MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY WATER RESOURCES DIVISION MAY 2015

STAFF REPORT

A BIOLOGICAL AND PHYSICAL SURVEY OF SITES IN THE RABBIT RIVER WATERSHED ALLEGAN COUNTY, MICHIGAN AUGUST 2013



INTRODUCTION

Monitoring by Surface Water Assessment Section (SWAS) staff is implemented on a five-year rotating basis with the most recent survey reports for the Rabbit River watershed completed in 2003 (MDEQ, 2004) and 2008 (MDEQ, 2009). Biological and physical habitat conditions of the Rabbit River watershed were assessed by SWAS staff in August 2013. The primary objectives of the 2013 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 Michigan Water Quality Standards (MDEQ, 2006).
- Identify possible sources of water quality impairment.
- Satisfy monitoring requests submitted by internal and external customers.

DESCRIPTION

A tributary to the lower Kalamazoo River, and approximately 293 square miles in size, the Rabbit River watershed is primarily contained within Allegan County but reaches into Barry, Ottawa, and Kent Counties. Land use is primarily agricultural with areas of forested and urban land. The Rabbit River and its tributaries are relatively low gradient streams that drain predominantly sandy soils. The entire main stem of the Rabbit River and its tributaries upstream of Green Lake Creek confluence are designated coldwater streams, as are Silver Creek, Miller Creek in Monterey Township, and the unnamed tributaries upstream of Miller Creek.

METHODS

The surveys described in this report were conducted according to the SWAS Procedure 51 (Creal, Hanshue, Kosek, Oemke, & Walterhouse, 1996). 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, Hanshue, Kosek, Oemke, & Walterhouse, 1996). Stream habitat was qualitatively evaluated at each station 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

Nineteen locations were sampled in 2013 with scores ranging from 5 (excellent) to -6 (poor) (Table 1). Many of the locations that received lower scores were specifically targeted for sampling due to known issues and are scheduled for restoration activities or a future Total Maximum Daily Load (TMDL). Sedimentation and bank erosion were a common issue throughout the watershed due to dredged/channelized streams, unstable/flashy streams, and unrestricted animal access (Figure).

SAMPLING RESULTS

Table 1. Location and assessment scores for stations sampled during 2013 in the Rabbit River watershed.

Station	Stream	Location	STORET #	Latitude	Longitude	Invertebrate Score ²	Habitat Score ¹	Justification for Visit
A	Black Creek	d/s 140th Avenue	30601	42.710147	-85.8988835	-6	119	Livestock access site, which needs prerestoration data collected
В	Black Creek	u/s of 140th Avenue	30710	42.712029	-85.902278	-1	67	Control site for documentation of success with restoration of downstream location
С	Rabbit River	d/s confluence Green Lake Creek	30712	42.68792	-85.658193	0	80	Livestock access site, which needs prerestoration data collected
D	Rabbit River	u/s confluence Green Lake Creek	30713	42.688076	-85.656638	4	147	Control site for documentation of success with restoration of downstream location
F	Rabbit River	Cattle Access off of 130th Avenue	30707	42.636469	-85.749667	1	132	Livestock access site, which needs prerestoration data collected
G	Rabbit River	u/s of Cattle Access off of 130th Avenue	30708	42.635522	-85.7441	2	163	Control site for documentation of success with restoration of downstream location
K	Red Run Drain	u/s of 140th Avenue	30526	42.71052	-85.70311	-4	103	Listed for a future TMDL
L	Felts Drain	u/s of 136th Avenue	30709	42.68102	-85.834624	-2	102	Pre-data for planned bank stabilization work
М	Felts Drain	u/s of 137th Avenue	30711	42.688395	-85.822403	-2	82	Pre-data for planned bank stabilization work
N	Red Run Drain	d/s and East of 21st Street	30714	42.735799	-85.749656	1	119	Pre-data
0	Red Run Drain	u/s of 21st Street	30531	42.73596	-85.75061	-3	95	Pre-data
8	Black Creek	140th Avenue	30601	42.70960	-85.89870	-6	119	Status Site/ Also Targeted (Station A)
9	Bear Creek	Main Street (Hopkins)	30700	42.62403	-85.76340	-1	104	Status Site
13	Black Creek	144th Avenue	30701	42.73871	-85.89329	2	105	Status Site
14	Miller Creek	15th Street	30702	42.61375	-85.69230	4	143	Status Site
16	Miller Creek	124th Avenue	30703	42.59428	-85.66971	5	177	Status Site
19	Rabbit River	132nd Avenue	30704	42.65298	-85.71600	0	140	Status Site
1T	Black Creek	34th Street	30602	42.76000	-85.88000	2	105	Trend Site/Mussel survey
4T	Rabbit River	36th Street	30673	42.70100	-85.89900	-2	145	Trend Site

²Invertebrate assessment scores (+5 to +9-Excellent, +4 to -4-Acceptable, -5 to -9-Poor)

Status Sites

Six stations (8, 9, 13, 14, 16, and 19), (Table 1) were randomly chosen for assessment and determination of the attainment status of the Rabbit River watershed (status sites). These locations ranged in scores from 5 (excellent) to -6 (poor).

Black Creek

Station 8, downstream of 140th Avenue scored -6 (poor) for the macroinvertebrate community. This location was also a targeted monitoring request due to the presence of unrestricted cattle access (Figure). This site was in the middle of a grazed cattle pasture, with cattle having unrestricted access to the creek. Sedimentation and lack of riparian vegetation were obvious issues at this location.

Station 13, upstream of 144th Avenue, scored 2 (acceptable) and had a marginal habitat score of 104. This location was an obviously dredged drain, which had some issues with in-stream habitat and bank stability due to the dredging. The area downstream of 144th Avenue was investigated after a landowner expressed concern over erosion issues. Heavy sand deposits were noted and photographed at this location (Figure).

Miler Creek

Stations 14 and 16 scored in the upper end of acceptable and excellent, respectively, and had good habitat scores. In-stream habitat was decent at both locations and the riparian habitat was an intact wooded wetland. A couple of small areas were noted as having bank stability issues.

Bear Creek

Station 9 scored -1 (acceptable) for macroinvertebrates and 104 (marginal) for habitat. This station was located off of Main Street in downtown Hopkins. The stream appeared to be dredged often near the road crossing and had substantial concrete bank armoring. In-stream habitat was lacking and available habitat was affected by a heavy silt layer. Stream banks had obvious areas of erosion and stability issues.

Rabbit River

Station 19, upstream of 132nd Street, scored 0 (acceptable) for macroinvertebrates and 140 (good) for habitat. This station appears to have issues with flashiness and was very silty. In-stream habitat consisted mainly of large woody debris. Riparian habitat was an intact, wooded wetland.

Trend Sites

Two stations (1T and 4T) (Table 1) were sampled as part of the trend program, which resamples the same locations every 5 years to provide an estimate of water quality trends based on changes in the macroinvertebrate community.

Black Creek

Station 1T scored 2 (acceptable) for macroinvertebrates and 105 (good) for habitat. These scores are similar to scores received in 2008 (-4/93) and 2003 (0/109). This location has obviously been dredged and has issues with bank stability and in-stream habitat. A large freshwater mussel community was noted at this location and a mussel survey was conducted. Ten species and 257 individuals were collected and the density was estimated at 4.0 mussels per m². Three Slippershell mussels were collected; this is a State of Michigan threatened species. The results of the survey are contained in Table 2.

Table 2. Freshwater mussel survey results from Black Creek, Station 1T.

Species	Individuals	Size range (mm)
White heelsplitter, Lasmigona	65	56-165
complanata		
Pocketbook, Lampsilis ventricosa	10	84-141
Strange floater, Strophitus undulates	13	61-108
Wabash pigtoe, Fuscoania flava	17	59-104
Spike, Eliptio dilatata	21	60-92
Giant floater, Pyganodon grandis	30	61-123
Fat Mucket, Lampsilis siliquoidea	82	55-115
Mucket, Actinonaias ligamentina	14	79-121
Fluted-shell, Lasmigona costata	2	80-119
Slippershell, Alasmidonta viridis	3	37-42

Rabbit River

Station 4T scored -2 (acceptable) for macroinvertebrates and 145 (good) for habitat. These scores are similar to those collected in 2008 (-1/131). This location flowed through a wooded wetland and had substantial large woody debris. Substrate habitat was lacking and the stream bottom was predominantly sand.

Targeted Monitoring

Stations A-O were sampled based on internal and external requests for monitoring, which were solicited for the Rabbit River watershed during 2013 (Table 1).

Black Creek

Stations A and B, upstream and downstream of 140th Avenue, were sampled due to cattle access issues. The area downstream of the access issue (Station B) scored significantly higher for macroinvertebrates (-1) than the impacted area (-6, Station A). The MDEQ district staff are working with the landowners to limit the cattle access to the stream.

Rabbit River

Stations C and D were requested due to cattle access issues on Green Lake Creek, a tributary to the Rabbit River. The upstream location (Station D) scored significantly higher in macroinvertebrates and habitat indicating substantial impacts from the increased sedimentation. The cattle appeared to not be accessing the stream at the time of sampling as most scars along the bank had become vegetated. This site should be revisited in the future to determine if the conditions have improved.

Stations F and G were requested as a follow-up to a cattle exclusion/crossing that was installed. The crossing was effectively controlling access to the stream, but a broken fence at the upstream end of the cattle yard was still allowing access. However, stream conditions appear to have greatly improved and were well vegetated where it was obvious that cattle had previously had access. Scores for macroinvertebrates within the crossing area (Station F) and well upstream (Station G) of the area only differed by one point and were in the "acceptable" range. This area should be revisited to determine if the fence has been fixed and the cattle are restricted from access to the stream.

Felts Drain

Stations L and M were requested for collection of baseline data for a stream bank stabilization project that is proposed. Both locations scored -2 (acceptable) for macroinvertebrates and within the marginal range for habitat.

Red Run Drain

Approximately 25 miles of Red Run Drain is scheduled for a future TMDL (AUID 040500030806-02) due to poor macroinvertebrate scores in the past. Station K was targeted and scored -4 (acceptable) for macroinvertebrates. Although this is in the acceptable range, it is on the lower end trending toward poor. Two other locations (144th and 142nd Avenues) were also scheduled for assessment. When these sites were visited, they were not flowing and thus were not suitable for Procedure 51 assessment. The fact that these locations receive inadequate water during part of the year could be a reason why they scored poorly in the past.

Stations N and O on Red Run Drain are also located within the TMDL-listed AUID, but much closer to the confluence with the mainstem of the Rabbit River. Macroinvertebrates at Station N scored 1 (acceptable) and Station O scored -3 (acceptable). Habitat at both locations scored marginal with Station O having some substantial issues with bank stability and lack of in-stream habitat. These stations were targeted for baseline sampling because a bank stabilization project is planned near Station O.

Future Needs

- Station 13 (downstream of 144th Avenue) should be investigated to determine the condition of the erosion issues.
- Stations 1T and 4T will be sampled in 2018 as continuation of the trend site monitoring.
- A freshwater mussel survey at Station 1T is suggested to monitor the mussel population.
- Stations A, C, D, F, and G should be visited to determine if cattle access has been or remains restricted.
- Stations L, M, N, and O should be visited if the bank stabilization project has been completed.
- Station K and other sites on Red Run Drain should be visited to update the status of the scheduled TMDL.

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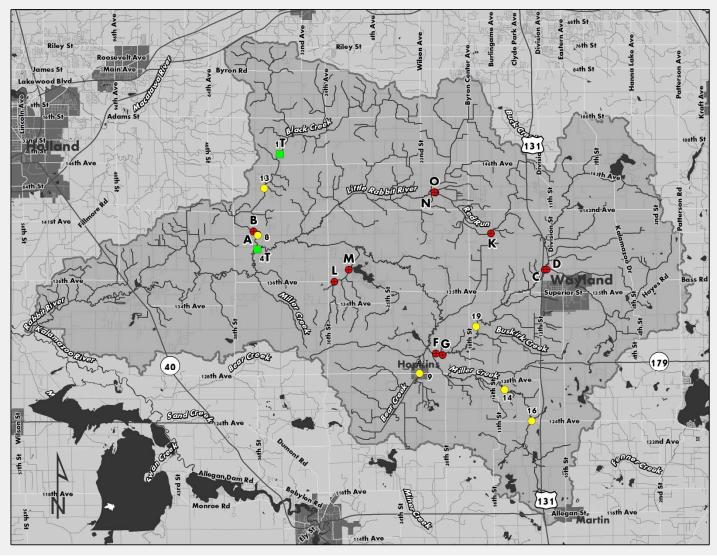


Figure 1. Stations sampled in the Rabbit River watershed 2013.



Figure 2. Station 13, Black Creek Downstream of 144th Avenue. Heavy sand deposition.



Figure 3. Station 8/A, Black Creek Upstream of 140th Avenue. Unrestricted cattle access issues.

