



Arkansas Water Resources Center

EXTENDED WATER QUALITY MONITORING OF THE LINCOLN LAKE WATERSHED

Arkansas Soil & Water Conservation Commission
Contract #0016914

Cooperating Agencies
ARKANSAS WATER RESOURCES CENTER
ARKANSAS SOIL & WATER CONSERVATION COMMISSION

December, 2000

Authors

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Final Report

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PROJECT DESCRIPTION

For seven years, the Lincoln Lake (Moore's Creek and Beatty Branch) watershed was monitored for improvements in water quality resulting from agricultural best management practices (BMP) implemented to reduce nutrient transport. During the first three years of monitoring (1991 to 1994), nitrogen transport declined significantly (Edwards et al., 1994, 1996, and 1997) under both base and storm flow conditions. This decline in nitrogen transport was again observed in the three-year period following 1994 (Vendrell et al. 1998). This monitoring effort has demonstrated that water quality has improved in the Lincoln Lake watershed. However, since the nitrogen transport continued to decline and there was some indication that phosphorus may begin to decline, monitoring was extended for another year (1998).

In the Lincoln Lake watershed there is one monitoring site on Beatty Branch Creek and two on Moore's Creek. Significant land use changes not related to the original BMP implementation have occurred above the lower Moore's Creek site. The High Ocean Ranch that comprises approximately 800 acres of the Moore's Creek bottom was sold. The new owners sold the timber rights and logging began in late 1995. Following the timber harvest in the spring of 1996 this area was subdivided into residential tracts. The first manufactured homes appeared in the spring of 1997. The Beatty Branch basin was unaffected. The result was a decline in forested areas in the Moore's Creek watershed in favor of residential development. In response to this change in land use, a new monitoring site was installed above the harvested area.

Nutrient transport by Moore's Creek and Beatty Branch, the two streams that feed Lincoln Lake, was monitored from September 1991 until April 1994 (Edwards et al.,

1994, 1996, and 1997). During storm flow conditions, significant decreases in mean concentrations and mass transport of nitrate-nitrogen ($\text{NO}_3\text{-N}$), ammonium-nitrogen ($\text{NH}_4\text{-N}$), total Kjeldahl nitrogen (TKN), and chemical oxygen demand (COD) were observed in this watershed and attributed to BMP implementation. There were no decreases in total phosphorus (TP) or total suspended solids (TSS). Likewise, during base flow conditions, significant decreases of $\text{NH}_3\text{-N}$, TKN, and COD were observed. After the end of this initial monitoring project, the stream monitoring continued on a limited basis in the Lincoln Lake basin for another three years, 1994 through 1997. A final report was made on this earlier continued monitoring (Vendrell et al., 1998) in which the results of the trend analysis over the period from 1994 through 1997 were compared to the earlier trends (Edwards et al., 1996) from 1991 to 1994. In this 1998 report, the conclusions were: 1) No increasing trends were observed for either mean concentration or mass transport of nitrogen. 2) Mean concentrations of $\text{NO}_3\text{-N}$, $\text{NH}_4\text{-N}$, and TKN in Beatty Branch Creek, $\text{NH}_4\text{-N}$ and TKN in Moores Creek, and loads of $\text{NH}_4\text{-N}$ in Beatty Branch Creek continued to decline. 3) A decreasing trend in TP mean concentration was observed for the first time at the Beatty Branch site during storm flow.

OBJECTIVES

The objectives of this extended monitoring are to 1) determine if nitrogen transport continues to decline, 2) determine if phosphorus and sediment transport trends are maintained, and 3) determine the effects of the timber harvest in the Moores Creek basin.

MATERIALS AND METHODS

The watershed description, water quality monitoring methods, and methods for statistical trend analysis were identical to those described in a previous report (Vendrell et

al, 1998) and the reader is referred to this report for these details. Water quality monitoring and trend analysis was carried out by these methods on data collected from January 1995 through December 1998 at the Lower Moores Creek (LMC) and Beatty Branch (BB) sites and from July 1996 through February 1999 at the Upper Moores Creek (UMC) site.

RESULTS AND DISCUSSION

Stream Discharge

Monthly discharge for LMC, UMC, and BB are given in Figures 1, 8, and 15, respectively. In these graphs, storm and base discharge are stacked into the same bar graphic and the combined height represents total discharge within an individual month. Discharge had the same seasonal character as described in a previous report of the three-year monitoring period (Vendrell et al., 1998).

No significant trends were observed at any of the monitoring sites for this four-year monitoring period. These results departed somewhat from those reported previously for the three-year monitoring period (1994 through 1997). Trend analysis over the three-year period showed significantly increasing trend in discharge at the BB site due to base flow. No significant trends were observed at the other two sites as a result of this shorter monitoring period. The only reasonable explanation for this discrepancy is that the shorter monitoring period ended with a wet year and that adding another year of monitoring was able to buffer this effect. In Figure 15 it can be observed that in fact that the late 1996 and early 1997 were periods of high discharge and the following months returned to the more usual discharge pattern. With no significant trends in discharge it

can be assumed that the significant trends in either load or mean concentration are more likely due to the BMPs and less to climatic variations.

Loads

Monthly base, storm, and total flow loads of $\text{NO}_3\text{-N}$, TP, $\text{NH}_4\text{-N}$, TKN, TOC, and TSS for the LMC site is given in Figures 2 through 7. In these bar-graph graphics base and storm loads are stacked together within an individual month and the total height of the bar represents the total monthly load. Figures 9 through 14 contain the mean loads for the UMC site. Loads for the BB site can be found in Figures 16 through 21. The LMC and BB sites have monthly loads from January 1995 through December 1998; whereas, the UMC site has loads from July 1996 through February 1999.

Table 1 contains a list of all the significant trends that were observed at all three monitoring sites and under all flow types. There were no significant load trends at the LMC or UMC sites. The LMC results agree with the most recent three-year trend analysis but contrast with the first three years of monitoring that showed downward trends of $\text{NO}_3\text{-N}$, $\text{NH}_4\text{-N}$, TKN, and TOC. The most available explanation for both this agreement and discrepancy is that these are the effects of the timber harvest and residential development.

Previously reported, the UMC site exhibited increased TSS loads. There was good reason to be skeptical of this trend because of the insufficient period of monitoring. Extending the monitoring period caused this anomalous trend to disappear.

Beatty Branch was the only site that showed significant load trends (Table 1). Ammonium-N and TKN decreased and there were no significant increasing trends ($\alpha=0.10$). The $\text{NH}_4\text{-N}$ decline agrees with the two previous reports. The TKN decrease

($\alpha=0.10$). The $\text{NH}_4\text{-N}$ decline agrees with the two previous reports. The TKN decrease agrees with the first three-years of monitoring; however no $\text{NO}_3\text{-N}$ decrease occurred as did in the first three-years of monitoring and no TSS decrease as did in the second three-year monitoring period. It is important to note that neither $\text{NO}_3\text{-N}$ load nor load from any of the other parameters increased. This lack of increasing trends can be interpreted as the BMPs are expressing effects by preventing the increase in concentrations, keeping loads from increasing, and thus improving water quality.

Mean Concentrations

Monthly flow-weighted mean concentrations of $\text{NO}_3\text{-N}$, TP, $\text{NH}_4\text{-N}$, TKN, TOC, and TSS under base, storm, and total flow conditions for the LMC site are given in Figures 22 through 27. Figures 28 through 33 contain the mean concentrations calculated for the UMC site. Mean concentrations for the BB site can be found in Figures 34 through 39. The LMC and BB sites have monthly concentrations from January 1995 through December 1998; however, the UMC site has monthly concentrations from July 1996 through February 1999.

In the previous three-year report (Vendrell et al., 1998), significant downward trends for mean concentrations of $\text{NH}_4\text{-N}$, TKN, and TOC were observed at the LMC site. At this site, $\text{NH}_4\text{-N}$ and TOC decreased during storm flow conditions; whereas, TKN decreased during base and total flow. The previous monitoring effort by Edwards et al. (1996 and 1997) showed decreases of $\text{NH}_4\text{-N}$, and TKN during base flow and $\text{NO}_3\text{-N}$, $\text{NH}_4\text{-N}$, and TKN during storm flow at this LMC site. The newer UMC site showed increasing trends of TP, $\text{NH}_4\text{-N}$, TOC and TSS. There were no previous monitoring

BB site significant decreases of NO₃-N, TP, NH₄-N, TKN, TOC and TSS were observed during storm flow. Ammonia-N and TKN decreased during base and total flow.

Decreasing TP and TSS concentrations during storm flow was a new response.

Extending the monitoring period for another year resulted in fewer significant trends compared to the previous three-year monitoring reports (Table 2). Mean concentrations of NH₄-N decreased during base and total flow at the BB site and during storm flow at the LMC site. This is consistent with the previous findings except the longer monitoring period did not show NH₄-N decreases during storm flow at the BB site and no base or total flow decreases at the LMC site. Regardless of these inconsistencies, it is apparent that NH₄-N continues to decrease in tributaries to Lincoln Lake.

Total Kjeldahl nitrogen had the most widespread decreases. All three sites showed significant TKN decreases (Table 2) with the BB and LMC site decreasing during base and total flow and the UMC site during base flow. These results are consistent with those from earlier reports except that TKN declined at the UMC site. However, the previous increase reported for the UMC site was probably an anomalous statistical result caused by performing trend analysis on an insufficiently short time period and the trend reported here is more reliable.

Total phosphorus significantly increased during storm flow at the LMC site. No decreases were observed. The decreases reported previously are not supported by this longer period of monitoring.

A significant decreasing trend was observed for TSS during base flow at the UMC site. No other sites exhibited significant trends for TSS, NO₃-N, or TOC. Reported earlier, Nitrate-N significantly declining at the LMC and BB sites. The changes in land

use in the LMC watershed due to the timber harvest and residential development is the likely reason for changes at the LMC site. Apparently, since there is no longer a decreasing trend for $\text{NO}_3\text{-N}$, declines at the BB site experienced early in this monitoring project are leveling off or possibly even returning to higher concentrations.

The monthly mean concentrations and mass transport of parameters for the three sampling sites by stream flow conditions are provided in Tables 3-8. The flow conditions are combined flow, base flow and storm flow conditions.

CONCLUSIONS

Increasing trends were not observed for either load or mean concentrations of any nitrogen species ($\text{NO}_3\text{-N}$, $\text{NH}_4\text{-N}$, TKN). Loads of $\text{NH}_4\text{-N}$ and TKN significantly decreased in BB. Mean concentrations of $\text{NH}_4\text{-N}$ decreased in BB and LMC and TKN decreased at all three sites. Therefore, the BMPs were able to retard nitrogen transport early in their application and these early declines were effectively maintained throughout the seven years of monitoring and nitrogen continues to decline.

Nitrate-N was formerly reported to decrease both in concentration and load. Decreases of $\text{NO}_3\text{-N}$ were not observed in this longer monitoring period. Therefore, the BMP have expressed their full ability to reduce $\text{NO}_3\text{-N}$ transport.

No decreases in phosphorus were observed from the statistical trend analysis of this four-year monitoring effort. In fact, TP significantly increased at the LMC site. However, it is important to point out that no significantly increasing trends had been observed previously and this site had appreciable land use changes from timber harvest activities and residential development.

Mean concentrations of TSS decreased only at the UMC site and there were no load decreases at any of the sites. Prior trend analysis showed TSS increasing at this site but in the prior reports it was stated that these increases were probably an artifact of the overly short monitoring period. This appears to be the case because the current analysis shows significantly decreasing TSS mean concentrations.

The effects of the timber harvest and residential development appear to be that these land use changes have stopped the decrease in nitrogen loads. At the affected site, mean concentrations of TP were observed to increase and this is the first time that a significant increase has been reported. These effects could possibly be due to some other unobserved change in this watershed, but the logging and residential development was the most obvious changes.

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- Edwards, D. R., T. C. Daniel, H. D. Scott, J. F. Murdock, M. J. Habiger, and H. M. Burks, Stream quality impacts of best management practices in a Northwest Arkansas basin, *Water Resources Bulletin*, 32(3), 499-509, 1996.
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APPENDIX A
Tables 1-8

Table 1. Significant trend coefficients and probabilities for loads of water quality parameters at the Beatty Branch (BB) site in the Lincoln Lake watershed. No significant load trends occurred at the Upper or Lower Moores Creek sites.

Parameter	Flow Type	Model Probability*	Trend Coefficient**	Trend Probability*
NH ₄ -N	Base	0.0004	-0.033641	0.0277
	Storm	0.0155	-0.069721	0.0098
	Total	0.0007	-0.041007	0.0389
NO ₃ -N	Storm	0.0377	-0.04193	0.1069
TKN	Base	0.0001	-0.025718	0.0689
	Total	0.1008	-0.049422	0.0426

* Model and trend probabilities are considered significant if the P-values are less than 0.10.

** Negative coefficients represent decreasing trends and positive values represent increasing trends.

Table 2. Significant trend coefficients and probabilities for water quality parameters at the Beatty Branch (BB), Lower Moores Creek (LMC), and Upper Moores Creek (UMC) sites in the Lincoln Lake watershed.

Parameter	Site	Flow Type	Model Probability*	Trend Coefficient**	Trend Probability*
NH ₄ -N	BB	Base	0.0085	-0.035851	0.0049
		Total	0.0238	-0.037257	0.0058
	LMC	Storm	0.0012	-0.024309	0.0415
TKN	BB	Base	0.0208	-0.028493	0.0023
		Total	0.0302	-0.028354	0.0037
	LMC	Base	0.0029	-0.017136	0.0022
		Total	0.0063	-0.016092	0.0297
	UMC	Base	0.0079	-0.018806	0.0359
	TP	LMC	Storm	0.0478	0.018019
TSS	UMC	Base	0.0029	-0.058421	0.0724

* Model and trend probabilities are considered significant if the P-values are less than 0.10.

** Negative coefficients represent decreasing trends and positive values represent increasing trends.

Table 3. Monthly mean concentrations of NO₃-N, TP, NH₃-N, TKN, TOC, and TSS during combined flow condition (base plus storm) for the Lower Moores Creek (LMC), Upper Moores Creek (UMC), and Beatty Branch (BB) sites.

Date month-year	Discharge M ³	<i>Lower Moores Creek</i>					
		NO ₃ -N mg/L	TP mg/L	NH ₃ -N mg/L	TKN mg/L	TOC mg/L	TSS mg/L
Jan-95	1570759	1.26	0.42	0.13	1.86	0.00	116.31
Feb-95	222158	1.47	0.10	0.19	1.24	5.35	5.56
Mar-95	607347	1.03	0.22	0.24	2.01	13.28	118.84
Apr-95	979624	0.65	0.50	0.24	2.78	11.52	245.01
May-95	1134548	0.32	0.39	0.13	1.58	12.39	73.36
Jun-95	146047	0.89	0.16	0.09	2.96	9.67	8.12
Jul-95	18643	1.08	0.14	0.02	1.05	9.51	10.70
Aug-95							
Sep-95							
Oct-95	23028	0.38	0.21	0.03	0.98	6.93	28.66
Nov-95	24624	0.05	0.12	0.02	0.75	4.63	7.02
Dec-95	153619	1.39	0.10	0.41	1.96	4.63	23.28
Jan-96	825281	1.80	0.62	0.18	2.37	6.24	312.14
Feb-96	141606	1.30	0.02	0.02	0.26	1.52	1.07
Mar-96	159690	1.22	0.06	0.02	0.46	3.90	1.80
Apr-96	1283491	1.37	0.60	0.26	1.94	10.52	106.42
May-96	631345	0.86	0.39	0.13	1.39	13.18	50.06
Jun-96	159040	1.33	0.12	0.05	1.44	11.70	73.52
Jul-96	17795	0.20	0.12	0.01	0.55	6.42	7.83
Aug-96	16553	0.08	0.07	0.01	0.29	3.06	2.30
Sep-96	536641	0.94	0.08	0.00	0.39	4.36	2.20
Oct-96	273235	0.68	0.07	0.02	0.42	4.90	1.48
Nov-96	3084779	0.83	0.40	0.06	1.08	9.75	21.23
Dec-96	351349	0.66	0.15	0.03	0.42	3.53	3.33
Jan-97	227320	0.34	0.04	0.03	0.35	2.75	1.35
Feb-97	1160513	0.87	0.44	0.13	1.46	7.68	55.96
Mar-97	829009	1.10	0.33	0.33	1.42	9.94	27.04
Apr-97	546691	0.26	0.14	0.02	0.61	4.81	10.70
May-97	176026	0.21	0.09	0.03	0.55	5.10	9.47
Jun-97	513994	0.56	0.44	0.06	1.45	9.18	115.91
Jul-97	69391	0.51	0.15	0.04	0.58	6.51	5.81
Aug-97	76842	0.10	0.10	0.04	0.57	6.70	8.40
Sep-97	35706	0.65	0.14	0.03	0.71	6.97	6.62
Oct-97	142243	0.72	0.13	0.02	0.61	5.78	3.89
Nov-97	263750	1.41	0.09	0.02	0.59	5.24	2.32
Dec-97	776459	1.51	0.25	0.04	0.79	6.82	32.92
Jan-98	2092895	0.97	1.18	0.09	2.70	7.98	549.71
Feb-98							
Mar-98							
Apr-98							
May-98	79203	0.29	0.10	0.03	0.56	4.52	6.17
Jun-98	13897	0.27	0.10	0.02	0.53	5.50	2.68
Jul-98	30434	0.17	0.12	0.05	0.45	5.67	0.36
Aug-98	35124	0.14	0.10	0.06	0.38	4.04	0.35
Sep-98	353843	1.00	0.12	0.06	0.65	7.96	4.33
Oct-98	994679	1.30	0.33	0.11	0.98	7.58	16.76
Nov-98	745893	1.40	0.19	0.04	0.68	6.56	30.97
Dec-98	855342	2.11	0.21	0.05	0.72	6.49	27.58

Table 3. (cont'd)

Date month-year	Discharge M ³	<i>Upper Moores Creek</i>					
		NO3-N mg/L	TP mg/L	NH3-N mg/L	TKN mg/L	TOC mg/L	TSS mg/L
Jul-96	4654	4.29	0.15	0.18	0.78	5.78	6.32
Aug-96	5686	0.13	0.06	0.02	0.25	2.10	0.93
Sep-96	531000	0.93	0.08	0.00	0.43	3.89	1.30
Oct-96	183915	1.21	0.14	0.03	0.64	5.78	8.93
Nov-96	1770023	0.81	0.58	0.09	1.45	9.31	146.02
Dec-96	242129	0.70	0.11	0.02	0.43	3.99	2.70
Jan-97	125422	0.65	0.04	0.02	0.40	3.03	1.33
Feb-97	722180	1.07	1.52	0.27	4.71	8.93	980.71
Mar-97	533094	0.90	0.38	0.00	1.48	8.73	112.51
Apr-97	311616	0.54	0.20	0.11	0.94	7.97	45.91
May-97	38778	1.33	0.12	0.17	0.79	37.08	5.55
Jun-97	251668	0.86	0.60	0.21	2.07	9.89	225.62
Jul-97	16107	0.60	0.21	0.04	0.78	7.48	5.57
Aug-97	24192	0.26	0.18	0.02	0.75	8.70	26.48
Sep-97	4457	0.19	0.10	0.01	0.50	5.88	7.19
Oct-97	50323	0.37	0.19	0.04	0.74	5.06	41.71
Nov-97	132665	1.95	0.11	0.01	0.65	5.27	3.17
Dec-97	769547	1.94	0.25	0.06	0.81	5.34	28.65
Jan-98	1665191	1.26	0.88	0.09	1.89	7.27	250.13
Feb-98	579907	1.10	0.27	0.06	1.00	8.40	17.22
Mar-98	1511826	0.84	0.62	0.10	1.93	8.29	203.00
Apr-98	317650	0.85	0.16	0.06	0.76	7.02	7.85
May-98	114099	0.29	0.09	0.03	0.48	3.61	3.91
Jun-98	17782	0.25	0.07	0.05	0.42	2.71	1.36
Jul-98	18288	0.18	0.09	0.04	0.31	3.95	0.20
Aug-98	5305	0.33	0.06	0.06	0.31	4.20	0.47
Sep-98	161294	2.17	0.11	0.06	0.48	6.48	0.10
Oct-98	495293	2.24	0.59	0.08	1.31	6.51	132.82
Nov-98	483496	1.66	0.46	0.04	0.58	6.04	28.80
Dec-98	515208	3.16	0.32	0.12	0.70	6.44	3.03
Jan-99	323117	2.64	0.12	0.03	0.56		30.06
Feb-99	410808	2.18	0.48	0.03	1.37		227.38

Table 3. (cont'd)

Date month-year	Discharge M ³	NO3-N mg/L	<i>Beatty Branch</i>				
			TP mg/L	NH3-N mg/L	TKN mg/L	TOC mg/L	TSS mg/L
Jan-95	285369	1.03	0.48	0.07	1.89	0.00	78.09
Feb-95	60860	0.92	0.09	0.01	0.82	4.31	4.76
Mar-95	127663	0.66	1.05	0.38	2.80	18.51	48.28
Apr-95	220470	0.46	0.46	0.11	2.22	8.88	274.77
May-95	242360	0.31	0.38	0.16	1.36	10.53	97.64
Jun-95	29213	0.12	0.09	0.02	0.65	6.13	3.98
Jul-95	7759	0.09	0.09	0.12	2.41	4.79	7.14
Aug-95							
Sep-95							
Oct-95	10436	0.99	0.03	1.04	10.02	2.64	1.42
Nov-95	31120	0.13	0.05	0.27	1.20	1.32	2.03
Dec-95	141283	0.96	0.05	0.11	0.69	2.10	12.79
Jan-96	252111	1.94	0.11	0.09	0.93	4.03	42.33
Feb-96	58092	1.14	0.02	0.03	0.31	1.47	0.82
Mar-96							
Apr-96	581810	1.20	0.26	0.07	1.05	7.10	29.02
May-96	213986	0.61	0.31	0.07	1.01	10.06	36.02
Jun-96	21830	0.52	0.09	0.14	1.17	9.83	19.75
Jul-96	0	0.00	0.00	0.00	0.00	0.00	0.00
Aug-96	0	0.00	0.00	0.00	0.00	0.00	0.00
Sep-96	221112	0.62	0.37	0.06	0.77	6.70	33.57
Oct-96							
Nov-96	1624215	0.76	0.55	0.10	0.88	7.72	26.72
Dec-96	436373	0.46	0.08	0.02	0.41	2.68	1.29
Jan-97	686524	0.25	0.04	0.01	0.36	1.78	0.53
Feb-97	538114	0.70	0.22	0.06	0.65	4.80	66.54
Mar-97	468623	0.39	0.08	0.02	0.30	2.59	2.04
Apr-97	616659	0.32	0.09	0.00	0.44	3.72	5.18
May-97	63916	0.06	0.05	0.01	0.26	2.68	1.39
Jun-97	132229	0.21	0.23	0.01	0.93	6.73	12.64
Jul-97	27154	0.06	0.06	0.03	0.27	2.63	2.02
Aug-97	21180	1.67	0.30	0.00	0.84	5.51	22.00
Sep-97	15263	0.99	0.69	0.19	1.53	7.16	64.51
Oct-97	1032610	0.09	0.08	0.02	0.21	1.77	3.85
Nov-97	34779	0.63	0.08	0.01	0.38	3.32	2.02
Dec-97	776459	1.51	0.25	0.04	0.79	6.82	32.92
Jan-98	306059	0.86	0.71	0.08	1.39	5.93	195.87
Feb-98	107627	0.64	0.19	0.01	0.57	4.19	19.95
Mar-98	197272	0.53	0.44	0.08	1.24	6.71	61.32
Apr-98	71288	0.17	0.11	0.01	0.43	3.48	5.66
May-98	42548	0.06	0.07	0.02	0.24	2.10	1.41
Jun-98	3281	0.05	0.04	0.01	0.28	1.99	1.48
Jul-98	369	0.02	0.06	0.18	0.36	2.63	0.80
Aug-98	0	0.00	0.00	0.00	0.00	0.00	0.00
Sep-98	65786	0.08	0.06	0.02	0.12	2.20	0.10
Oct-98	290346	1.49	1.29	0.13	2.12	6.46	553.51
Nov-98	207371	1.20	0.18	0.02	0.45	4.25	26.34
Dec-98	186531	1.68	0.25	0.03	0.64	5.43	24.12

Table 4. Monthly mass transport of NO₃-N, TP, NH₃-N, TKN, TOC, and TSS during combined flow conditions (base and storm) for the Lower Moores Creek (LMC), Upper Moores Creek (UMC), and Beatty Branch (BB) sites.

Date month-year	Discharge M ³	<i>Lower Moores Creek</i>					
		NO ₃ -N Kg	TP Kg	NH ₃ -N Kg	TKN Kg	TOC Kg	TSS Kg
Jan-95	1570759	1979	653	203	2918	0	182688
Feb-95	222158	327	23	41	276	1187	1235
Mar-95	607347	626	134	147	1218	8064	72175
Apr-95	979624	632	492	234	2720	11288	240016
May-95	1134548	362	440	147	1795	14062	83232
Jun-95	146047	131	23	13	432	1412	1186
Jul-95	18643	20	3	0	20	177	199
Aug-95							
Sep-95							
Oct-95	23028	9	5	1	23	160	660
Nov-95	24624	1	3	1	19	114	173
Dec-95	153619	214	16	63	302	711	3576
Jan-96	825281	1487	515	152	1957	5151	257604
Feb-96	141606	184	2	3	37	216	152
Mar-96	159690	195	9	3	73	624	287
Apr-96	1283491	1757	765	335	2494	13508	136593
May-96	631345	541	246	84	877	8321	31605
Jun-96	159040	212	20	7	230	1862	11693
Jul-96	17795	4	2	0	10	114	139
Aug-96	16553	1	1	0	5	51	38
Sep-96	536641	504	43	1	209	2339	1181
Oct-96	273235	186	20	7	114	1338	404
Nov-96	3084779	2545	1241	200	3326	30064	65486
Dec-96	351349	231	51	9	147	1242	1170
Jan-97	227320	76	8	7	81	626	306
Feb-97	1160513	1015	508	153	1694	8914	64948
Mar-97	829009	914	271	271	1178	8244	22420
Apr-97	546691	144	75	11	333	2630	5848
May-97	176026	37	17	6	98	897	1668
Jun-97	513994	288	227	30	744	4716	59575
Jul-97	69391	36	10	3	40	452	403
Aug-97	76842	8	8	3	44	515	645
Sep-97	35706	23	5	1	25	249	236
Oct-97	142243	103	18	3	87	823	553
Nov-97	263750	371	23	5	156	1383	611
Dec-97	776459	1174	191	32	615	5296	25559
Jan-98	2092895	2024	2466	185	5643	16699	1150486
Feb-98							
Mar-98							
Apr-98							
May-98	79203	23	8	2	44	358	489
Jun-98	13897	4	1	0	7	76	37
Jul-98	30434	5	4	2	14	172	11
Aug-98	35124	5	4	2	13	142	12
Sep-98	353843	355	43	22	231	2815	1531
Oct-98	994679	1293	330	109	971	7540	16668
Nov-98	745893	1045	145	31	504	4893	23102
Dec-98	855342	1805	180	47	614	5551	23590

Table 4. (cont'd)

Date month-year	Discharge M ³	<i>Upper Moores Creek</i>					
		NO3-N Kg	TP Kg	NH3-N Kg	TKN Kg	TOC Kg	TSS Kg
Jul-96	4654	20	1	1	4	27	29
Aug-96	5686	1	0	0	1	12	5
Sep-96	531000	493	42	1	228	2064	690
Oct-96	183915	222	27	6	118	1063	1643
Nov-96	1770023	1427	1024	152	2559	16473	258451
Dec-96	242129	170	27	5	104	966	653
Jan-97	125422	81	5	2	50	380	166
Feb-97	722180	774	1098	197	3399	6451	708248
Mar-97	533094	479	203	1	789	4655	59979
Apr-97	311616	168	62	33	294	2484	14306
May-97	38778	51	4	7	31	1438	215
Jun-97	251668	215	151	54	521	2490	56781
Jul-97	16107	10	3	1	13	120	90
Aug-97	24192	6	4	1	18	210	641
Sep-97	4457	1	0	0	2	26	32
Oct-97	50323	18	9	2	37	255	2099
Nov-97	132665	259	15	2	87	700	420
Dec-97	769547	1492	192	43	625	4107	22051
Jan-98	1665191	2104	1461	158	3140	12099	416516
Feb-98	579907	639	157	38	577	4871	9988
Mar-98	1511826	1272	939	144	2920	12534	306903
Apr-98	317650	271	51	19	242	2230	2494
May-98	114099	33	10	3	55	412	446
Jun-98	17782	4	1	1	8	48	24
Jul-98	18288	3	2	1	6	72	4
Aug-98	5305	2	0	0	2	22	3
Sep-98	161294	349	17	10	78	1046	16
Oct-98	495293	1111	293	40	649	3226	65785
Nov-98	483496	801	223	21	281	2919	13926
Dec-98	515208	1629	164	59	361	3320	1560
Jan-99	323117	854	40	8	183		9713
Feb-99	410808	895	197	12	565		93410

Table 4. (cont'd)

Date month-year	Discharge M ³	NO3-N Kg	<i>Beatty Branch</i>				
			TP Kg	NH3-N Kg	TKN Kg	TOC Kg	TSS Kg
Jan-95	285369	293	138	20	538	0	22285
Feb-95	60860	56	5	1	50	262	290
Mar-95	127663	84	134	48	357	2363	6163
Apr-95	220470	101	100	25	489	1957	60579
May-95	242360	76	92	38	331	2553	23663
Jun-95	29213	4	2	0	19	179	116
Jul-95	7759	1	1	1	19	37	55
Aug-95							
Sep-95							
Oct-95	10436	10	0	11	105	28	15
Nov-95	31120	4	1	8	37	41	63
Dec-95	141283	135	7	16	98	297	1806
Jan-96	252111	489	28	22	234	1017	10672
Feb-96	58092	66	1	2	18	85	47
Mar-96							
Apr-96	581810	700	149	43	613	4133	16882
May-96	213986	130	66	15	215	2153	7709
Jun-96	21830	11	2	3	25	215	431
Jul-96	0	0	0	0	0	0	0
Aug-96	0	0	0	0	0	0	0
Sep-96	221112	137	81	13	170	1482	7422
Oct-96							
Nov-96	1624215	1233	885	162	1422	12542	43399
Dec-96	436373	203	33	10	179	1171	564
Jan-97	686524	172	25	9	244	1221	362
Feb-97	538114	375	116	30	350	2583	35806
Mar-97	468623	181	39	8	142	1215	955
Apr-97	616659	194	58	1	268	2295	3196
May-97	63916	4	3	1	16	171	89
Jun-97	132229	28	30	1	123	889	1672
Jul-97	27154	2	2	1	7	71	55
Aug-97	21180	35	6	0	18	117	466
Sep-97	15263	15	11	3	23	109	985
Oct-97	1032610	97	86	18	222	1829	3976
Nov-97	34779	22	3	0	13	116	70
Dec-97	776459	1174	191	32	615	5296	25559
Jan-98	306059	264	216	25	424	1815	59948
Feb-98	107627	69	20	1	61	451	2148
Mar-98	197272	104	88	16	244	1324	12096
Apr-98	71288	12	8	1	31	248	403
May-98	42548	2	3	1	10	90	60
Jun-98	3281	0	0	0	1	7	5
Jul-98	369	0	0	0	0	1	0
Aug-98	0	0	0	0	0	0	0
Sep-98	65786	5	4	1	8	145	7
Oct-98	290346	433	375	38	616	1877	160710
Nov-98	207371	248	38	4	94	882	5462
Dec-98	186531	313	46	6	119	1013	4499

Table 5. Monthly mean concentrations of NO₃-N, TP, NH₃-N, TKN, TOC, and TSS during base flow conditions for the Lower Moores Creek (LMC), Upper Moores Creek (UMC), and Beatty Branch (BB) sites.

