188
Number of hybrid sunfish	0	0	0	0
Number of anomalies	0	0	0	0
Percent anomalies	0.000	0.000	0.000	0.000
Percent salmonids	0.000	0.000	0.000	0.000
Reach sampled (ft)				
Area sampled (sq ft)				
Density (# fish/sq ft)				
Gear				bps

Table 3B. Fish metric evaluation of the Clinton River watershed, June - September, 2009.

	Newland Drain Romeo Plank Road 6/30/2009 STATION 27		Tupper Brook 31 Mile Road 6/30/2009 STATION 32		Tupper Brook 29 Mile Road 6/30/2009 STATION 34		East Branch Coon Creek 32 Mile Road 8/19/2009 STATION 36	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	11	1	7	0	6	1	12	1
NO. OF DARTER, SCULPIN, MADTOM TAXA	3	1	1	0	1	0	4	1
NUMBER OF SUNFISH TAXA	1	0	2	1	2	1	0	-1
NUMBER OF SUCKER TAXA	1	0	1	0	1	1	1	0
NUMBER OF INTOLERANT TAXA	1	-1	1	-1	1	0	1	-1
PERCENT TOLERANT	75.00	-1	91.11	-1	59.60	-1	41.49	0
PERCENT OMNIVOROUS TAXA	21.51	0	66.67	-1	36.36	0	25.53	0
PERCENT INSECTIVOROUS TAXA	77.91	1	32.22	0	53.54	0	44.15	0
PERCENT PISCIVOROUS TAXA	0.00	-1	1.11	0	10.10	0	1.06	0
% SIMPLE LITHOPHILIC SPawner TAXA	25.00	0	23.89	0	29.29	0	33.51	0
TOTAL SCORE		0		-2		2		0
FISH COMMUNITY RATING		ACCEPT.		ACCEPT.		ACCEPT.		ACCEPT.
Comments:			Comments:		Comments:		Comments:	

Table 3A. Qualitative fish sampling results for the Clinton River watershed, June - September, 2009.

North Branch Clinton River	
24 Mile Rd	
9/2/2009	
TAXA	STATION 39
Umbridae (mudminnows)	
<i>Umbra limi</i> (Central mudminnow)	2
Esocidae (pikes)	
<i>Esox lucius</i> (Northern Pike)	5
Cyprinidae (minnows and carps)	
<i>Nocomis biguttatus</i> (Horneyhead chub)	10
<i>Luxilus cornutus</i> (Common shiner)	6
<i>Pimephales notatus</i> (Bluntnose minnow)	3
Catostomidae (suckers)	
<i>Catostomus commersoni</i> (White sucker)	2
<i>Hypentelium nigricans</i> (Northern hog sucker)	5
<i>Moxostoma duquesnei</i> (Black redhorse)	7
Ictaluridae (Bullhead, Catfish)	
<i>Ameiurus melas</i> (Black bullhead)	1
<i>Noturus miurus</i> (Brindled madtom)	1
Centrarchidae (sunfish)	
<i>Ambloplites rupestris</i> (Rock bass)	18
<i>Lepomis cyanellus</i> (Green sunfish)	6
<i>Lepomis gibbosus</i> (Pumpkinseed sf)	1
<i>Pomoxis nigromaculatus</i> (Black crappie)	3
Percidae (perch)	
<i>Etheostoma caeruleum</i> (Rainbow darter)	4
<i>Etheostoma blennioides</i> (Greenside darter)	32
<i>Etheostoma nigrum</i> (Johnny darter)	10
<i>Percina maculata</i> (Blackside darter)	11
<i>Perca flavescens</i> (Yellow perch)	2
Gobiidae (gobies)	
<i>Neogobius melanostomus</i> (Round goby)	39
TOTAL INDIVIDUALS	168
Number of hybrid sunfish	0
Number of anomalies	0
Percent anomalies	0.000
Percent salmonids	0.000
Reach sampled (ft)	
Area sampled (sq ft)	
Density (# fish/sq ft)	
Gear	ss

Table 3B. Fish metric evaluation of the Clinton River watershed, June - September, 2009.