Appendix A

Macroinvertebrate and Habitat Scores

ΓΑΧΑ	Black Creek 140th Avenue 8/6/2013 ation A and 8	Bear Creek Main Street 8/16/2013 Station 9	Black Creek 144th Avenue 8/6/2013 Station 13	Miller Creek 15th Street 8/8/2013 Station 14
IAAA	ation A and 6	Station 9	Station 13	Station 14
PLATYHELMINTHES (flatworms) Turbellaria			3	1
ANNELIDA (segmented worms)			,	1
Hirudinea (leeches)	4	1	1	
Oligochaeta (worms)	8	1	1	6
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	49	95	35	63
Decapoda (crayfish)	3	7	5	6
Isopoda (sowbugs) Arachnoidea	46	14	37	
Hydracarina	1	1	1	1
nsecta	•	•	•	•
Ephemeroptera (mayflies)				
Baetidae	3	6	25	9
Caenidae		1		
Ephemeridae				4
Heptageniidae	4		21	21
Isonychiidae Materiana didaa				3
Metretopodidae Tricorythidae		9		1 1
Odonata		9		1
Anisoptera (dragonflies)				
Aeshnidae		2		2
Zygoptera (damselflies)				
Calopterygidae	1	46	2	35
Coenagrionidae	1	7	1	4
Hemiptera (true bugs)				
Belostomatidae				1
Corixidae	135		9	
Gerridae		1	1	
Pleidae Veliidae	1	4		
Megaloptera	1			
Corydalidae (dobson flies)			1	
Sialidae (alder flies)		2	1	
Trichoptera (caddisflies)				
Brachycentridae				13
Helicopsychidae				13
Hydropsychidae	1	1	139	41
Leptoceridae	6	3	1	12
Polycentropodidae Uenoidae	6	3	4	1
Coleoptera (beetles)			1	1
Haliplidae (adults)		23		
Dryopidae (ddulis)		1		
Elmidae	4	17	65	19
Diptera (flies)				
Athericidae	9			
Ceratopogonidae	1	14		1
Chironomidae	49	59	26	20
Culicidae Simuliidae		1	3	1
Simuliidae Tabanidae		2	5	1 2
Tipulidae	1	1	6	2
MOLLUSCA			· ·	2
Gastropoda (snails)				
Ancylidae (limpets)	1		1	2
Hydrobiidae				1
Physidae	1	12	1	5
Viviparidae				1
Pelecypoda (bivalves)				_
Pisidiidae	1			1 1
Sphaeriidae (clams) Unionidae (mussels)	1		1 1	1
Cinomate (musseus)				
TOTAL INDIVIDUALS	330	331	393	294

	Black Creek 140th Avenue 8/6/2013 Station A and 8		Bear Creek Main Street 8/16/2013 Station 9		Black Creek 144th Avenue 8/6/2013 Station 13		Miller Creek 15th Street 8/8/2013 Station 14	
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	22	0	26	1	27	1	32	1
NUMBER OF MAYFLY TAXA	2	0	3	0	2	0	6	1
NUMBER OF CADDISFLY TAXA	2	0	2	0	4	0	5	1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MA YFLY COMP.	2.12	-1	4.83	0	11.70	0	13.27	0
PERCENT CADDISFLY COMP.	2.12	-1	1.21	-1	36.90	1	27.21	0
PERCENT DOMINANT TAXON	40.91	-1	28.70	0	35.37	0	21.43	0
PERCENT ISOPOD, SNAIL, LEECH	15.76	-1	8.16	0	10.18	0	3.06	1
PERCENT SURF. AIR BREATHERS	41.21	-1	8.76	0	2.54	1	0.34	1
TOTAL SCORE		-6		-1		2		4
MACROINV. COMMUNITY RATING		POOR		ACCEPT.		ACCEPT.		ACCEPT.

	Miller Creek 124th Avenue 8/8/2013	Rabbit River upstream 132nd Avenue 9/6/2013	Black Creek 34th Avenue 8/5/2013	Rabbit River 36th Street 8/15/2013
TAXA	Station 16	Station 19	Station 1T	Station 4T
PLATYHELMINTHES (flatworms)				
Turbellaria	1			
ANNELIDA (segmented worms)				
Hirudinea (leeches) Oligochaeta (worms)	1	1	3 6	13
ARTHROPODA	1	1	0	15
Crustacea				
Amphipoda (scuds)	31	153	68	85
Decapoda (crayfish)	1	12	27	8
Isopoda (sowbugs)		34	40	18
Arachnoidea				
Hydracarina	1		1	1
Insecta				
Ephemeroptera (mayflies) Baetiscidae	1			
Baetidae	24	15	2	29
Caenidae	1	15	2	29
Heptageniidae	11	25	26	26
Odonata			==	==
Anisoptera (dragonflies)				
Aeshnidae	1	2		
Gomphidae	1	1		
Zygoptera (damselflies)				_
Calopterygidae	6	18	6	3
Coenagrionidae	1			
Plecoptera (stoneflies) Perlidae		1		4
Hemiptera (true bugs)		1		*
Corixidae	1	1	4	11
Gerridae	1	1	1	
Mesoveliidae	7			2
Notonectidae		1		
Veliidae		1	1	
Megaloptera				
Corydalidae (dobson flies)			1 10	
Sialidae (alder flies) Trichoptera (caddisflies)			10	
Brachycentridae	21	1		14
Helicopsychidae	7			14
Hydropsychidae	32	11		9
Leptoceridae	1			
Limnephilidae	5	1		5
Philopotamidae	1		6	
Polycentropodidae				7
Coleoptera (beetles)				_
Dytiscidae (total)	10			2
Gyrinidae (adults) Haliplidae (adults)	3		1	
Elmidae (aduits)	38	9	43	9
Diptera (flies)	36	,	43	,
Athericidae	1		1	21
Ceratopogonidae	8			4
Chironomidae	41	9	60	17
Simuliidae	56			5
Stratiomyidae			1	
Tabanidae	1	1		
Tipulidae MOLLUSCA	2		1	
MOLLUSCA Gastropoda (snails)				
Ancylidae (limpets)			8	
Hydrobiidae	1		2	
Physidae	8	1	=	4
Planorbidae	1			
Viviparidae	1			
Pelecypoda (bivalves)				
Corbiculidae			2	
Pisidiidae		1		1
Sphaeriidae (clams)	1	1	1 10	
Unionidae (mussels)			10	

	Miller (124th A 8/8/2 Statio	venue j 013	Rabbit pstream 132 9/6/2 Station	nd Avenu 013	Black 0 34th Av 8/5/2 Statio	enue 013	Rabbit 36th S 8/15/2 Statio	treet 2013
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	37	1	24	0	26	1	23	0
NUMBER OF MAYFLY TAXA	4	1	2	0	2	0	2	0
NUMBER OF CADDISFLY TAXA	6	1	3	0	1	-1	4	0
NUMBER OF STONEFLY TAXA	0	-1	1	1	0	-1	1	1
PERCENT MAYFLY COMP.	11.21	0	13.25	0	8.43	0	18.46	0
PERCENT CADDISFLY COMP.	20.30	0	4.30	0	1.81	-1	11.74	0
PERCENT DOMINANT TAXON	16.97	1	50.66	-1	20.48	0	28.52	0
PERCENT ISOPOD, SNAIL, LEECH	3.64	1	11.92	-1	15.96	-1	7.38	0
PERCENT SURF. AIR BREATHERS	6.67	1	1.32	1	2.41	1	5.03	1
TOTAL SCORE		5		0		-2		2
MACROINV COMMUNITY RATING	. 1	EXCELLEN	TT .	ACCEPT		A CCEPT		A CCEPT

	Rabbit River	Rabbit River upstreamcattle	Rabbit River	Rabbit River
	cattle access off 130th Avenue 8/16/2013	access off 130th Avenue 8/16/2013	upstream of Green Lake Creek 9/6/2013	Lake Creek 9/6/2013
TAXA	Station F	Station G	Station D	Station C
PLATYHELMINTHES (flatworms)				
Turbellaria ANNELIDA (segmented worms)	1			
Hirudinea (leeches)	1	1		
Oligochaeta (worms)	3	1		1
ARTHROPODA	,			
Crustacea				
Amphipoda (scuds)	32	127	50	175
Decapoda (crayfish)		4	3	1
Isopoda (sowbugs)	1	8		8
Arachnoidea				
Hydracarina	4	4	1	
Insecta				
Ephemeroptera (may flies)				
Baetidae	28	2	13	6
Caenidae	6			
Ephemerellidae	1	19	13	4
Heptageniidae Tricorythidae	1	19	13	4
	1			
Odonata Anisoptera (dragonflies)				
Ansopiera (dragonnies) Aeshnidae	2	2	1	
Gomphidae	2	1	1	2
Zygoptera (dams elflies)		•		2
Calopterygidae	2	29	3	10
Coenagrionidae	8	27	,	10
Plecoptera (stoneflies)	· ·			
Perlidae		2	1	
Hemiptera (true bugs)				
Belostomatidae	1			1
Corixidae	40	8		1
Gerridae			1	
Mesoveliidae			1	1
Nepidae		1		
Notonectidae			2	
Megaloptera				
Corydalidae (dobson flies)			1	1
Trichoptera (caddisflies)				
Brachycentridae	4	2	1	2
Hydropsychidae	22	3	117	31
Hydroptilidae	1			1
Leptoceridae	4	13		
Limnephilidae	1	1		
Phryganeidae		1		
Polycentropodidae				1
Coleoptera (beetles)				1
Dytiscidae (total) Haliplidae (adults)	2	1		1
Hydrophilidae (total)	2	1		
Elmidae	3	7	2	1
Diptera (flies)	,	,	-	
Athericidae		1		
Ceratopogonidae	22	•	1	4
Chironomidae	127	35	29	34
Culicidae			-	1
Simuliidae	9	1	106	11
Tabanidae		1	1	
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)		14		
Hydrobiidae	1			
Lymnaeidae		2		
Physidae	40	11		2
Planorbidae	1			
Viviparidae	1			
Pelecypoda (bivalves)				
Pisidiidae		1		
Sphaeriidae (clams)		1		
TOTAL INDIVIDUALS	372	303	347	300
TOTAL INDIVIDUALS	3/2	303	347	300

	Rabbit	River	Rabbit upstrear		Rabbit R	tiver	Rabbit	River
	cattle acc	ess off	access of	ff 130th	upstream of G	reen Lake	downstrear	n of Green
	130th A	venue	Avei	nue	Creel	c	Lake (Creek
	8/16/2	2013	8/16/2	2013	9/6/20	13	9/6/2	013
	Statio	on F	Statio	n G	Station	D	Statio	on C
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	31	1	29	1	19	0	23	0
NUMBER OF MAYFLY TAXA	5	1	2	0	2	0	2	0
NUMBER OF CADDISFLY TAXA	5	1	5	1	2	0	4	0
NUMBER OF STONEFLY TAXA	0	-1	1	1	1	1	0	-1
PERCENT MAYFLY COMP.	9.95	0	6.93	0	7.49	0	3.33	0
PERCENT CADDISFLY COMP.	8.60	0	6.60	0	34.01	1	11.67	0
PERCENT DOMINANT TAXON	34.14	0	41.91	-1	33.72	0	58.33	-1
PERCENT ISOPOD, SNAIL, LEECH	12.10	-1	11.88	-1	0.00	1	3.33	1
PERCENT SURF. AIR BREATHERS	12.10	0	3.30	1	1.15	1	1.67	1
TOTAL SCORE		1		2		4		0
MACROINV. COMMUNITY RATING	i .	ACCEPT.		ACCEPT.		ACCEPT.		ACCEPT.

