

THE IMPACT OF STORM CHARACTERISTICS AND LAND USE ON
NUTRIENT EXPORT IN TWO GLACIATED WATERSHEDS IN
CENTRAL INDIANA, USA

Laura E. Wagner

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Philippe G. Vidon, Ph.D., Chair

Lenore P. Tedesco, Ph.D.

Master's Thesis
Committee

Kathy J. Licht, Ph.D.

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ABSTRACT

Laura E. Wagner

THE IMPACT OF STORM CHARACTERISTICS AND LAND USE ON NUTRIENT EXPORT IN TWO GLACIATED WATERSHEDS IN CENTRAL INDIANA, USA

This study investigated nutrient export during three spring storm events in two different land use watersheds (agricultural and mixed land use) in a glacial till landscape of the Midwestern, USA. The objectives of the study were: (1) to determine how land use affects water, nitrate, soluble reactive phosphorus (SRP) and dissolved organic carbon (DOC) delivery (timing, amount) to streams during spring storms in two central Indiana watersheds with contrasting land use; and (2) to determine nitrate, SRP and DOC flow pathways to streams during spring storms. High frequency stream sampling of nutrients and cations, coupled with hydrograph separations using $\delta^{18}\text{O}$, was used to identify water flow pathways and event and pre-event water contributions to the streams. Data indicate land use and storm characteristics play a role in the export of water and nutrients. In the agricultural watershed (Watershed A), the storm hydrograph is dominated by pre-event water, whereas the mixed land use watershed (Watershed M) storm hydrograph is more event water dominated. Watershed A also contains higher nutrient concentrations, especially nitrate. High bulk precipitation and greater maximum intensity export more nitrate, SRP, and DOC to the streams. Results also indicate nitrate, DOC, and SRP concentrations display distinct temporal patterns during spring storm events. DOC concentration increased with stormflow and peaked on the rising limb/with

maximum discharge regardless of land use or storm event. In Watershed A, SRP concentration followed a similar pattern to DOC during small storms; therefore they are believed to be exported together with flushing of saturated near-surface soil waters via macropores/overland flow. However, SRP likely has multiple flowpaths, one dominated over another depending on the storm. Nitrate concentrations matched Ca^{2+} , Mg^{2+} , and Na^+ trajectories and decreased with stormflow, suggesting a tile drain/subsurface flowpath. Nitrate and SRP peak concentrations are delayed relative to DOC in Watershed M. The wet retention ponds in the headwaters are believed to delay the stormflow response, and therefore, the delivery of nutrients to the stream.

Philippe Vidon, Ph.D., Committee Chair

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Introduction

Exports of nitrate, soluble reactive phosphorus (SRP), and dissolved organic carbon (DOC) from Midwestern states have been identified as causes of many water quality problems both locally and nationally (e.g., eutrophication and hypoxia in the Gulf of Mexico, Goolsby, 2000; Martin et al., 1999). Many studies have therefore focused on the processes controlling nitrate, SRP and DOC delivery to streams. In particular, research has shown that flowpaths that dominate during storm events generally determine the resulting surface water chemistry during and after the event (Bonell, 1993). Royer et al. (2006) also showed that most nutrient exports typically occur during high flow periods or stormflow. Understanding nutrient export processes during stormflow is therefore critical to the development of successful strategies to improve water quality with respect to nutrients at the watershed scale (Sidle et al., 2000). Finally, knowledge of sources and flowpaths of water (and nutrients) during a storm event can assist in effective modeling of stream discharge and streamwater chemistry (Christopherson et al., 1982).

Although many studies have investigated the impact of land use on nutrients and carbon concentration in streams, there is still much uncertainty on the impact of land use on nitrogen, phosphorus and carbon losses in streams at the watershed scale. For instance, Coulter et al. (2004) found that agricultural land uses are generally a greater source of nutrients than urban land uses in Northern Kentucky. In Southern Ontario, Hill (1978) showed a positive correlation between nitrate concentration in streams and the percentage of the watershed used for agriculture. To the contrary, in North Carolina, Bolstad and Swank (1997) found that there were large consistent increases in nitrate concentration during stormflow as building density increased. In east-central Illinois,

Osborne and Wiley (1988) found that urbanization, not agriculture is a major factor controlling SRP concentration in streams throughout the year and that urbanization also impacts the nitrate concentration, especially during the summer/fall period.

Many studies have also focused on determining the nitrate, SRP and DOC delivery pathways to streams (Baker et al., 2006; Royer et al., 2006; Gentry et al., 2007). Preferential flow via macropores has been shown to increase the rate of nitrate transport from the surface to subsurface drains and groundwater in agricultural areas (Shaffer et al., 1979, Smettem et al., 1983, Edwards et al., 1989, Li and Ghodrati, 1994). Baker et al. (2006) found that tile drains and macropores are primary pathways for agricultural-chemical transport to Leary Weber Ditch (central Indiana) during most storms. Similarly, in an east-central Illinois watershed, Royer et al. (2006) found that artificial drainage was the primary mechanism for nitrate export. For SRP, Royer et al. (2006) found that both tile drainage and overland flow contributed to SRP export, while particulate P was exported with overland flow. Also in east-central Illinois, Gentry et al. (2007) found that concentrations of SRP and particulate P increased in tiles with discharge, indicating that tiles were a source of P to streams. Finally, research suggests that DOC is mainly exported with near-surface soil water (McGlynn and McDonnell, 2003).

Although research has started to identify the major nitrate, SRP and DOC flowpaths to streams, few detailed empirical studies have thoroughly examined nitrate, SRP and DOC concentration patterns in stream during storms. This strongly limits our ability to predict/model nitrogen, phosphorus, and carbon concentrations and loads during storms. Studies focusing on nutrient concentration dynamics in streams during storms mainly focus on nitrate and DOC and usually take place in mountainous to gently rolling

forested landscapes (Creed and Band, 1998; Welsh et al., 2001; McHale et al., 2002; Inamdar et al., 2004). In the forested Dry Creek watershed in the Catskill Mountains of New York, Welsh et al. (2001) found that stream nitrate concentrations peaked slightly before stream discharge. In a forested Ontario watershed, Creed and Band (1998) found similar results with nitrate concentrations highest on the rising limb of the hydrograph and attributed this pattern to the flushing of nitrate that accumulated near/at the soil surface. Other studies in forested watersheds have also found that nitrate peaks on the rising limb but attribute this to the displacement of till water by infiltrating precipitation (McHale et al., 2002; Inamdar et al., 2004). For DOC, Hornberger et al. (1994) and Boyer et al. (1997) found DOC concentrations higher on the rising limb of the hydrograph, suggesting that DOC is flushed from the near-surface soil waters when the ground becomes saturated. Other studies indicate that DOC concentrations peak after the discharge peak, and attributed this pattern to DOC being exported via near-surface soil runoff and/or overland flow (Inamdar et al., 2004) and/or the displacement of topsoil waters to the stream via macropores (Hangen et al., 2001). In a small urban watershed in Oregon, Hook and Yeakley (2005) found an increase in DOC concentrations during stormflow and attributed the majority of DOC export during storms to remnant riparian areas.

Research therefore indicates significant variability in the processes controlling nitrate and DOC delivery to streams. Information is still needed on DOC and nitrate delivery pathways to streams, especially in artificially drained landscapes of the Midwest where detailed empirical studies of nitrate, SRP and DOC delivery to streams are lacking.

The objectives of this study are therefore to (1) determine how land use affects water, nitrate, SRP and DOC delivery (timing, amount) to streams during spring storms in two Midwestern watersheds with contrasting land use (agriculture vs. mixed urban/agriculture land use) and (2) determine nitrate, SRP and DOC flow pathways to streams during spring storms. To achieve these objectives, this study investigated nitrate, SRP and DOC concentration dynamics in two Midwestern streams in relation to stream hydrology (discharge, event/pre-event water, cations, $\delta^{18}\text{O}$) and precipitation dynamics (intensity, bulk precipitation) in the watersheds studied. High resolution sampling of three spring storm events was conducted in subwatersheds of School Branch Watershed, an agricultural watershed (Watershed A) and Irishman's Run Watershed, a mixed land use watershed (Watershed M) in central Indiana (Figure 1). Spring events were chosen because the majority of nutrient delivery occurs in the spring (Royer et al., 2006) and nitrate, SRP and DOC were selected for analysis because these compounds are soluble and readily biologically available forms of carbon, nitrogen and phosphorus.

Materials and Methods

Site Description

The two first order watersheds used in this study are School Branch Creek watershed (Hendricks County) and Irishman's Run watershed (Boone County) located in central Indiana (Figure 1). The climate is classified as temperate continental and humid. January average temperature is -3 °C, whereas average July temperature is 23 °C (Indiana State Climate Office, 2005). The average annual precipitation ranges from 96 to 102 cm (Newman, 1997). The geology of the study area consists of mostly limestone and shale of Silurian to Mississippian age overlain by glacial deposits with till thickness in the watersheds ranging from 30 to 60 meters (Gray, 1983). The soils are poorly drained, deep, and nearly level to gently sloping silt loams and silty clay loams (USDA, 1974).

Study Watershed A (Figure 1) is a 10.9 km² agricultural subwatershed of School Branch Creek watershed, with a stream length of 5.0 km. The land use is approximately 85% agricultural (corn-soybean rotation) with small percentages of residential, forest, and other land uses (roads, open water) and is heavily tile drained (Appendix A). The slope of this agricultural subwatershed is approximately 0.08%. A previous assessment study determined that 34% of School Branch Creek has 8 meter wide woody buffer (Tedesco et al., 2005). Mean discharge in School Branch Creek over the 5 month sampling period was 139 L/s.

Study Watershed M (Figure 1) is a 6.7 km² mixed land use subwatershed of Irishman's Run watershed, with a stream length of 4.6 km. This watershed consists of residential neighborhoods (33%), agriculture (corn-soybean rotation) (33%), pasture (17%), forest (13%) and other land uses (roads, open water) (3%). Single-family

residential dwellings built in the 1980s to present dominate the development. New construction contains at least three wet retention ponds in multiple developments that feed into Irishman's Run. The slope of the subwatershed is approximately 0.4% and 57% of Irishman's Run has 8 meter wide woody buffer (Tedesco et al., 2005). Mean discharge in Irishman's Run over the 5 month sampling period was 147 L/s.