North Branch Clinton River		
24 Mile Rd		
9/2/2009		
STATION 39		
METRIC	Value	Score
TOTAL NUMBER OF TAXA	20	1
NO. OF DARTER, SCULPIN, MADTOM TAXA	5	1
NUMBER OF SUNFISH TAXA	4	1
NUMBER OF SUCKER TAXA	3	1
NUMBER OF INTOLERANT TAXA	4	0
PERCENT TOLERANT	13.69	1
PERCENT OMNIVOROUS TAXA	4.76	1
PERCENT INSECTIVOROUS TAXA	78.57	1
PERCENT PISCIVOROUS TAXA	13.69	0
% SIMPLE LITHOPHILIC SPAWNER TAXA	20.83	0
TOTAL SCORE		7
FISH COMMUNITY RATING		EXCELLENT

Comments:

Table 4. Habitat evaluation for the Clinton River watershed, June - September, 2009.

	Unnamed Tributary to Clinton River Ortonville Road RIFFLE/RUN STATION 1	Sashabaw Creek Pine Knob Trail RIFFLE/RUN STATION 2	Clinton River Cooley Lake Road GLIDE/POOL STATION 3	Clinton River Eastway Drive RIFFLE/RUN STATION 4
HABITAT METRIC				
Substrate and Instream Cover				
Epifaunal Substrate/ Avail Cover (20)	16	15	10	11
Embeddedness (20)*	15	11		11
Velocity/Depth Regime (20)*	14	14		16
Pool Substrate Characterization (20)**			16	
Pool Variability (20)**			5	
Channel Morphology				
Sediment Deposition (20)	13	14	15	9
Flow Status - Maint. Flow Volume (10)	9	10	10	9
Flow Status - Flashiness (10)	8	9	9	2
Channel Alteration (20)	17	17	15	11
Frequency of Riffles/Bends (20)*	16	16		10
Channel Sinuosity (20)**			6	
Riparian and Bank Structure				
Bank Stability (L) (10)	9	9	10	6
Bank Stability (R) (10)	9	9	10	5
Vegetative Protection (L) (10)	8	6	9	7
Vegetative Protection (R) (10)	8	3	9	7
Riparian Veg. Zone Width (L) (10)	5	2	3	4
Riparian Veg. Zone Width (R) (10)	5	2	6	5
TOTAL SCORE (200):	152	137	133	113

HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)
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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:	9/2/2009	6/18/2009	6/29/2009	8/31/2009
Weather:	Sunny	Sunny	Cloudy	Sunny
Air Temperature:	72 Deg. F.	75 Deg. F.	Deg. F.	65 Deg. F.
Water Temperature:	66 Deg. F.	69 Deg. F.	75 Deg. F.	64 Deg. F.
Ave. Stream Width:	6 Feet	15 Feet	50 Feet	34 Feet
Ave. Stream Depth:	0.3 Feet	1.5 Feet	3 Feet	1.5 Feet
Surface Velocity:	1 Ft./Sec.	1.5 Ft./Sec.	0.75 Ft./Sec.	1.25 Ft./Sec.
Estimated Flow:	1.8 CFS	33.75 CFS	112.5 CFS	63.75 CFS
Stream Modifications:	None	None	None	Bank Stabilization
Nuisance Plants (Y/N):	N	N	N	N
Report Number:				

STORET No.:	631208	631077	630630	631207
Stream Name:	butary to Clinton River	Sashabaw Creek	Clinton River	Clinton River
Road Crossing/Location:	Ortonville Road	Pine Knob Trail	Cooley Lake Road	Eastway Drive
County Code:	63	63	63	63
TRS:	04N09E20	04N09E35	03N09E33	03N10E27
Latitude (dd):	42.73225	42.714479	42.62807	42.641779
Longitude (dd):	-83.419474	-83.35373	-83.39587	-83.25984
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Coldwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090003	4090003	4090003	4090003

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 4. Habitat evaluation for the Clinton River watershed, June - September, 2009.

	Galloway Creek Deep Wood Lane RIFFLE/RUN STATION 5	Galloway Creek Butler Rd RIFFLE/RUN STATION 6	Clinton River Rochester Road RIFFLE/RUN STATION 7	Paint Creek Silver Bell Road GLIDE/POOL STATION 8
HABITAT METRIC				
Substrate and Instream Cover				
Epifaunal Substrate/ Avail Cover (20)	12	10	15	10
Embeddedness (20)*	13	10	10	
Velocity/Depth Regime (20)*	16	14	10	
Pool Substrate Characterization (20)**				10
Pool Variability (20)**				5
Channel Morphology				
Sediment Deposition (20)	10	11	13	13
Flow Status - Maint. Flow Volume (10)	9	9	10	10
Flow Status - Flashiness (10)	3	3	3	4
Channel Alteration (20)	18	8	15	14
Frequency of Riffles/Bends (20)*	18	13	16	
Channel Sinuosity (20)**				8
Riparian and Bank Structure				
Bank Stability (L) (10)	5	2	6	8
Bank Stability (R) (10)	5	2	6	8
Vegetative Protection (L) (10)	6	5	6	8
Vegetative Protection (R) (10)	6	5	7	8
Riparian Veg. Zone Width (L) (10)	6	4	4	6
Riparian Veg. Zone Width (R) (10)	9	6	4	6
TOTAL SCORE (200):	136	102	125	118

HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)
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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:	6/18/2009	6/18/2009	8/31/2009	6/29/2009
Weather:	artly Cloudy	Partly Cloudy	Sunny	Partly Cloudy
Air Temperature:	72 Deg. F.	68 Deg. F.	Deg. F.	70 Deg. F.
Water Temperature:	69 Deg. F.	64 Deg. F.	62 Deg. F.	69 Deg. F.
Ave. Stream Width:	15 Feet	15 Feet	38 Feet	32 Feet
Ave. Stream Depth:	0.5 Feet	1.5 Feet	1 Feet	2.5 Feet
Surface Velocity:	1.2 Ft./Sec.	0.75 Ft./Sec.	2 Ft./Sec.	0.8 Ft./Sec.
Estimated Flow:	9 CFS	16.875 CFS	76 CFS	64 CFS
Stream Modifications:	None	Canopy Removal	None	None
Nuisance Plants (Y/N):	N	N	N	N
Report Number:				
STORET No.:	631205	631032	630602	631204
Stream Name:	loway Creek	Galloway Creek	Clinton River	Paint Creek
Road Crossing/Location:	Deep Wood Lane	Butler Rd	Rochester Road	Silver Bell Road
County Code:	63	63	63	63
TRS:	03N10E24	03N11E19	03N11E15	04N11E28
Latitude (dd):	42.66094	42.659167	42.67539	42.72503
Longitude (dd):	-83.24078	-83.20083	-83.13509	-83.15749
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Coldwater	Warmwater	Warmwater	Coldwater
USGS Basin Code:	4090003	4090003	4090003	4090003

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 4. Habitat evaluation for the Clinton River watershed, June - September, 2009.

	Paint Creek Ludlow Road RIFFLE/RUN STATION 9	Stony Creek Inwood Road RIFFLE/RUN STATION 11	McClure Drain Park Road RIFFLE/RUN STATION 12	Clinton River Earl Memorial Highway RIFFLE/RUN STATION 14
HABITAT METRIC				
Substrate and Instream Cover				
Epifaunal Substrate/ Avail Cover (20)	13	15	13	9
Embeddedness (20)*	12	12	11	16
Velocity/Depth Regime (20)*	14	15	10	16
Pool Substrate Characterization (20)**				
Pool Variability (20)**				
Channel Morphology				
Sediment Deposition (20)	15	7	10	6
Flow Status - Maint. Flow Volume (10)	9	10	9	9
Flow Status - Flashiness (10)	5	7	6	3
Channel Alteration (20)	16	20	16	16
Frequency of Riffles/Bends (20)*	16	16	11	14
Channel Sinuosity (20)**				
Riparian and Bank Structure				
Bank Stability (L) (10)	7	9	9	5
Bank Stability (R) (10)	6	9	9	5
Vegetative Protection (L) (10)	7	10	8	2
Vegetative Protection (R) (10)	5	10	8	6
Riparian Veg. Zone Width (L) (10)	6	9	8	3
Riparian Veg. Zone Width (R) (10)	3	9	8	5
TOTAL SCORE (200):	134	158	136	115

HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	EXCELLENT (NON- IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)
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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:	6/29/2009	9/1/2009	9/1/2009	8/31/2009
Weather:	partly Cloudy	Sunny	Sunny	Sunny
Air Temperature:	Deg. F.	75 Deg. F.	73 Deg. F.	70
Water Temperature:	Deg. F.	64 Deg. F.	61 Deg. F.	62
Ave. Stream Width:	35 Feet	15 Feet	6 Feet	65
Ave. Stream Depth:	2 Feet	1.75 Feet	0.5 Feet	2
Surface Velocity:	1.25 Ft./Sec.	1 Ft./Sec.	0.5 Ft./Sec.	1.5
Estimated Flow:	87.5 CFS	26.25 CFS	1.5 CFS	195
Stream Modifications:	debris Removal	None	None	None
Nuisance Plants (Y/N):	N	N	N	N
Report Number:				
STORET No.:	631203	500554	631206	500561
Stream Name:	Paint Creek	Stony Creek	McClure Drain	Clinton River
Road Crossing/Location:	Ludlow Road	Inwood Road	Park Road	Earl Memorial Highway
County Code:	63	50	63	50
TRS:	03N11E10	04N12E17	04N11E25	02N12E04
Latitude (dd):	42.688495	42.76358	42.73346	42.62027
Longitude (dd):	-83.142974	-83.07401	-83.09758	-83.03205
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Coldwater	Coldwater	Coldwater	Warmwater
USGS Basin Code:	4090003	4090003	4090003	4090003