	Red Run Drain astream 21st Street 9/27/2013 Station N	Red Run Drain 21st Street 8/5/2013 Station O	Red Run Drain 140th Avenue up 8/5/2013 Station K	Black Creek estream of 140th Avenue 8/8/2013 Station B
PLATYHELMINTHES (flatworms)				
Turbellaria			1	
NEMATOMORPHA (roundworms)		1		
ANNELIDA (segmented worms)				
Hirudinea (leeches)	2		6	
Oligochaeta (worms)	1	1		18
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	71	168	51	27
Decapoda (crayfish)	1	2	2	1
Isopoda (sowbugs)	31	52	90	9
Arachnoidea				
Hydracarina	61	8	14	2
Insecta				
Ephemeroptera (mayflies)				
Baetidae	44	21	2	46
Heptageniidae	1			1
Leptophlebiidae	1			
Odonata				
Anisoptera (dragonflies)				
Gomphidae			1	
Zygoptera (dams elflies)				
Calopterygidae	5	2	1	2
Coenagrionidae	4		2	1
Hemiptera (true bugs)				
Belostomatidae	1			1
Corixidae	8	2	14	42
Gerridae	1	1	3	1
Mesoveliidae	1			
Nepidae	1			
Notonectidae	1	1	2	
Pleidae				4
Veliidae				1
Trichoptera (caddisflies)				
Brachycentridae	10	12		
Hydropsychidae	45	10	15	17
Hydroptilidae	1			
Phryganeidae	1			
Polycentropodidae				1
Coleoptera (beetles)				
Dytiscidae (total)	1			
Haliplidae (adults)	6		1	2
Hydrophilidae (total)	1			
Elmidae	1	1	2	4
Scirtidae (larvae)	-	-	-	1
Diptera (flies)				-
Ceratopogonidae	6			8
Chironomidae	47	29	105	64
Culicidae	.,		1	6
Simuliidae	16	7	2	15
Stratiomyidae	-0	•	1	
Tipulidae	1	1	1	1
MOLLUSCA	•	•	•	•
Gastropoda (snails)				
Lymnaeidae		1		
Physidae	8	4	2	98
Planorbidae	1	1	-	,,,
Pelecypoda (bivalves)	•	•		
Corbiculidae			1	
TOTAL INDIVIDUALS	380	325	320	373
	Red Run Drain downstream 21s		Red Run Dra	

	Red Rur downstre 9/27/2 Statio	am 21st 2013	Red Rur 21st S 8/5/2 Statio	treet 013	Red Run 140th A 8/5/2 Statio	venue 013	upstrean 8/8/	Creek of 140th 2013 on B
METRIC	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	31	1	20	0	23	0	25	1
NUMBER OF MAYFLY TAXA	3	0	1	-1	1	-1	2	0
NUMBER OF CADDISFLY TAXA	4	0	2	0	1	-1	2	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	12.11	0	6.46	0	0.63	-1	12.60	0
PERCENT CADDISFLY COMP.	15.00	0	6.77	0	4.69	0	4.83	0
PERCENT DOMINANT TAXON	18.68	1	51.69	-1	32.81	0	26.27	0
PERCENT ISOPOD, SNAIL, LEECH	11.05	-1	17.85	-1	30.63	-1	28.69	-1
PERCENT SURF. AIR BREATHERS	5.53	1	1.23	1	6.88	1	15.28	0
TOTAL SCORE		1		-3		-4		-1
MACROINV. COMMUNITY RATING	3 .	ACCEPT.		ACCEPT.	4	ACCEPT.	4	ACCEPT.

Upstream 136th 137th Avenue Avenue Avenue Avenue 8/15/2013 8		Felts Drain	Felts Drain
Avenue		upstream	upstream
PLATYHELMINTHES (flatworms)		136th	137th
PLATYHELMINTHES (flatworms) Turbellaria 1		Avenue	Avenue
PLATYHELMINTHES (flatworms) Turbellaria 1		8/15/2013	8/15/2013
Turbellaria 1 1 ANNELIDA (segmented worms) Hirudinea (leeches) 4 4 1 Oligochaeta (worms) 1 8 ARTHROPODA Crustacea Amphipoda (scuds) 202 75 Decapoda (crayfish) 1 Isopoda (sowbugs) 21 102 Arachnoidea Hydracarina 1 1 Insecta Ephemeroptera (mayflies) Baetidae 5 42 Tricorythidae 1 1 Odonata Anisoptera (dragonflies) Aeshnidae 1 1 Cordulegastridae 2 Macromiidae 4 Hemiptera (true bugs) Corixidae 1 1 8 Gerridae 1 1 8 Gerridae 1 1 8 Gerridae 1 1 2 Trichoptera (caddisflies) Brachycentridae 1 1 Veliidae 1 2 Trichoptera (caddisflies) Brachycentridae 1 1 Hydropsychidae 1 4 Phryganeidae 1 1 Elmidae 1 1 Stratiomyidae 7 9 Chironomidae 7 21 Stratiomyidae 1 1 Simuliidae 7 21 Stratiomyidae 1 1 Simuliidae 2 1 Stratiomyidae 1 1 Simuliidae 2 1 Tabanidae 1 1 Tabanidae 1 1 Tabanidae 1 1 Tipulidae 2 1 MOLLUSCA Gastropoda (snails) Lymneidae 1 1 Physidae 1 1	TAXA	Station L	Station M
Turbellaria 1 1 ANNELIDA (segmented worms) Hirudinea (leeches) 4 4 1 Oligochaeta (worms) 1 8 ARTHROPODA Crustacea Amphipoda (scuds) 202 75 Decapoda (crayfish) 1 Isopoda (sowbugs) 21 102 Arachnoidea Hydracarina 1 1 Insecta Ephemeroptera (mayflies) Baetidae 5 42 Tricorythidae 1 1 Odonata Anisoptera (dragonflies) Aeshnidae 1 1 Cordulegastridae 2 Macromiidae 4 Hemiptera (true bugs) Corixidae 1 1 8 Gerridae 1 1 8 Gerridae 1 1 8 Gerridae 1 1 2 Trichoptera (caddisflies) Brachycentridae 1 1 Veliidae 1 2 Trichoptera (caddisflies) Brachycentridae 1 1 Hydropsychidae 1 4 Phryganeidae 1 1 Elmidae 1 1 Stratiomyidae 7 9 Chironomidae 7 21 Stratiomyidae 1 1 Simuliidae 7 21 Stratiomyidae 1 1 Simuliidae 2 1 Stratiomyidae 1 1 Simuliidae 2 1 Tabanidae 1 1 Tabanidae 1 1 Tabanidae 1 1 Tipulidae 2 1 MOLLUSCA Gastropoda (snails) Lymneidae 1 1 Physidae 1 1			
ANNELIDA (segmented worms) Hirudinea (leeches)			
Hirudinea (leeches)		1	1
Oligochaeta (worms) 1			
ARTHROPODA Crustacea Amphipoda (scuds)			
Crustacea		1	8
Amphipoda (scuds) 202 75 Decapoda (crayfish) 1 Isopoda (sowbugs) 21 102 Arachnoidea Hydracarina 1 Insecta Ephemeroptera (mayflies) Baetidae 5 42 Tricorythidae 0 Odonata Anisoptera (dragonflies) Aeshnidae 1 Cordulegastridae 1 Cordulegastridae 4 Ephemioptera (damselflies) Caloptery gidae 15 7 Coenagrionidae 4 Hemiptera (true bugs) Corixidae 1 1 Serridae 1 1 Mesoveliidae 1 2 Trichoptera (caddisflies) Brachycentridae 1 1 Hydropsychidae 1 1 Hydropsychidae 1 1 Hydropsychidae 1 1 Hydropsychidae 1 1 Diptera (flies) Dytiscidae (total) 1 1 Elmidae 1 1 Diptera (flies) Ceratopogonidae 57 9 Chironomidae 30 48 Dixidae 1 1 Tripulidae 2 1 Tripulidae 1 1 Tipulidae 1 1 Tipulidae 1 1 Dixidae 1 1 Tipulidae 1 1 Dynnaeidae 1 1 Tipulidae 1 1 Dynnaeidae 1 1			
Decapoda (crayfish) 1			
Isopoda (sowbugs)			75
Arachnoidea Hydracarina Insecta Ephemeroptera (mayflies) Baetidae 5 42 Tricorythidae Odonata Anisoptera (dragonflies) Aeshnidae 1 Cordulegastridae 4 Zygoptera (damselflies) Calopterygidae 5 7 Coenagrionidae 4 Hemiptera (true bugs) Corixidae 1 8 Gerridae 1 1 8 Gerridae 1 1 1 Mesoveliidae 1 1 2 Trichoptera (caddisflies) Brachycentridae 1 1 2 Trichoptera (caddisflies) Brachycentridae 1 1 4 Hydropsychidae 1 1 4 Phryganeidae 1 1 1 Elmidae 1 1 1 Diptera (flies) Ceratopogonidae 57 9 Chironomidae 30 48 Dixidae 1 1 Simuliidae 7 21 Stratiomyidae 1 1 Tipulidae 1 1 Ti			
Hydracarina 1 Insecta Ephemeroptera (mayflies) Baetidae 5 42 Tricorythidae 1 1 1 1 1 1 1 1 1		21	102
Ephemeroptera (mayflies)			_
Ephemeroptera (mayflies) Baetidae 5 42 Tricorythidae 1 Odonata Anisoptera (dragonflies) Aeshnidae 1 Cordulegastridae 2 Macromiidae 4 Zygoptera (damselflies) Calopterygidae 15 7 Coenagrionidae 4 Hemiptera (true bugs) Corixidae 1 8 Gerridae 1 1 8 Gerridae 1 1 1 Mesoveliidae 1 2 Trichoptera (caddisflies) Brachycentridae 1 2 Trichoptera (caddisflies) Brachycentridae 1 4 Phryganeidae 1 4 Phryganeidae 1 1 3 Haliplidae (adults) 1 1 3 Haliplidae (adults) 1 1 1 Diptera (ffles) Ceratopogonidae 57 9 Chironomidae 30 48 Dixidae 1 Tibulidae 1 1 1 Simuliidae 7 21 Stratiomyidae 1 Tabanidae 1 Tipulidae 1 Tipulidae 1 Tipulidae 1 Toenardiae 1 Tipulidae 1 Tipulidae 1 Tipulidae 1 Toenardiae 1 Tipulidae	*		1
Baetidae			
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Odonata		5	
Anisoptera (dragonflies) Aeshnidae 1 Cordulegastridae 2 Macromiidae 4 Zygoptera (damselflies) Calopterygidae 15 7 Coenagrionidae 4 Hemiptera (true bugs) Corixidae 1 8 Gerridae 1 1 8 Gerridae 1 1 1 Mesoveliidae 1 1 2 Trichoptera (caddisflies) Brachycentridae 1 1 Hydropsychidae 1 4 Phry aneidae 1 1 Hydropsychidae 1 3 Haliplidae (adults) 1 1 Diptera (flies) Ceratopogonidae 57 9 Chironomidae 30 48 Dixidae 1 1 Simuliidae 7 21 Stratiomyidae 1 1 Tipulidae 1 1	*		1
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Cordulegastridae			
Macromiidae 4 Zygoptera (damselflies) 7 Calopterygidae 15 7 Coenagrionidae 4 Hemiptera (true bugs) 8 Corixidae 1 8 Gerridae 1 1 Mesoveliidae 1 1 Notonectidae 1 2 Trichoptera (caddisflies) 8 1 Brachycentridae 1 2 Trichoptera (caddisflies) 8 1 Brachycentridae 1 4 Phryganeidae 1 4 Phryganeidae 1 4 Coleoptera (beetles) 0 2 Dytiscidae (total) 1 3 Haliplidae (adults) 1 1 Elmidae 1 1 Diptera (flies) 2 9 Ceratopogonidae 57 9 Chironomidae 30 48 Dixidae 1 1 Simuliidae 7		1	
Zygoptera (damselflies)			
Calopterygidae 15 7 Coenagrionidae 4 Hemiptera (true bugs) 1 8 Corixidae 1 1 Geridae 1 1 Mesoveliidae 1 1 Notonectidae 1 1 Veliidae 1 2 Trichoptera (caddisflies) 1 4 Brachycentridae 1 4 Hydropsychidae 1 4 Phryg aneidae 1 3 Coleoptera (beetles) Dytiscidae (total) 1 3 Haliplidae (adults) 1 1 1 Elmidae 1 1 1 Diptera (flies) Ceratopogonidae 57 9 9 Chironomidae 30 48 1 1 Dixidae 1 1 1 Simuliidae 7 21 21 Stratiomyidae 1 1 1 Topulidae 1 1<			4
Coenagrionidae			
Hemiptera (true bugs) Corixidae			7
Corixidae 1 8 Gerridae 1 1 Mes oveliidae 1 1 Notonectidae 1 2 Veliidae 1 2 Trichoptera (caddisflies) 3 4 Brachycentridae 1 4 Hydropsychidae 1 4 Phryganeidae 1 3 Coleoptera (beetles) 5 5 Dytiscidae (total) 1 1 Haliplidae (adults) 1 1 Elmidae 1 1 Ceratopogonidae 57 9 Chironomidae 30 48 Dixidae 1 1 Simuliidae 7 21 Stratiomyidae 1 1 Tabanidae 1 1 MOLLUSCA Castropoda (snails) Lymnaeidae 1 1 Physidae 1 1		4	
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Trichoptera (caddisflies) Brachycentridae			
Brachycentridae 1 Hydropsychidae 1 Phryganeidae 1 Coleoptera (beetles) 1 Dytiscidae (total) 1 Haliplidae (adults) 1 Elmidae 1 Diptera (flies) 1 Ceratopogonidae 57 9 Chironomidae 30 48 Dixidae 1 1 Simuliidae 7 21 Stratiomyidae 1 1 Tabanidae 1 1 Tipulidae 2 1 MOLLUSCA Castropoda (snails) Lymnaeidae 1 1 Physidae 1 1		1	2
Hydropsychidae			
Phryganeidae 1 Coleoptera (beetles) 3 Dytiscidae (total) 1 3 Haliplidae (adults) 1 1 Elmidae 1 1 Diptera (flies) 57 9 Ceratopogonidae 57 9 Chironomidae 30 48 Dixidae 1 1 Simuliidae 7 21 Stratiomyidae 1 1 Tabanidae 1 1 Tipulidae 2 1 MOLUSCA Castropoda (snails) Lymnaeidae 1 1 Physidae 1 1			
Coleoptera (beetles) Dytiscidae (total) 1 3 Haliplidae (adults) 1 1 Elmidae 1 1 Diptera (files) Ceratopogonidae 57 9 Chironomidae 30 48 Dixidae 1 1 Simuliidae 7 21 Stratiomyidae 1 Tabanidae 1 Tipulidae 2 1 MOLUSCA Gastropoda (snails) Lymnaeidae 1 1 Physidae 1 1			4
Dytiscidae (total)		1	
Haliplidae (adults)			_
Elmidae			
Diptera (flies Ceratopogonidae 57 9	•		
Ceratopogonidae 57 9 Chironomidae 30 48 Dixidae 1 1 Simuliidae 7 21 Stratiomyidae 1 1 Tabanidae 1 1 Tipulidae 2 1 MOLUSCA Sastropoda (snails) Lymnaeidae 1 1 Physidae 1 1		1	1
Chironomidae 30 48 Dixidae 1 1 Simuliidae 7 21 Stratiomyidae 1 Tabanidae Tipulidae 2 1 MOLLUSCA Sastropoda (snails) Lymnaeidae 1 1 Lymnaeidae 1 1 1 Physidae 1 1 1	•		
Dixidae 1 1 Simuliidae 7 21 Stratiomyidae 1			
Simuliidae 7 21 Stratiomyidae 1			
Stratiomyidae 1 Tabanidae 1 Tipulidae 2 1 MOLUSCA Sastropoda (snails) Lymnaeidae 1 1 Physidae 1 1		_	
Tabanidae 1 Tipulidae 2 1 MOLUSCA		•	21
Tipulidae 2 1 MOLLUSCA Castropoda (snails) Lymnaeidae 1 1 Physidae 1 1	•		
MOLLUSCA Gastropoda (snails) Lymnaeidae 1 1 Physidae 1 1		_	
Castropoda (snails) 1 1 Lymnaeidae 1 1 Physidae 1 1	•	2	1
Lymnaeidae 1 1 Physidae 1 1			
Physidae 1 1			
TOTAL INDIVIDUALS 365 348	Physidae	1	1
TOTAL INDIVIDUALS 365 348			
	TOTAL INDIVIDUALS	365	348

