McDill Pond
Stormwater Investigation and Management

Tiffany Lyden

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University of Wisconsin-Stevens Point

report for
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INTRODUCTION:

In urban areas, stormwater runoff from streets and other impervious surfaces can carry pollutants into lakes and rivers directly through urban storm sewer systems. Stormwater sampling was conducted in Stevens Point in 1996 as part of a DNR Lake Planning Grant to determine the impacts of stormwater runoff on the Plover River and McDill Pond.

Some of the major contaminants typically present in urban stormwater runoff that were investigated as part of this project were sediment, nutrients, and trace metals. A brief explanation of each is contained below.

Sediment is probably one of the greatest single pollutants present in runoff. Sediment causes increased turbidity in the water, and can smother fish spawning beds and make river channels and lake beds shallower as particulates settle out of the water. In existing urban areas, street surfaces are the primary sources of sediment (WI Stormwater Manual, 1994). Although these areas contribute large amounts of sediment, by far the highest sediment loads come from areas under construction (WI Stormwater Manual, 1994).

Nutrients such as nitrogen and phosphorus that are carried into waterways by stormwater can stimulate additional aquatic plant and algae growth. In lakes like McDill Pond, phosphorus is usually a bigger concern than nitrogen because the lake is phosphorus limited. Sources of phosphorus in stormwater include sediment, leaves and grass clippings, lawn fertilizers, and vehicle exhaust. In residential areas, lawns contribute about 33% of the phosphorus in runoff, while streets contribute about 46% (Bannerman et al, 1992). Nitrogen is usually abundant enough in lakes and streams that nitrogen in stormwater runoff does not usually increase weed and algae growth (WI Stormwater Manual, 1994). However, certain nitrogen compounds, such as ammonia and nitrate, can have other impacts. For example, high levels of ammonia that get converted to nitrate can use up available oxygen, killing fish and aquatic life. Nitrate can also cause health concerns by leaching into groundwater and contaminating drinking wells. (WI Stormwater Manual, 1994)

Trace metals that are carried into waterways by stormwater can cause health problems for human and aquatic life. Metals such as lead, zinc, cadmium, and chromium are commonly found in urban stormwater runoff. High levels of these metals present in lake sediments can preclude dredging because of health concerns with the disposal of sediments. Sources of trace metals in stormwater include vehicle traffic on streets and parking lots, runoff from galvanized roofs, gutters, or scrap metal, and many other sources ranging from combustion to deteriorating metal and paint (WI Stormwater Manual, 1994).

PROJECT OVERVIEW:

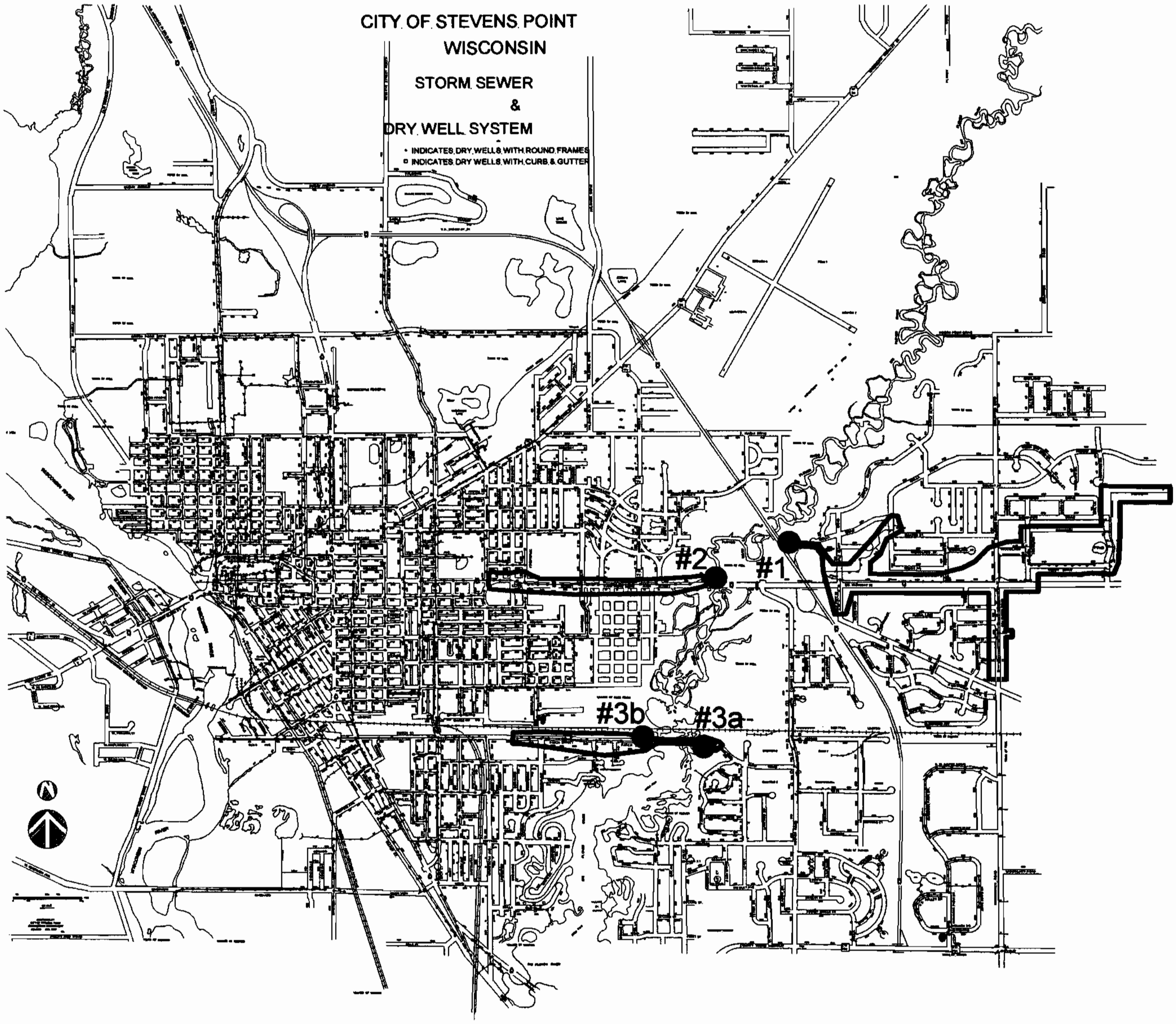
This project sampled runoff from three major storm sewers that drain into the Plover River and McDill Pond. The three storm sewers and their drainage areas are shown on Maps 1-4. All three storm sewers each collect runoff from large drainage areas and therefore have the potential to contribute higher amounts of pollutants than smaller storm sewer systems. There are a number of smaller storm sewers around McDill Pond, but since these contribute runoff from relatively small drainage areas, they were not included in this study.

STUDY AREA:

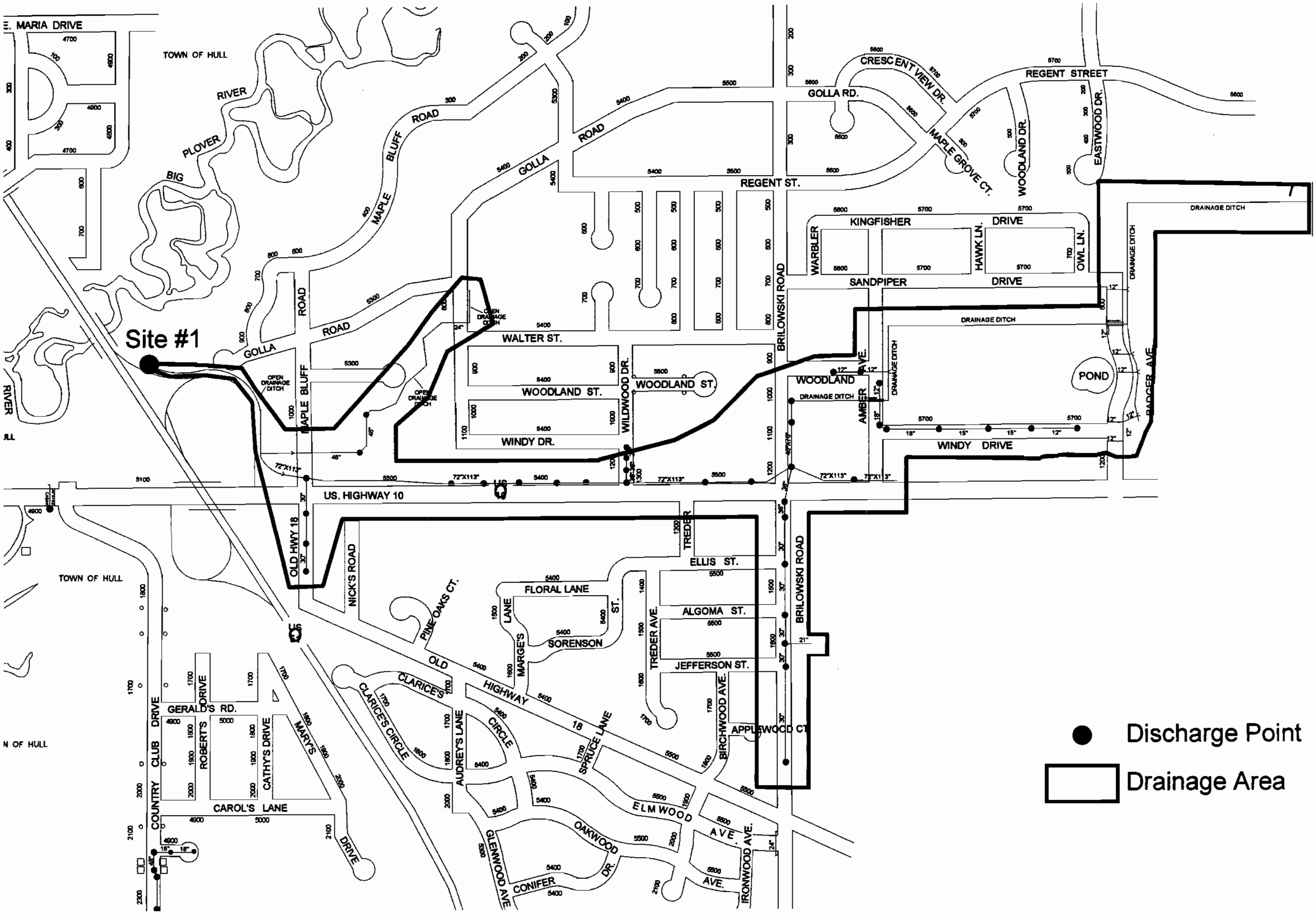
The three storm sewers that were sampled and a description of their drainage areas are listed below:

Site **#1** - is the open concrete drainage ditch alongside of the northbound Highway 51 ramp. As shown on Map 2, this storm sewer system collects runoff from along Highway 10 east to Badger Avenue. Stormwater is collected from direct road runoff from Hwy