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 4. Habitat evaluation for the Clinton River watershed, June - September, 2009.

	Clinton River In Dodge Park RIFFLE/RUN STATION 15	Red Run Drain 14 Mile GLIDE/POOL STATION 16	Middle Branch Clinton Earl Memorial Highway GLIDE/POOL STATION 17	Middle Branch Clinton Schoenherr Road RIFFLE/RUN STATION 18
HABITAT METRIC				
Substrate and Instream Cover				
Epifaunal Substrate/ Avail Cover (20)	10	5	6	11
Embeddedness (20)*	11			13
Velocity/Depth Regime (20)*	16			14
Pool Substrate Characterization (20)**		6	8	
Pool Variability (20)**		3	4	
Channel Morphology				
Sediment Deposition (20)	5	8	5	10
Flow Status - Maint. Flow Volume (10)	9	9	10	10
Flow Status - Flashiness (10)	3	0	6	3
Channel Alteration (20)	16	2	9	11
Frequency of Riffles/Bends (20)*	6			15
Channel Sinuosity (20)**		3	6	
Riparian and Bank Structure				
Bank Stability (L) (10)	5	6	7	5
Bank Stability (R) (10)	5	6	7	5
Vegetative Protection (L) (10)	5	3	5	5
Vegetative Protection (R) (10)	5	3	5	5
Riparian Veg. Zone Width (L) (10)	6	2	2	5
Riparian Veg. Zone Width (R) (10)	4	2	4	5
TOTAL SCORE (200):	106	58	84	117

HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)
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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:	8/31/2009	6/30/2009	7/1/2009	7/1/2009
Weather:	Sunny	Cloudy	Cloudy	Cloudy
Air Temperature:	70 Deg. F.	Deg. F.	Deg. F.	Deg. F.
Water Temperature:	62 Deg. F.	68 Deg. F.	Deg. F.	Deg. F.
Ave. Stream Width:	65 Feet	70 Feet	9 Feet	22 Feet
Ave. Stream Depth:	1.5 Feet	1 Feet	1 Feet	1.5 Feet
Surface Velocity:	2 Ft./Sec.	0.3 Ft./Sec.	0.75 Ft./Sec.	0.4 Ft./Sec.
Estimated Flow:	195 CFS	21 CFS	6.75 CFS	13.2 CFS
Stream Modifications:	None	Dredged	Dredged	Dredged
Nuisance Plants (Y/N):	N	N	N	N
Report Number:				
STORET No.:	500468	500011	500567	500568
Stream Name:	Clinton River	Red Run Drain	Middle Branch Clinton River	Middle Branch Clinton River
Road Crossing/Location:	In Dodge Park	14 Mile	Earl Memorial Highway	Schoenherr Road
County Code:	50	50	50	50
TRS:	02N12E14	01N12E03	03N12E10	03N12E02
Latitude (dd):	42.5953	42.53675	42.694361	42.70089
Longitude (dd):	-83.0098	-83.00822	-83.034223	-82.995624
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090003	4090003	4090003	4090003

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 4. Habitat evaluation for the Clinton River watershed, June - September, 2009.

