ATTACHMENT 1

RESULTS OF BIOLOGICAL AND WATER QUALITY SAMPLING

(Updated Since Tt's Completed Reported, Attachment 2, Appendix A)

INTRODUCTION

As part of the five-year basin approach for monitoring, assessment, and the issuance of National Pollution Discharge Elimination System (NPDES) permits, ambient biological, water column chemical, sediment, and bioassay sampling was conducted in the Duck Creek basin from June to October 2000. This study area comprised: Duck Creek mainstem, the East , West, and Middle Forks of Duck Creek, Pawpaw Creek and other tributaries greater than approximately two square. Table 8 illustrates sampling locations. Specific objectives of this evaluation were to:

1) Monitor and assess the chemical (water and sediment) integrity, physical habitat, and biological integrity (biomonitoring of macroinvertebrates and fish along with fish tissue) of the streams within the 2000 Duck Creek watershed study area;

2) Evaluate the smaller headwater streams in subwatersheds to assess general watershed quality and to assign aquatic life use designation or primary headwater habitat classification as determined;

3) Determine the attainment status of the current designated Warmwater Habitat (WWH) or Limited Resource Water (LRW) aquatic life use and other non-aquatic use designations and recommend changes in use where appropriate; and,

4) Conduct water resource trend assessments where historical data exists.

The findings of this evaluation factor into regulatory actions taken by the Ohio EPA (*e.g.*, NPDES permits, Director's Orders, the Ohio Water Quality Standards [OAC 3745-1], Water Quality Permit Support Documents [WQPSDs]) and are incorporated into State Water Quality Management Plans, the Ohio Nonpoint Source Assessment, and the biennial Water Resource Inventory (305[b]) report.

SUMMARY

Aquatic Life Use Attainment Status

In the basin survey, there was an attempt to sample all streams $\geq$ 2 mi.^{2}. There was180.3 miles of stream assessed in Duck Creek basin. Overall, 85 percent of stream miles in all sampled streams in Duck Creek basin fully attained its designated or recommended aquatic life uses. Nine percent partially attained, and only six percent of stream miles sampled did not attain their designated or recommended aquatic life use.

The 2000 Duck Creek mainstem study area included the whole mainstem reach (RM 24.3) to the mouth. Good to exceptional conditions persisted that attained WWH biocriteria extending downstream to Marietta (except for short zone at RM 5.5 almost recovered from a manure spill/fish kill). There was some NON attainment in the mouth area (lower 2.5 miles) due to contaminated sediments, a hazardous waste pond leak (now removed) and other NPS effects. All effects were magnified by pooled influence of Duck Creek at the mouth by Ohio River impoundments. There was 20.8 of 24.3 miles of mainstem Duck Creek in attainment of its WWH criteria (85.6 %).

West Fork Duck Creek fully attained its WWH use designation for its full length of 36.4 miles) (100%) (good to exceptional performance) despite some unsewered areas inputting improperly treated waste and cattle NPS inputs (higher fecal coliform bacteria conc. and sedimentation). Downstream from Caldwell there was a short reach where excess nutrient concentrations combined with open canopy conditions to threaten biological attainment (stills meets marginally but high

primary production from nutrient enrichment present with possible low nighttime D.O. concentrations from decomposition/oxygen demand).

East Fork Duck Creek (proposed to be WWH) met WWH use designation biocriteria in 28.77 miles of 30.5 miles of stream (94%). Good to exceptional performance was recorded except one short segment where accumulated NPS sedimentation (siltation and mining runoff) had clogged stream channel and limited fish biomass. Also infrequent lower pH concentrations (6.43 was < 5th %ile of all pH's in WAP ecoregion streams that attained WWH biocriteria) that are input via nearby old mining tributaries upstream likely contributes to lower fish communty biomass score.

Approximately 50 percent of Middle Fork Duck Creek attained WWH biocriteria through its length (6.8 of 13.8 miles with <1 mile unassessed). Middle Fork Duck Creek had 5.5 miles in partial attainment and 0.7 miles in NON attainment of WWH biological standards. Mining (residual and/or current NPS runoff in form of sedimentation, low pH, and elevated metals concentrations) was the main source with some agricultural (cattle grazing) and road construction inputs. Most impacts were in the lower six miles (see details in stream summary pages).