Date month-year	Discharge M ³	<i>Lower Moores Creek</i>					
		NO ₃ -N mg/L	TP mg/L	NH ₃ -N mg/L	TKN mg/L	TOC mg/L	TSS mg/L
Jan-95	578792	1.41	0.10	0.01	0.72	0.00	0.57
Feb-95	220989	1.47	0.10	0.18	1.24	5.31	5.53
Mar-95	307103	1.04	0.08	0.15	0.84	7.26	5.85
Apr-95	338748	0.64	0.24	0.17	1.33	9.24	60.08
May-95	333220	0.34	0.26	0.11	1.16	10.08	36.94
Jun-95	131043	0.88	0.16	0.09	2.93	9.61	8.11
Jul-95	18643	1.08	0.14	0.02	1.05	9.51	10.70
Aug-95							
Sep-95							
Oct-95	23028	0.38	0.21	0.03	0.98	6.93	28.66
Nov-95	24624	0.05	0.12	0.02	0.75	4.63	7.02
Dec-95	115892	1.20	0.05	0.23	0.76	1.85	6.65
Jan-96	372407	2.28	0.22	0.02	1.41	3.52	215.08
Feb-96	141606	1.30	0.02	0.02	0.26	1.52	1.07
Mar-96	159690	1.22	0.06	0.02	0.46	3.90	1.80
Apr-96	320906	1.74	0.14	0.02	0.66	6.24	6.46
May-96	232254	0.85	0.19	0.02	0.86	8.38	27.09
Jun-96	159040	1.33	0.12	0.05	1.44	11.70	73.52
Jul-96	17795	0.20	0.12	0.01	0.55	6.42	7.83
Aug-96	16553	0.08	0.07	0.01	0.29	3.06	2.30
Sep-96	536641	0.94	0.08	0.00	0.39	4.36	2.20
Oct-96	158269	0.63	0.07	0.02	0.42	4.72	1.53
Nov-96	677020	0.98	0.26	0.03	0.76	7.03	10.50
Dec-96	351349	0.66	0.15	0.03	0.42	3.53	3.33
Jan-97	227320	0.34	0.04	0.03	0.35	2.75	1.35
Feb-97	442142	0.83	0.15	0.08	0.62	5.69	8.25
Mar-97	591152	1.15	0.31	0.37	1.40	9.65	22.79
Apr-97	413779	0.16	0.09	0.01	0.45	3.73	4.58
May-97	176026	0.21	0.09	0.03	0.55	5.10	9.47
Jun-97	229574	0.62	0.20	0.04	0.89	7.86	24.97
Jul-97	69391	0.51	0.15	0.04	0.58	6.51	5.81
Aug-97	76842	0.10	0.10	0.04	0.57	6.70	8.40
Sep-97	35706	0.65	0.14	0.03	0.71	6.97	6.62
Oct-97	118320	0.64	0.12	0.02	0.57	5.50	3.62
Nov-97	263750	1.41	0.09	0.02	0.59	5.24	2.32
Dec-97	599540	1.53	0.17	0.03	0.64	5.97	18.94
Jan-98	511440	1.32	0.15	0.01	0.47	4.82	8.57
Feb-98							
Mar-98							
Apr-98							
May-98	79203	0.29	0.10	0.03	0.56	4.52	6.17
Jun-98	13897	0.27	0.10	0.02	0.53	5.50	2.68
Jul-98	30434	0.17	0.12	0.05	0.45	5.67	0.36
Aug-98	35124	0.14	0.10	0.06	0.38	4.04	0.35
Sep-98	116426	0.87	0.12	0.06	0.62	7.44	3.77
Oct-98	320821	1.24	0.07	0.04	0.32	4.24	0.18
Nov-98	576537	1.33	0.10	0.03	0.45	5.86	6.89
Dec-98	722983	2.16	0.20	0.05	0.70	6.17	27.61

Table 5. (cont'd)

Date month-year	Discharge M ³	<i>Upper Moores Creek</i>					
		NO3-N mg/L	TP mg/L	NH3-N mg/L	TKN mg/L	TOC mg/L	TSS mg/L
Jul-96	4654	4.29	0.15	0.18	0.78	5.78	6.32
Aug-96	5686	0.13	0.06	0.02	0.25	2.10	0.93
Sep-96	60189	0.92	0.08	0.00	0.43	3.87	1.30
Oct-96	108216	1.18	0.07	0.02	0.48	4.34	1.02
Nov-96	610364	0.86	0.39	0.06	1.13	7.63	90.60
Dec-96	242129	0.70	0.11	0.02	0.43	3.99	2.70
Jan-97	125422	0.65	0.04	0.02	0.40	3.03	1.33
Feb-97	343320	1.16	0.69	0.14	2.26	6.68	340.72
Mar-97	369208	0.82	0.33	0.00	1.32	7.50	123.80
Apr-97	216110	0.39	0.07	0.02	0.48	7.28	3.45
May-97	38778	1.33	0.12	0.17	0.79	37.08	5.55
Jun-97	130446	1.08	0.28	0.24	1.23	8.79	23.66
Jul-97	16107	0.60	0.21	0.04	0.78	7.48	5.57
Aug-97	24192	0.26	0.18	0.02	0.75	8.70	26.48
Sep-97	4457	0.19	0.10	0.01	0.50	5.88	7.19
Oct-97	36319	0.09	0.05	0.01	0.38	3.66	0.73
Nov-97	132665	1.95	0.11	0.01	0.65	5.27	3.17
Dec-97	616478	2.05	0.15	0.03	0.60	4.42	10.53
Jan-98	572013	1.69	0.14	0.02	0.53	4.69	4.94
Feb-98	429474	1.15	0.18	0.04	0.75	6.85	7.50
Mar-98	722537	0.89	0.47	0.06	1.47	7.49	155.59
Apr-98	303481	0.88	0.16	0.06	0.78	7.18	8.06
May-98	114099	0.29	0.09	0.03	0.48	3.61	3.91
Jun-98	17782	0.25	0.07	0.05	0.42	2.71	1.36
Jul-98	18288	0.18	0.09	0.04	0.31	3.95	0.20
Aug-98	5305	0.33	0.06	0.06	0.31	4.20	0.47
Sep-98	65470	1.95	0.10	0.06	0.45	6.20	0.10
Oct-98	183356	2.06	0.07	0.02	0.29	3.38	0.11
Nov-98	396234	1.77	0.45	0.04	0.45	5.55	1.80
Dec-98	439724	3.20	0.30	0.11	0.67	6.22	2.81
Jan-99	295262	2.74	0.06	0.02	0.37		3.86
Feb-99	314214	2.39	0.12	0.01	0.47		8.54

Table 5. (cont'd)

Date month-year	Discharge M ³	NO3-N mg/L	<i>Beatty Branch</i>				
			TP mg/L	NH3-N mg/L	TKN mg/L	TOC mg/L	TSS mg/L
Jan-95	137279	1.00	0.20	0.03	0.81	0.00	10.87
Feb-95	60860	0.92	0.09	0.01	0.82	4.31	4.76
Mar-95	76535	0.66	0.09	0.02	0.66	6.11	7.04
Apr-95	97981	0.41	0.22	0.07	1.75	7.71	92.19
May-95	86484	0.30	0.22	0.14	1.07	8.63	60.05
Jun-95	29213	0.12	0.09	0.02	0.65	6.13	3.98
Jul-95	7759	0.09	0.09	0.12	2.41	4.79	7.14
Aug-95							
Sep-95							
Oct-95	10436	0.99	0.03	1.04	10.02	2.64	1.42
Nov-95	31120	0.13	0.05	0.27	1.20	1.32	2.03
Dec-95	115518	0.66	0.02	0.11	0.53	0.85	8.68
Jan-96	143762	2.03	0.01	0.02	0.39	0.85	2.26
Feb-96	58092	1.14	0.02	0.03	0.31	1.47	0.82
Mar-96							
Apr-96	379005	0.95	0.16	0.03	0.63	5.80	11.49
May-96	118718	0.51	0.20	0.05	0.72	6.69	30.69
Jun-96	21830	0.52	0.09	0.14	1.17	9.83	19.75
Jul-96	0	0.00	0.00	0.00	0.00	0.00	0.00
Aug-96	0	0.00	0.00	0.00	0.00	0.00	0.00
Sep-96	101040	0.50	0.05	0.00	0.18	2.34	0.85
Oct-96							
Nov-96	225209	0.80	0.23	0.03	0.56	5.15	13.06
Dec-96	204757	0.54	0.10	0.02	0.43	2.87	1.47
Jan-97	300935	0.26	0.04	0.01	0.36	1.82	0.60
Feb-97	224595	0.53	0.11	0.03	0.41	3.16	17.16
Mar-97	255233	0.39	0.09	0.01	0.34	2.53	2.30
Apr-97	149776	0.22	0.07	0.00	0.35	3.11	3.54
May-97	54598	0.06	0.05	0.01	0.25	2.64	1.57
Jun-97	44849	0.19	0.21	0.01	0.86	6.33	11.56
Jul-97	27154	0.06	0.06	0.03	0.27	2.63	2.02
Aug-97	21180	1.67	0.30	0.00	0.84	5.51	22.00
Sep-97	15263	0.99	0.69	0.19	1.53	7.16	64.51
Oct-97	278174	0.11	0.06	0.01	0.16	1.61	1.25
Nov-97	34779	0.63	0.08	0.01	0.38	3.32	2.02
Dec-97	599540	1.53	0.17	0.03	0.64	5.97	18.94
Jan-98	152925	1.01	0.21	0.02	0.47	4.08	20.46
Feb-98	101332	0.64	0.14	0.01	0.44	3.84	3.88
Mar-98	138680	0.53	0.35	0.06	0.99	6.12	36.52
Apr-98	71288	0.17	0.11	0.01	0.43	3.48	5.66
May-98	36533	0.06	0.07	0.02	0.25	2.12	1.46
Jun-98	3281	0.05	0.04	0.01	0.28	1.99	1.48
Jul-98	369	0.02	0.06	0.18	0.36	2.63	0.80
Aug-98	0	0.00	0.00	0.00	0.00	0.00	0.00
Sep-98	12267	0.08	0.06	0.02	0.12	2.20	0.10
Oct-98	105844	0.48	0.06	0.01	0.15	2.35	4.50
Nov-98	159920	0.92	0.11	0.01	0.26	3.34	3.86
Dec-98	171625	1.70	0.22	0.03	0.60	5.15	24.44

Table 6. Monthly mass transport of NO₃-N, TP, NH₄-N, TKN, TOC, and TSS during base flow conditions for the Lower Moores Creek (LMC), Upper Moores Creek (UMC), and Beatty Branch (BB) sites.

Date month-year	Discharge M ³	<i>Lower Moores Creek</i>					
		NO ₃ -N Kg	TP Kg	NH ₃ -N Kg	TKN Kg	TOC Kg	TSS Kg
Jan-95	578792	816	57	8	414	0	332
Feb-95	220989	324	23	41	274	1174	1221
Mar-95	307103	320	26	45	258	2230	1798
Apr-95	338748	217	80	57	451	3129	20352
May-95	333220	112	88	38	387	3358	12309
Jun-95	131043	116	20	12	384	1259	1063
Jul-95	18643	20	3	0	20	177	199
Aug-95							
Sep-95							
Oct-95	23028	9	5	1	23	160	660
Nov-95	24624	1	3	1	19	114	173
Dec-95	115892	139	5	26	88	214	771
Jan-96	372407	848	84	6	524	1309	80097
Feb-96	141606	184	2	3	37	216	152
Mar-96	159690	195	9	3	73	624	287
Apr-96	320906	558	44	6	213	2002	2075
May-96	232254	198	45	5	200	1947	6291
Jun-96	159040	212	20	7	230	1862	11693
Jul-96	17795	4	2	0	10	114	139
Aug-96	16553	1	1	0	5	51	38
Sep-96	536641	504	43	1	209	2339	1181
Oct-96	158269	100	11	3	66	748	243
Nov-96	677020	662	175	22	513	4763	7108
Dec-96	351349	231	51	9	147	1242	1170
Jan-97	227320	76	8	7	81	626	306
Feb-97	442142	368	67	34	274	2516	3648
Mar-97	591152	681	184	219	828	5703	13471
Apr-97	413779	65	37	3	186	1543	1895
May-97	176026	37	17	6	98	897	1668
Jun-97	229574	142	46	9	205	1804	5733
Jul-97	69391	36	10	3	40	452	403
Aug-97	76842	8	8	3	44	515	645
Sep-97	35706	23	5	1	25	249	236
Oct-97	118320	76	14	2	67	650	428
Nov-97	263750	371	23	5	156	1383	611
Dec-97	599540	920	99	18	383	3576	11355
Jan-98	511440	678	77	7	239	2466	4382
Feb-98							
Mar-98							
Apr-98							
May-98	79203	23	8	2	44	358	489
Jun-98	13897	4	1	0	7	76	37
Jul-98	30434	5	4	2	14	172	11
Aug-98	35124	5	4	2	13	142	12
Sep-98	116426	102	13	7	72	866	439
Oct-98	320821	397	23	11	102	1360	57
Nov-98	576537	769	60	20	262	3381	3970
Dec-98	722983	1561	147	34	505	4462	19961

Table 6. (cont'd)

Date month-year	Discharge M ³	<i>Upper Moores Creek</i>					
		NO ₃ -N Kg	TP Kg	NH ₃ -N Kg	TKN Kg	TOC Kg	TSS Kg
Jul-96	4654	20	1	1	4	27	29
Aug-96	5686	1	0	0	1	12	5
Sep-96	60189	56	5	0	26	233	78
Oct-96	108216	127	8	2	52	470	110
Nov-96	610364	522	238	38	691	4658	55300
Dec-96	242129	170	27	5	104	966	653
Jan-97	125422	81	5	2	50	380	166
Feb-97	343320	398	237	49	775	2293	116978
Mar-97	369208	303	123	0	488	2767	45706
Apr-97	216110	83	14	5	104	1573	746
May-97	38778	51	4	7	31	1438	215
Jun-97	130446	141	36	32	161	1147	3087
Jul-97	16107	10	3	1	13	120	90
Aug-97	24192	6	4	1	18	210	641
Sep-97	4457	1	0	0	2	26	32
Oct-97	36319	3	2	1	14	133	26
Nov-97	132665	259	15	2	87	700	420
Dec-97	616478	1265	90	21	372	2722	6494
Jan-98	572013	966	82	14	305	2683	2825
Feb-98	429474	495	77	16	320	2943	3219
Mar-98	722537	642	338	43	1064	5412	112421
Apr-98	303481	267	50	19	236	2180	2446
May-98	114099	33	10	3	55	412	446
Jun-98	17782	4	1	1	8	48	24
Jul-98	18288	3	2	1	6	72	4
Aug-98	5305	2	0	0	2	22	3
Sep-98	65470	127	7	4	30	406	7
Oct-98	183356	377	13	4	54	620	20
Nov-98	396234	701	177	15	177	2200	714
Dec-98	439724	1407	131	47	296	2737	1236
Jan-99	295262	809	17	4	110		1140
Feb-99	314214	751	38	2	147		2682

Table 6. (cont'd)

Date month-year	Discharge M ³	NO ₃ -N Kg	<i>Beatty Branch</i>				
			TP Kg	NH ₃ -N Kg	TKN Kg	TOC Kg	TSS Kg
Jan-95	137279	138	27	4	111	0	1493
Feb-95	60860	56	5	1	50	262	290
Mar-95	76535	50	7	2	50	468	539
Apr-95	97981	40	21	7	172	755	9033
May-95	86484	26	19	12	93	746	5193
Jun-95	29213	4	2	0	19	179	116
Jul-95	7759	1	1	1	19	37	55
Aug-95							
Sep-95							
Oct-95	10436	10	0	11	105	28	15
Nov-95	31120	4	1	8	37	41	63
Dec-95	115518	76	2	12	61	98	1003
Jan-96	143762	292	2	3	55	122	325
Feb-96	58092	66	1	2	18	85	47
Mar-96							
Apr-96	379005	360	59	12	238	2198	4353
May-96	118718	61	24	6	85	795	3644
Jun-96	21830	11	2	3	25	215	431
Jul-96	0	0	0	0	0	0	0
Aug-96	0	0	0	0	0	0	0
Sep-96	101040	50	5	0	19	237	85
Oct-96							
Nov-96	225209	179	53	6	127	1160	2941
Dec-96	204757	110	20	4	87	588	301
Jan-97	300935	79	12	4	107	548	182
Feb-97	224595	119	24	8	92	709	3854
Mar-97	255233	99	22	4	87	645	587
Apr-97	149776	34	11	0	53	466	530
May-97	54598	3	3	1	14	144	86
Jun-97	44849	9	9	0	39	284	518
Jul-97	27154	2	2	1	7	71	55
Aug-97	21180	35	6	0	18	117	466
Sep-97	15263	15	11	3	23	109	985
Oct-97	278174	30	16	2	46	447	349
Nov-97	34779	22	3	0	13	116	70
Dec-97	599540	920	99	18	383	3576	11355
Jan-98	152925	155	32	2	71	624	3129
Feb-98	101332	65	14	1	44	389	393
Mar-98	138680	73	49	9	137	849	5065
Apr-98	71288	12	8	1	31	248	403
May-98	36533	2	3	1	9	77	53
Jun-98	3281	0	0	0	1	7	5
Jul-98	369	0	0	0	0	1	0
Aug-98	0	0	0	0	0	0	0
Sep-98	12267	1	1	0	1	27	1
Oct-98	105844	51	7	1	16	249	476
Nov-98	159920	147	18	1	41	534	618
Dec-98	171625	291	38	5	103	885	4194

Table 7. Monthly mean concentrations of NO₃-N, TP, NH₃-N, TKN, TOC, and TSS during storm flow conditions for the Lower Moores Creek (LMC), Upper Moores Creek (UMC), and Beatty Branch (BB) sites.

Date month-year	Discharge M ³	<i>Lower Moores Creek</i>					
		NO ₃ -N mg/L	TP mg/L	NH ₃ -N mg/L	TKN mg/L	TOC mg/L	TSS mg/L
Jan-95	991967	1.17	0.60	0.20	2.52	0.00	183.83
Feb-95	1168	2.16	0.14	0.52	1.73	11.67	11.75
Mar-95	300243	1.02	0.36	0.34	3.20	19.43	234.40
Apr-95	640875	0.65	0.64	0.28	3.54	12.73	342.76
May-95	801328	0.31	0.44	0.14	1.76	13.36	88.51
Jun-95	15004	0.99	0.16	0.10	3.24	10.17	8.20
Jul-95	0	0.00	0.00	0.00	0.00	0.00	0.00
Aug-95							
Sep-95							
Oct-95	0	0.00	0.00	0.00	0.00	0.00	0.00
Nov-95	0	0.00	0.00	0.00	0.00	0.00	0.00
Dec-95	37727	1.99	0.27	0.98	5.65	13.17	74.35
Jan-96	452874	1.41	0.95	0.32	3.16	8.48	391.96
Feb-96	0	0.00	0.00	0.00	0.00	0.00	0.00
Mar-96	0	0.00	0.00	0.00	0.00	0.00	0.00
Apr-96	962585	1.25	0.75	0.34	2.37	11.95	139.75
May-96	399091	0.86	0.50	0.20	1.70	15.97	63.43
Jun-96	0	0.00	0.00	0.00	0.00	0.00	0.00
Jul-96	0	0.00	0.00	0.00	0.00	0.00	0.00
Aug-96	0	0.00	0.00	0.00	0.00	0.00	0.00
Sep-96	0	0.00	0.00	0.00	0.00	0.00	0.00
Oct-96	114966	0.75	0.08	0.03	0.42	5.14	1.40
Nov-96	2407759	0.78	0.44	0.07	1.17	10.51	24.25
Dec-96	0	0.00	0.00	0.00	0.00	0.00	0.00
Jan-97	0	0.00	0.00	0.00	0.00	0.00	0.00
Feb-97	718370	0.90	0.61	0.17	1.98	8.91	85.33
Mar-97	237858	0.98	0.37	0.22	1.47	10.68	37.62
Apr-97	132912	0.59	0.29	0.06	1.11	8.18	29.74
May-97	0	0.00	0.00	0.00	0.00	0.00	0.00
Jun-97	284420	0.52	0.64	0.07	1.90	10.24	189.31
Jul-97	0	0.00	0.00	0.00	0.00	0.00	0.00
Aug-97	0	0.00	0.00	0.00	0.00	0.00	0.00
Sep-97	0	0.00	0.00	0.00	0.00	0.00	0.00
Oct-97	23923	1.11	0.17	0.02	0.82	7.20	5.20
Nov-97	0	0.00	0.00	0.00	0.00	0.00	0.00
Dec-97	176919	1.43	0.52	0.08	1.31	9.72	80.29
Jan-98	1581455	0.85	1.51	0.11	3.42	9.00	724.71
Feb-98							
Mar-98							
Apr-98							
May-98	0	0.00	0.00	0.00	0.00	0.00	0.00
Jun-98	0	0.00	0.00	0.00	0.00	0.00	0.00
Jul-98	0	0.00	0.00	0.00	0.00	0.00	0.00
Aug-98	0	0.00	0.00	0.00	0.00	0.00	0.00
Sep-98	237417	1.07	0.13	0.06	0.67	8.21	4.60
Oct-98	673858	1.33	0.46	0.15	1.29	9.17	24.65
Nov-98	169356	1.63	0.50	0.06	1.43	8.93	112.97
Dec-98	132359	1.85	0.25	0.10	0.82	8.22	27.42

Table 7. (cont'd)

<i>Upper Moores Creek</i>							
Date	Discharge	NO3-N	TP	NH3-N	TKN	TOC	TSS
month-year	M ³	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jul-96	0	0.00	0.00	0.00	0.00	0.00	0.00
Aug-96	0	0.00	0.00	0.00	0.00	0.00	0.00
Sep-96	470811	0.93	0.08	0.00	0.43	3.89	1.30
Oct-96	75700	1.25	0.24	0.05	0.88	7.83	20.25
Nov-96	1159659	0.78	0.68	0.10	1.61	10.19	175.18
Dec-96	0	0.00	0.00	0.00	0.00	0.00	0.00
Jan-97	0	0.00	0.00	0.00	0.00	0.00	0.00
Feb-97	378860	0.99	2.27	0.39	6.92	10.98	1560.66
Mar-97	163885	1.07	0.49	0.00	1.84	11.52	87.09
Apr-97	95507	0.89	0.50	0.30	1.98	9.54	141.98
May-97	0	0.00	0.00	0.00	0.00	0.00	0.00
Jun-97	121222	0.62	0.95	0.18	2.97	11.08	442.94
Jul-97	0	0.00	0.00	0.00	0.00	0.00	0.00
Aug-97	0	0.00	0.00	0.00	0.00	0.00	0.00
Sep-97	0	0.00	0.00	0.00	0.00	0.00	0.00
Oct-97	14003	1.08	0.54	0.11	1.67	8.68	148.01
Nov-97	0	0.00	0.00	0.00	0.00	0.00	0.00
Dec-97	153069	1.48	0.67	0.15	1.65	9.05	101.63
Jan-98	1093178	1.04	1.26	0.13	2.59	8.61	378.43
Feb-98	150432	0.95	0.53	0.14	1.71	12.81	45.00
Mar-98	789289	0.80	0.76	0.13	2.35	9.02	246.40
Apr-98	14169	0.31	0.07	0.01	0.43	3.50	3.40
May-98	0	0.00	0.00	0.00	0.00	0.00	0.00
Jun-98	0	0.00	0.00	0.00	0.00	0.00	0.00
Jul-98	0	0.00	0.00	0.00	0.00	0.00	0.00
Aug-98	0	0.00	0.00	0.00	0.00	0.00	0.00
Sep-98	95824	2.32	0.11	0.06	0.50	6.68	0.10
Oct-98	311936	2.35	0.90	0.12	1.91	8.36	210.83
Nov-98	87262	1.14	0.54	0.07	1.19	8.24	151.40
Dec-98	75484	2.94	0.43	0.16	0.87	7.72	4.30
Jan-99	27855	1.62	0.85	0.14	2.60		307.74
Feb-99	96593	1.49	1.65	0.10	4.33		939.28

Table 7. (cont'd)

								<i>Beatty Branch</i>	
Jan-95	148090	1.05	0.75	0.11	2.88	0.00	140.40		
Feb-95	0	0.00	0.00	0.00	0.00	0.00	0.00		
Mar-95	51128	0.65	2.49	0.91	6.00	37.06	110.00		
Apr-95	122488	0.50	0.65	0.15	2.59	9.81	420.83		
May-95	155876	0.32	0.47	0.16	1.53	11.59	118.49		
Jun-95	0	0.00	0.00	0.00	0.00	0.00	0.00		
Jul-95	0	0.00	0.00	0.00	0.00	0.00	0.00		
Aug-95									
Sep-95									
Oct-95	0	0.00	0.00	0.00	0.00	0.00	0.00		
Nov-95	0	0.00	0.00	0.00	0.00	0.00	0.00		
Dec-95	25765	2.30	0.20	0.14	1.42	7.72	31.20		
Jan-96	108349	1.82	0.24	0.17	1.65	8.26	95.50		
Feb-96	0	0.00	0.00	0.00	0.00	0.00	0.00		
Mar-96									
Apr-96	202805	1.68	0.44	0.15	1.85	9.55	61.78		
May-96	95268	0.73	0.44	0.10	1.37	14.26	42.67		
Jun-96	0	0.00	0.00	0.00	0.00	0.00	0.00		
Jul-96	0	0.00	0.00	0.00	0.00	0.00	0.00		
Aug-96	0	0.00	0.00	0.00	0.00	0.00	0.00		
Sep-96	120072	0.72	0.63	0.11	1.26	10.37	61.10		
Oct-96									
Nov-96	1399006	0.75	0.59	0.11	0.93	8.14	28.92		
Dec-96	231616	0.40	0.06	0.03	0.40	2.52	1.13		
Jan-97	385590	0.24	0.04	0.01	0.36	1.75	0.47		
Feb-97	313519	0.82	0.29	0.07	0.82	5.98	101.91		
Mar-97	213390	0.38	0.08	0.02	0.26	2.67	1.72		
Apr-97	466883	0.34	0.10	0.00	0.46	3.92	5.71		
May-97	9318	0.05	0.05	0.00	0.30	2.91	0.30		
Jun-97	87381	0.22	0.24	0.00	0.97	6.93	13.20		
Jul-97	0	0.00	0.00	0.00	0.00	0.00	0.00		
Aug-97	0	0.00	0.00	0.00	0.00	0.00	0.00		
Sep-97	0	0.00	0.00	0.00	0.00	0.00	0.00		
Oct-97	754436	0.09	0.09	0.02	0.23	1.83	4.81		
Nov-97	0	0.00	0.00	0.00	0.00	0.00	0.00		
Dec-97	176919	1.43	0.52	0.08	1.31	9.72	80.29		
Jan-98	153133	0.71	1.21	0.14	2.30	7.78	371.04		
Feb-98	6295	0.64	1.00	0.10	2.66	9.74	278.70		
Mar-98	58592	0.53	0.66	0.13	1.81	8.11	120.01		
Apr-98	0	0.00	0.00	0.00	0.00	0.00	0.00		
May-98	6015	0.06	0.09	0.02	0.20	2.02	1.10		
Jun-98	0	0.00	0.00	0.00	0.00	0.00	0.00		
Jul-98	0	0.00	0.00	0.00	0.00	0.00	0.00		
Aug-98	0	0.00	0.00	0.00	0.00	0.00	0.00		
Sep-98	53519	0.08	0.06	0.02	0.12	2.20	0.10		
Oct-98	184502	2.07	1.99	0.20	3.26	8.82	868.46		
Nov-98	47451	2.12	0.43	0.06	1.10	7.33	102.09		
Dec-98	14906	1.49	0.51	0.06	1.07	8.63	20.48		

Table 8. Monthly mass transport of NO₃-N, TP, NH₃-N, TKN, TOC, and TSS during storm flow conditions for the Lower Moores Creek (LMC), Upper Moores Creek (UMC), and Beatty Branch (BB) sites.

Date month-year	Discharge M ³	<i>Lower Moores Creek</i>					
		NO ₃ -N Kg	TP Kg	NH ₃ -N Kg	TKN Kg	TOC Kg	TSS Kg
Jan-95	991967	1163	596	195	2504	0	182356
Feb-95	1168	3	0	1	2	14	14
Mar-95	300243	306	108	102	961	5834	70377
Apr-95	640875	415	412	177	2269	8159	219664
May-95	801328	250	352	109	1408	10703	70923
Jun-95	15004	15	2	2	49	153	123
Jul-95	0	0	0	0	0	0	0
Aug-95							
Sep-95							
Oct-95	0	0	0	0	0	0	0
Nov-95	0	0	0	0	0	0	0
Dec-95	37727	75	10	37	213	497	2805
Jan-96	452874	639	431	146	1433	3842	177507
Feb-96	0	0	0	0	0	0	0
Mar-96	0	0	0	0	0	0	0
Apr-96	962585	1199	721	329	2281	11505	134518
May-96	399091	342	201	80	677	6374	25313
Jun-96	0	0	0	0	0	0	0
Jul-96	0	0	0	0	0	0	0
Aug-96	0	0	0	0	0	0	0
Sep-96	0	0	0	0	0	0	0
Oct-96	114966	86	9	3	48	591	161
Nov-96	2407759	1883	1067	179	2813	25301	58378
Dec-96	0	0	0	0	0	0	0
Jan-97	0	0	0	0	0	0	0
Feb-97	718370	648	440	119	1419	6398	61299
Mar-97	237858	233	88	52	350	2540	8949
Apr-97	132912	79	38	8	147	1087	3953
May-97	0	0	0	0	0	0	0
Jun-97	284420	147	181	21	540	2912	53843
Jul-97	0	0	0	0	0	0	0
Aug-97	0	0	0	0	0	0	0
Sep-97	0	0	0	0	0	0	0
Oct-97	23923	27	4	0	20	172	124
Nov-97	0	0	0	0	0	0	0
Dec-97	176919	254	92	14	231	1719	14204
Jan-98	1581455	1346	2389	178	5404	14233	1146104
Feb-98							
Mar-98							
Apr-98							
May-98	0	0	0	0	0	0	0
Jun-98	0	0	0	0	0	0	0
Jul-98	0	0	0	0	0	0	0
Aug-98	0	0	0	0	0	0	0
Sep-98	237417	253	30	15	159	1949	1092
Oct-98	673858	895	307	98	869	6180	16611
Nov-98	169356	276	85	11	242	1512	19132
Dec-98	132359	245	33	13	109	1088	3629

Table 8. (cont'd)

Date month-year	Discharge M ³	<i>Upper Moores Creek</i>					
		NO3-N Kg	TP Kg	NH3-N Kg	TKN Kg	TOC Kg	TSS Kg
Jul-96	0	0	0	0	0	0	0
Aug-96	0	0	0	0	0	0	0
Sep-96	470811	438	38	1	202	1831	612
Oct-96	75700	94	18	4	67	593	1533
Nov-96	1159659	905	786	113	1868	11815	203151
Dec-96	0	0	0	0	0	0	0
Jan-97	0	0	0	0	0	0	0
Feb-97	378860	376	861	148	2624	4158	591271
Mar-97	163885	176	80	1	301	1888	14273
Apr-97	95507	85	48	29	189	911	13560
May-97	0	0	0	0	0	0	0
Jun-97	121222	75	115	22	360	1343	53694
Jul-97	0	0	0	0	0	0	0
Aug-97	0	0	0	0	0	0	0
Sep-97	0	0	0	0	0	0	0
Oct-97	14003	15	8	1	23	122	2073
Nov-97	0	0	0	0	0	0	0
Dec-97	153069	227	102	23	253	1385	15557
Jan-98	1093178	1138	1379	144	2835	9416	413691
Feb-98	150432	143	80	21	257	1928	6769
Mar-98	789289	629	601	101	1856	7122	194482
Apr-98	14169	4	1	0	6	50	48
May-98	0	0	0	0	0	0	0
Jun-98	0	0	0	0	0	0	0
Jul-98	0	0	0	0	0	0	0
Aug-98	0	0	0	0	0	0	0
Sep-98	95824	222	11	6	48	640	10
Oct-98	311936	734	280	36	595	2607	65764
Nov-98	87262	100	47	6	104	719	13212
Dec-98	75484	222	32	12	66	583	325
Jan-99	27855	45	24	4	72		8572
Feb-99	96593	144	159	10	418		90728

Table 8. (cont'd)

Date month-year	Discharge M ³	<i>Beatty Branch</i>					
		NO3-N Kg	TP Kg	NH3-N Kg	TKN Kg	TOC Kg	TSS Kg
Jan-95	148090	155	111	16	426	0	20792
Feb-95	0	0	0	0	0	0	0
Mar-95	51128	33	127	47	307	1895	5624
Apr-95	122488	61	79	18	317	1202	51546
May-95	155876	50	73	26	238	1807	18470
Jun-95	0	0	0	0	0	0	0
Jul-95	0	0	0	0	0	0	0
Aug-95							
Sep-95							
Oct-95	0	0	0	0	0	0	0
Nov-95	0	0	0	0	0	0	0
Dec-95	25765	59	5	4	37	199	804
Jan-96	108349	197	26	18	179	895	10347
Feb-96	0	0	0	0	0	0	0
Mar-96							
Apr-96	202805	341	90	31	376	1936	12529
May-96	95268	70	42	10	130	1358	4065
Jun-96	0	0	0	0	0	0	0
Jul-96	0	0	0	0	0	0	0
Aug-96	0	0	0	0	0	0	0
Sep-96	120072	86	76	13	151	1245	7336
Oct-96							
Nov-96	1399006	1054	832	156	1296	11383	40458
Dec-96	231616	93	14	6	92	584	263
Jan-97	385590	92	14	5	137	673	180
Feb-97	313519	256	92	23	258	1874	31952
Mar-97	213390	82	17	5	56	570	368
Apr-97	466883	161	47	1	216	1830	2666
May-97	9318	0	0	0	3	27	3
Jun-97	87381	19	21	0	85	606	1153
Jul-97	0	0	0	0	0	0	0
Aug-97	0	0	0	0	0	0	0
Sep-97	0	0	0	0	0	0	0
Oct-97	754436	67	70	16	176	1382	3627
Nov-97	0	0	0	0	0	0	0
Dec-97	176919	254	92	14	231	1719	14204
Jan-98	153133	109	185	22	353	1191	56819
Feb-98	6295	4	6	1	17	61	1754
Mar-98	58592	31	39	8	106	475	7032
Apr-98	0	0	0	0	0	0	0
May-98	6015	0	1	0	1	12	7
Jun-98	0	0	0	0	0	0	0
Jul-98	0	0	0	0	0	0	0
Aug-98	0	0	0	0	0	0	0
Sep-98	53519	4	3	1	6	118	5
Oct-98	184502	382	368	37	601	1628	160234
Nov-98	47451	101	20	3	52	348	4844
Dec-98	14906	22	8	1	16	129	305

Table 3. Monthly mean concentrations of NO₃-N, TP, NH₃-N, TKN, TOC, and TSS during combined flow condition (base plus storm) for the Lower Moores Creek (LMC), Upper Moores Creek (UMC), and Beatty Branch (BB) sites.