	Price Brook 29 Mile Road RIFLE/RUN STATION 19	Middle Branch Clinton River 24 Mile Road GLIDE/POOL STATION 20	Gloede Ditch 21 Mile Road GLIDE/POOL STATION 21	Miller Drain Heydenreich Road GLIDE/POOL STATION 22
HABITAT METRIC				
Substrate and Instream Cover				
Epifaunal Substrate/ Avail Cover (20)	13	6	2	1
Embeddedness (20)*	16			
Velocity/Depth Regime (20)*	7			
Pool Substrate Characterization (20)**		8	5	6
Pool Variability (20)**		8	2	3
Channel Morphology				
Sediment Deposition (20)	9	5	15	14
Flow Status - Maint. Flow Volume (10)	9	9	9	9
Flow Status - Flashiness (10)	6	2	4	4
Channel Alteration (20)	5	13	5	11
Frequency of Riffles/Bends (20)*	10			
Channel Sinuosity (20)**		7	5	7
Riparian and Bank Structure				
Bank Stability (L) (10)	6	3	6	4
Bank Stability (R) (10)	6	4	6	6
Vegetative Protection (L) (10)	6	3	3	7
Vegetative Protection (R) (10)	6	3	3	5
Riparian Veg. Zone Width (L) (10)	2	3	2	3
Riparian Veg. Zone Width (R) (10)	0	3	2	2
TOTAL SCORE (200):	101	77	69	82

HABITAT RATING:	MARGINAL (MODERATELY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)
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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:	6/30/2009	9/1/2009	9/1/2009	9/1/2009
Weather:	Cloudy	Sunny	Sunny	Sunny
Air Temperature:	Deg. F.	70 Deg. F.	65 Deg. F.	70 Deg. F.
Water Temperature:	Deg. F.	59 Deg. F.	57 Deg. F.	Deg. F.
Ave. Stream Width:	2 Feet	27 Feet	20 Feet	12 Feet
Ave. Stream Depth:	1 Feet	2 Feet	1.5 Feet	1.25 Feet
Surface Velocity:	1.5 Ft./Sec.	0.3 Ft./Sec.	0.2 Ft./Sec.	0.2 Ft./Sec.
Estimated Flow:	3 CFS	16.2 CFS	6 CFS	3 CFS
Stream Modifications:	Relocated	None	Dredged	None
Nuisance Plants (Y/N):	N	N	N	N
Report Number:				
STORET No.:	500569	500559	500555	500558
Stream Name:	Price Brook	iddle Branch Clinton River	Gloede Ditch	Miller Drain
Road Crossing/Location:	29 Mile Road	24 Mile Road	21 Mile Road	Heydenreich Road
County Code:	50	50	50	50
TRS:	04N12E14	03N13E08	03N13E30	02N13E09
Latitude (dd):	42.75783	42.68644	42.64214	42.6091
Longitude (dd):	-83.01032	-82.94717	-82.9579	-82.9174
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Coldwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090003	4090003	4090003	4090003

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 4. Habitat evaluation for the Clinton River watershed, June - September, 2009.

	North Branch Clinton River Hough Rd RIFFLE/RUN STATION 23	North Branch Clinton River McKay Rd GLIDE/POOL STATION 25	North Branch Clinton River Armada Center Road RIFFLE/RUN STATION 26	Newland Drain Romeo Plank Road RIFFLE/RUN STATION 27
HABITAT METRIC				
Substrate and Instream Cover				
Epifaunal Substrate/ Avail Cover (20)	15	10	14	10
Embeddedness (20)*	16		12	17
Velocity/Depth Regime (20)*	13		13	11
Pool Substrate Characterization (20)**		10		
Pool Variability (20)**		15		
Channel Morphology				
Sediment Deposition (20)	15	10	12	16
Flow Status - Maint. Flow Volume (10)	10	9	9	9
Flow Status - Flashiness (10)	9	5	7	6
Channel Alteration (20)	15	16	13	9
Frequency of Riffles/Bends (20)*	16		15	15
Channel Sinuosity (20)**		15		
Riparian and Bank Structure				
Bank Stability (L) (10)	9	6	5	8
Bank Stability (R) (10)	9	6	8	8
Vegetative Protection (L) (10)	9	8	5	6
Vegetative Protection (R) (10)	9	8	9	6
Riparian Veg. Zone Width (L) (10)	7	4	5	2
Riparian Veg. Zone Width (R) (10)	7	7	8	2
TOTAL SCORE (200):	159	129	135	125

