

DATA REPORT

**AUTOMATED WATER QUALITY MONITORING IN GERMAN
BRANCH FOR THE
WATERSHED TARGETING PROJECT**

STATE OF MARYLAND
COOPERATIVE PROJECT

DEPARTMENT OF THE ENVIRONMENT
DEPARTMENT OF AGRICULTURE
OFFICE OF THE GOVERNOR
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF STATE PLANNING

MAY 1994

STATE OF MARYLAND
WATERSHED TARGETING PROJECT

DATA REPORT

AUTOMATED WATER QUALITY MONITORING IN GERMAN
BRANCH FOR THE WATERSHED TARGETING PROJECT

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CHESAPEAKE BAY AND WATERSHED MANAGEMENT ADMINISTRATION
MARYLAND DEPARTMENT OF THE ENVIRONMENT

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INTRODUCTION

The Watershed Targeting Project is a state wide effort to develop, demonstrate, and evaluate a coordinated approach towards the implementation of the various Chesapeake Bay Cleanup activities. The primary goal of the project is to demonstrate the kinds of improvements in water quality and habitat conditions for living resources that can result from coordinate management actions.

The project has been initiated by several State and Federal agencies. The Governor's Office, the State Departments of Agriculture, the Environment, Natural Resources and State Planning, the University of Maryland, and the United States Departments of the Interior and Agriculture have committed resources to the planning and implementation of this project.

Four basins have been Targeted by the project. Sawmill Creek in Anne Arundel County, the Bird River in Baltimore County, the Piney/Alloway Creeks basin in Carroll County, and the German Branch basin in Queen Anne County have been targeted.

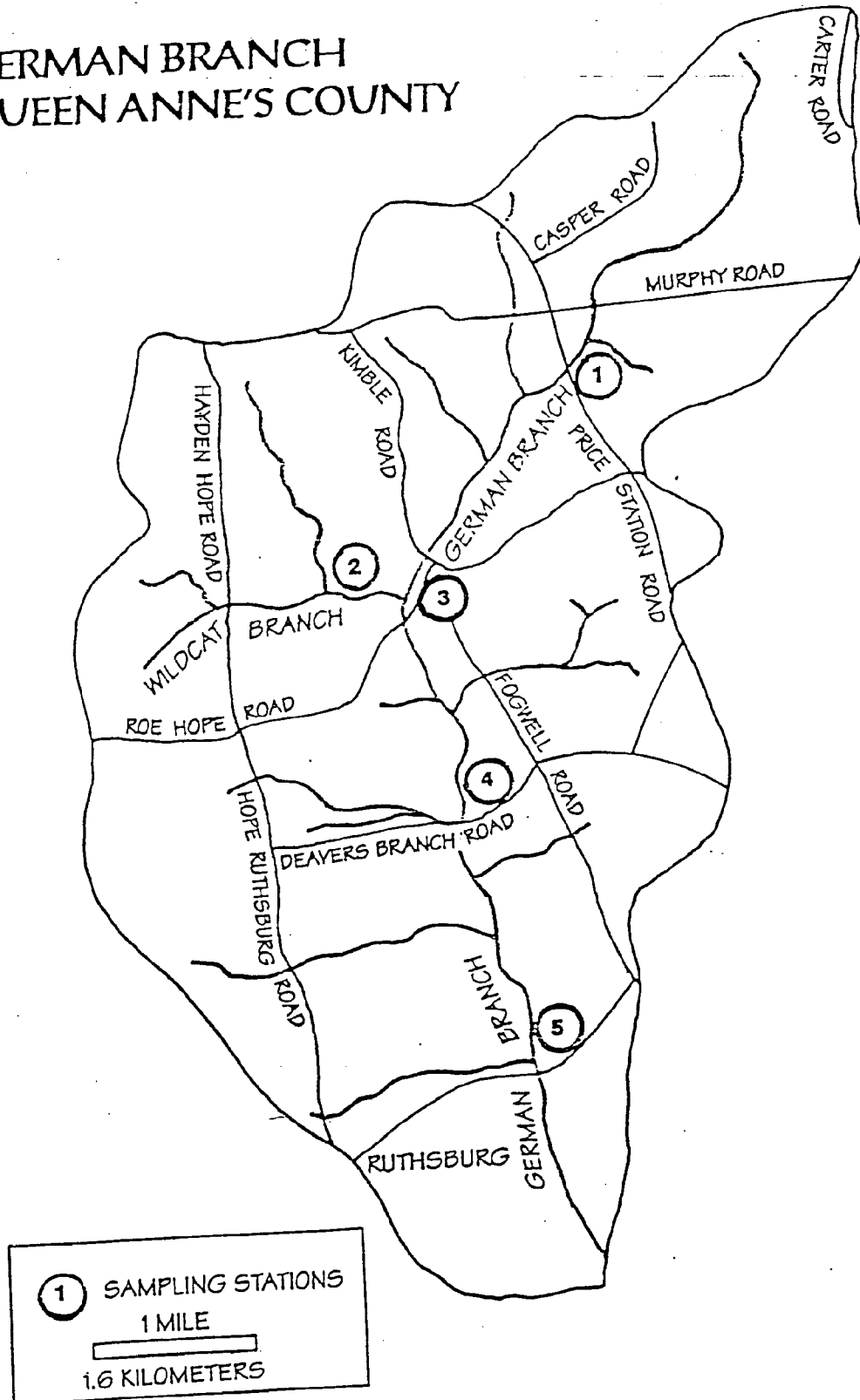
The project is set up in four phases. The first phase involved planning, initiating the project, and recruiting the cooperators. The second phase involved selecting the basins to be targeted. The third phase is the assessment and implementation of the project. The final phase of the project will involve reporting and disseminating the results.

The project is in the assessment and implementation phase. Water quality assessment and monitoring plans have been drawn up for each of the watersheds. Each assessment and monitoring plan has four components; finfish sampling, macroinvertebrate sampling, water quality sampling, and hydrologic characterization. The water quality sampling and hydrologic characterization can be further subdivided. Water quality samples are collected manually on a monthly basis during predominately baseflow conditions and during stormflow conditions by automated water quality sampling stations. Flow data is collected in the same manner, manually once a month and by automated stations during storm events. At least one automated water quality sampling and flow monitoring station has been installed in each of the targeted watersheds. This grant was used to contract with the Smithsonian Environmental Research Center (SERC) to install and operate an automated water quality and flow monitoring station at the base of the German Branch Watershed (Station 5, Figure 1).

The Smithsonian Environmental Research Center was asked to conduct the automated water quality and flow monitoring because of they are conducting research for two other projects in the German Branch basin. The largest project is a National Science Foundation funded study designed to study the effects of geochemistry, land use distribution, and weather on watershed discharges of nitrogen and phosphorus to the

FIGURE 1:

GERMAN BRANCH QUEEN ANNE'S COUNTY



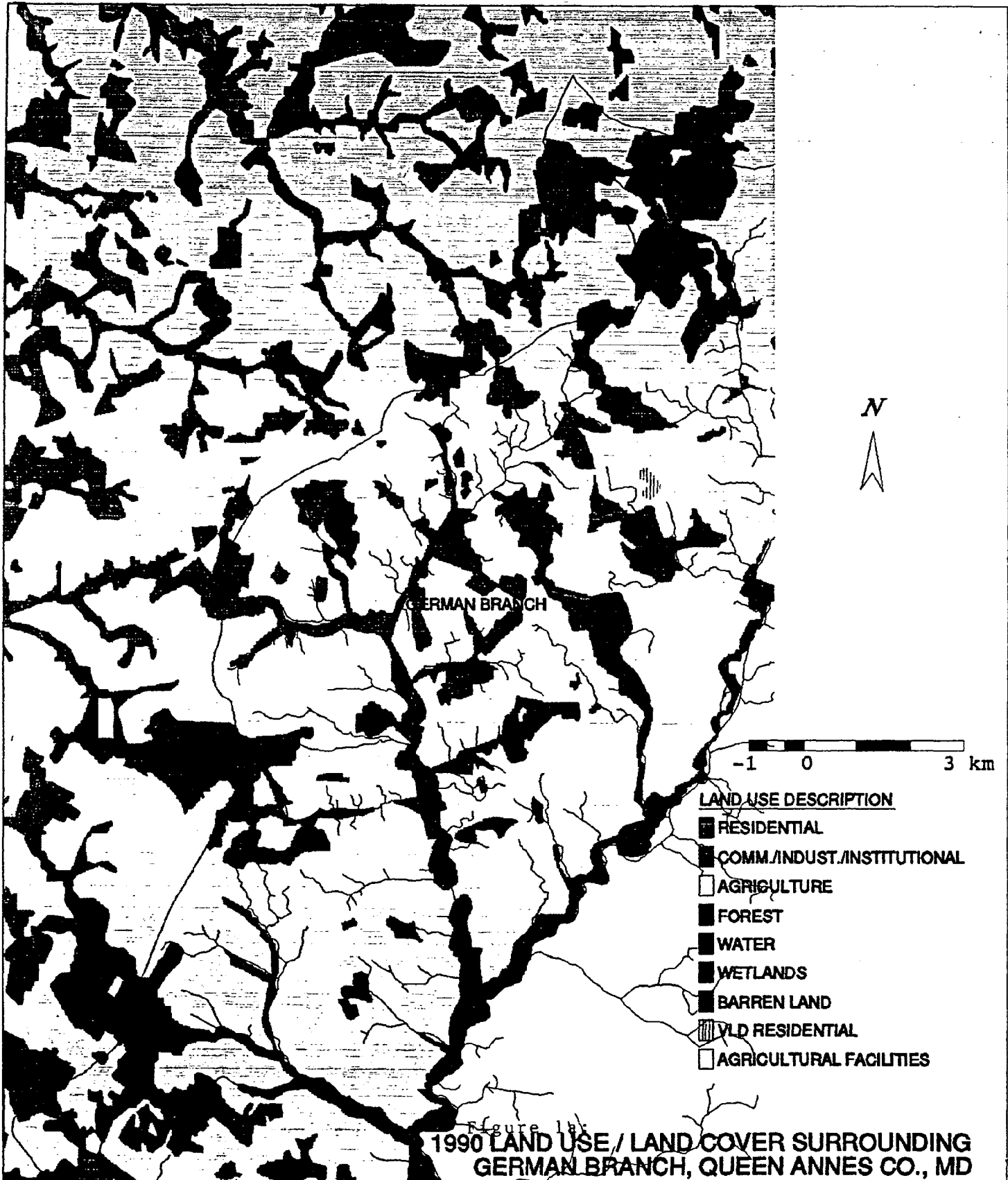
Chesapeake Bay. An automated water quality and flow monitoring station is being operated at Murphy Rd. (Figure 1) by the Smithsonian for this study. Within this basin study is a smaller study funded by the Governor's Council Research Fund. This study, titled "The Comparative Study of Nutrient and Sediment Interception in Chesapeake Bay Riparian Zones" is designed to address three objectives. The project will evaluate the nutrient transport in surface and groundwater resulting from widespread land use practices, evaluate the nutrient reduction capability of riparian buffer strips, and estimate nutrient loads from poorly quantified nonpoint sources. Nested within the riparian zone study is the automated water quality and flow monitoring being funded with the Coastal Zone Management Grant (CZM). The objective of the CZM funded automated water quality and flow monitoring is to develop an estimate of the annual nutrient exports from the German Branch basin by providing continuous flow proportioned water quality sampling and sample analysis. The monitoring at the Station 5 on German Branch will provide an estimate of the annual nutrient discharges from the entire German Branch Basin for all three of these studies.

The water quality monitoring is designed to detect changes in water quality that result from various implementation activities in the German Branch watershed. USDA and MDE are the lead implementation agencies in the German Branch watershed. The USDA German Branch Hydrologic Unit Project and a Main Bay Implementation Grant to MDE are the primary implementation funding mechanisms.

The Hydrologic Unit Project uses cost share funds as an incentive to encourage farmers to adopt water quality oriented BMP's. The Hydrologic Unit Project has approximately \$600,000 budgeted for administration, planning, and implementation in the project area between 1991 and 1995. Through accelerated technical and financial assistance and a concentrated information and education program, the project expects to treat 80 percent of the 8,800 acres of cropland in the watershed (Figures 1a and 1b). The major systems and practices to be implemented are:

Conservation Farm Plans	7,000 acres
Integrated Crop Management	7,000 acres
Riparian Vegetation, Stream	
Protection and Cropland Conversion	250 acres
Sediment Control Structures	50 acres
Timber Stand Improvement	500 acres
Cover Crop	1,000 acres

The Main Bay Implementation Grant is an EPA grant to assist in the in the restoration of water quality in the Chesapeake Bay and its tributaries. EPA, MDE and DNR have committed approximately \$88,000 towards developing a wetland restoration projects in the German Branch watershed as part of the Targeted Watershed Project. One project to restore a 1.5 acre wetland has been constructed.