Storm Event Sampling and Analysis

Three storm events were monitored between April 2006 and June 2006 (Figure 2). Precipitation timing and intensity was recorded at 15 minute intervals at each watershed by a Vaisala WXT510 Multi-Parameter Transmitter weather station. In addition, graduated rain gages were distributed throughout each watershed (10 in Watershed A; 5 in Watershed M) to capture variability in bulk precipitation and chemistry (Figure 1). Stream stage was recorded at 15-minute intervals using a levellogger (Solinst 3001) at each watershed outlet. A Doppler acoustic velocity meter (Sontek Argonaut-SW) was installed in rotation at each watershed to develop the stage-discharge relationship. Soil characteristics were determined using a combination of field observation and USDA soil maps. Piezometer nests at 90 cm and 150 cm were established in each watershed at multiple locations. Twenty were installed in Watershed A (five nests of 90 and 150 cm on each side of the stream) and six (three nests) were installed in Watershed M to monitor the water table. All piezometers were installed using a hand auger and constructed of 1.27 cm diameter PVC with a 20-cm screen length. Because flow was parallel to the water table surface in both watersheds, water level in the piezometers was used as a proxy for water table depth before each storm event. Four ISCO brand portable

autosamplers (models 6712, 2900 and 2700) were deployed (two at the outlet of each watershed) to collect high resolution stream samples during the events. One sampler per watershed contained bottles with 8 ml of 11N sulfuric acid to preserve the DOC and SRP samples. Before the start of each event, rain gages were deployed and water table measurements were taken using a water level meter. Field blanks (Milli-Q water) were collected to insure the integrity of field sampling methods. ISCO samplers were triggered manually and samples were taken every two hours on the rising limb of the hydrograph and every four hours on the falling limb. To capture more of the variability in nutrient concentrations during the storm, each stream sample is a composite of 4 sub-samples taken every 30 to 60 minutes. Approximately 40, 45, and 70 stream water samples were collected in each watershed for Storm 1, Storm 2, and Storm 3, respectively.

All water samples (stream water and precipitation) were filtered using Whatman GF/F 0.7 μm filters. Selected anion and cation concentrations (NO_3^- , PO_4^{2-} , Ca^{2+} , K^+ , Mg^{2+} , and Na^+), DOC, and $\delta^{18}\text{O}$ were analyzed. Triplicate analyses of 10% of all samples and check standards analyzed every 10 samples were performed to assess measurement error. Nitrate and SRP concentrations were determined using a Konelab 20 Photometric Analyzer (EST Analytical) using the Hydrazine Reduction method (EPA Method 353.1) and the ascorbic acid method (EPA method 365.2), respectively (Clesceri et al., 1998). Major cation concentrations were determined using a Dionex DX500 Ion Chromatograph with a CS15 column and an 11N sulfuric acid eluent. Five ml aliquots of all samples were analyzed for $\delta^{18}\text{O}$ using equilibration with CO_2 followed by headspace $^{13}\text{CO}_2$ analysis. DOC samples were analyzed using a persulfate oxidation to CO_2 and an

OI Analytical DOC/DIC analyzer interfaced to IRMS. Error analysis for all parameters is located in Table 1.

Hydrograph Separation

A simple mixing model based on $\delta^{18}\text{O}$ was used to separate event (direct precipitation/overland flow/preferential flow via macropores) from pre-event water (stored in the watershed prior to the storm event) in the streams during the storms studied. This method involves two major assumptions. (1) Stormflow consists of two water types, event and pre-event water, both having different isotopic signatures (Sklash, 1990; Hill and Waddington, 1993). This assumption was tested by performing student t-tests on the pre-event and event water to determine if they were statistically different in their isotopic signature ($p < 0.05$). (2) Soil water storage, vadose water, and other surface water storage contributions have similar isotopic signatures to groundwater or their contributions are insignificant during storm events (Sklash, 1990; Hill and Waddington, 1993). This assumption was addressed by using stream baseflow as the pre-event component because it integrates water from all upstream potential sources before the storm (Sklash, 1990). Two conservation of mass equations can be used to solve for the event and pre-event contributions in the stream during storms (Q = discharge, C = concentration of $\delta^{18}\text{O}$, p = pre-event, e = event, st = stream) (Sklash, 1990; Brown et al., 1999):

$$Q_{st} = Q_p + Q_e \quad (1)$$

$$C_{st}Q_{st} = C_pQ_p + C_eQ_e \quad (2)$$

The relative contributions of event and pre-event water were calculated for each stream sample. The event water component is the average $\delta^{18}\text{O}$ for the rain gages in each

watershed for each storm event. The pre-event water component is the average $\delta^{18}\text{O}$ of stream baseflow four hours before the storm event.

Cation Data Analysis

Major cation concentration patterns during storm events were used to support the hydrograph separation findings. Many studies have used cations as groundwater tracers because of the significant difference in cation concentrations in groundwater compared to other potential water sources to the stream (Reid et al., 1981; Elwood and Turner, 1989; Kahl et al., 1992; Hill, 1993; Elsenbeer et al., 1994; Burns et al., 1998; Inamdar et al., 2004).

Results

Storm Description

Three 2006 spring events were monitored in early May (Storm 1), late May (Storm 2), and June (Storm 3) (Figure 2). The months of April and May 2006 were average precipitation months ($\pm 0.5\%$); June was above average (+36%), according to the NOAA 1971-2000 monthly climate averages (NOAA, 2002). Bulk precipitation for the three events studied ranged from 2.7 to 8.0 cm (Table 2). Average intensities ranged from 0.5 to 3.0 cm/hr and maximum intensities from 1.8 to 6.2 cm/hr (Table 2). In both watersheds, the event of greatest precipitation, maximum intensity, and 7-day antecedent precipitation began on June 22 and continued through June 30, with three different precipitation pulses.

Both watersheds reacted quickly to the onset of precipitation (Figure 2), baseflow to peak discharge times ranged from 4.5 to 7 hours in Watershed A and 2 to 5 hours in Watershed M. Peak discharge and pre-event discharge values are located in Figures 3, 4, 5, 6, 7, and 8. The largest of the storms studied (largest peak discharge) was Storm 3, (pulse 1 for Watershed A; pulse 3 for Watershed M) producing a maximum discharge of 2900 L/s in both watersheds (Figures 5, 8). Storms 1 and 2 produced significantly smaller peak discharges in both watersheds (Figures 3, 4, 6, 7).

Hydrograph Separation

$\delta^{18}\text{O}$ ranged from -6.22 to -3.50 ‰ in precipitation (“event water”) and -7.72 to -5.80 ‰ in stream baseflow (“pre-event water”) (Table 3). Before performing the hydrograph separation, student’s t-tests confirmed that $\delta^{18}\text{O}$ for the event and pre-event

components for each storm event in each watershed were statistically different (<0.05). The average and maximum event and pre-event water contributions for all three storms in Watershed A and M are given in Table 4; event and pre-event contributions are given graphically in Figure 9.

Watershed M has a higher maximum percentage of event water during all three events than Watershed A (Table 4). Generally pre-event water contributed more than 50% to stream discharge; however, pre-event water contributions reached their minimum during the Storm 3 event; 48% in Watershed A (Figure 5) and 4% in Watershed M (Figure 8). Storm 1 in Watershed M produced larger percentages of average event and maximum event water contributions than Watershed A (Table 4). Both watersheds had similar average contributions of pre-event (77%) and event water (23%) during Storm 2 (Table 4).

Pre-event and event water contributions were most affected by antecedent precipitation, bulk precipitation and maximum intensity of the storm events in Watershed A. Event water contributions were positively correlated with antecedent precipitation ($r^2=0.85$), bulk precipitation ($r^2=0.97$), and maximum intensity ($r^2=0.96$); pre-event water contributions were negatively correlated ($r^2= -0.85$; -0.97 ; -0.96 respectively). The relationship was less clear in Watershed M where bulk precipitation was negatively correlated with maximum event water contribution ($r^2= -0.99$).

Cation Concentrations and Dynamics

Major cation concentrations measured in precipitation and baseflow are presented in Table 5. Major cations Ca^{2+} , Mg^{2+} , and Na^+ have higher concentrations in baseflow

than precipitation in both watersheds (Table 5). Baseflow Ca^{2+} and K^+ concentrations vary between storms, however, baseflow Mg^{2+} does not vary between watersheds or storms. In addition, baseflow Na^+ concentrations are significantly higher in Watershed M than Watershed A (Table 5). Precipitation Ca^{2+} , Mg^{2+} , and Na^+ concentrations are below the detection limit during all storms in both watersheds. K^+ concentrations are similar in both precipitation and baseflow in both watersheds. Figure 10 shows typical behavior of major cations during a storm event. Ca^{2+} , Mg^{2+} , and Na^+ drop significantly in concentration at the beginning of stormflow, while K^+ increases with stormflow.

Nutrient Concentrations

Pre-storm (before the increase in discharge), during, and post-storm (after the discharge reached pre-storm level) nitrate concentrations varied with land use (Figure 11). Nitrate concentrations were larger (5x-38x) in Watershed A than in Watershed M for all three storm events ($p < 0.001$). Watershed A had average nitrate concentrations ranging from 3.69 to 5.74 mg/L during the storm events, and a maximum concentration of 14.33 mg/L. In contrast, Watershed M had average nitrate concentrations during the storm events of 0.44 to 1.23 mg/L and a maximum concentration of 3.45 mg/L. While clear differences in nitrate concentration are seen between watersheds, there is no clear pattern of nitrate evolution during storm events. Nitrate concentrations exhibit little change or decrease during and after the storms in Watershed A, whereas they exhibit little change or a very slight increase during the storm in Watershed M. SRP concentrations are low and show little variability. On average, DOC concentrations were higher during the storm event than pre- or post-storm concentrations for both watersheds.

Nutrient Dynamics

DOC increased with stormflow during storm events in both Watershed A and M (Figures 3, 4, 5, 6, 7, 8). DOC concentrations were consistently higher on the recession limb than the rising limb of the hydrograph in both watersheds; however, the concentration dropped faster in Watershed M than Watershed A.

Watershed A Storm 3 pulse 1 (Figure 5) displays a clear nitrate response. There is a dilution of nitrate (concentration decreases) as discharge increases. For Storms 1, 2 and 3 (pulses 2 and 3) (Figures 3, 4, 5), the variations observed during the storm are within the range of variation observed before and after the storm. For Watershed M, Storms 1 and 3 (pulse 1) display a delayed peak in nitrate (Figures 6, 8). There is no clear nitrate response for Storm 2 or Storm 3 (pulse 2, 3) (Figure 7, 8).

SRP increased with stormflow in Watershed A for Storms 1 and 2 (Figure 3, 4). Watershed A Storm 3 pulses 1 and 3 exhibited slightly delayed increases relative to discharge and DOC (Figure 5). Watershed M Storm 2 (Figure 7) also exhibited an increase in SRP concentration with stormflow, however, the SRP peak was delayed relative to discharge. For Storms 1 and 3 in Watershed M, no clear patterns were observed as SRP variations were within the range of variation observed before and after the storm (Figures 6, 8).

