

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
WATER BUREAU  
NOVEMBER 2009

STAFF REPORT

A BIOLOGICAL SURVEY OF SITES IN THE ROGUE RIVER WATERSHED  
KENT AND NEWAYGO COUNTIES, MICHIGAN  
JULY 2008

**INTRODUCTION**

Staff of the Surface Water Assessment Section, Water Bureau, Michigan Department of Environmental Quality (MDEQ), conducted qualitative biological surveys during the summer of 2008 to assess point and nonpoint source (NPS) pollution throughout the Rogue River Watershed (Figure 1). The goals of the monitoring were: (1) support the development of water quality-based effluent limits for National Pollutant Discharge Elimination System permits; (2) support the NPS Program; (3) determine if waters are attaining Michigan Water Quality Standards (WQS); and (4) determine if the quality of the water body is changing over time. The objective of this survey was to qualitatively characterize the biotic integrity of fish and macroinvertebrate communities with respect to existing habitat conditions at selected sites throughout the Rogue River Watershed.

The Rogue River Watershed encompasses 234 square miles in the Southern Michigan/Northern Indiana Till Plain ecoregion. Portions of the Rogue River and 7 tributaries are also designated as natural rivers pursuant to Part 305, Natural Rivers, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The Rogue River Natural River Plan originally developed in 1973: (1) provides a physical description of the river and the watershed as a whole; (2) reviews values of the river and factors affecting its future nature and use; and (3) provides a plan for the protection of the river's natural qualities and to guide its future use (MDNR, 1973).

Biological surveys in the Rogue River Watershed were conducted by MDEQ staff using rapid bioassessment techniques in 1992 (Wuycheck, 2002; Rockafellow, 2003a), 1993 (Wuycheck, 1999 and 2001a), 1996 (Wuycheck, 2002), 1998 (Rockafellow, 2003b), 2001 (Wuycheck, 2001b), 2002 (Rockafellow, 2002), and 2003 (Rockafellow, 2004). During the most recent sampling in 2003, macroinvertebrate communities were evaluated at 17 stations and documented as being acceptable at 11 of the stations and excellent at the remaining 6 stations. The overall stream habitat was rated as excellent at 8 stations, good at 8 stations, and fair at 1 station. The results were generally consistent with the sampling results from 1992, 1993, 1996, 1998, 2001, and 2002, which also documented acceptable to excellent macroinvertebrate communities as well as fish communities that were generally attaining the coldwater designation.

The surveys described in this report conducted at wadeable sites were conducted according to the guidelines of Great Lakes and Environmental Assessment Section Procedure 51 (MDEQ, 1990). The coldwater fish communities were determined to be attaining the coldwater designation if 1% or greater of the fish community were salmonids. The macroinvertebrate communities were scored with metrics that rate water bodies from excellent (+5 to +9) to poor (-5 to -9). Fish and macroinvertebrate 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).

Two site selection methods were used to assess the Rogue River Watershed in 2008: stratified random and targeted. A probabilistic monitoring approach, using stratified random site selection to address statewide and regional questions about water quality, was used to select 33 stations throughout the Rogue and Flat River Watersheds (MDEQ, 2006 draft). The sampling results from the Flat River are presented in a separate report (Walterhouse, 2009). In addition to probabilistic monitoring, 3 sites within the Rogue River Watershed were selected for targeted monitoring to clarify the attainment status of the water bodies and 2 sites were selected because of historic problematic NPS issues.

Sampling locations are shown in Figure 1. Fish and macroinvertebrate community ratings and habitat evaluations are given in Tables 1A and 1B, 2A and 2B, and Table 3, respectively. A summary of the site locations and sampling results from this survey are presented in Table 4.

Digital images were taken upstream and downstream at each of the sites that were surveyed during this investigation. The photographs were transferred to a Microsoft PowerPoint presentation and are available upon request.

## **SUMMARY**

In summary, water quality throughout the Rogue River Watershed was adequate to support excellent to acceptable biological communities at locations with suitable riparian and in-stream habitat. Compared to other watersheds in southern Michigan, the degree of historic channelization and dredging of the main stem and its tributaries is limited, with the major exception of the headwaters of the Rogue River in Newaygo County. The draining of wetlands is also limited in the Rogue River Watershed compared to other watersheds in southern Michigan. The Rogue River Natural River Plan provides an outline for preservation of the watershed and contains suggested management controls and guidelines for management of the Rogue River and its tributaries.

## **SAMPLING RESULTS**

### Fish Communities

Fish community sampling was conducted at a site on Stegman Creek downstream of Tefft Avenue (Station 15) where previous macroinvertebrate sampling conducted in 2003 documented excellent biota in the coldwater stream. Sampling in 2008 documented that the fish community was attaining its coldwater designation. Two species of fish were collected and brown trout accounted for 70% of the fish collected.

The coldwater fish community collected from Cedar Creek downstream of Indian Lakes Road (Station 16) was attaining the coldwater designated use. Eight species of fish were collected. The catch was dominated numerically by brown trout (29%) followed by mottled sculpin (27%) and brook trout (21%).

The fish community sampling conducted at Duke Creek upstream of 18 Mile Road (Station 19) also documented attainment of the coldwater designation. Brown trout and brook trout were collected and together accounted for 6.6% of the fish community by number. Twelve species of fish were collected. Numerically, creek chub was the most abundant species collected accounting for about 50% of the catch. Five of the 12 species of fish that were collected are considered intolerant of degraded conditions, but over 70% percent of the community was composed of fish considered tolerant of degraded environmental conditions.

Fish community sampling was also conducted in the headwaters of Spring Creek upstream of 20 Mile Road (Station 20) to determine if the coldwater designation was being attained. Brook trout accounted for 3% of the fish collected, indicative of attainment of the coldwater

designation. Eight species of fish were collected and 3 of the species are considered intolerant of degraded environmental conditions. Numerically the catch was dominated by mottled sculpin, which accounted for more than 60% of the catch.

### Macroinvertebrate Communities

The macroinvertebrate community scores ranged from 9 to -4 at the 21 wadeable sites that were evaluated throughout the watershed. No sites were rated as poor. Eight sites were rated as excellent and 13 sites were rated as acceptable. Of the 13 sites that were rated as acceptable, 8 of the sites scored in the negative range. The 8 sites with negative scores, tending toward poor that would be considered moderately impaired, were located at the following locations: Rogue River at Division Avenue (Station 4), Rogue River at 22 Mile Road (Station 6), Rogue River at 136<sup>th</sup> Street (Station 7), Rogue River at 128<sup>th</sup> Street (Station 8), Ransom Creek at 104<sup>th</sup> Street (Station 9), Unnamed Tributary to Rogue River at Jewell Road (Station 10), Nash Creek at Phelps Avenue (Station 11), Walter Creek at Sparta Avenue (Station 14), and Cedar Creek at 17 Mile Road (Station 17).

The site on the Rogue River at Division Avenue (Station #4) was a natural meandering section that lacked riffle habitat and was bordered by a wide wooded floodplain. The depth of the stream on average was 2 feet, water velocities were slow, and the bottom substrate was sand and silt. Instream habitat suitable for macroinvertebrate colonization was limited to the margins of the stream channel and large woody debris, which was moderately abundant. The remaining 3 sites (Stations 6-8) on the Rogue River were in Newaygo County where the stream has been channelized and is maintained, limiting the amount of suitable habitat. The site on Ransom Creek (Station 9) was also in Newaygo County where channelization and maintenance activities limit the amount of suitable stream habitat. The site on the Unnamed Tributary to the Rogue River at Jewell Road (Station 10) was limited by the amount of flow. Water was present in the pool habitats but was minimal in the riffles, and flow was estimated to be less than 0.5 cubic foot per second. Nash Creek at Phelps Avenue (Station 11) was also a dredged stream channel with marginal habitat and a riparian zone that was limited in width because of the lawn maintenance activities. Walter Creek was historically visually assessed as being impaired because of channelization and maintenance. Walter Creek at Sparta Road (Station 14) was dredged and stream habitat was marginal. Cedar Creek at 17 Mile Road (Station 17) was a natural headwater stream channel with sand substrate that flows through a wide scrub/shrub wetland where the habitat was rated as excellent. The abundance of sites throughout the watershed that support macroinvertebrate communities that rate either excellent or acceptable with minimal impairment demonstrates general attainment of WQS throughout the watershed.