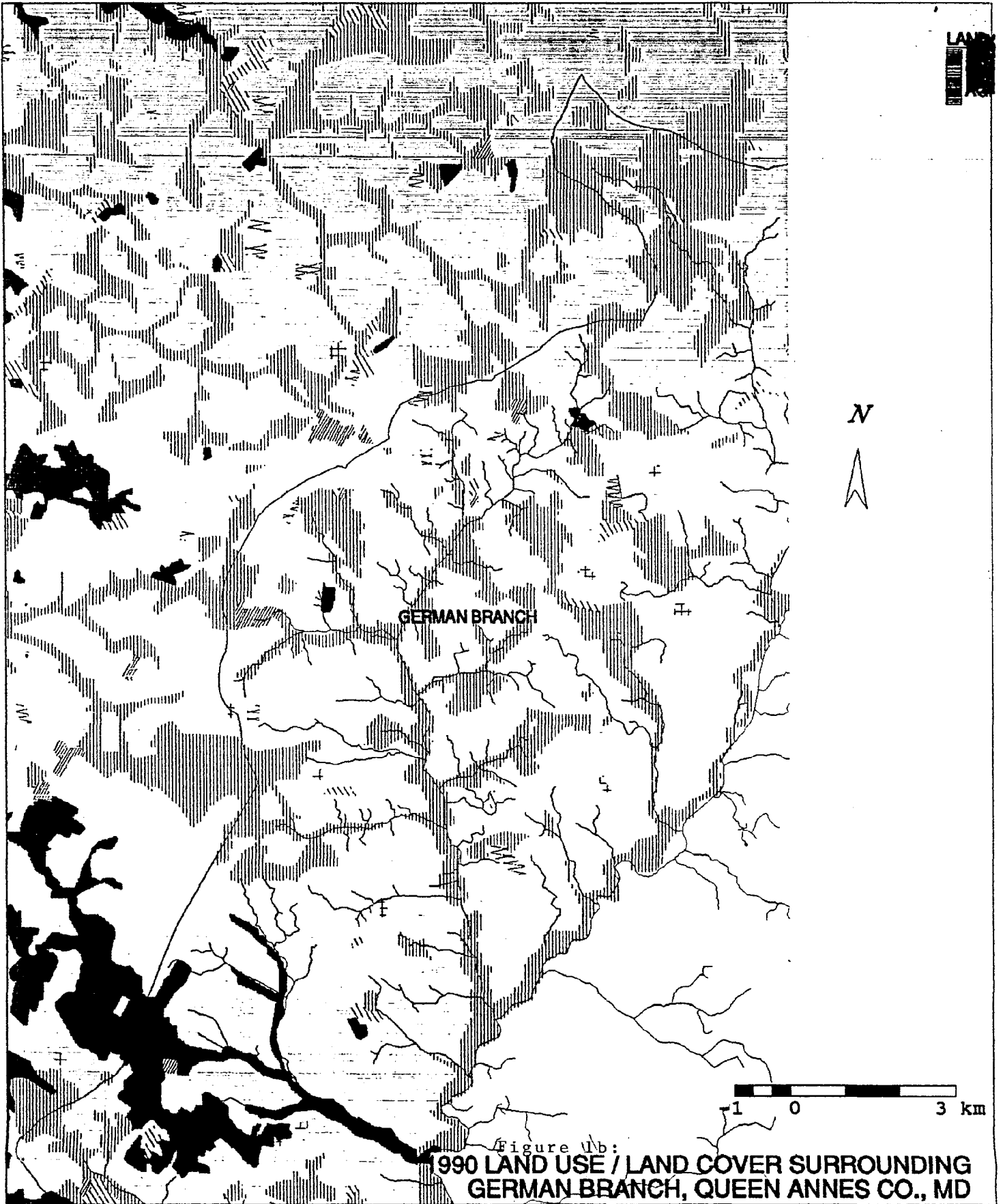


Figure 1b:
1990 LAND USE / LAND COVER SURROUNDING
GERMAN BRANCH, QUEEN ANNES CO., MD

LAND USE DESCRIPTION FOR ATTACHED MAP

LAND USE DESCRIPTION

-  LOW DENSITY RESIDENTIAL
-  MEDIUM DENSITY RESIDENTIAL
-  HIGH DENSITY RESIDENTIAL
-  COMMERCIAL
-  INDUSTRIAL
-  INSTITUTIONAL
-  EXTRACTIVE
-  OPEN URBAN LAND
-  CROPLAND
-  PASTURE
-  ORCHARDS
-  ROW & GARDEN CROPS
-  DECIDUOUS FOREST
-  EVERGREEN FOREST
-  MIXED FOREST
-  BRUSH
-  WATER
-  WETLANDS
-  BEACHES
-  BARE EXPOSED ROCK
-  BARE GROUND
-  LARGE LOT SUBDIVISION (AG.)
-  LARGE LOT SUBDIVISION (FOREST)
-  FEEDING OPERATIONS
-  AGRICULTURAL FACILITIES

Figure 1b: Legend

METHODS

The water quality sampling and flow monitoring is being conducted at a site adjacent to the Rt. 304 bridge over German Branch (Station 5, Figure 1). The sampling station was installed in May of 1990. The sampling station is equipped with automated water quality and flow sampling equipment designed by the Smithsonian Environmental Research Center staff. Flow proportioned water samples are continuously collected and composited for weekly intervals. Grab samples are collected on a periodic basis. The Smithsonian Environmental Research Center is analyzing the water samples for the following suite of parameters;

All water samples: total phosphorus, total phosphate, total organic carbon, total kjeldahl nitrogen (TKN), nitrate, total ammonium, chloride, and total suspended particulates.

Grab samples: dissolved phosphate, dissolved organic carbon, dissolved kjeldahl nitrogen, dissolved ammonium, pH, and alkalinity.

RESULTS

Water chemistry data and flow stage data from 10/92 through 9/93 are presented in Appendix A. Water chemistry data and flow data from 7/90 through 10/93 are presented in Appendix B. Since a full year of chemistry data and flow data are necessary before the annual discharge of nutrients can be estimated, annual loadings have been calculated on a twelve month period based on the beginning of the data record.

Annual and weekly loads have been computed using the concentration and flow data at Station 310. The loads are calculated from flow weighted weekly average concentrations and the total flow for each week. Total flows for each week are presented in Figure 2. The weekly concentration data are presented in Figures 3 through 9. The weekly load data are presented in Figures 10 through 18. The annual loads for the period 7/90 through 6/91, 7/91 through 6/92 and 7/92 through 6/93 are presented in Table 1.

Table 1.

Annual Loads Discharged By German Branch (Metric Tons/yr.)

Parameter	June 1990 - 1991	June 1991 - 1992	June 1992 - 1993
Total Flow (m ³ /yr)	17061733	17481956	22946363
Total P	3.36	4.57	4.28

PO4	1.89	2.64	2.49
Organic Carbon	151.68	166.55	223.96
NO3	59.17	58.52	79.36
NH4	2.68	2.91	3.60
TKN	16.33	19.21	22.24
Sediment	470.77	513.67	574.76
* Total N	75.50	77.73	100.56

* Total N = (TKN + NO3)

Loading coefficients have been calculated by dividing the annual load by the basin area and converting to a standard unit (kg/ha/yr). Loading coefficients for German Branch are presented in Table 2.

TABLE 2: Loading coefficients for TN and TP in the German Branch watershed (kg/ha/yr).

	TP	TN
1990-1991	.6463	14.522
1991-1992	.8790	14.951
1992-1993	.8232	19.342

Figure 2 shows the seasonal changes in flow in German Branch. Flows increased 31% over the last year due to heavy spring rains. The increased flows drove up most of the loadings. The results indicate that the total P and dissolved P loads in German Branch decreased approximately 6%. Loadings of the other parameters increased over the last year. The organic carbon loading increased 34%, sediment load increased 12%, and the total nitrogen load increased 29%. Constituent concentrations appear to be flow dependent. Concentrations of most constituents decreased with increasing flow and increased with decreasing flow. Figures 4, 5, and 6, clearly demonstrate this pattern. Sediment concentrations were the exception to this rule (Figure 9). Sediment concentrations increased with increasing flow.

Total phosphorus and PO₄ concentrations are heavily influenced by sediment concentrations. TP and PO₄ concentrations usually increase with flow in a pattern similar to sediment. In German Branch, TP and PO₄ concentrations increase with decreasing flow. As stated in the last annual report, one of the suspected reasons for the apparent anomolous behavior of TP and PO₄ is a nursery upstream of the sampling station that fertilizes through an irrigation system during dry periods. The Targeted Watershed Project is in the process of documenting the influence of this nutrient source to German Branch. Efforts to date, have been unsuccessful in encouraging the operator to develop a treatment system for the irrigation runoff.