Pawpaw Creek achieved the EWH biocriteria standards in 10.8 miles of 11.0 miles assessed (93%) with 0.6 miles unassessed. There was sedimentation in short reach above one site sampled that was temporary in nature (private road construction) after bank stabilization would have occurred (also IBI of 44 at impaired site was only two points below EWH absolute minimum score). It seems to be one of the least mined basins in the Duck Creek watershed and recovered where some had occurred, though there was some NPS sediment accumulation near the Pawpaw Creek mouth at the confluence with East Fork Duck Creek.

Smaller Tributaries

Tributaries greater than two square miles in the Duck Creek basin were sampled (and also some 1 mi.^{2}) where some water column chemical, physical and bacteriological data were recorded (see attainment table and sample location table). Twenty-two of thirty sampled streams (73%) had some portion or all of the sampled stream reach that fully attained its designated stream use, and the linear total comprised 85 percent of stream miles evaluated. Most sampled tributaries surveyed throughout the basin improved dramatically from past or perceived impaired water quality from historical legacy mining and other uses. Time, mine land restoration, and, in some areas, remining, contributed to improvements. Most water quality use designations were upgraded based on biological sampling. Where NON attainment (6% of stream miles) or partial attainment (9% of stream miles) of the assigned aquatic life use designations were documented, various causes and sources of impairment were found: mining (residual and/or current NPS runoff in form of habitat or flow alterations, siltation/sedimentation, low pH, and elevated metals concentrations); agriculture (cattle grazing/pastoral use with siltation and loss of riparian buffer with nutrient/bacterial inputs); and organic inputs with low D.O.'s (from poor or failing septic treatment (nutrient or bacterial inputs) and agriculture or cattle waste inputs). Individual streams with cause and source code lists are in stream summary TMDL table. Now, WWH aquatic life use designation or better is the norm within Duck Creek basin with few streams still listed as lower quality designations of Limited Resource Water (AMD) or Modified Warmwater Habitat.

Table 1. Aquatic life use attainment status of sites sampled in the Duck Creek basin from June-October, 2000. The Index of Biotic Integrity (IBI), Modified Index of well being (MIwb), and the Invertebrate Community Index (ICI) are scores based on the performance of the biotic community. The Qualitative Habitat Evaluation Index (QHEI) measures the ability of the physical habitat to support a biotic community. Aquatic life uses for the Duck Creek basin were based on biological sampling conducted during June - October 2000.

RIVER MILE Fish/Invert.	IBI	MIwb	ICI[a]	QHEI	Attainment Status[b]	Site Location
Duck Creek (06-300) 2000 Western Allegheny Plateau (WAP) - WWH (existing)						
21.2 w	50	9	48	51.5	FULL	
16.1 b / 16.4	53	8.8	50	58	FULL	
11.2 b / 11.3	51	9.3	48	72.5	FULL	
5.5w	43[ns]	6.7*	44	59.5	PARTIAL	**manure spill**
3.2 b	43	8.5[ns]	--	60	(FULL)	**influenced by Ohio R dam & barge traffic**
-- / 2.5	--	--	F*		**(NON)**	ust. Amer. Cyanimid "impounded"
1.8 b	38[ns]	6.3*	P*	59.5	**NON**	dst. Amer. Cyanimid "impounded"
0.5 b / --	42	7.6*	--	57.5	(PARTIAL)	near mouth / recovery
Duck Creek (1997) (WAP) - WWH (existing)						
-- / 3.7	--	--	40		(FULL)	ust. landfills
3.5 b / 3.5	30*	7.1*	44	65.5	PARTIAL	ust. landfills (& last riffle area)
-- / 3.3	--	--	38		(FULL)	dst. Vandele Landfill Trib.
3.2 b	31*	7.2*	32[ns]	67	PARTIAL	dst. possible second landfill Trib.
Duck Creek 1984 (WAP) - WWH (existing)						
21.1	40[ns]	7.5*	40		PARTIAL	
West Fork Duck Creek (06-340) 2000 (WAP) - WWH (existing)						
34.2	54	--	VG	51	FULL	
33.3	48	--	VG	58.5	FULL	
31.4	47	8.7	40	74.5	FULL	
28	46	8.9	46	61.5	FULL	
23.1	50	8.7	VG[d]	63.5	FULL	
22.99/23.00	46	9.5	P		--	Acute Mix zone effluent was not acutely toxic
22.9/22.6	44	8.8	G[d]		FULL	dst. Caldwell WWTP
-- / 22.3	--	--	MG[ns]	--	FULL	dst. Caldwell
20.7	46	9.2	44	60	FULL	dst. Dana / recovery
16	51	9.9	32[ns]	74	FULL	adjacent SR 821 nr. I-77 crossover
11.2 / 12.8	48	9.6	48	65.5	FULL	ust. Dexter
9.1	49	9	42	59	FULL	dst. Macksburg
4.6	45	8.9	48	75	FULL	
0.1	49	8.6	E	59	FULL	nr. mouth
East Fork Duck Creek (06-320) 2000 (WAP) - LWH (existing); WWH (proposed)						
29.9 / 30.3	44	--	E	66.5	FULL	adj. CR 6
28.4	42[ns]	--	G	56	FULL	adj. CR 6
26.3	44	--	40	46.5	FULL	from SR 78
20.7	55	9.7	40	80	FULL	dst. TR 263