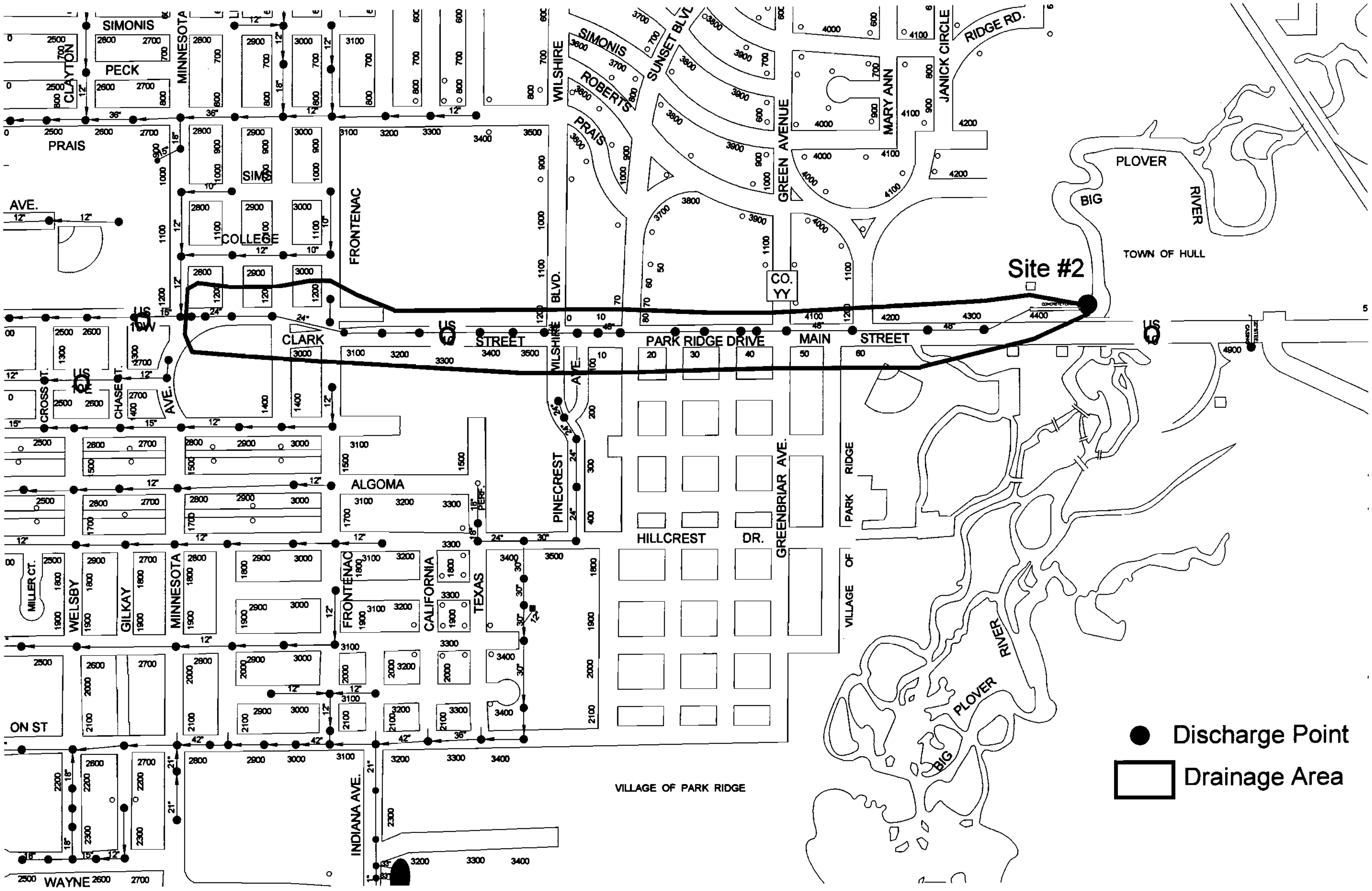
Map 1
Storm Sewers and Drainage Areas



Map 2
Storm Drainage Area for Site #1

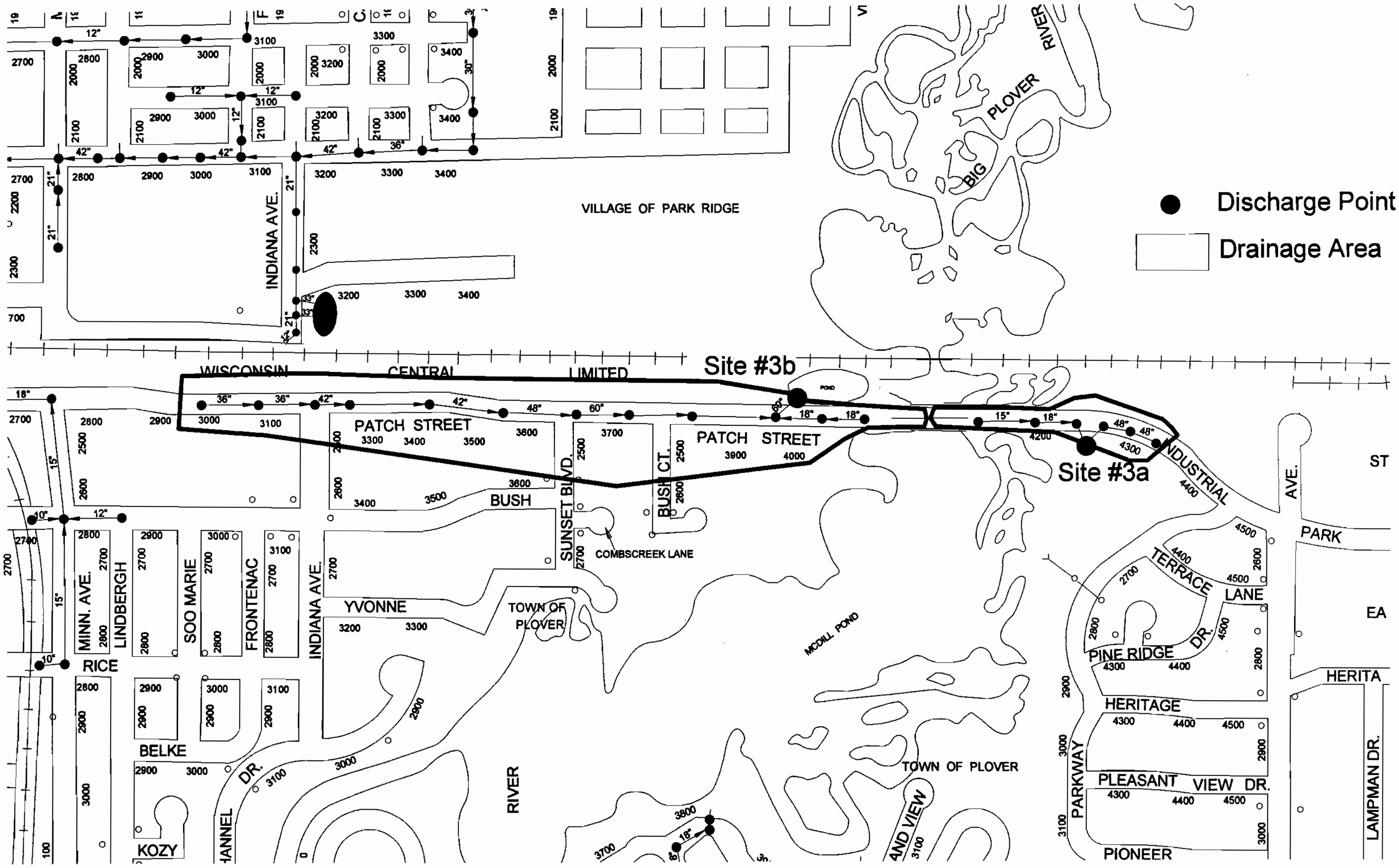


Map 3
Storm Drainage Area for Site #2



Map 4

Storm Drainage Areas for Site #3a & Site #3b



10, including rooftop and parking lot runoff from a number of businesses along Hwy 10 that have hooked into the system. Portions of Brilowski Road and Windy Drive as well as two drainage ditches also contribute runoff to the system, as shown on Map 2. Before discharging into the Plover River, the stormwater first empties into a wetland (near where Highway 51 crosses over the river).

Site **#2** - is the culvert immediately north of Hwy 10, on the west side of the Plover River, just north of Iverson Park. As shown on Map 3, this collects runoff from along Highway 10 west to Minnesota Street.

Site **#3a** - is the culvert that empties into a small dry detention basin immediately south of Patch Street and east of McDill Pond. As shown on Map 4, this collects runoff from along Industrial Park Road. This site was used for the June storm event.
Site **#3b** - is the outlet of the detention pond immediately north of Patch Street and west of Plover River, at the point where the Green Circle trail crosses the detention basin outlet into the Plover River. (Site #3a was only used for the June storm event, after which the location was changed to site #3b to collect runoff from a larger source area for the July and August storms.) As shown on Map 4, site 3b collects runoff along Patch Street east of the bridge to Minnesota Avenue.

STORMWATER SAMPLING:

Three storm events were sampled in the summer of 1996. The dates of the storms and durations of the samplings were:

June 1, 1996	5:30 pm - 9:30 pm
July 8, 1996	5:15 am - 6:45 am
August 5, 1996	4:45 pm - 6:15 pm

Each storm event was sampled at three different times, in an attempt to collect samples during the first part of the runoff (at the beginning of the storm), during the peak part of the runoff, and during the period of decreasing runoff.

Samples were collected by hand in sterilized bottles and taken to the UW-Stevens Point Environmental Task Force (ETF) Lab for analysis. The following parameters were analyzed:

Total Suspended Solids (TSS)
Volatile Suspended Solids (VSS)
Total Kjeldahl Nitrogen (TKN)
Nitrate + Nitrite (NO3 + NO2)
Ammonia (NH4)
Total Phosphorus (TP)
Soluble Reactive Phosphorus (SRP)
Lead (Pb)
Cadmium (Cd)
Chromium (Cr)
Zinc (Zn)
Chemical Oxygen Demand (COD)
pH
Conductivity
Alkalinity
Hardness
Chloride (Cl)
Sulfate (SO4)
Sodium (Na)
Potassium (K)

RESULTS:

Results are shown in Table 1 and are graphed in Figures 1-4. The results show variability between the sites and also variability between the storms.

General:

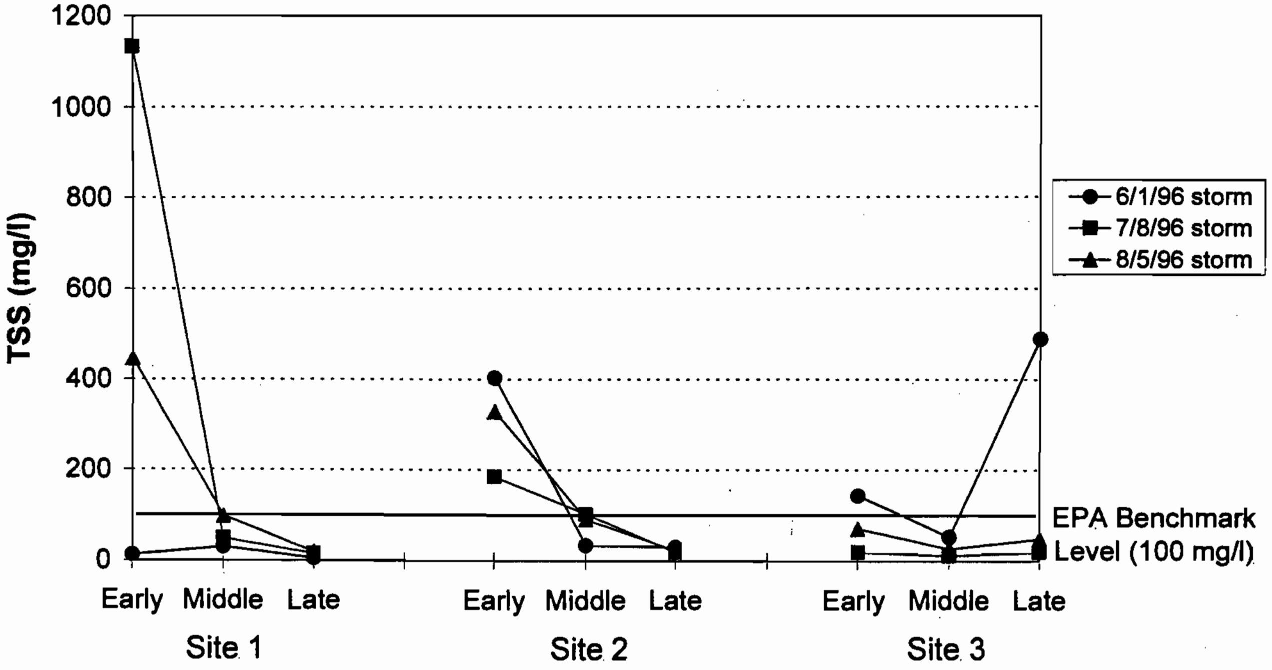
At sites 1 and 2, the early sampling period for all three storms generally showed a peak in concentration for many of the parameters that were sampled. This indicates it was the first part of the runoff, when the runoff from rainfall first passes along the pavement, picking up the highest concentration of sediments, nutrients, and pollutants. In most cases, concentrations decreased in the middle and late samples as expected.