Date month-year	<i>Lower Moores Creek</i>						
	Discharge M ³	NO ₃ -N mg/L	TP mg/L	NH ₃ -N mg/L	TKN mg/L	TOC mg/L	TSS mg/L
Jan-95	1570759	1.26	0.42	0.13	1.86	0.00	116.31
Feb-95	222158	1.47	0.10	0.19	1.24	5.35	5.56
Mar-95	607347	1.03	0.22	0.24	2.01	13.28	118.84
Apr-95	979624	0.65	0.50	0.24	2.78	11.52	245.01
May-95	1134548	0.32	0.39	0.13	1.58	12.39	73.36
Jun-95	146047	0.89	0.16	0.09	2.96	9.67	8.12
Jul-95	18643	1.08	0.14	0.02	1.05	9.51	10.70
Aug-95							
Sep-95							
Oct-95	23028	0.38	0.21	0.03	0.98	6.93	28.66
Nov-95	24624	0.05	0.12	0.02	0.75	4.63	7.02
Dec-95	153619	1.39	0.10	0.41	1.96	4.63	23.28
Jan-96	825281	1.80	0.62	0.18	2.37	6.24	312.14
Feb-96	141606	1.30	0.02	0.02	0.26	1.52	1.07
Mar-96	159690	1.22	0.06	0.02	0.46	3.90	1.80
Apr-96	1283491	1.37	0.60	0.26	1.94	10.52	106.42
May-96	631345	0.86	0.39	0.13	1.39	13.18	50.06
Jun-96	159040	1.33	0.12	0.05	1.44	11.70	73.52
Jul-96	17795	0.20	0.12	0.01	0.55	6.42	7.83
Aug-96	16553	0.08	0.07	0.01	0.29	3.06	2.30
Sep-96	536641	0.94	0.08	0.00	0.39	4.36	2.20
Oct-96	273235	0.68	0.07	0.02	0.42	4.90	1.48
Nov-96	3084779	0.83	0.40	0.06	1.08	9.75	21.23
Dec-96	351349	0.66	0.15	0.03	0.42	3.53	3.33
Jan-97	227320	0.34	0.04	0.03	0.35	2.75	1.35
Feb-97	1160513	0.87	0.44	0.13	1.46	7.68	55.96
Mar-97	829009	1.10	0.33	0.33	1.42	9.94	27.04
Apr-97	546691	0.26	0.14	0.02	0.61	4.81	10.70
May-97	176026	0.21	0.09	0.03	0.55	5.10	9.47
Jun-97	513994	0.56	0.44	0.06	1.45	9.18	115.91
Jul-97	69391	0.51	0.15	0.04	0.58	6.51	5.81
Aug-97	76842	0.10	0.10	0.04	0.57	6.70	8.40
Sep-97	35706	0.65	0.14	0.03	0.71	6.97	6.62
Oct-97	142243	0.72	0.13	0.02	0.61	5.78	3.89
Nov-97	263750	1.41	0.09	0.02	0.59	5.24	2.32
Dec-97	776459	1.51	0.25	0.04	0.79	6.82	32.92
Jan-98	2092895	0.97	1.18	0.09	2.70	7.98	549.71
Feb-98							
Mar-98							
Apr-98							
May-98	79203	0.29	0.10	0.03	0.56	4.52	6.17
Jun-98	13897	0.27	0.10	0.02	0.53	5.50	2.68
Jul-98	30434	0.17	0.12	0.05	0.45	5.67	0.36
Aug-98	35124	0.14	0.10	0.06	0.38	4.04	0.35
Sep-98	353843	1.00	0.12	0.06	0.65	7.96	4.33
Oct-98	994679	1.30	0.33	0.11	0.98	7.58	16.76
Nov-98	745893	1.40	0.19	0.04	0.68	6.56	30.97
Dec-98	855342	2.11	0.21	0.05	0.72	6.49	27.58

*no data available

Table 3. (cont'd)

Date	Discharge	<i>Upper Moores Creek</i>					
		NO3-N	TP	NH3-N	TKN	TOC	TSS
month-year	M ³	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jul-96	4654	4.29	0.15	0.18	0.78	5.78	6.32
Aug-96	5686	0.13	0.06	0.02	0.25	2.10	0.93
Sep-96	531000	0.93	0.08	0.00	0.43	3.89	1.30
Oct-96	183915	1.21	0.14	0.03	0.64	5.78	8.93
Nov-96	1770023	0.81	0.58	0.09	1.45	9.31	146.02
Dec-96	242129	0.70	0.11	0.02	0.43	3.99	2.70
Jan-97	125422	0.65	0.04	0.02	0.40	3.03	1.33
Feb-97	722180	1.07	1.52	0.27	4.71	8.93	980.71
Mar-97	533094	0.90	0.38	0.00	1.48	8.73	112.51
Apr-97	311616	0.54	0.20	0.11	0.94	7.97	45.91
May-97	38778	1.33	0.12	0.17	0.79	37.08	5.55
Jun-97	251668	0.86	0.60	0.21	2.07	9.89	225.62
Jul-97	16107	0.60	0.21	0.04	0.78	7.48	5.57
Aug-97	24192	0.26	0.18	0.02	0.75	8.70	26.48
Sep-97	4457	0.19	0.10	0.01	0.50	5.88	7.19
Oct-97	50323	0.37	0.19	0.04	0.74	5.06	41.71
Nov-97	132665	1.95	0.11	0.01	0.65	5.27	3.17
Dec-97	769547	1.94	0.25	0.06	0.81	5.34	28.65
Jan-98	1665191	1.26	0.88	0.09	1.89	7.27	250.13
Feb-98	579907	1.10	0.27	0.06	1.00	8.40	17.22
Mar-98	1511826	0.84	0.62	0.10	1.93	8.29	203.00
Apr-98	317650	0.85	0.16	0.06	0.76	7.02	7.85
May-98	114099	0.29	0.09	0.03	0.48	3.61	3.91
Jun-98	17782	0.25	0.07	0.05	0.42	2.71	1.36
Jul-98	18288	0.18	0.09	0.04	0.31	3.95	0.20
Aug-98	5305	0.33	0.06	0.06	0.31	4.20	0.47
Sep-98	161294	2.17	0.11	0.06	0.48	6.48	0.10
Oct-98	495293	2.24	0.59	0.08	1.31	6.51	132.82
Nov-98	483496	1.66	0.46	0.04	0.58	6.04	28.80
Dec-98	515208	3.16	0.32	0.12	0.70	6.44	3.03
Jan-99	323117	2.64	0.12	0.03	0.56		30.06
Feb-99	410808	2.18	0.48	0.03	1.37		227.38

*no data available

Table 3. (cont'd)

Date month-year	Discharge M ³	NO3-N mg/L	<i>Beatty Branch</i>			TKN mg/L	TOC mg/L	TSS mg/L
			TP mg/L	NH3-N mg/L				
Jan-95	285369	1.03	0.48	0.07	1.89	0.00	78.09	
Feb-95	60860	0.92	0.09	0.01	0.82	4.31	4.76	
Mar-95	127663	0.66	1.05	0.38	2.80	18.51	48.28	
Apr-95	220470	0.46	0.46	0.11	2.22	8.88	274.77	
May-95	242360	0.31	0.38	0.16	1.36	10.53	97.64	
Jun-95	29213	0.12	0.09	0.02	0.65	6.13	3.98	
Jul-95	7759	0.09	0.09	0.12	2.41	4.79	7.14	
Aug-95								
Sep-95								
Oct-95	10436	0.99	0.03	1.04	10.02	2.64	1.42	
Nov-95	31120	0.13	0.05	0.27	1.20	1.32	2.03	
Dec-95	141283	0.96	0.05	0.11	0.69	2.10	12.79	
Jan-96	252111	1.94	0.11	0.09	0.93	4.03	42.33	
Feb-96	58092	1.14	0.02	0.03	0.31	1.47	0.82	
Mar-96								
Apr-96	581810	1.20	0.26	0.07	1.05	7.10	29.02	
May-96	213986	0.61	0.31	0.07	1.01	10.06	36.02	
Jun-96	21830	0.52	0.09	0.14	1.17	9.83	19.75	
Jul-96	0							
Aug-96	0							
Sep-96	221112	0.62	0.37	0.06	0.77	6.70	33.57	
Oct-96								
Nov-96	1624215	0.76	0.55	0.10	0.88	7.72	26.72	
Dec-96	436373	0.46	0.08	0.02	0.41	2.68	1.29	
Jan-97	686524	0.25	0.04	0.01	0.36	1.78	0.53	
Feb-97	538114	0.70	0.22	0.06	0.65	4.80	66.54	
Mar-97	468623	0.39	0.08	0.02	0.30	2.59	2.04	
Apr-97	616659	0.32	0.09	0.00	0.44	3.72	5.18	
May-97	63916	0.06	0.05	0.01	0.26	2.68	1.39	
Jun-97	132229	0.21	0.23	0.01	0.93	6.73	12.64	
Jul-97	27154	0.06	0.06	0.03	0.27	2.63	2.02	
Aug-97	21180	1.67	0.30	0.00	0.84	5.51	22.00	
Sep-97	15263	0.99	0.69	0.19	1.53	7.16	64.51	
Oct-97	1032610	0.09	0.08	0.02	0.21	1.77	3.85	
Nov-97	34779	0.63	0.08	0.01	0.38	3.32	2.02	
Dec-97	776459	1.51	0.25	0.04	0.79	6.82	32.92	
Jan-98	306059	0.86	0.71	0.08	1.39	5.93	195.87	
Feb-98	107627	0.64	0.19	0.01	0.57	4.19	19.95	
Mar-98	197272	0.53	0.44	0.08	1.24	6.71	61.32	
Apr-98	71288	0.17	0.11	0.01	0.43	3.48	5.66	
May-98	42548	0.06	0.07	0.02	0.24	2.10	1.41	
Jun-98	3281	0.05	0.04	0.01	0.28	1.99	1.48	
Jul-98	369	0.02	0.06	0.18	0.36	2.63	0.80	
Aug-98	0							
Sep-98	65786	0.08	0.06	0.02	0.12	2.20	0.10	
Oct-98	290346	1.49	1.29	0.13	2.12	6.46	553.51	
Nov-98	207371	1.20	0.18	0.02	0.45	4.25	26.34	
Dec-98	186531	1.68	0.25	0.03	0.64	5.43	24.12	

*no data available

Table 4. Monthly mass transport of NO₃-N, TP, NH₃-N, TKN, TOC, and TSS during combined flow conditions (base and storm) for the Lower Moores Creek (LMC), Upper Moores Creek (UMC), and Beatty Branch (BB) sites.

Date month-year	<i>Lower Moores Creek</i>						
	Discharge M ³	NO ₃ -N Kg	TP Kg	NH ₃ -N Kg	TKN Kg	TOC Kg	TSS Kg
Jan-95	1570759	1979	653	203	2918	0	182688
Feb-95	222158	327	23	41	276	1187	1235
Mar-95	607347	626	134	147	1218	8064	72175
Apr-95	979624	632	492	234	2720	11288	240016
May-95	1134548	362	440	147	1795	14062	83232
Jun-95	146047	131	23	13	432	1412	1186
Jul-95	18643	20	3	0	20	177	199
Aug-95							
Sep-95							
Oct-95	23028	9	5	1	23	160	660
Nov-95	24624	1	3	1	19	114	173
Dec-95	153619	214	16	63	302	711	3576
Jan-96	825281	1487	515	152	1957	5151	257604
Feb-96	141606	184	2	3	37	216	152
Mar-96	159690	195	9	3	73	624	287
Apr-96	1283491	1757	765	335	2494	13508	136593
May-96	631345	541	246	84	877	8321	31605
Jun-96	159040	212	20	7	230	1862	11693
Jul-96	17795	4	2	0	10	114	139
Aug-96	16553	1	1	0	5	51	38
Sep-96	536641	504	43	1	209	2339	1181
Oct-96	273235	186	20	7	114	1338	404
Nov-96	3084779	2545	1241	200	3326	30064	65486
Dec-96	351349	231	51	9	147	1242	1170
Jan-97	227320	76	8	7	81	626	306
Feb-97	1160513	1015	508	153	1694	8914	64948
Mar-97	829009	914	271	271	1178	8244	22420
Apr-97	546691	144	75	11	333	2630	5848
May-97	176026	37	17	6	98	897	1668
Jun-97	513994	288	227	30	744	4716	59575
Jul-97	69391	36	10	3	40	452	403
Aug-97	76842	8	8	3	44	515	645
Sep-97	35706	23	5	1	25	249	236
Oct-97	142243	103	18	3	87	823	553
Nov-97	263750	371	23	5	156	1383	611
Dec-97	776459	1174	191	32	615	5296	25559
Jan-98	2092895	2024	2466	185	5643	16699	1150486
Feb-98							
Mar-98							
Apr-98							
May-98	79203	23	8	2	44	358	489
Jun-98	13897	4	1	0	7	76	37
Jul-98	30434	5	4	2	14	172	11
Aug-98	35124	5	4	2	13	142	12
Sep-98	353843	355	43	22	231	2815	1531
Oct-98	994679	1293	330	109	971	7540	16668
Nov-98	745893	1045	145	31	504	4893	23102
Dec-98	855342	1805	180	47	614	5551	23590

*no data available

Table 4. (cont'd)

Date month-year	Discharge M ³	<i>Upper Moores Creek</i>					
		NO3-N Kg	TP Kg	NH3-N Kg	TKN Kg	TOC Kg	TSS Kg
Jul-96	4654	20	1	1	4	27	29
Aug-96	5686	1	0	0	1	12	5
Sep-96	531000	493	42	1	228	2064	690
Oct-96	183915	222	27	6	118	1063	1643
Nov-96	1770023	1427	1024	152	2559	16473	258451
Dec-96	242129	170	27	5	104	966	653
Jan-97	125422	81	5	2	50	380	166
Feb-97	722180	774	1098	197	3399	6451	708248
Mar-97	533094	479	203	1	789	4655	59979
Apr-97	311616	168	62	33	294	2484	14306
May-97	38778	51	4	7	31	1438	215
Jun-97	251668	215	151	54	521	2490	56781
Jul-97	16107	10	3	1	13	120	90
Aug-97	24192	6	4	1	18	210	641
Sep-97	4457	1	0	0	2	26	32
Oct-97	50323	18	9	2	37	255	2099
Nov-97	132665	259	15	2	87	700	420
Dec-97	769547	1492	192	43	625	4107	22051
Jan-98	1665191	2104	1461	158	3140	12099	416516
Feb-98	579907	639	157	38	577	4871	9988
Mar-98	1511826	1272	939	144	2920	12534	306903
Apr-98	317650	271	51	19	242	2230	2494
May-98	114099	33	10	3	55	412	446
Jun-98	17782	4	1	1	8	48	24
Jul-98	18288	3	2	1	6	72	4
Aug-98	5305	2	0	0	2	22	3
Sep-98	161294	349	17	10	78	1046	16
Oct-98	495293	1111	293	40	649	3226	65785
Nov-98	483496	801	223	21	281	2919	13926
Dec-98	515208	1629	164	59	361	3320	1560
Jan-99	323117	854	40	8	183		9713
Feb-99	410808	895	197	12	565		93410

*no data available

Table 4. (cont'd)

Date month-year	<i>Beatty Branch</i>						
	Discharge M ³	NO3-N Kg	TP Kg	NH3-N Kg	TKN Kg	TOC Kg	TSS Kg
Jan-95	285369	293	138	20	538	0	22285
Feb-95	60860	56	5	1	50	262	290
Mar-95	127663	84	134	48	357	2363	6163
Apr-95	220470	101	100	25	489	1957	60579
May-95	242360	76	92	38	331	2553	23663
Jun-95	29213	4	2	0	19	179	116
Jul-95	7759	1	1	1	19	37	55
Aug-95							
Sep-95							
Oct-95	10436	10	0	11	105	28	15
Nov-95	31120	4	1	8	37	41	63
Dec-95	141283	135	7	16	98	297	1806
Jan-96	252111	489	28	22	234	1017	10672
Feb-96	58092	66	1	2	18	85	47
Mar-96							
Apr-96	581810	700	149	43	613	4133	16882
May-96	213986	130	66	15	215	2153	7709
Jun-96	21830	11	2	3	25	215	431
Jul-96	0	0	0	0	0	0	0
Aug-96	0	0	0	0	0	0	0
Sep-96	221112	137	81	13	170	1482	7422
Oct-96							
Nov-96	1624215	1233	885	162	1422	12542	43399
Dec-96	436373	203	33	10	179	1171	564
Jan-97	686524	172	25	9	244	1221	362
Feb-97	538114	375	116	30	350	2583	35806
Mar-97	468623	181	39	8	142	1215	955
Apr-97	616659	194	58	1	268	2295	3196
May-97	63916	4	3	1	16	171	89
Jun-97	132229	28	30	1	123	889	1672
Jul-97	27154	2	2	1	7	71	55
Aug-97	21180	35	6	0	18	117	466
Sep-97	15263	15	11	3	23	109	985
Oct-97	1032610	97	86	18	222	1829	3976
Nov-97	34779	22	3	0	13	116	70
Dec-97	776459	1174	191	32	615	5296	25559
Jan-98	306059	264	216	25	424	1815	59948
Feb-98	107627	69	20	1	61	451	2148
Mar-98	197272	104	88	16	244	1324	12096
Apr-98	71288	12	8	1	31	248	403
May-98	42548	2	3	1	10	90	60
Jun-98	3281	0	0	0	1	7	5
Jul-98	369	0	0	0	0	1	0
Aug-98	0	0	0	0	0	0	0
Sep-98	65786	5	4	1	8	145	7
Oct-98	290346	433	375	38	616	1877	160710
Nov-98	207371	248	38	4	94	882	5462
Dec-98	186531	313	46	6	119	1013	4499

*no data available

Table 5. Monthly mean concentrations of NO₃-N, TP, NH₃-N, TKN, TOC, and TSS during base flow conditions for the Lower Moores Creek (LMC), Upper Moores Creek (UMC), and Beatty Branch (BB) sites.

Date month-year	Discharge M ³	<i>Lower Moores Creek</i>					
		NO ₃ -N mg/L	TP mg/L	NH ₃ -N mg/L	TKN mg/L	TOC mg/L	TSS mg/L
Jan-95	578792	1.41	0.10	0.01	0.72	0.00	0.57
Feb-95	220989	1.47	0.10	0.18	1.24	5.31	5.53
Mar-95	307103	1.04	0.08	0.15	0.84	7.26	5.85
Apr-95	338748	0.64	0.24	0.17	1.33	9.24	60.08
May-95	333220	0.34	0.26	0.11	1.16	10.08	36.94
Jun-95	131043	0.88	0.16	0.09	2.93	9.61	8.11
Jul-95	18643	1.08	0.14	0.02	1.05	9.51	10.70
Aug-95							
Sep-95							
Oct-95	23028	0.38	0.21	0.03	0.98	6.93	28.66
Nov-95	24624	0.05	0.12	0.02	0.75	4.63	7.02
Dec-95	115892	1.20	0.05	0.23	0.76	1.85	6.65
Jan-96	372407	2.28	0.22	0.02	1.41	3.52	215.08
Feb-96	141606	1.30	0.02	0.02	0.26	1.52	1.07
Mar-96	159690	1.22	0.06	0.02	0.46	3.90	1.80
Apr-96	320906	1.74	0.14	0.02	0.66	6.24	6.46
May-96	232254	0.85	0.19	0.02	0.86	8.38	27.09
Jun-96	159040	1.33	0.12	0.05	1.44	11.70	73.52
Jul-96	17795	0.20	0.12	0.01	0.55	6.42	7.83
Aug-96	16553	0.08	0.07	0.01	0.29	3.06	2.30
Sep-96	536641	0.94	0.08	0.00	0.39	4.36	2.20
Oct-96	158269	0.63	0.07	0.02	0.42	4.72	1.53
Nov-96	677020	0.98	0.26	0.03	0.76	7.03	10.50
Dec-96	351349	0.66	0.15	0.03	0.42	3.53	3.33
Jan-97	227320	0.34	0.04	0.03	0.35	2.75	1.35
Feb-97	442142	0.83	0.15	0.08	0.62	5.69	8.25
Mar-97	591152	1.15	0.31	0.37	1.40	9.65	22.79
Apr-97	413779	0.16	0.09	0.01	0.45	3.73	4.58
May-97	176026	0.21	0.09	0.03	0.55	5.10	9.47
Jun-97	229574	0.62	0.20	0.04	0.89	7.86	24.97
Jul-97	69391	0.51	0.15	0.04	0.58	6.51	5.81
Aug-97	76842	0.10	0.10	0.04	0.57	6.70	8.40
Sep-97	35706	0.65	0.14	0.03	0.71	6.97	6.62
Oct-97	118320	0.64	0.12	0.02	0.57	5.50	3.62
Nov-97	263750	1.41	0.09	0.02	0.59	5.24	2.32
Dec-97	599540	1.53	0.17	0.03	0.64	5.97	18.94
Jan-98	511440	1.32	0.15	0.01	0.47	4.82	8.57
Feb-98							
Mar-98							
Apr-98							
May-98	79203	0.29	0.10	0.03	0.56	4.52	6.17
Jun-98	13897	0.27	0.10	0.02	0.53	5.50	2.68
Jul-98	30434	0.17	0.12	0.05	0.45	5.67	0.36
Aug-98	35124	0.14	0.10	0.06	0.38	4.04	0.35
Sep-98	116426	0.87	0.12	0.06	0.62	7.44	3.77
Oct-98	320821	1.24	0.07	0.04	0.32	4.24	0.18
Nov-98	576537	1.33	0.10	0.03	0.45	5.86	6.89
Dec-98	722983	2.16	0.20	0.05	0.70	6.17	27.61

*no data available

Table 5. (cont'd)

		<i>Upper Moores Creek</i>					
Date	Discharge	NO3-N	TP	NH3-N	TKN	TOC	TSS
month-year	M ³	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jul-96	4654	4.29	0.15	0.18	0.78	5.78	6.32
Aug-96	5686	0.13	0.06	0.02	0.25	2.10	0.93
Sep-96	60189	0.92	0.08	0.00	0.43	3.87	1.30
Oct-96	108216	1.18	0.07	0.02	0.48	4.34	1.02
Nov-96	610364	0.86	0.39	0.06	1.13	7.63	90.60
Dec-96	242129	0.70	0.11	0.02	0.43	3.99	2.70
Jan-97	125422	0.65	0.04	0.02	0.40	3.03	1.33
Feb-97	343320	1.16	0.69	0.14	2.26	6.68	340.72
Mar-97	369208	0.82	0.33	0.00	1.32	7.50	123.80
Apr-97	216110	0.39	0.07	0.02	0.48	7.28	3.45
May-97	38778	1.33	0.12	0.17	0.79	37.08	5.55
Jun-97	130446	1.08	0.28	0.24	1.23	8.79	23.66
Jul-97	16107	0.60	0.21	0.04	0.78	7.48	5.57
Aug-97	24192	0.26	0.18	0.02	0.75	8.70	26.48
Sep-97	4457	0.19	0.10	0.01	0.50	5.88	7.19
Oct-97	36319	0.09	0.05	0.01	0.38	3.66	0.73
Nov-97	132665	1.95	0.11	0.01	0.65	5.27	3.17
Dec-97	616478	2.05	0.15	0.03	0.60	4.42	10.53
Jan-98	572013	1.69	0.14	0.02	0.53	4.69	4.94
Feb-98	429474	1.15	0.18	0.04	0.75	6.85	7.50
Mar-98	722537	0.89	0.47	0.06	1.47	7.49	155.59
Apr-98	303481	0.88	0.16	0.06	0.78	7.18	8.06
May-98	114099	0.29	0.09	0.03	0.48	3.61	3.91
Jun-98	17782	0.25	0.07	0.05	0.42	2.71	1.36
Jul-98	18288	0.18	0.09	0.04	0.31	3.95	0.20
Aug-98	5305	0.33	0.06	0.06	0.31	4.20	0.47
Sep-98	65470	1.95	0.10	0.06	0.45	6.20	0.10
Oct-98	183356	2.06	0.07	0.02	0.29	3.38	0.11
Nov-98	396234	1.77	0.45	0.04	0.45	5.55	1.80
Dec-98	439724	3.20	0.30	0.11	0.67	6.22	2.81
Jan-99	295262	2.74	0.06	0.02	0.37		3.86
Feb-99	314214	2.39	0.12	0.01	0.47		8.54

*no data available

Table 5. (cont'd)

Date month-year	Discharge M ³	<i>Beatty Branch</i>					
		NO3-N mg/L	TP mg/L	NH3-N mg/L	TKN mg/L	TOC mg/L	TSS mg/L
Jan-95	137279	1.00	0.20	0.03	0.81	0.00	10.87
Feb-95	60860	0.92	0.09	0.01	0.82	4.31	4.76
Mar-95	76535	0.66	0.09	0.02	0.66	6.11	7.04
Apr-95	97981	0.41	0.22	0.07	1.75	7.71	92.19
May-95	86484	0.30	0.22	0.14	1.07	8.63	60.05
Jun-95	29213	0.12	0.09	0.02	0.65	6.13	3.98
Jul-95	7759	0.09	0.09	0.12	2.41	4.79	7.14
Aug-95							
Sep-95							
Oct-95	10436	0.99	0.03	1.04	10.02	2.64	1.42
Nov-95	31120	0.13	0.05	0.27	1.20	1.32	2.03
Dec-95	115518	0.66	0.02	0.11	0.53	0.85	8.68
Jan-96	143762	2.03	0.01	0.02	0.39	0.85	2.26
Feb-96	58092	1.14	0.02	0.03	0.31	1.47	0.82
Mar-96							
Apr-96	379005	0.95	0.16	0.03	0.63	5.80	11.49
May-96	118718	0.51	0.20	0.05	0.72	6.69	30.69
Jun-96	21830	0.52	0.09	0.14	1.17	9.83	19.75
Jul-96	0						
Aug-96	0						
Sep-96	101040	0.50	0.05	0.00	0.18	2.34	0.85
Oct-96							
Nov-96	225209	0.80	0.23	0.03	0.56	5.15	13.06
Dec-96	204757	0.54	0.10	0.02	0.43	2.87	1.47
Jan-97	300935	0.26	0.04	0.01	0.36	1.82	0.60
Feb-97	224595	0.53	0.11	0.03	0.41	3.16	17.16
Mar-97	255233	0.39	0.09	0.01	0.34	2.53	2.30
Apr-97	149776	0.22	0.07	0.00	0.35	3.11	3.54
May-97	54598	0.06	0.05	0.01	0.25	2.64	1.57
Jun-97	44849	0.19	0.21	0.01	0.86	6.33	11.56
Jul-97	27154	0.06	0.06	0.03	0.27	2.63	2.02
Aug-97	21180	1.67	0.30	0.00	0.84	5.51	22.00
Sep-97	15263	0.99	0.69	0.19	1.53	7.16	64.51
Oct-97	278174	0.11	0.06	0.01	0.16	1.61	1.25
Nov-97	34779	0.63	0.08	0.01	0.38	3.32	2.02
Dec-97	599540	1.53	0.17	0.03	0.64	5.97	18.94
Jan-98	152925	1.01	0.21	0.02	0.47	4.08	20.46
Feb-98	101332	0.64	0.14	0.01	0.44	3.84	3.88
Mar-98	138680	0.53	0.35	0.06	0.99	6.12	36.52
Apr-98	71288	0.17	0.11	0.01	0.43	3.48	5.66
May-98	36533	0.06	0.07	0.02	0.25	2.12	1.46
Jun-98	3281	0.05	0.04	0.01	0.28	1.99	1.48
Jul-98	369	0.02	0.06	0.18	0.36	2.63	0.80
Aug-98	0						
Sep-98	12267	0.08	0.06	0.02	0.12	2.20	0.10
Oct-98	105844	0.48	0.06	0.01	0.15	2.35	4.50
Nov-98	159920	0.92	0.11	0.01	0.26	3.34	3.86
Dec-98	171625	1.70	0.22	0.03	0.60	5.15	24.44

*no data available

Table 6. Monthly mass transport of NO₃-N, TP, NH₄-N, TKN, TOC, and TSS during base flow conditions for the Lower Moores Creek (LMC), Upper Moores Creek (UMC), and Beatty Branch (BB) sites.

Date month-year	<i>Lower Moores Creek</i>						
	Discharge M ³	NO ₃ -N Kg	TP Kg	NH ₃ -N Kg	TKN Kg	TOC Kg	TSS Kg
Jan-95	578792	816	57	8	414	0	332
Feb-95	220989	324	23	41	274	1174	1221
Mar-95	307103	320	26	45	258	2230	1798
Apr-95	338748	217	80	57	451	3129	20352
May-95	333220	112	88	38	387	3358	12309
Jun-95	131043	116	20	12	384	1259	1063
Jul-95	18643	20	3	0	20	177	199
Aug-95							
Sep-95							
Oct-95	23028	9	5	1	23	160	660
Nov-95	24624	1	3	1	19	114	173
Dec-95	115892	139	5	26	88	214	771
Jan-96	372407	848	84	6	524	1309	80097
Feb-96	141606	184	2	3	37	216	152
Mar-96	159690	195	9	3	73	624	287
Apr-96	320906	558	44	6	213	2002	2075
May-96	232254	198	45	5	200	1947	6291
Jun-96	159040	212	20	7	230	1862	11693
Jul-96	17795	4	2	0	10	114	139
Aug-96	16553	1	1	0	5	51	38
Sep-96	536641	504	43	1	209	2339	1181
Oct-96	158269	100	11	3	66	748	243
Nov-96	677020	662	175	22	513	4763	7108
Dec-96	351349	231	51	9	147	1242	1170
Jan-97	227320	76	8	7	81	626	306
Feb-97	442142	368	67	34	274	2516	3648
Mar-97	591152	681	184	219	828	5703	13471
Apr-97	413779	65	37	3	186	1543	1895
May-97	176026	37	17	6	98	897	1668
Jun-97	229574	142	46	9	205	1804	5733
Jul-97	69391	36	10	3	40	452	403
Aug-97	76842	8	8	3	44	515	645
Sep-97	35706	23	5	1	25	249	236
Oct-97	118320	76	14	2	67	650	428
Nov-97	263750	371	23	5	156	1383	611
Dec-97	599540	920	99	18	383	3576	11355
Jan-98	511440	678	77	7	239	2466	4382
Feb-98							
Mar-98							
Apr-98							
May-98	79203	23	8	2	44	358	489
Jun-98	13897	4	1	0.30	7	76	37
Jul-98	30434	5	4	2	14	172	11
Aug-98	35124	5	4	2	13	142	12
Sep-98	116426	102	13	7	72	866	439
Oct-98	320821	397	23	11	102	1360	57
Nov-98	576537	769	60	20	262	3381	3970
Dec-98	722983	1561	147	34	505	4462	19961

*no data available

Table 6. (cont'd)

Date month-year	Discharge M ³	<i>Upper Moores Creek</i>					
		NO ₃ -N Kg	TP Kg	NH ₃ -N Kg	TKN Kg	TOC Kg	TSS Kg
Jul-96	4654	20	1	1	4	27	29
Aug-96	5686	1	0	0	1	12	5
Sep-96	60189	56	5	0	26	233	78
Oct-96	108216	127	8	2	52	470	110
Nov-96	610364	522	238	38	691	4658	55300
Dec-96	242129	170	27	5	104	966	653
Jan-97	125422	81	5	2	50	380	166
Feb-97	343320	398	237	49	775	2293	116978
Mar-97	369208	303	123	0	488	2767	45706
Apr-97	216110	83	14	5	104	1573	746
May-97	38778	51	4	7	31	1438	215
Jun-97	130446	141	36	32	161	1147	3087
Jul-97	16107	10	3	1	13	120	90
Aug-97	24192	6	4	1	18	210	641
Sep-97	4457	1	0	0	2	26	32
Oct-97	36319	3	2	1	14	133	26
Nov-97	132665	259	15	2	87	700	420
Dec-97	616478	1265	90	21	372	2722	6494
Jan-98	572013	966	82	14	305	2683	2825
Feb-98	429474	495	77	16	320	2943	3219
Mar-98	722537	642	338	43	1064	5412	112421
Apr-98	303481	267	50	19	236	2180	2446
May-98	114099	33	10	3	55	412	446
Jun-98	17782	4	1	1	8	48	24
Jul-98	18288	3	2	1	6	72	4
Aug-98	5305	2	0	0	2	22	3
Sep-98	65470	127	7	4	30	406	7
Oct-98	183356	377	13	4	54	620	20
Nov-98	396234	701	177	15	177	2200	714
Dec-98	439724	1407	131	47	296	2737	1236
Jan-99	295262	809	17	4	110		1140
Feb-99	314214	751	38	2	147		2682

*no data available

Table 6. (cont'd)

Date month-year	<i>Beatty Branch</i>						
	Discharge M ³	NO ₃ -N Kg	TP Kg	NH ₃ -N Kg	TKN Kg	TOC Kg	TSS Kg
Jan-95	137279	138	27	4	111	0	1493
Feb-95	60860	56	5	1	50	262	290
Mar-95	76535	50	7	2	50	468	539
Apr-95	97981	40	21	7	172	755	9033
May-95	86484	26	19	12	93	746	5193
Jun-95	29213	4	2	0	19	179	116
Jul-95	7759	1	1	1	19	37	55
Aug-95							
Sep-95							
Oct-95	10436	10	0	11	105	28	15
Nov-95	31120	4	1	8	37	41	63
Dec-95	115518	76	2	12	61	98	1003
Jan-96	143762	292	2	3	55	122	325
Feb-96	58092	66	1	2	18	85	47
Mar-96							
Apr-96	379005	360	59	12	238	2198	4353
May-96	118718	61	24	6	85	795	3644
Jun-96	21830	11	2	3	25	215	431
Jul-96	0	0	0	0	0	0	0
Aug-96	0	0	0	0	0	0	0
Sep-96	101040	50	5	0	19	237	85
Oct-96							
Nov-96	225209	179	53	6	127	1160	2941
Dec-96	204757	110	20	4	87	588	301
Jan-97	300935	79	12	4	107	548	182
Feb-97	224595	119	24	8	92	709	3854
Mar-97	255233	99	22	4	87	645	587
Apr-97	149776	34	11	0	53	466	530
May-97	54598	3	3	1	14	144	86
Jun-97	44849	9	9	0	39	284	518
Jul-97	27154	2	2	1	7	71	55
Aug-97	21180	35	6	0	18	117	466
Sep-97	15263	15	11	3	23	109	985
Oct-97	278174	30	16	2	46	447	349
Nov-97	34779	22	3	0	13	116	70
Dec-97	599540	920	99	18	383	3576	11355
Jan-98	152925	155	32	2	71	624	3129
Feb-98	101332	65	14	1	44	389	393
Mar-98	138680	73	49	9	137	849	5065
Apr-98	71288	12	8	1	31	248	403
May-98	36533	2	3	1	9	77	53
Jun-98	3281	0	0	0	1	7	5
Jul-98	369	0	0	0	0	1	0
Aug-98	0	0	0	0	0	0	0
Sep-98	12267	1	1	0	1	27	1
Oct-98	105844	51	7	1	16	249	476
Nov-98	159920	147	18	1	41	534	618
Dec-98	171625	291	38	5	103	885	4194

*no data available

Table 7. Monthly mean concentrations of NO₃-N, TP, NH₃-N, TKN, TOC, and TSS during storm flow conditions for the Lower Moores Creek (LMC), Upper Moores Creek (UMC), and Beatty Branch (BB) sites.