RIVER MILE Fish/Invert.	IBI	MIwb	ICI[a]	QHEI	Attainment Status[b]	Site Location
14.3 / 14.1	46	7.9^{ns}	VG	68.5	FULL	dst. CR 48
9.6	53	9	E	72	FULL	CR 47 (Harrietsville)
4.2	40^{ns}	6.6*	46	42.5	PARTIAL	ust. TR 313
0.1 / 0.9	46	8.4	G	51	FULL	ust. SR 821 & dst. Pawpaw Cr. confl
Middle Fork Duck Creek (06-322) 2000 (WAP) - WWH (existing)						
12.7	42^{ns}	–	–	52.5	(FULL)	CR 50 (1.1 mi.^{2})
11.8	44	--	G	37.5	FULL	adj. SR 564
10.8	48	--	E	44	FULL	SR 564 and CR 15
– / 10.4	--	--	P*		(**NON**)	adj. SR 564 (new road construction)
9.8	40^{ns}	--	VG	60.5	FULL	SR 564
5.4	26*	--	48	50	PARTIAL	ust. SR 564 (Middleburg)
0.2 / 0.1	32*	3.9*	P*	54	**NON**	SR 564 & SR 145 (AMD trib. ust. & NPS)
Middle Fork Duck Creek (06-322) 1998 (WAP) - WWH (existing)						
1.1	44	7.6*	--	65.0	(PARTIAL)	
Pawpaw Creek (06-321) 2000 WAP - EWH (existing)						
11	50	--	E	59.5	FULL	adj. SR 564
9.6	56	--	E	66.5	FULL	CR 30 and CR 15
8.2	52	--	E	71.5	FULL	from CR 15
3.8	44*	--	E	72	PARTIAL	TR 324 or 460 (active “401" during sample)
Pawpaw Creek (06-321) (1998) - EWH (existing)						
0.3	52	10.1	E	70.5	FULL	near mouth
Whipple Run (06-306) 2000 (WAP) - WWH (existing)						
4.6	48	--	E	65.5	FULL	
4	52	--	VG	65.5	FULL	
0.2 / 0.1	48	--	F*	63.5	PARTIAL	town of Whipple septic? NPS silt, RR?
Nelots Creek (06-360) 2000 (WAP) - WWH (proposed)						
1.6 / 1.1	48	--	VG	61.5	FULL	
0.2 / 0.1	42^{ns}	--	G	60.5	FULL	
Coal Run (06-366) 2000 (WAP) - WWH (proposed)						
3.6	54	--	MG^{ns}	47	FULL	cattle, NPS sedimentation/nutrients
2.9	50	--	MG^{ns}	51	FULL	cattle, NPS sedimentation/nutrients
0.8 / 1.0	54	--	G	55	FULL	siltation
Dog Run (06-346) 2000 (WAP) - WWH (existing)						
2.6	28*	--	MG^{ns}	59	PARTIAL	ust. Lk Caldwell/interstitial pool/NPS
1	32*	--	F*	35.5	**NON**	dst Lk Caldwell/NPS silt, more lentic
Wolf Run (06-347) 2000 (WAP) - WWH (existing)						
2.7 / 2.5	40^{ns}	--	MG^{ns}	59	FULL	ust. Lake Caldwell
-- / 0.5	--	--	F*		**(NON)**	dst Wolf Run Res releases/ town NPS
0.4 / --	50	--	--	46.5	(FULL)	dst. Wolf Run Reservoir