FIGURE 2: GERMAN BRANCH, QUEENE ANNE COUNTY
FLOW-MEAN DAILY DISCHARGE CUBIC METERS/WK

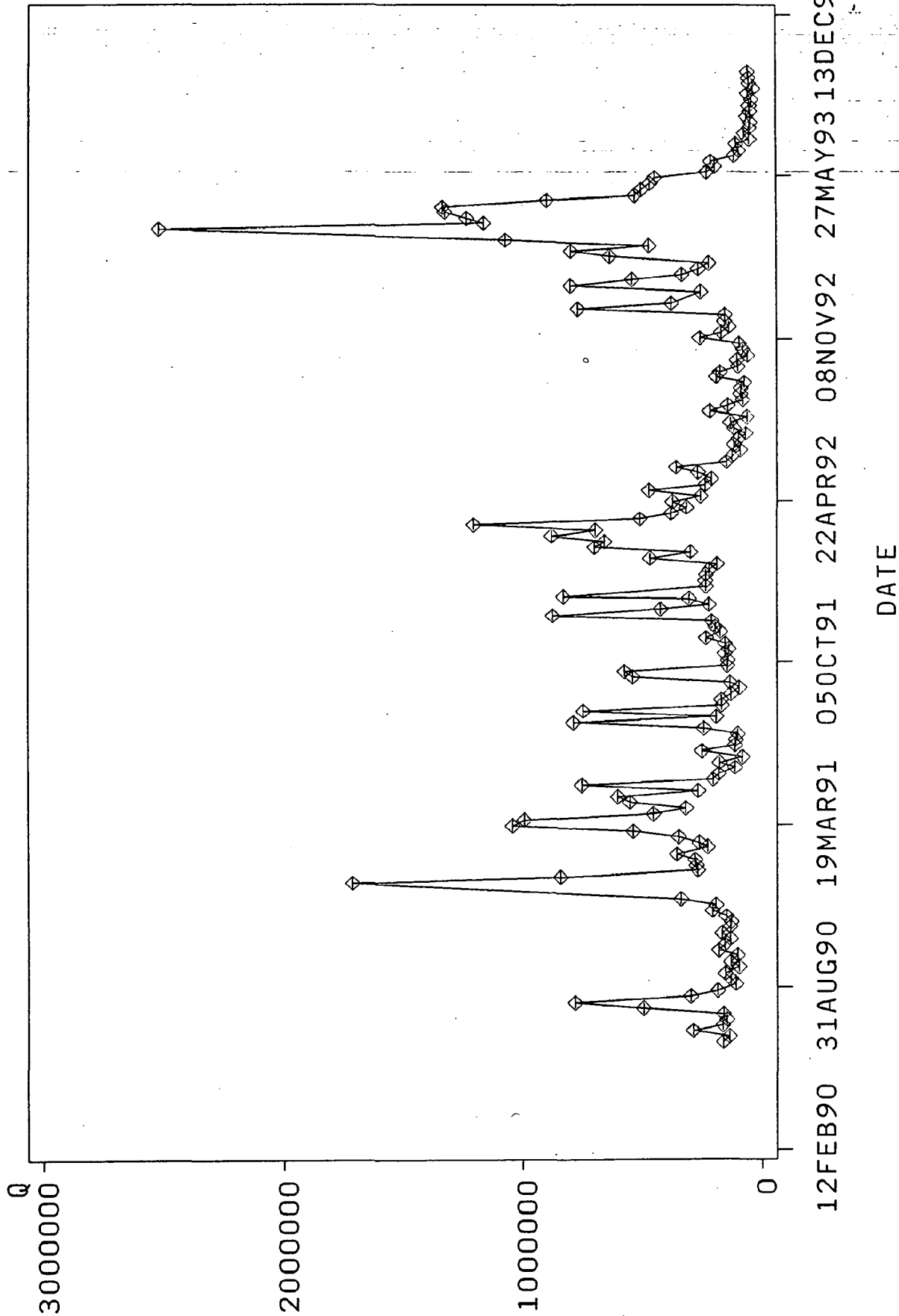


FIGURE 3: WEEKLY MEAN CONCENTRATION TP UG/ML

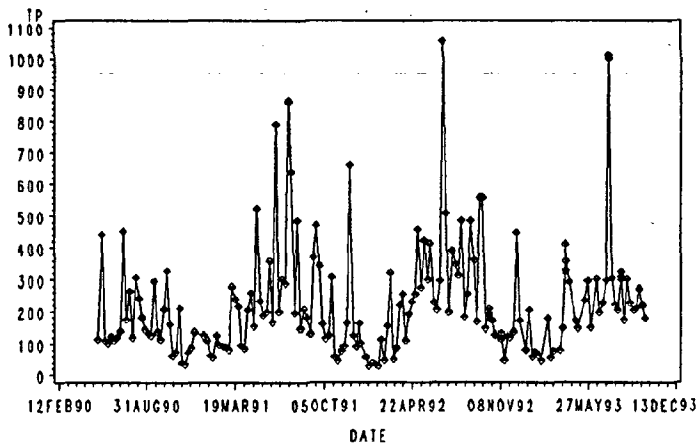


FIGURE 4: WEEKLY MEAN PO4 CONCENTRATION UG/ML

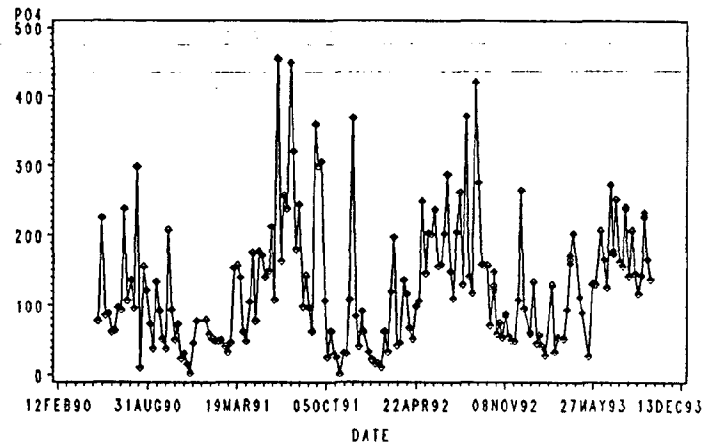


FIGURE 5: WEEKLY MEAN TOTAL NITROGEN CONCENTRATION UG/ML

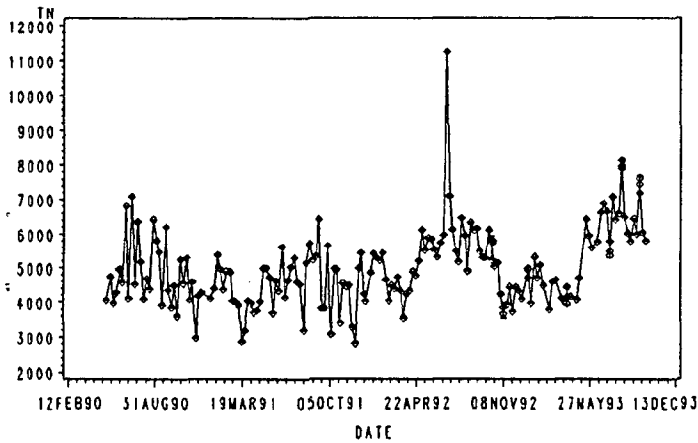


FIGURE 6: WEEKLY MEAN NO3+NO2 CONCENTRATIONS UG/ML

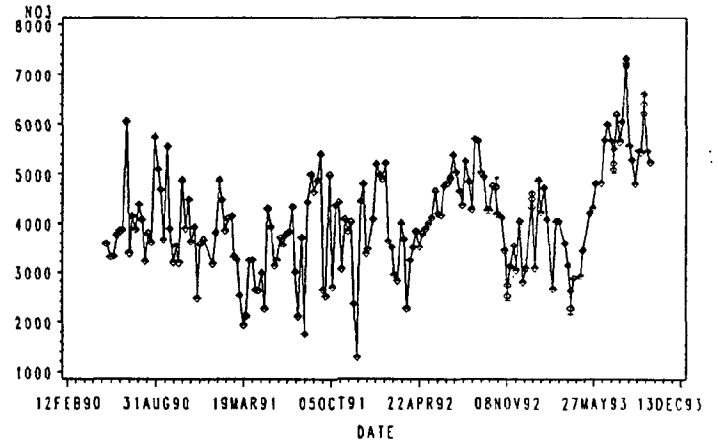


FIGURE 7: WEEKLY MEAN NH4 CONCENTRATIONS UG/ML

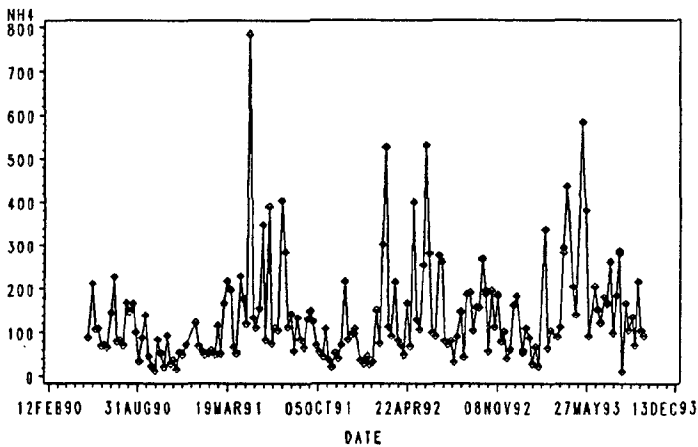


FIGURE 8: WEEKLY MEAN TOTAL KJELDAHL NITROGEN CONCENTRATION UG/ML

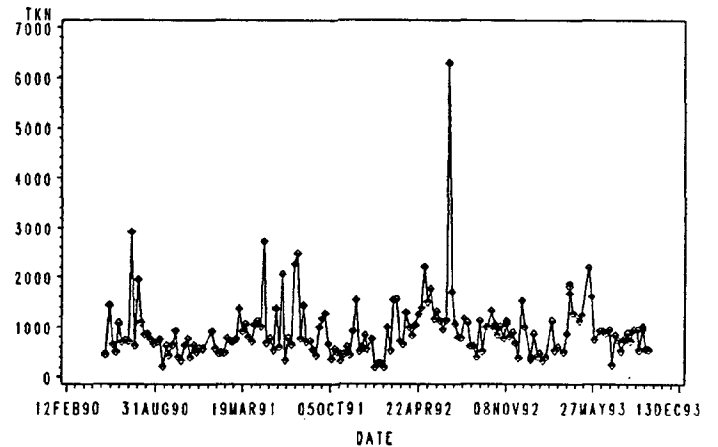


FIGURE 9: WEEKLY MEAN SEDIMENT CONCENTRATION MG/ML

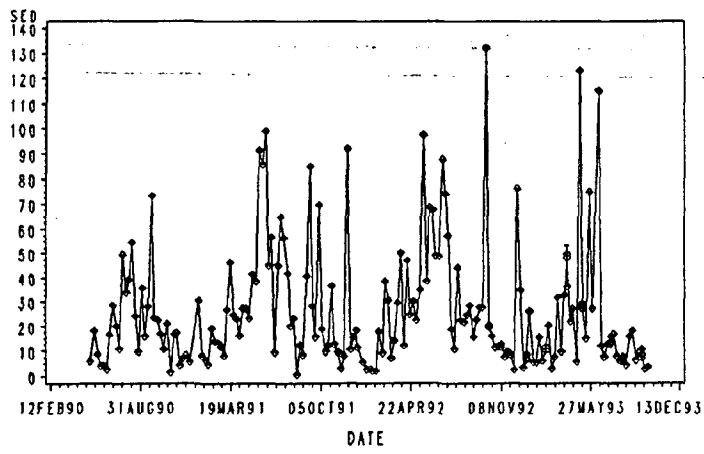


FIGURE 10: WEEKLY MEAN ORGANIC CARBON CONCENTRATION MG/ML

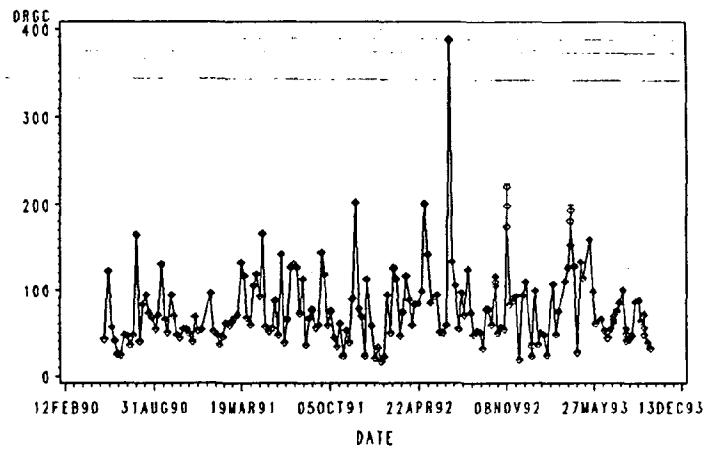


FIGURE 11: TP LOAD KG/WK

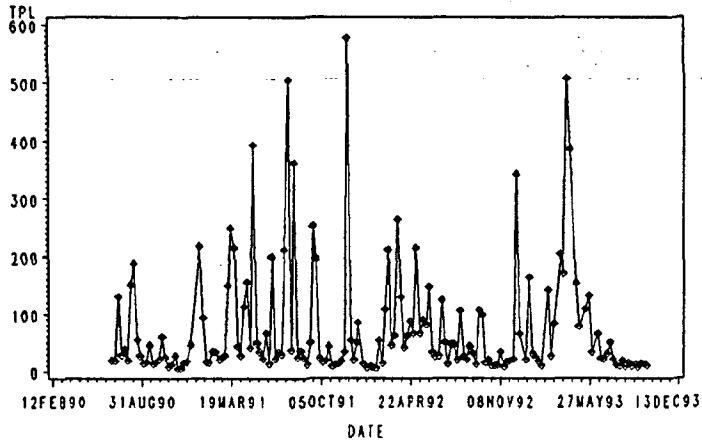


FIGURE 12: PO4 LOAD KG/WK

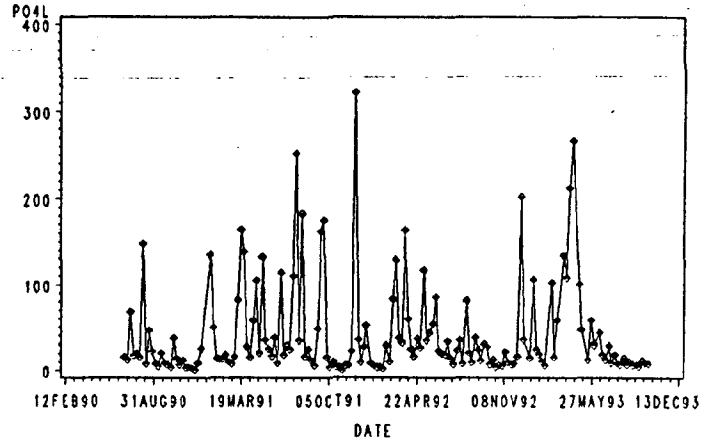


FIGURE 13: ORGANIC CARBON LOAD KG/WK

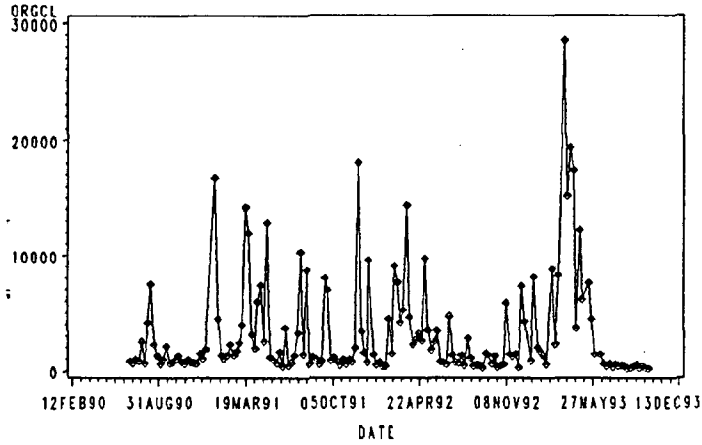


FIGURE 14: NO3 LOAD KG/WK

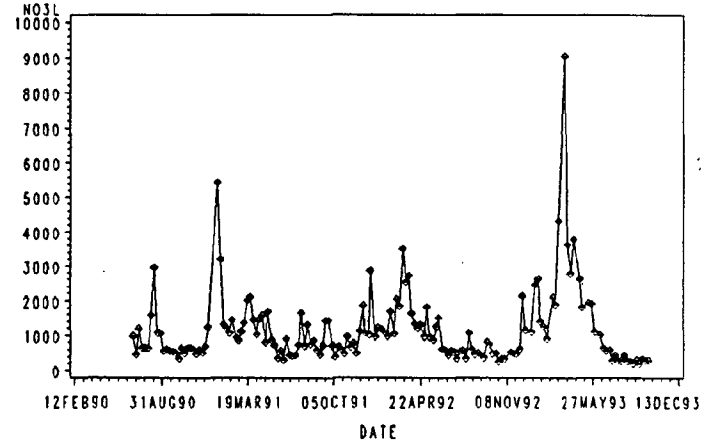


FIGURE 15: NH4 LOAD KG/WK

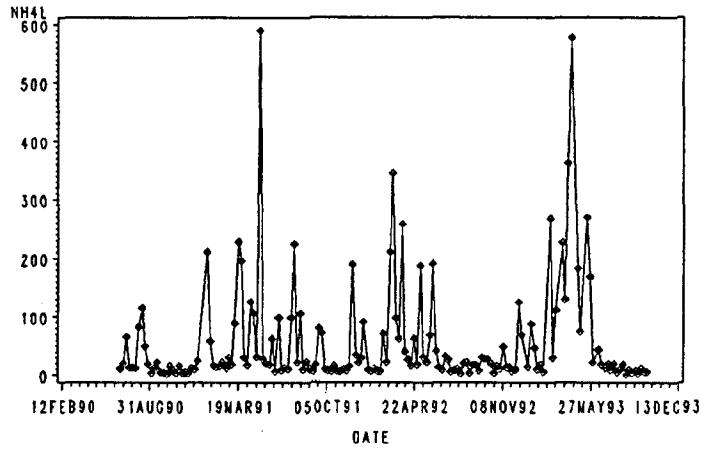


FIGURE 16: TOTAL KJELDAHL NITROGEN LOAD KG/WK

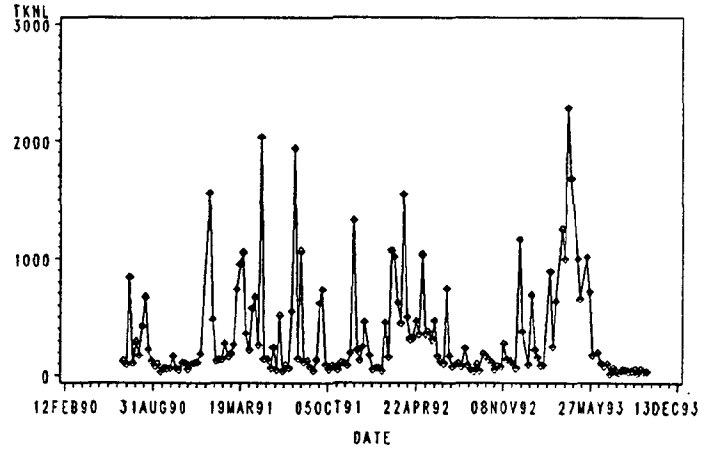


FIGURE 17: SEDIMENT LOAD KG/WK

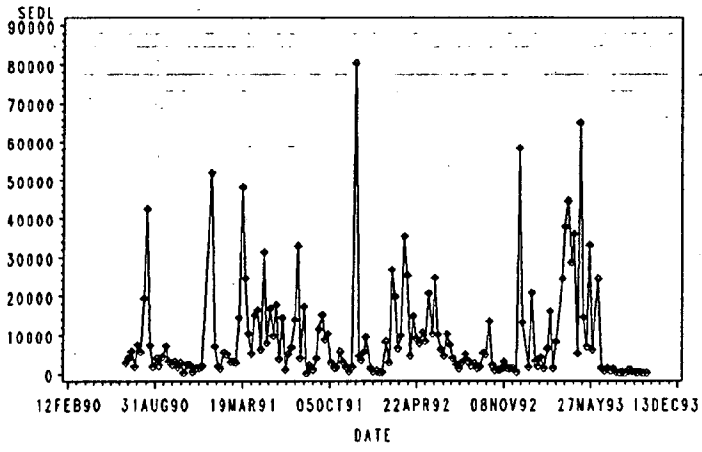
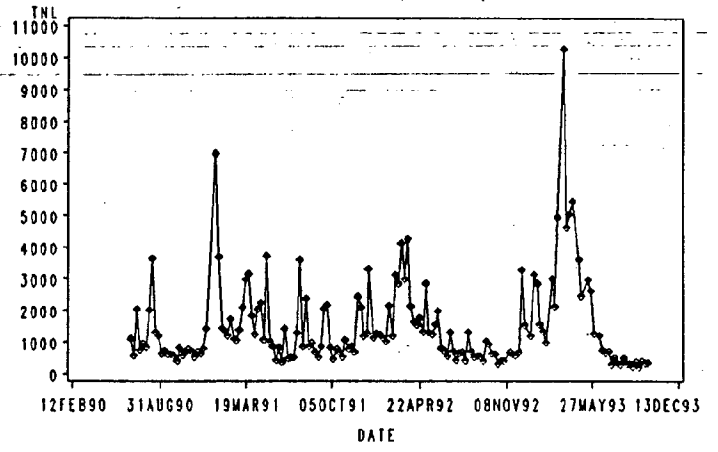


FIGURE 18: TOTAL NITROGEN LOAD KG/WK



APPENDIX A

1992-1993 DATA SET

Weekly Flow and Water Quality Data from German Branch Watershed, SERC Site 310

GB weekly data

Date	Year	Julian Day	Time	Flow m ³	Sed Rep	OM mg/l	TP gcal COD/l	PO4 ug P/l	TKN ug N/l	NH4 ug N/l	NO3 ug N/l	pH	Alkalinity mg CaCO3/l	Conductivity uMhos/cm	
29-Sep-92	92	273	8:00	1.76E+05	1	27.56	77	558	157	998	159	4273	7.21	211	
6-Oct-92	92	280	8:38	1.01E+05	1	132.04	59	147	71	1328	269	4764	7.16	844	213
14-Oct-92	92	288	12:21	1.05E+05	1	19.72	116	193	123	1057	188	4729	7.39	902	224
14-Oct-92	92	288			2	20.48	105	209	128	1020	196	4187	7.39	882	
14-Oct-92	92	288			3	20.32	110	188	147	958	196	4750	7.39	868	
20-Oct-92	92	294	8:38	6.08E+04	1	16.04	49	172	60	836	57	4177	7.32	888	214
27-Oct-92	92	301	10:49	7.95E+04	1	11.28	56	128	74	1010	196	4105	7.30	888	211
3-Nov-92	92	308	8:23	9.54E+04	1	11.8	53	120	54	770	113	3430	6.73	848	219
10-Nov-92	92	315	7:45	2.59E+05	1	11.4	220	132	84	1062	188		7.12	836	220
10-Nov-92	92	315			2	12.64	175	130	84	1121	184	2518	7.12	839	
10-Nov-92	92	315			3	12.4	198	113	87	1098	188	2731	7.12	835	
17-Nov-92	92	322	0:37	1.70E+05	1	7.64	82	48	56	801	79	3111	7.19	803	215
24-Nov-92	92	329	8:40	1.37E+05	1	9.6	87	123	50	893	102	3535	7.14	832	206
30-Nov-92	92	335	0.5	1.56E+05	1	8.48	92	119	49	672	42	3039	7.56	797	205
8-Dec-92	92	343	0:38	1.55E+05	1	2.56	19	138	107	388	61	4036	7.51	776	219
15-Dec-92	92	350	8:08	7.65E+05	1	76.13	93	448	264	1518	163	2787	7.30	583	208
22-Dec-92	92	357	8:27	3.76E+05	1	34.84	109	171	95	998	183	3074	7.17	607	200
28-Dec-92	92	363			1	3.76									
5-Jan-93	93	5	8:32	2.55E+05	1	6.48	34	81	60	379	55	4322	7.21	637	199.8
5-Jan-93	93	5			2	7.32	34	82	61	346	58	4605	7.21	641	
5-Jan-93	93	5			3	8.64	23	81	61	418	55	4494	7.21	642	
12-Jan-93	93	12	0:47	7.95E+05	1	26.15	99	206	133	866	110	3079	7.05	489	178.6
20-Jan-93	93	20	0:38	5.39E+05	1	5.68	36	59	46	420	88	4866	7.08	577	201
26-Jan-93	93	26	13:41	3.33E+05	1	5.52	49	73	58	477	30	4213	7.39	562	197.5