HABITAT RATING:	EXCELLENT (NON- IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)
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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:	8/20/2009	8/20/2009	8/20/2009	6/30/2009
Weather:	partly Cloudy	Cloudy	Rainy	Rainy
Air Temperature:	Deg. F.	Deg. F.	Deg. F.	Deg. F.
Water Temperature:	64 Deg. F.	68 Deg. F.	Deg. F.	Deg. F.
Ave. Stream Width:	6 Feet	14 Feet	18 Feet	9 Feet
Ave. Stream Depth:	0.5 Feet	1.25 Feet	1 Feet	0.75 Feet
Surface Velocity:	1.5 Ft./Sec.	0.4 Ft./Sec.	0.75 Ft./Sec.	0.5 Ft./Sec.
Estimated Flow:	4.5 CFS	7 CFS	13.5 CFS	3.375 CFS
Stream Modifications:	None	None	None	Dredged
Nuisance Plants (Y/N):	N	N	N	N
Report Number:				
STORET No.:	440177	500444	500562	500570
Stream Name:	Clinton River	North Branch Clinton River	North Branch Clinton River	Newland Drain
Road Crossing/Location:	Hough Rd	McKay Rd	Armada Center Road	Romeo Plank Road
County Code:	44	50	50	50
TRS:	06N12E26	05N12E01	05N13E18	05N13E17
Latitude (dd):	42.907759	42.878198	42.84914	42.86055
Longitude (dd):	-83.00852	-83.0007	-82.97868	-82.96507
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Coldwater	Coldwater	Warmwater	Warmwater
USGS Basin Code:	4090003	4090003	4090003	4090003

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 4. Habitat evaluation for the Clinton River watershed, June - September, 2009.

	North Branch Clinton River Card Road GLIDE/POOL STATION 31	Tupper Brook 31 Mile Road RIFFLE/RUN STATION 32	Tupper Brook 30 Mile Road RIFFLE/RUN STATION 33	Tupper Brook 29 Mile Road GLIDE/POOL STATION 34
HABITAT METRIC				
Substrate and Instream Cover				
Epifaunal Substrate/ Avail Cover (20)	3	10	6	7
Embeddedness (20)*		17	15	
Velocity/Depth Regime (20)*		10	6	
Pool Substrate Characterization (20)**	6			15
Pool Variability (20)**	10			5
Channel Morphology				
Sediment Deposition (20)	12	5	6	13
Flow Status - Maint. Flow Volume (10)	9	8	5	9
Flow Status - Flashiness (10)	3	3	2	6
Channel Alteration (20)	15	14	11	6
Frequency of Riffles/Bends (20)*		15	10	
Channel Sinuosity (20)**	10			5
Riparian and Bank Structure				
Bank Stability (L) (10)	5	8	6	8
Bank Stability (R) (10)	5	8	6	8
Vegetative Protection (L) (10)	5	6	6	5
Vegetative Protection (R) (10)	5	6	6	5
Riparian Veg. Zone Width (L) (10)	4	4	5	3
Riparian Veg. Zone Width (R) (10)	6	8	5	3
TOTAL SCORE (200):	98	122	95	98

HABITAT RATING:	MARGINAL (MODERATELY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)
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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:	9/8/2009	6/30/2009	8/19/2009	6/30/2009
Weather:	Cloudy	Cloudy	Sunny	Cloudy
Air Temperature:	68 Deg. F.	Deg. F.	80 Deg. F.	Deg. F.
Water Temperature:	64 Deg. F.	Deg. F.	74 Deg. F.	Deg. F.
Ave. Stream Width:	45 Feet	8 Feet	4 Feet	6 Feet
Ave. Stream Depth:	2.5 Feet	0.5 Feet	0.25 Feet	1 Feet
Surface Velocity:	0.1 Ft./Sec.	0.5 Ft./Sec.	0.3 Ft./Sec.	0.25 Ft./Sec.
Estimated Flow:	11.25 CFS	2 CFS	0.3 CFS	1.5 CFS
Stream Modifications:	None	None	None	Dredged
Nuisance Plants (Y/N):	N	N	N	N
Report Number:				
STORET No.:	500489	500572	500571	500566
Stream Name:	Clinton River	Tupper Brook	Tupper Brook	Tupper Brook
Road Crossing/Location:	Card Road	31 Mile Road	30 Mile Road	29 Mile Road
County Code:	50	50	50	50
TRS:	03N13E10	04N13E02	04N13E11	04N13E14
Latitude (dd):	42.69582	42.79021	42.77575	42.76139
Longitude (dd):	-82.89903	-82.91729	-82.90736	-82.90092
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090003	4090003	4090003	4090003

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 4. Habitat evaluation for the Clinton River watershed, June - September, 2009.