### Habitat

Overall stream habitat scores, which consider in-stream habitat as well as the adjacent stream banks and riparian habitat, at the 21 sites in the Rogue River Watershed ranged from 64 (marginal) to 179 (excellent). Glide/pool metrics were used to evaluate habitat at 11 of the sites and riffle/run metrics were used at the remaining 10 sites. None of the sites in the watershed were rated as poor with the overall stream habitat rating protocol. Stream habitat at 6 of the sites was rated as marginal, 9 were rated as good, and 6 were rated as excellent. The sites with better overall habitat that were categorized as excellent with scores of at least 155 included: Rogue River at Jericho Road (Station 2), Rogue River at Edgertown Road (Station 3), Stegman Creek downstream of Tefft Avenue (Station 15), Cedar Creek downstream of Indian Lake Road (Station 16), Cedar Creek at 17 Mile Road (Station 17), and Spring Creek at 21 Mile Road (Station 21). The sites where habitat scores were better had natural (unmodified) stream channels, a diversity of substrate types with an abundance of large woody debris, and wide, wooded, or wetland corridors adjacent to the stream channel.

### Stratified Random Sample Results

In 2008, 100% of the streams in the Flat and Rogue River Watersheds were estimated to be supporting the other indigenous aquatic life designated use component of Rule 323.1100(1)(e) of Michigan's WQS. This estimate is based on the results of sampling at 17 randomly selected sites in the Flat River Watershed and 16 randomly selected sites in the Rogue River Watershed. Details of these results along with statewide random sampling results will be available later in 2009.

### NPS Monitoring Summary

Fish and macroinvertebrate community sampling was conducted downstream of Tefft Avenue on Stegman Creek (Station 15) to document the condition of the aquatic biota after completion of road crossing improvements at Stegman Road and ½ mile upstream on Stegman Creek at Shaner Road. The MDEQ provided nearly \$200,000 of grant money to the Kent County Road Commission to repair the 2 gravel road crossings that were identified as problematic sources of sand that were impacting Stegman Creek (Wuycheck, 2002). Historic biological sampling before the road crossings were repaired is limited. Sampling in 2008 downstream of the repaired road crossing at Tefft Avenue documented an excellent macroinvertebrate community, excellent stream habitat, and a coldwater fish community that was predominately brown trout of several different year classes. Visual reconnaissance at Tefft Avenue and upstream at Shaner Road revealed no evidence of erosion at either road crossing.

### NPS Problem Summary

In 2008, the only site-specific NPS problem that was observed in the Rogue River Watershed was a highly visible cattle access problem on Cedar Creek along Algoma Avenue. The site has been problematic for years (at least 10) and efforts to work with the land owner and the Michigan Department of Agriculture have reduced the extent of the problem, but the continued unlimited access by less than a dozen cows has destroyed the native riparian vegetation and caused the stream channel to become shallow, wide, and braided. Cedar Creek is a trout stream that is one of the tributaries which is designated as "Natural River" in the Rogue River Watershed. The Rogue River Natural River Plan outlines riparian activities and land management practices that will preserve, protect, and enhance a unique Michigan natural resource.

Overall, water quality in the Rogue River and its tributaries is good. Limitations to the biological communities can be primarily attributed to habitat limitations in the Rogue River headwaters in Newaygo County as well as in some of the tributary streams where historic and current efforts to quickly drain water from agricultural portions of the watershed create homogenous stream habitat that limits the diversity of the aquatic biota.

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## REFERENCES

- Creal, W., S. Hanshue, S. Kosek, M. Oemke, and M. Walterhouse. 1996. Update of GLEAS Procedure 51 Metric Scoring and Interpretation. MDEQ Staff Report #MI/DEQ/SWQ-96/068 (revised 5/98).
- MDEQ. 1990. GLEAS Procedure 51 - Qualitative Biological and Habitat Survey Protocols for Wadeable Streams and Rivers, April 24, 1990. Revised June 1991, August 1996, January 1997, May 2002, and December 2008.
- MDEQ. (2006-draft). SWAS Procedure (# to be assigned). Biological Status and Trend Monitoring Procedure. Effective May 22, 2006.
- MDNR. 1973. Rogue River Natural River Plan, Kent County. MDNR, Fisheries Division. Revised March 12, 2002.
- Rockafellow, D. 2002. A Biological Assessment of Becker Creek, Kent County, Michigan, August 8, 2002. MDEQ Staff Report #MI/DEQ/SWQ-02/010.
- Rockafellow, D. 2003a. A Biological Survey of the Rogue River Watershed, Kent and Newaygo Counties, August 1998. MDEQ Staff Report #MI/DEQ/WD-03/076.
- Rockafellow, D. 2003b. A Biological Survey of Duke Creek, Kent County, Michigan, June 1992. MDEQ Staff Report #MI/DEQ/WD-03/046.
- Rockafellow, D. 2004. A Biological Survey of the Rogue River Watershed, Kent and Newaygo Counties, August 2003. MDEQ Staff Report #MI/DEQ/WD-03/129.
- Walterhouse, M. 2009. A Biological Survey of Sites in the Flat River Watershed, Ionia, Kent, and Montcalm Counties, Michigan, July and August 2008. MDEQ Staff Report #MI/DEQ/WB-09/056.
- Wuycheck, J. 1999. Biological Survey of Cedar Creek and Little Cedar Creek, Kent County, Michigan, June 2-3, 1993. MDEQ Staff Report #MI/DEQ/SWQ-99/007.
- Wuycheck, J. 2001a. A Biological Community and Habitat Assessment of Ball Creek, Kent County, Michigan, June 1, 1993. MDEQ Staff Report #MI/DEQ/SWQ-01/086.
- Wuycheck, J. 2001b. A Biological Community and Habitat Assessment of Ball Creek, Kent County, Michigan, June 27, 2001. MDEQ Staff Report #MI/DEQ/SWQ-01/087.
- Wuycheck, J. 2002. Biological Survey of Stegman Creek and Becker Creek, Tributary to the Rogue River, Kent County, Michigan, June 8, 1992 and August 28, 1996. MDEQ Staff Report #MI/DEQ/WD-02/107.