	Felts Drain		Felts Drain	
	upstrean	upstream 136th		n 137th
	8/15/2	2013	8/15/2	2013
	Statio	n L	Statio	n M
METRIC	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	28	1	27	1
NUMBER OF MAYFLY TAXA	1	0	2	0
NUMBER OF CADDISFLY TAXA	3	0	1	-1
NUMBER OF STONEFLY TAXA	0	-1	0	-1
PERCENT MAYFLY COMP.	1.37	-1	12.36	0
PERCENT CADDISFLY COMP.	0.82	-1	1.15	-1
PERCENT DOMINANT TAXON	55.34	-1	29.31	0
PERCENT ISOPOD, SNAIL, LEECH	7.40	0	30.17	-1
PERCENT SURF. AIR BREATHERS	1.64	1	4.89	1
TOTAL SCORE		-2		-2
MACROINV. COMMUNITY RATING	; .	ACCEPT.	1	ACCEPT.

	Black Creek		Bear Creek		Black Creek		Miller Creek	
	140th Avenue		Main Street		144th Avenue		15th Street	
	GLIDE/POOL		GLIDE/POOL		GLIDE/POOL		GLIDE/POOL	
	Station A and 8		Station 9		Station 13		Station 14	
HABITAT METRIC								
Substrate and Instream Cover	_							_
Epifaunal Substrate/ Avail Cover (20)	8		5		10		12	
Embeddedness (20)*					- 10			
Velocity/Depth Regime (20)*								-
Pool Substrate Characterization (20)**	7		11		10		10	
Pool Variability (20)**	15		12		13		13	-
	15		12		13		15	-
Channel Morphology	10		9		10		10	
Sediment Deposition (20)								-
Flow Status - Maint. Flow Volume (10)	8		9		8		9	
Flow Status - Flashiness (10)	3		5		2		8	
Channel Alteration (20)	15		12		13		18	
Frequency of Riffles/Bends (20)*								
Channel Sinuosity (20)**	11		9		5		11	
Riparian and Bank Structure								
Bank Stability (L) (10)	5		6		5		7	
Bank Stability (R) (10)	5		6		5		7	
Vegetative Protection (L) (10)	6		8		7		9	
Vegetative Protection (R) (10)	6		8		7		9	
Riparian Veg. Zone Width (L) (10)	10		2		5		10	
Riparian Veg. Zone Width (R) (10)	10		2		5		10	
inputation registation (10) (10)			-				10	
TOTAL SCORE (200):	119		104		105		143	
HABITAT RATING:	GOOD		MARGINAL		GOOD		GOOD	
	(SLIGHTLY		(MODERATELY		(SLIGHTLY		(SLIGHTLY	
	IMPAIRED)		IMPAIRED)		IMPAIRED)		IMPAIRED)	
Note: Individual metrics may better de	scribe conditions of	lirectly af	fecting the biologi	cal comm	unity while the H	bitat Ratio	ng	
describes the gen	eral riverine enviro	nment at	the site(s).					
Date:	8/6/2013		8/16/2013		8/6/2013		8/8/2013	
Weather:	Cloudy		Sunny		Cloudy		Sunny	
Air Temperature:	70	Deg. F.	65	Deg. F.	65	Deg. F.	70	Deg.
Water Temperature:	67	Deg. F.	62	Deg. F.	64	Deg. F.	71	Deg.
Ave. Stream Width:	20	Feet	15	Feet	20	Feet	15	Feet
	2.5	Feet	1.5	Feet	2.2	Feet	1	Feet
Ave. Stream Depth: Surface Velocity:	0.5	Ft./Sec.	1.5	Ft/Sec.	1	Ft/Sec.	1	Ft./S
Estimated Flow:	25	CFS	22.5	CFS	44	CFS	15	CFS
Stream Modifications:	Dredged		Dredged		Dredged		None	
Nuisance Plants (Y/N):	N		N		N		N	-
Report Number:								-
STORET No.:	30601		30700		30701		30702	
	Black Creek				Black Creek		Miller Creek	-
Stream Name:			Bear Creek					
Road Crossing/Location:	140th Avenue		Main Street		144th Avenue		15th Street	
County Code:	03		03		03		03	
TRS:	04N13W19		03N12W30		04N13W07		03N12W26	-
	42 7000		12 (2102		10 73071		40 (1000	
Latitude (dd):	42.7096		42.62403		42.73871		42.61375	-
Longitude (dd):	-85.8987		-85.7634		-85.89329		-85.6923	
Ecoregion:	SMNITP		SMNITP		SMNITP		SMNITP	
Stream Type:	Warmwater		Warmwater		Warmwater		Warmwater	
	4050003		4050003		4050003		4050003	
USGS Basin Code:								
USGS Bas in Code:								
USGS Basin Code: P Applies only to Riffle/Run stream Surveys								