RIVER MILE Fish/Invert.	IBI	MIwb	ICI[a]	QHEI	Attainment Status[b]	Site Location
Johnny Woods River (06-348) 2000 (WAP) - LWH (existing); WWH (proposed)						
1.6 / 1.4	50	--	G	54	FULL	
0.4 / 0.3	48	--	G	70	FULL	
Horse Run (06-363) 2000 (WAP) - WWH (proposed)						
2.5 / 2.2	48	--	G	56	FULL	
1.1	48	--	G	57	FULL	
Trib. to Horse Run (confl. @ RM 2.15) (So. Br. Horse Run) (06-347) 2000 (WAP) - WWH (proposed)						
0.2 / 0.1	44	--	MG[ns]	50.5	FULL	
Patty Creek (06-368) 2000 (WAP) - WWH (proposed)						
1.7	44	--	--	49.0	(FULL)	
			(WAP) - EWH (proposed)			
0.1	58	--	E	75.0	FULL	
Salt Run (06-362) 2000 (WAP) - WWH (existing)						
2.1 / 2.2	42[ns]	--	MG[ns]	55	FULL	
0.8 / 0.9	42[ns]	--	MG[ns]	46.5	FULL	
– / 0.2	--	--	MG[ns]	66	(FULL)	
Elk Run (06-344) 2000 (WAP) - WWH (proposed)						
0.4 / --	48	--	--	47.0	(FULL)	
Trib to West Fork Duck Creek (confl.@ RM 9.35)(Macksburg Run)(06-361)2000 (WAP)						
0.3	42[ns]	--	E	49.5	FULL	WWH (proposed)
Buffalo Run (06-342) 2000 (WAP) - LRW (existing); WWH (proposed)						
1.6	28*	--	26*	53	**NON**	likely AMD/gray slag/coagulent present on rocks
0.2 / 0.1	44	--	G	42	FULL	
Warren Run (06-343) 2000 (WAP) - LWH (existing); WWH (proposed)						
0.3 /0.1	38*	--	F*	52	**NON**	irregular pulse AMD/bugs recovering
Trib. to West Fork Duck Cr. (confluence @ RM 3.05) (06-359) 2000 (WAP) - MWH (proposed)						
0.2	12*	--	F*	49.5	**NON**	AMD impacts
Trib. to West Fork Duck Cr. (confluence @ RM 2.30) (06-358) 2000 (WAP) - MWH (proposed)						
0.2/ --	28	--	E	42	(FULL)	MH ust.-Wetland/pool-mining repair? WWH (proposed)
-- / 0.1	--	--	E	--	(FULL)	
Sugar Creek (06-304) 2000 (WAP) - WWH (existing)						
0.2 / 0.1	48	--	E	61	FULL	
Killwell Run (06-301) 2000 (WAP) - WWH (existing)						
0.2 / 0.1	44	--	VG	47.5	FULL	

RIVER MILE Fish/Invert.	IBI	MIwb	ICI[a]	QHEI	Attainment Status[b]	Site Location
Otterslide Run (06-323) 2000 (WAP) - LWH (existing); WWH (proposed)						
0.2 / 0.1	34*	--	G	65	PARTIAL	mined/had mining recovery, roadwork
Mare Run (06-324) 2000 (WAP) - LWH (existing); WWH (proposed)						
0.7	48	--	F*	42.5	PARTIAL	NPS nutrients enriched,silt/cows open
– / 0.1	--	--	G		(FULL)	
West Fork East Fork Duck Cr. (06-335) 2000 (WAP) - LWH (existing); MWH (proposed)						
1.4	30	--	MG	40.5	FULL	
						WWH (proposed)
0.1	48	--	G	61.5	FULL	
Trib. to East Fork Duck Cr. (confluence @ RM 5.73) (06-353) 2000 (WAP) - LRW-AMD (proposed)						
0.2 / 0.1	12*	--	VP*	40	**NON**	AMD & NPS siltation & w'coal fines
Trib. to East Fork Duck Cr. (confluence @ RM 4.15) (06-352) 2000 (WAP) - WWH (proposed)						
0.2 / 0.1	38*	--	G	57	PARTIAL	NPS siltation, there is coal mining nr.
Barnes Run (06-334) 2000 (WAP) - LWH (existing); WWH (proposed)						
1.5	48	--	VG	65	FULL	
0.1	52	--	G	47.1	FULL	
Schwab Run (06-330) 2000 (WAP) - LWH (existing); WWH (proposed)						
2.8 / 3.0	28*	--	E	56	PARTIAL	NPS ag. siltation/ open cow pasture
Greasy Run (06-332) 2000 (WAP) - LWH (existing); WWH (proposed)						
2.1 / 1.2	38*	--	MG[ns]	62.5	PARTIAL	
0.7	56	--	F*	35	PARTIAL	NPS agri., open canopy/open pasture
Elk Fork (06-331) 2000 (WAP) - LWH (existing); WWH (proposed)						
2.5 / --	50	--	--	61	(FULL)	Ust. McBride Run (~1 mi.^{2})
– / 2.2	--	--	F*	--	**(NON)**	pulsed AMD from 1 mi.^{2} trib ust.(dst. McBride Run)
1.8	48	--	MG[ns]	55	FULL	
0.2 / 0.1	50	--	P*	59	**NON**	NPS nutrients & poss. AMD(coal dust)
Creighton Run (06-327) 2000 (WAP) - LWH (existing); EWH (proposed)						
0.9 / 0.8	50	--	E	62	FULL	
Flag Run (06-329) 2000 (WAP) - LWH (existing); WWH (proposed)						
2.5 / --	30*	--	--	54.5	**(NON)**	
1.0 / 0.8	36*	--	VG	54.5	PARTIAL	gas line const. ust./ old mining area
– / 0.4	--	--	E	54	(FULL)	
0.1	40[ns]	--	E	58.5	FULL	
Road Fork (06-328) 2000 (WAP) - LWH (Existing); CWH (proposed)						
2.0	42[ns]	--	E	60.5	FULL	
					WWH (proposed)	
1.5 / 1.4	34*	--	G	63	PARTIAL	past mining/coal fines,silt/gravel load
0.7	48	--	E	61.5	FULL	