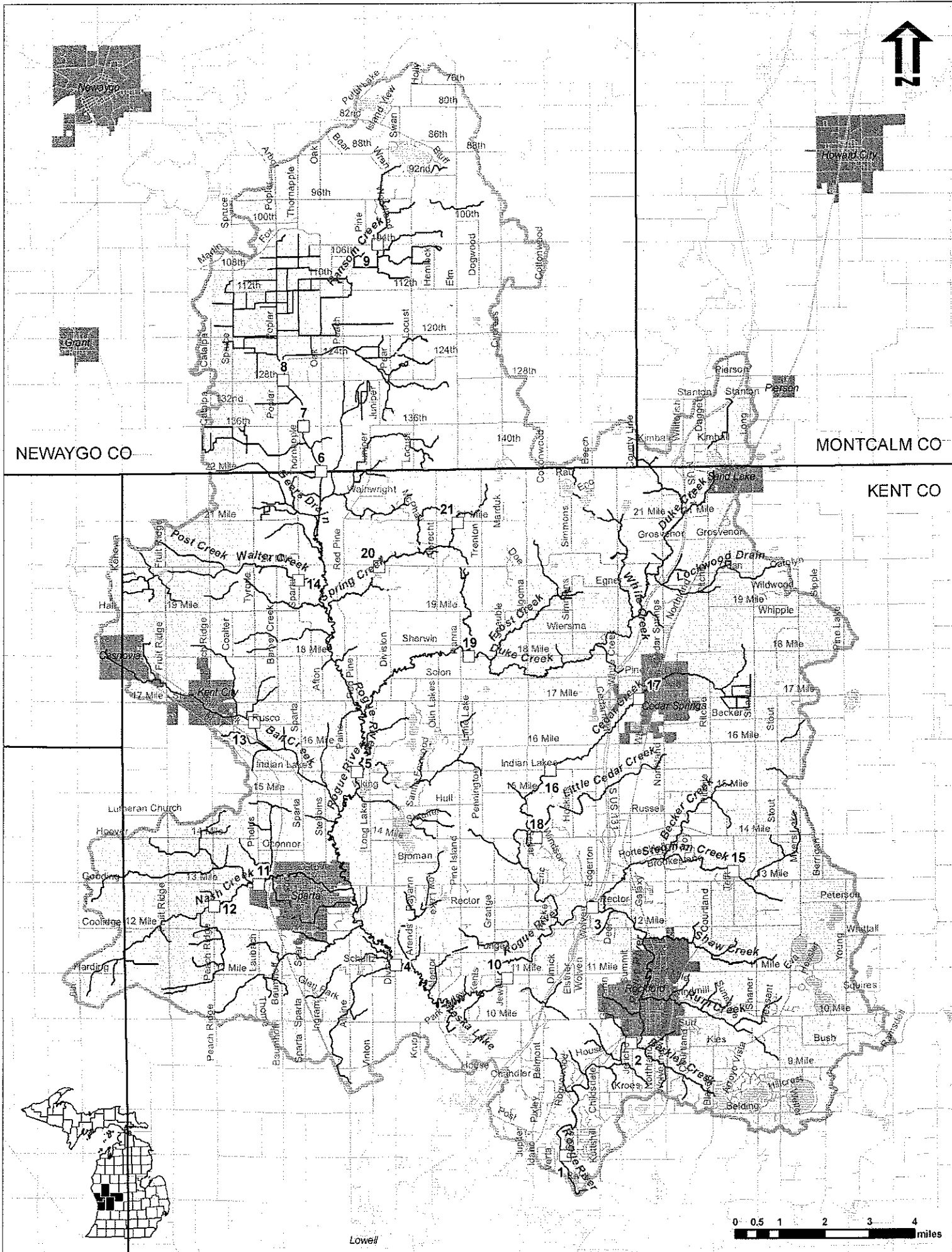


Figure 1: 2008 Site Locations in the Rogue River Watershed, Kent, Montcalm, Muskegon, Newaygo, and Ottawa Counties.

Table 1A. Qualitative fish sampling results for sites in the Rogue River Watershed, Kent and Newaygo Counties, July 2008.

TAXA	Stegman Creek	Cedar Creek	Duke Creek	Spring Creek
	d/s Tefft Ave	d/s Indian Lakes Road	18 Mile Road	20 Mile Road
	7/30/2008	7/30/2008	7/30/2008	7/30/2008
	STATION 15	STATION 16	STATION 19	STATION 20
Petromyzontidae (lampreys)				
<i>Lamprey spp. ammocoete</i>		4	8	5
Salmonidae (trouts)				
<i>Salmo trutta (Brown trout)</i>	72	60	10	
<i>Salvelinus fontinalis (Brook trout)</i>		44	1	2
Umbridae (mudminnows)				
<i>Umbra limi (Central mudminnow)</i>		1	7	2
Cyprinidae (minnows and carps)				
<i>Nocomis biguttatus (Horneyhead chub)</i>				1
<i>Semotilus atromaculatus (Creek chub)</i>		14	87	13
<i>Rhinichthys atratulus (Blacknose dace)</i>		14	7	
Cottidae (sculpins)				
<i>Cottus bairdii (Mottled sculpin)</i>	31	55	14	44
Catostomidae (suckers)				
<i>Catostomus commersoni (White sucker)</i>		15	14	3
<i>Hypentelium nigricans (Northern hog sucker)</i>			1	
Centrarchidae (sunfish)				
<i>Lepomis cyanellus (Green sunfish)</i>			1	
<i>Lepomis macrochirus (Bluegill sf)</i>			10	
Percidae (perch)				
<i>Etheostoma nigrum (Johnny darter)</i>			6	
<i>Percina maculata (Blackside darter)</i>				1
<b>TOTAL INDIVIDUALS</b>	<b>103</b>	<b>207</b>	<b>166</b>	<b>71</b>
Number of hybrid sunfish	0	1	0	0
Number of anomalies	0	0	0	0
Percent anomalies	0.000	0.000	0.000	0.000
Percent salmonids	69.9	50.2	6.6	2.8
Reach sampled (ft)	180	210	450	200
Area sampled (sq ft)	2,160	3,150	9,900	2,400
Density (# fish/sq ft)	0.048	0.066	0.017	0.030
Gear	bps	ss	ss	bps
Sampling Time	30 min	24.2 min	23 min	25 min

Table 1B. Fish metric evaluation of sites in the Rogue River Watershed, Kent and Newaygo Counties, July 2008.

METRIC	Stegman Creek		Cedar Creek		Duke Creek		Spring Creek	
	d/s Tefft Ave		d/s Indian Lakes Road		18 Mile Road		20 Mile Road	
	8/6/2003		7/30/2008		7/30/2008		7/30/2008	
	STATION 15		STATION 16		STATION 19		STATION 20	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	2		8		12		8	
NO. OF DARTER, SCULPIN, MADTOM TAXA	1		1		2		2	
NUMBER OF SUNFISH TAXA	0		0		2		0	
NUMBER OF SUCKER TAXA	0		1		2		1	
NUMBER OF INTOLERANT TAXA	2		4		5		3	
PERCENT TOLERANT	0.00		21.26		73.49		25.35	
PERCENT OMNIVOROUS TAXA	0.00		21.26		69.28		25.35	
PERCENT INSECTIVOROUS TAXA	30.10		26.57		19.28		64.79	
PERCENT PISCIVOROUS TAXA	0.00		0.00		0.00		0.00	
% SIMPLE LITHOPHILIC SPAWNER TAXA	0.00		14.01		13.25		5.63	
<b>TOTAL SCORE</b>		Not scored		Not scored		Not scored		Not scored
<b>FISH COMMUNITY RATING</b>		Attaining Coldwater Designation		Attaining Coldwater Designation		Attaining Coldwater Designation		Attaining Coldwater Designation



Table 2A. Qualitative macroinvertebrate sampling results for sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

TAXA	Rogue River Rogue River Road 7/30/2008 STATION 1	Rogue River Jericho Rd 7/17/2008 STATION 2	Rogue River Edgertown Road 7/29/2008 STATION 3	Rogue River Division Avenue 7/17/2008 STATION 4
PORIFERA (sponges)	1		1	1
ANNELIDA (segmented worms)				
Oligochaeta (worms)	3	2	3	
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	51	54	93	64
Decapoda (crayfish)	1	1	8	25
Isopoda (sowbugs)	2	7	4	40
Arachnoidea				
Hydracarina	8	3		
Insecta				
Ephemeroptera (mayflies)				
Baetidae	27	10	18	
Caenidae			1	
Ephemerellidae	2	1		
Ephemeridae	2	5	2	
Heptageniidae	4	5	7	2
Isonychiidae	2	10	3	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	2	1	1	6
Zygoptera (damselflies)				
Calopterygidae			3	4
Plecoptera (stoneflies)				
Perlidae	7	12	1	
Pteronarcyidae	6		1	
Hemiptera (true bugs)				
Belostomatidae			1	
Corixidae	2	15	37	30
Gerridae	1	1	1	1
Notonectidae		1		
Pleidae			4	
Saldidae	1			
Veliidae	17	1		1
Megaloptera				
Corydalidae (dobson flies)			1	
Neuroptera (spongilla flies)				
Sisyridae				1
Trichoptera (caddisflies)				
Brachycentridae	2	4		80
Glossosomatidae	1		3	
Helicopsychidae			1	
Hydropsychidae	81	59	19	34
Hydroptilidae	8			
Leptoceridae	5	24	1	7
Limnephilidae	1		1	1
Phlebotamidae	3	2		
Phryganeidae		25		1
Polycentropodidae	3			1
Uenoidea		4		
Coleoptera (beetles)				
Gyrinidae (adults)				1
Halplidae (adults)			6	1
Hydrophilidae (total)			1	
Psephenidae (adults)		1	1	
Elmidae	9	7	13	9
Gyrinidae (larvae)		1		
Diptera (flies)				
Athericidae	1		1	
Chironomidae	68	11	6	3
Simuliidae	10	11	6	1
Tabanidae		1	1	
MOLLUSCA				
Gastropoda (snails)				
Ancyllidae (limpets)		3	1	
Hydrobiidae			3	
Physidae	9	8	55	2
Pleuroceridae	1	7	10	
Viviparidae			5	1
Pelecypoda (bivalves)				
Sphaeriidae (clams)	3	11	29	1
Unionidae (mussels)			1	
TOTAL INDIVIDUALS	344	309	354	318