	East Branch Coon Creek North Rd (u/s Armada WWTP) RIFFLE/RUN STATION 35	East Branch Coon Creek 32 Mile Road RIFFLE/RUN STATION 36	East Branch Coon Creek Omo Road GLIDE/POOL STATION 37	Deer Creek Bates Road GLIDE/POOL STATION 38
HABITAT METRIC				
Substrate and Instream Cover				
Epifaunal Substrate/ Avail Cover (20)	14	15	10	7
Embeddedness (20)*	16	14		
Velocity/Depth Regime (20)*	14	15		
Pool Substrate Characterization (20)**			10	10
Pool Variability (20)**			11	5
Channel Morphology				
Sediment Deposition (20)	12	13	11	11
Flow Status - Maint. Flow Volume (10)	8	8	9	9
Flow Status - Flashiness (10)	4	4	3	3
Channel Alteration (20)	16	16	11	10
Frequency of Riffles/Bends (20)*	15	18		
Channel Sinuosity (20)**			8	5
Riparian and Bank Structure				
Bank Stability (L) (10)	7	6	6	5
Bank Stability (R) (10)	6	6	6	5
Vegetative Protection (L) (10)	8	6	6	8
Vegetative Protection (R) (10)	8	6	6	8
Riparian Veg. Zone Width (L) (10)	6	3	5	4
Riparian Veg. Zone Width (R) (10)	3	5	7	7
TOTAL SCORE (200):	137	135	109	97

HABITAT RATING:	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)
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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:	8/19/2009	8/19/2009	8/19/2009	8/19/2009
Weather:	Sunny	Sunny	Sunny	Sunny
Air Temperature:	Deg. F.	Deg. F.	Deg. F.	Deg. F.
Water Temperature:	70 Deg. F.	Deg. F.	76 Deg. F.	74 Deg. F.
Ave. Stream Width:	15 Feet	12 Feet	16 Feet	18 Feet
Ave. Stream Depth:	0.75 Feet	0.75 Feet	1.5 Feet	1 Feet
Surface Velocity:	0.2 Ft./Sec.	0.5 Ft./Sec.	0.3 Ft./Sec.	0.1 Ft./Sec.
Estimated Flow:	2.25 CFS	4.5 CFS	7.2 CFS	1.8 CFS
Stream Modifications:	None	None	Dredged	Dredged
Nuisance Plants (Y/N):	N	N	N	N
Report Number:				
STORET No.:	500431	500565	500563	500564
Stream Name:	Coon Creek	East Branch Coon Creek	East Branch Coon Creek	Deer Creek
Road Crossing/Location:	North Rd (u/s Armada WWTP)	32 Mile Road	Omo Road	Bates Road
County Code:	50	50	50	50
TRS:	05N13E26	05N13E36	04N13E36	04N14E20
Latitude (dd):	42.838	42.80651	42.72549	42.7602
Longitude (dd):	-82.88774	-82.87115	-82.86481	-82.82298
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090003	4090003	4090003	4090003

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 4. Habitat evaluation for the Clinton River watershed, June - September, 2009.

	North Branch Clinton River 24 Mile Rd RIFFLE/RUN STATION 39	North Branch Clinton River 23 Mile Road GLIDE/POOL STATION 40	McBride Drain 24 Mile Road GLIDE/POOL STATION 41	McBride Drain 23 Mile Road GLIDE/POOL STATION 42
HABITAT METRIC				
Substrate and Instream Cover				
Epifaunal Substrate/ Avail Cover (20)	10	6	2	4
Embeddedness (20)*	16			
Velocity/Depth Regime (20)*	5			
Pool Substrate Characterization (20)**		6	5	5
Pool Variability (20)**		11	3	4
Channel Morphology				
Sediment Deposition (20)	10	9	16	16
Flow Status - Maint. Flow Volume (10)	9	9	9	9
Flow Status - Flashiness (10)	2	2	8	6
Channel Alteration (20)	14	11	6	6
Frequency of Riffles/Bends (20)*	6			
Channel Sinuosity (20)**		6	5	5
Riparian and Bank Structure				
Bank Stability (L) (10)	3	2	6	8
Bank Stability (R) (10)	3	5	5	8
Vegetative Protection (L) (10)	2	1	2	4
Vegetative Protection (R) (10)	2	1	2	4
Riparian Veg. Zone Width (L) (10)	6	6	2	3
Riparian Veg. Zone Width (R) (10)	8	8	2	3
TOTAL SCORE (200):	96	83	73	85