2-Feb-93	93	33	9:06	2.65E+05	1	15.48	47	64	42	328	66	4727	7.44	621	204
9-Feb-93	93	40	9:06	2.21E+05	1	6.17	24	47	28	404	24	4077	7.32	632	201
17-Feb-93	93	48	0:38	6.33E+05	1	10.1							7.23	455	180.2
17-Feb-93	93	48			2	11.47							7.23	456	
17-Feb-93	93	48			3	9.67							7.23	453	
23-Feb-93	93	54	9:05	7.94E+05	1	20.24	107	179	129	1121	337	2657	6.84	307	146.3
2-Mar-93	93	61	0:48	4.67E+05	1	3.17	48	58	34	531	64	4035	7.21	491	182.8
9-Mar-93	93	68	0:36	1.07E+06	1	7.68	75	77	54	595	104	4035	7.05	386	165.4
15-Mar-93	93	74			1	31.68									
23-Mar-93	93	82	9:43	2.52E+06	1	9.68	110	81	53	497	90	3589	7.14	360	159.3
30-Mar-93	93	89	9:36	1.18E+06	1	32.7	127	147	93	860	112	3130	7.04	518	163.2
5-Apr-93	93	95	9:25	1.23E+06	1	36.2	153	412	172	1852	294	2264	6.87	450	168.8
5-Apr-93	93	95			2	48.27	193	360	166	1660	283	2273	6.92	450	
5-Apr-93	93	95			3	49.67	181	329	160	1803	284	2617	6.89	452	
13-Apr-93	93	103	0:38	1.32E+06	1	21.73	128	293	202	1274	437	2867	7.02	401	150.1
19-Apr-93	93	109	8:36	1.33E+06	1	27.27							6.97	441	157.7
27-Apr-93	93	117	8:32	8.96E+05	1	5.7	133	172	112	1118	204	2924	6.98	425	140.6
3-May-93	93	123	9:13	5.28E+05	1	122.93	114	148	89	1244	141	3432	7.10	587	185.4
10-May-93	93	130	8:44	5.00E+05	1	28.87							7.52	659	200
10-May-93	93	130			2	27							7.52	657	
10-May-93	93	130			3	28.13							7.52	661	
18-May-93	93	138	8:29	4.63E+05	1	14.87	159	236	27	2186	582	4203	7.23	636	197.5
25-May-93	93	145	9:24	4.43E+05	1	74.68	98	297	131	1605	380	4317	7.10	651	201
1-Jun-93	93	152	8:54	2.29E+05	1	26.88	60	150	131	748	92	4817	7.37	699	208
8-Jun-93	93	159	0:37	1.96E+05	1										
14-Jun-93	93	165	0:37	2.12E+05	1	115.1	65	303	207	926	205	4822	7.30	735	209
21-Jun-93	93	172	8:14	1.14E+05	1	11.8	52	198	166	919	153	5688	7.18	760	216
28-Jun-93	93	179	8:29	9.45E+04	1	7.72	43	228	126	883	123	5987	6.88	756	226
6-Jul-93	93	187	8:29	1.06E+05	1	12.76	54	299	273	954	181	5682	7.33	749	218

Weekly Flow and Water Quality Data from German Branch Watershed, SERC Site 310

Date	Year	Julian Day	Time	Flow m ³	Sed Rep	mg/l	OM gcal COD/l	TP ug P/l	PO4 ug P/l	TKN ug N/l	NH4 ug N/l	NO3 ug N/l	pH	Alkalinity mg CaCO3/l	Conductivity uMhos/cm
12-Jul-93	93	193	9:59	5.01E+04	1	15.68	61	1002	178	245	169	5511	6.86	860	239
12-Jul-93	93	193			2	13.4	64	1002	174	249	165	5089			
12-Jul-93	93	193			3	12.52	68	1009	177	247	166	5218			
19-Jul-93	93	200	8:29	7.22E+04	1	16.84	74	305	253	843	262	6200	7.36	810	235
26-Jul-93	93	207	6:59	4.91E+04	1	7.88	84	223	163	727	99	5658	7.37	812	231
2-Aug-93	93	214	8:19	4.48E+04	1	6	100	205	157	522	185	6054	6.82	778	237
9-Aug-93	93	221	6:44	6.24E+04	1	6.72	54	311	238	715	281	7164	7.11	831	234
9-Aug-93	93	221			2	7.6	40	301	240	729	288	7226			
9-Aug-93	93	221			3	5.96	48	326	242	782	281	7323			
16-Aug-93	93	228	0:38	4.72E+04	1	4.52	41	174	142	884	11	5579	7.03	882	236
23-Aug-93	93	235	0:33	5.04E+04	1	15.72	46	303	207	714	167	5287	7.25	882	220
30-Aug-93	93	242	8:44	4.06E+04	1	18.24	85	228	146	947	106	4817	7.46	903	227
7-Sep-93	93	250	8:44	5.69E+04	1	6.32	87	206	118	947	136	5470	6.99	817	240
13-Sep-93	93	256	8:14	3.46E+04	1	9.04	63	210	143	540	71	5437	7.28	896	233
20-Sep-93	93	263	9:20	5.13E+04	1	7.16	71	271	229	1016	217	6414	7.09	825	244
20-Sep-93	93	263			2	10.64	55	268	234	996	217	6608			
20-Sep-93	93	263			3	8.32	47	275	226	940	216	6220			
27-Sep-93	93	270	0.4	5.37E+04	1	3	38	221	166	568	104	5454	7.25	858	220
4-Oct-93	93	277	0:36	5.71E+04	1	3.48	31	179	138	549	93	5236	7.12	836	212