Table 2B. Macroinvertebrate metric evaluation of sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

METRIC	Rogue River Rogue River Road 7/30/2008 STATION 1		Rogue River Jericho Rd 7/17/2008 STATION 2		Rogue River Edgertown Road 7/29/2008 STATION 3		Rogue River Division Avenue 7/17/2008 STATION 4	
	Value	Score	Value	Score	Value	Score	Value	Score
	TOTAL NUMBER OF TAXA	33	1	33	1	39	1	25
NUMBER OF MAYFLY TAXA	5	1	5	1	5	1	1	-1
NUMBER OF CADDISFLY TAXA	8	1	6	1	5	1	6	1
NUMBER OF STONEFLY TAXA	2	1	1	1	2	1	0	-1
PERCENT MAYFLY COMP.	10.76	0	10.03	0	8.76	0	0.63	-1
PERCENT CADDISFLY COMP.	30.23	1	38.19	1	7.06	0	38.99	1
PERCENT DOMINANT TAXON	23.55	0	19.09	1	26.27	0	25.16	0
PERCENT ISOPOD, SNAIL, LEECH	3.49	1	8.09	0	22.03	-1	13.52	-1
PERCENT SURF. AIR BREATHERS	6.10	1	6.15	1	14.41	0	10.69	0
TOTAL SCORE	7		7		3		-1	
MACROINV. COMMUNITY RATING	EXCELLENT		EXCELLENT		ACCEPT.		ACCEPT.	

Table 2A (cont'd). Qualitative macroinvertebrate sampling results for sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

TAXA	Rogue River Indian Lakes Rd 7/29/2008 STATION 5	Rogue River 22 Mile Road 7/31/2008 STATION 6	Rogue River 136th Street 7/31/2008 STATION 7	Rogue River 128th Street 7/31/2008 STATION 8
PORIFERA (sponges)	1			1
PLATYHELMINTHES (flatworms)				
Turbellaria				2
ANNELIDA (segmented worms)				
Hirudinea (leeches)	1	1	1	
Oligochaeta (worms)	1	1	4	1
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	72	40	37	43
Decapoda (crayfish)	17	1	1	2
Isopoda (sowbugs)		1		
Arachnoidea				1
Hydracarina				1
Insecta				
Ephemeroptera (mayflies)				
Baetidae	6	1	1	
Caenidae		1		6
Heptageniidae	7			1
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	3	7	8	3
Gomphidae	1			
Libellulidae				1
Zygoptera (damselflies)				
Calopterygidae	3	2	2	3
Coenagrionidae		9	16	9
Plecoptera (stoneflies)				
Perlidae	1			
Hemiptera (true bugs)				
Belostomatidae	1	5	1	
Corixidae	4	104	110	44
Gerridae	1	1	1	1
Naucoridae		1		
Nepidae		1		3
Notonectidae	1			
Veliidae	1	1	1	
Megaloptera				
Sialidae (alder flies)	1	1	2	
Trichoptera (caddisflies)				
Brachycentridae	98			
Hydropsychidae	30			
Leptoceridae	8	1		1
Limnephilidae	4	4	12	1
Philopotamidae			1	
Polycentropodidae	1			
Lepidoptera (moths)				
Noctuidae			2	
Coleoptera (beetles)				
Gyrinidae (adults)		1	1	3
Halplidae (adults)		6	1	1
Hydrophilidae (total)	1	18	3	1
Elmidae	5	97	26	114
Diptera (flies)				
Athericidae	1			
Ceratopogonidae				1
Chironomidae	3	21	28	9
Culicidae			2	
Dixidae		1		
Simuliidae	3			
Tabanidae	1	1		
Tipulidae				1
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)		11	5	
Hydrobiidae		1		
Physidae	1	32	15	4
Planorbidae		8	2	
Pleuroceridae		2		
Viviparidae		1		
Pelecypoda (bivalves)				
Sphaeriidae (clams)	7			1
Unionidae (mussels)		1		
TOTAL INDIVIDUALS	285	384	283	258

Table 2B (cont'd). Macroinvertebrate metric evaluation of sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

METRIC	Rogue River Indian Lakes Rd 7/29/2008 STATION 5		Rogue River 22 Mile Road 7/31/2008 STATION 6		Rogue River 136th Street 7/31/2008 STATION 7		Rogue River 128th Street 7/31/2008 STATION 8	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	30	1	33	1	25	1	26	1
NUMBER OF MAYFLY TAXA	2	0	2	0	1	-1	2	0
NUMBER OF CADDISFLY TAXA	5	1	2	0	2	0	2	0
NUMBER OF STONEFLY TAXA	1	1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	4.56	0	0.52	-1	0.35	-1	2.71	-1
PERCENT CADDISFLY COMP.	49.47	1	1.30	-1	4.59	0	0.78	-1
PERCENT DOMINANT TAXON	34.39	0	27.08	0	38.87	-1	44.19	-1
PERCENT ISOPOD, SNAIL, LEECH	0.70	1	14.84	-1	8.13	0	1.55	1
PERCENT SURF AIR BREATHERS	3.16	1	35.94	-1	42.40	-1	20.54	-1
TOTAL SCORE		6		-4		-4		-3
MACROINV. COMMUNITY RATING		EXCELLENT		ACCEPT.		ACCEPT.		ACCEPT.

Table 2A (cont'd). Qualitative macroinvertebrate sampling results for sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

TAXA	Ransom Creek 104th St 7/31/2008 STATION 9	Unnamed Tributary to Rogue River Jewell Road 7/30/2008 STATION 10	Nash Creek Phelps Ave 7/17/2008 STATION 11	Nash Creek Peach Ridge Avenue 7/17/2008 STATION 12
BRYOZOA (moss animals)				1
ANNELIDA (segmented worms)				
Hirudinea (leeches)			2	
Oligochaeta (worms)		17	2	8
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	173	104	1	
Decapoda (crayfish)	2	3	11	8
Isopoda (sowbugs)	1	30	2	
Insecta				
Ephemeroptera (mayflies)				
Baetidae		5	4	28
Heptageniidae	1			
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	2	1	9	3
Gomphidae	1	1		
Libellulidae	1			
Zygoptera (damselflies)				
Calopterygidae	18	1	1	
Hemiptera (true bugs)				
Corixidae	1		12	
Gerridae	4	4	17	10
Saldidae	1			
Veliidae	10	1	13	
Megaloptera				
Corydalidae (dobson flies)		1		
Sialidae (alder flies)			1	
Trichoptera (caddisflies)				
Hydropsychidae	5	1	1	30
Limnephilidae	2	1	6	11
Coleoptera (beetles)				
Gyrinidae (adults)			1	
Hydrophilidae (total)	2			2
Elmidae	2	6	13	119
Diptera (flies)				
Chironomidae	7	55	123	17
Simuliidae	3	22	1	1
Tabanidae	5	2	1	3
Tipulidae				3
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)			6	
Physidae	10		18	9
Planorbidae	1			
Pleuroceridae			1	2
Viviparidae				1
Pelecypoda (bivalves)				
Sphaeriidae (clams)			28	1
TOTAL INDIVIDUALS	252	255	274	257

Table 2B (cont'd). Macroinvertebrate metric evaluation of sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