HABITAT RATING:	MARGINAL (MODERATELY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)	MARGINAL (MODERATELY IMPAIRED)
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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:	9/2/2009	9/2/2009	9/8/2009	9/8/2009
Weather:	Sunny	Sunny	Cloudy	Cloudy
Air Temperature:	60 Deg. F.	70 Deg. F.	Deg. F.	Deg. F.
Water Temperature:	58 Deg. F.	58 Deg. F.	68 Deg. F.	68 Deg. F.
Ave. Stream Width:	45 Feet	35 Feet	13 Feet	14 Feet
Ave. Stream Depth:	1.25 Feet	2.5 Feet	1.25 Feet	0.5 Feet
Surface Velocity:	0.6 Ft./Sec.	0.6 Ft./Sec.	0.01 Ft./Sec.	0.6 Ft./Sec.
Estimated Flow:	33.75 CFS	52.5 CFS	0.1625 CFS	4.2 CFS
Stream Modifications:	None	None	Dredged	Dredged
Nuisance Plants (Y/N):	N	N	N	N
Report Number:				
STORET No.:	500436	500560	500557	500556
Stream Name:	Clinton River	North Branch Clinton River	McBride Drain	McBride Drain
Road Crossing/Location:	24 Mile Rd	23 Mile Road	24 Mile Road	23 Mile Road
County Code:	50	50	50	50
TRS:	03N13E26	03N13E14	03N13E09	03N13E15
Latitude (dd):	42.644167	42.67346	42.68719	42.67306
Longitude (dd):	-82.87861	-82.88191	-82.92038	-82.9014
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Warmwater	Warmwater	Warmwater	Warmwater
USGS Basin Code:	4090003	4090003	4090003	4090003

* Applies only to Riffle/Run stream Surveys

** Applies only to Glide/Pool stream Surveys

COMMENTS:

Table 5. Water chemistry analysis results for the Clinton River watershed, September 9, 2009. See Figure 1 for location information.

		Stony Creek	Stony Creek	McClure Creek	West Branch Stony Creek	West Branch Stony Creek	North Branch Clinton River	North Branch Clinton River	North Branch Clinton River	East Pond Creek	East Pond Creek	East Pond Creek
		<i>Brewer Rd.</i>	<i>Inwood Rd.</i>	<i>Metropark Rd.</i>	<i>Metropark Rd.</i>	<i>Metropark Rd.</i>	<i>Hough Rd.</i>	<i>Kidder Rd.</i>	<i>Armada Rd.</i>	<i>33-Mile Rd.</i>	<i>McVicar Rd.</i>	<i>Powell Rd.</i>
<i>Parameter</i>	<i>Units</i>	Station 10	Station 11	Station 12	Station 13	(replicate)	Station 23	Station 24	Station 26	Station 28	Station 29	Station 30
Ammonia	mg N/L	.038	.35	.022	.022	.021	.020	ND	.037	.024	.033	.057
Aroclor 1016	ug/L						ND					
Aroclor 1221	ug/L						ND					
Aroclor 1232	ug/L						ND					
Aroclor 1242	ug/L						ND					
Aroclor 1248	ug/L						ND					
Aroclor 1254	ug/L						ND					
Aroclor 1260	ug/L						ND					
Aroclor 1262	ug/L						ND					
Aroclor 1268	ug/L						ND					
Arsenic - Total	ug/L	1.8					3.8				2.6	2.6
Barium - Total	ug/L	52					59				64	74
Cadmium - Total	ug/L	ND					ND				ND	ND
Chromium - Total	ug/L	ND					ND				ND	ND
Conductance	umhos/cm	654	603									
Copper - Total	ug/L	ND					1.4				ND	1.6
Lead - Total	ug/L	ND					ND				ND	ND
Mercury - Total	ug/L	ND					ND				ND	ND
Nitrate + Nitrite	mg N/L	.110	.26	.81	.131	.133	1.52	2.2	1.80	.050	.084	.92
Nitrite	mg N/L	.007	.035	.007	.005	.005	.006	.008	.015	.003	.004	.015
Ortho-phosphate	mg P/L	.009	.007	.004	.037	.036	.009	.038	.029	.005	.009	.016
Selenium - Total	ug/L	ND					ND				ND	ND
Silver - Total	ug/L	ND					ND				ND	ND
Solids - Total Dissolved	mg/L	410	380									
Total Kjeldahl Nitrogen	mg N/L	.66	1.06	.70	.76	.73	.28	.36	.48	.56	.59	.76
Total Phosphorus	mg P/L	.043	.071	.030	.094	.094	.029	.064	.074	.029	.042	.060
Zinc - Total	ug/L	ND					ND				ND	ND