Daily Flows for German Branch Watershed, SERC Site 310

Date	Year	Julian Day	Flow m3	Date	Year	Julian Day	Flow m3	Date	Year	Julian Day	Flow m3
1-Oct-92	92	275	1.36E+04	21-Nov-92	92	326	1.70E+04	11-Jan-93	93	11	7.41E+04
2-Oct-92	92	276	1.25E+04	22-Nov-92	92	327	1.96E+04	12-Jan-93	93	12	9.01E+04
3-Oct-92	92	277	1.15E+04	23-Nov-92	92	328	2.93E+04	13-Jan-93	93	13	1.09E+05
4-Oct-92	92	278	1.15E+04	24-Nov-92	92	329	2.22E+04	14-Jan-93	93	14	8.70E+04
5-Oct-92	92	279	1.14E+04	25-Nov-92	92	330	2.10E+04	15-Jan-93	93	15	6.71E+04
6-Oct-92	92	280	1.04E+04	26-Nov-92	92	331	2.67E+04	16-Jan-93	93	16	6.20E+04
7-Oct-92	92	281	1.02E+04	27-Nov-92	92	332	3.70E+04	17-Jan-93	93	17	5.87E+04
8-Oct-92	92	282	1.02E+04	28-Nov-92	92	333	2.74E+04	18-Jan-93	93	18	5.09E+04
9-Oct-92	92	283	1.24E+04	29-Nov-92	92	334	2.34E+04	19-Jan-93	93	19	4.49E+04
10-Oct-92	92	284	2.24E+04	30-Nov-92	92	335	1.95E+04	20-Jan-93	93	20	4.18E+04
11-Oct-92	92	285	1.38E+04	1-Dec-92	92	336	1.88E+04	21-Jan-93	93	21	4.13E+04
12-Oct-92	92	286	1.31E+04	2-Dec-92	92	337	2.05E+04	22-Jan-93	93	22	7.02E+04
13-Oct-92	92	287	1.22E+04	3-Dec-92	92	338	2.07E+04	23-Jan-93	93	23	6.34E+04
14-Oct-92	92	288	1.17E+04	4-Dec-92	92	339	1.87E+04	24-Jan-93	93	24	5.51E+04
15-Oct-92	92	289	1.07E+04	5-Dec-92	92	340	1.99E+04	25-Jan-93	93	25	5.47E+04
16-Oct-92	92	290	1.04E+04	6-Dec-92	92	341	2.04E+04	26-Jan-93	93	26	4.42E+04
17-Oct-92	92	291	1.01E+04	7-Dec-92	92	342	2.00E+04	27-Jan-93	93	27	4.20E+04
18-Oct-92	92	292	1.01E+04	8-Dec-92	92	343	1.94E+04	28-Jan-93	93	28	4.21E+04
19-Oct-92	92	293	1.12E+04	9-Dec-92	92	344	1.92E+04	29-Jan-93	93	29	4.11E+04
20-Oct-92	92	294	1.12E+04	10-Dec-92	92	345	4.73E+04	30-Jan-93	93	30	3.74E+04
21-Oct-92	92	295	1.11E+04	11-Dec-92	92	346	4.31E+05	31-Jan-93	93	31	3.71E+04
22-Oct-92	92	296	1.11E+04	12-Dec-92	92	347	1.31E+05	1-Feb-93	93	32	3.73E+04
23-Oct-92	92	297	1.11E+04	13-Dec-92	92	348	6.89E+04	2-Feb-93	93	33	3.09E+04
24-Oct-92	92	298	1.11E+04	14-Dec-92	92	349	4.81E+04	3-Feb-93	93	34	3.13E+04
25-Oct-92	92	299	1.23E+04	15-Dec-92	92	350	3.70E+04	4-Feb-93	93	35	3.30E+04
26-Oct-92	92	300	1.24E+04	16-Dec-92	92	351	3.30E+04	5-Feb-93	93	36	3.29E+04
27-Oct-92	92	301	1.22E+04	17-Dec-92	92	352	4.95E+04	6-Feb-93	93	37	3.28E+04
28-Oct-92	92	302	1.19E+04	18-Dec-92	92	353	9.34E+04	7-Feb-93	93	38	3.00E+04
29-Oct-92	92	303	1.19E+04	19-Dec-92	92	354	5.18E+04	8-Feb-93	93	39	3.14E+04
30-Oct-92	92	304	1.15E+04	20-Dec-92	92	355	5.42E+04	9-Feb-93	93	40	3.14E+04
31-Oct-92	92	305	1.77E+04	21-Dec-92	92	356	5.53E+04	10-Feb-93	93	41	3.06E+04
1-Nov-92	92	306	1.67E+04	22-Dec-92	92	357	4.07E+04	11-Feb-93	93	42	3.06E+04
2-Nov-92	92	307	1.44E+04	23-Dec-92	92	358	3.80E+04	12-Feb-93	93	43	5.78E+04
3-Nov-92	92	308	6.54E+04	24-Dec-92	92	359	3.75E+04	13-Feb-93	93	44	3.04E+05
4-Nov-92	92	309	3.72E+04	25-Dec-92	92	360	3.24E+04	14-Feb-93	93	45	1.07E+05
5-Nov-92	92	310	2.21E+04	26-Dec-92	92	361	3.16E+04	15-Feb-93	93	46	6.91E+04
6-Nov-92	92	311	6.61E+04	27-Dec-92	92	362	2.89E+04	16-Feb-93	93	47	1.01E+05
7-Nov-92	92	312	3.35E+04	28-Dec-92	92	363	2.99E+04	17-Feb-93	93	48	2.00E+05
8-Nov-92	92	313	2.12E+04	29-Dec-92	92	364	3.61E+04	18-Feb-93	93	49	8.54E+04
9-Nov-92	92	314	1.84E+04	30-Dec-92	92	365	3.64E+04	19-Feb-93	93	50	6.30E+04
10-Nov-92	92	315	1.71E+04	31-Dec-92	92	366	3.61E+04	20-Feb-93	93	51	5.59E+04
11-Nov-92	92	316	1.68E+04	1-Jan-93	93	1	3.32E+04	21-Feb-93	93	52	5.91E+04
12-Nov-92	92	317	1.68E+04	2-Jan-93	93	2	2.97E+04	22-Feb-93	93	53	1.91E+05
13-Nov-92	92	318	4.82E+04	3-Jan-93	93	3	2.82E+04	23-Feb-93	93	54	1.30E+05
14-Nov-92	92	319	3.24E+04	4-Jan-93	93	4	2.81E+04	24-Feb-93	93	55	7.86E+04
15-Nov-92	92	320	2.11E+04	5-Jan-93	93	5	1.43E+05	25-Feb-93	93	56	6.31E+04
16-Nov-92	92	321	1.94E+04	6-Jan-93	93	6	8.45E+04	26-Feb-93	93	57	6.09E+04
17-Nov-92	92	322	1.76E+04	7-Jan-93	93	7	5.60E+04	27-Feb-93	93	58	6.07E+04
18-Nov-92	92	323	1.75E+04	8-Jan-93	93	8	8.32E+04	28-Feb-93	93	59	5.85E+04
19-Nov-92	92	324	1.74E+04	9-Jan-93	93	9	2.04E+05	1-Mar-93	93	60	5.69E+04
20-Nov-92	92	325	1.72E+04	10-Jan-93	93	10	1.24E+05	2-Mar-93	93	61	5.90E+04

Daily Flows for German Branch Watershed, SERC Site 310

Date	Year	Julian Day	Flow m3	Date	Year	Julian Day	Flow m3	Date	Year	Julian Day	Flow m3
3-Mar-93	93	62	5.98E+04	23-Apr-93	93	113	1.26E+05	13-Jun-93	93	164	1.92E+04
4-Mar-93	93	63	2.40E+05	24-Apr-93	93	114	9.87E+04	14-Jun-93	93	165	1.95E+04
5-Mar-93	93	64	3.28E+05	25-Apr-93	93	115	9.12E+04	15-Jun-93	93	166	2.02E+04
6-Mar-93	93	65	1.70E+05	26-Apr-93	93	116	1.43E+05	16-Jun-93	93	167	1.66E+04
7-Mar-93	93	66	1.16E+05	27-Apr-93	93	117	1.54E+05	17-Jun-93	93	168	1.34E+04
8-Mar-93	93	67	9.70E+04	28-Apr-93	93	118	1.02E+05	18-Jun-93	93	169	1.20E+04
9-Mar-93	93	68	8.62E+04	29-Apr-93	93	119	8.75E+04	19-Jun-93	93	170	1.32E+04
10-Mar-93	93	69	7.87E+04	30-Apr-93	93	120	8.12E+04	20-Jun-93	93	171	2.18E+04
11-Mar-93	93	70	8.08E+04	1-May-93	93	121	7.70E+04	21-Jun-93	93	172	1.60E+04
12-Mar-93	93	71	7.19E+04	2-May-93	93	122	7.23E+04	22-Jun-93	93	173	1.64E+04
13-Mar-93	93	72	2.08E+05	3-May-93	93	123	6.71E+04	23-Jun-93	93	174	1.34E+04
14-Mar-93	93	73	5.99E+05	4-May-93	93	124	6.44E+04	24-Jun-93	93	175	1.35E+04
15-Mar-93	93	74	2.41E+05	5-May-93	93	125	7.50E+04	25-Jun-93	93	176	1.35E+04
16-Mar-93	93	75	2.49E+05	6-May-93	93	126	7.76E+04	26-Jun-93	93	177	1.10E+04
17-Mar-93	93	76	6.39E+05	7-May-93	93	127	6.58E+04	27-Jun-93	93	178	1.27E+04
18-Mar-93	93	77	7.17E+05	8-May-93	93	128	6.02E+04	28-Jun-93	93	179	1.16E+04
19-Mar-93	93	78	2.47E+05	9-May-93	93	129	5.40E+04	29-Jun-93	93	180	1.04E+04
20-Mar-93	93	79	1.77E+05	10-May-93	93	130	4.90E+04	30-Jun-93	93	181	9.27E+03
21-Mar-93	93	80	1.68E+05	11-May-93	93	131	4.73E+04	1-Jul-93	93	182	1.14E+04
22-Mar-93	93	81	1.47E+05	12-May-93	93	132	5.99E+04	2-Jul-93	93	183	1.45E+04
23-Mar-93	93	82	1.26E+05	13-May-93	93	133	1.23E+05	3-Jul-93	93	184	1.99E+04
24-Mar-93	93	83	2.85E+05	14-May-93	93	134	6.75E+04	4-Jul-93	93	185	1.60E+04
25-Mar-93	93	84	1.78E+05	15-May-93	93	135	5.80E+04	5-Jul-93	93	186	1.46E+04
26-Mar-93	93	85	1.31E+05	16-May-93	93	136	5.28E+04	6-Jul-93	93	187	1.40E+04
27-Mar-93	93	86	1.21E+05	17-May-93	93	137	6.91E+04	7-Jul-93	93	188	1.28E+04
28-Mar-93	93	87	1.51E+05	18-May-93	93	138	5.60E+04	8-Jul-93	93	189	6.41E+03
29-Mar-93	93	88	1.56E+05	19-May-93	93	139	9.72E+04	9-Jul-93	93	190	4.46E+03
30-Mar-93	93	89	1.91E+05	20-May-93	93	140	9.18E+04	10-Jul-93	93	191	7.99E+03
31-Mar-93	93	90	1.25E+05	21-May-93	93	141	6.67E+04	11-Jul-93	93	192	8.63E+03
1-Apr-93	93	91	3.45E+05	22-May-93	93	142	5.40E+04	12-Jul-93	93	193	7.96E+03
2-Apr-93	93	92	2.91E+05	23-May-93	93	143	4.50E+04	13-Jul-93	93	194	7.26E+03
3-Apr-93	93	93	1.99E+05	24-May-93	93	144	4.10E+04	14-Jul-93	93	195	5.85E+03
4-Apr-93	93	94	1.25E+05	25-May-93	93	145	3.80E+04	15-Jul-93	93	196	2.09E+04
5-Apr-93	93	95	1.05E+05	26-May-93	93	146	3.58E+04	16-Jul-93	93	197	1.13E+04
6-Apr-93	93	96	9.66E+04	27-May-93	93	147	3.38E+04	17-Jul-93	93	198	8.77E+03
7-Apr-93	93	97	8.88E+04	28-May-93	93	148	3.25E+04	18-Jul-93	93	199	1.04E+04
8-Apr-93	93	98	8.38E+04	29-May-93	93	149	3.09E+04	19-Jul-93	93	200	8.48E+03
9-Apr-93	93	99	8.09E+04	30-May-93	93	150	2.90E+04	20-Jul-93	93	201	9.29E+03
10-Apr-93	93	100	3.68E+05	31-May-93	93	151	2.86E+04	21-Jul-93	93	202	9.96E+03
11-Apr-93	93	101	3.36E+05	1-Jun-93	93	152	4.55E+04	22-Jul-93	93	203	5.16E+03
12-Apr-93	93	102	1.54E+05	2-Jun-93	93	153	3.12E+04	23-Jul-93	93	204	4.42E+03
13-Apr-93	93	103	1.19E+05	3-Jun-93	93	154	3.44E+04	24-Jul-93	93	205	6.75E+03
14-Apr-93	93	104	1.04E+05	4-Jun-93	93	155	3.35E+04	25-Jul-93	93	206	6.64E+03
15-Apr-93	93	105	9.63E+04	5-Jun-93	93	156	3.30E+04	26-Jul-93	93	207	6.28E+03
16-Apr-93	93	106	2.76E+05	6-Jun-93	93	157	3.10E+04	27-Jul-93	93	208	6.70E+03
17-Apr-93	93	107	4.71E+05	7-Jun-93	93	158	2.58E+04	28-Jul-93	93	209	6.22E+03
18-Apr-93	93	108	1.63E+05	8-Jun-93	93	159	2.66E+04	29-Jul-93	93	210	7.66E+03
19-Apr-93	93	109	1.22E+05	9-Jun-93	93	160	6.37E+04	30-Jul-93	93	211	5.20E+03
20-Apr-93	93	110	1.01E+05	10-Jun-93	93	161	3.13E+04	31-Jul-93	93	212	6.12E+03
21-Apr-93	93	111	9.45E+04	11-Jun-93	93	162	2.65E+04	1-Aug-93	93	213	6.31E+03
22-Apr-93	93	112	2.11E+05	12-Jun-93	93	163	2.39E+04	2-Aug-93	93	214	1.06E+04