METRIC	Ransom Creek 104th St 7/31/2008 STATION 1		Unnamed Trib. to Rogue Riv Jewell Road 7/30/2008 STATION 2		Nash Creek Phelps Ave 7/17/2008 STATION 3		Nash Creek Peach Ridge Avenue 7/17/2008 STATION 4	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	21	1	17	1	23	1	18	1
NUMBER OF MAYFLY TAXA	1	0	1	1	1	0	1	0
NUMBER OF CADDISFLY TAXA	2	0	2	1	2	0	2	0
NUMBER OF STONEFLY TAXA	0	-1	0	-1	0	-1	0	-1
PERCENT MAYFLY COMP.	0.40	-1	1.96	-1	1.46	-1	10.89	0
PERCENT CADDISFLY COMP.	2.78	-1	0.78	-1	2.55	-1	15.95	0
PERCENT DOMINANT TAXON	68.65	-1	40.78	-1	44.89	-1	46.30	-1
PERCENT ISOPOD, SNAIL, LEECH	4.76	0	11.76	-1	10.58	-1	4.67	0
PERCENT SURF. AIR BREATHERS	7.14	0	1.96	1	15.69	0	4.67	1
TOTAL SCORE		-3		-1		-4		0
MACROINV. COMMUNITY RATING		ACCEPT.		ACCEPT.		ACCEPT		ACCEPT.

Table 2A (cont'd). Qualitative macroinvertebrate sampling results for sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

TAXA	Ball Creek Rusco Rd 7/29/2008 STATION 13	Walter Creek Sparta Road 7/29/2008 STATION 14	Stegman Creek d/s Tefft Ave 7/30/2008 STATION 15	Cedar Creek d/s Indian Lakes Rd 7/17/2008 STATION 16
ANNELIDA (segmented worms)				
Hirudinea (leeches)		1	1	1
Oligochaeta (worms)	3		11	9
ARTHROPODA				
Crustacea				
Amphipoda (scuds)		57	35	65
Decapoda (crayfish)	2	3		3
Isopoda (sowbugs)	1	1		11
Arachnoidea				
Hydracarina	28		6	1
Insecta				
Ephemeroptera (mayflies)				
Baetidae	77	1	25	21
Caenidae				4
Ephemerellidae			2	
Heptageniidae		1		1
Leptophlebiidae	1	1	1	
Tricorythidae				8
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	2	5		1
Corduliidae				5
Gomphidae		2		
Libellulidae		1		
Zygoptera (damselflies)				
Calopterygidae	4	1		13
Coenagrionidae	1	6		
Plecoptera (stoneflies)				
Chloroperlidae			2	
Pteronarcyidae				1
Hemiptera (true bugs)				
Corixidae	18	19	1	4
Gerridae	1	2	1	1
Saldidae	1			
Veliidae		32		
Megaloptera				
Sialidae (alder flies)		10	2	
Trichoptera (caddisflies)				
Brachycentridae			43	13
Glossosomatidae			24	6
Helicopsychidae		1		
Hydropsychidae			3	33
Hydroptilidae	6			
Lepidostomatidae			1	
Leptoceridae	3		1	1
Limnephilidae	1	1	2	7
Philopotamidae			13	
Rhyacophiliidae			1	
Uenoidae				1
Coleoptera (beetles)				
Dytiscidae (total)	1		2	
Halipididae (adults)		1		1
Hydrophilidae (total)	7			
Elmidae	36	9	3	1
Gyrinidae (larvae)	1			
Diptera (flies)				
Ceratopogonidae	1		2	
Chironomidae	71	127	65	122
Culicidae		3		
Dixidae	1		1	
Simuliidae	14	1	12	6
Stratiomyidae			1	
Tabanidae	1			1
Tipulidae			5	
MOLLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)				1
Physidae	15	5	1	2
Pleuroceridae		3		
Pelecypoda (bivalves)				
Sphaeriidae (clams)	5	5		5
TOTAL INDIVIDUALS	302	299	267	349

Table 2B (cont'd). Macroinvertebrate metric evaluation of sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

METRIC	Ball Creek Rusco Rd 7/29/2008 STATION 13		Walter Creek Sparta Road 7/29/2008 STATION 14		Stegman Creek d/s Tefft Ave 7/30/2008 STATION 15		Cedar Creek d/s Indian Lakes Rd 7/17/2008 STATION 16	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	26	1	26	1	28	1	30	1
NUMBER OF MAYFLY TAXA	2	0	3	1	3	0	4	1
NUMBER OF CADDISFLY TAXA	3	0	2	0	8	1	6	1
NUMBER OF STONEFLY TAXA	0	-1	0	-1	1	1	1	1
PERCENT MAYFLY COMP.	25.83	1	1.00	-1	10.49	0	9.74	0
PERCENT CADDISFLY COMP.	3.31	-1	0.67	-1	32.96	1	17.48	0
PERCENT DOMINANT TAXON	25.50	0	42.47	-1	24.34	0	34.96	0
PERCENT ISOPOD, SNAIL, LEECH	5.30	0	3.34	1	0.75	1	4.30	0
PERCENT SURF. AIR BREATHERS	9.27	0	19.06	0	1.87	1	1.72	1
TOTAL SCORE	0		-1		6		5	
MACROINV. COMMUNITY RATING	ACCEP.T.		ACCEP.T.		EXCELLENT		EXCELLENT	

Table 2A (cont'd). Qualitative macroinvertebrate sampling results for sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

TAXA	Cedar Creek 17 Mile Road 7/17/2008 STATION 17	Little Cedar Creek 14 Mile Road 7/31/2008 STATION 18	Duke Creek 18 Mile Road 7/31/2008 STATION 19	Spring Creek 20 Mile Road 7/30/2008 STATION 20
PORIFERA (sponges)		1		
PLATYHELMINTHES (flatworms)				
Turbellaria	1			
ANNELIDA (segmented worms)				
Hirudinea (leeches)	8		1	1
Oligochaeta (worms)	4		14	1
ARTHROPODA				
Crustacea				
Amphipoda (scuds)	66		13	47
Decapoda (crayfish)	21	11	2	1
Isopoda (sowbugs)	70			
Arachnoidea				
Hydracarina			1	
Insecta				
Ephemeroptera (mayflies)				
Baetidae	7	1	47	67
Caenidae		1		1
Ephemerellidae			2	
Ephemeridae		3		2
Heptageniidae		11	5	
Isonychiidae		5	2	
Leptophlebiidae				7
Tricorythidae			16	
Odonata				
Anisoptera (dragonflies)				
Aeshnidae	2	1	1	4
Gomphidae		5	1	
Zygoptera (damselflies)				
Calopterygidae	7		2	26
Plecoptera (stoneflies)				
Perlidae		20	10	
Hemiptera (true bugs)				
Corixidae	1			1
Gerridae	3	1	1	2
Veliidae	1		1	1
Megaloptera				
Corydalidae (dobson flies)		13	1	
Sialidae (alder flies)		2	2	
Trichoptera (caddisflies)				
Brachycentridae			18	10
Glossosomatidae			2	
Helicopsychidae		8	42	
Hydropsychidae	41	20	28	6
Hydroptilidae		1	2	
Lepidostomatidae		1		
Leptoceridae		2	1	
Limnephilidae	3	3	3	1
Philopotamidae		27	1	
Phryganeidae	1			
Uenoidae		18		
Coleoptera (beetles)				
Gyrinidae (adults)				2
Hydrophilidae (total)		1	2	
Psephenidae (adults)		35	1	
Elmidae	2	51	38	
Diptera (flies)				
Athericidae		2	8	
Chironomidae	55	12	19	15
Simuliidae	1		3	82
Tabanidae			1	1
Tipulidae		2	1	1
MOELLUSCA				
Gastropoda (snails)				
Ancylidae (limpets)		1	2	
Hydrobiidae		2	1	
Physidae	11		1	1
Planorbidae	1			1
Pleuroceridae		3		
Pelecypoda (bivalves)				
Sphaeriidae (clams)	40	4	1	1
TOTAL INDIVIDUALS	346	268	297	282