Table 1. Stormwater Sampling Data - 1996

June 1	**TSS**	**VSS**	**TKN**	**NO3+NO2**	**NH4**	**TP**	**SRP**	**Pb**	**Cd**	**Cr**	**Zn**	**COD**	**pH**	**Conductivity**	**Alkalinity**	**Hardness**	**Cl**	**SO4**	**Na**	**K**
Site&Period	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l	(mg/l)	(mg/l)	(su)	(umhos)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
#1 Early	13	11	1.10	2.52	0.01	0.06	0.01	0.02	<0.002	0.07	<0.005	29.1	8.51	389	160	204	16.6	30.5	4.9	2.1
Middle	31	24	1.11	0.82	0.34	0.24	0.13	0.01	<0.002	0.08	<0.005	54.1	7.60	120	44	48	4.1	8	4.1	0.2
Late	6	5	0.82	0.81	0.31	0.15	0.08	0.02	<0.002	0.08	<0.005	75.4	7.50	141	52	56	6.7	8.5	5.8	1.5
#2 Early	404	176	11.10	2.48	0.8	1.85	1.02	0.14	<0.002	0.11	0.336	506	6.72	383	60	60	46.4	29.5	46.1	5.5
Middl	35	20	1.86	0.58	1.53	0.34	0.21	0.01	<0.002	0.15	0.044	67	7.08	75.1	24	24	4.2	6	6.2	2
Late	31	6	0.90	0.45	0.63	0.16	0.11	0.02	<0.002	0.11	0.012	17.6	7.05	67.6	24	20	4.1	4.5	5.5	1.3
#3a Early	144	78	6.88	0.94	0.75	0.82	0.23	0.02	<0.002	0.1	0.107	251	6.67	76	20	44	3.4	6	4.6	1
Middle	53	26	2.29	0.64	0.5	0.42	0.17	0.01	<0.002	0.12	0.022	127	7.01	68.5	24	28	3.8	5	5	0.8
Late	489	446	2.24	0.39	0.26	0.63	0.25	0.04	<0.002	0.11	0.031	83.5	7.36	35.1	20	16	1.6	2.5	2.3	0.4
July 8	**TSS**	**VSS**	**TKN**	**NO3+NO2**	**NH4**	**TP**	**SRP**	**Pb**	**Cd**	**Cr**	**Zn**	**COD**	**pH**	**Conductivity**	**Alkalinity**	**Hardness**	**Cl**	**SO4**	**Na**	**K**
Site&Period	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l	(mg/l)	(mg/l)	(su)	(umhos)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
#1 Early	1134	943	2.23	0.6	0.76	0.69	0.18	0.02	<0.002	0.02	0.269	73.3	7.59	275	132	160	2	17	2.56	6.47
Middle	50	35	2.18	1.1	1.24	0.25	0.18	0.01	<0.002	0.02	0.045	63	7.00	103	32	36	6	8	4.61	2.28
Late	16	14	1.46	0.9	0.93	0.15	0.12	0.01	<0.002	0.02	0.021	61.6	6.58	103	32	36	3	7.5	3.11	1.62
#2 Early	185	90	5.24	0.9	0.89	0.51	0.31	0.35	<0.002	0.03	0.155	156	6.32	92	28	28	8	7.5	6.74	4.51
Middle	103	62	3.48	0.8	0.96	0.46	0.25	0.03	<0.002	0.02	0.085	165	6.38	71	24	24	3	5.5	4	3.21
Late	20	6	2.82	0.9	1.01	0.3	0.19	0.01	<0.002	0.02	0.027	65.6	6.57	62	20	20	3	5	3.98	2.58
#3b Early	20	11	1.16	0.5	0.7	0.11	0.06	0	<0.002	0.02	0.038	27.2	7.20	381	68	88	62	12	32.9	1.73
Middle	12	8	1.32	0.5	0.71	0.09	0.05	0.002	<0.002	0.02	0.034	24.8	7.26	376	68	88	63	11	31.3	1.44
Late	20	8	1.4	0.5	0.7	0.11	0.06	0	<0.002	0.02	0.039	78.1	7.18	375	68	88	63	10.5	35.9	1.87
August 5	**TSS**	**VSS**	**TKN**	**NO3+NO2**	**NH4**	**TP**	**SRP**	**Pb**	**Cd**	**Cr**	**Zn**	**COD**	**pH**	**Conductivity**	**Alkalinity**	**Hardness**	**Cl**	**SO4**	**Na**	**K**
Site&Period	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l	(mg/l)	(mg/l)	(su)	(umhos)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
#1 Early	446	401	2.17	0.5	0.83	0.83	0.22	0.16	<0.002	0.02	0.565	97	6.59	41.9	19	20	2	3.5	2.83	
Middle	98	73	1.28	0.5	0.34	0.27	0.15	0.03	<0.002	<0.0	0.087	59.4	6.84	56.7	23	24	3	3.5	2.75	
Late	20	14	1.93	0.3	1.25	0.12	0.09	0.01	<0.002	<0.0	0.016	109	6.80	53.6	22	40	3	3	2.1	
#2 Early	330	234	4.18	0.8	1.32	0.65	0.31	0.36	<0.002	0.06	0.276	238	6.65	121	40	28	16	7.5	11.04	
Middle	91	69	2.11	0.2	1.54	0.24	0.15	0.03	<0.002	<0.0	0.144	42.6	6.66	32.4	15	16	<1	2	1.32	
Late	24	14	1.16	0.4	0.74	0.16	0.12	0.02	<0.002	<0.0	0.044	42.3	6.64	40.1	16	12	2	2	1.58	
#3b Early	71	54	1.42	0.7	0.39	0.26	0.13	0.16	<0.002	0.02	0.097	48.4	7.13	336	68	92	59	10.5	27.4	
Middle	27	19	1.55	0.5	0.36	0.19	0.1	0.11	<0.002	<0.0	0.044	38	7.17	327	64	84	52	10	26.1	
Late	49	38	1.77	0.7	0.68	0.23	0.11	0.04	<0.002	<0.0	0.019	43.2	7.11	292	64	80	44	9	21.87	

Figure 1
Sediment Data from Stormwater Samples

Total Suspended Solids (TSS)



Volatile Suspended Solids (VSS)

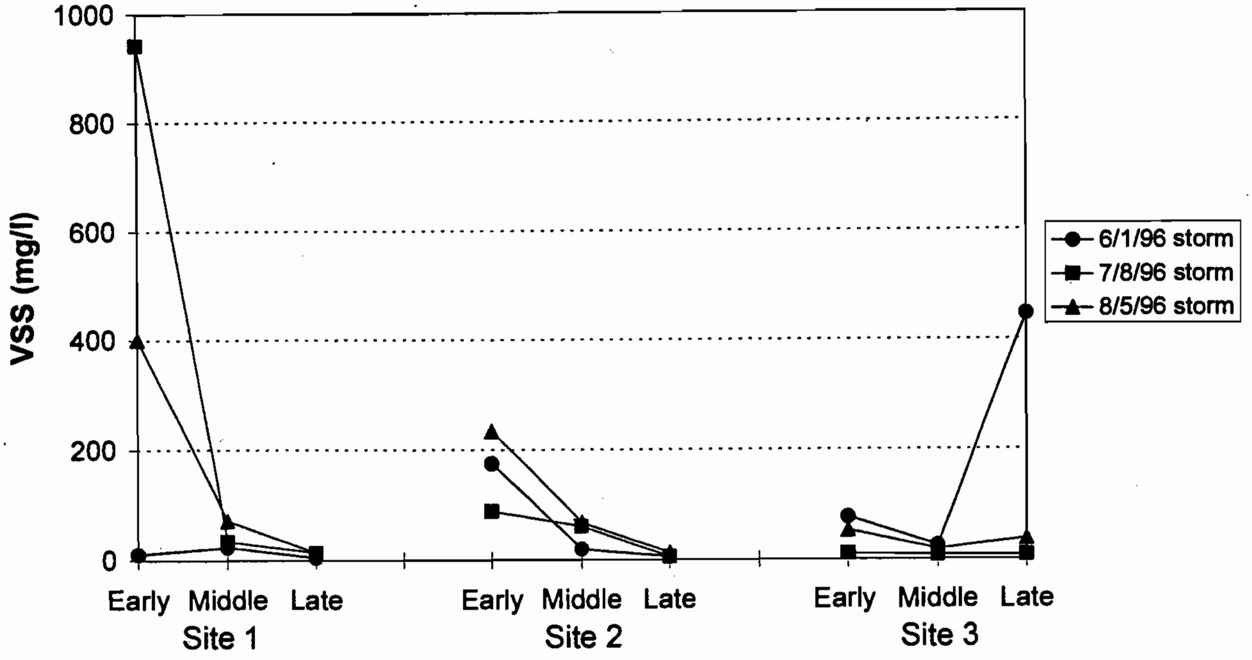
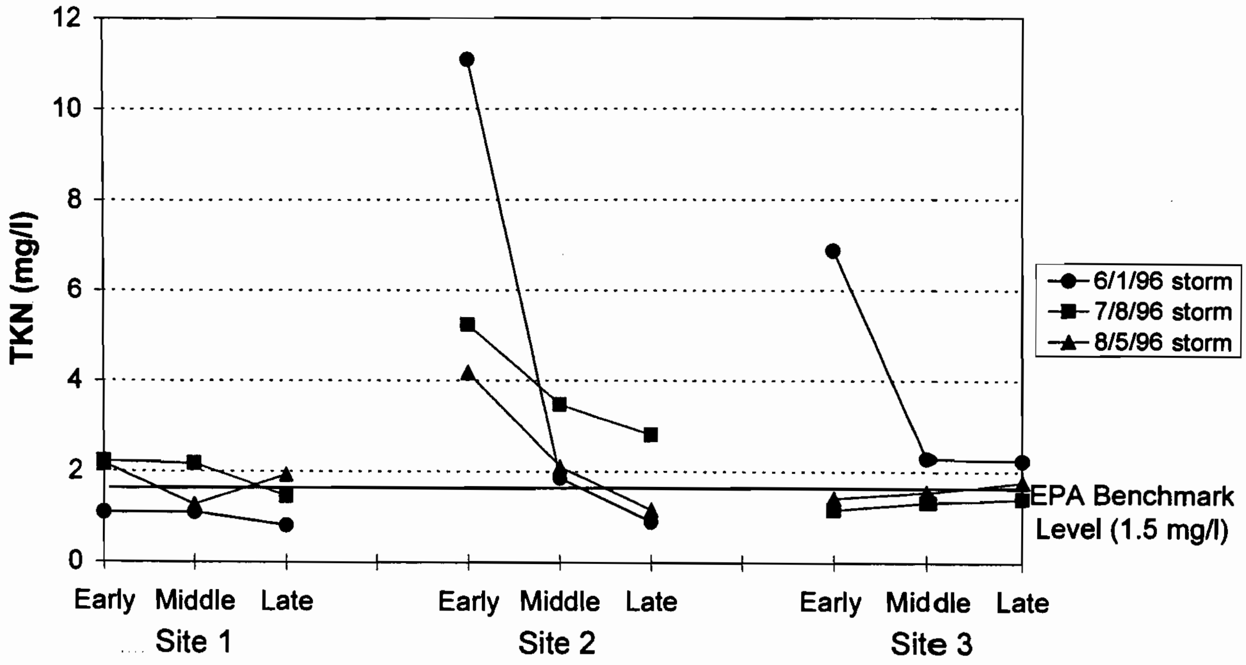


Figure 2
Nutrient Data from Stormwater Samples

Total Kjeldahl Nitrogen (TKN)



Nitrate (NO3-N+NO2-N)