Daily Flows for German Branch Watershed, SERC Site 310

Date	Year	Julian Day	Flow m3	Date	Year	Julian Day	Flow m3	Date	Year	Julian Day	Flow m3
3-Aug-93	93	215	1.20E+04	23-Sep-93	93	266	7.76E+03				
4-Aug-93	93	216	9.39E+03	24-Sep-93	93	267	7.91E+03				
5-Aug-93	93	217	9.07E+03	25-Sep-93	93	268	8.01E+03				
6-Aug-93	93	218	6.02E+03	26-Sep-93	93	269	8.45E+03				
7-Aug-93	93	219	9.65E+03	27-Sep-93	93	270	8.77E+03				
8-Aug-93	93	220	6.49E+03	28-Sep-93	93	271	9.53E+03				
9-Aug-93	93	221	5.80E+03	29-Sep-93	93	272	8.67E+03				
10-Aug-93	93	222	6.45E+03	30-Sep-93	93	273	8.54E+03				
11-Aug-93	93	223	7.49E+03								
12-Aug-93	93	224	6.65E+03								
13-Aug-93	93	225	5.99E+03								
14-Aug-93	93	226	6.45E+03								
15-Aug-93	93	227	6.61E+03								
16-Aug-93	93	228	7.20E+03								
17-Aug-93	93	229	8.05E+03								
18-Aug-93	93	230	9.53E+03								
19-Aug-93	93	231	9.95E+03								
20-Aug-93	93	232	5.56E+03								
21-Aug-93	93	233	5.90E+03								
22-Aug-93	93	234	5.67E+03								
23-Aug-93	93	235	5.85E+03								
24-Aug-93	93	236	6.47E+03								
25-Aug-93	93	237	7.21E+03								
26-Aug-93	93	238	4.23E+03								
27-Aug-93	93	239	5.41E+03								
28-Aug-93	93	240	4.23E+03								
29-Aug-93	93	241	6.71E+03								
30-Aug-93	93	242	8.87E+03								
31-Aug-93	93	243	9.62E+03								
1-Sep-93	93	244	6.62E+03								
2-Sep-93	93	245	3.04E+03								
3-Sep-93	93	246	6.11E+03								
4-Sep-93	93	247	1.05E+04								
5-Sep-93	93	248	8.86E+03								
6-Sep-93	93	249	5.64E+03								
7-Sep-93	93	250	6.28E+03								
8-Sep-93	93	251	6.41E+03								
9-Sep-93	93	252	5.41E+03								
10-Sep-93	93	253	5.64E+03								
11-Sep-93	93	254	5.50E+03								
12-Sep-93	93	255	5.20E+03								
13-Sep-93	93	256	6.45E+03								
14-Sep-93	93	257	1.49E+04								
15-Sep-93	93	258	3.87E+03								
16-Sep-93	93	259	4.74E+03								
17-Sep-93	93	260	5.83E+03								
18-Sep-93	93	261	8.31E+03								
19-Sep-93	93	262	6.72E+03								
20-Sep-93	93	263	6.48E+03								
21-Sep-93	93	264	7.33E+03								
22-Sep-93	93	265	7.68E+03								

APPENDIX B

1990-1993 DATA SET

The SAS System

11:40 Wednesday, May 25, 1994 1

OBS	DATE	SED	OM	TP	PO4	TKN	NH4	NO3	PH	Q	SEDL	ORGL
1										98730		
2	12MAY90	6.1		113.0	77.0	452.0	88.0	3584.0	7.3			
3	21MAY90	18.0		440.0	225.0	1433.0	211.0	3299.0	6.7			
4	29MAY90	8.6		110.0	86.0	444.0	107.0	3309.0	6.9			
6	04JUN90	4.1		101.0	88.0	499.0	108.0	3766.0	7.0			
7	11JUN90	4.2		123.0	62.0	1076.0	69.0	3848.0	6.9			
8	18JUN90	2.6		110.0	64.0	690.0	70.0	3869.0	6.8			
9	25JUN90	16.4		119.0	97.0	744.0	65.0	6049.0	6.7	163273	2677.60	789.47
10	02JUL90	28.4		139.0	93.3	708.0	146.3	3374.3	6.8	138007	3919.29	648.84
11	09JUL90	20.0		450.0	238.0	2917.0	227.0	4142.0	7.0	288174	5763.32	1037.63
12	16JUL90	10.7		175.0	107.0	627.0	80.0	3876.0	7.1	165164	1767.21	798.61
13	23JUL90	49.6		264.3	136.0	1945.5	81.7	4381.3	7.0	148986	7389.50	2529.01
14	30JUL90	33.8		121.0	96.0	1086.0	70.0	4066.0	7.1	162359	5487.58	651.42
15	06AUG90	39.4		306.0	299.0	855.0	168.0	3218.0	7.0	493246	19433.35	4161.01
16	13AUG90	54.6		242.0	10.0	864.0	149.0	3800.0	7.1	778435	42501.36	7447.78
17	20AUG90	24.2		181.0	155.0	753.0	166.0	3618.0	7.1	298192	7216.04	2239.45
18	27AUG90	9.7		144.7	121.3	657.7	101.0	5746.7	7.1	187094	1814.76	1289.60
19	04SEP90	35.6		130.0	73.0	699.0	35.0	5095.0	7.2	110218	5095.0	612.31
20	10SEP90	15.8		127.0	39.0	750.0	87.0	4690.0	7.2	131610	2079.38	947.78
21	17SEP90	27.9		294.0	133.0	228.0	140.0	3667.0	7.2	154563	4312.19	2067.14
22	25SEP90	73.2		138.0	92.0	630.0	46.0	5558.0	7.0	97023	7101.88	648.80
23	01OCT90	23.5		115.0	53.0	442.0	24.0	3893.0	7.1	132510	3113.90	681.62
24	09OCT90	22.6		208.0	39.0	640.0	12.0	3191.0	6.9	103023	2328.25	985.69
25	15OCT90	16.6		328.0	207.0	923.0	83.0	3545.0	6.9	181472	3012.35	1288.19
26	22OCT90	10.6		159.0	93.0	403.0	53.0	3183.0	7.0	157169	1665.94	759.95

OBS	TPL	PO4L	TKNL	NH4L	NO3L	STATION	TN	TNL	ORGC
1						310			
2	19.429	15.837	121.47	10.612	987.61	310	6793.0	1109.08	47.0
3	19.182	12.876	97.71	20.190	465.66	310	4082.3	563.37	45.7
4	19.675	68.583	840.58	65.414	1193.58	310	7059.0	2034.16	35.0
5	28.903	17.672	103.55	13.213	640.16	310	4503.0	743.71	47.0
6	39.376	20.262	289.84	12.172	652.73	310	6326.8	942.58	165.0
7	19.645	15.586	176.32	11.365	660.13	310	5152.0	836.45	39.0
8	150.929	147.476	421.71	82.863	1587.22	310	4073.0	2008.93	82.0
9	188.376	7.784	672.55	115.984	2957.97	310	4664.0	3630.52	93.0
10	53.971	46.218	224.53	49.498	1078.83	310	4371.0	1303.36	73.0
11	27.072	22.694	123.05	18.896	1075.14	310	6404.4	1198.19	67.0
12	14.328	8.046	77.04	3.858	561.54	310	5794.0	638.59	54.0
13	16.714	5.133	98.70	11.450	617.23	310	5440.0	715.94	70.0
14	45.440	20.556	35.24	21.638	566.77	310	3895.0	602.01	130.0
15	13.389	8.926	61.12	4.463	539.24	310	6188.0	600.36	65.0
16	15.238	7.023	58.57	3.180	515.85	310	4335.0	574.41	50.0
17	21.428	4.018	65.93	1.236	328.74	310	3831.0	394.67	93.0
18	59.521	37.564	167.49	15.062	643.30	310	4468.0	810.79	69.0
19	24.989	14.616	63.34	8.330	500.25	310	3586.0	563.59	47.0

OBS	DATE	SED	OM	TP	PO4	TKN	NH4	NO3	PH	Q	SEDL	ORGL
27	29OCT90	21.1	.	61.7	52.0	340.0	22.3	4878.3	7.0	133168	2809.77	598.69
28	05NOV90	1.6	.	75.0	72.0	634.0	93.0	3902.0	6.9	168666	269.86	937.01
29	13NOV90	16.5	.	210.0	24.0	772.0	29.0	4490.0	7.1	134333	2216.43	746.27
30	19NOV90	17.2	.	39.0	32.0	406.0	38.0	3644.0	6.9	129923	2234.61	654.94
31	26NOV90	4.2	.	33.0	16.0	632.0	17.0	3936.0	6.9	150304	631.26	603.05
32	03DEC90	7.2	.	73.0	3.0	498.0	54.0	2465.0	7.4	208983	1504.64	1461.98
33	10DEC90	8.3	.	88.0	47.0	571.0	50.0	3578.0	7.1	193308	1604.41	1034.13
34	17DEC90	5.8	.	135.3	76.7	565.7	72.3	3682.3	7.0	337851	1959.48	1842.14
35	07JAN91	30.4	.	127.0	79.0	909.0	123.0	3173.0	6.6	1710812	52007.23	16720.43
36	14JAN91	8.2	.	111.0	59.0	573.0	69.0	3812.0	7.0	840567	6892.46	4410.26
37	22JAN91	6.7	.	62.0	53.0	476.0	58.0	4881.0	7.1	268780	1800.78	1299.62
38	28JAN91	4.8	.	58.0	50.0	493.0	51.0	4467.0	6.9	274649	1318.28	1017.19
39	04FEB91	19.2	.	125.0	49.0	487.0	53.0	3859.0	7.1	279722	5370.51	1294.97
40	11FEB91	13.8	.	96.0	51.0	780.0	60.0	4091.0	7.0	354245	4888.44	2223.08
41	20FEB91	13.0	.	91.0	42.0	712.0	51.0	4141.0	7.3	228264	2967.35	1362.03
42	25FEB91	11.5	.	88.0	33.0	711.0	115.0	3310.0	6.8	262422	3017.77	1700.84
43	04MAR91	8.3	.	81.3	47.3	759.3	52.0	3234.3	7.2	347631	2885.26	2406.88
44	11MAR91	26.6	.	278.0	153.0	1372.0	166.0	2526.0	6.6	536796	14278.37	3920.93
45	18MAR91	46.2	.	239.0	157.0	917.0	218.0	1935.0	6.8	1042397	48157.39	14155.61
46	25MAR91	24.6	.	216.0	139.0	1057.0	197.0	2115.0	6.8	993769	24446.03	11961.70
47	01APR91	23.0	.	95.0	62.0	798.0	67.0	3223.0	6.9	451562	10385.64	3112.53
48	08APR91	16.2	.	86.0	49.0	711.0	53.0	3237.0	6.9	318262	5155.70	1931.78
49	15APR91	27.2	.	205.0	105.0	1045.0	229.0	2635.0	6.6	550404	14970.57	5945.56
50	22APR91	27.1	.	259.0	175.0	1115.0	177.0	2625.0	6.8	600200	16264.96	7347.92
51	29APR91	23.4	.	155.0	77.0	1004.0	120.0	2988.0	6.9	268078	6272.85	2537.29
52	06MAY91	41.6	.	523.0	176.0	2709.0	785.0	2252.0	6.9	750895	31236.36	12823.57

OBS	TPL	FO4L	TKNL	NH4L	NO3L	STATION	TN	TNL	ORGC
27	8.216	6.925	45.28	2.970	649.62	310	5218.3	694.89	43.7
28	12.650	12.144	106.93	15.685	658.12	310	4536.0	765.05	54.0
29	28.209	3.224	103.70	3.896	603.14	310	5262.0	706.84	54.0
30	5.067	4.157	52.75	4.937	473.43	310	4050.0	526.17	49.0
31	4.960	2.405	94.99	2.555	591.58	310	4568.0	686.57	39.0
32	15.255	0.627	104.07	11.285	515.13	310	2963.0	619.20	68.0
33	17.011	9.085	110.38	9.665	691.64	310	4149.0	802.01	52.0
34	45.710	25.912	191.12	24.426	1244.03	310	4248.0	1435.15	53.0
35	217.267	135.150	1555.08	210.424	5428.25	310	4082.0	6983.34	95.0
36	93.300	49.592	481.63	57.997	3204.15	310	4385.0	3685.78	51.0
37	16.664	14.245	127.94	15.589	1311.88	310	5357.0	1439.81	47.0
38	15.929	13.732	135.40	14.007	1226.82	310	4960.0	1362.22	36.0
39	34.964	13.706	136.22	14.825	1079.42	310	4346.0	1215.64	45.0
40	34.007	18.066	276.30	21.254	1449.18	310	4871.0	1725.48	61.0
41	20.771	9.587	162.52	11.641	945.21	310	4853.0	1107.73	58.0
42	23.092	8.660	186.58	30.178	868.59	310	4021.0	1055.17	63.0
43	28.262	16.442	263.95	18.076	1124.31	310	3993.6	1388.26	67.3
44	149.225	82.127	736.46	89.106	1355.91	310	3898.0	2092.37	71.0
45	249.126	163.652	955.85	227.236	2016.98	310	2852.0	2972.83	132.0
46	214.648	138.130	1050.38	195.767	2101.76	310	3172.0	3152.15	117.0
47	42.897	27.996	360.34	30.254	1455.34	310	4021.0	1815.68	67.0
48	27.370	15.594	226.28	16.867	1030.19	310	3948.0	1256.46	59.0
49	112.830	57.791	575.16	126.039	1450.27	310	3680.0	2025.43	105.0
50	155.447	105.032	669.20	106.232	1575.48	310	3740.0	2244.69	119.0
51	41.551	20.641	269.14	32.168	800.99	310	3992.0	1070.14	92.0
52	392.707	132.154	2034.12	589.436	1690.97	310	4961.0	3725.09	166.0