Date month-year	Discharge M ³	<i>Lower Moores Creek</i>					
		NO ₃ -N mg/L	TP mg/L	NH ₃ -N mg/L	TKN mg/L	TOC mg/L	TSS mg/L
Jan-95	991967	1.17	0.60	0.20	2.52	0.00	183.83
Feb-95	1168	2.16	0.14	0.52	1.73	11.67	11.75
Mar-95	300243	1.02	0.36	0.34	3.20	19.43	234.40
Apr-95	640875	0.65	0.64	0.28	3.54	12.73	342.76
May-95	801328	0.31	0.44	0.14	1.76	13.36	88.51
Jun-95	15004	0.99	0.16	0.10	3.24	10.17	8.20
Jul-95	0						
Aug-95							
Sep-95							
Oct-95	0						
Nov-95	0						
Dec-95	37727	1.99	0.27	0.98	5.65	13.17	74.35
Jan-96	452874	1.41	0.95	0.32	3.16	8.48	391.96
Feb-96	0						
Mar-96	0						
Apr-96	962585	1.25	0.75	0.34	2.37	11.95	139.75
May-96	399091	0.86	0.50	0.20	1.70	15.97	63.43
Jun-96	0						
Jul-96	0						
Aug-96	0						
Sep-96	0						
Oct-96	114966	0.75	0.08	0.03	0.42	5.14	1.40
Nov-96	2407759	0.78	0.44	0.07	1.17	10.51	24.25
Dec-96	0						
Jan-97	0						
Feb-97	718370	0.90	0.61	0.17	1.98	8.91	85.33
Mar-97	237858	0.98	0.37	0.22	1.47	10.68	37.62
Apr-97	132912	0.59	0.29	0.06	1.11	8.18	29.74
May-97	0						
Jun-97	284420	0.52	0.64	0.07	1.90	10.24	189.31
Jul-97	0						
Aug-97	0						
Sep-97	0						
Oct-97	23923	1.11	0.17	0.02	0.82	7.20	5.20
Nov-97	0						
Dec-97	176919	1.43	0.52	0.08	1.31	9.72	80.29
Jan-98	1581455	0.85	1.51	0.11	3.42	9.00	724.71
Feb-98							
Mar-98							
Apr-98							
May-98	0						
Jun-98	0						
Jul-98	0						
Aug-98	0						
Sep-98	237417	1.07	0.13	0.06	0.67	8.21	4.60
Oct-98	673858	1.33	0.46	0.15	1.29	9.17	24.65
Nov-98	169356	1.63	0.50	0.06	1.43	8.93	112.97
Dec-98	132359	1.85	0.25	0.10	0.82	8.22	27.42

*no data available

Table 7. (cont'd)

Date month-year	Discharge M ³	<i>Upper Moores Creek</i>					
		NO3-N mg/L	TP mg/L	NH3-N mg/L	TKN mg/L	TOC mg/L	TSS mg/L
Jul-96	0						
Aug-96	0						
Sep-96	470811	0.93	0.08	0.00	0.43	3.89	1.30
Oct-96	75700	1.25	0.24	0.05	0.88	7.83	20.25
Nov-96	1159659	0.78	0.68	0.10	1.61	10.19	175.18
Dec-96	0						
Jan-97	0						
Feb-97	378860	0.99	2.27	0.39	6.92	10.98	1560.66
Mar-97	163885	1.07	0.49	0.00	1.84	11.52	87.09
Apr-97	95507	0.89	0.50	0.30	1.98	9.54	141.98
May-97	0						
Jun-97	121222	0.62	0.95	0.18	2.97	11.08	442.94
Jul-97	0						
Aug-97	0						
Sep-97	0						
Oct-97	14003	1.08	0.54	0.11	1.67	8.68	148.01
Nov-97	0						
Dec-97	153069	1.48	0.67	0.15	1.65	9.05	101.63
Jan-98	1093178	1.04	1.26	0.13	2.59	8.61	378.43
Feb-98	150432	0.95	0.53	0.14	1.71	12.81	45.00
Mar-98	789289	0.80	0.76	0.13	2.35	9.02	246.40
Apr-98	14169	0.31	0.07	0.01	0.43	3.50	3.40
May-98	0						
Jun-98	0						
Jul-98	0						
Aug-98	0						
Sep-98	95824	2.32	0.11	0.06	0.50	6.68	0.10
Oct-98	311936	2.35	0.90	0.12	1.91	8.36	210.83
Nov-98	87262	1.14	0.54	0.07	1.19	8.24	151.40
Dec-98	75484	2.94	0.43	0.16	0.87	7.72	4.30
Jan-99	27855	1.62	0.85	0.14	2.60		307.74
Feb-99	96593	1.49	1.65	0.10	4.33		939.28

*no data available

Table 7. (cont'd)

Date month-year	Discharge M ³	<i>Beatty Branch</i>					
		NO3-N mg/L	TP mg/L	NH3-N mg/L	TKN mg/L	TOC mg/L	TSS mg/L
Jan-95	148090	1.05	0.75	0.11	2.88	0.00	140.40
Feb-95	0						
Mar-95	51128	0.65	2.49	0.91	6.00	37.06	110.00
Apr-95	122488	0.50	0.65	0.15	2.59	9.81	420.83
May-95	155876	0.32	0.47	0.16	1.53	11.59	118.49
Jun-95	0						
Jul-95	0						
Aug-95							
Sep-95							
Oct-95	0						
Nov-95	0						
Dec-95	25765	2.30	0.20	0.14	1.42	7.72	31.20
Jan-96	108349	1.82	0.24	0.17	1.65	8.26	95.50
Feb-96	0						
Mar-96							
Apr-96	202805	1.68	0.44	0.15	1.85	9.55	61.78
May-96	95268	0.73	0.44	0.10	1.37	14.26	42.67
Jun-96	0						
Jul-96	0						
Aug-96	0						
Sep-96	120072	0.72	0.63	0.11	1.26	10.37	61.10
Oct-96							
Nov-96	1399006	0.75	0.59	0.11	0.93	8.14	28.92
Dec-96	231616	0.40	0.06	0.03	0.40	2.52	1.13
Jan-97	385590	0.24	0.04	0.01	0.36	1.75	0.47
Feb-97	313519	0.82	0.29	0.07	0.82	5.98	101.91
Mar-97	213390	0.38	0.08	0.02	0.26	2.67	1.72
Apr-97	466883	0.34	0.10	0.00	0.46	3.92	5.71
May-97	9318	0.05	0.05	0.00	0.30	2.91	0.30
Jun-97	87381	0.22	0.24	0.00	0.97	6.93	13.20
Jul-97	0						
Aug-97	0						
Sep-97	0						
Oct-97	754436	0.09	0.09	0.02	0.23	1.83	4.81
Nov-97	0						
Dec-97	176919	1.43	0.52	0.08	1.31	9.72	80.29
Jan-98	153133	0.71	1.21	0.14	2.30	7.78	371.04
Feb-98	6295	0.64	1.00	0.10	2.66	9.74	278.70
Mar-98	58592	0.53	0.66	0.13	1.81	8.11	120.01
Apr-98	0						
May-98	6015	0.06	0.09	0.02	0.20	2.02	1.10
Jun-98	0						
Jul-98	0						
Aug-98	0						
Sep-98	53519	0.08	0.06	0.02	0.12	2.20	0.10
Oct-98	184502	2.07	1.99	0.20	3.26	8.82	868.46
Nov-98	47451	2.12	0.43	0.06	1.10	7.33	102.09
Dec-98	14906	1.49	0.51	0.06	1.07	8.63	20.48

*no data available

Table 8. Monthly mass transport of NO₃-N, TP, NH₃-N, TKN, TOC, and TSS during storm flow conditions for the Lower Moores Creek (LMC), Upper Moores Creek (UMC), and Beatty Branch (BB) sites.

Date month-year	<i>Lower Moores Creek</i>						
	Discharge M ³	NO ₃ -N Kg	TP Kg	NH ₃ -N Kg	TKN Kg	TOC Kg	TSS Kg
Jan-95	991967	1163	596	195	2504	0	182356
Feb-95	1168	3	0	1	2	14	14
Mar-95	300243	306	108	102	961	5834	70377
Apr-95	640875	415	412	177	2269	8159	219664
May-95	801328	250	352	109	1408	10703	70923
Jun-95	15004	15	2	2	49	153	123
Jul-95	0	0	0	0	0	0	0
Aug-95							
Sep-95							
Oct-95	0	0	0	0	0	0	0
Nov-95	0	0	0	0	0	0	0
Dec-95	37727	75	10	37	213	497	2805
Jan-96	452874	639	431	146	1433	3842	177507
Feb-96	0	0	0	0	0	0	0
Mar-96	0	0	0	0	0	0	0
Apr-96	962585	1199	721	329	2281	11505	134518
May-96	399091	342	201	80	677	6374	25313
Jun-96	0	0	0	0	0	0	0
Jul-96	0	0	0	0	0	0	0
Aug-96	0	0	0	0	0	0	0
Sep-96	0	0	0	0	0	0	0
Oct-96	114966	86	9	3	48	591	161
Nov-96	2407759	1883	1067	179	2813	25301	58378
Dec-96	0	0	0	0	0	0	0
Jan-97	0	0	0	0	0	0	0
Feb-97	718370	648	440	119	1419	6398	61299
Mar-97	237858	233	88	52	350	2540	8949
Apr-97	132912	79	38	8	147	1087	3953
May-97	0	0	0	0	0	0	0
Jun-97	284420	147	181	21	540	2912	53843
Jul-97	0	0	0	0	0	0	0
Aug-97	0	0	0	0	0	0	0
Sep-97	0	0	0	0	0	0	0
Oct-97	23923	27	4	0	20	172	124
Nov-97	0	0	0	0	0	0	0
Dec-97	176919	254	92	14	231	1719	14204
Jan-98	1581455	1346	2389	178	5404	14233	1146104
Feb-98							
Mar-98							
Apr-98							
May-98	0	0	0	0	0	0	0
Jun-98	0	0	0	0	0	0	0
Jul-98	0	0	0	0	0	0	0
Aug-98	0	0	0	0	0	0	0
Sep-98	237417	253	30	15	159	1949	1092
Oct-98	673858	895	307	98	869	6180	16611
Nov-98	169356	276	85	11	242	1512	19132
Dec-98	132359	245	33	13	109	1088	3629

*no data available

Table 8. (cont'd)

Date month-year	<i>Upper Moores Creek</i>						
	Discharge M ³	NO3-N Kg	TP Kg	NH3-N Kg	TKN Kg	TOC Kg	TSS Kg
Jul-96	0	0	0	0	0	0	0
Aug-96	0	0	0	0	0	0	0
Sep-96	470811	438	38	1	202	1831	612
Oct-96	75700	94	18	4	67	593	1533
Nov-96	1159659	905	786	113	1868	11815	203151
Dec-96	0	0	0	0	0	0	0
Jan-97	0	0	0	0	0	0	0
Feb-97	378860	376	861	148	2624	4158	591271
Mar-97	163885	176	80	1	301	1888	14273
Apr-97	95507	85	48	29	189	911	13560
May-97	0	0	0	0	0	0	0
Jun-97	121222	75	115	22	360	1343	53694
Jul-97	0	0	0	0	0	0	0
Aug-97	0	0	0	0	0	0	0
Sep-97	0	0	0	0	0	0	0
Oct-97	14003	15	8	1	23	122	2073
Nov-97	0	0	0	0	0	0	0
Dec-97	153069	227	102	23	253	1385	15557
Jan-98	1093178	1138	1379	144	2835	9416	413691
Feb-98	150432	143	80	21	257	1928	6769
Mar-98	789289	629	601	101	1856	7122	194482
Apr-98	14169	4	1	0	6	50	48
May-98	0	0	0	0	0	0	0
Jun-98	0	0	0	0	0	0	0
Jul-98	0	0	0	0	0	0	0
Aug-98	0	0	0	0	0	0	0
Sep-98	95824	222	11	6	48	640	10
Oct-98	311936	734	280	36	595	2607	65764
Nov-98	87262	100	47	6	104	719	13212
Dec-98	75484	222	32	12	66	583	325
Jan-99	27855	45	24	4	72		8572
Feb-99	96593	144	159	10	418		90728
*no data available							

Table 8. (cont'd)

Date month-year	<i>Beatty Branch</i>						
	Discharge M ³	NO3-N Kg	TP Kg	NH3-N Kg	TKN Kg	TOC Kg	TSS Kg
Jan-95	148090	155	111	16	426	0	20792
Feb-95	0	0	0	0	0	0	0
Mar-95	51128	33	127	47	307	1895	5624
Apr-95	122488	61	79	18	317	1202	51546
May-95	155876	50	73	26	238	1807	18470
Jun-95	0	0	0	0	0	0	0
Jul-95	0	0	0	0	0	0	0
Aug-95							
Sep-95							
Oct-95	0	0	0	0	0	0	0
Nov-95	0	0	0	0	0	0	0
Dec-95	25765	59	5	4	37	199	804
Jan-96	108349	197	26	18	179	895	10347
Feb-96	0	0	0	0	0	0	0
Mar-96							
Apr-96	202805	341	90	31	376	1936	12529
May-96	95268	70	42	10	130	1358	4065
Jun-96	0	0	0	0	0	0	0
Jul-96	0	0	0	0	0	0	0
Aug-96	0	0	0	0	0	0	0
Sep-96	120072	86	76	13	151	1245	7336
Oct-96							
Nov-96	1399006	1054	832	156	1296	11383	40458
Dec-96	231616	93	14	6	92	584	263
Jan-97	385590	92	14	5	137	673	180
Feb-97	313519	256	92	23	258	1874	31952
Mar-97	213390	82	17	5	56	570	368
Apr-97	466883	161	47	1	216	1830	2666
May-97	9318	0	0	0	3	27	3
Jun-97	87381	19	21	0	85	606	1153
Jul-97	0	0	0	0	0	0	0
Aug-97	0	0	0	0	0	0	0
Sep-97	0	0	0	0	0	0	0
Oct-97	754436	67	70	16	176	1382	3627
Nov-97	0	0	0	0	0	0	0
Dec-97	176919	254	92	14	231	1719	14204
Jan-98	153133	109	185	22	353	1191	56819
Feb-98	6295	4	6	1	17	61	1754
Mar-98	58592	31	39	8	106	475	7032
Apr-98	0	0	0	0	0	0	0
May-98	6015	0	1	0	1	12	7
Jun-98	0	0	0	0	0	0	0
Jul-98	0	0	0	0	0	0	0
Aug-98	0	0	0	0	0	0	0
Sep-98	53519	4	3	1	6	118	5
Oct-98	184502	382	368	37	601	1628	160234
Nov-98	47451	101	20	3	52	348	4844
Dec-98	14906	22	8	1	16	129	305

*no data available

APPENDIX B
Figures 1-39

Lower Moores Creek Discharge

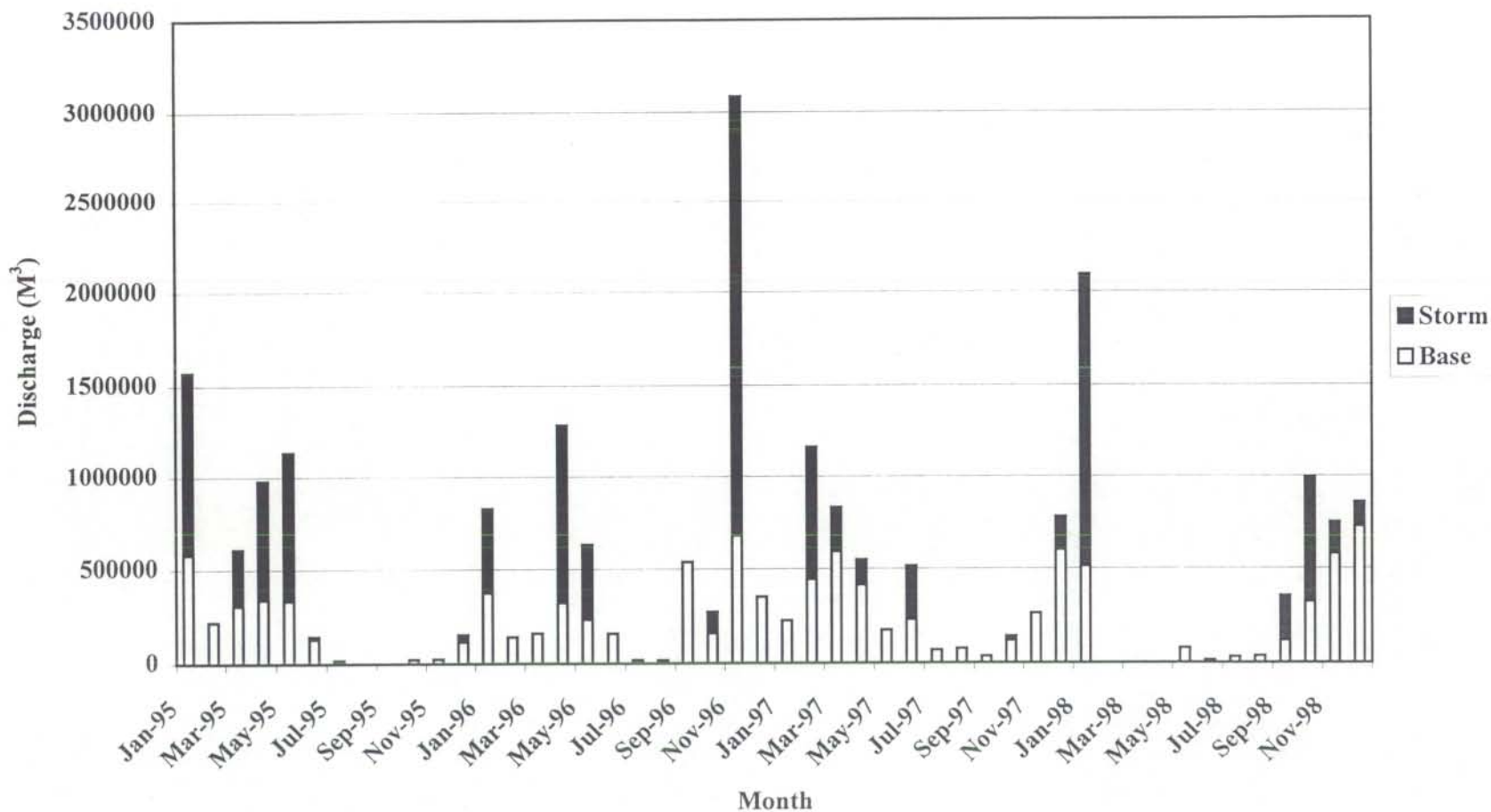


Figure 1. Base, storm, and total discharge at the Lower Moores Creek site.

Lower Moores Creek
Nitrate-N
Loads

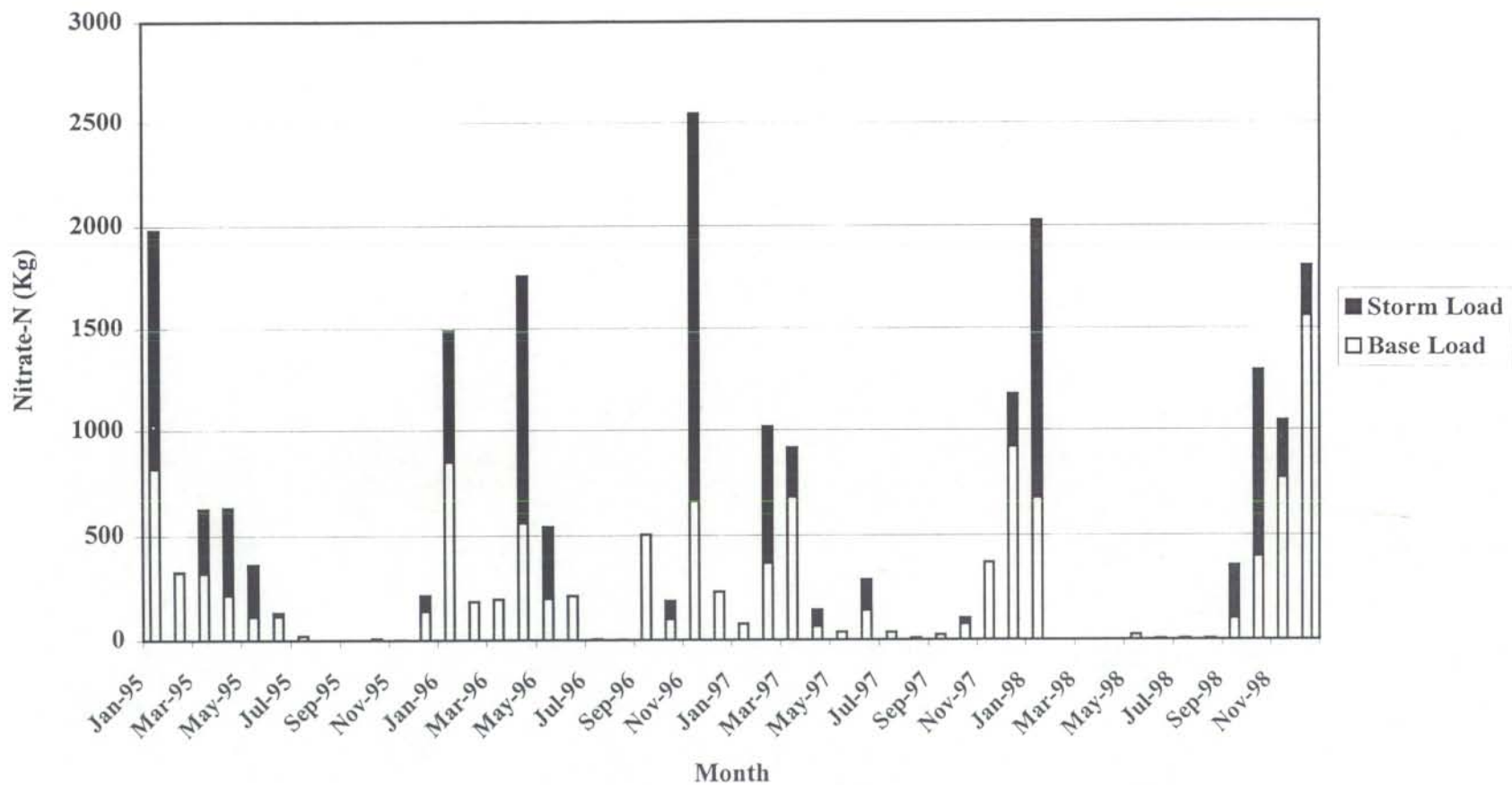


Figure 2. Base, storm, and total loads of nitrate-N at the Lower Moores Creek site.

Lower Moores Creek
Total Phosphorus
Loads

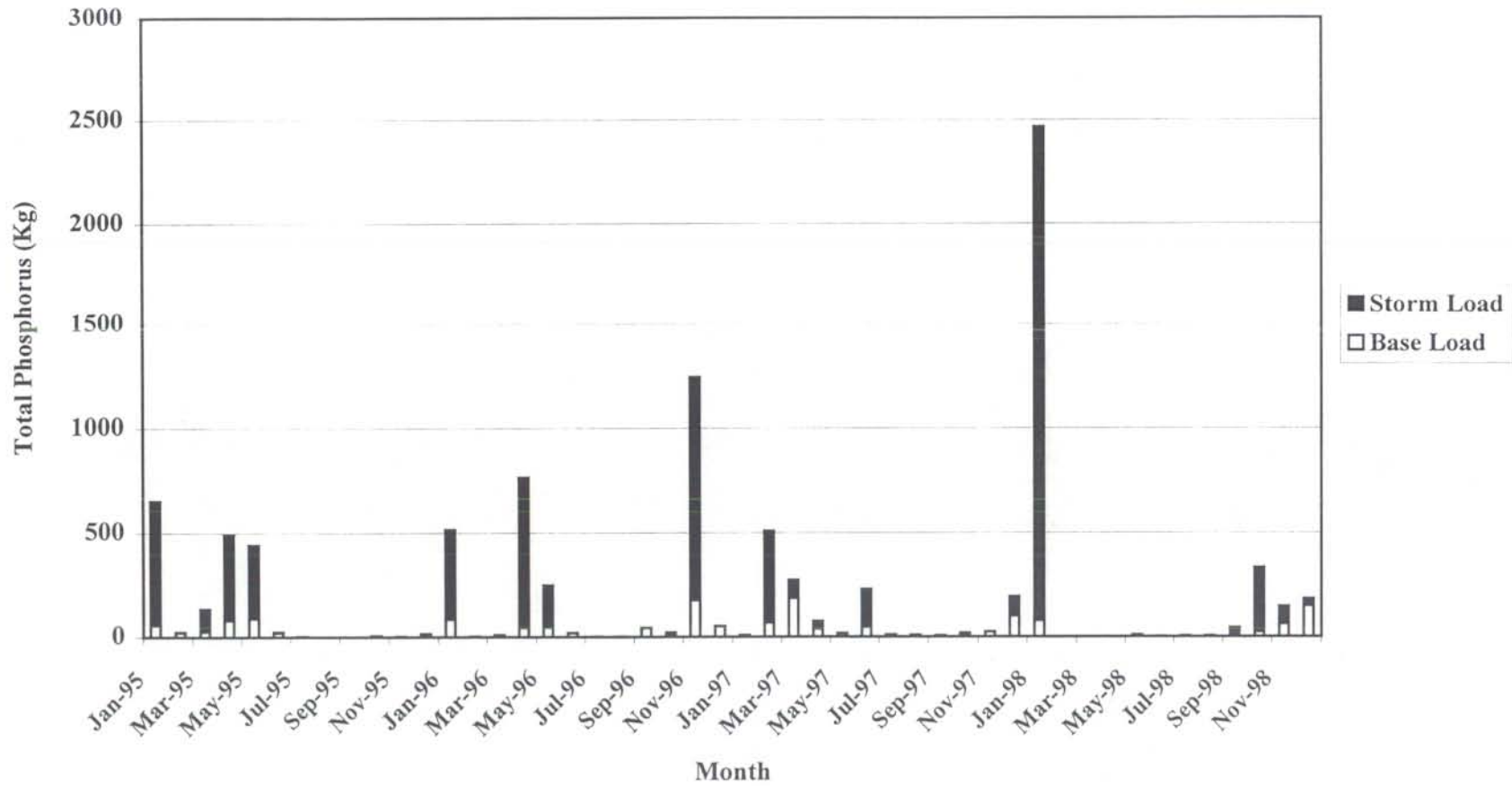


Figure 3. Base, storm, and total loads of total phosphorus at the Lower Moores Creek site.

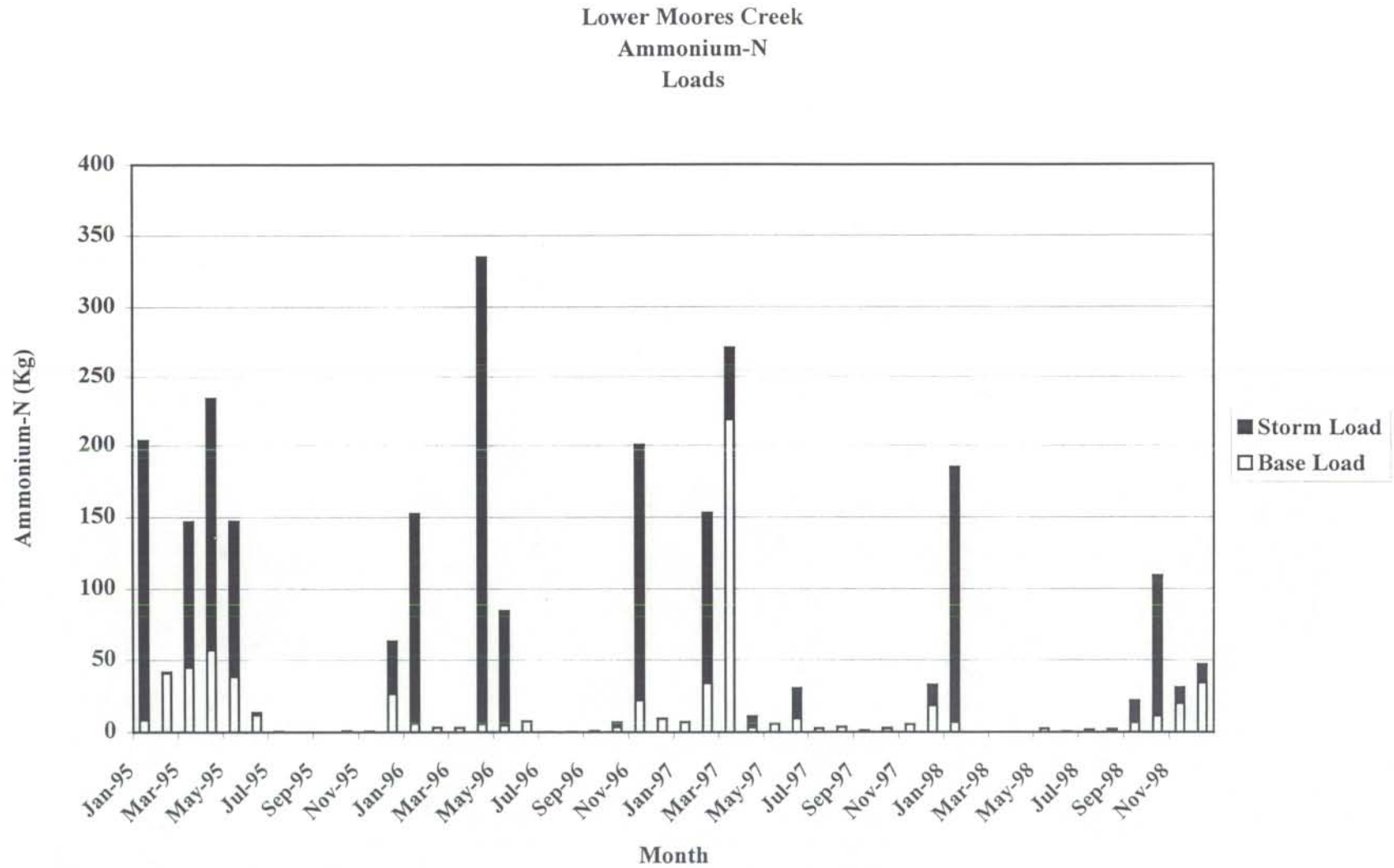


Figure 4. Base, storm, and total loads of ammonium-N at the Lower Moores Creek site.

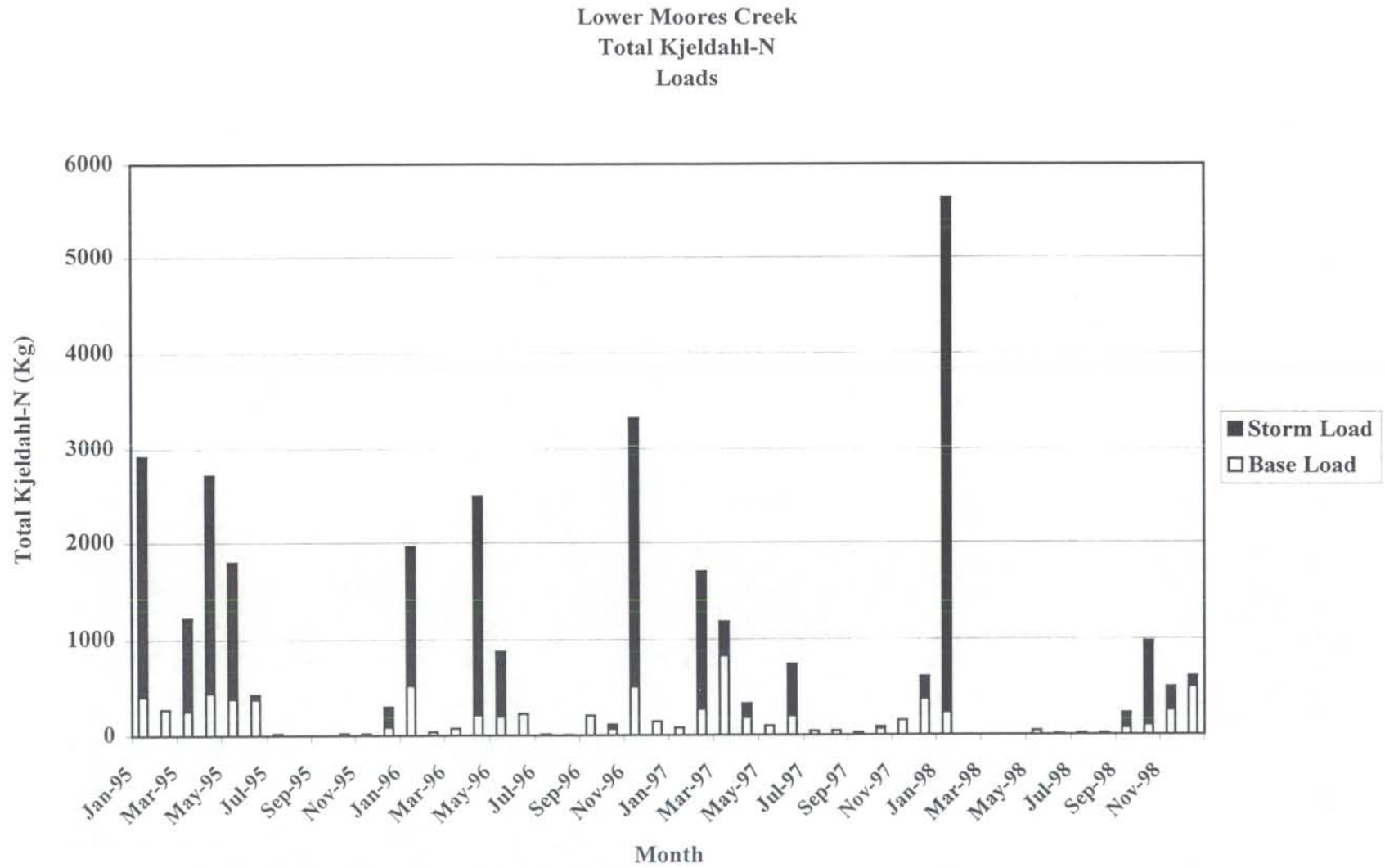


Figure 5. Base, storm, and total loads of TKN at the Lower Moores Creek site.