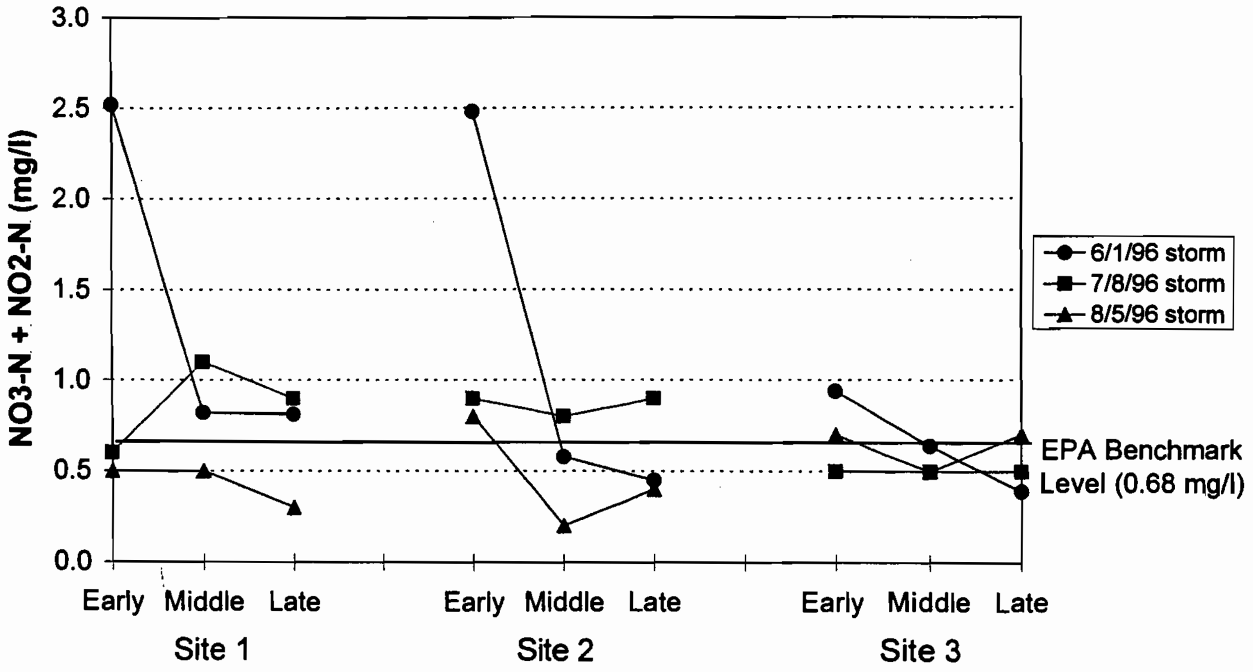
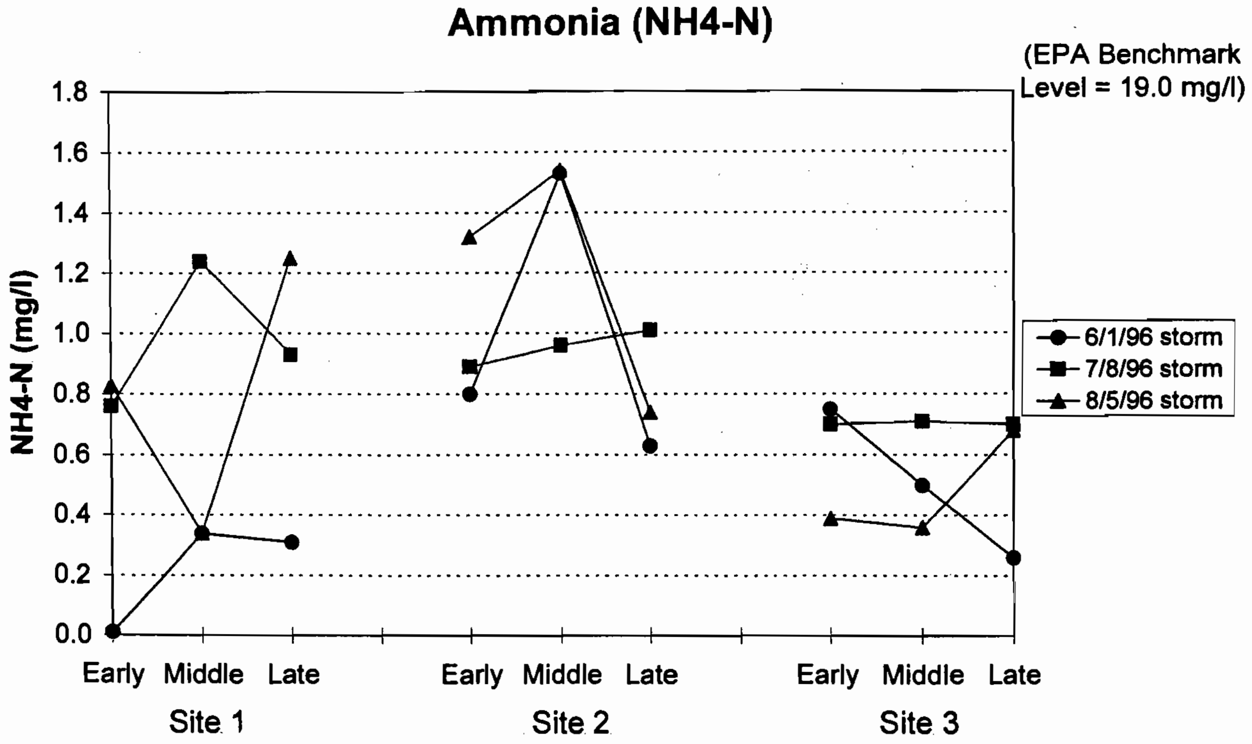


Figure 2 (cont'd)
Nutrient Data from Stormwater Samples



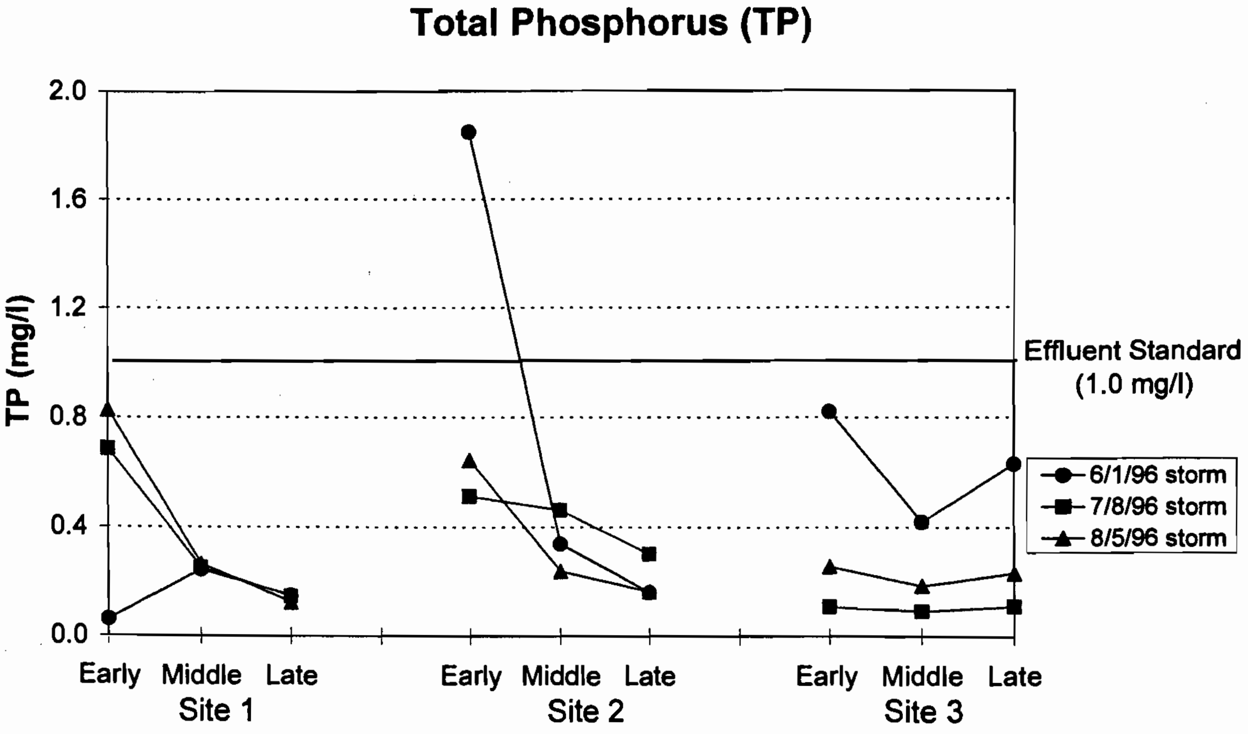


Figure 2 (cont'd)
Nutrient Data from Stormwater Samples

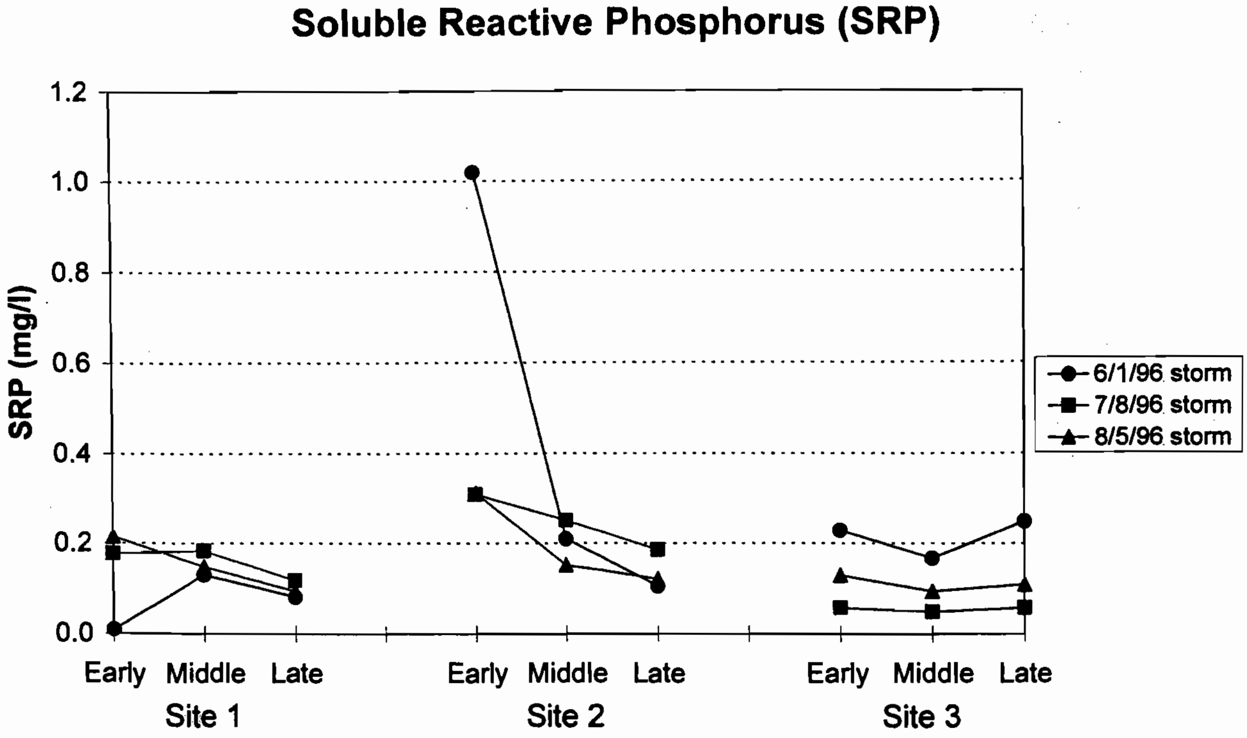
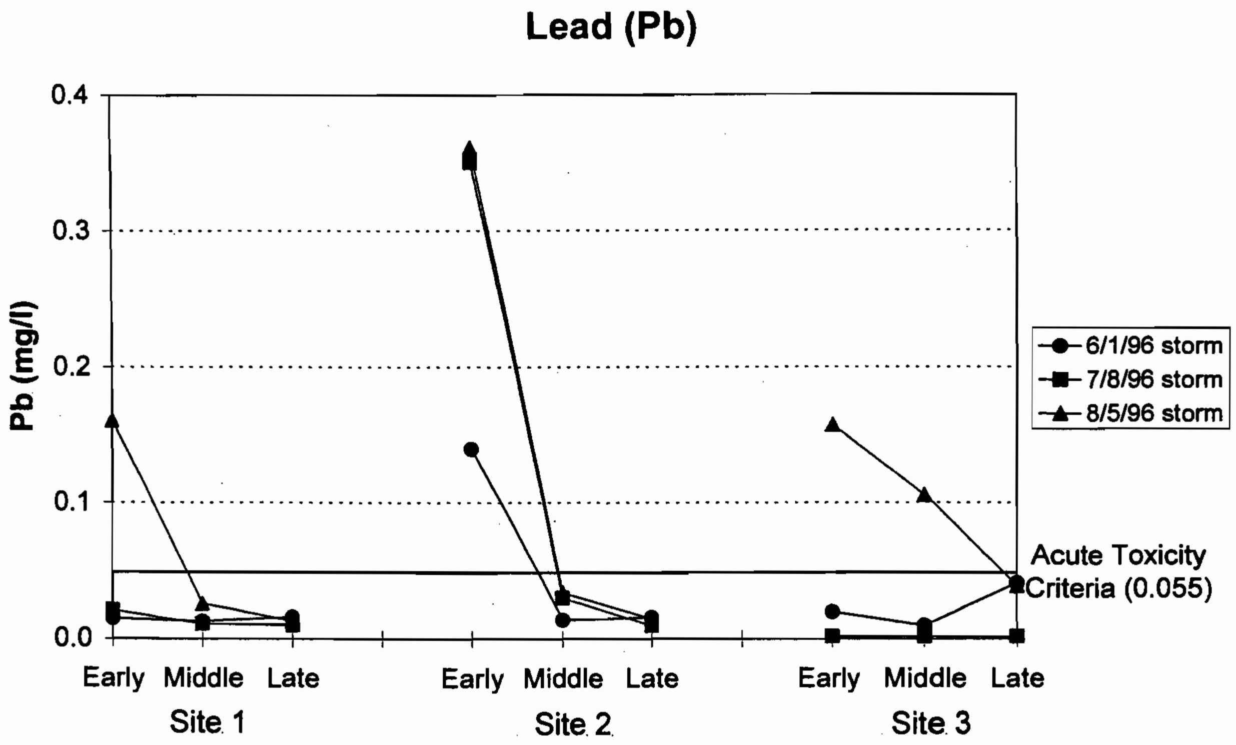