OB5	DATE	SED	OM	TP	PO4	TKN	NH4	NO3	PH	Q	SEDL	ORGL
53	13MAY91	38.4	-	235.0	171.7	676.3	134.7	4296.0	7.1	205216	7880.07	1197.06
54	20MAY91	91.4	-	189.0	140.0	776.0	111.0	3929.0	7.0	183658	16785.87	963.61
55	28MAY91	85.7	-	199.0	149.0	539.0	156.0	3134.0	7.1	114126	9780.32	645.76
56	03JUN91	99.0	-	361.0	212.0	1372.0	348.0	3234.0	7.2	179194	17739.71	1603.85
57	10JUN91	45.2	-	167.0	108.0	598.0	83.0	3705.0	6.9	83330	3766.41	402.92
58	17JUN91	56.7	-	791.0	454.0	2057.0	390.0	3560.0	7.2	252640	14324.29	3690.73
59	24JUN91	9.4	-	199.0	163.0	344.0	75.0	3781.0	6.9	114651	1077.69	448.21
60	01JUL91	45.1	-	303.0	257.0	784.0	111.0	3831.0	6.9	110452	4981.25	738.60
61	08JUL91	64.7	-	289.0	239.0	647.0	106.0	4334.0	6.9	102914	6658.35	1344.62
62	15JUL91	56.4	-	864.0	448.7	2258.0	404.3	3007.0	6.0	246659	13798.38	3264.55
63	22JUL91	41.9	-	641.0	321.0	2467.0	285.0	2110.0	6.8	786040	32934.15	10269.99
64	29JUL91	20.0	-	196.0	180.0	772.0	112.0	3726.0	6.9	192482	3849.53	1425.75
65	05AUG91	23.2	-	486.0	245.0	1432.0	143.0	1758.0	6.8	743898	17257.95	8647.95
66	12AUG91	0.7	-	146.0	98.0	697.0	58.0	4423.0	7.2	169218	118.45	609.31
67	19AUG91	12.3	-	208.0	142.0	717.0	135.0	4975.0	7.0	172095	2116.71	1168.51
68	26AUG91	8.4	-	180.0	97.0	554.0	85.0	4646.0	7.1	130595	1096.97	1021.08
69	03SEP91	40.6	-	132.0	63.0	447.0	66.0	4870.0	7.0	96019	3898.26	543.30
70	09SEP91	84.8	-	371.0	360.0	999.0	132.0	5395.0	6.8	134896	11438.86	804.91
71	16SEP91	28.0	-	471.0	300.0	1162.0	149.0	2638.0	7.0	538718	15083.68	7880.78
72	23SEP91	15.6	-	345.3	306.3	1280.3	125.3	2513.0	7.1	572315	8927.86	6947.66
73	30SEP91	69.5	-	161.0	107.0	655.0	70.0	4974.0	6.6	146251	10164.16	872.67
74	07OCT91	18.9	-	117.0	26.0	375.0	56.0	2698.0	6.4	143099	2719.61	1110.30
75	15OCT91	9.8	-	127.0	63.0	559.0	46.0	4369.0	6.2	156172	1530.44	706.93
76	21OCT91	12.0	-	309.0	31.0	497.0	109.0	4419.0	6.1	139494	1673.88	473.58
77	28OCT91	36.6	-	59.0	25.0	335.0	38.0	3056.0	7.1	155182	5679.50	957.89
78	04NOV91	12.7	-	47.0	1.0	454.0	23.0	4078.0	6.4	234656	2980.05	555.24

OB5	TPL	PO4L	TKNL	NH4L	NO3L	STATION	TN	TNL	ORGL
53	48.224	35.235	138.78	27.642	881.58	310	4972.3	1020.37	56.7
54	34.710	25.711	142.51	20.385	721.57	310	4705.0	864.09	51.0
55	22.710	17.004	61.51	17.803	357.66	310	3673.0	419.17	55.0
56	64.687	37.988	245.85	62.358	579.50	310	4606.0	825.34	87.0
57	13.916	8.999	49.83	6.916	308.73	310	4303.0	358.56	47.0
58	199.833	114.695	519.67	98.527	899.37	310	5617.0	1419.04	142.0
59	22.815	18.688	39.44	8.599	433.48	310	4125.0	472.92	38.0
60	33.466	28.385	86.59	12.260	423.13	310	4615.0	509.72	65.0
61	29.741	24.596	66.58	10.909	446.02	310	4981.0	512.60	127.0
62	211.379	109.775	552.42	98.913	735.67	310	5265.0	1288.09	129.7
63	503.838	252.312	1939.11	224.015	1658.50	310	4577.0	3597.60	127.0
64	37.725	34.646	148.59	21.557	717.17	310	4498.0	865.76	72.0
65	361.524	182.250	1065.23	106.374	1307.74	310	3190.0	2372.97	113.0
66	24.705	16.583	117.94	9.814	748.43	310	5120.0	866.37	35.0
67	35.795	24.437	123.39	23.232	856.15	310	5692.0	979.54	66.0
68	23.506	12.667	72.35	11.100	606.73	310	5200.0	679.07	76.0
69	12.674	6.049	42.92	6.337	467.60	310	5317.0	510.52	55.0
70	50.045	48.561	134.76	17.806	727.74	310	6394.0	863.50	58.0
71	253.729	161.611	625.97	80.267	1421.10	310	3800.0	2047.07	144.0
72	197.615	175.295	732.71	71.709	1438.19	310	3793.3	2170.90	118.0
73	23.546	15.648	95.79	10.237	727.43	310	5629.0	823.22	58.0
74	16.836	3.741	53.96	8.058	388.23	310	3073.0	442.19	75.0
75	19.833	9.839	87.30	7.184	682.30	310	4928.0	769.59	44.0
76	43.102	4.324	69.33	15.204	616.41	310	4916.0	685.73	33.0
77	9.155	3.879	51.98	5.897	474.22	310	3391.0	526.21	60.0
78	11.029	0.235	106.53	5.397	956.90	310	4532.0	1063.43	23.0

OBS	DATE	SED	OM	TP	PO4	TKN	NH4	NO3	PH	Q	SEDL	ORGL
79	12NOV91	9.60		77.0	32.0	595.0	53.0	3842.0		175612	1685.83	939.46
80	18NOV91	3.10		93.0	31.0	439.0	41.0	4019.0	7.30	196424	608.90	767.89
81	22NOV91	8.10		162.7	107.7	918.0	70.3	2343.3	7.00	211229	1710.91	1977.52
82	02DEC91	92.00		660.0	369.0	1523.0	217.0	1270.0	6.60	872677	80284.04	18045.59
83	10DEC91	10.60		126.0	84.0	518.0	83.0	4439.0	7.00	421400	4466.71	3338.16
84	16DEC91	15.50		90.0	42.0	593.0	94.0	4805.0	7.30	222754	3452.59	1558.32
85	23DEC91	18.40		162.0	91.0	829.0	98.0	3371.0	7.00	304753	5607.30	771.10
86	26DEC91	11.40		102.0	62.0	556.0	109.0	3455.0	7.50	827879	9437.56	9539.08
87	07JAN92	5.80		57.0	34.0	749.0	37.0	4080.0	7.20	234495	1360.03	1375.09
88	14JAN92	2.70		28.0	22.0	199.0	30.0	5189.0	7.00	236140	637.56	485.87
89	22JAN92	2.90		38.0	15.0	279.0	45.0	4971.0	7.30	234256	679.32	771.19
90	28JAN92	2.20		33.7	16.7	276.7	27.7	4900.0	7.50	221203	486.63	370.94
91	04FEB92	2.10		28.0	10.0	197.0	33.0	5213.0	7.30	188541	395.93	426.73
92	11FEB92	17.80		115.0	62.0	978.0	152.0	3644.0	7.00	463796	8255.34	4437.43
93	19FEB92	9.20		48.0	33.0	527.0	76.0	3491.0	7.10	298735	2748.29	1505.93
94	25FEB92	38.50		155.0	119.3	1533.7	301.7	2945.7	7.20	696568	26817.12	9029.33
95	03MAR92	30.30		322.0	196.0	1549.0	527.0	2818.0	6.90	655689	19866.82	7622.51
96	10MAR92	7.30		52.0	43.0	712.0	112.0	4001.0	7.00	876865	6400.94	4149.66
97	17MAR92	14.10		87.7	46.7	646.3	91.3	3672.0	7.10	692523	9764.30	5236.52
98	24MAR92	29.40		220.0	136.0	1289.0	215.0	2256.0		1200409	35291.04	14325.47
99	31MAR92	50.00		254.0	117.0	992.0	82.0	3224.0	7.50	506387	25318.64	4584.45
100	07APR92	12.00		111.0	67.0	825.0	71.0	3500.0	7.20	376710	4520.39	2247.80
101	14APR92	47.00		191.3	52.7	1031.3	49.3	3838.0	7.20	314104	14762.47	2649.77
102	21APR92	24.60		231.0	98.0	1256.0	167.0	3505.0	7.20	372969	9174.78	3184.73
103	28APR92	30.00		255.0	106.0	1379.0	68.0	3793.0	7.20	257030	7710.68	2591.38
104	05MAY92	22.60		457.0	249.0	2202.0	400.0	3892.0	7.10	469883	10619.06	9668.10

OBS	TPL	PO4L	TKNL	NH4L	NO3L	STATION	TN	TNL	ORGL
79	13.522	5.619	104.49	9.307	674.68	310	4437.0	779.17	52.0
80	18.267	6.089	86.23	8.053	789.41	310	4458.0	875.63	38.0
81	34.366	22.749	193.90	14.849	494.96	310	3261.3	688.86	88.7
82	575.951	322.009	1329.05	189.366	1108.27	310	2793.0	2437.32	201.0
83	53.095	35.397	218.28	34.975	1870.54	310	4957.0	2086.82	77.0
84	20.047	9.355	132.09	20.938	1070.30	310	5398.0	1202.39	68.0
85	49.369	27.732	252.63	29.865	1027.29	310	4200.0	1279.93	23.0
86	84.441	51.327	460.29	90.236	2860.24	310	4011.0	3320.53	112.0
87	13.366	7.973	175.63	8.676	956.71	310	4829.0	1132.34	57.0
88	6.612	5.195	46.99	7.084	1225.30	310	5388.0	1272.29	20.0
89	8.901	3.514	65.36	10.541	1164.45	310	5250.0	1229.81	32.0
90	7.454	3.694	61.21	6.127	1083.86	310	5176.7	1145.07	16.3
91	5.279	1.885	37.14	6.222	982.84	310	5410.0	1019.98	22.0
92	53.335	28.755	453.58	70.495	1690.03	310	4622.0	2143.61	93.0
93	14.339	9.858	157.43	22.703	1042.85	310	4018.0	1200.28	49.0
94	107.965	83.098	1068.30	210.149	2051.82	310	4479.4	3120.12	126.0
95	211.126	128.511	1015.63	345.538	1847.68	310	4367.0	2863.31	113.0
96	45.596	37.704	624.31	98.206	3508.24	310	4713.0	4132.55	46.0
97	60.733	32.340	447.57	63.226	2542.87	310	4318.3	2990.44	73.5
98	264.083	163.251	1547.28	258.081	2708.05	310	3545.0	4255.33	116.0
99	128.619	59.246	502.32	41.523	1632.55	310	4216.0	2134.87	88.0
100	41.814	25.239	310.78	26.746	1318.45	310	4325.0	1629.23	58.0
101	60.086	16.553	323.93	15.485	1205.50	310	4869.3	1529.42	82.0
102	86.153	36.550	468.44	62.284	1307.22	310	4761.0	1775.66	83.0
103	65.541	27.244	354.43	17.478	974.89	310	5172.0	1329.32	98.0
104	214.731	116.998	1034.65	187.948	1028.73	310	6094.0	2863.39	200.0

OBS	DATE	SED	OM	TP	PO4	TKN	NH4	NO3	PH	Q	SEDL	ORGCL
105	12MAY92	34.90		276.3	145.0	1494.3	129.3	3995.0	7.30	237979	8305.23	3469.21
106	19MAY92	97.50		422.0	202.0	1752.0	107.0	4115.0	7.30	212734	20740.98	1838.39
107	27MAY92	38.40		301.0	201.0	1154.0	256.0	4664.0	7.10	267998	10290.84	2508.96
108	02JUN92	68.60		413.0	237.0	1315.0	531.0	4193.0	7.30	357809	24545.01	3423.39
109	09JUN92	67.60		231.0	156.0	1118.0	281.0	4159.0	6.90	149419	10100.44	768.59
110	16JUN92	49.00		207.0	158.0	953.0	100.0	4758.0	7.10	126991	6222.38	640.16
111	24JUN92	49.80		296.3	201.7	1125.0	92.3	4820.0	7.00	91741	4495.18	550.24
112	30JUN92	87.00		1056.0	287.0	6302.0	276.0	4928.0	7.30	117395	10306.99	4673.93
113	07JUL92	74.30		507.0	148.0	1694.0	262.0	5381.0	6.80	99433	7387.67	1360.52
114	14JUL92	57.50		198.0	110.0	1067.0	81.0	5035.0	7.20	68115	3916.50	735.79
115	21JUL92	18.90		390.0	204.0	791.3	72.3	4662.3	7.30	117424	2219.25	652.34
116	28JUL92	11.00		350.0	261.0	771.0	81.0	4368.0	7.40	132933	1462.22	1312.88
117	04AUG92	44.20		313.0	130.0	1173.0	33.0	5253.0	7.20	64248	2839.68	462.68
118	11AUG92	22.60		485.3	371.7	1085.0	90.3	4852.0	7.00	218845	4945.76	2798.53
119	18AUG92	21.90		183.0	141.0	607.0	148.0	4283.0	7.20	143501	3142.58	1077.70
120	25AUG92	24.70		255.0	118.0	606.0	45.0	5704.0		80994	2000.50	391.63
121	01SEP92	28.30		485.0	421.0	401.0	187.0	5680.0	7.30	89793	2541.07	471.12
122	08SEP92	15.70		362.7	275.3	1117.3	191.0	5020.7	7.10	88046	1382.28	450.18
123	15SEP92	22.80		168.0	158.0	512.0	105.0	4935.0	7.30	74151	1690.60	236.48
124	22SEP92	27.60		558.0	157.0	998.0	159.0	4273.0	7.20	191785	5293.12	1519.24
125	28SEP92	27.56	77	558.0	157.0	998.0	159.0	4273.0	7.21	176000	4850.42	1394.20
126	05OCT92	132.04	59	147.0	71.0	1328.0	269.0	4764.0	7.16	101000	13335.67	613.05
127	13OCT92	19.72	116	193.0	123.0	1057.0	188.0	4729.0	7.39	105000	2070.54	1253.05
128	13OCT92	20.48	105	209.0	128.0	1020.0	196.0	4187.0	7.39			
129	13OCT92	20.32	110	188.0	147.0	958.0	196.0	4187.0	7.39			
130	19OCT92	16.04	49	172.0	60.0	836.0	57.0	4177.0	7.32	60800	975.20	306.49