The relative timing of DOC, nitrate, and SRP varies between storms and watershed. In general, DOC and SRP increase together with stormflow in Watershed A and during Storm 2 in Watershed M (Figures 3, 4, 5, 7); however, in Watershed M the SRP peak is delayed with respect to the DOC and discharge peaks (Figure 7). In Watershed A Storm 3 pulse 1 (Figure 5), nitrate slowly decreases as DOC and SRP

increase. In Watershed M, nitrate increases after DOC during Storm 1 and Storm 3 pulse 1 (Figures 6, 8).

Discussion

1) How do storm characteristics and land use affect water, nitrate, DOC, and SRP delivery to streams during spring storms?

Both storm characteristics and land use affect water delivery to the streams. In general, discharge from Watershed A contains mostly pre-event water during the storm events (Table 4). In Watershed A, average event water contributions to the stream ranged from 11 to 33%, and maximum event water contributions were between 32 and 61%. These results are consistent with tile drain-dominated systems. Stone and Wilson (2006) found that preferential flow, a major source of event water to tile drains, contributed 11 and 15% of total tile drain flow and 40 and 81% of peak flows for two storm hydrographs.

Whereas positive correlations are seen between event water and high antecedent precipitation, bulk precipitation and maximum intensity in Watershed A, such relationships are not observed in watershed M, where bulk precipitation is negatively correlated with event water. This implies that there is a more complex export of event water during storms in Watershed M. Wet retention ponds store runoff water until it is displaced by runoff from the subsequent storm (EPA, 1999). Watershed M could be releasing significant amounts of pre-event water from the retention ponds to the stream during events, causing the negative correlation between bulk precipitation and event water.

Watershed M has higher maximum event water than Watershed A in every storm (Table 4). In addition, Storm 1 in Watershed M had larger average event water contribution (Table 4). When comparing the maximum specific discharge in both

watersheds, Watershed M has larger cumulative specific discharge for all three storm events (11.5, 24.4, 31.0 mm) than Watershed A (4.0, 9.4, 30.0 mm). When the specific discharge was expressed as a % of bulk precipitation for each storm event, Watershed M had higher percentages with the exception of storm 3 (43%, 72%, 39% vs. 14%, 26%, 52% respectively). This implies that when taking into account the difference in amount of precipitation and the size of each watershed, more water reaches the stream in Watershed M during each of the events studied. This may explain the higher amount of event contributions during Storm 1 in Watershed M (a mixed land use watershed), which produces a higher water yield and specific discharge than Watershed A (an agricultural land use watershed). This is consistent with literature regarding the effects of urbanization on watershed hydrology (Anderson, 1968; Leopold, 1968; Hammer, 1972; Hollis, 1975). In summary, a difference in hydrology is seen between the two watersheds during storm events; the agricultural watershed (Watershed A) is pre-event water dominated, whereas the mixed land use watershed (Watershed M) is more event water dominated.

In addition to hydrology, land use can affect nutrient concentrations. Nitrate, SRP, and DOC concentrations were statistically higher in Watershed A than Watershed M ($p < 0.01$). Coulter et al. (2004) found higher mean nitrate and mean SRP concentrations in an agricultural watershed than mixed or urban watersheds. Their data support results from this study in an agriculturally dominated watershed (Watershed A) and a mixed land use watershed (Watershed M). Storm characteristics can also affect nutrient export. The highest nitrate, DOC, and SRP concentrations were observed during Storm 3. Storm 3 had the highest bulk precipitation and greatest maximum intensity of

the storms, and therefore the greatest discharge. It is well known that most nutrient export occurs during high flow periods (Baker et al., 2006; Royer et al., 2006).

Results also suggest that storm characteristics affect nitrate export. Storm 1 and 2 are smaller storms and a clear concentration increase/decrease is not seen in Watershed A. Storm 3 pulse 1 in Watershed A has the largest increase in discharge and a clear nitrate dilution was followed by an small increase, implying a threshold for nitrate dilution in Watershed A. Variability in nitrate behavior has been observed in other studies. In the Adirondack Mountains of New York, McHale et al. (2002) found that nitrate peaked before the peak discharge during one storm (nitrate flushing) and after discharge during another storm. Vanni et al. (2001) found that in agricultural watersheds in Ohio, some storms produced a decrease in nitrate during stormflow and other storms exhibited an increase in nitrate with stormflow. In Watershed M, a clear dilution in nitrate is not seen. During Storm 1, a delayed increase in nitrate is seen. In Storm 3, a slightly delayed peak in nitrate during pulse 1 is seen and no clear reaction is seen with pulse 2 or 3. This could be due to a memory effect, where most of the nitrate is flushed with the first pulse.

DOC and SRP are also affected by storm characteristics and land use. During the smallest storm (Storm 1) in Watershed A, there is a small increase in DOC concentration. Royer and David (2005) found that the amount of DOC exported is influenced by precipitation. Storms 2 and 3 in Watershed A and Storms 1, 2, and 3 in Watershed M all exhibit clear increases in DOC. The timing of the peak in DOC on the storm hydrograph is not affected by land use, but DOC concentration remains high in Watershed A and drops faster in Watershed M. SRP increased with DOC in Watershed A; however, in

Watershed M, SRP is delayed relative to DOC and is much more variable during baseflow.

Major cation concentration fluctuations are consistent in most storms in both watersheds (Figure 10). Mg^{2+} , Na^+ , and Ca^{2+} to a lesser extent, show a dilution trend, documented in many studies (Reid et al., 1981; Elwood and Turner, 1989; Kahl et al., 1992; Hill, 1993; Inamdar et al., 2004). K^+ , however, increases with stormflow.

Data therefore indicate that land use and storm characteristics do play a role in both the export of water and nutrients in the study watersheds. In the case of Watershed M, there is more export of event water and the export of water is more complicated possibly due to complex land use and water management strategies. Watershed A is a tile-dominated, agricultural watershed, and contains higher nutrient concentrations, especially nitrate, than Watershed M. High bulk precipitation and greater maximum intensity can export more DOC, nitrate, and SRP to the streams. During most events, Mg^{2+} , Ca^{2+} , and Na^+ decrease with stormflow, except K^+ which increases with stormflow.

2) Can nutrient specific flow paths to the streams be identified during the storms studied? Do they vary with land use?

Results suggest DOC is exported with overland flow/flushing of saturated near-surface soil waters via macropores, which is consistent with the findings of Boyer et al. (1997). DOC concentration increases with precipitation/stormflow (Figure 3, 4, 5, 6, 7, 8) and DOC concentrations during the storm are well correlated (positively) with discharge (Table 6a). In addition, DOC concentrations follow K^+ concentration patterns (Figure 10); therefore they have very similar export pathways. DOC concentration

decreases with depth in the soil profile as the amount of organic matter from plants decreases (McDowell and Wood, 1984; Thurman, 1985), therefore DOC concentrations are low in groundwater (Thurman, 1985). Results suggest that DOC is exported quickly from the landscape and high concentrations are associated with near-surface soils, therefore DOC sources to the stream can be inferred to be a result of flushing of near-surface soil water via macropores/overland flow.

Results suggest a tile drain/subsurface flow pathway for nitrate. In Watershed A, nitrate clearly follows Mg^{2+} , Ca^{2+} , and Na^+ patterns (Figure 10) in the storm hydrographs. These parallel trends imply they are exported via similar pathways/processes. Mg^{2+} , Ca^{2+} , and Na^+ have larger concentrations in baseflow (mostly groundwater) than precipitation (Table 5), indicating pre-event water association. They consistently drop in concentration at the onset of precipitation with nitrate, suggesting the introduction of higher event water contributions. In addition, during Storm 3 pulse 1, nitrate is diluted when event water contribution is the highest, also indicating a pre-event water association. These results are supported by Royer et al. (2006) who found that artificial drainage was the primary mechanism for nitrate export in an east-central Illinois watershed. In addition, Baker et al. (2006) found the highest concentration of nitrate in the tile drains.

In Watershed A, results suggest that SRP is exported with DOC in Storms 1 and 2, but a different flowpath is dominating SRP export during Storm 3. Similar to the east-central Illinois results of Gentry et al. (2007), the majority of the storms in Watershed A produced an increase in SRP concentration with stormflow. In Watershed A, Storms 1 and 2 produced an increase of SRP with increasing stormflow and SRP peaked with the

DOC peak in concentration, implying they have the same flowpath, flushing of saturated near-surface soil water via macropores/overland flow (Figures 3, 4). In addition, SRP and DOC concentrations during the storm have strong positive correlations (Table 6b). However, SRP in pulse 1 of Storm 3 in Watershed A is slightly delayed relative to DOC, suggesting a slightly longer flowpath. It is likely SRP is exported with multiple flowpaths, one dominating over another depending on the storm event. Gentry et al. (2007) suggests that SRP export is complex and is affected by storm characteristics.

While SRP has a clear flushing of near-surface soil waters via macropores/overland flow pathway in Watershed A, Watershed M exhibits no clear pattern, especially for Storms 1 and 3 (Figures 6, 8). This suggests a more complex export of SRP due to the various land uses in the watershed. Storm 2 in Watershed M exhibited an increase of SRP with stormflow, with the peak in SRP delayed relative to DOC (Figure 7). Sonoda et al. (2002) found that in urban areas, groundwater influence was not the only control on streamwater SRP, indicating that surface water sources were likely also responsible. In this case, wet retention ponds likely affect the headwaters of watershed M. These ponds could be releasing water and nutrients slowly during the event. The results of this study support this conclusion and warrant further research of SRP export during storm events.

Whereas Watershed A exhibits no clear change in concentration or a dilution in concentration, Watershed M exhibits a delayed increase in nitrate concentration (Figures 6, 8). It is hypothesized that the delayed slow release of nutrients in Watershed M are due to the release of water from the wet retention ponds. Residential ponds are generally designed to release water when there is approximately 2.5 cm or more precipitation in 24

hours (J. Hoffman, personal communication, June 11, 2007), which could explain the delayed nitrate peak in watershed M for Storm 1 and 3. In addition, unlike Watershed A, Watershed M nitrate increases are associated with higher contributions of event water to the stream, especially Storm 1 (Figure 6).

Overall, data indicate that DOC is likely exported with flushing of saturated near-surface soil waters via macropores/overland flow regardless of land use or storm characteristics in the watersheds studied. In Watershed A, data indicate that tile drain flow/subsurface flow is likely the main source of nitrate to the stream; however, in Watershed M, retention ponds also appear to affect nitrate delivery to streams by delaying the peak of nitrate for large (> 2.5 cm) storm events. More research is necessary on the process controlling SRP delivery to streams. Data indicate that SRP is likely exported with multiple flowpaths, one dominating over another depending on the storm in Watershed A; however, in Watershed M, data indicate that the ponds likely have an effect on SRP export.