Table 2B (cont'd). Macroinvertebrate metric evaluation of sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

METRIC	Cedar Creek 17 Mile Road 7/17/2008 STATION 17		Little Cedar Creek 14 Mile Road 7/31/2008 STATION 18		Duke Creek 18 Mile Road 7/31/2008 STATION 19		Spring Creek 20 Mile Road 7/30/2008 STATION 20	
	Value	Score	Value	Score	Value	Score	Value	Score
TOTAL NUMBER OF TAXA	21	0	31	1	38	1	24	0
NUMBER OF MAYFLY TAXA	1	-1	5	1	5	1	4	1
NUMBER OF CADDISFLY TAXA	3	0	8	1	8	1	3	0
NUMBER OF STONEFLY TAXA	0	-1	1	1	1	1	0	-1
PERCENT MAYFLY COMP.	2.02	-1	7.84	0	24.24	1	27.30	1
PERCENT CADDISFLY COMP.	13.01	0	29.85	1	32.66	1	6.03	0
PERCENT DOMINANT TAXON	20.23	0	19.03	1	15.82	1	29.08	0
PERCENT ISOPOD, SNAIL, LEECH	26.01	-1	2.24	1	1.68	1	1.06	1
PERCENT SURF AIR BREATHERS	1.45	1	13.81	0	1.68	1	2.13	1
TOTAL SCORE		-3		7		9		3
MACROINV. COMMUNITY RATING		ACCEPT.		EXCELLENT		EXCELLENT		ACCEPT.

Table 2A (cont'd). Qualitative macroinvertebrate sampling results for sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

		Spring Creek 21 Mile Road 7/31/2008 STATION 21
TAXA		
ANNELIDA (segmented worms)		
Oligochaeta (worms)	3	
ARTHROPODA		
Crustacea		
Amphipoda (scuds)	30	
Isopoda (sowbugs)	1	
Insecta		
Ephemeroptera (mayflies)		
Baetidae	37	
Ephemeridae	1	
Heptageniidae	4	
Leptophlebiidae	3	
Odonata		
Anisoptera (dragonflies)		
Cordulegastridae	1	
Zygoptera (damselflies)		
Calopterygidae	1	
Plecoptera (stoneflies)		
Chloroperlidae	4	
Hemiptera (true bugs)		
Gerridae	1	
Veliidae	1	
Megaloptera		
Corydalidae (dobson flies)	1	
Trichoptera (caddisflies)		
Helicopsychidae	2	
Hydropsychidae	90	
Limnephilidae	1	
Molannidae	1	
Philopotamidae	14	
Coleoptera (beetles)		
Elmidae	16	
Diptera (flies)		
Ceratopogonidae	3	
Chironomidae	31	
Simuliidae	53	
Tabanidae	1	
Tipulidae	11	
MOLLUSCA		
Gastropoda (snails)		
Planorbidae	2	
Pelecypoda (bivalves)		
Sphaeriidae (clams)	1	
TOTAL INDIVIDUALS	314	

Table 2B (cont'd). Macroinvertebrate metric evaluation of sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

			Spring Creek 21 Mile Road 7/31/2008 STATION 21
METRIC	Value	Score	
TOTAL NUMBER OF TAXA	26	1	
NUMBER OF MAYFLY TAXA	4	1	
NUMBER OF CADDISFLY TAXA	5	1	
NUMBER OF STONEFLY TAXA	1	1	
PERCENT MAYFLY COMP.	14.33	0	
PERCENT CADDISFLY COMP.	34.39	1	
PERCENT DOMINANT TAXON	28.66	0	
PERCENT ISOPOD, SNAIL, LEECH	0.96	1	
PERCENT SURF. AIR BREATHERS	0.64	1	
TOTAL SCORE	7		
MACROINV. COMMUNITY RATING	EXCELLENT		

Table 3. Habitat evaluation for sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

HABITAT METRIC	Station 1 Rogue River Rogue River Road RIFFLE/RUN	Station 2 Rogue River Jericho Rd RIFFLE/RUN	Station 3 Rogue River Edgertown Road RIFFLE/RUN	Station 4 Rogue River Division Avenue GLIDE/POOL	Station 5 Rogue River Indian Lakes Rd GLIDE/POOL
<b>Substrate and Instream Cover</b>					
Epifaunal Substrate/ Avail Cover (20)	15	16	15	13	6
Embeddedness (20)*	16	18	18		
Velocity/Depth Regime (20)*	18	16	16		
Pool Substrate Characterization (20)**				11	10
Pool Variability (20)**				11	13
<b>Channel Morphology</b>					
Sediment Deposition (20)	16	18	15	11	3
Flow Status - Maint. Flow Volume (10)	9	9	8	7	7
Flow Status - Flashiness (10)	5	9	2	4	2
Channel Alteration (20)	18	20	18	18	15
Frequency of Riffles/Bends (20)*	16	18	16		
Channel Sinuosity (20)**				16	15
<b>Riparian and Bank Structure</b>					
Bank Stability (L) (10)	8	9	8	9	9
Bank Stability (R) (10)	3	9	8	9	6
Vegetative Protection (L) (10)	8	9	9	10	9
Vegetative Protection (R) (10)	5	5	9	10	6
Riparian Veg. Zone Width (L) (10)	3	7	4	10	9
Riparian Veg. Zone Width (R) (10)	2	4	9	10	2
<b>TOTAL SCORE (200):</b>	<b>142</b>	<b>167</b>	<b>155</b>	<b>149</b>	<b>112</b>
<b>HABITAT RATING:</b>	<b>GOOD (SLIGHTLY IMPAIRED)</b>	<b>EXCELLENT (NON- IMPAIRED)</b>	<b>EXCELLENT (NON- IMPAIRED)</b>	<b>GOOD (SLIGHTLY IMPAIRED)</b>	<b>GOOD (SLIGHTLY IMPAIRED)</b>

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

Date:	7/30/2008	7/17/2008	7/29/2008	7/17/2008	7/29/2008
Weather:	Cloudy	Sunny	Sunny	Sunny	Sunny
Air Temperature:	75 Deg. F.	75 Deg. F.	85 Deg. F.	70 Deg. F.	85 Deg. F.
Water Temperature:	70 Deg. F.	68 Deg. F.	73 Deg. F.	68 Deg. F.	72 Deg. F.
Ave. Stream Width:	80 Feet	100 Feet	70 Feet	70 Feet	25 Feet
Ave. Stream Depth:	1 Feet	1 Feet	1 Feet	2 Feet	2 Feet
Surface Velocity:	1 Ft./Sec.	1 Ft./Sec.	1 Ft./Sec.	0.5 Ft./Sec.	0.5 Ft./Sec.
Estimated Flow:	80 CFS	100 CFS	70 CFS	70 CFS	25 CFS
Stream Modifications:	None	None	None	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	410413	410418	410744	410745	410644
Stream Name:	Rogue River	Rogue River	Rogue River	Rogue River	Rogue River
Road Crossing/Location:	Rogue River Road	Jericho Rd	Edgertown Road	Division Avenue	Indian Lakes Rd
County Code:	41	41	41	41	41
TRS:	08N11W15	08N11W01	09N11W23	09N12W25	09N12W01
Latitude (dd):	43.073	43.10922	43.153	43.135	43.197
Longitude (dd):	-85.595	-85.566	-85.5828	-85.67	-85.687
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Coldwater	Coldwater	Coldwater	Coldwater	Coldwater
USGS Basin Code:	4050006	4050006	4050006	4050006	4050006

\* Applies only to Riffle/Run stream Surveys

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

COMMENTS:

Table 3 (cont'd). Habitat evaluation for sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