	Miller Creek		Rabbit River		Black Creek		Rabbit River	
			upstream 132nd					
	124th Avenue		Avenue		34th Avenue		36th Street	
	RIFFLE/RUN		GLIDE/POOL		GLIDE/POOL		GLIDE/POOL	
	Station 16		Station 19		Station 1T		Station 4T	
HABITAT METRIC	Diamon 10		Diamon 17		Diamon 11		Diamon 41	
Substrate and Instream Cover								
Epifaunal Substrate/ Avail Cover (20)	16		9		11		7	
Embeddedness (20)*	16							
Velocity/Depth Regime (20)*	18							
Pool Substrate Characterization (20)**			9		6		11	
Pool Variability (20)**			16		8		14	
Channel Morphology			10				14	
Sediment Deposition (20)	16		12		16		10	
Flow Status - Maint. Flow Volume (10)	10		7		9		9	_
Flow Status - Flashiness (10)	8		3		5		6	
Channel Alteration (20)	20		19		13		20	_
	18		19		13		20	
Frequency of Riffles/Bends (20)*	18		19		-		20	
Channel Sinuosity (20)**			19		5		20	
Riparian and Bank Structure	_							
Bank Stability (L) (10)	9		8		6		7	
Bank Stability (R) (10)	9		8		6		7	
Vegetative Protection (L) (10)	9		7		7		7	
Vegetative Protection (R) (10)	9		7		7		7	
Riparian Veg. Zone Width (L) (10)	9		9		3		10	
Riparian Veg. Zone Width (R) (10)	10		7		3		10	
TOTAL SCORE (200):	177		140		105		145	-
HABITAT RATING:	EXCELLENT		GOOD		GOOD		GOOD	
	(NON-		(SLIGHTLY		(SLIGHTLY		(SLIGHTLY	
	IMPAIRED)		IMPAIRED)		IMPAIRED)		IMPAIRED)	
Note: Individual metrics may better des	scribe conditions	directly of	facting the biologi	1		-Liene Doein		
describes the gene				cai commi	inity while the H	abitat Katii	ıg	
	eral riverine enviro		the site(s).	cai commi		abitat Katii		
Date:	8/8/2013		the site(s). 9/6/2013	icai commi	8/5/2013	abitat Ratii	8/15/2013	
Date: Weather:	8/8/2013 Sunny	nment at	9/6/2013 Sunny				8/15/2013 Cloudy	
Date: Weather: Air Temperature:	8/8/2013 Sunny	Deg. F.	9/6/2013 Sunny 55	Deg. F.	8/5/2013 Cloudy	Deg. F.	8/15/2013 Cloudy 65	Deg. F.
Date: Weather: Air Temperature: Water Temperature:	8/8/2013 Sunny 70 68	Deg. F.	9/6/2013 Sunny 55 64	Deg. F. Deg. F.	8/5/2013 Cloudy	Deg. F.	8/15/2013 Cloudy 65 60	Deg. F.
Date: Weather: Air Temperature: Water Temperature:	8/8/2013 Sunny 70 68 25	Deg. F. Deg. F. Feet	9/6/2013 Sunny 55 64	Deg. F. Deg. F. Feet	8/5/2013 Cloudy 63 15	Deg. F. Deg. F. Feet	8/15/2013 Cloudy 65 60 40	Deg. F. Feet
Date: Weather: Air Temperature: Water Temperature: Ave. Stream Width:	8/8/2013 Sunny 70 68	Deg. F.	9/6/2013 Sunny 55 64	Deg. F. Deg. F.	8/5/2013 Cloudy	Deg. F.	8/15/2013 Cloudy 65 60	Deg. F.
Date: Weather: Air Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth:	8/8/2013 Sunny 70 68 25	Deg. F. Deg. F. Feet	9/6/2013 Sunny 55 64	Deg. F. Deg. F. Feet	8/5/2013 Cloudy 63 15	Deg. F. Deg. F. Feet	8/15/2013 Cloudy 65 60 40	Deg. F. Feet Feet
Date: Weather: Wather: Water Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow:	8/8/2013 Sunny 70 68 25 1.5 2	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	9/6/2013 Sunny 55 64 15	Deg. F. Deg. F. Feet Feet	8/5/2013 Cloudy 63 15 1.5 0.5	Deg. F. Deg. F. Feet	8/15/2013 Cloudy 65 60 40 3 1	Deg. F. Feet Feet
Date: Weather: Wather: Water Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow:	8/8/2013 Sunny 70 68 25 1.5	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	9/6/2013 Sunny 55 64 15 2	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3	Deg. F. Feet Feet Ft./Sec.
Date: Weather: Air Temperature: Water Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications:	8/8/2013 Sunny 70 68 25 1.5 2	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	9/6/2013 Sunny 55 64 15 2 0.6	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1	Deg. F. Feet Feet Ft./Sec.
Date: Weather: Ad Temperature: Water Temperature: Water Temperature: Vev. Stream Watth: Surface Velocity: Stream Color: Stream Modifications: Nusiance Plants (V/N);	8/8/2013 Sunny 70 68 25 1.5 2 75 Bank Stabilization	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	9/6/2013 Sunny 55 64 15 2 0.6 18 None	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5 11.25 Dredged	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 120 None	Deg. F. Feet Feet Ft./Sec.
Date: Weather: Aa' Temperature: Water Temperature: Water Temperature: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Nuisance Plants (V/N); Report Number:	8/8/2013 Sunny 70 68 25 1.5 2 75 Bank Stabilization	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	9/6/2013 Sunny 55 64 15 2 0.6 18 None N	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5 11.25 Dredged N	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 120 None N	Deg. F. Feet Feet Ft./Sec.
Date: Weather: Ar Temperature: Water Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Nuisance Plants (Y/N); Report Number: STORET No.:	8/8/2013 Sunny 70 68 25 1.5 2 75 Bank Stabilization N	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	9/6/2013 Sunny 55 64 15 2 0.6 18 None N	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5 11.25 Dredged N	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 1 120 None N	Deg. F. Feet Feet Ft./Sec.
Date: Weather: Ar Temperature: Water Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Nuisance Plants (Y/N); Report Number: STORET No.:	8/8/2013 Sunny 70 68 25 1.5 2 75 Bank Stabilization	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	9/6/2013 Sunny 55 64 15 2 0.6 18 None N	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5 11.25 Dredged N	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 120 None N	Deg. F. Feet Feet Ft./Sec.
Date: Weather: Ar Temperature: Water Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Nuisance Plants (Y/N): Report Number: STORET No.: Stream Name:	8/8/2013 Sunny 70 68 25 1.5 2 75 Bank Stabilization N	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	the site(s). 9/6/2013 Sunny 55 64 15 2 0.6 18 None N	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5 11.25 Dredged N	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 1 120 None N	Deg. F. Feet Feet Ft./Sec.
Date: Weather: Aa Temperature: Water Temperature: Water Temperature: Ave. Stream Depth: Surface Velocity: Estimated Plow: Stream Modifications: Nutsance Plants (Y/N): Report Number: STORET No.: Stream Name: Road Crossing/Location:	8/8/2013 Sunny 70 68 25 1.5 2 75 Bank Stabilization N 30703 Miller Creek	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	9/6/2013 Sunny 55 64 15 2 0.6 18 None N	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5 11.25 Dredged N	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 120 None N	Deg. F. Feet Feet Ft./Sec.
Date: Weather: Air Tempenture: Water Tempenture: Water Tempenture: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Nuis ance Plants (YIN): Report Number: STORET No.: Stream Name: Road Crossing/Location: County Code:	8/8/2013 Sunny 70 68 25 1.5 2 75 Bank Stabilization N 30703 Miller Creek	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	he site(s). 9/6/2013 Sunny 55 64 15 2 0.6 18 None N 30704 Rabbit River upstream 132nd Avenue	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5 11.25 Dredged N	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 120 None N	Deg. F. Feet Feet Ft./Sec.
Date: Weather: Air Tempenture: Water Tempenture: Water Tempenture: Ave. Stream Width: Ave. Stream Midth: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Stream Modifications: Stream Name: Stream Name: Road Crossing/Location: County Code: TRS:	8/8/2013 Sunny 70 68 25 1.5 2 75 Bank Stabilization N 30703 Milter Creek 124th Avenue 03 02N12W01	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	10 site(s). 9/6/2013 Sunny 55 64 15 2 0.6 18 None N 30704 Rabbit River upstream 132nd Avenue 03 03N12W10	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5 11.25 Dredged N 30602 Black Creek 03 04N13W05	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 1 120 None N 3 3673 Rabbit River 36th Street 03 04N13W30	Deg. F. Feet Feet Ft./Sec.
Date: Weather: Aa Temperature: Water Emperature: Water Emperature: Ave. Stream Width: Ave. Stream Depth: Sustemed Plow: Stream Modifications: Nusamer Plants (VY): Report Number: STORET No.: Stream Name: Road Crossing/Location: County Code: TRS: Latitude (dd):	8/8/2013 Sunny 70 68 25 1.5 2 75 Bank Stabilization N 30703 Miller Creek 124th Avenue 03 02N12W01	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	9/6/2013 Sunnay 55 64 15 2 0.6 18 None N 30704 Rabbit River upstream 132nd Avenue 03 03N12W10	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5 11.25 Dredged N 30602 Black Creek 34th Avenue 03 04N13W05	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 120 None N 30673 Rabbii River 36th Street 0 3 04N13W30	Deg. F. Feet Feet Ft./Sec.
Date: Weather: Air Tempenture: Water Tempenture: Water Tempenture: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Nuis ance Plants (YIN); Report Number: STORET No.: Stream Name: Road Crossing/Location: County Code: TRS: Latitude (dd): Longitude (dd):	## 1 riverine envire ### 2013 Sunny	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	he site(s). 9/6/2013 Sunny 55 64 15 2 0.6 18 None N 30704 Rabbit River upstream 132nd Avenue 03312240 42.65298 48.716	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 15 0.5 11.25 Deedged N 34th Avenue 03 04N13W6 42.76033 -85.88018	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 1 120 None N 36673 Rabbit River 36th Street 03 04N13W32 42.70023	Deg. F. Feet Feet Ft./Sec.
Date: Weather: Air Tempenture: Water Tempenture: Water Tempenture: Ave. Stream Width: Ave. Stream Depth: Sufface Velocity: Sufface Velocity: Sufface Velocity: Sufface Work Sufface Velocity: Stream Modifications: Valsamce Plants (V/N): Report Number: STORET No.: STORET No.: STORET No.: STORET No.: STORET No.: County Code: TRS: Latitude (dd): Longitude (dd): Longitude (dd): Longitude (dd): Longitude (dd):	ral riverine envire 8/8/2013 Sunny 70 68 25 1.5 2 75 Bank Stabilization N 20703 Miller Creek 124th Avenue 03 03 42.59428 -85.69671 SMNTTP	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	he site(s). 9/6/2013 Sunny 55 51 64 15 2 0.6 18 None N 30704 Rabbit Riva Babbit Riva GSNIZW10 42.65298 48.776 SMMITP	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5 11.25 Dredged N 30602 Black Creek 34th Avenue 03 42.76033 -85.88018 SMNITP	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 120 None N 30673 Rabbit River 36th Street 03 04N13W30 42,70023 -83,8995 SMNITP	Deg. F. Feet Feet Ft./Sec.
Date: Weather: Air Tempenture: Water Tempenture: Water Tempenture: Ave. Stream Width: Ave. Stream Depth: Sufface Velocity: Sufface Velocity: Sufface Velocity: Sufface Work Sufface Velocity: Stream Modifications: Valsamce Plants (V/N): Report Number: STORET No.: STORET No.: STORET No.: STORET No.: STORET No.: County Code: TRS: Latitude (dd): Longitude (dd): Longitude (dd): Longitude (dd): Longitude (dd):	## 1 riverine envire ### 2013 Sunny	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	he site(s). 9/6/2013 Sunny 55 64 15 2 0.6 18 None N 30704 Rabbit River upstream 132nd Avenue 03312240 42.65298 48.716	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 15 0.5 11.25 Deedged N 34th Avenue 03 04N13W6 42.76033 -85.88018	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 1 120 None N 36673 Rabbit River 36th Street 03 04N13W32 42.70023	Deg. F. Feet Feet Ft./Sec.
Date: Weather: A Temperature: Water Emperature: Water Emperature: Ave. Stream With: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Vulsiance Plants (VIN): Report Number: STORET No.: STORET No.: STORET No.: STORET No.: County Code: TRS. Latitude (dd): Longitude (dd): Ecoregion: Stream Type:	ral riverine envire 8/8/2013 Sunny 70 68 25 1.5 2 75 Bank Stabilization N 20703 Miller Creek 124th Avenue 03 03 42.59428 -85.69671 SMNTTP	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	he site(s). 9/6/2013 Sunny 55 51 64 15 2 0.6 18 None N 30704 Rabbit Riva Babbit Riva GSNIZW10 42.65298 48.776 SMMITP	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5 11.25 Dredged N 30602 Black Creek 34th Avenue 03 42.76033 -85.88018 SMNITP	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 120 None N 30673 Rabbit River 36th Street 03 04N13W30 42,70023 -83,8995 SMNITP	Deg. F. Feet Feet Ft./Sec.
Date: Weather: A Temperature: Water Emperature: Water Emperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Vusiance Plants (VIN): Report Number: STORET No.: STORET No.: STORET No.: STORET No.: STORET No.: County Code: TRS: Latitude (dd): Longitude (dd): Ecoregion: Stream Type: USIGS Basin Code:	R8/R2013 Sunny 70 68 25 1-5 2 75 Bank Stabilization N 30703 Miller Creek 124th Avenue 7 03 202N12W01 42.59428 85.6971 SMNTTP Warmwater	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	96/2013 96/2013 Sumpy 55 51 52 64 15 2 0.6 18 None N 30704 Rabbit Rival Avenue 30812W10 42.65298 85.716 SMMITP Warmwater	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5 11.25 Dredged N 30602 Black Creek 34th Avenue 03 04N13W05 42.76033 -88.88018 SMNTTP Warmwater	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 120 None N 30673 Rabbit River 36th Street 03 42.70023 -85.89895 SMNTP Coldwater	Deg. F. Feet Feet Ft./Sec.
Date: Weather: A Temperature: Water Emperature: Water Emperature: Ave. Stream With: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Vulsiance Plants (VIN): Report Number: STORET No.: STORET No.: STORET No.: STORET No.: County Code: TRS. Latitude (dd): Longitude (dd): Ecoregion: Stream Type:	R8/R2013 Sunny 70 68 25 1-5 2 75 Bank Stabilization N 30703 Miller Creek 124th Avenue 7 03 202N12W01 42.59428 85.6971 SMNTTP Warmwater	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	96/2013 96/2013 Sumpy 55 51 52 64 15 2 0.6 18 None N 30704 Rabbit Rival Avenue 30812W10 42.65298 85.716 SMMITP Warmwater	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/5/2013 Cloudy 63 15 1.5 0.5 11.25 Dredged N 30602 Black Creek 34th Avenue 03 04N13W05 42.76033 -88.88018 SMNTTP Warmwater	Deg. F. Deg. F. Feet Feet Ft/Sec.	8/15/2013 Cloudy 65 60 40 3 1 120 None N 30673 Rabbit River 36th Street 03 42.70023 -85.89895 SMNTP Coldwater	Deg. F. Feet Feet Ft./Sec.