Figure 3
Trace Metals Data from Stormwater Samples



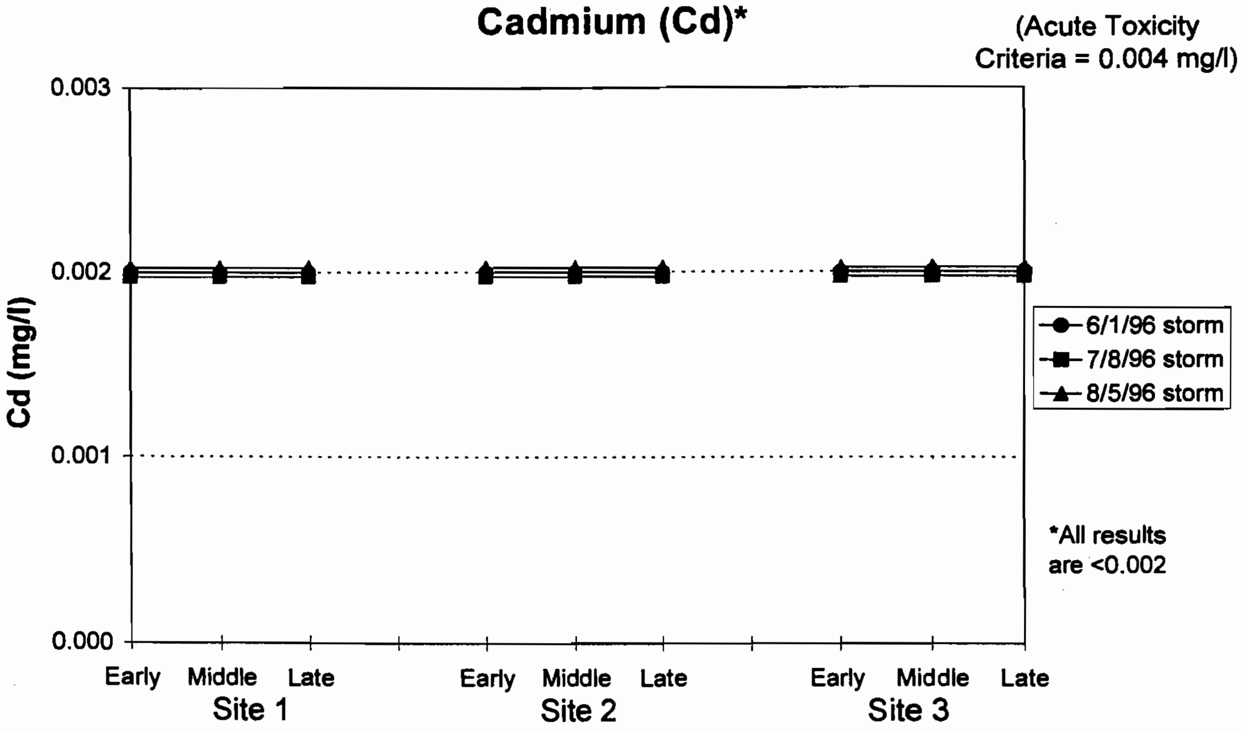
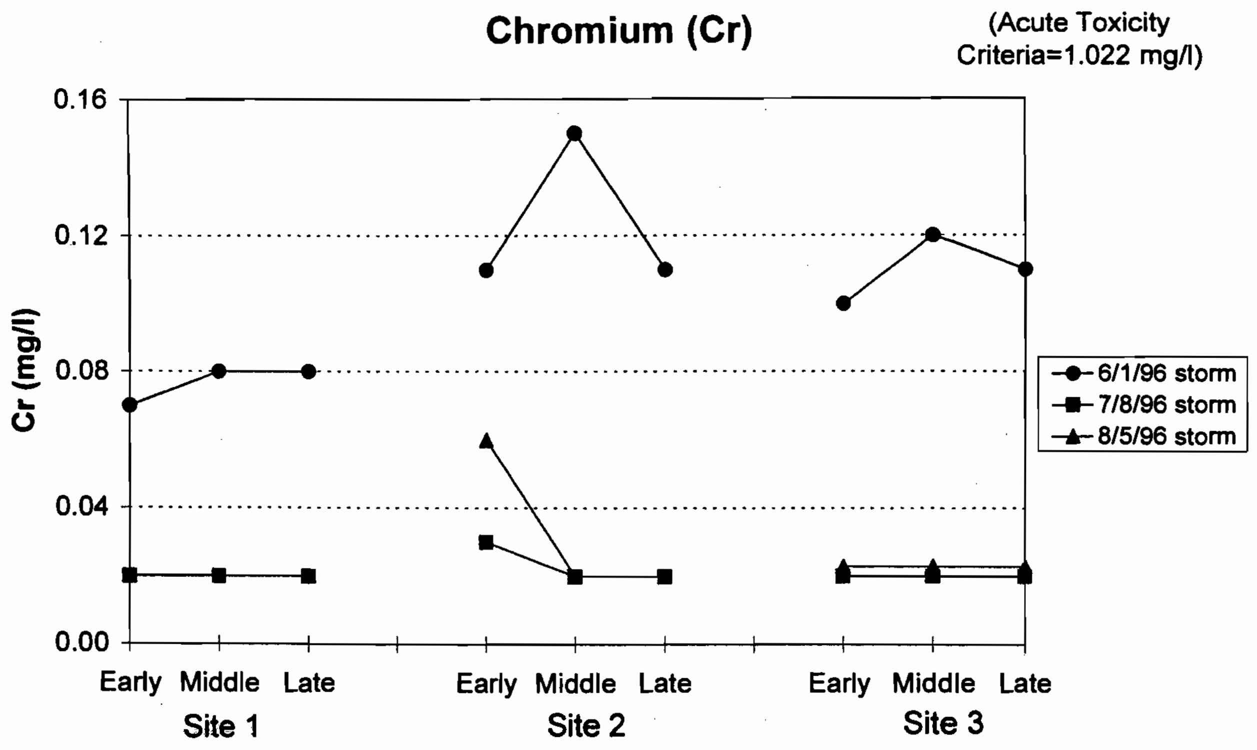


Figure 3 (cont'd)
Trace Metals Data from Stormwater Samples



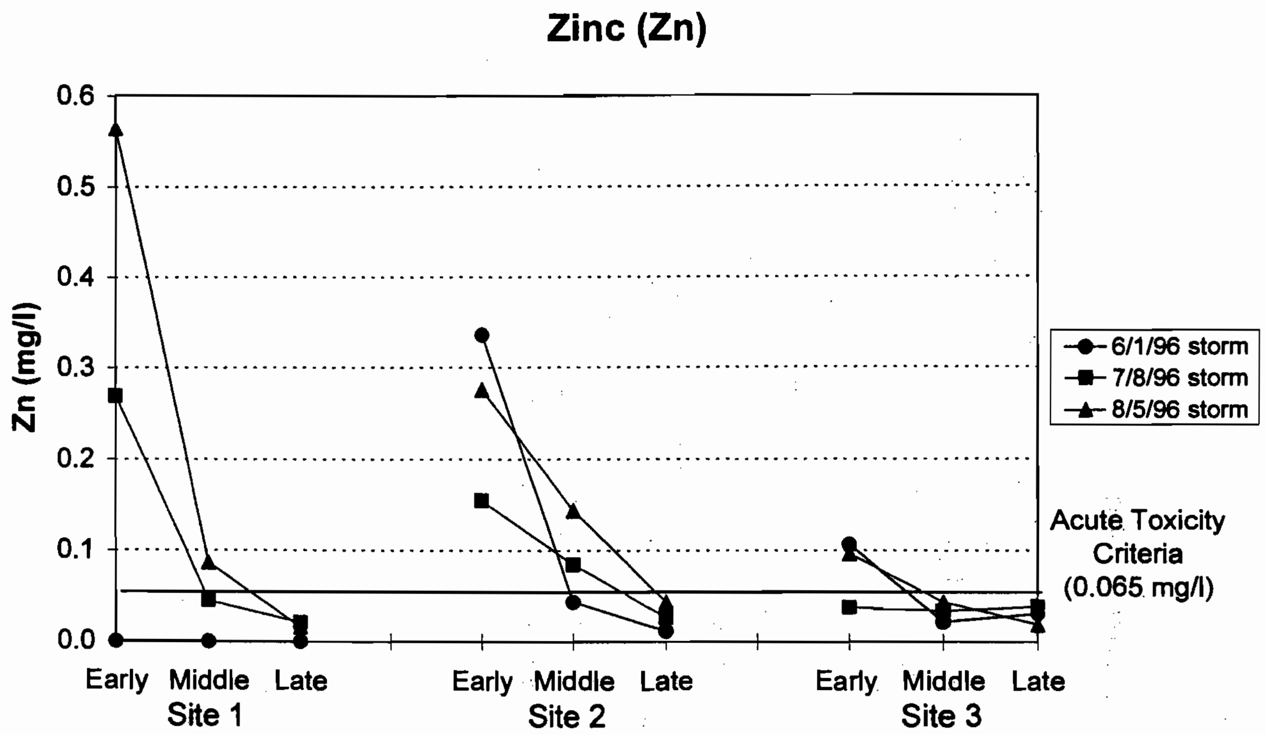
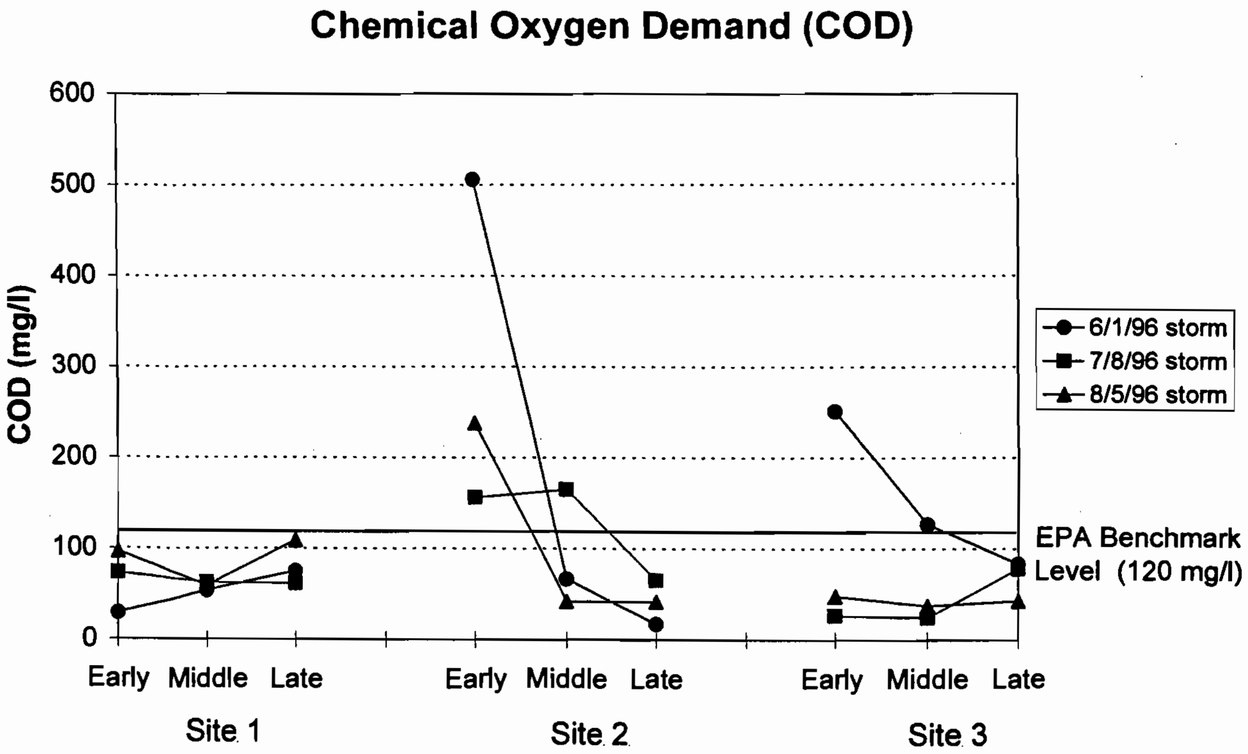