In some cases, results of this study are similar to other landscapes. For instance, DOC pathways across land uses tend to be very similar. In forested landscapes, Hornberger et al. (1994), Boyer et al. (1997), and McGlynn and McDonnell (2003) agree that DOC is exported with near-surface soil waters. On the other hand, nitrate results do not agree; most forested studies found that nitrate is exported with till water (McHale et al., 2002; Inamdar et al., 2004). In the tile-drained landscape of central Indiana, results suggest nitrate is exported in tile drains. Even in similar landscapes, SRP export pathway is not consistent. Similar to the results of this study, Royer et al. (2006) states that SRP is believed to be exported with both tile drainage and overland flow in Illinois.

3) Proposed Mechanisms for Nutrient Export

Watershed A

1. Rain saturates the ground surface and flushes near-surface soil water via macropores. This flushes DOC-rich waters (and nitrate-poor waters) to the stream, creating the sharp increase in DOC concentration (and for small storms, SRP).
2. As the storm continues, event water is exported through the macropores to the tile drains, bringing low nitrate concentration precipitation water and diluting the nitrate-rich tile drain water.
3. As the storm recedes, the event water contributions decrease and the nitrate concentration gradually increases with the increasing contributions of shallow groundwater/tile drain water to the stream.

Watershed M

Watershed M has more complicated land use and water management strategies, making it difficult to pinpoint the nutrient export pathways. More research is needed to address this issue. However, the DOC export pathway is clearly the same as Watershed A; flushing of saturated near-surface soil waters via macropores to the stream/overland flow. Nitrate and SRP have a longer flowpath in this watershed, and their export is believed to be affected by the retention ponds.

Conclusion

This detailed storm hydrograph sampling study contributes to the broader understanding of nutrient delivery to streams in a variety of land uses and landscapes. Nitrate, SRP, and DOC export pathways were investigated during spring storm events in central Indiana. Results show that nitrate, DOC, and SRP have different in-stream concentration patterns during storm events. The solute patterns vary with land use and storm characteristics. DOC concentration increases with discharge and peaks with event water, implying a flushing of saturated near-surface soil waters via macropores/overland flow export flowpath regardless of land use or storm characteristics. The temporal pattern of nitrate and Ca^{2+} , Mg^{2+} , and Na^+ suggests a tile drain/subsurface flowpath for nitrate in Watershed A. In general, SRP concentration increases with DOC and both peak together, implying they have the same flowpath, flushing of saturated near-surface soil waters via macropores/overland flow in the case of smaller storms. However, SRP likely has multiple flowpaths, one dominated over another depending on the storm. Nitrate and SRP patterns are not as clear in Watershed M; in most cases they are delayed relative to DOC and discharge. The wet retention ponds in the headwaters are believed to be the cause of this delay. Data therefore suggest that much uncertainty remains on SRP export pathways to streams, especially in mixed land use watersheds where delivery pathways are affected by agricultural, forested and urban land uses. It is important to determine nutrient export pathways in a variety of landscapes to improve management strategies and model nutrient loadings in our watersheds.

Table 1: Error Analysis.

Parameter	Mean	Std Dev.	Std err	% err	Detection Limit
$\delta^{18}\text{O}$ (‰)	-6.92	0.17	-0.05	-5.30	n/a
Nitrate (mg/L)	1.51	0.09	0.12	11.96	0.026
SRP (mg/L)	0.19	0.02	0.13	13.40	0.003
Silica (mg/L)	3.74	0.07	0.09	4.00	0.013
Ammonia (mg/L)	0.16	0.01	0.22	16.77	0.016
Chloride (mg/L)	29.77	0.18	0.02	1.56	0.327
DOC (mg/L)	4.87	0.06	0.02	1.63	0.500
Ca²⁺ (mg/L)	37.41	6.02	0.16	15.71	2.500
Mg²⁺ (mg/L)	19.73	3.92	0.19	19.39	1.200
K⁺ (mg/L)	2.65	0.23	0.10	10.22	0.200
Na⁺ (mg/L)	16.56	1.96	0.16	15.84	1.200

Table 2: Storm 1, Storm 2, and Storm 3 Storm Event Descriptions.

Watershed A						
Storm	Water table (BGS)	7 day Antecedent Precipitation (cm)	Bulk Precipitation (cm)	Average Intensity (cm/hr)	Maximum intensity (cm/hr)	
1	90.1	1.7	2.8	0.51	1.80	
2	80.3	1.9	3.6	1.31	2.84	
3	52.4	5.9	5.8	0.76	5.26	

Watershed M						
Storm	Water table (BGS)	7 day Antecedent Precipitation (cm)	Bulk Precipitation (cm)	Average Intensity (cm/hr)	Maximum intensity (cm/hr)	
1	84.5	n/a	2.7	n/a	n/a	
2	82.7	1.9	3.4	2.96	4.55	
3	86.0	3.8	8.0	0.96	6.22	

*BGS = water table below ground surface prior to storm event. n/a = weather station data not available for the storm event.

Table 3: Event (e) and Pre-event (p) Component $\delta^{18}\text{O}$ Concentrations.

Watershed A	Ce			Cp		
	concentration	S.D.	n	concentration	S.D.	n
Storm 1	-5.19	0.34	10	-6.67	0.11	5
2	-4.88	0.55	10	-7.22	0.22	3
3	-4.02	0.33	10	-7.34	0.14	3

Watershed M	Ce			Cp		
	concentration	S.D.	n	concentration	S.D.	n
Storm 1	-5.15	0.28	4	-6.68	0.23	3
2	-5.57	0.30	8	-6.83	0.14	3
3	-4.36	0.30	5	-6.06	0.17	4

S.D.= standard deviation; n= number of samples.

Table 4: Event and Pre-event Contributions for Storm Events Expressed as a % of Total Discharge.

Watershed A	Average Event Contribution (%)	Average Pre-event Contribution (%)	Maximum Event Contribution (%)	Maximum Pre-event Contribution (%)
Storm				
1	11.2	88.8	31.5	97.4
2	23.4	76.6	34.2	99.4
3	32.9	67.1	60.5	88.4

Watershed M	Average Event Contribution (%)	Average Pre-event Contribution (%)	Maximum Event Contribution (%)	Maximum Pre-event Contribution (%)
Storm				
1	44.0	56.0	77.4	99.1
2	23.3	76.7	47.6	95.4
3	22.8	77.2	95.5	96.7

Table 5: Mean Cation Concentrations.

Cation	Watershed A								
	Storm 1			Storm 2			Storm 3		
	Precipitation (mg/L)	Baseflow (mg/L)	n	Precipitation (mg/L)	Baseflow (mg/L)	n	Precipitation (mg/L)	Baseflow (mg/L)	n
Ca ²⁺	<2.50 (0.00)	75.08 (2.31)	n=7	<2.50 (1.28)	38.44 (10.66)	n=10	<2.50 (0.00)	40.86 (6.10)	n=15
Mg ²⁺	<1.20 (0.00)	21.00 (1.71)	n=7	<1.20 (0.00)	22.05 (1.97)	n=10	<1.20 (0.00)	21.05 (3.23)	n=15
K ⁺	<0.20 (0.24)	1.14 (0.05)	n=7	1.21 (1.25)	1.10 (0.15)	n=10	0.95 (1.21)	1.17 (0.16)	n=15
Na ⁺	<1.20 (0.00)	11.74 (2.21)	n=7	<1.20 (1.86)	9.02 (1.53)	n=10	<1.20 (0.00)	6.43 (1.64)	n=15

Cation	Watershed M								
	Storm 1			Storm 2			Storm 3		
	Precipitation (mg/L)	Baseflow (mg/L)	n	Precipitation (mg/L)	Baseflow (mg/L)	n	Precipitation (mg/L)	Baseflow (mg/L)	n
Ca ²⁺	<2.50 (1.73)	71.26 (3.06)	n=4	<2.50 (1.05)	39.57 (3.14)	n=4	<2.50 (2.17)	34.69 (3.61)	n=15
Mg ²⁺	<1.20 (0.00)	21.47 (0.13)	n=4	<1.20 (0.56)	23.67 (0.43)	n=4	<1.20 (2.02)	20.02 (1.07)	n=15
K ⁺	1.00 (1.22)	1.37 (0.06)	n=4	0.57 (0.47)	1.76 (0.04)	n=4	1.63 (3.37)	2.63 (0.07)	n=15
Na ⁺	<1.20 (0.00)	32.12 (0.04)	n=4	<1.20 (1.26)	32.24 (0.88)	n=4	<1.20 (1.56)	22.68 (0.83)	n=15

Standard deviations are given in parentheses; n=number of samples, < = below detection limit.

Table 6a: Correlation between Nutrient Concentrations and Discharge during Storms.

Watershed A	Nitrate		DOC		SRP		
	Storm	R ²	N	R ²	N	R ²	N
	1	0.963	7	0.995	7	0.792	7
	2	0.909	24	0.993	24	0.701	24
	3	0.771	37	0.995	37	0.719	37

Watershed M	Nitrate		DOC		SRP		
	Storm	R ²	N	R ²	N	R ²	N
	1	0.447	39	0.995	38	0.469	39
	2	0.706	24	0.990	24	0.809	24
	3	0.720	27	0.986	27	0.664	27

Table 6b: Correlation between DOC and SRP Concentrations during Storms.