Lower Moores Creek Total Organic Carbon Loads

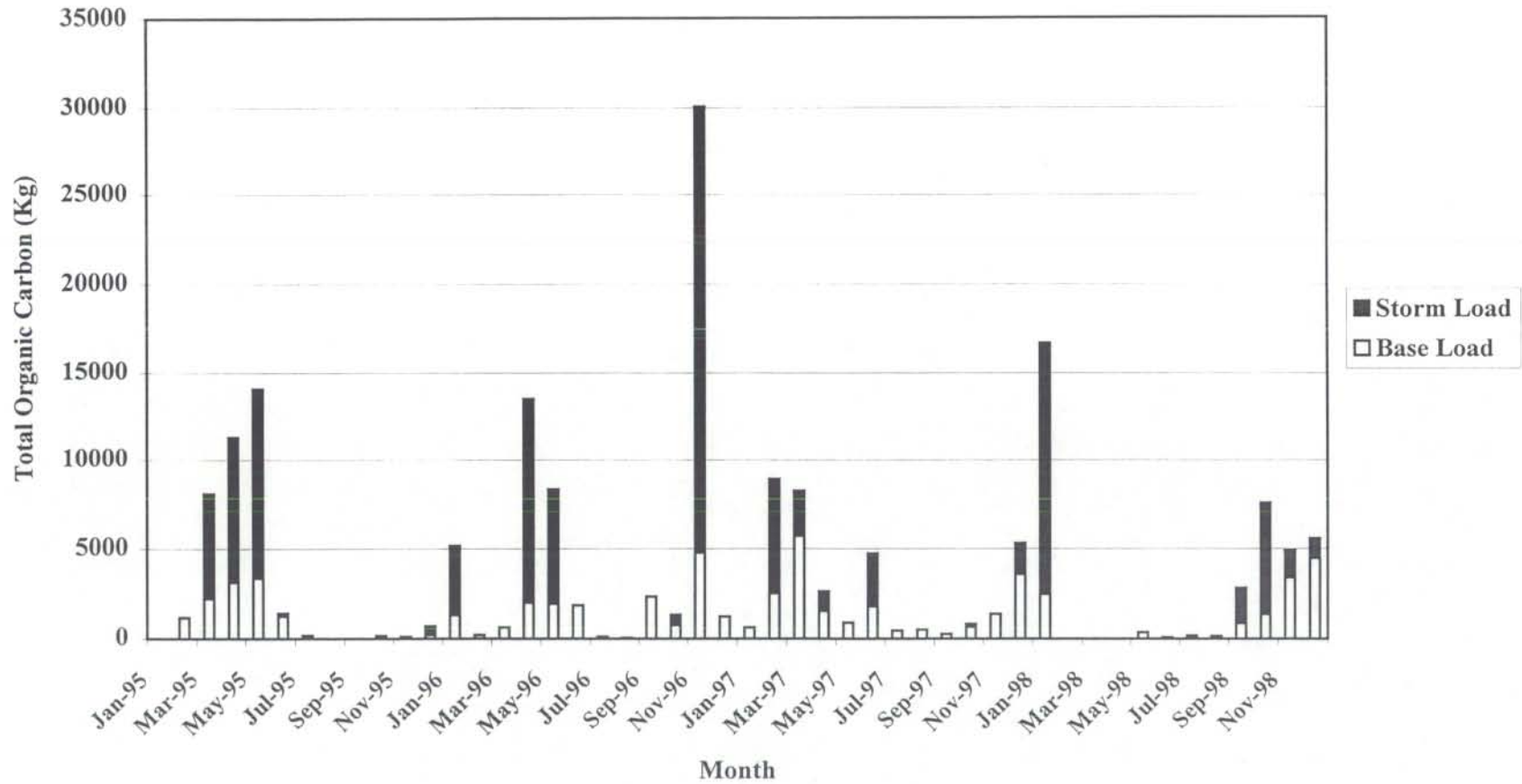
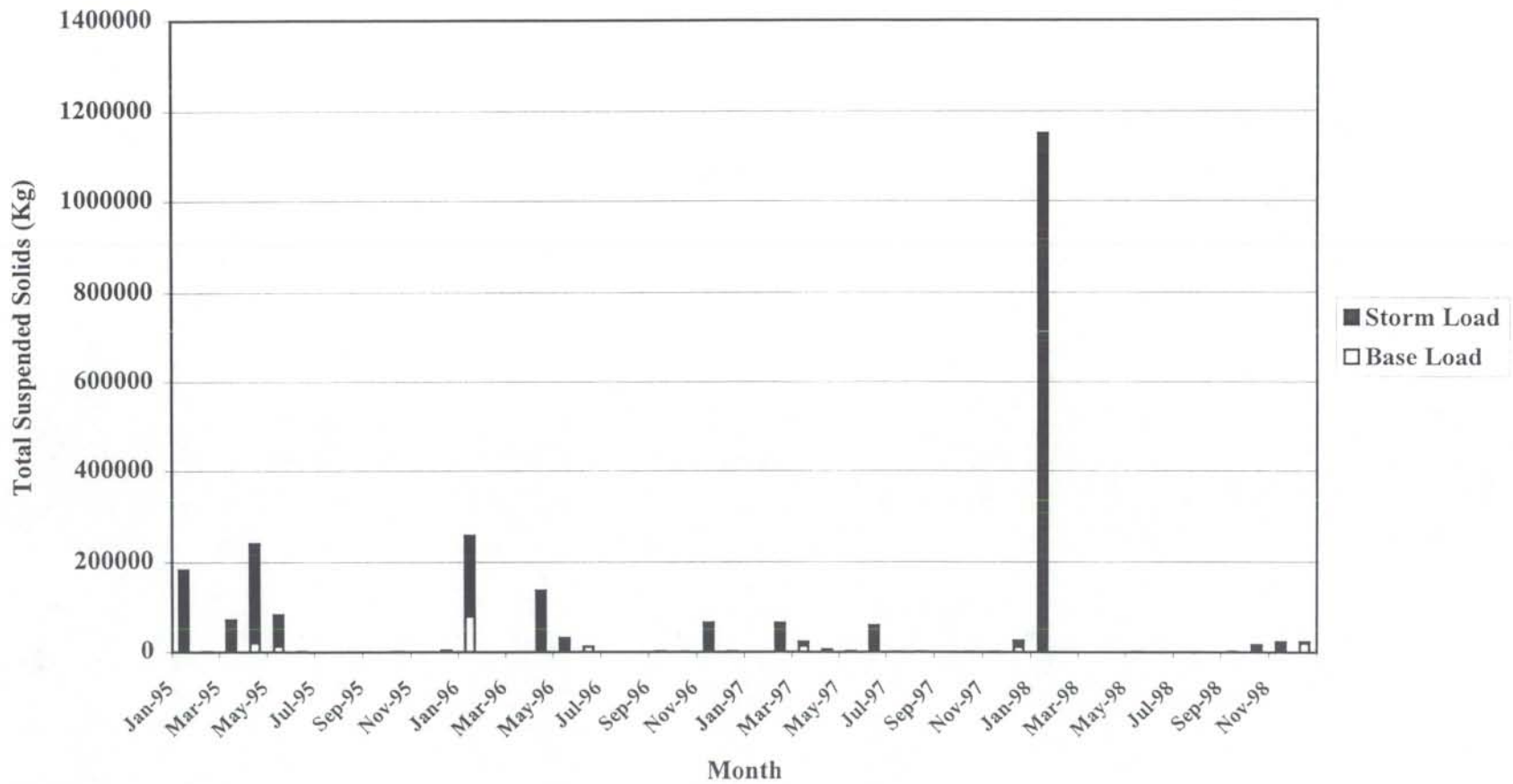


Figure 6. Base, storm, and total loads of TOC at the Lower Moores Creek site.

Lower Moores Creek
Total Suspended Solids
Loads



B-7

Figure 7. Base, storm, and total loads of TSS at the Lower Moores Creek site.

Upper Moores Creek Discharge

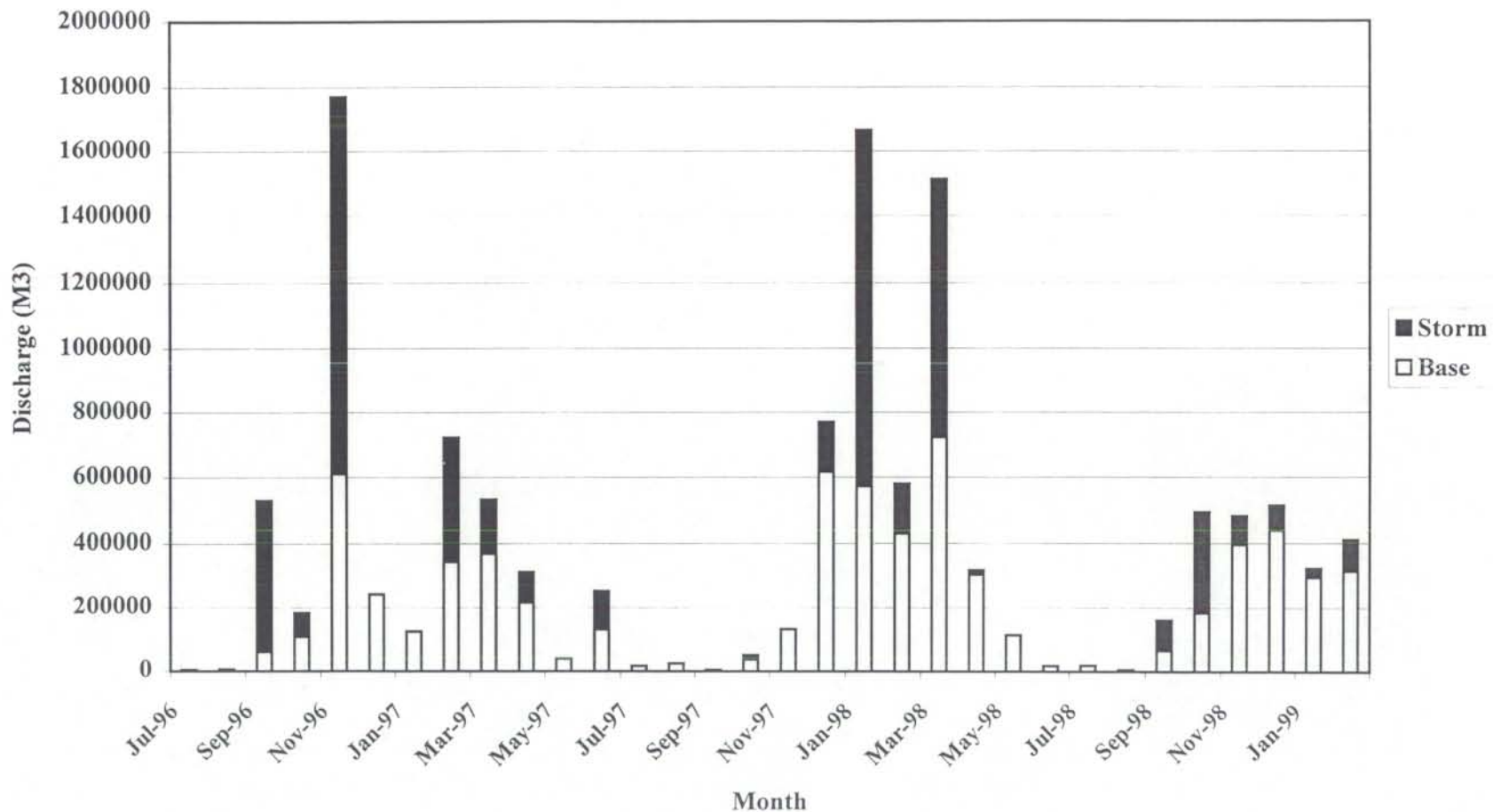


Figure 8. Base, storm, and total discharge at the Upper Moores Creek site.

Upper Moores Creek
Nitrate-N
Loads

B-9

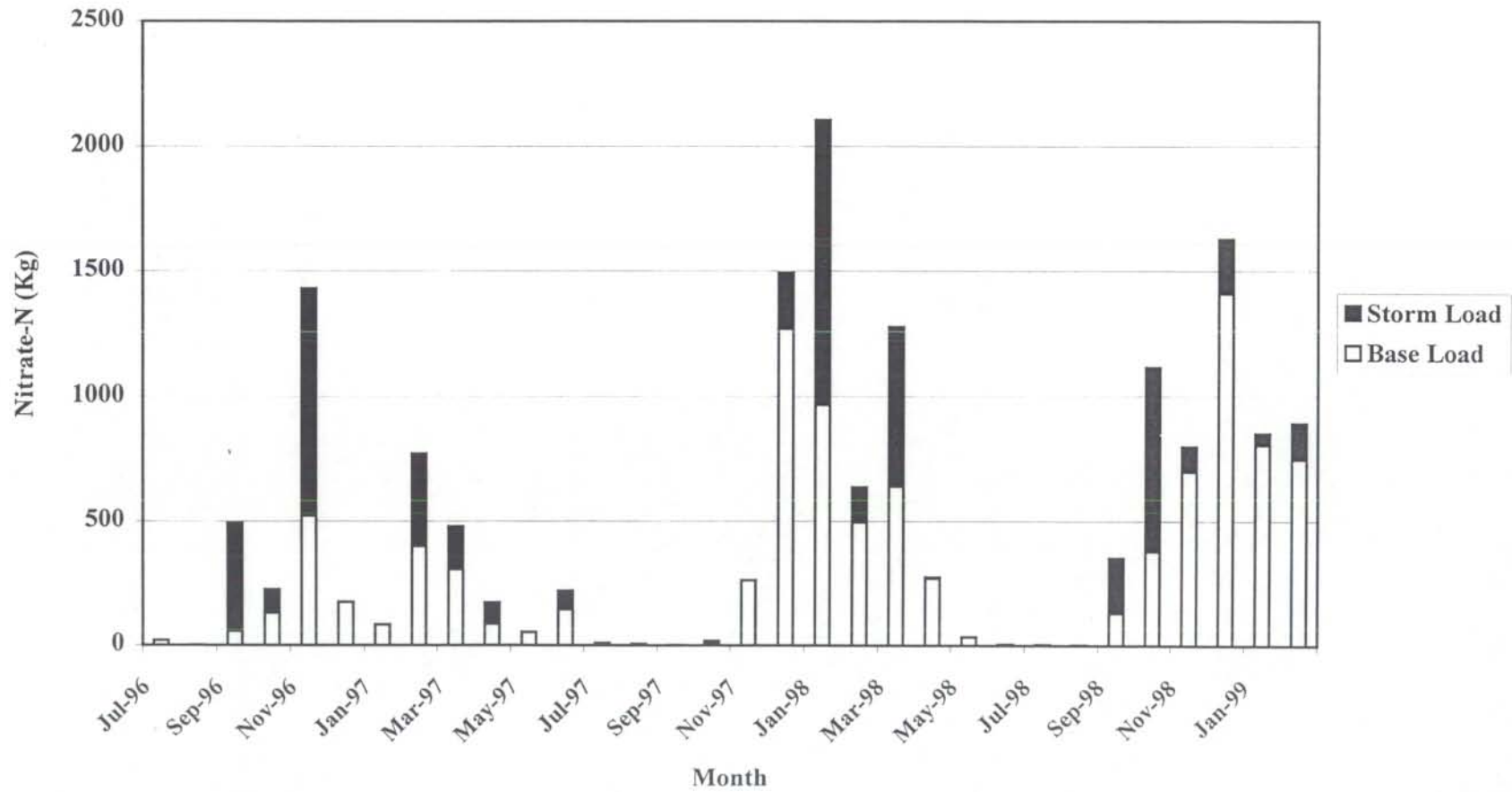


Figure 9. Base, storm, and total loads of nitrate-N at the Upper Moores Creek site.

Upper Moores Creek Total Phosphorus Loads

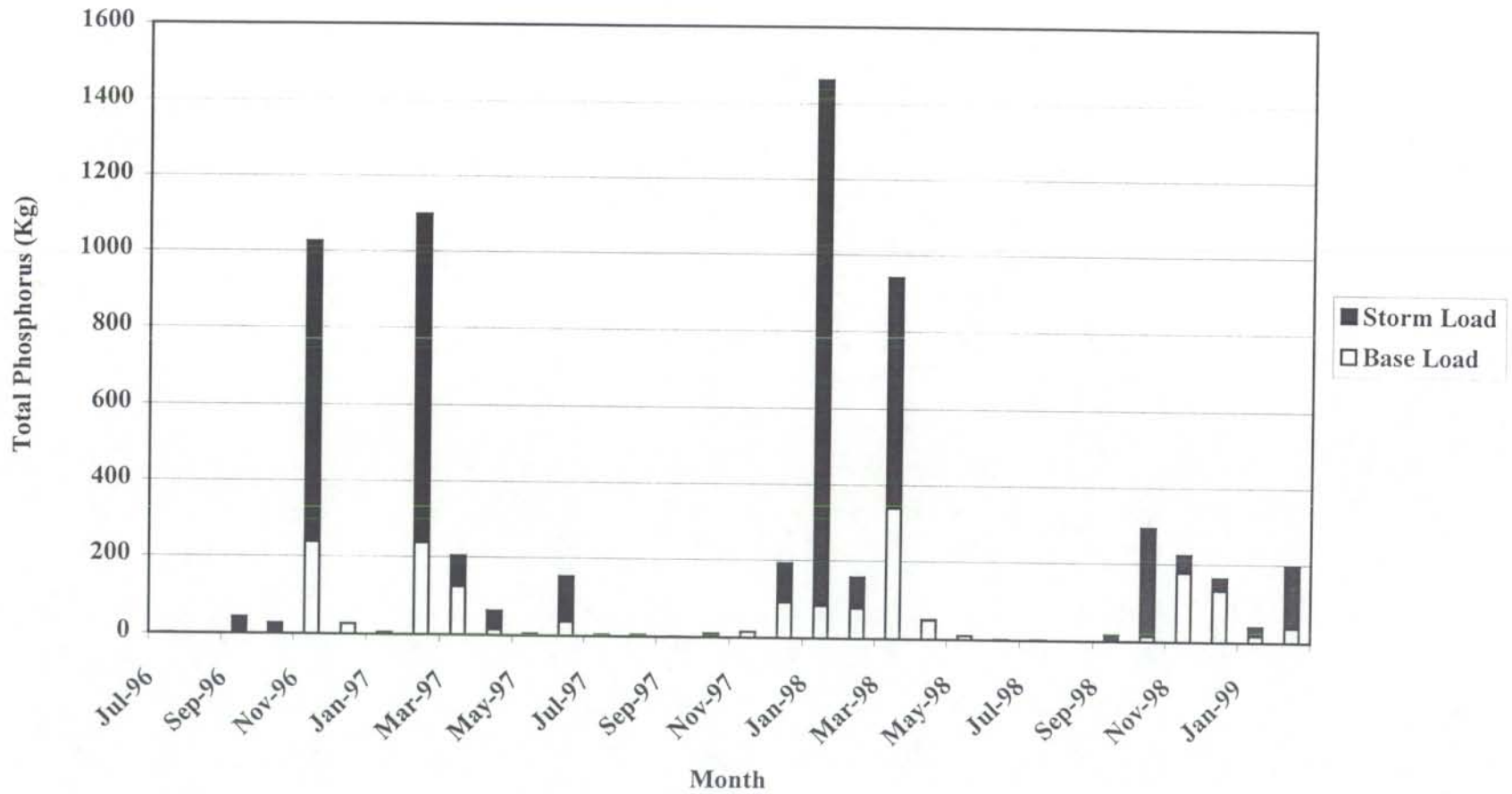


Figure 10. Base, storm, and total loads of total phosphorus at the Upper Moores Creek site.

Upper Moores Creek
Ammonium-N
Loads

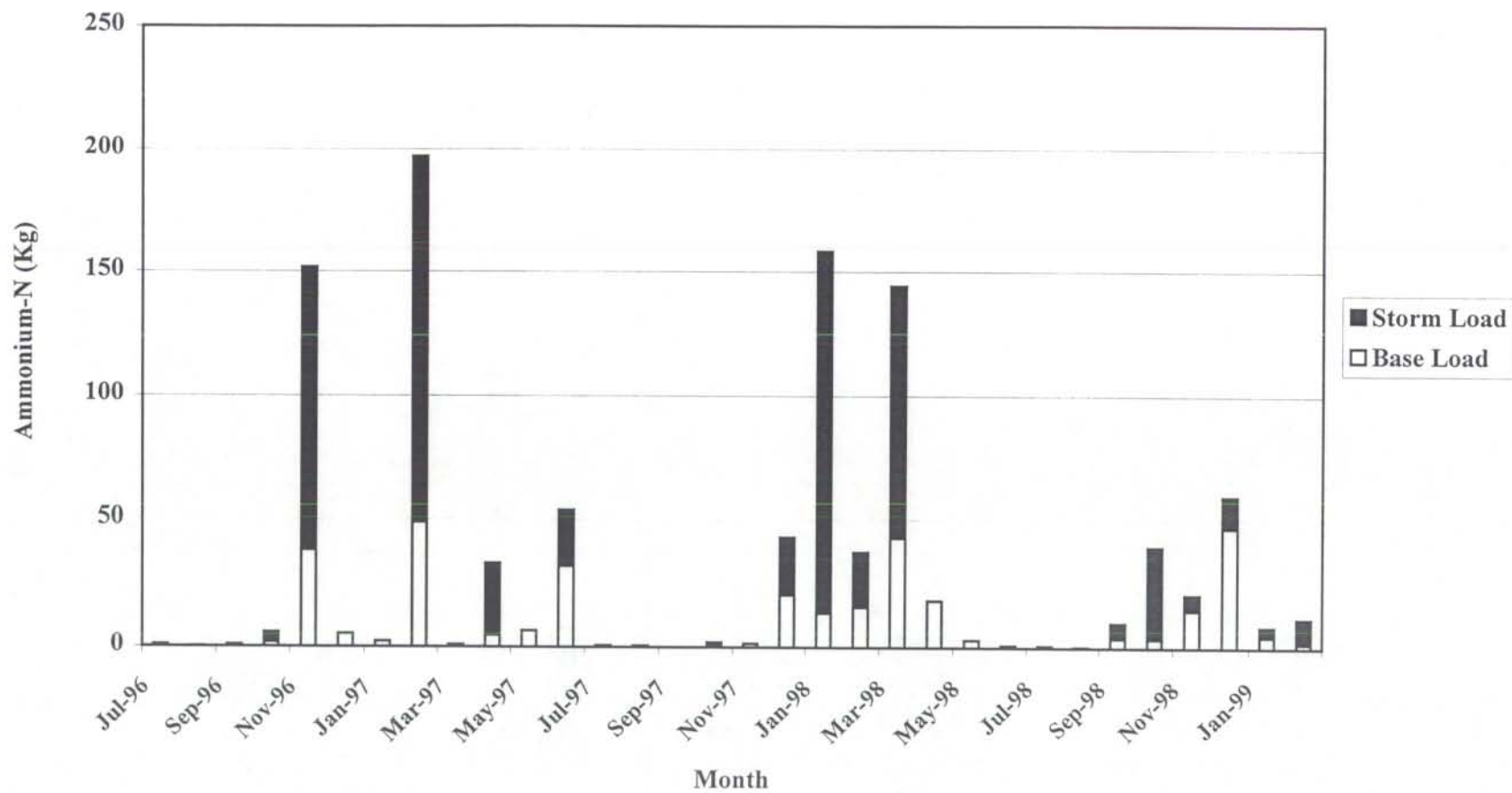


Figure 11. Base, storm, and total loads of ammonium-N at the Upper Moores Creek site.

Upper Moores Creek
Total Kjeldahl-N
Loads

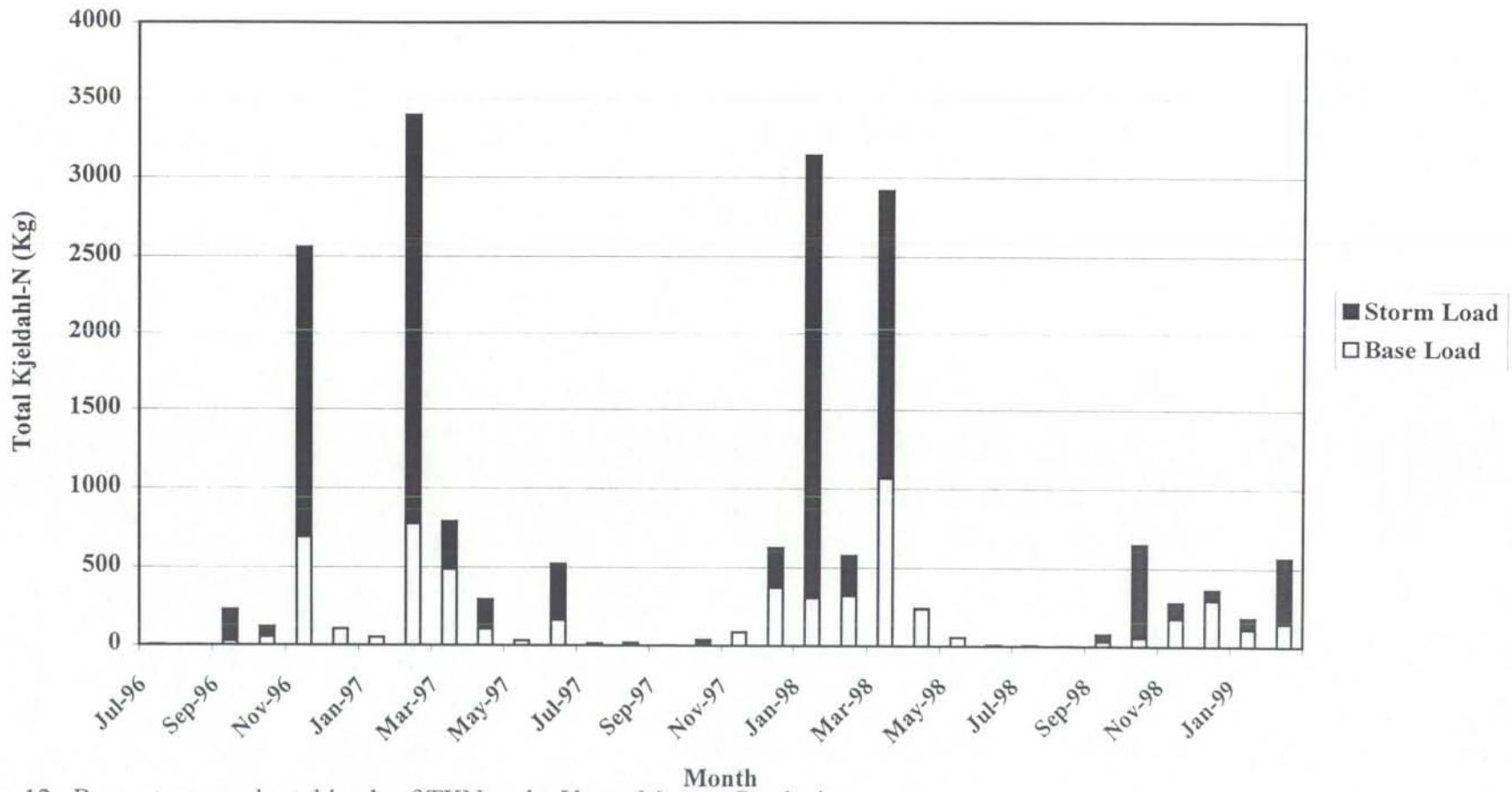


Figure 12. Base, storm, and total loads of TKN at the Upper Moores Creek site.

Upper Moores Creek
Total Organic Carbon
Loads

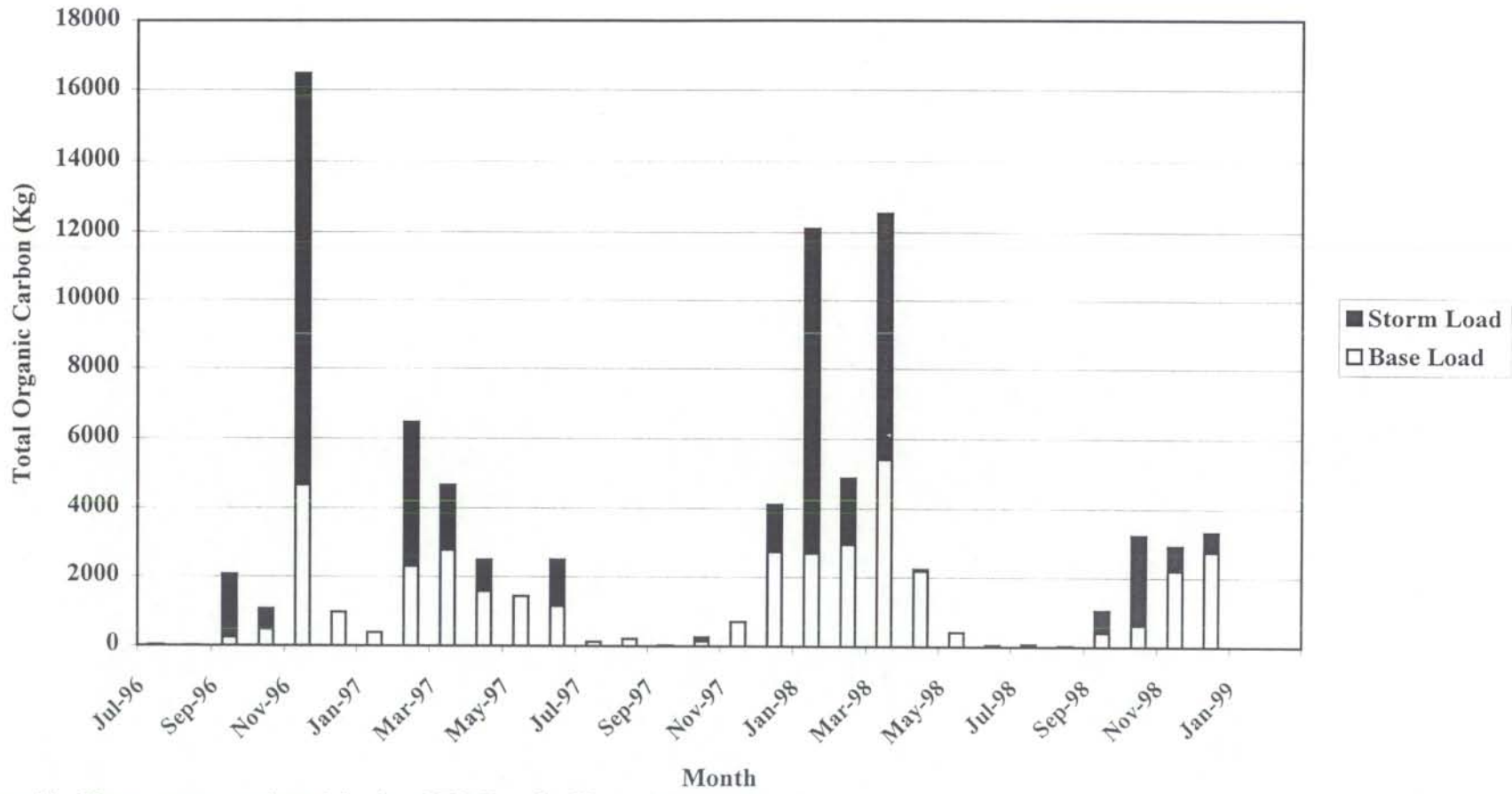


Figure 13. Base, storm, and total loads of TOC at the Upper Moores Creek site.