	Rabbit River		Rabbit River upstream cattle		Rabbit River upstream of		Rabbit River	
	cattle access off		upstream cattle access off 130th		upstream of Green Lake		downstream of Green Lake	
	130th Avenue		Avenue		Creek		Creek	
	GLIDE/POOL Station F		GLIDE/POOL Station G		GLIDE/POOL Station D		GLIDE/POOL Station C	
HABITAT METRIC	Station F		Station G		Station D		Station C	
Substrate and Instream Cover	10		15		16			
Epifaunal Substrate/ Avail Cover (20) Embeddedness (20)*	10		15		16		4	
Velocity/Depth Regime (20)*								
Pool Substrate Characterization (20)** Pool Variability (20)**	14		10 15		10 15		7 9	
Channel Morphology	- 11		13		13		,	
Sediment Deposition (20)	10		15		15		7	
Flow Status - Maint. Flow Volume (10)	10		10		7		7	
Flow Status - Flashiness (10) Channel Alteration (20)	19		8 20		12		1 12	
Frequency of Riffles/Bends (20)*								
Channel Sinuosity (20)**	13		15		13		13	
Riparian and Bank Structure Bank Stability (L) (10)	8		9		7		1	
Bank Stability (R) (10)	8		6		7		1	
Vegetative Protection (L) (10) Vegetative Protection (R) (10)	7		10		8		4	
Riparian Veg. Zone Width (L) (10)	3		10		10		5	
Riparian Veg. Zone Width (R) (10)	3		10		10		5	
TOTAL SCORE (200):	132		163		147		80	
HABITAT RATING:	GOOD		EXCELLENT		GOOD		MARGINAL	
	(SLIGHTLY		(NON-		(SLIGHTLY		(MODERATELY	1
	IMPAIRED)		IMPAIRED)		IMPAIRED)		IMPAIRED)	
Individual metrics may better describe conditi				y while th	e Habitat Rating			
describes the gen	eral riverine enviro	nment at	tne site(s).					
Date:	8/16/2013		8/16/2013		9/6/2013		9/6/2013	
Weather:	Sunny	ь.		ь -	Partly Cloudy	ъ -	Partly Cloudy	
Air Temperature: Water Temperature:	70 64	Deg. F.	70 63	Deg. F. Deg. F.	70 63	Deg. F. Deg. F.	70 63	Deg. I
Ave. Stream Width:	30	Feet	25	Feet	14	Feet	21	Feet
Ave. Stream Depth:	0.5	Feet	0.5	Feet	1.5	Feet	1 1 2	Feet
Surface Velocity: Estimated Flow:	1 15	Ft./Sec. CFS	0.5	Ft/Sec. CFS	1.3 27.3	Ft/Sec. CFS	1.3 27.3	Ft./Se CFS
	Bank							
Stream Modifications:	Stabilization		None		None		None	
Nuisance Plants (Y/N): Report Number:	N		N		N		N	
STORET No.:	30707		30708		30713		30712	
Stream Name:	Rabbit River		Rabbit River upstream cattle		Rabbit River upstream of		Rabbit River	
	cattle access off		access off 130th		Green Lake		Green Lake	
Road Crossing/Location:	130th Avenue		Avenue		Creek		Creek	
County Code: FRS:	03 03N12W20		03 03N12W20		03 04N11W31		03 04N11W31	
Latitude (dd):	42.63659 -85.74962		42.6358 -85.74368		42.688076 -85.656638		42.68792 -85.658193	
Longitude (dd): Ecoregion:	-85.74962 SMNITP		-85.74368 SMNITP		SMNITP		-85.658193 SMNITP	
Stream Type:	Warmwater		Warmwater		Warmwater		Warmwater	
	4050003						4050003	
USGS Basin Code:	4050003		4050003		4050003		4050003	
	Red Run Drain downstream 21st Street RIFFLE/RUN		Red Run Drain 21st Street GLIDE/POOL		Red Run Drain 140th Avenue RIFFLE/RUN		Black Creek upstream of 140th Avenue GLIDE/POOL	
* Applies only to Glide/Pool stream Surveys	Red Run Drain downstream 21st Street		21st Street		140th Avenue		upstream of 140th Avenue	
** Applies only to Glide/Pool stream Surveys HABITAT METRIC	Red Run Drain downstream 21st Street RIFFLE/RUN		21st Street GLIDE/POOL		140th Avenue RIFFLE/RUN		upstream of 140th Avenue GLIDE/POOL	
** Applies only to Glide/Pool stream Surveys HABITAT METRIC Substrate and Instream Cover	Red Run Drain downstream 21st Street RIFFLE/RUN Station N		21st Street GLIDE/POOL Station O		140th Avenue RIFFLE/RUN		upstream of 140th Avenue GLIDE/POOL Station B	
** Applies only to Glide/Pool stream Surveys HABITAT METRIC Substrate and Instream Cover Epifaunal Substrate/ Avail Cover (20) Embeddedness (20)*	Red Run Drain downstream 21st Street RIFFLE/RUN Station N		21st Street GLIDE/POOL		140th Avenue RIFFLE/RUN Station K		upstream of 140th Avenue GLIDE/POOL	
** Applies only to Glide/Fool stream Surveys **IABITAT METRIC **Unbtrate and Instrum Cower **Epifanail Substrate/ Avail Cover (20) **Enbeddedness (20)** **Velocity/Pepif Regime (20)**	Red Run Drain downstream 21st Street RIFFLE/RUN Station N		21st Street GLIDE/POOL Station O		140th Avenue RIFFLE/RUN Station K		upstream of 140th Avenue GLIDE/POOL Station B	
** Applies only to Glide/Pool stream Surveys **HABITAT METRIC **Substrate and Instream Cover **Fpifmand Substrate / Avail Cover (20) **Embeddedness (20)** **Vol.city/Depth Regime (20)** **Pool Substrate / Characterization (20)**	Red Run Drain downstream 21st Street RIFFLE/RUN Station N		21st Street GLIDE/POOL Station O		140th Avenue RIFFLE/RUN Station K		upstream of 140th Avenue GLIDE/POOL Station B	
** Applies only to Glide/Pool stream Surveys HABITAT METRIC Substrate and Instream Cover Epifuanal Substrate/ Avail Cover (20) Epifoddedness (20)* Velocity/Depth Regime (20)* Pool Substrate Characterization (20)** Pool Substrate Characterization (20)** Pool Variability (20)**	Red Run Drain downstream 21st Street RIFFLE/RUN Station N		21st Street GLIDE/POOL Station O 5		140th Avenue RIFFLE/RUN Station K 7 9 13		upstream of 140th Avenue GLIDE/POOL Station B	
** Applies only to Glide/Pool stream Surveys **HABITAT METRIC **Substrate and Instream Cower **Epifanual Substrate/ Avail Cover (20) **Epifanual Substrate/ Avail Cover (20) **Epifanual Substrate/ Avail Cover (20) **Epifanual Substrate (Avail Cover (20) **Pool Variability (20)** **Pool Variability (20)** **Channel Morphology **Sediment Deposition (20)	Red Run Drain downstream 21st Street RIFFLE/RUN Station N		21st Street GLIDE/POOL Station O 5 13 15		140th Avenue RIFFLE/RUN Station K 7 9 13		upstream of 140th Avenue GLIDE/POOL Station B	
** Applies only to Glide/Pool stream Surveys **HABITAT METRIC **substrate and Instream Cover **Fprinanal Substrate/ Avail Cover (20) **Fpriced-decleases (20)** **Vol.city/Depth Regime (20)** **Pool Substrate Characterization (20)**	Red Run Drain downstream 21st Street RIFFLE/RUN Station N		21st Street GLIDE/POOL Station O 5		140th Avenue RIFFLE/RUN Station K 7 9 13		upstream of 140th Avenue GLIDE/POOL Station B	
Applies only to Clide/Pool stream Surveys **HABITAT METRIC **Substrate and Instream Cover **Fpifunan Substrate (Avail Cover (20) **Fpifunan Substrate (Avail Cover (20) **Fpifunan Substrate (Avail Cover (20) **Fpool Substrate (Capita) **Pool Substrate Characterization (20) **Pool Substrate Characterization (20)** **Pool Substrate Characterization (20)* **Fool Substrate Maint: Flow Volume (10) **Flow Status - Maint: Flow Volume (10) **Flow Status - Maint: Flow Volume (10) **Flow Status - Flashiness (10) **Channel Akeration (20)	Red Run Drain downstream 21st Street RIFFLE/RUN Station N 10 13 15 15 11 10 6 6 15 15		21st Street GLIDE/POOL Station O 5 13 15 9 9		140th Avenue RIFFLE/RUN Station K 7 9 13		upstream of 140th Avenue GLIDE/POOL Station B 3 3 11 11 4 6	
** Applies only to Glde/Fool stream Surveys **ABITAT METRIC *Substrate and Instrum Cover *Epifamal Substrate Avail Cover (20) *Enbeddedness (20)* *Pool Substrate Characterization (20)** *Pool Variabity (20)** *Pool Variabity (20)** *Fool Variabity (20)*	Red Run Drain downstream 21st Street RIFFLE/RUN Station N		21st Street GLIDE/POOL Station O 5 13 15 9 9 11 10		140th Avenue RIFFLE/RUN Station K 7 9 13		upstream of 140th Avenue GIIDE/POOL Station B 3 11 11 11 4 6 3 7	
** Applies only to Glide Pool stream Surveys **HABITAT METRIC **Substrate and Instream Cover Figifuant Substrate (Avail Cover (20) Fasheddedness (20)* **Velocity/Depth Regime (20)* **Pool Substrate Characterization (20)** **Pool Substrate Characterization (20)** **Pool Substrate Characterization (20)* **Pool Substrate Characterization (20)* **Pool Substrate Characterization (20)* **Flow Status - Maint. Flow Volume (10) **Flow Status - Maint. Flow Volume (10) **Flow Status - Hashiness (10) **Channel Alenation (20) **Frequency of Rithles/Bends (20)* **Channel Simosity (20)** **Channel Simosity (20)**	Red Run Drain downstream 21st Street RIFFLERUN Station N 10 13 15 15 11 10 6 6 115 10 10		21st Street GLIDE/POOL Station O 5 13 15 9 9 1		140th Avenue RIFFLE/RUN Station K 7 9 13		upstream of 140th Avenue GLIDE/POOL Station B 3 3 11 11 4 6	
Applies only to Glide/Pool stream Surveys **BABITAT METRIC **Substrate and Instream Cover Fpifuanal Substrate/ Avail Cover (20) Farbeddedness (20)* **Velocity/Depth Regime (20)* **Pool Substrate Characterization (20) **Pool Substrate Characterization (20)** **Pool Substrate Characterization (20)** **Pool Substrate Characterization (20)* **Fow Status - Maint. Flow Volume (10) **Flow Status - Maint. Flow Volume (10) **Flow Status - Maint. Flow Volume (10) **Flow Status - Maint. Flow Volume (10) **Frequency of Ritfles/Rends (20)* **Channel Simpley (20)** **Riparian and Bank Structure Bank Stability (1, (10)	Red Run Drain downstream 21st Street RIFFLERUN Station N 10 13 15 15 15 10 10 10 10 10 10 10 10 10 10 10 10 10		21st Street GLIDE/POOL Station O 5 13 15 9 9 1 10 11 11		140th Avenue RIFFLE/RUN Station K 7 9 13 7 9 6 11 7 9 5		upstream of 140th Avenue GLIDE/POOL Station B 3 11 11 11 4 6 3 7 8	
** Applies only to Glide/Pool stream Surveys **HABITAT METRIC **Substrate and Instream Cover **Epifanania Substrate Avail Cover (20) **Enheddedness (20)** **Pool Variability (20)** **Fool Variability (20)** **Fool Variability (20)** **Fool Variability (20)** **Channel Aheration (21) **Fool Variability (20)** **Channel Smuosity (20)** **Channel Smuosity (20)** **Channel Smuosity (20)** **Epirina and Bank Sturbure **Bank Stability (1) (10) **Bank Stability (1) (10)	Red Run Drain downstream 21st Street RIFFLERUN Station N Station N 113 13 15 15 11 11 10 6 6 115 17 7 7		21st Street GLIDE/POOL Station O 5 13 15 9 9 1 10 10 11 3 3 3		140th Avenue RIFFLE/RUN Station K 7 9 13 7 9 6 6 11 7 5 5		upstream of 140th Avenue GLIDE/POOL Station B 3 111 111 4 6 3 7 7 8 3 3	
Applies only to Glide/Pool stream Surveys **BABITAT METRIC **Substrate and Instream Cover Fpifumal Substrate (Avail Cover (20) Farbeddedness (20)* **Velocity/Depth Regime (20)* **Pool Substrate (Avail Cover (20) **Fool Substrate (Avail Cover (20) **Fool Substrate Characterization (20) **Pool Substrate Characterization (20)** **Fool Substrate Characterization (20) **Fow Status - Maint. Flow Volume (10) **Flow Status - Maint. Flow Volume (10) **Flow Status - Maint. Flow Volume (10) **Fool Status - Flashiness (10) **Channel Sharbait (20)* **Sparian and Bank Structure Bank Shabity (3, 10)	Red Run Drain downstream 21st Street RIFFLERUN Station N 10 13 15 15 15 10 10 10 10 10 10 10 10 10 10 10 10 10		21st Street GLIDE/POOL Station O 5 13 15 9 9 1 10 11 11		140th Avenue RIFFLE/RUN Station K 7 9 13 7 9 6 11 7 9 5		upstream of 140th Avenue GLIDE/POOL Station B 3 11 11 11 4 6 3 7 8	
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** Applies only to Glide Pool stream Surveys HABITAT METRIC Substrate and Instream Cover Epifannal Substrate Avail Cover (20) Embeddedness (20)* Pool Substrate Characterization (20)** Pool Variability (20)** Pool Variability (20)** Channel Morphology Flow Status - Habithess (10) Channel Aberation (20) Channel Aleration (20) Channel Simonity (20)** Repartina and Bank Structure Bank Stability (1,1(10) Vegetative Protection (1), (10) Vegetative Protection (1), (10) Vegetative Protection (1), (10)	Red Run Drain downstream 21st Street RIFFLERUN Station N Station N Station N 10 13 15 15 11 10 10 6 6 15 10 10 7 7 7 3 3 3		21st Street GLIDE/FOOL Station O 13 15 9 1 10 10 11 11 5 5 5 5 5 6 7 12 13 15 5 7 15 15 15 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18		140h Avenue RIFFLERUN Station K 7 9 13 7 9 6 11 7 5 6 6 6		upstream of 140h Avenue CalDE/POOL. Station B 3 3 3 11 11 11 14 4 6 6 3 7 7 8 8 8 3 3 3 3 3 3 3 3 3 3 3	