Watershed A	DOC vs. SRP		
	Storm	R ²	N
	1	0.817	7
	2	0.757	24
	3	0.730	37

Watershed M	DOC vs. SRP		
	Storm	R ²	N
	1	0.435	39
	2	0.814	24
	3	0.588	27

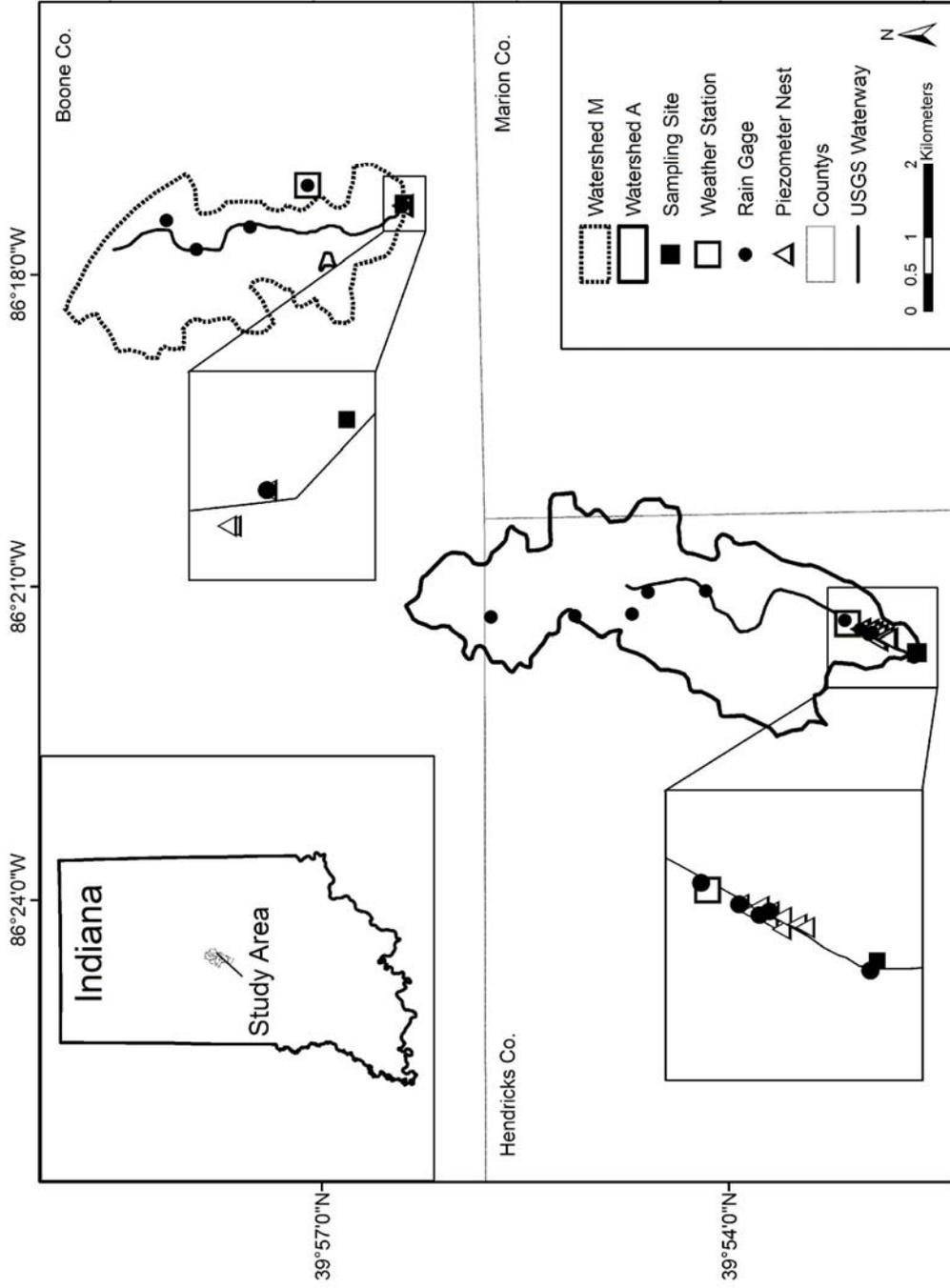


Figure 1: Study Area

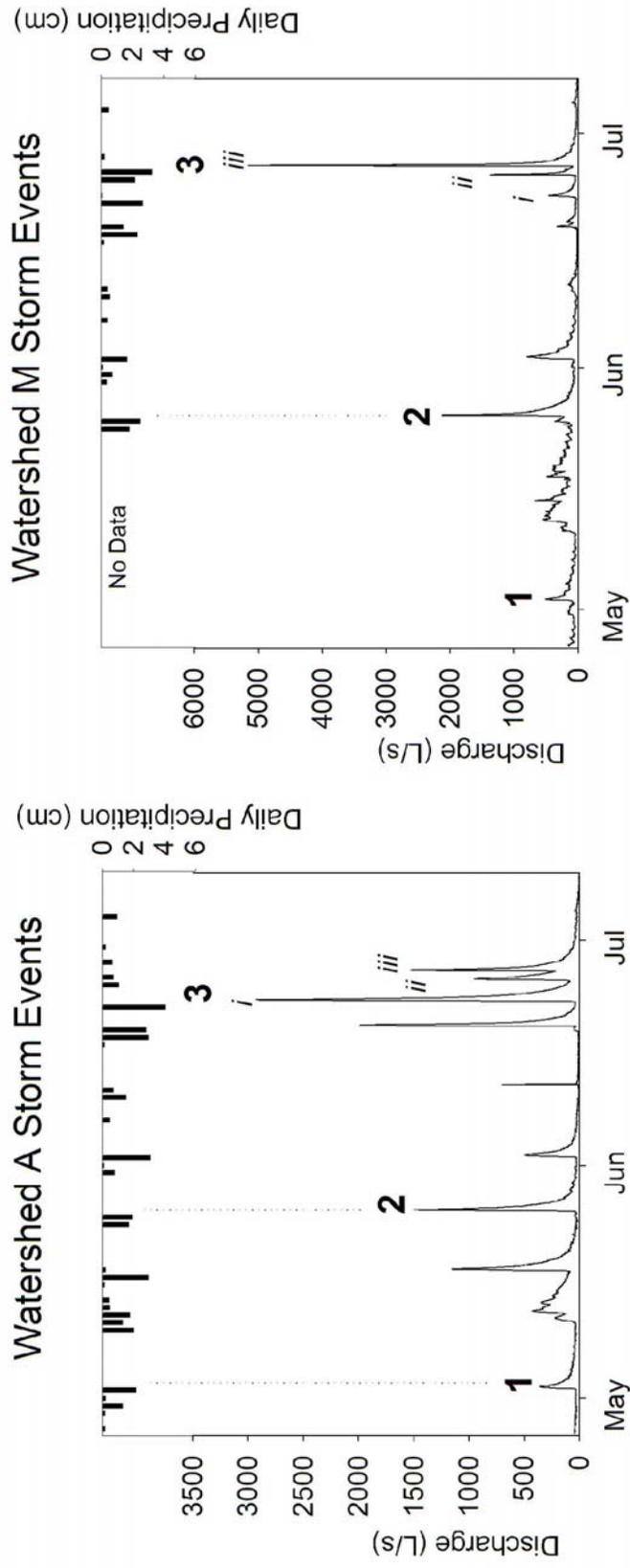


Figure 2: Precipitation and stream discharge for Storm 1, Storm 2, and Storm 3 in Watersheds A and M (1, 2, and 3 indicate Storms 1, 2, and 3; i, ii, and iii indicate pulses 1, 2, and 3 of Storm 3).

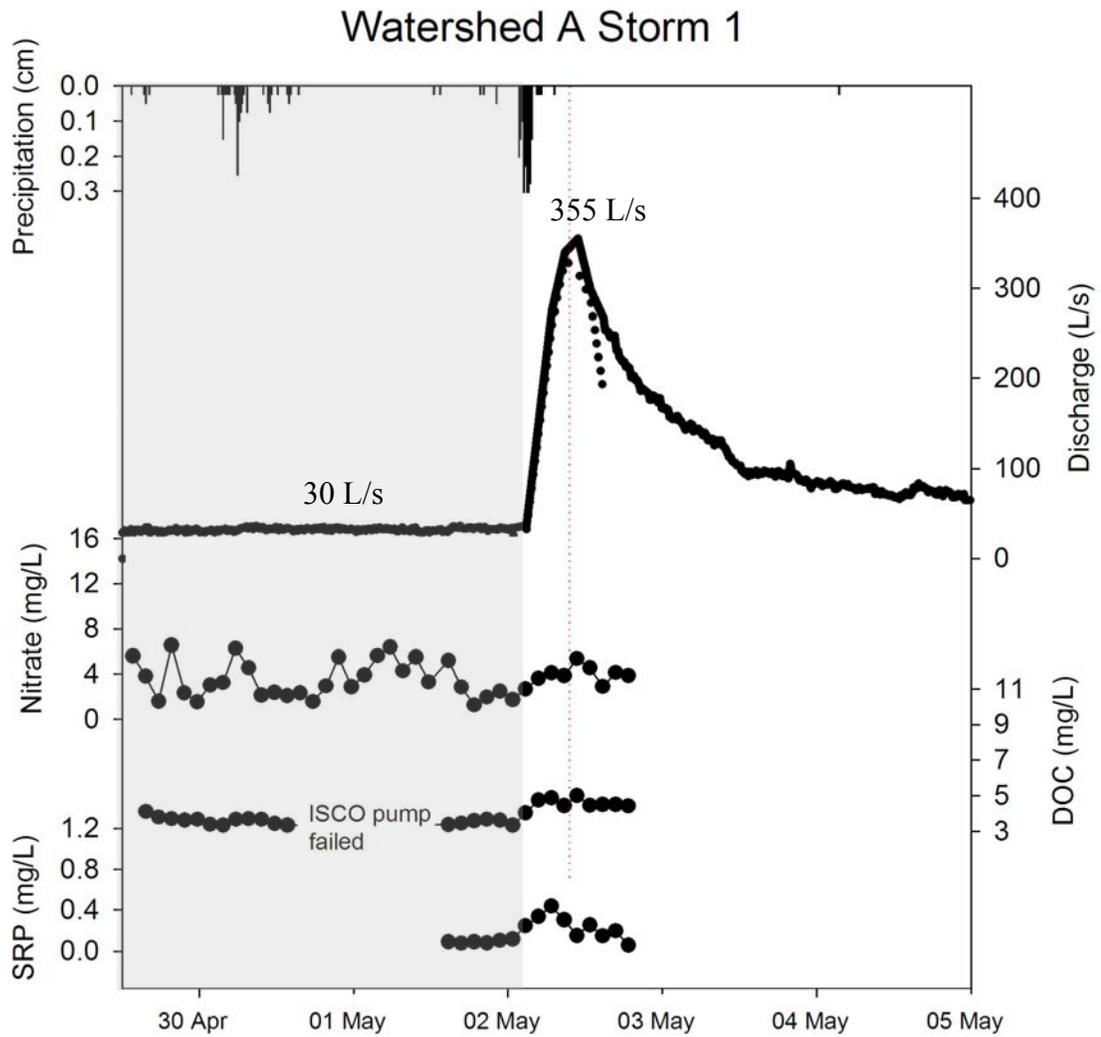


Figure 3: Watershed A Storm 1 hydrograph separation and dissolved organic carbon, nitrate, and soluble reactive phosphorus concentrations (area under dotted line=pre-event water contribution; area above dotted line=event water contribution; shaded area=pre-storm).