Biological Criteria for Western Allegheny Plateau (WAP)

Site Type INDEX	IBI Headwaters	IBI Wading	IBI Boat	MIwb Wading	MIwb Boat	ICI (all sites)
EWH Habitat	50	50	48	9.4	9.6	46
WWH Habitat	44	44	40	8.4	8.6	36
MWH	24	24	24	6.2	5.8	22
LRW	18	18	18	4.0	4.0	8

* Significant departure from ecoregion biocriterion; poor and very poor results are underlined.
ns Nonsignificant departure from biocriterion (<4 IBI or ICI units; <0.5 MIwb units).
a Narrative evaluation used in lieu of ICI (E=Exceptional; VG=Very Good; G=Good; MG=Marginally Good; F=Fair; P=Poor).
b Use attainment status based on one organism group is parenthetically expressed.
c Sampled or evaluated in 2000.
d sampled in July 2002 (follow-up sample) to match sites.
NA Not Applicable. The MIwb (Modified Index of Well-being) is not applicable to headwater sites.

Table 2. Water quality data for aluminum.

Station	Avg (µg/l)	Min (µg/l)	Max (µg/l)	Count	Start Date	End Date
C01G01	987	544	1770	7	7/11/2000	9/18/2000
C01G02	1695	530	4760	5	7/11/2000	9/18/2000
C01G03	309	200	464	3	8/16/2000	9/18/2000
C01G04	686	249	1300	6	7/11/2000	9/18/2000
C01G05	835	216	2560	9	7/11/2000	9/18/2000
C01G06	355	201	487	6	7/11/2000	9/18/2000
C01G07	337	200	732	9	7/11/2000	9/18/2000
C01G08	809	365	1840	6	7/11/2000	9/18/2000
C01G09	1094	544	2050	6	7/11/2000	9/18/2000
C01G10	859	620	1140	10	7/11/2000	9/18/2000
C01G11	548	200	1020	6	7/11/2000	9/18/2000
C01G12	511	323	827	10	7/11/2000	9/18/2000
C01G13	259	200	390	9	7/11/2000	9/18/2000
C01G14	221	200	324	11	7/11/2000	9/18/2000
C01G15	305	201	369	7	7/11/2000	9/18/2000
C01G16	731	358	1130	6	7/11/2000	9/18/2000
C01G17	274	200	791	8	7/11/2000	9/18/2000
C01G18	1694	200	4510	8	7/11/2000	9/18/2000
C01G19	200	200	200	7	7/11/2000	9/18/2000
C01G20	200	200	200	5	7/11/2000	9/18/2000
C01G21	200	200	200	6	7/11/2000	9/18/2000
C01G22	615	366	1400	7	7/11/2000	9/18/2000
C01G23	599	200	2370	7	7/11/2000	9/18/2000
C01G24	414	200	1430	11	7/11/2000	9/18/2000
C01G25	224	200	303	6	7/11/2000	9/18/2000
C01G26	221	200	282	9	7/11/2000	9/18/2000
C01G27	200	200	200	6	7/11/2000	9/18/2000
C01G28	448	209	954	9	7/11/2000	9/18/2000
C01G29	231	200	433	9	7/11/2000	9/18/2000
C01G30	320	200	426	7	7/11/2000	9/18/2000
C01G31	209	200	246	7	7/11/2000	9/18/2000
C01G32	200	200	200	7	7/11/2000	9/18/2000
C01G33	18745	200	108000	6	7/11/2000	9/18/2000