Applies only to Glide Pool stream Surveys **BABITAT METRIC **Substrate and Instream Cover Figifuant Substrate (Avail Cover (20) Fine-deddeness (20)* Velocity/Depth Regime (20)* Pool Substrate (Avail Cover (20) Fool Substrate (Avail Cover (20) Fool Substrate Characterization (20) Pool Substrate Characterization (20)** Fool Substrate Characterization (20)* Fow Status - Maint. Flow Volume (10) Flow Status - Maint. Flow Volume (10) Vegetative Protection (10) Vegetative Protection (10) Reparian Veg. Zone Width (10) Reparian Veg. Zone Width (10) (10)	Red Run Drain downstream 21st Street RIFFLERUN. Stration N 110 113 115 110 6 6 15 110 110 7 7 7 7 7 3 3 4 4		21st Street GLIDE/FOOL Station O 13 15 15 9 9 11 10 11 11 5 5 5 5 5 5 3		140th Avenue RIFFLERIN Station K 7 9 13 13 7 9 6 111 7 5 6 6 6 6		upstream of 140h Avenue GLIDE/FOOL. Station B 3 3 3 11 11 4 6 3 7 7 8 3 3 3 3 1	
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**Applies only to Glide Pool stream Surveys **HABITAT METRIC **Substrate and Instream Cover	Red Run Drain downstream 21st Sireet RIFFLERUN Station N	Deg. F. Deg. F. Feet Feet Ft./Sec.	21st Street GLIDE/POOL Station O 5 13 15 9 9 1 10 11 11 3 3 5 5 5 3 3 3 WARGINAL (MODIERATELY MPAIRED) Edited Street 15 15 16 17 17 18 19 19 19 10 10 11 11 11 11 11 11 11 11 11 11 11	Deg. F. Deg. F. Feet Feet Ft/Sec.	140h Avenue RIFFLERUN Station K 7 9 13 7 9 6 6 111 7 5 5 6 6 6 6 103 MARCHAL MMARED IMPAIRED Station HARED 103 85'2013 Cloudy Cloudy 15 0.5 0.1 0.75 Dredged N	Deg. F. Deg. F. Feet Feet Ft/Sec.	upstream of 140h Avenue GLIDE/POOL. Station B 11	Deg. 1 Deg. 1 Feet Feet Ft./Se
**Applies only to Glide/Fool stream Surveys **HABITAT METRIC **Substrate and Instream Cover	Red Run Dain downstream 21st Sireet RIFFLERIN Station N	Deg. F. Deg. F. Feet Feet Ft./Sec.	21st Street GLIDE/POOL Station O 5 13 15 9 9 1 10 11 11 3 3 5 5 5 3 3 3 15 5 5 11 11 15 Deedged N 21st Street 30531 Red Run Drain 21st Street 7 03	Deg. F. Deg. F. Feet Feet Ft/Sec.	140h Avenue RIFFLERUN Station K 7 9 13 7 9 6 6 111 7 5 5 6 6 6 6 103 MARCINAL (MODIERATE) MPAIRED) mity whise the H 10 15 5 5 10 10 10 10 10 10 10 10 10 10 10 10 10	Deg. F. Deg. F. Feet Feet Ft/Sec.	upstream of 140h Avenue GLIDE/POOL. Station B 3 3 11 11 4 6 3 7 8 8 3 3 1 1 11 MARGINAL (MODERATE) 6 6 67 67 8 8/R2013 Sunny 65 2 1 1 40 Dredged N 30710 Black Creek upstream of 140h Avenue 7 03	Deg. 1 Deg. 1 Feet Feet Ft./Se
**Applies only to Glide/Fool stream Surveys **HABITAT METRIC **Substrate and Instream Cover	Red Run Drain downstream 21st Sireet RIFFLERUN Station N	Deg. F. Deg. F. Feet Feet Ft./Sec.	21st Street GLIDE/POOL. Station O 5 13 15 9 9 1 10 10 11 3 3 5 5 5 3 3 3 95 MARGINAL (MODERATELY MIPAIRED) Cecting the biolog the sire(s). 8/5/2013 Cloudy 56 15 1 1 15 Dredged N 30531 Red Run Drain 21st Street	Deg. F. Deg. F. Feet Feet Ft/Sec.	140h Avenue RIFFLERUN Station K 7 7 9 13 7 7 9 6 11 7 7 9 6 11 7 5 5 6 6 6 6 6 6 6 103 MARGINAL (MODERATEL) MIPAIRED) unity while the He 8/5/2013 Cloudy 65 57 15 0.1 0.75 Dredged N 30526 Red Run Dmin 140h Avenue	Deg. F. Deg. F. Feet Feet Ft/Sec.	upstream of 140h Avenue GLIDE/POOL. Station B 11	Deg. 1 Deg. 1 Feet Feet Ft./Se
**Applies only to Glide/Pool stream Surveys **BABITAT METRIC **Substrate and Instream Cover	Red Run Dain downstream 21st Sireet RIFFLERIN Station N	Deg. F. Deg. F. Feet Feet Ft./Sec.	21st Street GLIDE/POOL Station O 5 13 15 9 9 1 10 11 11 3 3 5 5 5 3 3 3 15 5 5 11 11 15 Deedged N 21st Street 30531 Red Run Drain 21st Street 7 03	Deg. F. Deg. F. Feet Feet Ft/Sec.	140h Avenue RIFFLERUN Station K 7 9 13 7 9 6 6 111 7 5 5 6 6 6 6 103 MARCINAL (MODIERATE) MPAIRED) mity whise the H 10 15 5 5 10 10 10 10 10 10 10 10 10 10 10 10 10	Deg. F. Deg. F. Feet Feet Ft/Sec.	upstream of 140h Avenue GLIDE/POOL. Station B 3 3 11 11 4 6 3 7 8 8 3 3 1 1 11 MARGINAL (MODERATE) 6 6 67 67 8 8/R2013 Sunny 65 2 1 1 40 Dredged N 30710 Black Creek upstream of 140h Avenue 7 03	Deg. 1 Deg. 1 Feet Feet Ft./Se
**Applies only to Glide/Pool stream Surveys **BallTAT METRIC **Substrate and Instream Cover	Red Run Dain downstream 21st Street RIFFLERUN Station N 10 13 15 15 11 10 6 6 15 10 10 7 7 7 7 3 3 4 1 1 119 COOD (SILGHTLY IMPAIRED) SCHOOL CONTROL C	Deg. F. Deg. F. Feet Feet Ft./Sec.	21st Street GLIDE/POOL Station O 5 13 15 9 9 1 10 11 11 3 3 5 5 5 3 3 9 9 MARGRAL (MODERATELY IMPARED) Lecting the biolog the site(s). 8/5/2013 Cloudy 5 5 1 1 1 1 1 5 Deedged N 21st Street N 30531 Red Run Drain 22st Street 1 30531 Red Run Drain 24st Street 1 30531 Red Run Drain 24st Street 1 30531 Red Run Drain 24st Street 30 04N12W17	Deg. F. Deg. F. Feet Feet Ft/Sec.	140h Avenue RIFFLERUN Station K 7 9 13 7 9 13 7 9 6 111 7 5 5 6 6 101 11 7 MARCHAL (MODERATELY MPAIRED) Unity while the He 10 10 10 10 10 10 10 10 10 10 10 10 10	Deg. F. Deg. F. Feet Feet Ft/Sec.	upstream of 140th Avenue GLIDE/POOL. Station B 3 3 11 11 4 6 3 7 8 8 3 3 1 1 1 67 MARGINAL (MODERATE). Station B 8/8/2013 Sunny 65 65 65 65 65 65 67 90 2 1 40 Dredged N	Deg. 1 Deg. 1 Feet Feet Ft./Se
Applies only to Glide/Fool stream Surveys **Applies only to Glide/Fool stream Surveys **Substrate and Instream Cover Fpifunal Substrate (Avail Cover (20) Fool Substrate Characterization (20) Pool Substrate Characterization (20)* Fool Sutus - Flashiness (10) Flow Status - Maint. Flow Volume (10) Flow Status - Maint. Flow Volume (10) Flow Status - Maint. Flow Volume (10) Frequency of Riffles/Bends (20)* Channel Sharetian (20) Frequency of Riffles/Bends (20)* Channel Surveity (20)** Riparian Rabailty (1) (10) Bank Stabilty (R) (10) Regatative Protection (R) (10) Regatative Protection (R) (10) Reparian Veg. Zone Withth (R) (10) TOTAL SCORE (200): 4ABITAT RATING: Note: Individual metrics may better de describes the gen bate: Weather: Weather: Ver Tempenature: Water Tempenature: Water Tempenature: Water Tempenature: Ver Stream With: Ver Stream With: Ver Stream With: Ver Stream With: Ver Stream Modifications: Visitance Plants (VN); Report Number: STOREI No.: Stream Anon: Stream Anon: Stream Statude (dd): Longtinde (dd): Long	Red Run Drain downstream 21st Sireet RIFFLERUN Station N	Deg. F. Deg. F. Feet Feet Ft./Sec.	21st Street GLIDE/POOL. Station O 5 13 15 9 9 1 10 11 3 3 5 5 5 3 3 WARGINAL (MODERATELY IMPAIRED) Feeting the biolog the sire(s). 8/5/2013 Cloudy 56 15 1 1 15 Deedged N 30531 Red Run Drain 21st Sireet 7 00 NINZW17 42,7361 -88,751389 SMNTPP 42,73611 -88,751389	Deg. F. Deg. F. Feet Feet Ft/Sec.	140h Avenue RIFFLERUN Station K 7 7 9 13 7 7 9 6 111 7 7 5 5 6 6 6 6 6 6 6 6 6 103 MARGINAL (MODERATEL) MIPAIRED) unity while the He 8/5/2013 Cloudy 65 57 15 0.1 0.75 Dredged N 30526 Red Run Dmin 140h Avenue 7 03 30526 Red Run Dmin 140h Avenue 7 04 30526 Red Run Dmin 140h Avenue 7 04 30526 Red Run Dmin 140h Avenue 8 8/5/2013 SMNTP	Deg. F. Deg. F. Feet Feet Ft/Sec.	upstream of 140h Avenue GLIDE/POOL. Station B 3 3 11 11 11 4 6 3 7 8 8 3 3 1 11 11 67 8 8 3 3 3 1 1 1 07 MARGINAL. (MODERATEL MIMPAIRED) ng 8 8/8/2013 Sunny 65 65 20 2 1 1 40 Dredged N 30710 Black Creek upstream of 140h Avenue 0 0 0 0 0 0 0 0 0 1 0 1 0 1 0 1 0 1 0	Deg. 1 Deg. 1 Feet Feet Ft./Se
Applies only to Glide/Fool stream Surveys **Applies only to Glide/Fool stream Surveys **Substrate and Instream Cover Fpifunal Substrate (Avail Cover (20) Fool Substrate Characterization (20) Pool Substrate Characterization (20)* Fool Sutus - Flashiness (10) Flow Status - Maint. Flow Volume (10) Flow Status - Maint. Flow Volume (10) Flow Status - Maint. Flow Volume (10) Frequency of Riffles/Bends (20)* Channel Sharetian (20) Frequency of Riffles/Bends (20)* Channel Surveity (20)** Riparian Rabailty (1) (10) Bank Stabilty (R) (10) Regatative Protection (R) (10) Regatative Protection (R) (10) Reparian Veg. Zone Withth (R) (10) TOTAL SCORE (200): 4ABITAT RATING: Note: Individual metrics may better de describes the gen bate: Weather: Weather: Ver Tempenature: Water Tempenature: Water Tempenature: Water Tempenature: Ver Stream With: Ver Stream With: Ver Stream With: Ver Stream With: Ver Stream Modifications: Visitance Plants (VN); Report Number: STOREI No.: Stream Anon: Stream Anon: Stream Statude (dd): Longtinde (dd): Long	Red Run Dain downstream 21st Street RIFFLERUN Station N 10 13 15 15 11 10 6 6 15 10 10 7 7 7 7 3 3 4 1 1 119 COOD (SILGHTLY IMPAIRED) SCHOOL CONTROL C	Deg. F. Deg. F. Feet Feet Ft./Sec.	21st Street GLIDE/POOL Station O 5 13 15 9 9 1 10 11 11 3 3 5 5 5 3 3 9 9 MARGRAL (MODERATELY IMPARED) Lecting the biolog the site(s). 8/5/2013 Cloudy 5 5 1 1 1 1 1 5 Deedged N 21st Street N 30531 Red Run Drain 22st Street 1 30531 Red Run Drain 24st Street 1 30531 Red Run Drain 24st Street 1 30531 Red Run Drain 24st Street 30 04N12W17	Deg. F. Deg. F. Feet Feet Ft/Sec.	140h Avenue RIFFLERUN Station K 7 9 13 7 9 13 7 9 6 111 7 5 5 6 6 101 11 7 MARCHAL (MODERATELY MPAIRED) Unity while the He 10 10 10 10 10 10 10 10 10 10 10 10 10	Deg. F. Deg. F. Feet Feet Ft/Sec.	upstream of 140th Avenue GLIDE/POOL. Station B 3 3 11 11 4 6 3 7 8 8 3 3 1 1 1 67 MARGINAL (MODERATE). Station B 8/8/2013 Sunny 65 65 65 65 65 65 67 90 2 1 40 Dredged N	Deg. 1 Deg. 1 Feet Feet Ft./Se
Embeddedness (20)* Embeddedness (20)* Pool Substrate Characterization (20)** Pool Substrate Characterization (20)** Pool Variabilly (20)** Channel Morphology Sediment Deposition (20) Flow Status - Naint. Flow Volume (10) Flow Status - Flashiness (10) Channel Alteration (20) Channel Simosity (20)** Righterian and Bank Stability (1,) (10) Frequency of Rither-Stends (20)* Channel Simosity (20)** Righrain and Bank Stability (1,) (10) Wegetative Protection (10) Wegetative Protection (10) Reparian Veg. Zone Width (1,) (10) Reparian Veg. Zone Width (1,) (10) Riparian Veg. Zone Width (1,) (10) TOTAL SCORE (200): HABITAT RATINC Note: Individual metrics may better de describes the gen Date: Weather: Weat	Red Run Drain downstream 21st Sireet RIFFLERUN Station N	Deg. F. Deg. F. Feet Feet Ft./Sec.	21st Street GLIDE/POOL. Station O 5 13 15 9 9 1 10 10 11 3 3 5 5 5 3 3 3 95 MARGINAL (MODERATELY MIPAIRED) Tecting the biolog the site(s). MPAIRED 8/5/2013 Cloudy 56 15 1 1 15 Deedged N 21st Street 7 03 04N12W17 42,7361	Deg. F. Deg. F. Feet Feet Ft/Sec.	140h Avenue RIFFLERUN Station K 7 7 9 13 7 7 9 6 111 7 5 5 6 6 6 6 6 6 6 6 6 103 MARGINAL (MODERATEL) MIPAIRED) unity while the He 8/5/2013 Cloudy 65 57 15 0.1 0.75 Dredged N 1040 Avenue 7 30526 Red Run Dmin 140h Avenue 7 03 30526 Red Run Dmin 140h Avenue 7 043 24271083	Deg. F. Deg. F. Feet Feet Ft/Sec.	upstream of 140h Avenue GLIDE/POOL. Station B 3 3 11 11 4 4 6 3 7 8 8 3 3 1 1 1 1 67 MARGINAL. (MODERATEL A) IMPAIRED) ang 8 8/8/2013 Sunny 65 65 20 2 1 40 Dredged N 3 30710 Black Creek upstream of 140h Avenue 0 033 04/13/19/19 42/71036	I I F F
** Applies only to Gide Pool stream Surveys HABITAT METRIC Substrate and Instream Cover Epifumal Substrate (Avail Cover (20) Embeddedness (20)* Velocity/Depth Regime (20)* Pool Substrate Characterization (20)** Piow Status - Plashiness (10) Flow Status - Plashiness	Red Run Drain downstream 21st Sireet RIFFLERUN Station N	Deg. F. Deg. F. Feet Feet Ft./Sec.	21st Street GLIDE/POOL. Station O 5 13 15 9 9 1 10 11 3 3 5 5 5 3 3 WARGINAL (MODERATELY IMPAIRED) Feeting the biolog the sire(s). 8/5/2013 Cloudy 56 15 1 1 15 Deedged N 30531 Red Run Drain 21st Sireet 7 00 NINZW17 42,7361 -88,751389 SMNTPP 42,73611 -88,751389	Deg. F. Deg. F. Feet Feet Ft/Sec.	140h Avenue RIFFLERUN Station K 7 7 9 13 7 7 9 6 111 7 7 5 5 6 6 6 6 6 6 6 6 6 103 MARGINAL (MODERATEL) MIPAIRED) unity while the He 8/5/2013 Cloudy 65 57 15 0.1 0.75 Dredged N 30526 Red Run Dmin 140h Avenue 7 03 30526 Red Run Dmin 140h Avenue 7 04 30526 Red Run Dmin 140h Avenue 7 04 30526 Red Run Dmin 140h Avenue 8 8/5/2013 SMNTP	Deg. F. Deg. F. Feet Feet Ft/Sec.	upstream of 140h Avenue GLIDE/POOL. Station B 3 3 11 11 11 4 6 3 7 8 8 3 3 1 11 11 67 8 8 3 3 3 1 1 1 07 MARGINAL. (MODERATEL MIMPAIRED) ng 8 8/8/2013 Sunny 65 65 20 2 1 1 40 Dredged N 30710 Black Creek upstream of 140h Avenue 0 0 0 0 0 0 0 0 0 1 0 1 0 1 0 1 0 1 0	Deg Deg Feet Feet