Watershed A Storm 2

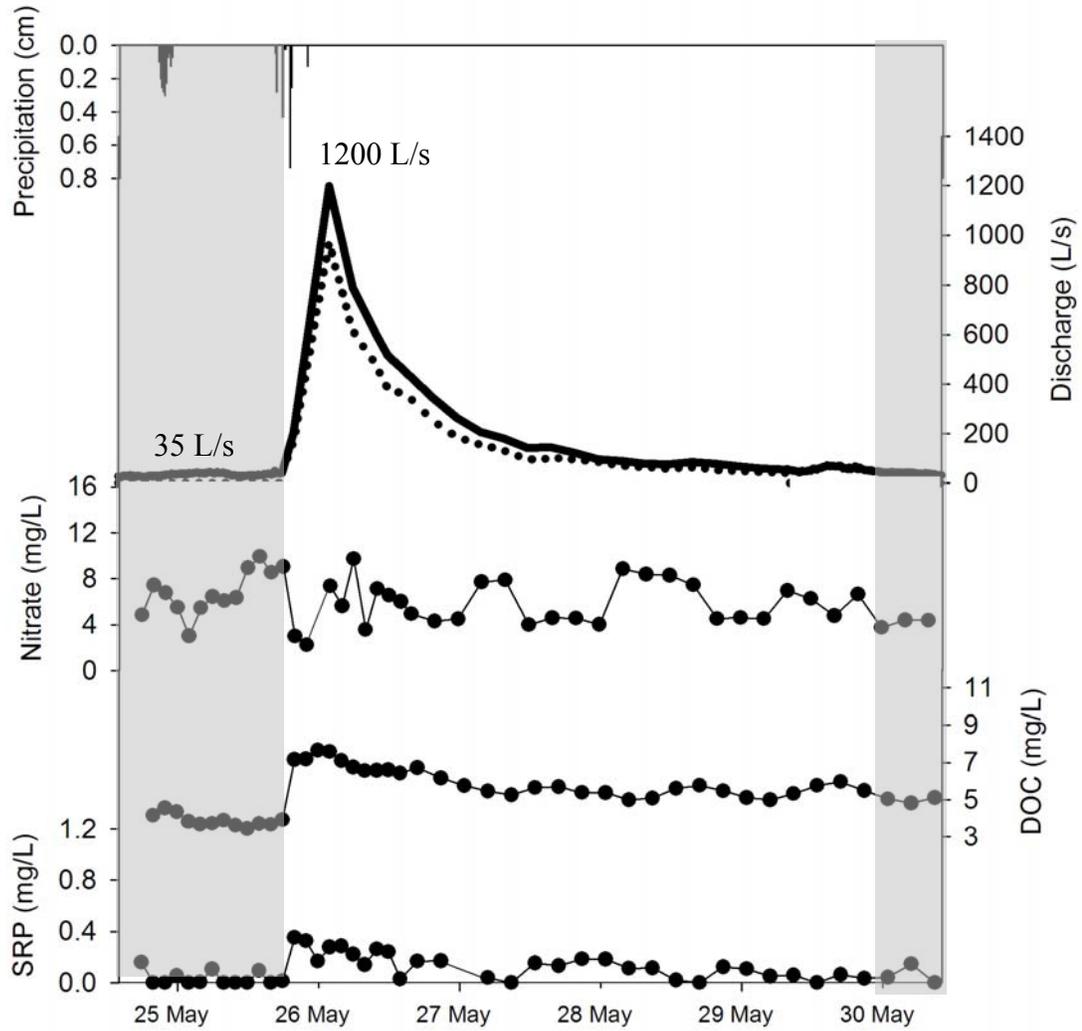


Figure 4: Watershed A Storm 2 hydrograph separation and dissolved organic carbon, nitrate, and soluble reactive phosphorus concentrations (area under dotted line=pre-event water contribution; area above dotted line=event water contribution; shaded areas=pre and post-storm).

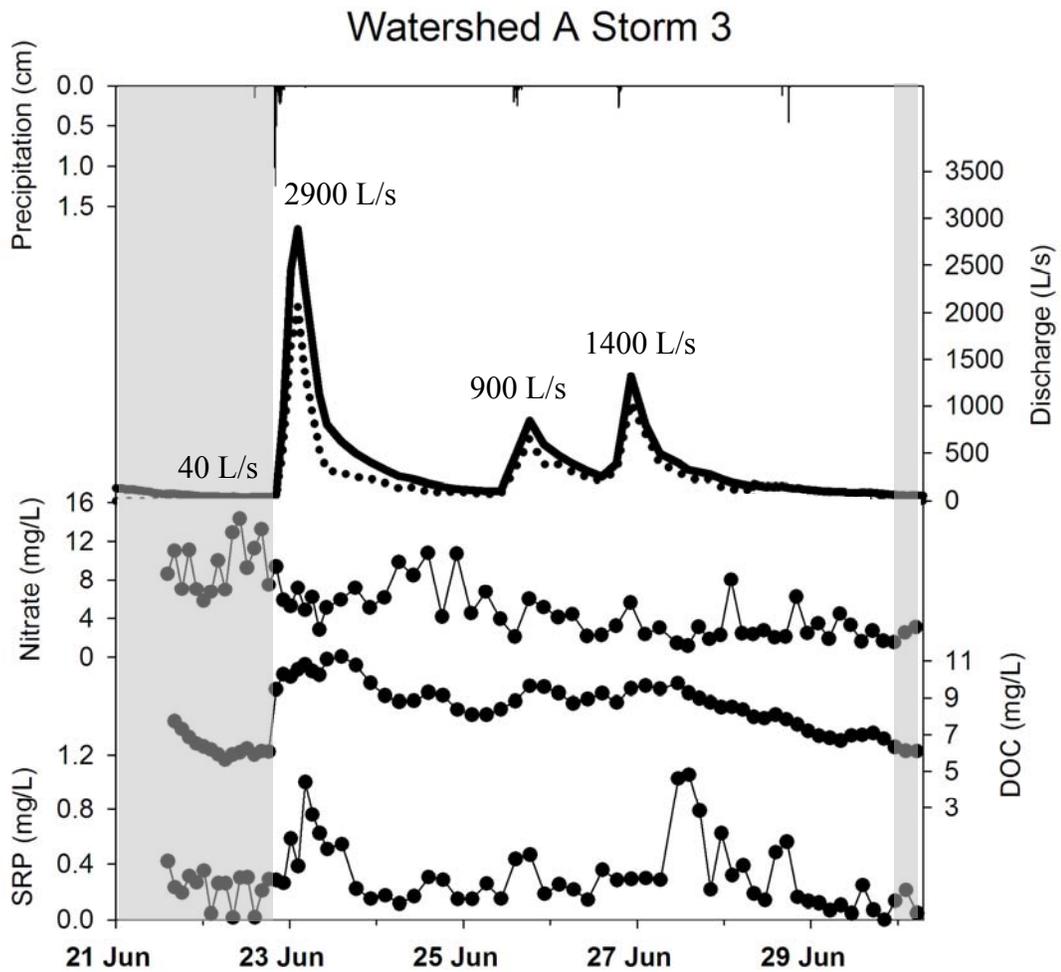


Figure 5: Watershed A Storm 3 hydrograph separation and dissolved organic carbon, nitrate, and soluble reactive phosphorus concentrations (area under dotted line=pre-event water contribution; area above dotted line=event water contribution; shaded areas=pre and post-storm).

Watershed M Storm 1

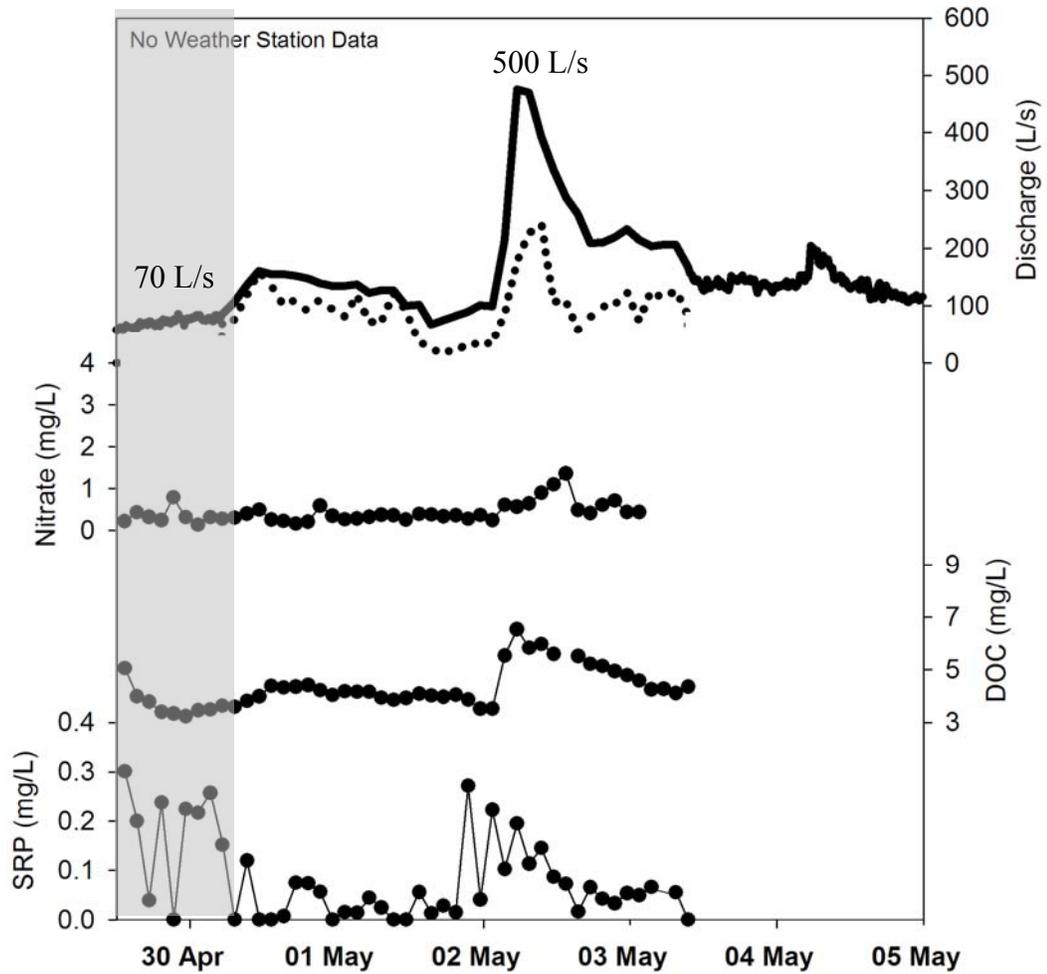


Figure 6: Watershed M Storm 1 hydrograph separation and dissolved organic carbon, nitrate, and soluble reactive phosphorus concentrations (area under dotted line=pre-event water contribution; area above dotted line=event water contribution; shaded area=pre-storm).