Upper Moores Creek Total Suspended Solids Loads

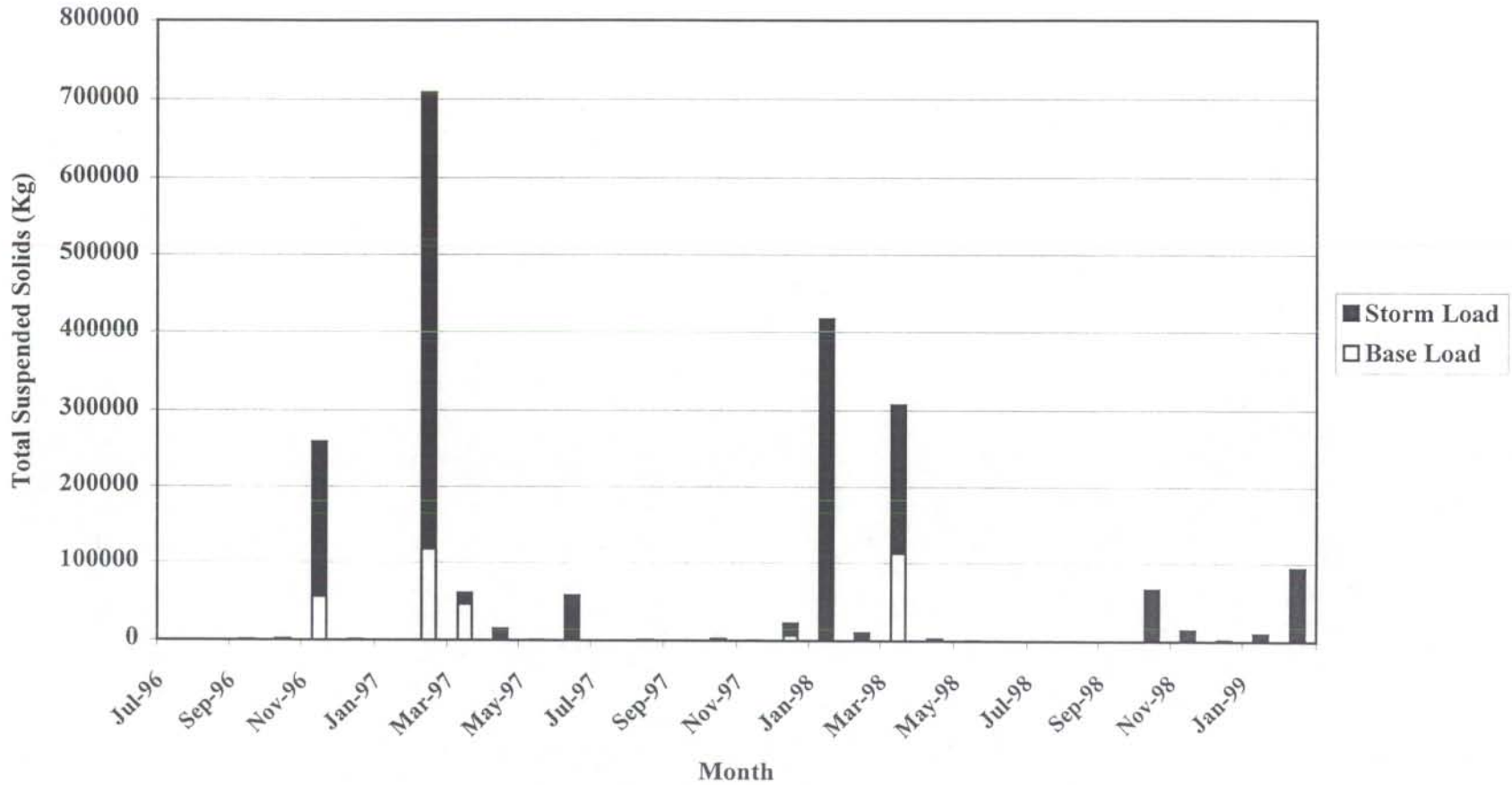


Figure 14. Base, storm, and total loads of TSS at the Upper Moores Creek site.

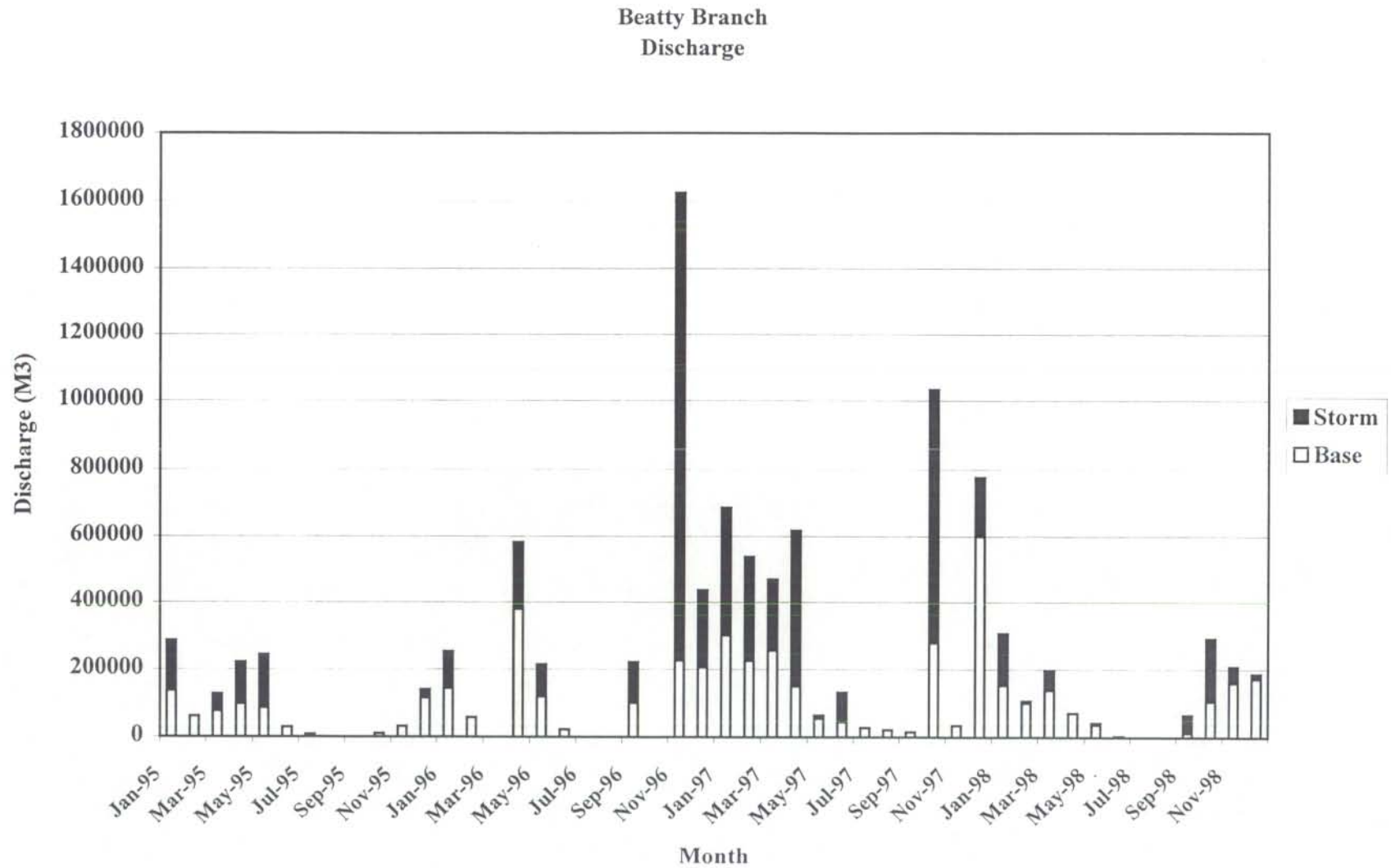


Figure 15. Base, storm, and total discharge at the Beatty Branch site.

Beatty Branch
Nitrate-N
Loads

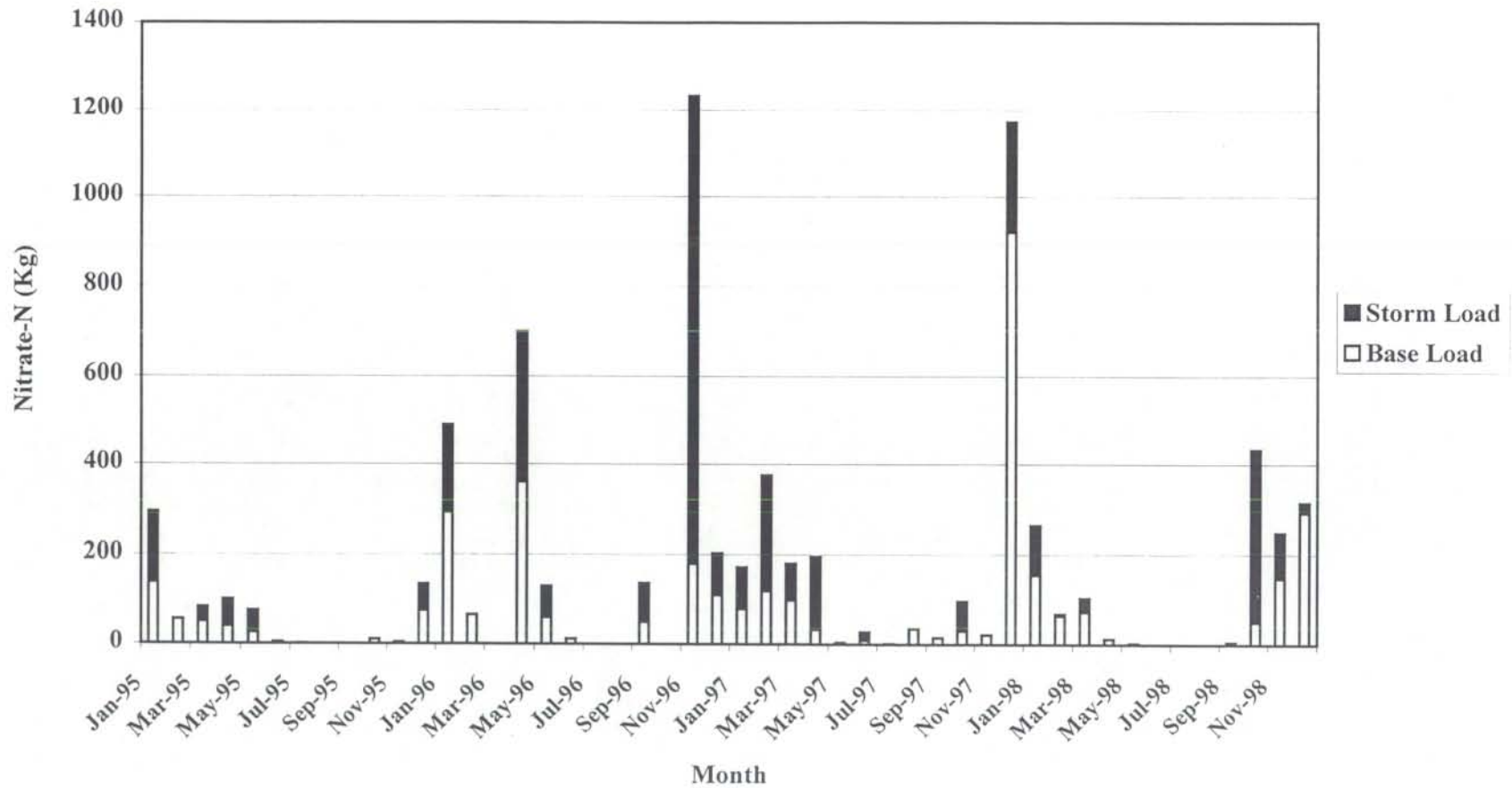


Figure 16. Base, storm, and total loads of nitrate-N at the Beatty Branch site.

Beatty Branch Total Phosphorus Loads

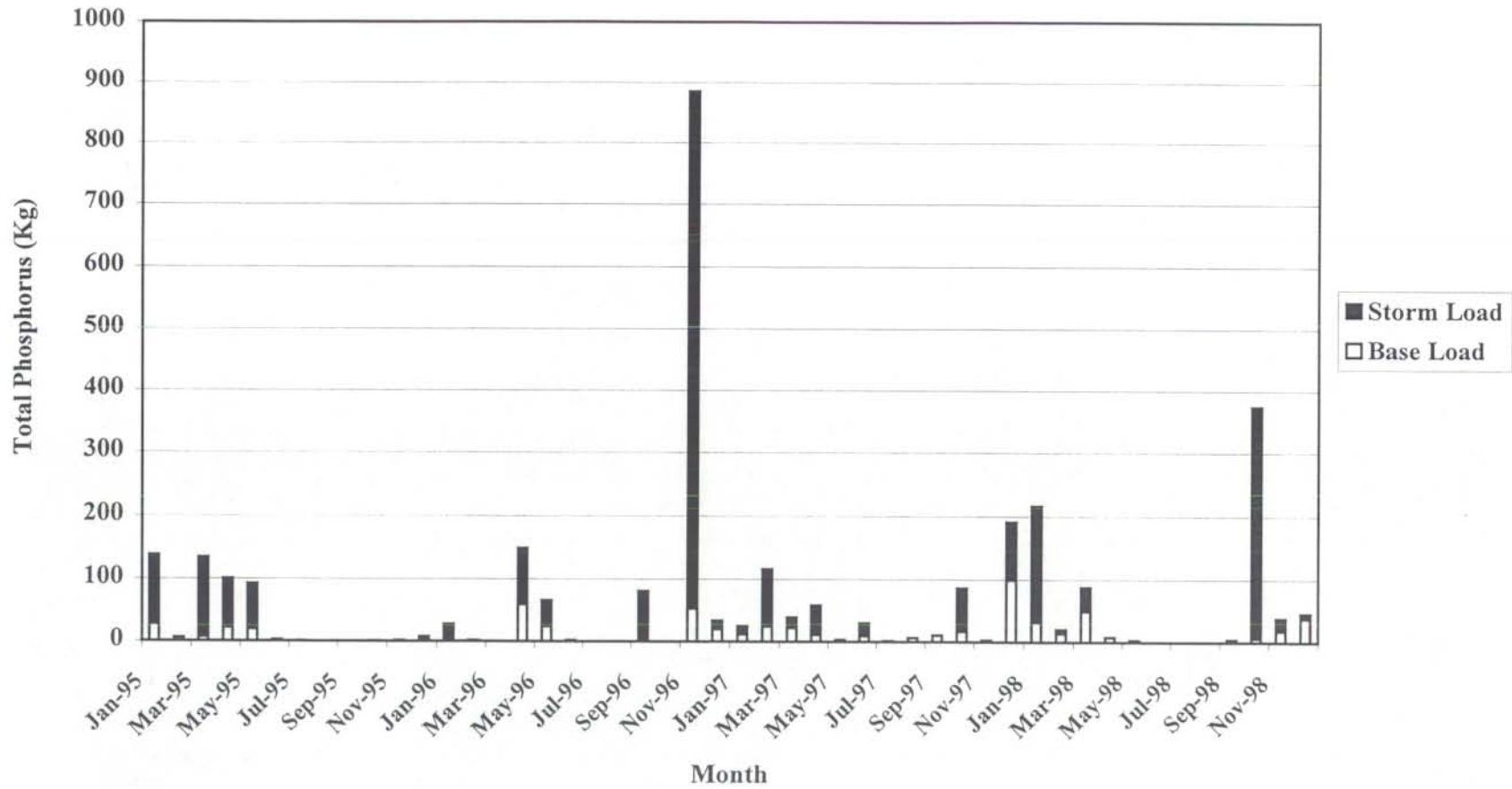


Figure 17. Base, storm, and total loads of total phosphorus at the Beatty Branch site.

Beatty Branch Ammonium-N Loads

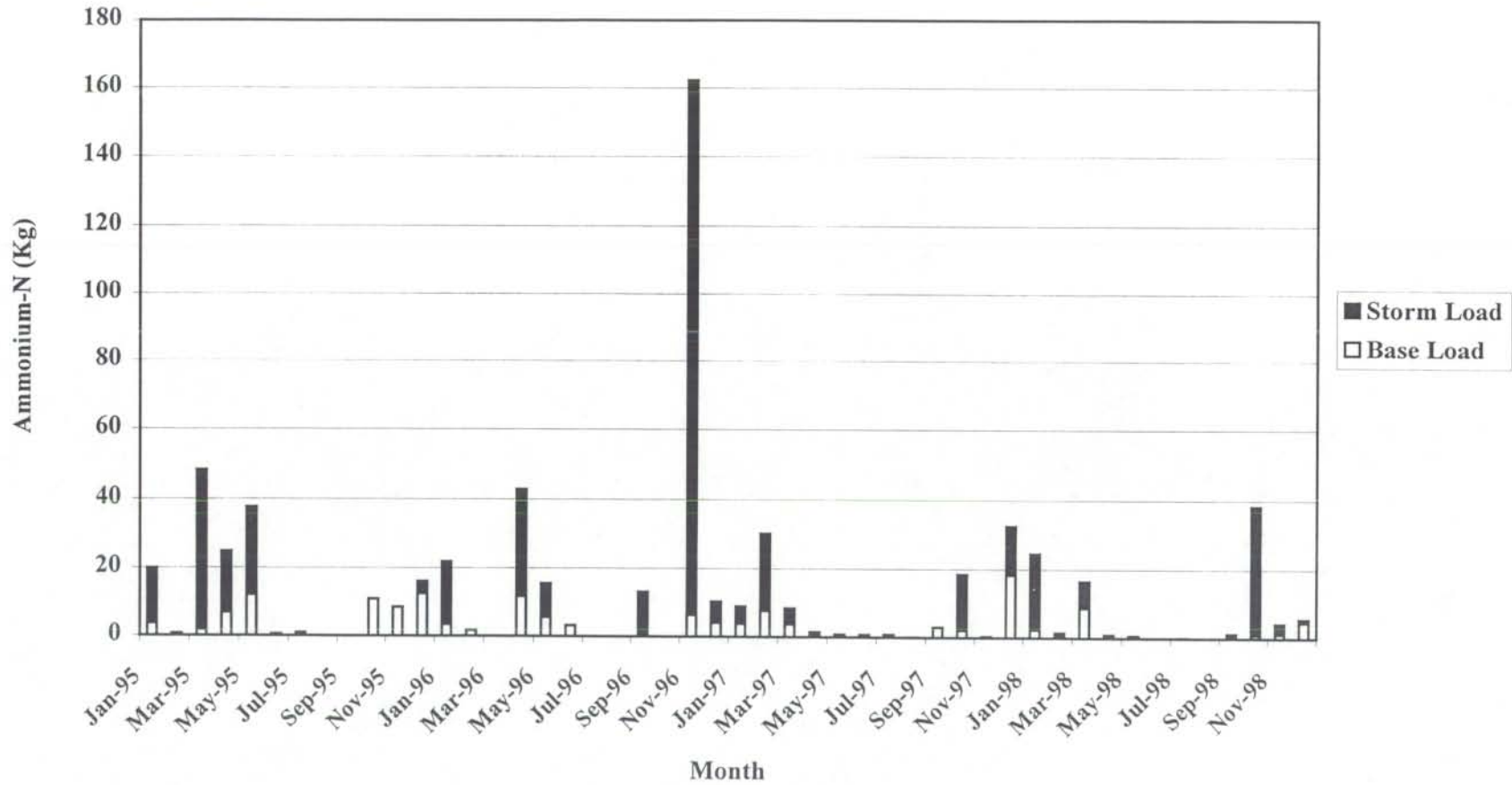


Figure 18. Base, storm, and total loads of ammonium-N at the Beatty Branch site.

Beatty Branch
Total Kjeldahl-N
Loads

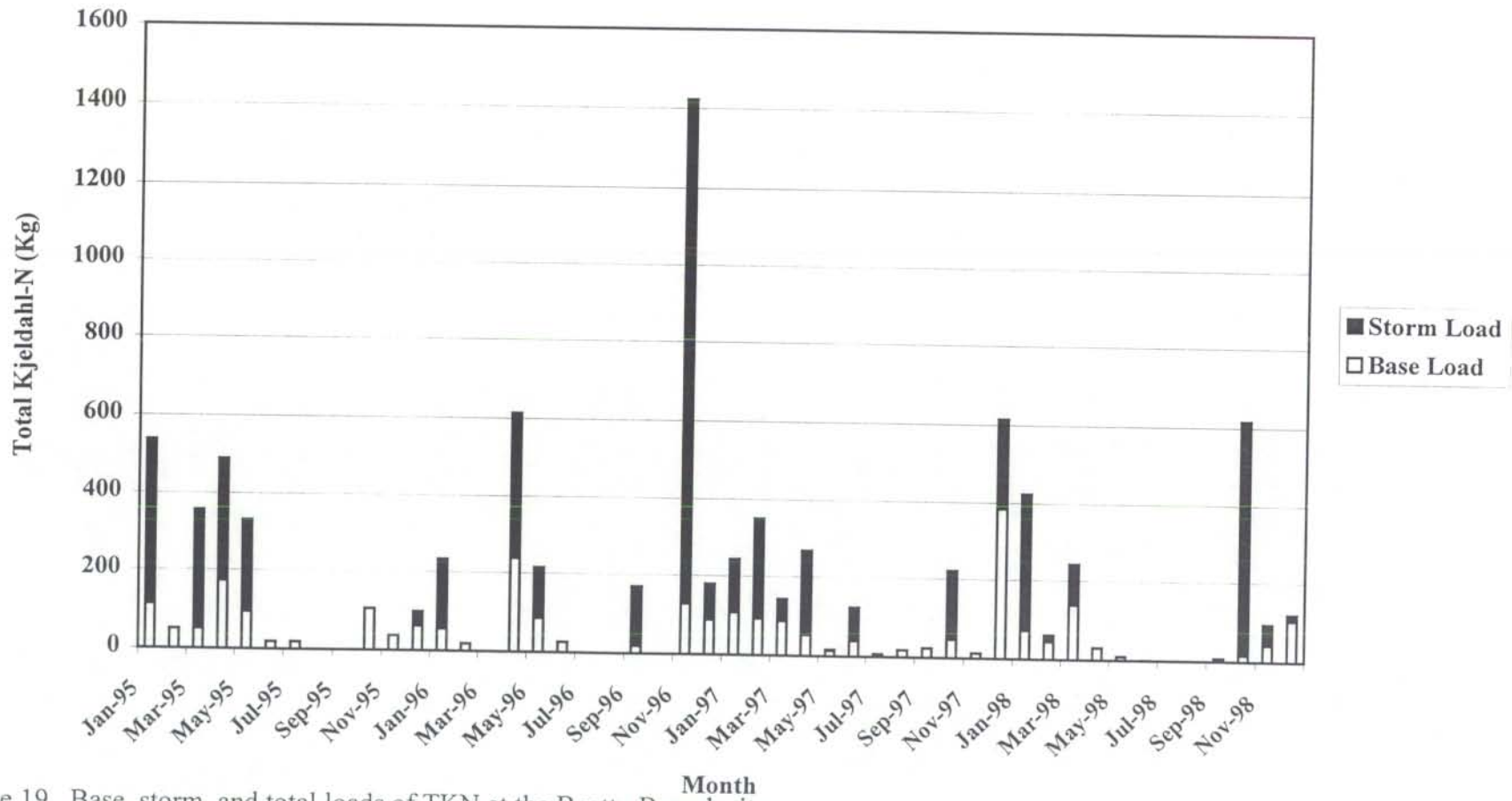


Figure 19. Base, storm, and total loads of TKN at the Beatty Branch site.

Beatty Branch Total Organic Carbon Loads

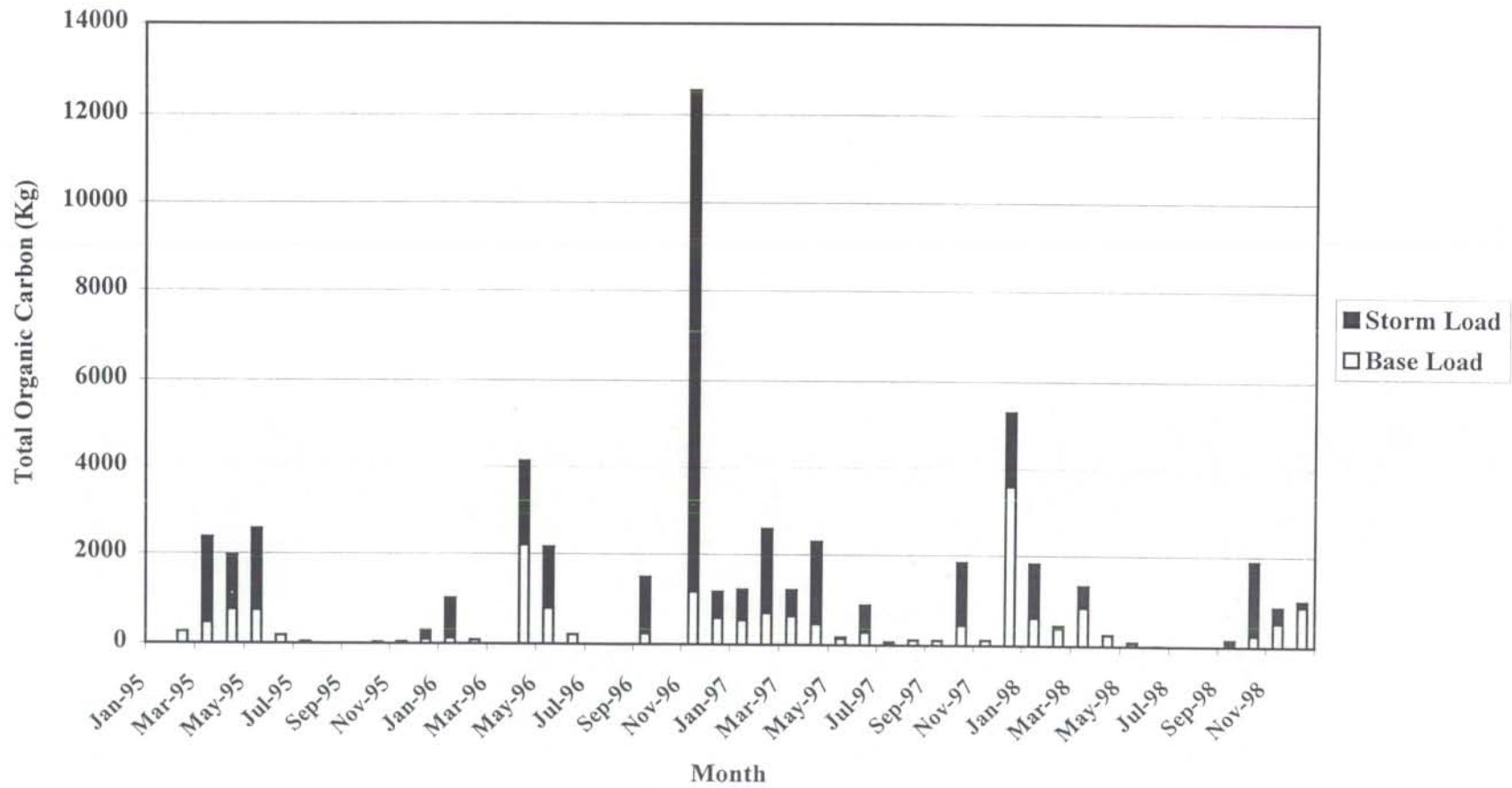


Figure 20. Base, storm, and total loads of TOC at the Beatty Branch site.

Beatty Branch
Total Suspended Solids
Loads

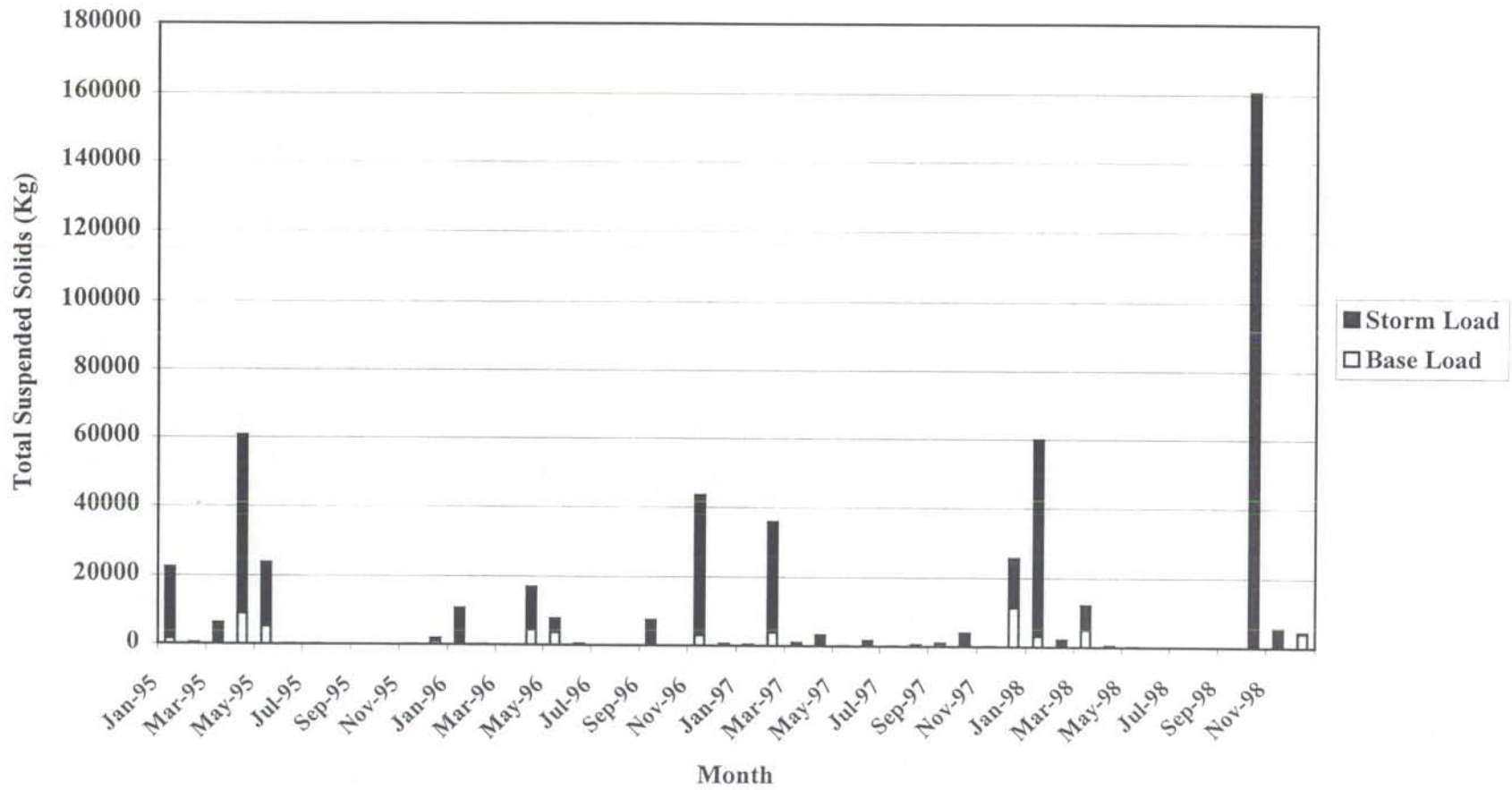


Figure 21. Base, storm, and total loads of TSS at the Beatty Branch site.

Lower Moores Creek
Nitrate-N
Mean Concentrations

B-22

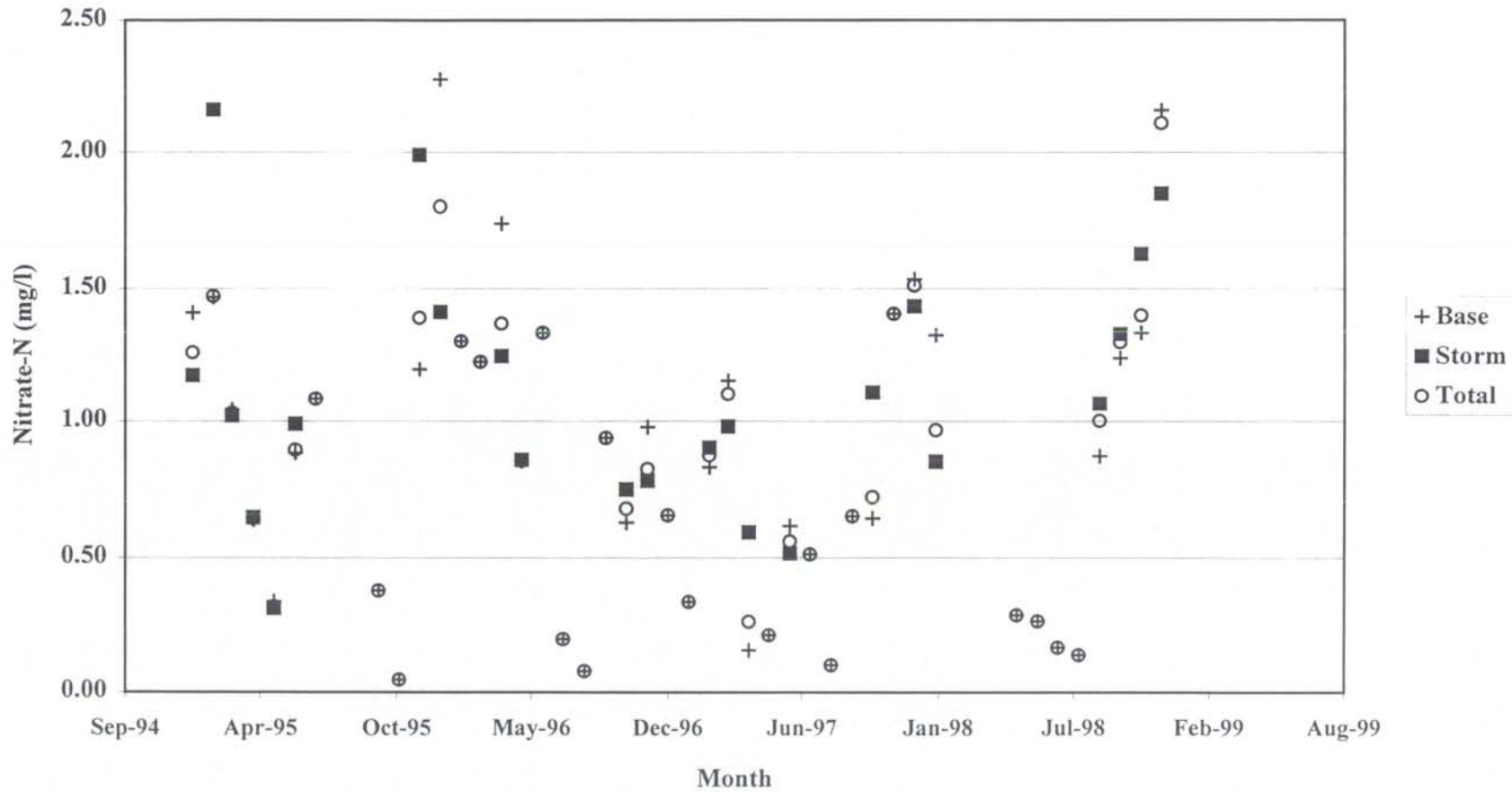


Figure 22. Base, storm, and total mean concentrations of nitrate-N at the Lower Moores Creek site.