Figure 4
Other Parameter Data from Stormwater Samples



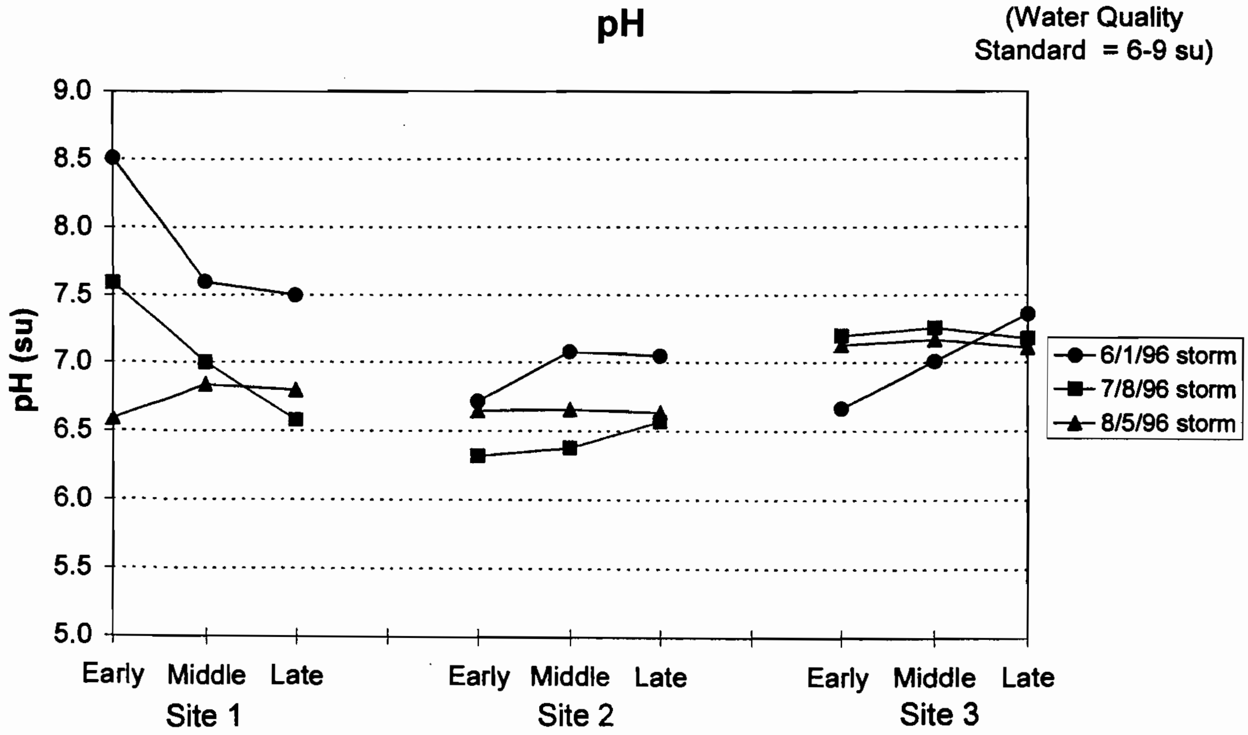
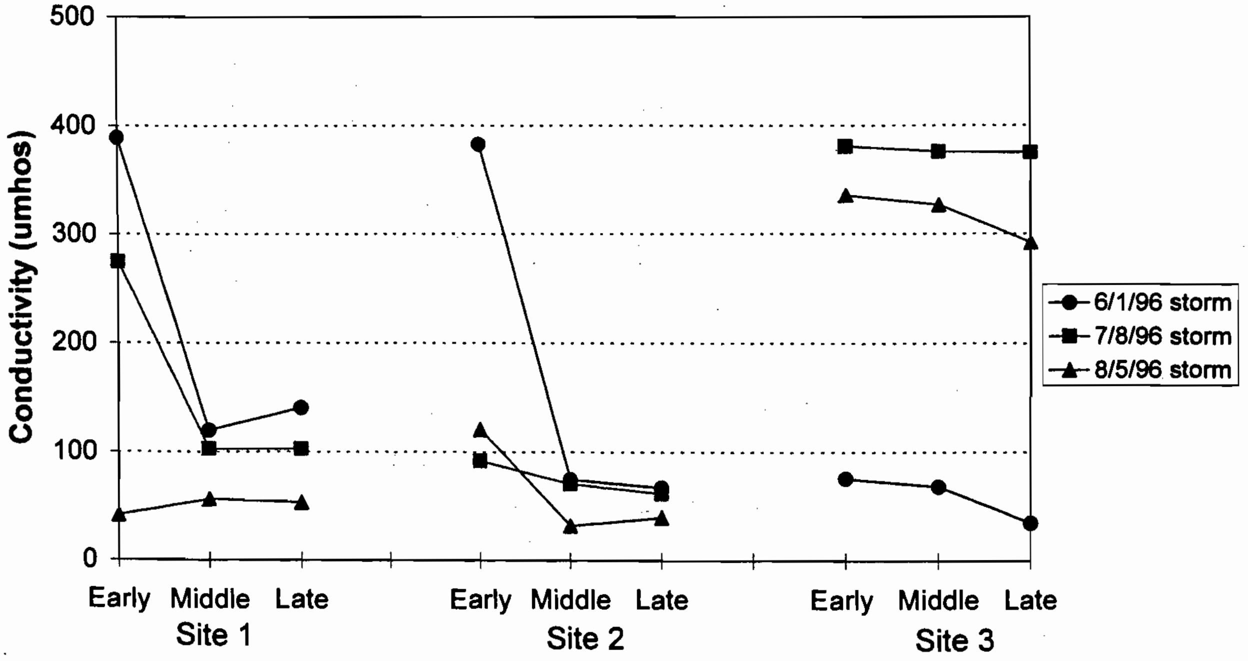


Figure 4 (cont'd)
Other Parameter Data from Stormwater Samples

Conductivity



Alkalinity

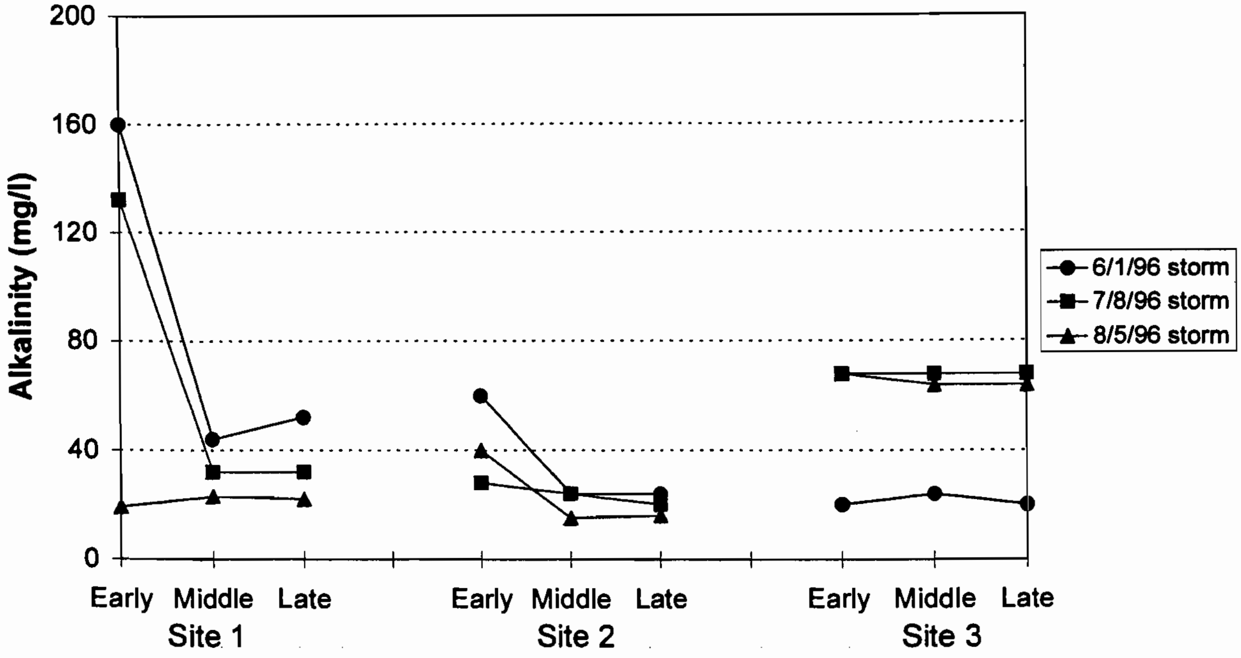
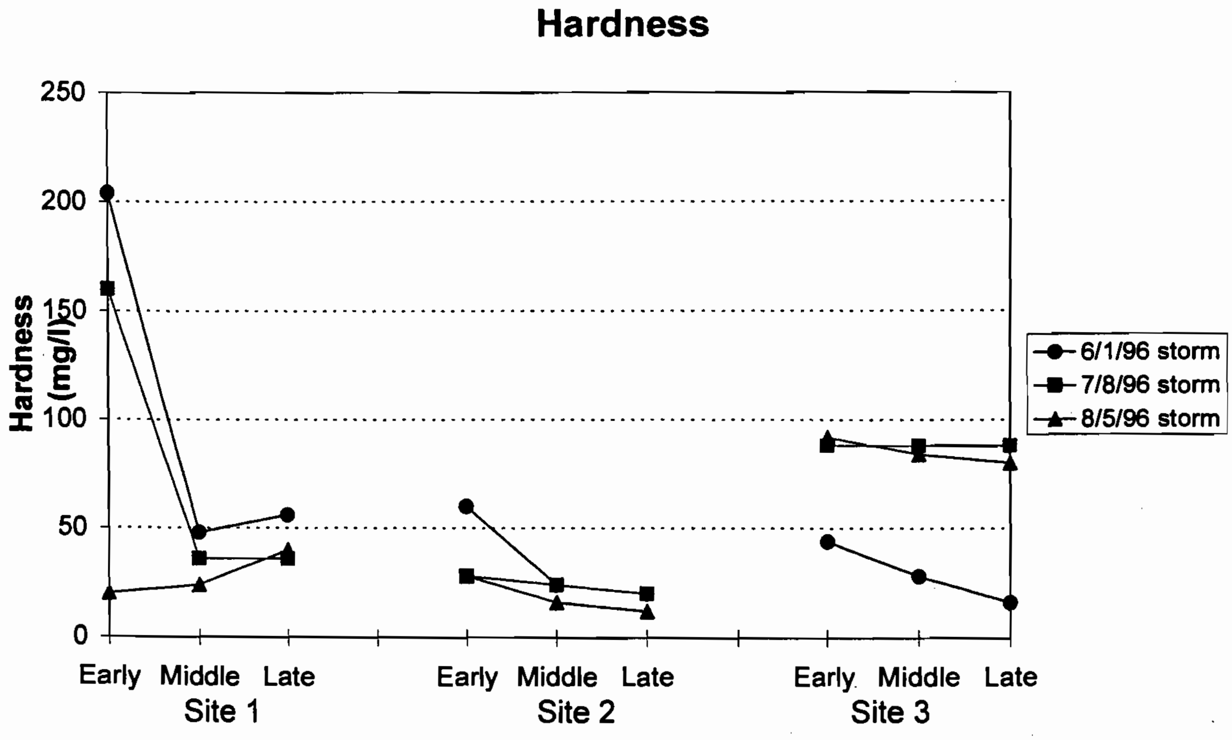