Watershed M Storm 2

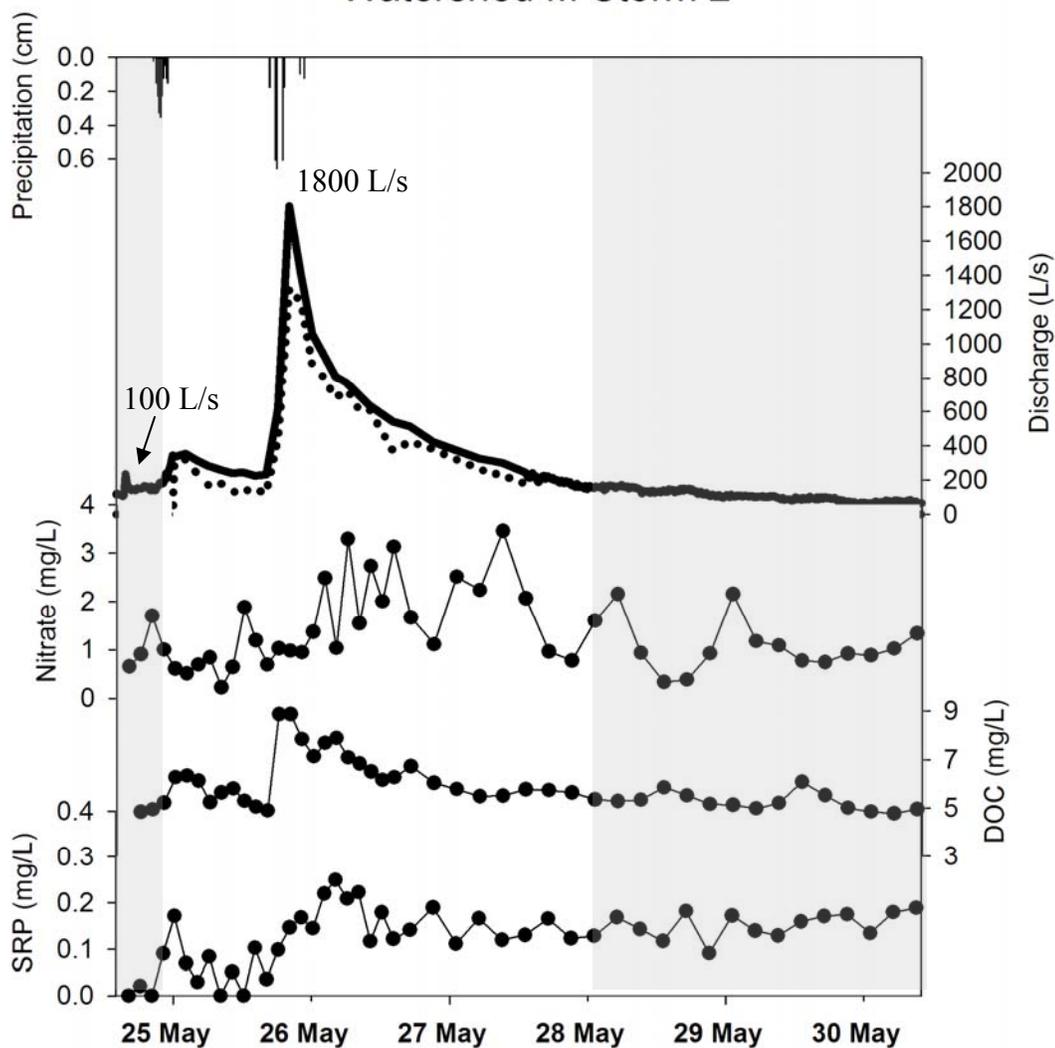


Figure 7: Watershed M Storm 2 hydrograph separation and dissolved organic carbon, nitrate, and soluble reactive phosphorus concentrations (area under dotted line=pre-event water contribution; area above dotted line=event water contribution; shaded areas=pre and post-storm).

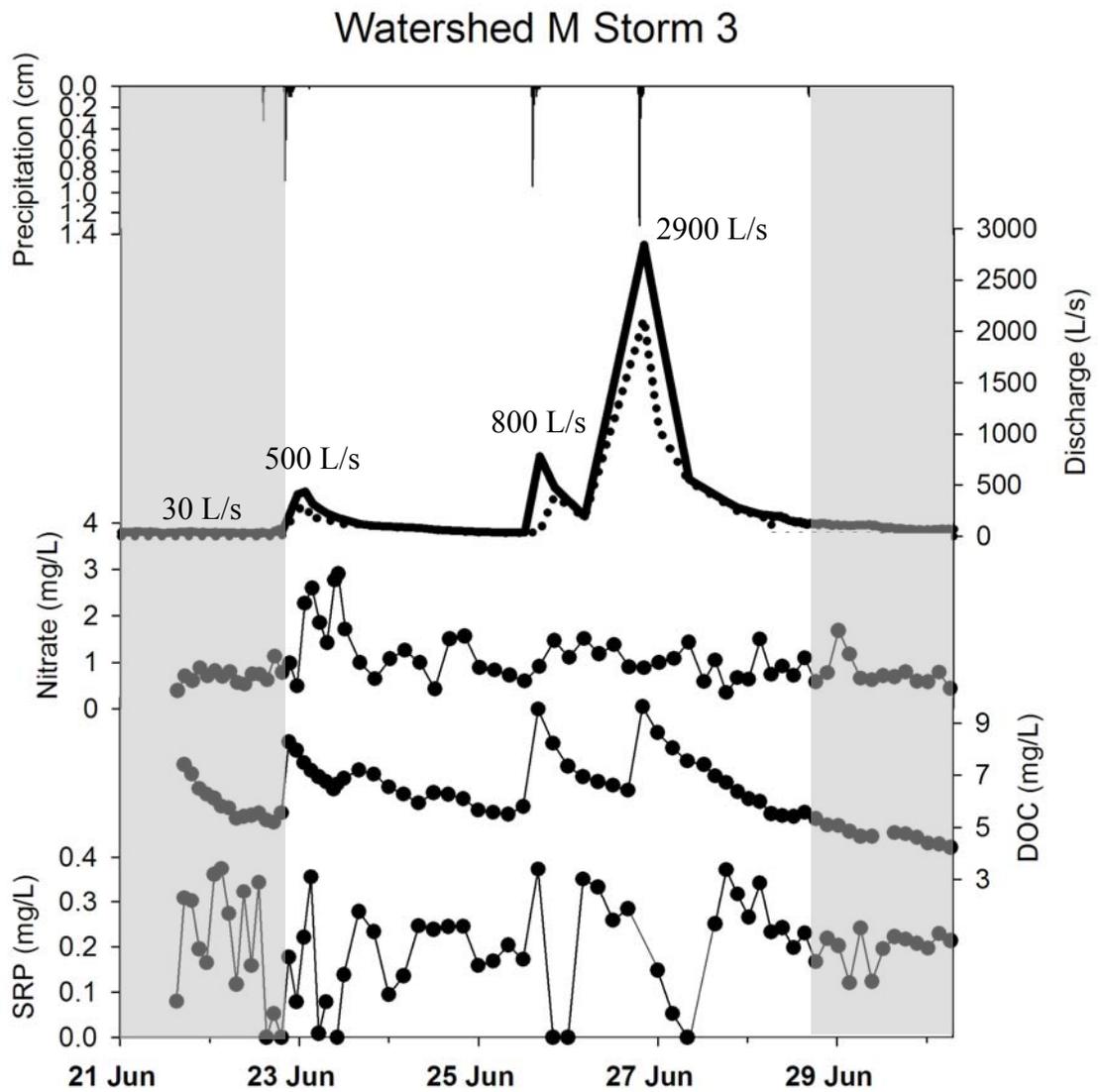


Figure 8: Watershed M Storm 3 hydrograph separation and dissolved organic carbon, nitrate, and soluble reactive phosphorus concentrations (area under dotted line=pre-event water contribution; area above dotted line=event water contribution, shaded areas=pre and post-storm).

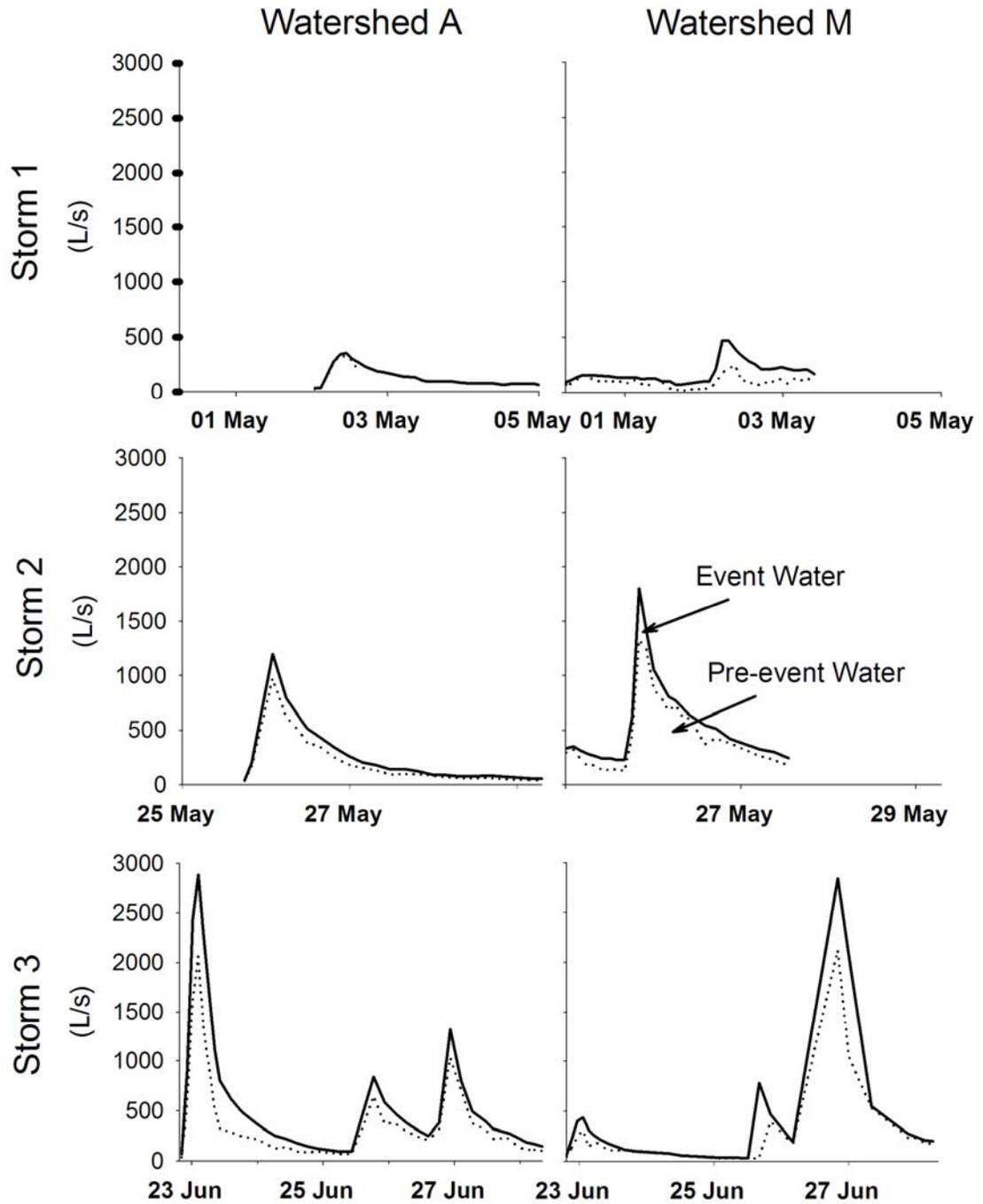


Figure 9: Hydrograph separations using $\delta^{18}\text{O}$ for storm events in Watershed A and Watershed M (solid line=stream discharge; area under dotted line=pre-event water contributions).