Lower Moores Creek
Total Phosphorus
Mean Concentrations

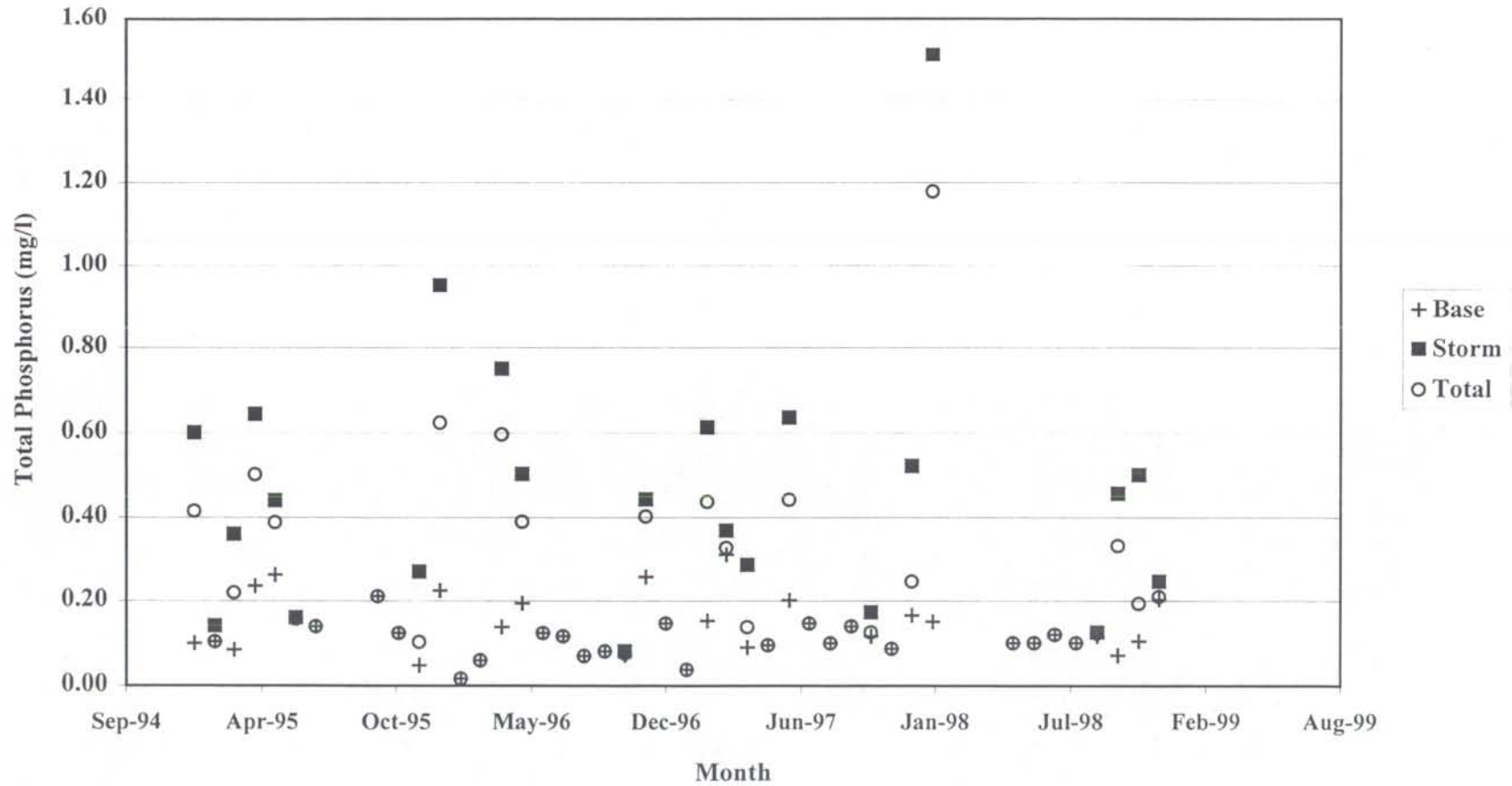


Figure 23. Base, storm, and total mean concentrations of total phosphorus at the Lower Moores Creek site.

Lower Moores Creek
Ammonium-N
Mean Concentrations

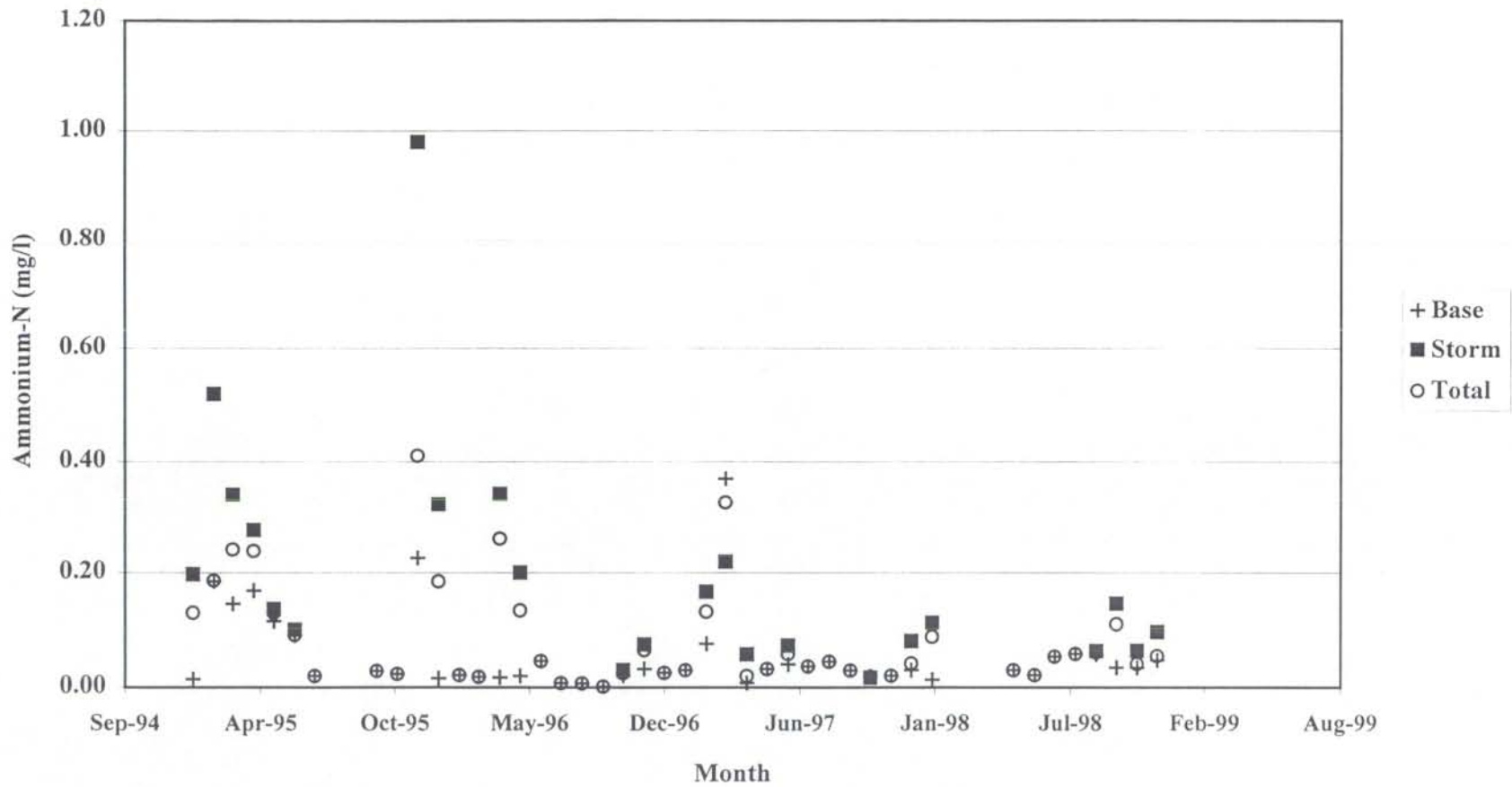


Figure 24. Base, storm, and total mean concentrations of ammonium-N at the Lower Moores Creek site.

Lower Moores Creek
Total Kjeldahl-N
Mean Concentrations

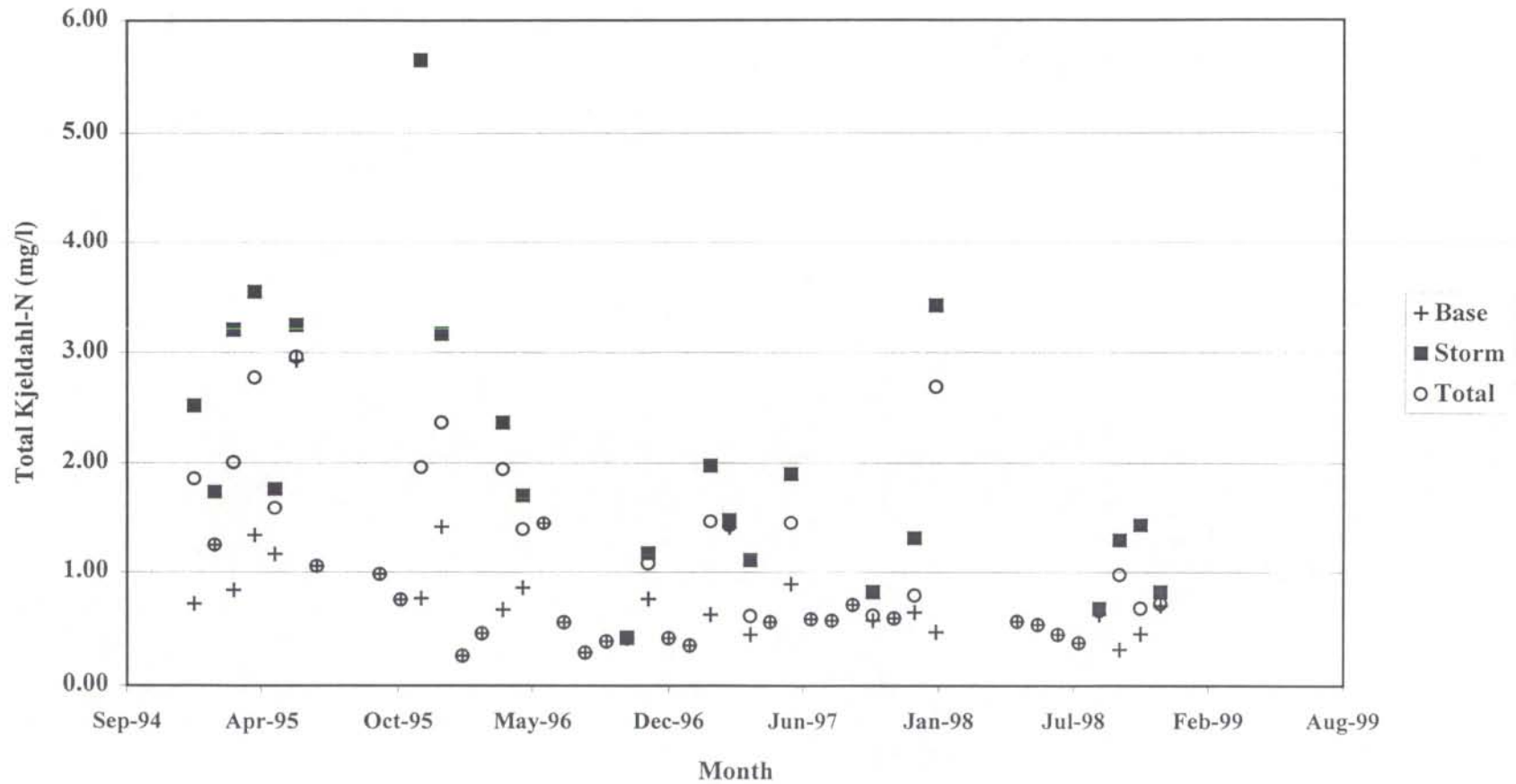


Figure 25. Base, storm, and total mean concentrations of TKN at the Lower Moores Creek site.

Lower Moores Creek
Total Organic Carbon
Mean Concentrations

B-26

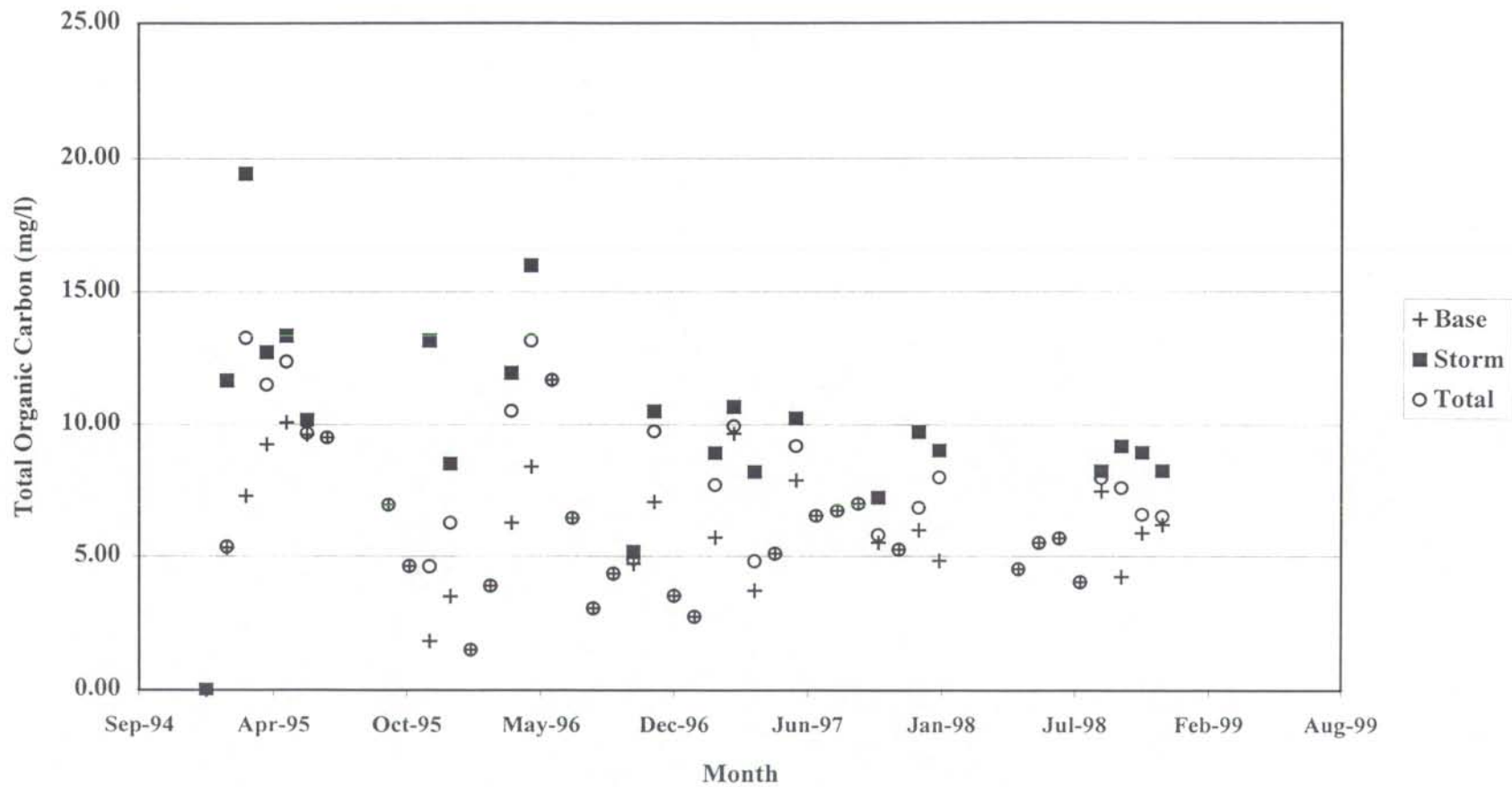


Figure 26. Base, storm, and total mean concentrations of TOC at the Lower Moores Creek site.

Lower Moores Creek
Total Suspended Solids
Mean Concentrations

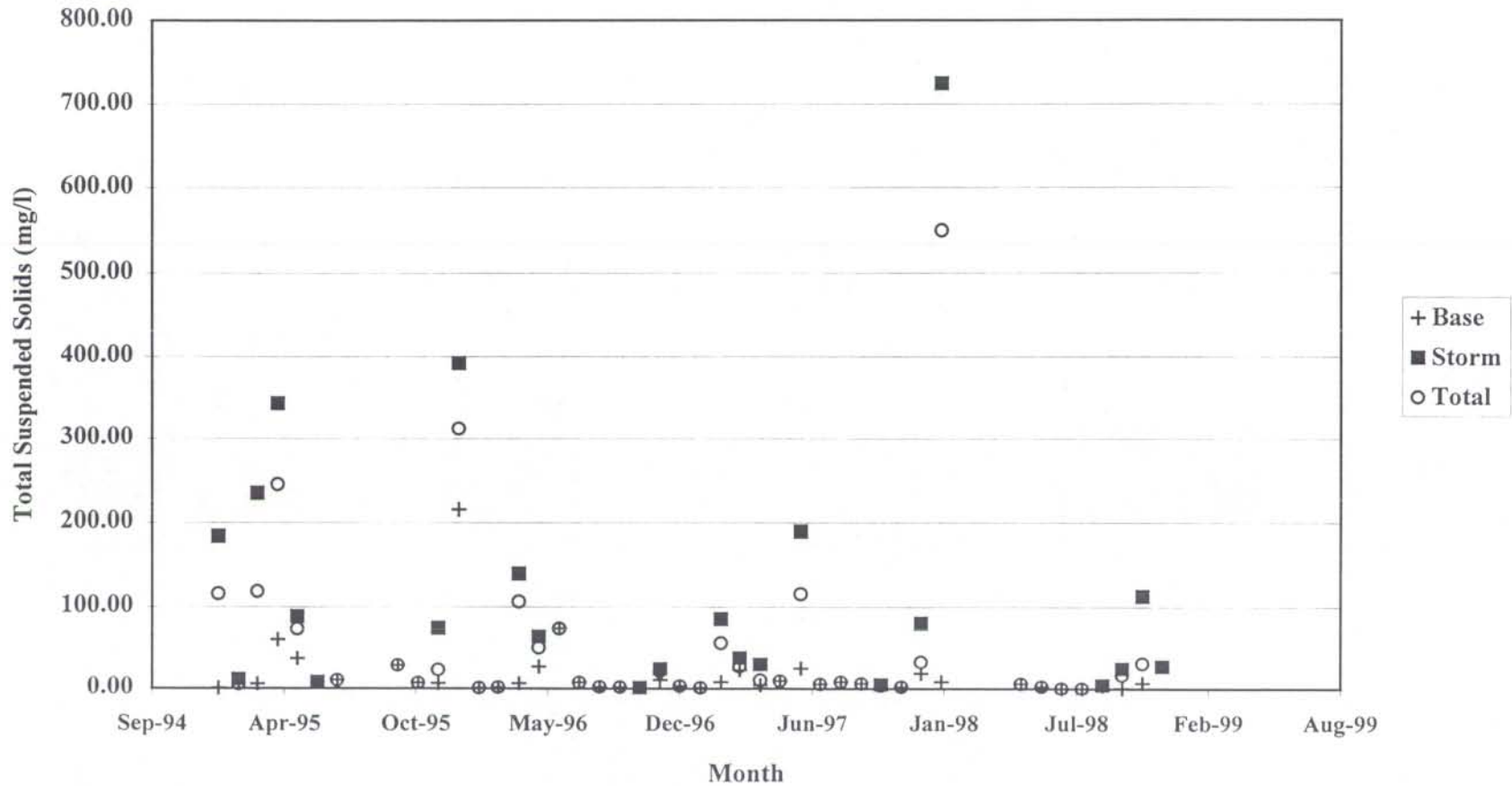


Figure 27. Base, storm, and total mean concentrations of TSS at the Lower Moores Creek site.

Upper Moores Creek
Nitrate-N
Mean Concentrations

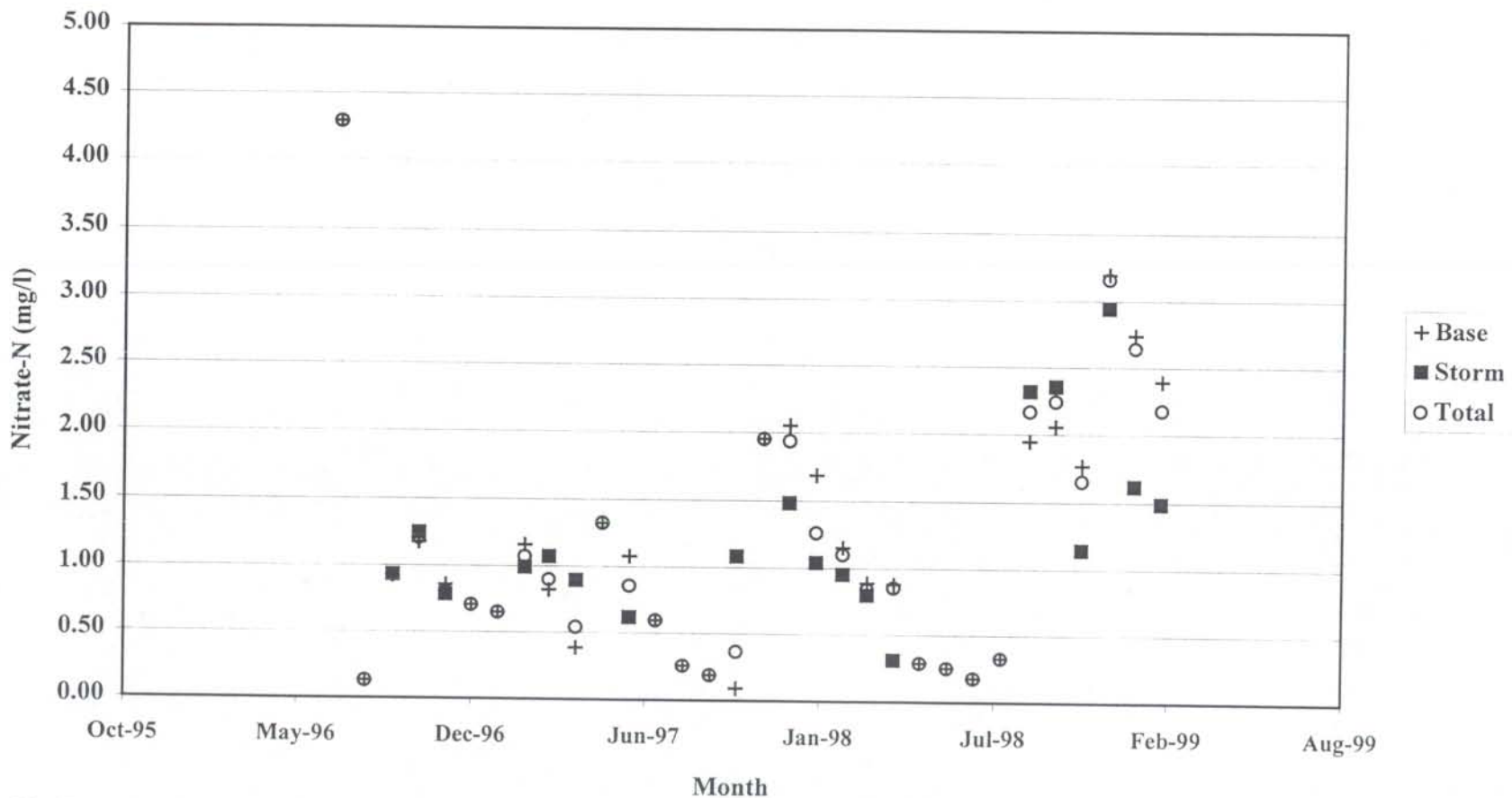


Figure 28. Base, storm, and total mean concentrations of nitrate-N at the Upper Moores Creek site.

Upper Moores Creek
Total Phosphorus
Mean Concentrations

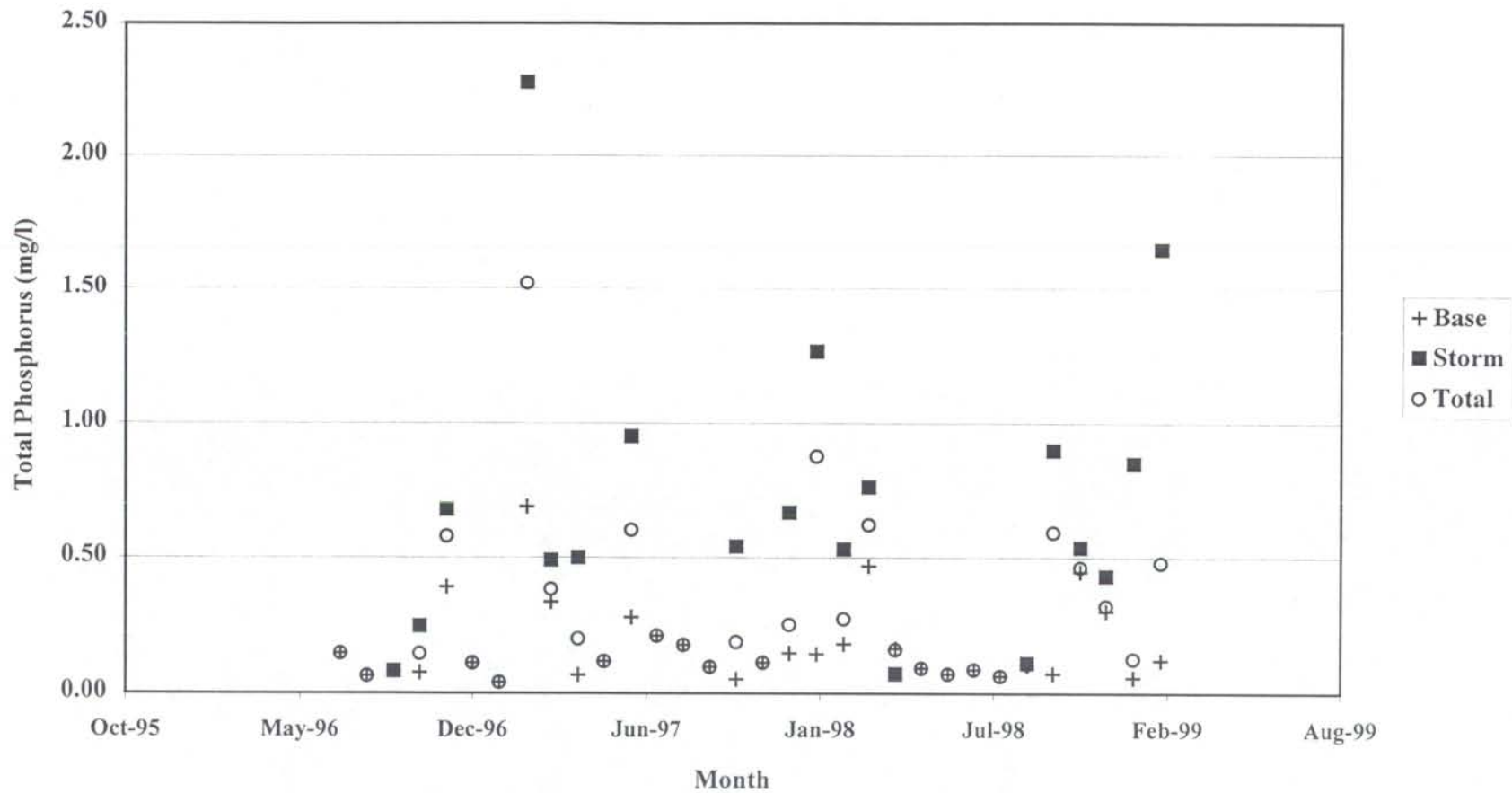


Figure 29. Base, storm, and total mean concentrations of total phosphorus at the Upper Moores Creek site.

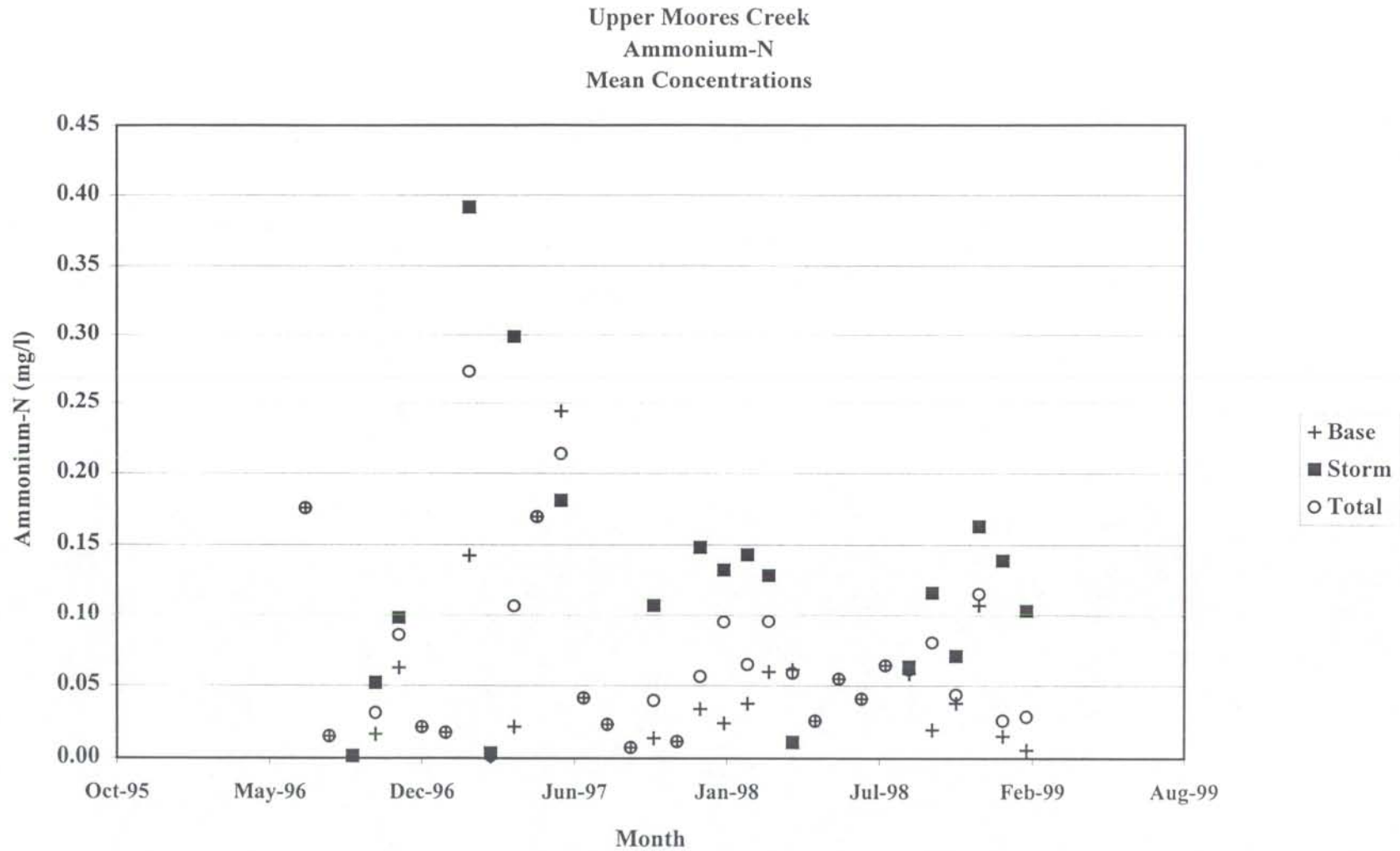


Figure 30. Base, storm, and total mean concentrations of ammonium-N at the Upper Moores Creek site.