OBS	TPL	PO4L	TKML	NH4L	NO3L	STATION	TN	TNL	ORGC
105	65.752	34.506	355.60	30.770	950.70	310	5489.3	1306.30	141.7
106	89.771	42.971	372.70	22.762	875.38	310	5867.0	1248.08	84.0
107	80.665	309.26	309.26	68.606	1249.91	310	5818.0	1559.17	91.0
108	147.771	84.798	470.51	189.991	1500.25	310	5508.0	1970.76	93.0
109	34.515	23.309	167.05	41.986	621.42	310	5277.0	788.46	50.0
110	26.286	20.064	121.02	12.699	604.21	310	5711.0	725.23	49.0
111	27.182	18.504	103.21	8.467	442.18	310	5945.0	545.38	58.3
112	123.966	33.691	739.80	32.400	578.51	310	11230.0	1318.31	387.0
113	50.411	14.716	168.43	26.051	535.03	310	7075.0	703.47	133.0
114	13.486	7.492	72.68	5.517	342.95	310	6102.0	415.63	105.0
115	45.794	23.954	92.92	8.490	547.45	310	5453.6	640.37	54.0
116	46.525	34.695	102.49	10.767	580.64	310	5139.0	683.12	96.0
117	20.109	8.352	75.36	2.120	337.49	310	6426.0	412.85	70.0
118	106.203	81.342	237.44	19.761	1061.81	310	5937.0	1299.25	124.3
119	26.260	20.233	87.10	21.238	614.60	310	4890.0	701.70	73.0
120	20.653	9.557	49.08	3.645	461.98	310	6310.0	511.06	47.0
121	43.548	37.802	36.01	16.791	510.01	310	6081.0	546.02	51.0
122	31.933	24.238	98.37	16.816	442.04	310	6138.0	540.41	49.7
123	12.457	11.716	37.96	7.786	365.92	310	5447.0	403.89	31.0
124	107.013	30.109	191.40	30.493	819.47	310	5271.0	1010.87	77.0
125	98.205	27.631	175.64	27.983	752.03	310	5271.0	927.67	
126	14.847	7.171	134.12	27.168	481.15	310	6092.0	615.27	
127	20.264	12.915	110.98	19.739	496.53	310	5786.0	607.51	
128						310	5207.0		
129						310	5708.0		
130	10.457	3.648	50.83	3.466	253.95	310	5013.0	304.78	

OBS	DATE	SED	OM	TP	PO4	TKN	NH4	NO3	PH	Q	SEDL	ORGCL
131	26OCT92	11.28	56	128	74	1010	196	4105	7.30	79500	896.73	458.01
132	02NOV92	11.80	53	120	54	770	113	3430	6.73	95400	1125.69	520.17
133	09NOV92	11.40	220	132	84	1062	188		7.12	259000	2952.52	5861.98
134	09NOV92	12.64	175	130	84	1121	184	2518	7.12			
135	09NOV92	12.40	198	113	87	1098	188	2731	7.12			
136	16NOV92	7.64	82	48	56	801	79	3111	7.19	170000	1298.76	1434.12
137	23NOV92	9.60	87	123	50	893	102	3535	7.14	137000	1315.16	1226.20
138	29NOV92	8.48	92	119	49	672	42	3039	7.56	156000	1322.84	1476.50
139	07DEC92	2.56	19	138	107	388	61	4036	7.51	155000	396.79	302.98
140	14DEC92	76.13	93	448	264	1518	163	2787	7.30	765000	58237.82	7319.24
141	21DEC92	34.84	109	171	95	998	183	3074	7.17	376000	13099.47	4216.34
142	27DEC92	3.76										
143	04JAN93	6.48	34	81	60	379	55	4322	7.21	255000	1652.35	891.95
144	04JAN93	7.32	34	82	61	346	58	4605	7.21			
145	04JAN93	8.64	23	81	61	418	55	4494	7.21			
146	11JAN93	26.15	99	206	133	866	110	3079	7.05	795000	20788.67	8097.00
147	19JAN93	5.68	36	59	46	420	88	4866	7.08	539000	3061.43	1996.24
148	25JAN93	5.52	49	73	58	477	30	4213	7.39	333000	1838.11	1678.66
149	01FEB93	15.48	47	64	42	328	66	4727	7.44	265000	4102.09	1281.34
150	08FEB93	6.17	24	47	28	404	24	4077	7.32	221000	1363.53	545.66
151	16FEB93	10.10							7.23	633000	6393.12	
152	16FEB93	11.47							7.23			
153	22FEB93	20.24	107	179	129	1121	337	2657	6.84	794000	16070.11	8740.29
154	01MAR93	3.17	48	58	34	531	64	4035	7.21	467000	1480.35	2306.11
155	08MAR93	7.68	75	77	54	595	104	4035	7.05	1070000	8217.37	8255.94
156	14MAR93	31.68										
OBS	TPL	PO4L	TKNL	NH4L	NO3L	STARTON	TN	TNL	ORGC			
131	10.176	5.883	80.29	15.582	326.34	310	5115	406.63				
132	11.448	5.151	73.46	10.780	327.21	310	4200	400.67				
133	34.187	21.755	275.05	48.691		310						
134						310	3639					
135						310	3829					
136	8.160	9.520	136.17	13.430	528.86	310	3912	665.02				
137	16.851	6.850	122.34	13.974	484.28	310	4428	606.62				
138	18.563	7.644	104.83	6.552	474.07	310	3711	578.90				
139	21.389	16.585	60.14	9.455	625.56	310	4424	685.70				
140	342.710	201.954	1161.24	124.692	2132.00	310	4305	3293.23				
141	64.294	35.719	375.24	68.806	1155.79	310	4072	1531.03				
142						310						
143	20.654	15.300	96.64	14.025	1102.08	310	4701	1198.72				
144						310	4951					
145						310	4912					
146	163.765	105.732	688.45	87.448	2447.74	310	3945	3136.19				
147	31.800	24.793	226.37	47.431	2622.70	310	5286	2849.07				
148	24.308	19.313	158.84	9.990	1402.89	310	4690	1561.73				
149	16.960	11.130	86.92	17.490	1252.62	310	5055	1339.54				
150	10.387	6.188	89.28	5.304	900.99	310	4481	990.27				
151						310						
152						310						
153	142.122	102.423	890.05	267.571	2109.60	310	3778	2599.65				
154	27.085	15.878	247.97	29.887	1884.29	310	4566	2132.26				
155	82.388	57.778	636.63	111.277	4317.33	310	4630	4953.96				
156						310						

OBS	DATE	SED	OM	TP	PO4	TKN	NH4	NO3	PH	Q	SEDL	ORGCL
157	22MAR93	9.68	110	81	53	497	90	3589	7.14	2520000	24392.92	28517.72
158	29MAR93	32.70	127	147	93	860	112	3130	7.04	1160000	37930.94	15155.95
159	04APR93	36.20	153	412	172	1852	294	2264	6.87	1230000	44524.75	19360.57
160	04APR93	48.27	193	360	166	1660	283	2273	6.92	.	.	.
161	04APR93	49.67	181	329	1803	284	2617	6.89	6.89	.	.	.
162	12APR93	21.73	128	293	202	1274	437	2867	7.02	1320000	28682.80	17382.23
163	18APR93	27.00	27	.	.	.	.	.	.	1330000	35908.99	3694.34
164	26APR93	5.70	133	172	112	1118	204	2824	6.98	896000	5107.06	12259.74
165	02MAY93	122.93	114	148	89	1244	141	3432	7.10	528000	64905.22	6192.42
166	09MAY93	28.87	.	.	.	.	.	.	7.52	500000	14434.60	.
167	09MAY93	27.00	.	.	.	.	.	.	7.52	.	.	.
168	09MAY93	28.13	.	.	.	.	.	.	7.52	.	.	.
169	17MAY93	14.87	159	236	27	2186	582	4203	7.23	463000	6884.62	7573.55
170	24MAY93	74.68	98	297	131	1605	380	4317	7.10	430000	33082.31	4466.34
171	31MAY93	26.88	60	150	131	748	92	4817	7.37	229000	6155.35	1413.54
172	07JUN93	.	65	303	207	926	205	4822	7.30	196000	.	.
173	13JUN93	115.10	73	.	.	.	.	.	.	212000	24400.52	1417.66
174	20JUN93	11.80	52	198	166	919	153	5888	7.18	114000	1345.16	609.86
175	27JUN93	7.72	43	228	126	883	123	5987	6.88	94500	729.52	418.04
176	05JUL93	12.76	54	299	273	954	181	5682	7.33	106000	1352.52	588.87
177	11JUL93	15.68	61	1002	178	245	169	5511	6.86	50100	785.55	314.40
178	11JUL93	13.40	64	1002	174	249	165	5089	.	.	.	.
179	11JUL93	12.52	68	1009	177	247	166	5218	.	.	.	.
180	18JUL93	16.84	74	305	253	843	262	6200	7.36	72200	1215.81	549.66
181	25JUL93	7.88	84	223	163	727	99	5658	7.37	49100	386.90	424.31
182	01AUG93	6.00	100	205	157	522	185	6054	6.82	44800	268.79	460.89
OBS	TPL	PO4L	TKNL	NH4L	NO3L	STATION	TN	TNL	ORGC			
157	204.114	133.556	1252.40	226.794	9044.03	310	4086	10296.43	.			
158	170.515	107.877	997.57	129.916	3630.70	310	3990	4628.27	.			
159	506.746	211.554	2277.90	361.610	2784.64	310	4116	5062.54	.			
160	.	.	.	.	.	310	3933	.	.			
161	.	.	.	.	.	310	4420	.	.			
162	386.749	266.633	1681.63	576.824	3784.33	310	4141	5465.97	.			
163	.	.	.	.	.	310	.	.	.			
164	154.108	100.349	1001.70	182.779	2619.83	310	4042	3621.53	.			
165	78.142	46.991	656.81	74.446	1812.05	310	4676	2468.86	.			
166	.	.	.	.	.	310	.	.	.			
167	.	.	.	.	.	310	.	.	.			
168	.	.	.	.	.	310	.	.	.			
169	109.265	12.501	1012.09	269.458	1945.93	310	6389	2958.02	.			
170	131.567	58.031	711.00	168.335	1912.38	310	5922	2623.37	.			
171	34.349	29.998	171.29	21.067	1103.06	310	5565	1274.35	.			
172	.	.	.	.	.	310	.	.	.			
173	64.234	43.883	196.31	43.459	1022.24	310	5748	1218.54	.			
174	22.571	18.923	104.76	17.442	648.41	310	6607	753.18	.			
175	21.545	11.907	83.44	11.623	565.76	310	6870	649.20	.			
176	31.693	28.937	101.12	19.185	602.28	310	6636	703.40	.			
177	50.199	8.918	12.27	8.467	276.09	310	5756	288.37	.			
178	.	.	.	.	.	310	5338	.	.			
179	.	.	.	.	.	310	5465	.	.			
180	22.020	18.266	60.86	18.916	447.63	310	7043	508.49	.			
181	10.949	8.003	35.69	4.861	277.80	310	6385	313.49	.			
182	9.184	7.033	23.38	8.288	271.21	310	6576	294.60	.			

OBS	DATE	SED	OM	TP	PO4	TKM	NH4	NO3	PH	Q	SEDL	ORCCL
183	08AUG93	6.72	54	311	238	715	281	7164	7.11	62400	419.32	346.66
184	08AUG93	7.60	40	301	240	729	288	7226				
185	08AUG93	5.96	48	326	242	782	281	7323				
186	15AUG93	4.52	41	174	142	884	11	5579	7.03	47200	213.34	199.09
187	22AUG93	15.72	46	303	207	714	167	5287	7.25	50400	792.27	238.51
188	29AUG93	18.24	85	228	146	947	106	4817	7.46	40600	740.52	355.03
189	06SEP93	6.32	87	206	118	947	136	5470	6.99	56900	359.60	509.28
190	12SEP93	9.04	63	210	143	540	71	5437	7.28	34600	312.78	224.25
191	19SEP93	7.16	71	271	229	1016	217	6414	7.09	51300	367.30	374.71
192	19SEP93	10.64	55	268	234	996	217	6608				
193	19SEP93	8.32	47	275	226	940	216	6220				
194	26SEP93	3.00	38	221	166	568	104	5454	7.25	53700	161.10	209.93
195	03OCT93	3.50	31	179	138	549	93	5236	7.12	57100	199.84	182.10
OBS	TPL	PO4L	TKNL	NH4L	NO3L	STATION	TN	TNL	ORGC			
183	19.406	14.851	44.61	17.534	447.02	310	7879	491.64				
184						310	7955					
185						310	8105					
186	8.213	6.702	41.72	0.519	263.32	310	6463	305.05				
187	15.271	10.433	35.98	8.417	266.46	310	6001	302.44				
188	9.257	5.927	38.45	4.303	195.56	310	5764	234.01				
189	11.721	6.714	53.88	7.738	311.23	310	6417	365.12				
190	7.266	4.948	18.68	2.457	188.11	310	5977	206.80				
191	13.902	11.747	52.12	11.132	329.03	310	7430	381.15				
192						310	7604					
193						310	7160					
194	11.867	8.914	30.50	5.585	292.87	310	6022	323.37				
195	10.221	7.880	31.35	5.310	298.97	310	5785	330.31				

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