Figure 4 (cont'd)
Other Parameter Data from Stormwater Samples



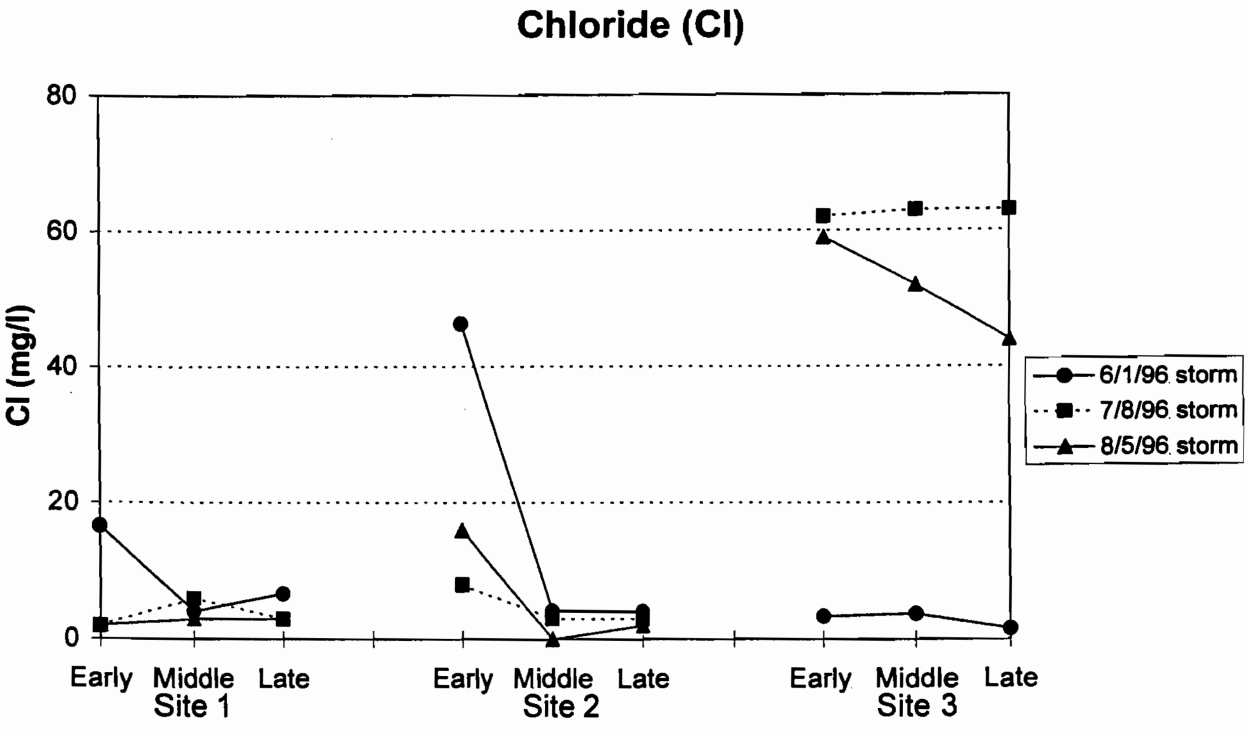
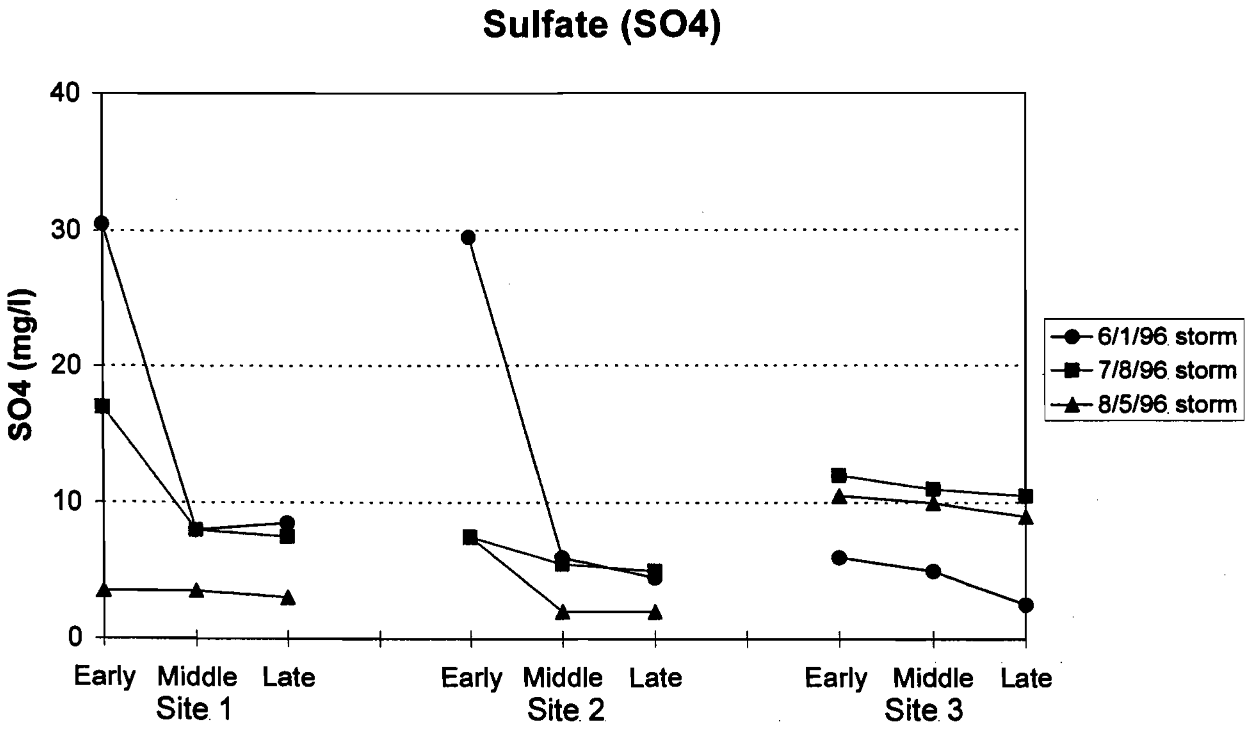


Figure 4 (cont'd)
Other Parameter Data from Stormwater Samples



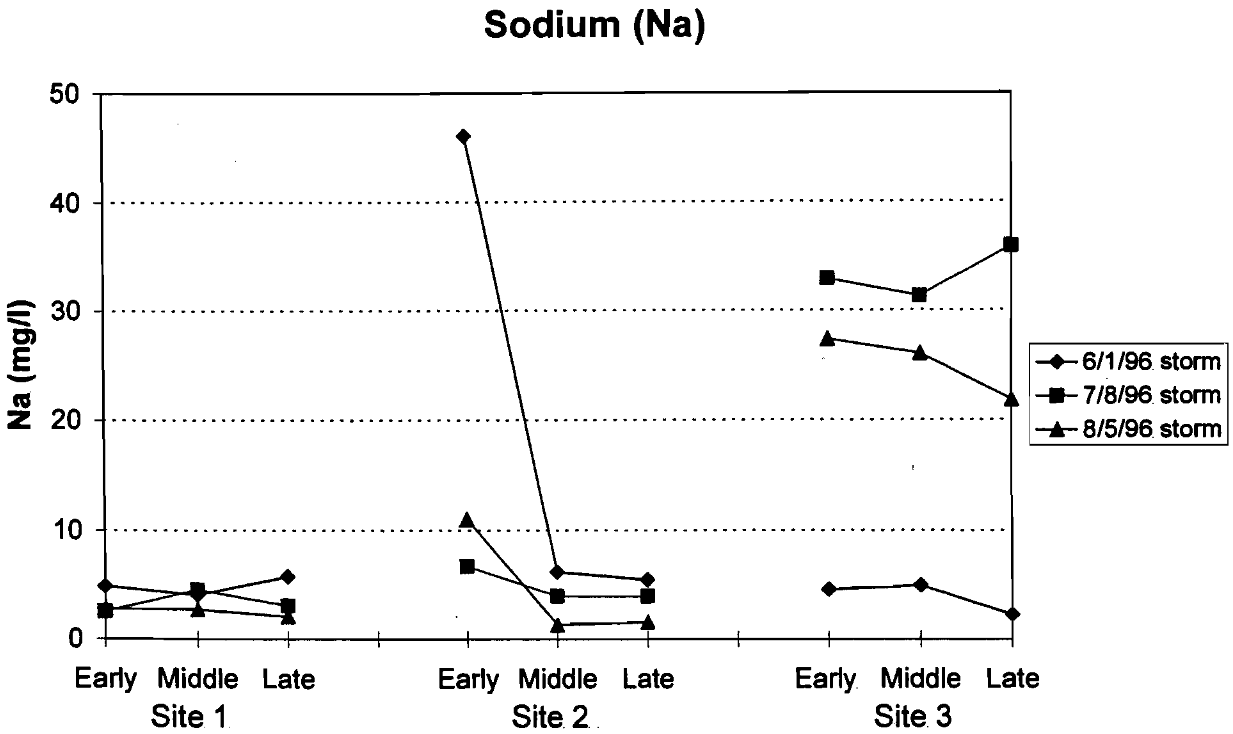
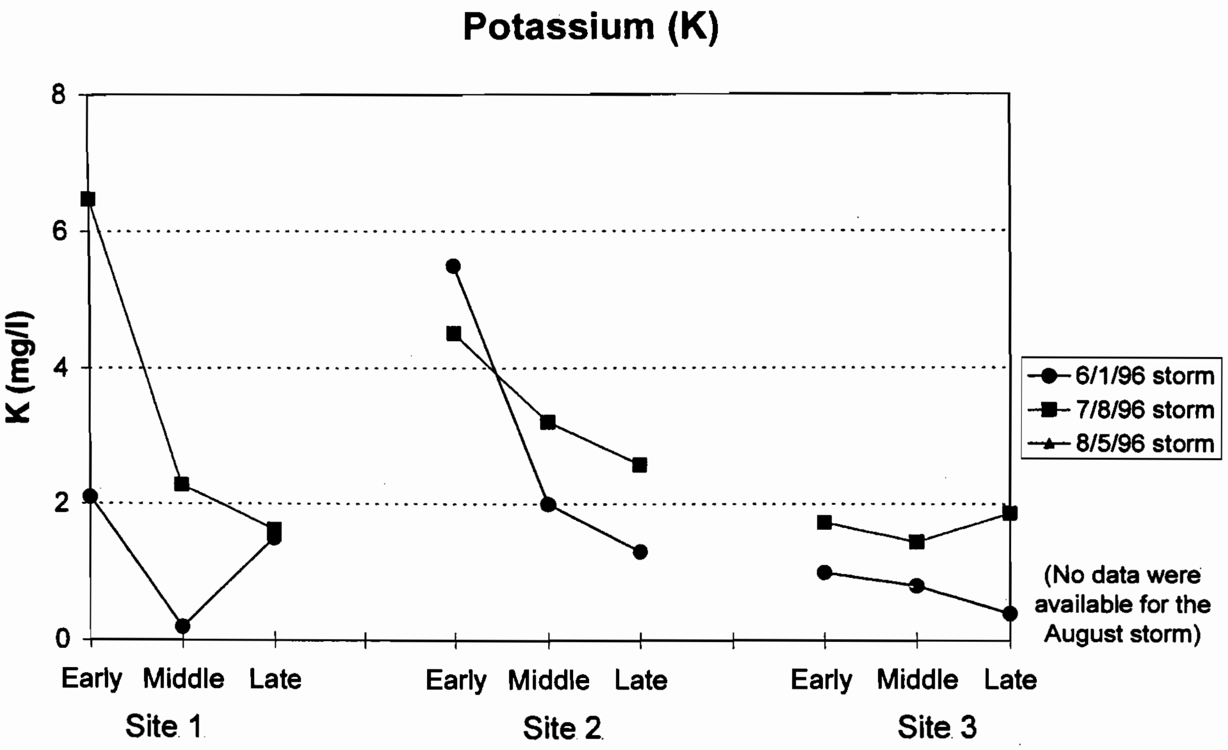


Figure 4 (cont'd)
Other Parameter Data from Stormwater Samples



Site 3b did not show a pattern from the early to the late sampling periods. This is probably because sampling was done at the outlet of a detention pond, after sediment, pollutants, and nutrients were able to settle out. Concentrations were generally lower at site 3b than at sites 1 and 2, probably due, at least in part, to the presence of the detention pond.

Similarly, stormwater at site 1 also has the opportunity for particulates to settle out before discharging to the Plover River (however, this is *after* the location where the samples were taken for this study). After site 1, the stormwater passes through a wetland before discharging to the Plover River. The stormwater data sampled as part of this project was collected upstream of the wetland, in the drainage ditch, for easier access during storm events. It is assumed that the wetland provides some filtering of contaminants, resulting in lower contaminant levels actually reaching the Plover River. Results from a 1996 UWSP undergraduate study (Flynn et al, 1996) of the effects of stormwater runoff on the Plover River suggest that the wetland downstream of site 1 is indeed removing some lead and chromium from the stormwater.

The only site that doesn't provide the opportunity for contaminants to settle out is site #2, where the discharge pipe empties into a concrete ditch and directly into the Plover River. Because of this, this discharge can be considered to have a more direct impact on the water quality.

Water Quality:

There are no official water quality standards established specifically for stormwater runoff. There are, however, other standards and concentrations that can be used in order to indicate potential problems with stormwater contaminant levels. For this report, Wisconsin Administrative Code surface water quality criteria, effluent standards, groundwater standards, and also EPA Benchmark values were used to assess the stormwater samples and indicate potential problems with concentration levels. A list of the parameters sampled and the concentrations and sources used for comparison purposes are contained in Table 2. It should be noted that for some of the parameters, there do not exist any standards or benchmarks that can be used for assessing stormwater concentrations.