Upper Moores Creek
Total Kjeldahl-N
Mean Concentrations

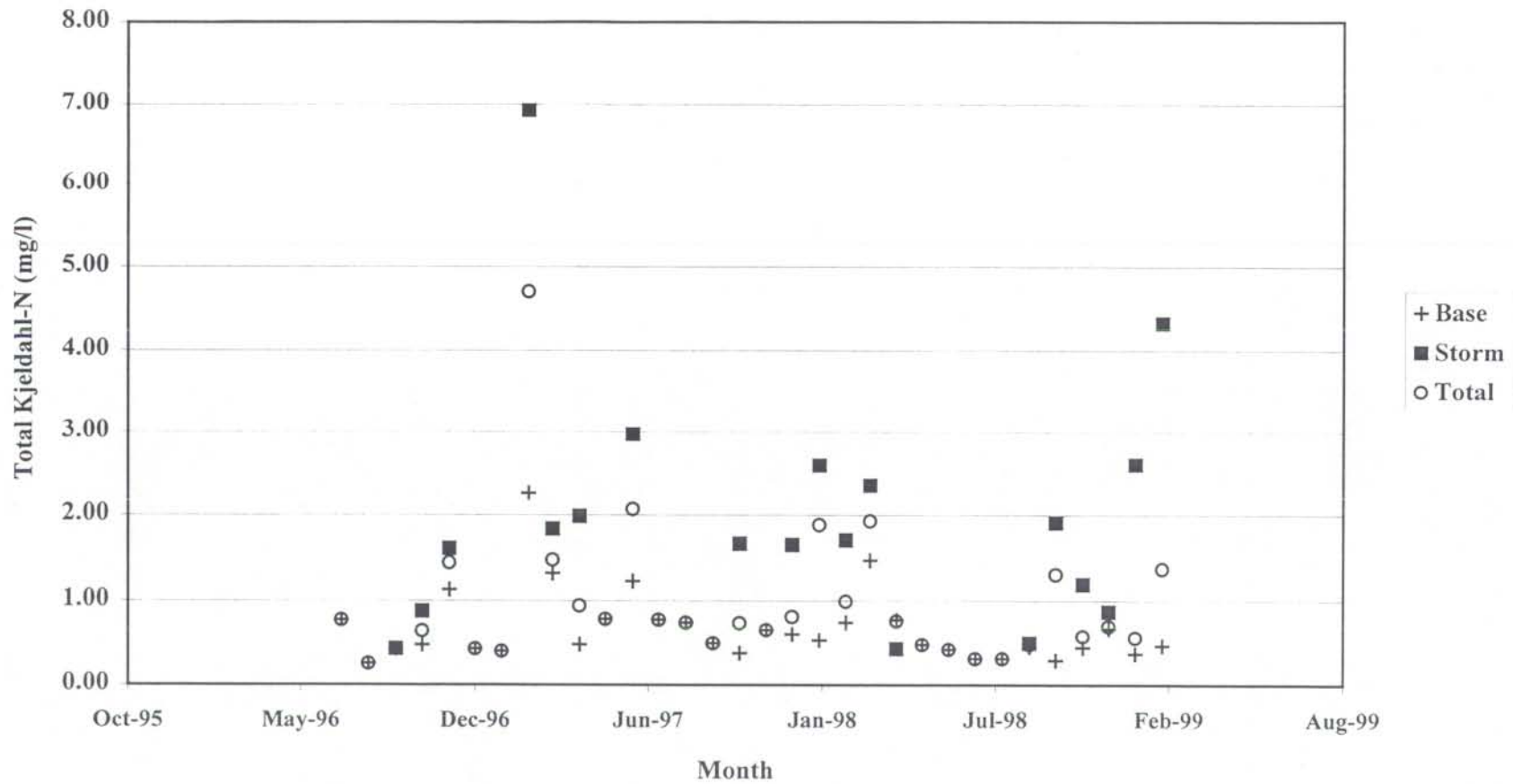


Figure 31. Base, storm, and total mean concentrations of TKN at the Upper Moores Creek site.

Upper Moores Creek
Total Organic Carbon
Mean Concentrations

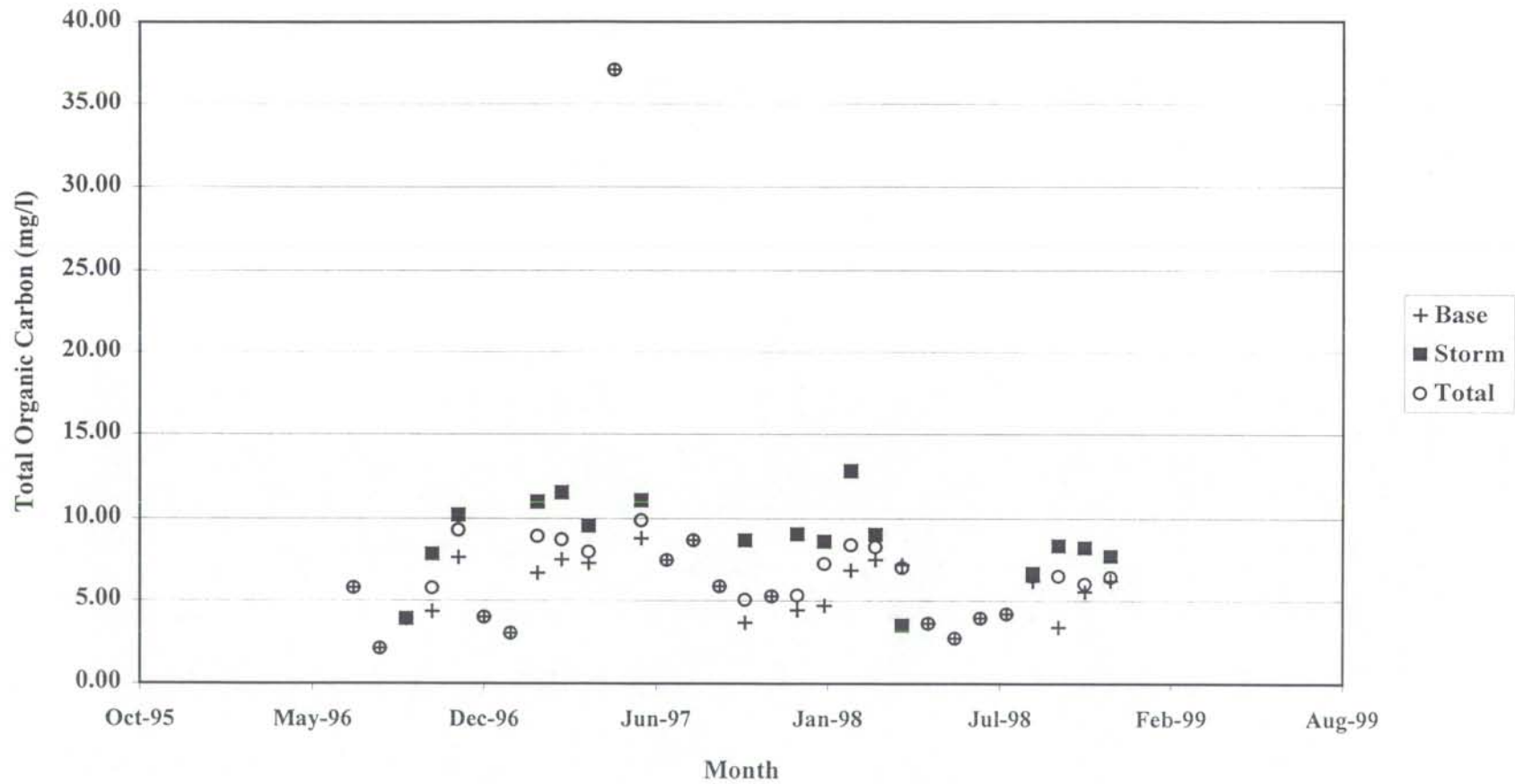


Figure 32. Base, storm, and total mean concentrations of TOC at the Upper Moores Creek site.

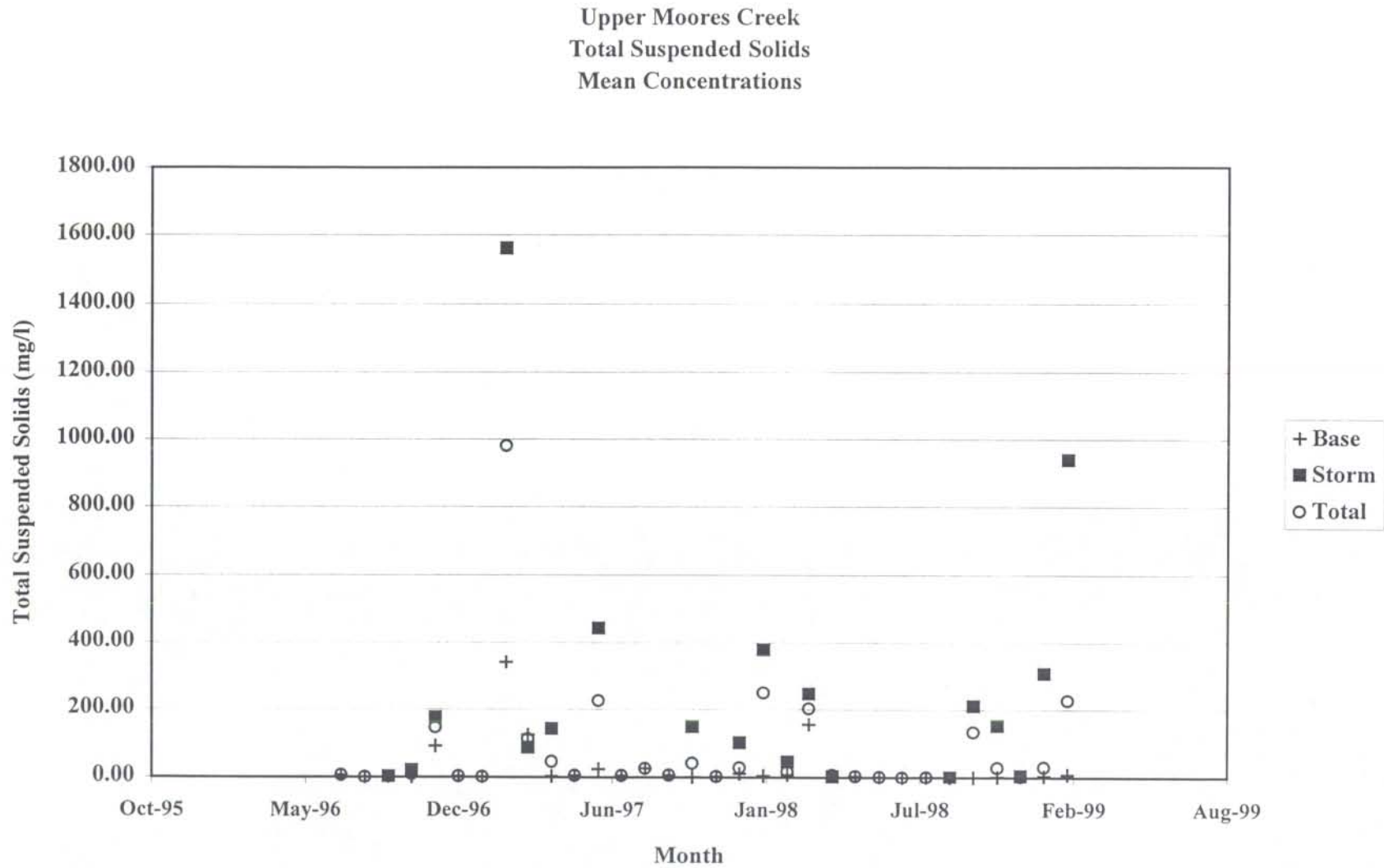


Figure 33. Base, storm, and total mean concentrations of TSS at the Upper Moores Creek site.

Beatty Branch
Nitrate-N
Mean Concentrations

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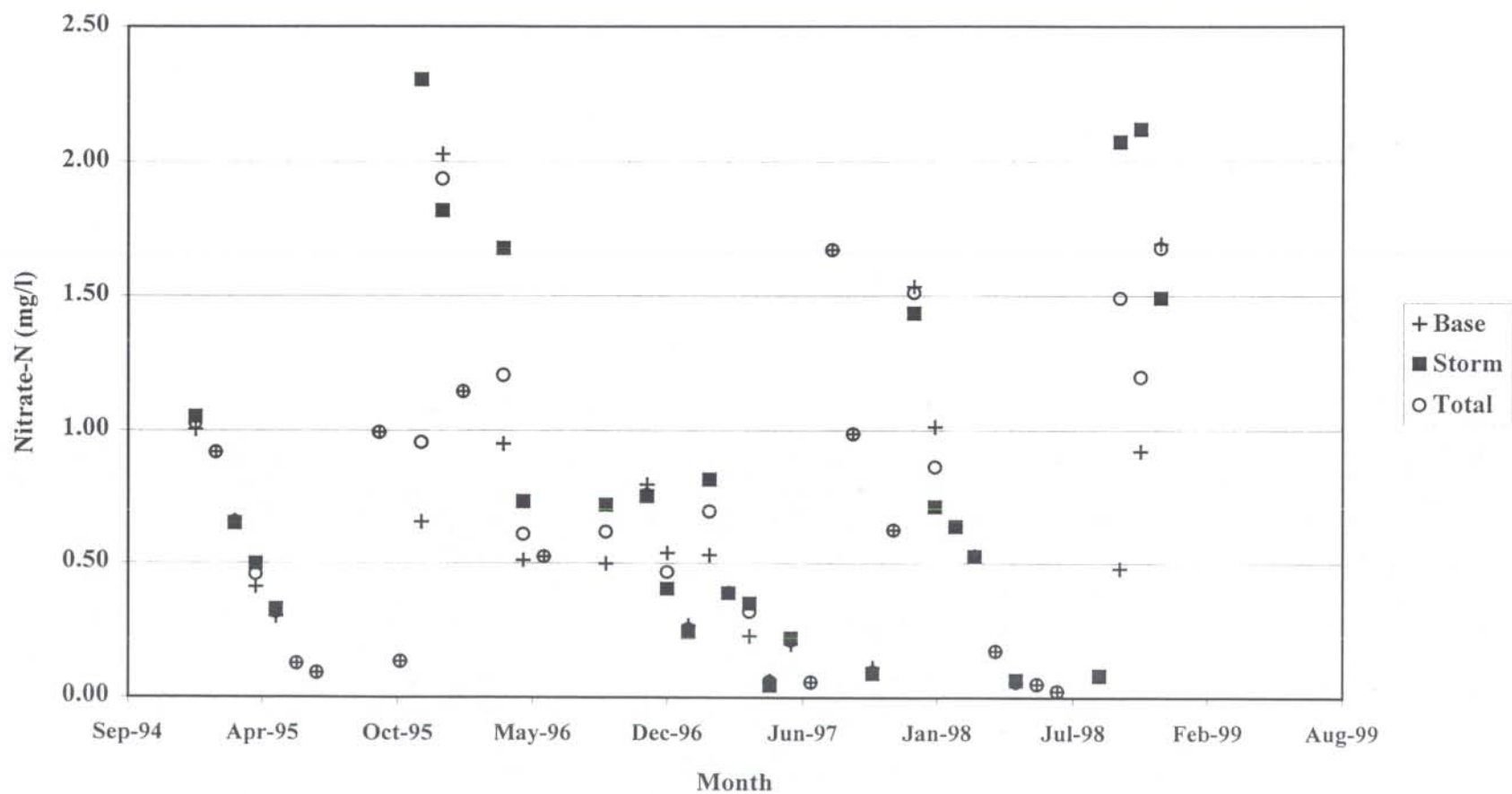


Figure 34. Base, storm, and total mean concentrations of nitrate-N at the Beatty Branch site.

Beatty Branch
Total Phosphorus
Mean Concentrations

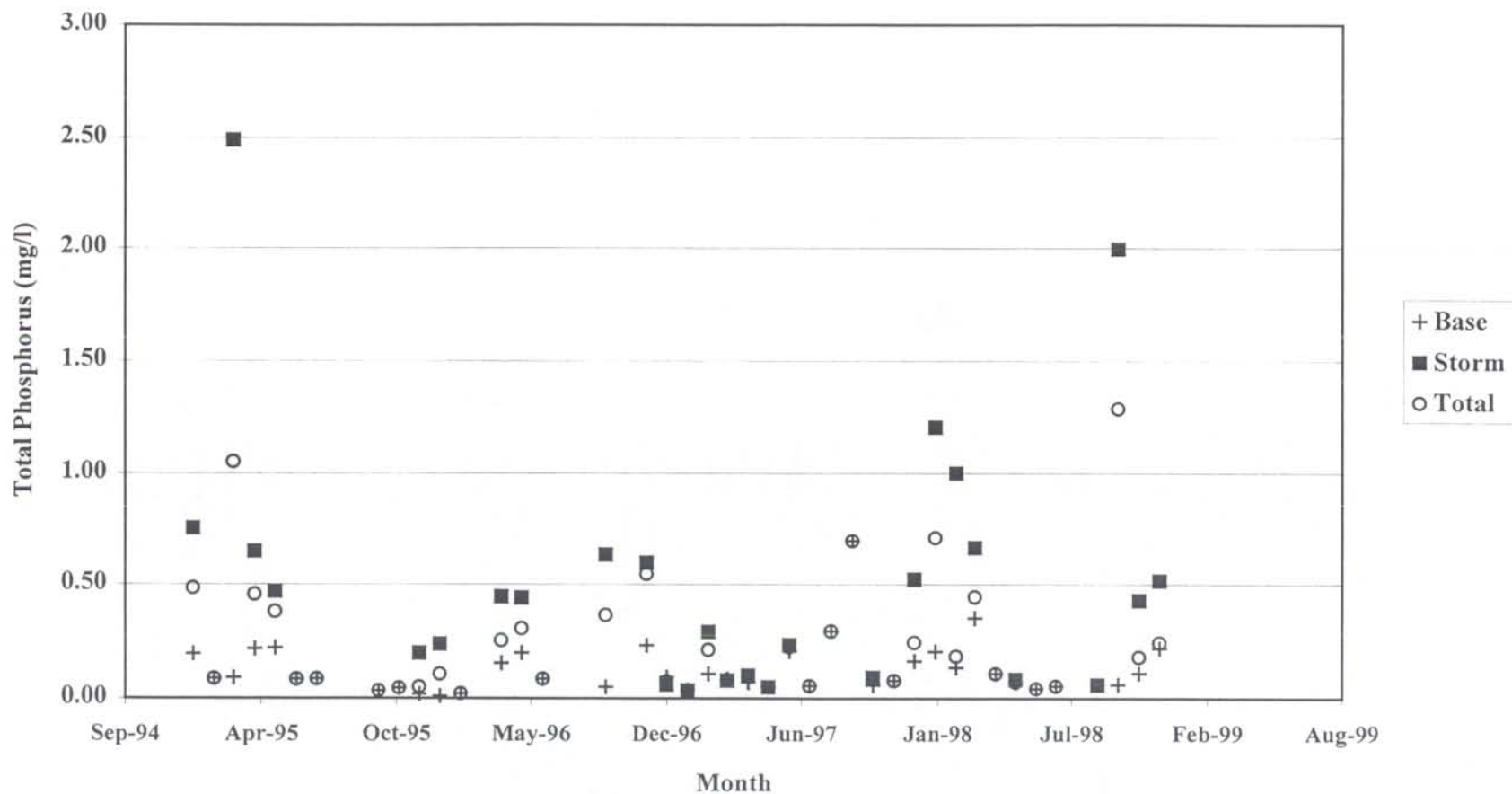


Figure 35. Base, storm, and total mean concentrations of total phosphorus at the Beatty Branch site.

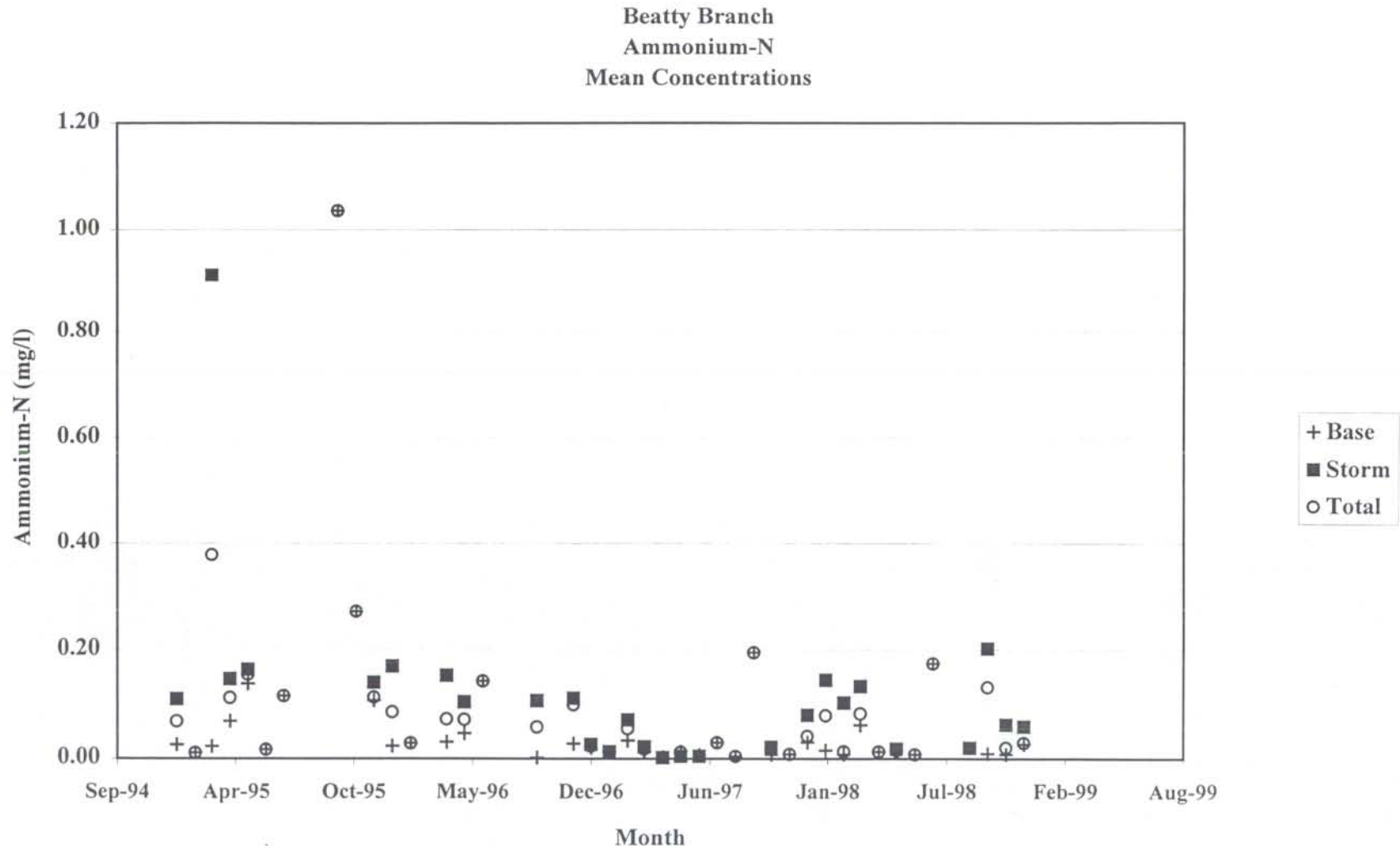


Figure 36. Base, storm, and total mean concentrations of ammonium-N at the Beatty Branch site.

Beatty Branch
Total Kjeldahl-N
Mean Concentrations

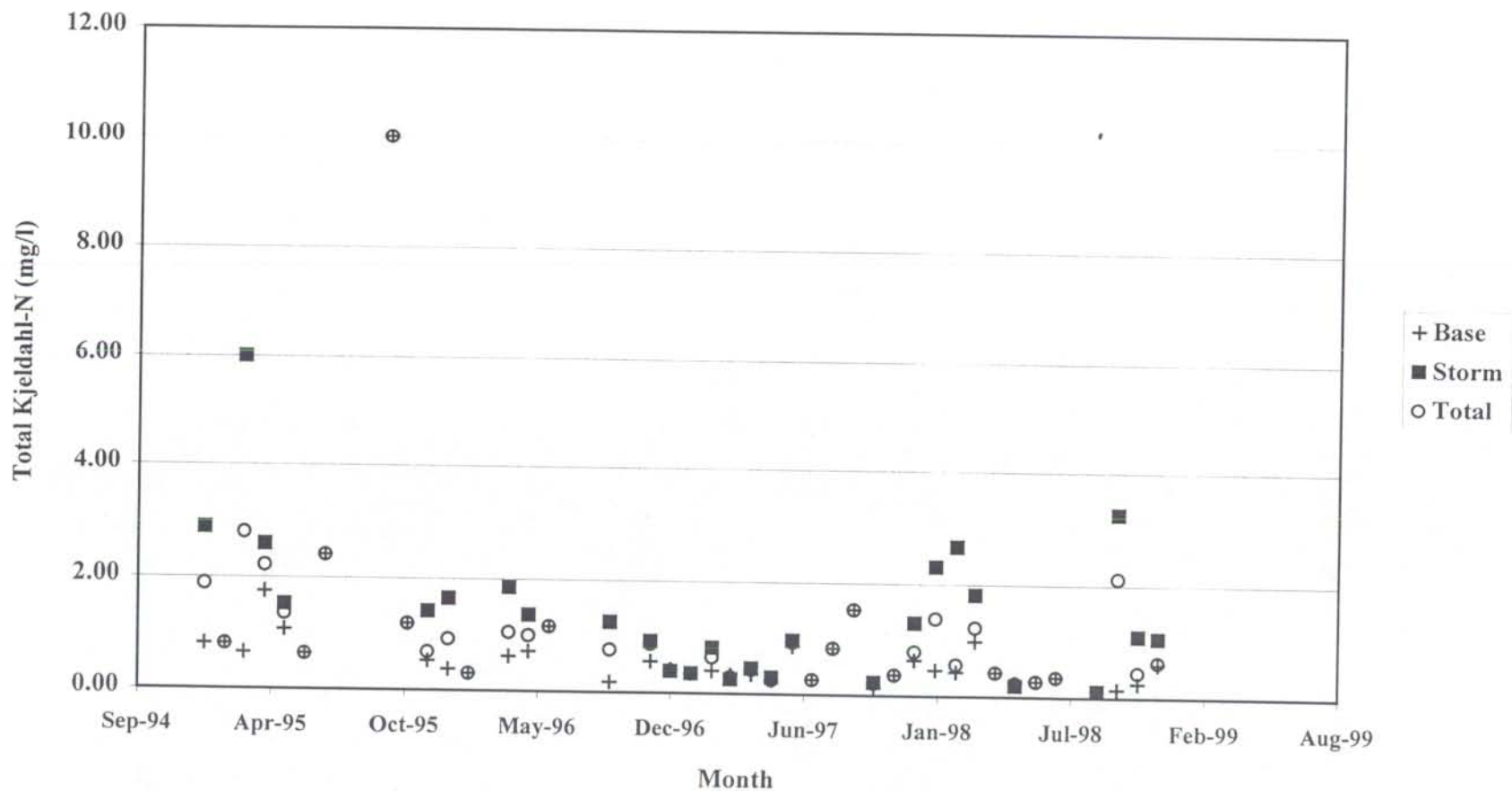


Figure 37. Base, storm, and total mean concentrations of TKN at the Beatty Branch site.

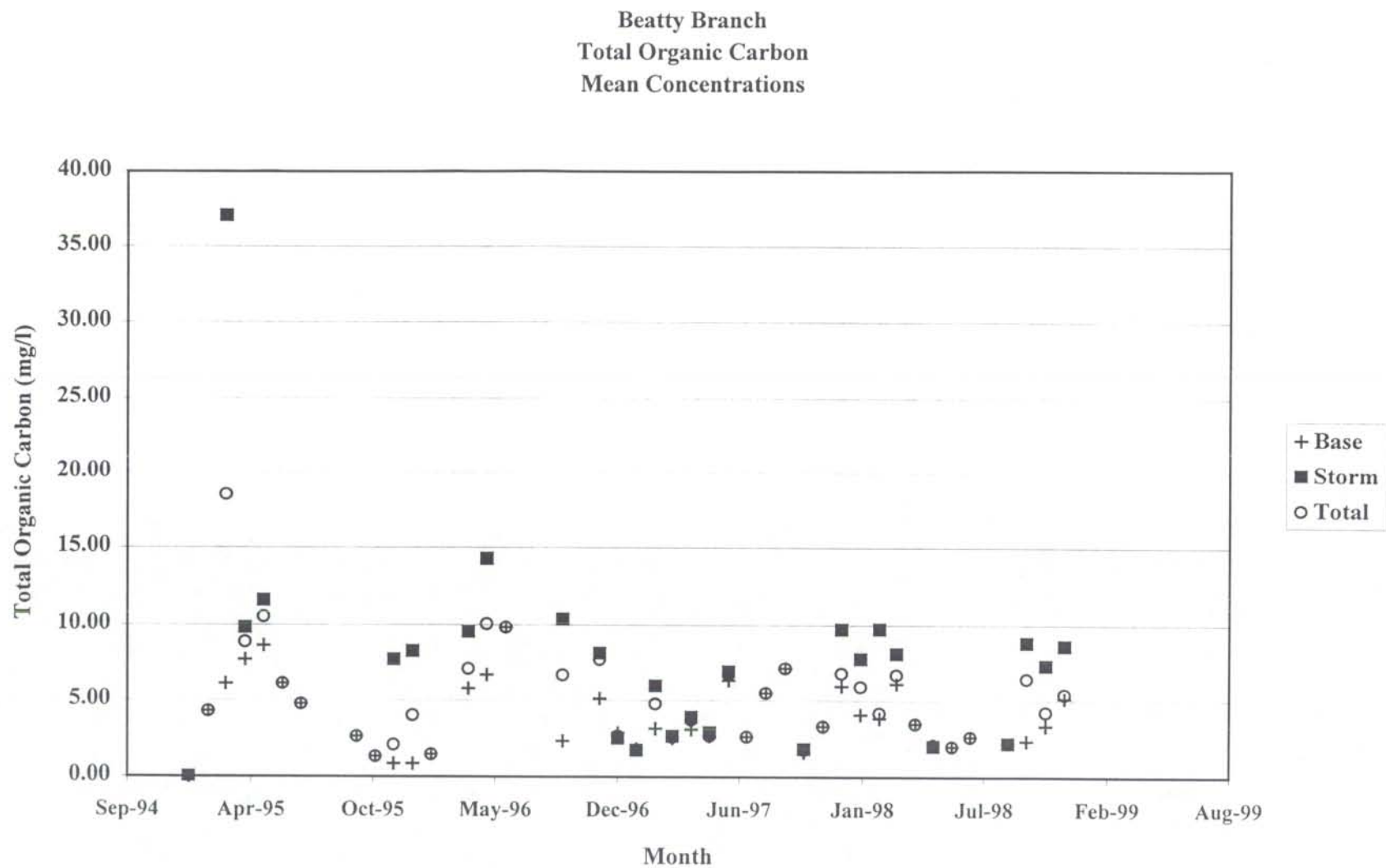


Figure 38. Base, storm, and total mean concentrations of TOC at the Beatty Branch site.

Beatty Branch
 Total Suspended Solids
 Mean Concentrations

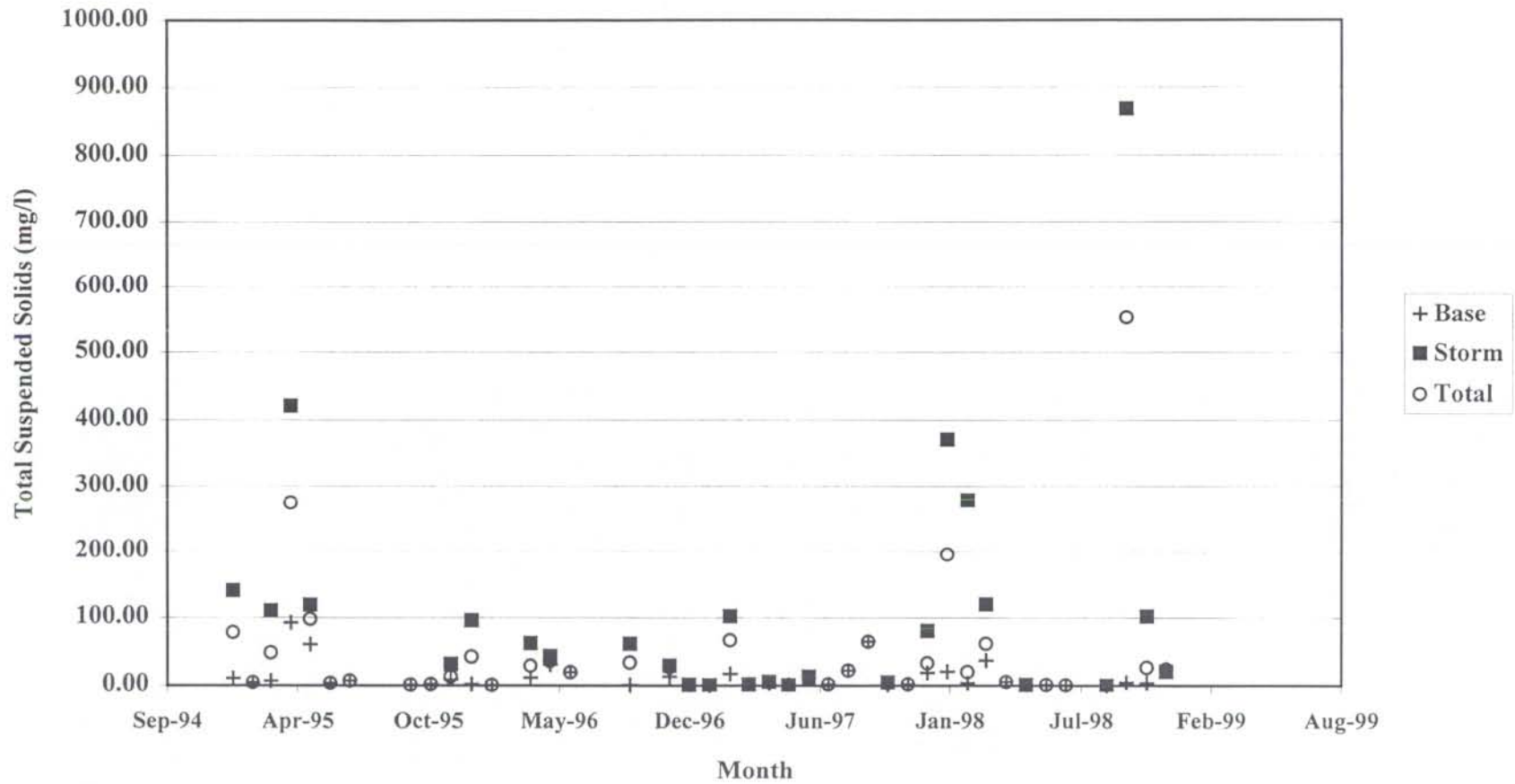


Figure 39. Base, storm, and total mean concentrations of TSS at the Beatty Branch site.