Station	Avg (µg/l)	Min (µg/l)	Max (µg/l)	Count	Start Date	End Date
C01G34	200	200	200	7	7/11/2000	9/18/2000
C01G35	200	200	200	4	7/11/2000	8/1/2000
C01G36	204	200	231	7	7/11/2000	9/18/2000
C01G37	200	200	200	6	7/11/2000	9/18/2000
C01G38	200	200	200	7	7/11/2000	9/18/2000
C01G39	200	200	200	11	7/11/2000	9/18/2000
C01G40	239	200	326	8	7/11/2000	9/18/2000
C01G41	288	200	726	6	7/11/2000	9/18/2000
C01G42	214	200	350	11	7/11/2000	9/18/2000
C01G43	326	200	1080	7	7/11/2000	9/18/2000
C01G44	218	200	307	6	7/11/2000	9/18/2000
C01G45	495	200	1620	6	7/11/2000	9/18/2000
C01G46	200	200	200	6	7/11/2000	9/18/2000
C01G49	91300	88000	94600	2	8/30/2000	9/18/2000
C01S06	1393	812	2080	6	7/11/2000	9/18/2000
C01S08	719	547	972	6	7/11/2000	9/18/2000
C01S09	213	200	266	8	7/11/2000	9/18/2000
C01S15	365	200	1160	6	7/11/2000	9/19/2000

Table 3. Water quality data for iron.

Station	Avg (µg/l)	Min (µg/l)	Max (µg/l)	Count	Start Date	End Date
C01G01	1140	537	1980	7	7/11/2000	9/18/2000
C01G02	2129	596	6360	5	7/11/2000	9/18/2000
C01G03	350	205	500	3	8/16/2000	9/18/2000
C01G04	774	428	1410	6	7/11/2000	9/18/2000
C01G05	963	357	2880	9	7/11/2000	9/18/2000
C01G06	464	353	543	6	7/11/2000	9/18/2000
C01G07	350	122	830	9	7/11/2000	9/18/2000
C01G08	865	383	2020	6	7/11/2000	9/18/2000
C01G09	1183	511	2490	6	7/11/2000	9/18/2000
C01G10	874	545	1270	10	7/11/2000	9/18/2000
C01G11	507	76	913	6	7/11/2000	9/18/2000
C01G12	809	508	1230	10	7/11/2000	9/18/2000
C01G13	334	187	650	9	7/11/2000	9/18/2000
C01G14	294	80	476	11	7/11/2000	9/18/2000
C01G15	429	331	523	7	7/11/2000	9/18/2000
C01G16	962	391	1750	6	7/11/2000	9/18/2000
C01G17	263	97	1040	8	7/11/2000	9/18/2000
C01G18	2216	182	6080	8	7/11/2000	9/18/2000
C01G19	196	76	256	7	7/11/2000	9/18/2000
C01G20	206	50	340	5	7/11/2000	9/18/2000
C01G21	82	50	121	6	7/11/2000	9/18/2000
C01G22	120	50	177	7	7/11/2000	9/18/2000
C01G23	515	50	2430	7	7/11/2000	9/18/2000
C01G24	346	129	728	11	7/11/2000	9/18/2000
C01G25	159	101	257	6	7/11/2000	9/18/2000
C01G26	241	105	339	9	7/11/2000	9/18/2000
C01G27	145	56	195	6	7/11/2000	9/18/2000
C01G28	678	310	1490	9	7/11/2000	9/18/2000
C01G29	397	135	811	9	7/11/2000	9/18/2000
C01G30	446	342	566	7	7/11/2000	9/18/2000
C01G31	305	160	465	7	7/11/2000	9/18/2000
C01G32	115	70	182	7	7/11/2000	9/18/2000
C01G33	36549	197	213000	6	7/11/2000	9/18/2000