HABITAT METRIC	Station 6	Station 7	Station 8	Station 9	Station 10
	Rogue River 22 Mile Road GLIDE/POOL	Rogue River 136th Street GLIDE/POOL	Rogue River 128th Street GLIDE/POOL	Ransom Creek 104th St GLIDE/POOL	Unnamed Trib. to Rogue Riv Jewell Road RIFFLE/RUN
<b>Substrate and Instream Cover</b>					
Epifaunal Substrate/ Avail Cover (20)	2	5	5	8	6
Embeddedness (20)*					16
Velocity/Depth Regime (20)*					6
Pool Substrate Characterization (20)**	6	6	6	6	
Pool Variability (20)**	2	2	2	5	
<b>Channel Morphology</b>					
Sediment Deposition (20)	8	8	8	8	5
Flow Status - Maint. Flow Volume (10)	8	8	8	8	3
Flow Status - Flashiness (10)	9	9	9	9	1
Channel Alteration (20)	1	1	1	6	18
Frequency of Riffles/Bends (20)*					18
Channel Sinuosity (20)**	1	1	1	6	
<b>Riparian and Bank Structure</b>					
Bank Stability (L) (10)	6	6	6	8	3
Bank Stability (R) (10)	6	6	6	8	3
Vegetative Protection (L) (10)	8	3	3	4	9
Vegetative Protection (R) (10)	3	3	3	4	9
Riparian Veg. Zone Width (L) (10)	8	3	3	3	8
Riparian Veg. Zone Width (R) (10)	3	3	3	3	8
<b>TOTAL SCORE (200):</b>	<b>71</b>	<b>64</b>	<b>64</b>	<b>86</b>	<b>113</b>
<b>HABITAT RATING:</b>	<b>MARGINAL (MODERATELY IMPAIRED)</b>	<b>MARGINAL (MODERATELY IMPAIRED)</b>	<b>MARGINAL (MODERATELY IMPAIRED)</b>	<b>MARGINAL (MODERATELY IMPAIRED)</b>	<b>GOOD (SLIGHTLY IMPAIRED)</b>

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

Date:	7/31/2008	7/31/2008	7/31/2008	7/31/2008	7/30/2008
Weather:	Sunny	Sunny	Sunny	Sunny	Sunny
Air Temperature:	82 Deg. F.	85 Deg. F.	85 Deg. F.	85 Deg. F.	80 Deg. F.
Water Temperature:	71 Deg. F.	73 Deg. F.	76 Deg. F.	70 Deg. F.	71 Deg. F.
Ave. Stream Width:	33 Feet	40 Feet	50 Feet	5 Feet	3 Feet
Ave. Stream Depth:	2.5 Feet	2 Feet	3 Feet	0.33 Feet	0.17 Feet
Surface Velocity:	0.5 Ft./Sec.	0.5 Ft./Sec.	0.2 Ft./Sec.	0.75 Ft./Sec.	0.5 Ft./Sec.
Estimated Flow:	41.25 CFS	40 CFS	30 CFS	1.2375 CFS	0.255 CFS
Stream Modifications:	Dredged	Dredged	Dredged	Dredged	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	620314	620266	620315	620210	410746 Unnamed Tributary to Rogue River
Stream Name:	Rogue River	Rogue River	Rogue River	Ransom Creek	
Road Crossing/Location:	22 Mile Road	136th Street	128th Street	104th St	Jewell Road
County Code:	62	62	62	62	41
TRS:	11N12W35	11N12W26	11N12W23	11N11W06	09N11W33
Latitude (dd):	43.29361	43.308	43.323	43.36646	43.13052
Longitude (dd):	-85.70241	-85.71	-85.719	-85.67713	-85.62057
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Coldwater	Coldwater	Coldwater	Coldwater	Warmwater
USGS Basin Code:	4050006	4050006	4050006	4050006	4050006

\* Applies only to Riffle/Run stream Surveys

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

COMMENTS:



Table 3 (cont'd). Habitat evaluation for sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

HABITAT METRIC	Station 11 Nash Creek Phelps Ave GLIDE/POOL	Station 12 Nash Creek Peach Ridge Avenue RIFFLE/RUN	Station 13 Ball Creek Rusco Rd GLIDE/POOL	Station 14 Walter Creek Sparta Road GLIDE/POOL	Station 15 Stegman Creek d/s Tefft Ave RIFFLE/RUN
<b>Substrate and Instream Cover</b>					
Epifaunal Substrate/ Avail Cover (20)	10	13	15	5	16
Embeddedness (20)*		6			18
Velocity/Depth Regime (20)*		13			11
Pool Substrate Characterization (20)**	6		13	6	
Pool Variability (20)**	3		6	3	
<b>Channel Morphology</b>					
Sediment Deposition (20)	3	10	13	13	11
Flow Status - Maint. Flow Volume (10)	5	8	9	9	9
Flow Status - Flashiness (10)	3	8	9	9	10
Channel Alteration (20)	6	13	6	6	20
Frequency of Riffles/Bends (20)*		11			16
Channel Sinuosity (20)**	6		5	3	
<b>Riparian and Bank Structure</b>					
Bank Stability (L) (10)	3	5	8	8	10
Bank Stability (R) (10)	3	5	8	8	10
Vegetative Protection (L) (10)	3	6	6	3	10
Vegetative Protection (R) (10)	3	3	6	3	10
Riparian Veg. Zone Width (L) (10)	1	4	9	8	10
Riparian Veg. Zone Width (R) (10)	5	2	3	8	10
<b>TOTAL SCORE (200):</b>	<b>60</b>	<b>107</b>	<b>116</b>	<b>92</b>	<b>171</b>
<b>HABITAT RATING:</b>	<b>MARGINAL (MODERATELY IMPAIRED)</b>	<b>GOOD (SLIGHTLY IMPAIRED)</b>	<b>GOOD (SLIGHTLY IMPAIRED)</b>	<b>MARGINAL (MODERATELY IMPAIRED)</b>	<b>EXCELLENT (NON- IMPAIRED)</b>

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

Date:	7/17/2008	7/17/2008	7/29/2008	7/29/2008	7/30/2008
Weather:	Sunny	Sunny	Sunny	Sunny	Sunny
Air Temperature:	80 Deg. F.	80 Deg. F.	85 Deg. F.	84 Deg. F.	85 Deg. F.
Water Temperature:	68 Deg. F.	64 Deg. F.	69 Deg. F.	72 Deg. F.	60 Deg. F.
Ave. Stream Width:	6 Feet	5 Feet	10 Feet	7 Feet	12 Feet
Ave. Stream Depth:	0.33 Feet	1 Feet	0.33 Feet	0.5 Feet	0.33 Feet
Surface Velocity:	0.5 Ft./Sec.	0.25 Ft./Sec.	0.25 Ft./Sec.	0.25 Ft./Sec.	0.75 Ft./Sec.
Estimated Flow:	1.65 CFS	1.25 CFS	0.825 CFS	0.875 CFS	2.97 CFS
Stream Modifications:	Dredged	None	Dredged	Dredged	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	410642	410747	410624	410748	410638
Stream Name:	Nash Creek	Nash Creek	Ball Creek	Walter Creek	Stegman Creek
Road Crossing/Location:	Phelps Ave	Peach Ridge Avenue	Rusco Rd	Sparta Road	d/s Tefft Ave
County Code:	41	41	41	41	41
TRS:	09N12W16	09N12W20	10N12W33	10N12W15	09N10W17
Latitude (dd):	43.16098	43.154	43.213	43.2588	43.16415
Longitude (dd):	-85.73029	-85.75	-85.732	-85.71241	-85.52068
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Coldwater	Coldwater	Coldwater	Coldwater	Coldwater
USGS Basin Code:	4050006	4050006	4050006	4050006	4050006

\* Applies only to Riffle/Run stream Surveys

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

COMMENTS:

Table 3 (cont'd). Habitat evaluation for sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