Table 2. Administrative Code Standards and EPA Benchmark Values used in assessing stormwater concentrations

Parameter	Standard or Benchmark Value Concentration (mg/l unless otherwise noted)	Source*
Total Suspended Solids (TSS)	100	EPA Benchmark
Volatile Suspended Solids (VSS)	--	--
Total Kjeldahl Nitrogen (TKN)	1.5	EPA Benchmark
Nitrate (NO3-N + NO2-N)	0.68	EPA Benchmark
Ammonia (NH4)	19	EPA Benchmark
Total Phosphorus (TP)	1	NR 217
Soluble Reactive Phosphorus (SRP)	--	--
Lead (Pb)	0.055	NR 105
Cadmium (Cd)	0.004	NR 105
Chromium (Cr)	1.022	NR 105
Zinc (Zn)	0.065	NR 105
Chemical Oxygen Demand (COD)	120	EPA Benchmark
pH	6.0 - 9.0 su	NR 102
Conductivity	--	--
Alkalinity	--	--
Hardness	--	--
Chloride (Cl)	--	--
Sulfate (SO4)	--	--
Sodium (Na)	--	--
Potassium (K)	--	--

*Sources:

EPA Benchmark Values - EPA Office of Wastewater Management
NR 140 - Groundwater Quality
NR 217 - Effluent Standards and Limitations
NR 105 - Surface Water Quality Criteria and Secondary Values for Toxic Substances (Acute Toxicity Criteria)
NR 102 - Water Quality Standards for Wisconsin Surface Waters

As shown in Figures 1-4, the stormwater data collected for this project exceeded the standards or benchmark values used for comparison purposes for the following parameters: Total Suspended Solids, Total Kjeldahl Nitrogen, Nitrate, Lead, Zinc, and Chemical Oxygen Demand.

Sediment

Total suspended solids (TSS) concentrations exceeded the EPA benchmark values at all three sites. At site 2, TSS values were exceeded for all three storms, as shown in Figure 1. These results suggest that stormwater is carrying a fair amount of sediment into McDill Pond. At sites 1 and 2, the highest levels of TSS appear in the early part of the storms. At site 3a, high levels were observed during the early part of the storm, but also peaked during the late part of the storm. This late period peak could have been caused by a sediment load somewhere in the drainage area that was flushed into the storm sewer system late in the storm.

Nutrients

In terms of nutrients, nitrogen concentrations were high enough to exceed EPA benchmark values for total kjeldahl nitrogen (TKN) and nitrate (NO3-N + NO2-N) at site 2 for all three storms (Figure 2). TKN benchmark values were also exceeded at site 3a, and nitrate benchmark values were also exceeded at site 1 for the June and July storms. These results suggest that stormwater events are clearly contributing nitrogen to the Plover River and McDill Pond, particularly at site 2. Although nitrate is being contributed by stormwater, the concentrations are not high enough to exceed established groundwater standards. Therefore, it is unlikely that high nitrate levels in groundwater are due to stormwater runoff in the McDill Pond area.

Phosphorus concentrations at site 2 exceeded effluent standards for sewage treatment plants for the early part of the June storm, as shown in Figure 2. Since the drainage area for site 2 is more residential than the other sites, it is likely that the spike in phosphorus levels at this site is due to lawn fertilizing. In residential areas, runoff water from lawns often contains higher phosphorus levels in June, due to typical lawn fertilization in late May (Barten and Jahnke, 1997).

While the phosphorus standards that were used in this study were only exceeded once, it should be noted that the stormwater phosphorus concentrations collected were actually much higher than average McDill Pond phosphorus readings (Short et al, 1993), and were much higher than phosphorus concentrations considered to cause nuisance algal blooms in lakes (Shaw et al, 1994). Clearly, stormwater runoff is contributing phosphorus to the Plover River and McDill Pond.

Trace Metals

Trace metal concentrations exceeded the acute toxicity criteria for lead and zinc, as shown in Figure 3. Lead toxicity values were exceeded at all three sites, primarily during the early part of the storms. At site 2, lead values were exceeded for all three storms, again during the early part of the storm. For zinc, benchmark values were exceeded at sites 1 and 2, and like lead, the highest values were primarily during the early part of the storms. These results indicate that stormwater is contributing high levels of lead and zinc to McDill Pond, and most of it is coming from the first 'flush' of rainwater off the streets.

Other Parameters

Chemical Oxygen Demand (COD) benchmark values were exceeded at site 2 and also site 3a (Figure 4). High COD levels indicate a high demand for oxygen in the water and therefore a likelihood for low oxygen levels. Decaying organic material such as leaves or grass clippings in runoff can cause a sudden increase or "pulse" in oxygen demand in a lake or stream after a storm, totally depleting oxygen. This can affect aquatic life, but can also cause the release of chemicals and nutrients from sediments.

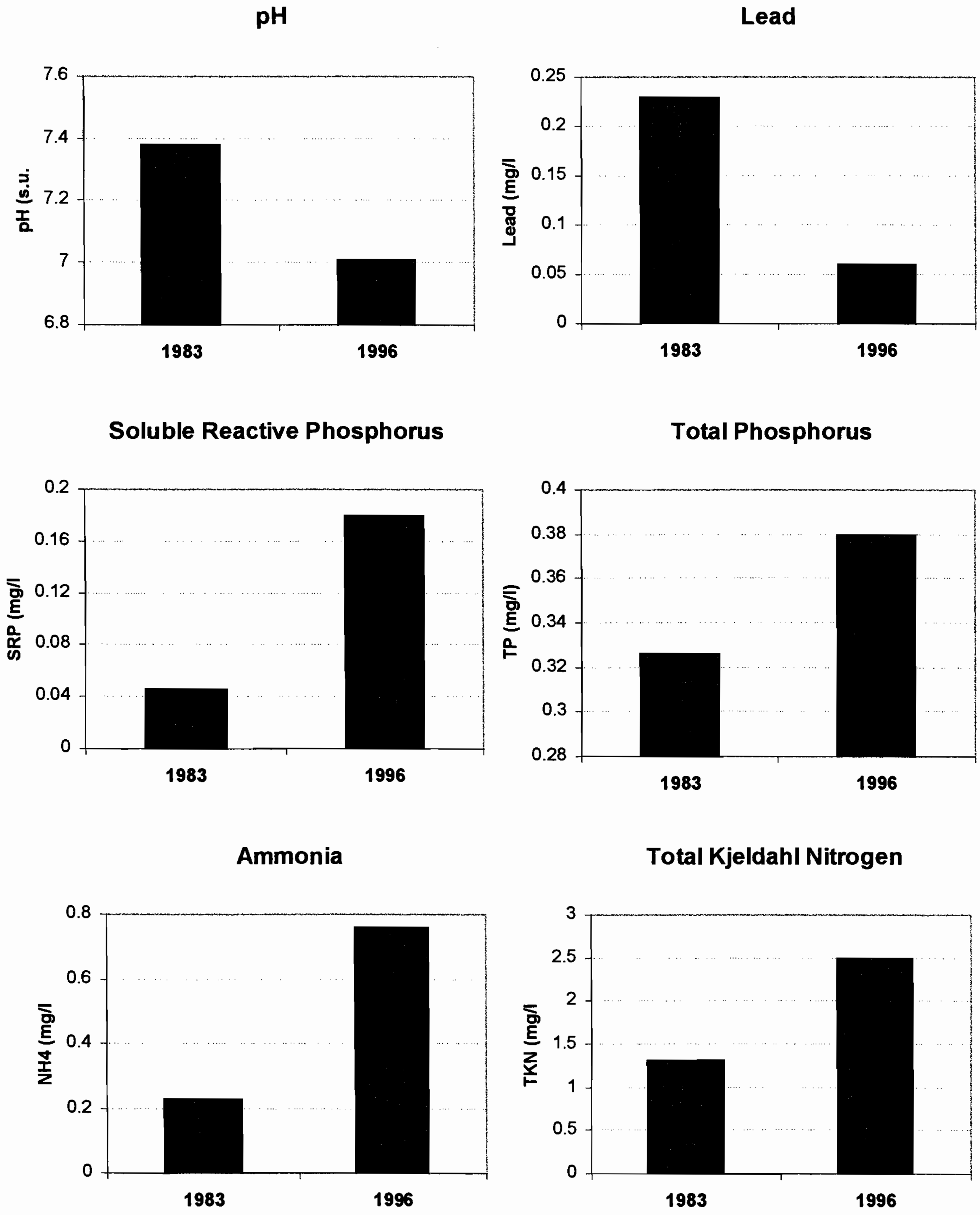
No standards or benchmark values were available to assess chloride levels. Recent average background levels for McDill Pond of about 10 mg/l (Short et al, 1993), however, show that all of the sites are contributing higher levels of chloride to the waterway. Site 3b in particular, shows very high chloride concentrations, five times the background levels found in McDill Pond. The reason for the high chloride concentrations at site 3b is unknown at this time. While chloride levels need to be extremely high (approaching salt water concentration) to directly affect fish and aquatic life, they can serve as a good indicator of other potential pollutants.

Water Quality Changes over Time:

Results from this study can be compared to results from a 1983 study (Mealy and Shaw, 1983) to show changes that have taken place in stormwater over time. The 1983 study collected stormwater from a highway 10 storm sewer discharge, close to the current site #2. The 1996 data from the same site show a drop in pH, as shown in Figure 5, indicating that the stormwater has become more acidic since the 1983 readings. Lead levels in stormwater also show a decrease since 1983, most likely due to the current use of unleaded gasoline. More notably however, is the increase in nutrient levels since 1983, including soluble reactive phosphorus (SRP), total phosphorus (TP), ammonia (NH4) and total kjeldahl nitrogen (TKN), as shown in Figure 5. These results suggest that more nutrients are getting transported from the drainage area into the Plover River and McDill Pond by stormwater. Vehicle exhaust and increased use of lawn fertilizers in the drainage areas are likely the main causes of the increased nutrient levels.

Of the nutrients, phosphorus is of higher concern than nitrogen because McDill Pond is phosphorus limited, meaning that additional phosphorus has the capability of causing additional plant and algae growth. Increased phosphorus can contribute to the overall eutrophication (nutrient enrichment) of McDill Pond.

Figure 5
Stormwater Changes Over Time: 1983 vs. 1996



SUMMARY:

The results from this study show that stormwater is contributing sediment, nutrients, and trace metals to the Plover River and McDill Pond. In some cases, the concentrations are much higher than established water quality standards or benchmark values.

Stormwater runoff events are contributing somewhat high levels of sediment to the Plover River and McDill Pond, particularly in the first 'flush' of stormwater into the system.

High nitrogen and phosphorus concentrations are also being brought into the waterway by storm events. Although nitrogen can cause some problems, phosphorus is a bigger concern because of its potential to increase aquatic plant and algae growth. Stormwater phosphorus levels are above the concentrations needed to cause nuisance algae blooms in lakes.

The results of this study also indicate that stormwater is contributing somewhat high levels of lead and zinc to the Plover River and McDill Pond, and most of it is coming from the first 'flush' of rainwater off the streets.

Of the three sites, stormwater at site 2 appears to be contributing the highest concentrations of nutrients, metals, and sediment. This is most likely because there is no type of a settling basin at that site to allow particulates to settle out of the stormwater before it enters the river. As a result, any particulate that stormwater picks up within the drainage area is most likely going to end up in the Plover River, and eventually in McDill Pond.

Results also suggest that at least for site 2, stormwater nutrient concentrations have increased over time. These nutrients can contribute to a further eutrophication (nutrient enrichment) of McDill Pond.

RECOMMENDATIONS:

McDill Pond is an urban impoundment surrounded by a large amount of impervious surfaces. Because of this, the existence of storm sewer systems are necessary to prevent street and basement flooding by rapidly transporting rainwater or snowmelt to other areas, in this case, the Plover River and McDill Pond. There are, however, actions that can be taken to minimize the amount of pollutants that enter the waterways:

1. Support the use of city street sweeping equipment to clean debris and pollutants from streets. Encourage private street sweeping for parking lots. This will remove polluntants from the streets before they are washed into the stormsewers by large rain events that will carry them into the waterway.

2. Reduce the use of lawn fertilizers in the drainage areas. Fertilizers applied before a rain event, the application of excessive fertilizer, or fertilizer spilled on sidewalks and driveways can all be washed into storm sewers and eventually into the Plover River and McDill Pond.

3. Support local and state construction site erosion controls. The use of erosion controls during construction can significantly reduce the amount of sediment that enters into storm sewers and eventually into waterbodies. Sediment particles can also easily transport phosphorus into waterways.

4. Support the use of settling basins with any future storm sewer constructions or modifications. This will help settle out some of the pollutants from stormwater before entering the river or lake.

5. Encourage/support any potential modification of the Highway 10 storm sewer to include a detention basin.

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