Station	Avg (µg/l)	Min (µg/l)	Max (µg/l)	Count	Start Date	End Date
C01G34	90	50	165	7	7/11/2000	9/18/2000
C01G35	109	50	183	4	7/11/2000	8/1/2000
C01G36	205	55	426	7	7/11/2000	9/18/2000
C01G37	149	50	272	6	7/11/2000	9/18/2000
C01G38	70	50	91	7	7/11/2000	9/18/2000
C01G39	106	50	306	11	7/11/2000	9/18/2000
C01G40	267	85	486	8	7/11/2000	9/18/2000
C01G41	270	50	989	6	7/11/2000	9/18/2000
C01G42	178	86	494	11	7/11/2000	9/18/2000
C01G43	431	161	1730	7	7/11/2000	9/18/2000
C01G44	476	341	676	6	7/11/2000	9/18/2000
C01G45	1091	549	2790	6	7/11/2000	9/18/2000
C01G46	153	82	241	6	7/11/2000	9/18/2000
C01G49	6915	5440	8390	2	8/30/2000	9/18/2000
C01S06	1246	946	1530	6	7/11/2000	9/18/2000
C01S08	652	394	972	6	7/11/2000	9/18/2000
C01S09	103	50	173	8	7/11/2000	9/18/2000
C01S15	489	200	1590	6	7/11/2000	9/19/2000

Table 4. Water quality data for manganese.

Station	Avg (µg/l)	Min (µg/l)	Max (µg/l)	Count	Start Date	End Date
C01G01	382	148	708	7	7/11/2000	9/18/2000
C01G02	395	264	498	5	7/11/2000	9/18/2000
C01G03	108	94	127	3	8/16/2000	9/18/2000
C01G04	179	149	233	6	7/11/2000	9/18/2000
C01G05	109	81	158	9	7/11/2000	9/18/2000
C01G06	105	83	141	6	7/11/2000	9/18/2000
C01G07	146	89	197	9	7/11/2000	9/18/2000
C01G08	169	127	238	6	7/11/2000	9/18/2000
C01G09	211	155	275	6	7/11/2000	9/18/2000
C01G10	176	132	217	10	7/11/2000	9/18/2000
C01G11	181	110	276	6	7/11/2000	9/18/2000
C01G12	240	98	321	10	7/11/2000	9/18/2000
C01G13	149	91	329	9	7/11/2000	9/18/2000
C01G14	152	95	280	11	7/11/2000	9/18/2000
C01G15	296	232	392	7	7/11/2000	9/18/2000
C01G16	681	409	1070	6	7/11/2000	9/18/2000
C01G17	196	63	543	8	7/11/2000	9/18/2000
C01G18	644	168	1080	8	7/11/2000	9/18/2000
C01G19	400	197	650	7	7/11/2000	9/18/2000
C01G20	1301	608	2080	5	7/11/2000	9/18/2000
C01G21	75	20	128	6	7/11/2000	9/18/2000
C01G22	532	356	1020	7	7/11/2000	9/18/2000
C01G23	225	87	398	7	7/11/2000	9/18/2000
C01G24	238	105	1020	11	7/11/2000	9/18/2000
C01G25	493	326	711	6	7/11/2000	9/18/2000
C01G26	127	102	143	9	7/11/2000	9/18/2000
C01G27	64	55	74	6	7/11/2000	9/18/2000
C01G28	291	139	483	9	7/11/2000	9/18/2000
C01G29	229	93	486	9	7/11/2000	9/18/2000
C01G30	393	245	688	7	7/11/2000	9/18/2000
C01G31	594	301	761	7	7/11/2000	9/18/2000
C01G32	61	41	78	7	7/11/2000	9/18/2000
C01G33	2768	467	12600	6	7/11/2000	9/18/2000