	Felts Drain		Felts Drain			
						_
	upstream 136th		upstream 137th			
	Avenue		Avenue			
	RIFFLE/RUN		RIFFLE/RUN			
	Station L		Station M			
HABITAT METRIC						
Substrate and Instream Cover						
Epifaunal Substrate/ Avail Cover (20)	3		2			
Embeddedness (20)*	5		3			
Velocity/Depth Regime (20)*	10		9			
Pool Substrate Characterization (20)**						
Pool Variability (20)**						
Channel Morphology						
Sediment Deposition (20)	4		1			
Flow Status - Maint. Flow Volume (10)	8		9			
Flow Status - Flashiness (10)	3		1			
Channel Alteration (20)	16		18			_
						_
Frequency of Riffles/Bends (20)*	15		11			
Channel Sinuosity (20)**						
Riparian and Bank Structure	_		_			_
Bank Stability (L) (10)	7		2			
Bank Stability (R) (10)	7		2			
Vegetative Protection (L) (10)	6		3			
Vegetative Protection (R) (10)	6		3			
Riparian Veg. Zone Width (L) (10)	6		9			
Riparian Veg. Zone Width (R) (10)	6		9			
TOTAL SCORE (200):	102		82			
HABITAT RATING	MARGINAL		MARGINAL			_
HABITAT KATING	(MODERATELY		(MODERATELY			
						_
	IMPAIRED)		IMPAIRED)			_
					inity while the Habitat Rat	in o
Note: Individual metrics may better de				icai commi	,	
	eral riverine enviro			icai commi		1
describes the gen	eral riverine enviro		the site(s).	icai comini		
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describes the gen	eral riverine enviro		the site(s).			
describes the gen Date:	eral riverine enviro 8/15/2013		the site(s). 8/15/2013			
describes the gen Date: Weather: Air Temperature:	8/15/2013 Sunny	nment at	the site(s). 8/15/2013	Deg. F.		
describes the gen Date: Weather: Air Temperature: Water Temperature:	8/15/2013 Sunny 60	nment at	8/15/2013 Cloudy			
describes the gen Date: Weather: Air Temperature: Water Temperature: Ave. Stream Width:	8/15/2013 Sunny 60 54	Deg. F. Deg. F. Feet	8/15/2013 Cloudy	Deg. F. Deg. F.		
describes the gen Date: Weather: kir Temperature: Water Temperature: Veve. Stream Width: Avev. Stream Depth:	8/15/2013 Sunny 60 54 10 0.25	Deg. F. Deg. F. Feet Feet	8/15/2013 Cloudy 56 15 0.25	Deg. F. Deg. F. Feet		
describes the gen Date: Weather: Air Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity:	8/15/2013 Sunny 60 54 10 0.25 0.5	Deg. F. Deg. F. Feet Feet Ft./Sec.	8/15/2013 Cloudy 56 15 0.25 0.5	Deg. F. Deg. F. Feet Feet Ft/Sec.		
describes the gen Date: We ather: Air Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow:	8/15/2013 Sunny 60 54 10 0.25 0.5 1.25	Deg. F. Deg. F. Feet Feet	8/15/2013 Cloudy 56 15 0.25 0.5 1.875	Deg. F. Deg. F. Feet		
describes the gen Date: Weather: Air Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications:	8/15/2013 Sunny 60 54 10 0.25 0.5 1.25 None	Deg. F. Deg. F. Feet Feet Ft./Sec.	8/15/2013 Cloudy 56 15 0.25 0.5 1.875 None	Deg. F. Deg. F. Feet Feet Ft/Sec.		
describes the gen Date: We eather: Air Temperature: Water Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Nuisance Plants (Y/N);	8/15/2013 Sunny 60 54 10 0.25 0.5 1.25	Deg. F. Deg. F. Feet Feet Ft./Sec.	8/15/2013 Cloudy 56 15 0.25 0.5 1.875	Deg. F. Deg. F. Feet Feet Ft/Sec.		
describes the gen Date: We ather: Air Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow:	8/15/2013 Sunny 60 54 10 0.25 0.5 1.25 None	Deg. F. Deg. F. Feet Feet Ft./Sec.	8/15/2013 Cloudy 56 15 0.25 0.5 1.875 None	Deg. F. Deg. F. Feet Feet Ft/Sec.		
describes the gen Date: We eather: Air Temperature: Water Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Webcity: Estimated Flow: Stream Modifications: Vuisance Plants (Y/N): Report Number:	8/15/2013 Sunny 60 54 10 0.25 0.5 1.25 None	Deg. F. Deg. F. Feet Feet Ft./Sec.	the site(s). 8/15/2013 Cloudy 56 15 0.25 0.5 1.875 None N	Deg. F. Deg. F. Feet Feet Ft/Sec.		
describes the gen Date: Weather: Air Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Plow: Stream Modifications: Vussance Plants (Y/N): Report Number: STORET No.:	8/15/2013 Sunny 60 54 10 0.25 0.5 1.25 None N	Deg. F. Deg. F. Feet Feet Ft./Sec.	the site(s). 8/15/2013 Cloudy 56 15 0.25 0.5 1.875 None N	Deg. F. Deg. F. Feet Feet Ft/Sec.		
describes the gen Date: Weather: We ather: With Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Vuisance Plants (Y/N): Report Number: Stream Name:	8/15/2013 Sunny 60 54 10 0.25 0.5 1.25 None N	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	the site(s). 8/15/2013 Cloudy 56 15 0.25 0.5 1.875 None N 30711 Felts Drain	Deg. F. Deg. F. Feet Feet Fect CFS		
describes the gen Date: Weather: Air Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Plow: Stream Modifications: Vussance Plants (Y/N): Report Number: STORET No.:	8/15/2013 Sunny 60 54 10 0.25 0.5 1.25 None N	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	the site(s). 8/15/2013 Cloudy 56 15 0.25 0.5 1.875 None N	Deg. F. Deg. F. Feet Feet Fect CFS		
describes the gen Date: Weather: We ather: With Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Vuisance Plants (Y/N): Report Number: Stream Name:	8/15/2013 Sunny 60 54 10 0.25 0.5 1.25 None N	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	the site(s). 8/15/2013 Cloudy 56 15 0.25 0.5 1.875 None N 30711 Felts Drain	Deg. F. Deg. F. Feet Feet Fect CFS		
describes the gen Date: Weather: With Temperature: Water Temperature: Wee. Stream Width: Wee. Stream Width: Wee. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Nuisance Plants (Y/N): Report Number. STORET No.: Stream Name: Road Crossing/Location: County Code:	8/15/2013 Sunny 60 54 10 0.25 0.5 1.25 None N	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	the site(s). 8/15/2013 Cloudy 56 15 0.25 0.5 1.875 None N 30711 Felts Drain	Deg. F. Deg. F. Feet Feet Fect CFS		
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describes the gen Date: Weather: Air Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Width: Ave. Stream Width: Stream Actifications: Stream Actifications: Stream Modifications: Stream Modifications: STORET No.: Stream Name: Cooling	8/15/2013 Sunny 60 54 10 0.25 0.5 1.25 None N 9 Felts Drain iream 136th Aver 03 03N13W03 42.68102 48.834624	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	## sinc(s). ## 8/15/2013 Cloudy	Deg. F. Deg. F. Feet Feet Fect CFS		
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describes the gen Date: Weather: Weather: With Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Nuisance Plants (Y/N): Report Number: STORET No.: Stream Name: Goad Crossing/Location: County Code: TRS: Latitude (dd): Ecoregion: Stream Type:	8/15/2013 Sunny 60 54 10 0.25 0.5 1.25 None N 30709 Felts Drain tream 136th Aven 03N13W03 42.68102 -88.834624 SMNTTP Warmwater	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	## sinc(s). ## 8/15/2013 County	Deg. F. Deg. F. Feet Feet Fect CFS		
describes the gen Date: Weather: Weather: With Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Pepth: Surface Velocity: Estimated Flow: Stream Modifications: Vuisance Plants (Y/N): Report Number: STORET No.: Stream Name: Stream Name: County Code: TRS: Latitude (dd): Longitude (dd): Ecoregion:	eral riverine enviro 8/15/2013 Sunny 60 54 10 0.25 0.5 1.25 None N 30709 Felts Drain itream 136th Aver 03 303N13W03 42.68102 -85.834624 SMNITP	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	## sinc(s). ## 8/15/2013 Soundy	Deg. F. Deg. F. Feet Feet Fect CFS		
describes the gen Date: Weather: Weather: With Temperature: Water Temperature: Ave. Stream Width: Ave. Stream Depth: Surface Velocity: Estimated Flow: Stream Modifications: Nuisance Plants (Y/N): Report Number: STORET No.: Stream Name: Goad Crossing/Location: County Code: TRS: Latitude (dd): Ecoregion: Stream Type:	8/15/2013 Sunny 60 54 10 0.25 0.5 1.25 None N 30709 Felts Drain tream 136th Aven 03N13W03 42.68102 -88.834624 SMNTTP Warmwater	Deg. F. Deg. F. Feet Feet Ft./Sec. CFS	## sinc(s). ## 8/15/2013 County	Deg. F. Deg. F. Feet Feet Fect CFS		