HABITAT METRIC	Station 16 Cedar Creek d/s Indian Lakes Rd RIFFLE/RUN	Station 17 Cedar Creek 17 Mile Road GLIDE/POOL	Station 18 Little Cedar Creek 14 Mile Road RIFFLE/RUN	Station 19 Duke Creek 18 Mile Road RIFFLE/RUN	Station 20 Spring Creek 20 Mile Road GLIDE/POOL
<b>Substrate and Instream Cover</b>					
Epifaunal Substrate/ Avail Cover (20)	15	15	11	12	11
Embeddedness (20)*	15		15	16	
Velocity/Depth Regime (20)*	13		13	15	
Pool Substrate Characterization (20)**		13			11
Pool Variability (20)**		5			8
<b>Channel Morphology</b>					
Sediment Deposition (20)	13	16	11	8	16
Flow Status - Maint. Flow Volume (10)	9	9	5	5	9
Flow Status - Flashiness (10)	8	9	3	2	9
Channel Alteration (20)	18	18	16	16	15
Frequency of Riffles/Bends (20)*	15		16	16	
Channel Sinuosity (20)**		16			13
<b>Riparian and Bank Structure</b>					
Bank Stability (L) (10)	10	9	7	5	10
Bank Stability (R) (10)	10	9	7	5	10
Vegetative Protection (L) (10)	10	9	8	9	10
Vegetative Protection (R) (10)	10	9	8	9	10
Riparian Veg. Zone Width (L) (10)	10	10	3	9	10
Riparian Veg. Zone Width (R) (10)	10	10	6	9	10
TOTAL SCORE (200):	166	157	129	136	152
HABITAT RATING:	EXCELLENT (NON- IMPAIRED)	EXCELLENT (NON- IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)	GOOD (SLIGHTLY IMPAIRED)

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

Date:	7/17/2008	7/17/2008	7/31/2008	7/31/2008	7/30/2008
Weather:	Sunny	Sunny	Sunny	Sunny	Sunny
Air Temperature:	80 Deg. F.	85 Deg. F.	85 Deg. F.	70 Deg. F.	85 Deg. F.
Water Temperature:	70 Deg. F.	72 Deg. F.	73 Deg. F.	65 Deg. F.	64 Deg. F.
Ave. Stream Width:	15 Feet	15 Feet	15 Feet	22 Feet	12 Feet
Ave. Stream Depth:	0.5 Feet	0.33 Feet	0.33 Feet	0.5 Feet	0.67 Feet
Surface Velocity:	0.75 Ft./Sec.	0.5 Ft./Sec.	0.75 Ft./Sec.	0.75 Ft./Sec.	0.5 Ft./Sec.
Estimated Flow:	5.625 CFS	2.475 CFS	3.7125 CFS	8.25 CFS	4.02 CFS
Stream Modifications:	None	None	None	None	None
Nuisance Plants (Y/N):	N	N	N	N	N
STORET No.:	410749	410750	410751	410752	410753
Stream Name:	Cedar Creek d/s Indian Lakes Road	Cedar Creek	Little Cedar Creek	Duke Creek	Spring Creek
Road Crossing/Location:	Road	17 Mile Road	14 Mile Road	18 Mile Road	20 Mile Road
County Code:	41	41	41	41	41
TRS:	09N11W03	10N11W25	09N11W10	10N11W29	10N12W12
Latitude (dd):	43.197	43.22	43.17539	43.234	43.263
Longitude (dd):	-85.601	-85.562	-85.60736	-85.637	-85.677
Ecoregion:	SMNITP	SMNITP	SMNITP	SMNITP	SMNITP
Stream Type:	Coldwater	Coldwater	Coldwater	Coldwater	Coldwater
USGS Basin Code:	4050006	4050006	4050006	4050006	4050006

\* Applies only to Riffle/Run stream Surveys

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

COMMENTS:

Table 3 (cont'd). Habitat evaluation for sites in the Rogue River watershed, Kent and Newaygo Counties, July 2008.

HABITAT METRIC	Station 21 Spring Creek 21 Mile Road RIFFLE/RUN
<b>Substrate and Instream Cover</b>	
Epifaunal Substrate/ Avail Cover (20)	16
Embeddedness (20)*	18
Velocity/Depth Regime (20)*	10
Pool Substrate Characterization (20)**	
Pool Variability (20)**	
<b>Channel Morphology</b>	
Sediment Deposition (20)	18
Flow Status - Maint. Flow Volume (10)	9
Flow Status - Flashiness (10)	10
Channel Alteration (20)	20
Frequency of Riffles/Bends (20)*	18
Channel Sinuosity (20)**	
<b>Riparian and Bank Structure</b>	
Bank Stability (L) (10)	10
Bank Stability (R) (10)	10
Vegetative Protection (L) (10)	10
Vegetative Protection (R) (10)	10
Riparian Veg. Zone Width (L) (10)	10
Riparian Veg. Zone Width (R) (10)	10
<b>TOTAL SCORE (200):</b>	<b>179</b>
<b>HABITAT RATING:</b>	<b>EXCELLENT (NON- IMPAIRED)</b>

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

Date: 7/31/2008  
 Weather: Sunny  
 Air Temperature: 76 Deg. F.  
 Water Temperature: 58 Deg. F.  
 Ave. Stream Width: 3 Feet  
 Ave. Stream Depth: 0.17 Feet  
 Surface Velocity: 0.75 Ft./Sec.  
 Estimated Flow: 0.3825 CFS  
 Stream Modifications: None  
 Nuisance Plants (Y/N): N  
 STORET No.: 410754  
 Stream Name: Spring Creek  
 Road Crossing/Location: 21 Mile Road  
 County Code: 41  
 TRS: 10N11W05  
 Latitude (dd): 43.277  
 Longitude (dd): -85.642  
 Ecoregion: SMNITP  
 Stream Type: Coldwater  
 USGS Basin Code: 4650006

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

COMMENTS:

Table 4. Summary of qualitative fish and macroinvertebrate communities and stream habitat ratings and scores at select locations in the Rogue River Watershed, July 2008.

Station Number	Stream and Location	Lat	Long	Macroinvertebrate Rating (score)	Habitat Rating (score)	Coldwater Fish Attainment
1	Rogue River at Rogue River Road	43.073	-85.595	Excellent (7)	Good (142)	
2	Rogue River at Jericho Road	43.10922	-85.566	Excellent (7)	Excellent (167)	
3	Rogue River at Edgertown Rd (US 131)	43.153	-85.5828	Acceptable (3)	Excellent (155)	
4	Rogue River at Division Avenue	43.135	-85.67	Acceptable (-1)	Good (149)	
5	Rogue River at Indian Lake Road	43.197	-85.687	Excellent (6)	Good (112)	
6	Rogue River at 22 Mile Road	43.29361	-85.70241	Acceptable (-4)	Marginal (71)	
7	Rogue River at 136th Street	43.308	-85.71	Acceptable (-4)	Marginal (64)	
8	Rogue River at 128th Street	43.323	-85.719	Acceptable (-3)	Marginal (64)	
9	Ransom Creek at 104th Street	43.36646	-85.67713	Acceptable (-3)	Marginal (86)	
10	UnNamed Tributary to Rogue at Jewell Rd	43.13052	-85.62057	Acceptable (-1)	Good (113)	
11	Nash Creek at Phelps Avenue	43.16098	-85.73029	Acceptable (-4)	Marginal (60)	
12	Nash Creek at Peach Ridge Avenue	43.154	-85.75	Acceptable (0)	Good (107)	
13	Ball Creek at Rusco Street	43.213	-85.732	Acceptable (0)	Good (116)	
14	Walter Creek at Sparta Avenue	43.2588	-85.71241	Acceptable (-1)	Marginal (92)	
15	Stegman Creek D/S Tefft Avenue	43.16415	-85.52068	Excellent (6)	Excellent (171)	Acceptable
16	Cedar Creek D/S Indian Lake Road	43.197	-85.601	Excellent (5)	Excellent (166)	Acceptable
17	Cedar Creek at 17 Mile Road	43.22	-85.562	Acceptable (-3)	Excellent (157)	
18	Little Cedar Creek at 14 Mile Road	43.17539	-85.60736	Excellent (7)	Good (129)	
19	Duke Creek at 18 Mile Road (western crossing)	43.234	-85.637	Excellent (9)	Good (136)	Acceptable
20	Spring Creek at 20 Mile Road	43.263	-85.677	Acceptable (3)	Good (152)	Acceptable
21	Spring Creek at 21 Mile Road	43.277	-85.642	Excellent (7)	Excellent (179)	