Station	Avg (µg/l)	Min (µg/l)	Max (µg/l)	Count	Start Date	End Date
C01G34	13	10	20	7	7/11/2000	9/18/2000
C01G35	20	10	26	4	7/11/2000	8/1/2000
C01G36	94	10	137	7	7/11/2000	9/18/2000
C01G37	73	10	184	6	7/11/2000	9/18/2000
C01G38	21	10	29	7	7/11/2000	9/18/2000
C01G39	122	60	185	11	7/11/2000	9/18/2000
C01G40	141	67	209	8	7/11/2000	9/18/2000
C01G41	257	111	537	6	7/11/2000	9/18/2000
C01G42	29	16	41	11	7/11/2000	9/18/2000
C01G43	217	154	414	7	7/11/2000	9/18/2000
C01G44	521	361	648	6	7/11/2000	9/18/2000
C01G45	625	300	1040	6	7/11/2000	9/18/2000
C01G46	22	10	40	6	7/11/2000	9/18/2000
C01G49	46150	44400	47900	2	8/30/2000	9/18/2000
C01S06	135	96	158	6	7/11/2000	9/18/2000
C01S08	133	92	154	6	7/11/2000	9/18/2000
C01S09	82	11	253	8	7/11/2000	9/18/2000
C01S15	87	65	114	6	7/11/2000	9/19/2000

Table 5. Water quality data for total suspended solids.

Station	Avg (mg/L)	Min (mg/L)	Max (mg/L)	Count	Start Date	End Date
C01G01	27	13	45	7	7/11/2000	9/18/2000
C01G02	102	11	387	5	7/11/2000	9/18/2000
C01G03	6	5	8	3	8/16/2000	9/18/2000
C01G04	20	6	46	6	7/11/2000	9/18/2000
C01G05	25	5	66	9	7/11/2000	9/18/2000
C01G06	11	5	16	6	7/11/2000	9/18/2000
C01G07	9	5	23	9	7/11/2000	9/18/2000
C01G08	24	8	63	6	7/11/2000	9/18/2000
C01G09	37	8	116	6	7/11/2000	9/18/2000
C01G10	19	13	30	10	7/11/2000	9/18/2000
C01G11	12	5	20	6	7/11/2000	9/18/2000
C01G12	16	13	22	10	7/11/2000	9/18/2000
C01G13	9	5	32	9	7/11/2000	9/18/2000
C01G14	6	5	9	11	7/11/2000	9/18/2000
C01G15	11	5	14	7	7/11/2000	9/18/2000
C01G16	21	14	26	6	7/11/2000	9/18/2000
C01G17	7	5	17	8	7/11/2000	9/18/2000
C01G18	37	5	89	8	7/11/2000	9/18/2000
C01G19	5	5	5	7	7/11/2000	9/18/2000
C01G20	5	5	5	5	7/11/2000	9/18/2000
C01G21	5	5	5	6	7/11/2000	9/18/2000
C01G22	6	5	7	7	7/11/2000	9/18/2000
C01G23	19	5	64	8	7/11/2000	9/18/2000
C01G24	9	5	18	11	7/11/2000	9/18/2000
C01G25	5	5	5	6	7/11/2000	9/18/2000
C01G26	6	5	10	9	7/11/2000	9/18/2000
C01G27	5	5	5	6	7/11/2000	9/18/2000
C01G28	16	5	33	9	7/11/2000	9/18/2000
C01G29	7	5	12	9	7/11/2000	9/18/2000
C01G30	10	6	17	7	7/11/2000	9/18/2000
C01G31	7	5	12	7	7/11/2000	9/18/2000
C01G32	5	5	5	7	7/11/2000	9/18/2000
C01G33	1,002	5	5880	6	7/11/2000	9/18/2000

Station	Avg (mg/L)	Min (mg/L)	Max (mg/L)	Count	Start Date	End Date
C01G34	5	5	5	7	7/11/2000	9/18/2000
C01G35	5	5	5	4	7/11/2000	8/1/2000
C01G36	5	5	5	7	7/11/2000	9/18/2000
C01G37	5	5	5	6	7/11/2000	9/18/2000
C01G38	5	5	5	7	7/11/2000	9/18/2000
C01G39	5	5	5	11	7/11/2000	9/18/2000
C01G40	7	5	12	8	7/11/2000	9/18/2000
C01G41	11	5	32	6	7/11/2000	9/18/2000
C01G42	5	5	9	11	7/11/2000	9/18/2000
C01G43	12	5	51	7	7/11/2000	9/18/2000
C01G44	8	5	16	6	7/11/2000	9/18/2000
C01G45	21	7	70	6	7/11/2000	9/18/2000
C01G46	5	5	5	6	7/11/2000	9/18/2000
C01G49	7	5	8	2	8/30/2000	9/18/2000
C01S06	28	22	35	6	7/11/2000	9/18/2000
C01S08	14	6	20	6	7/11/2000	9/18/2000
C01S09	5	5	7	8	7/11/2000	9/18/2000
C01S15	14	5	55	6	7/11/2000	9/19/2000