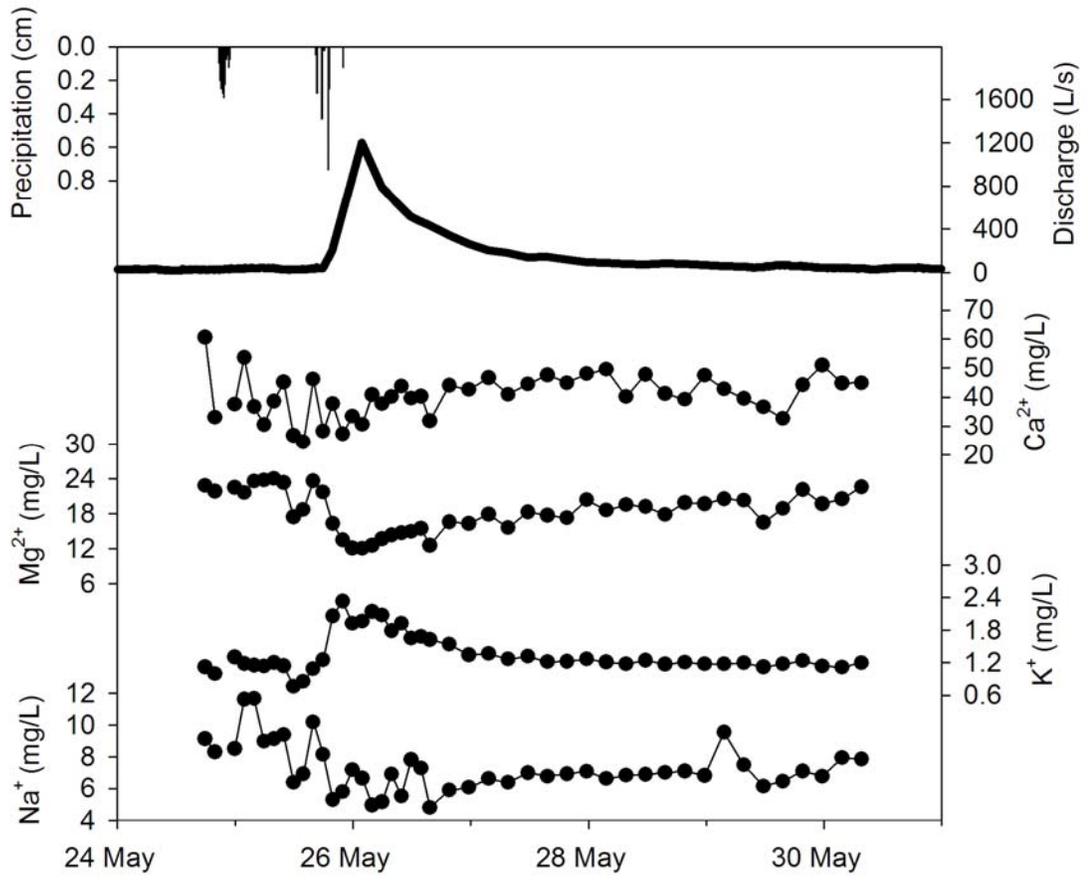


Figure 10: Stream discharge and cation dynamics for Watershed A Storm 2.

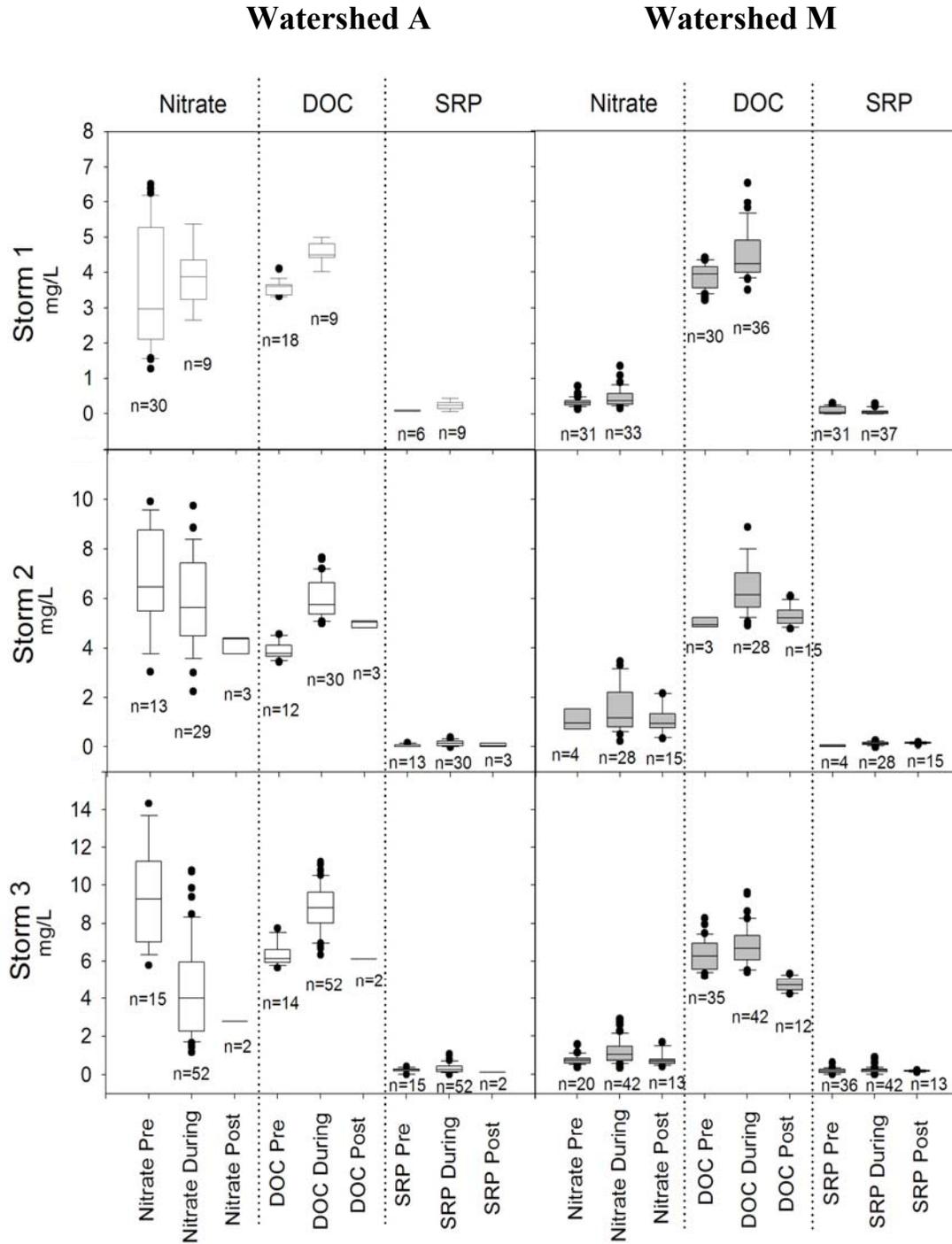
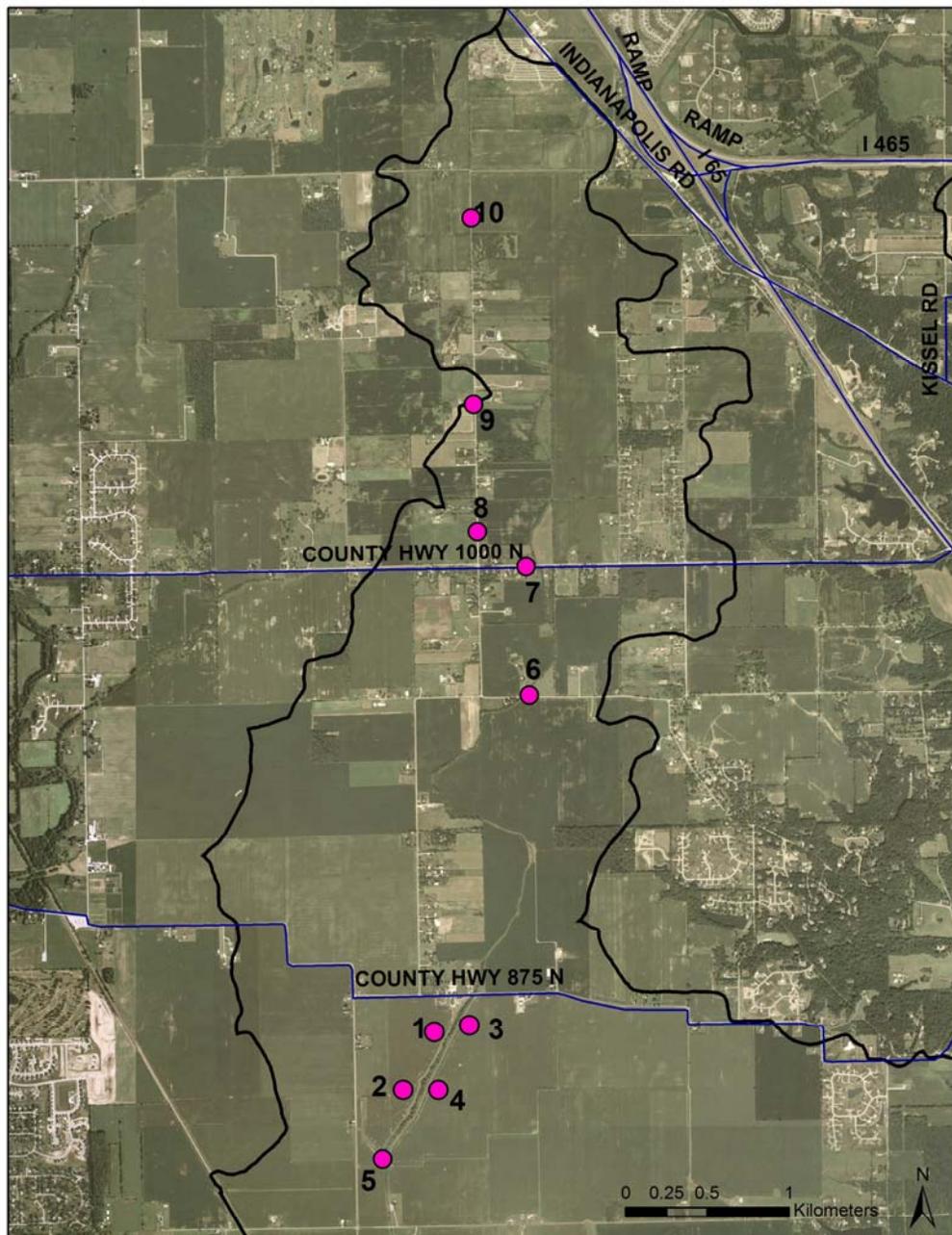


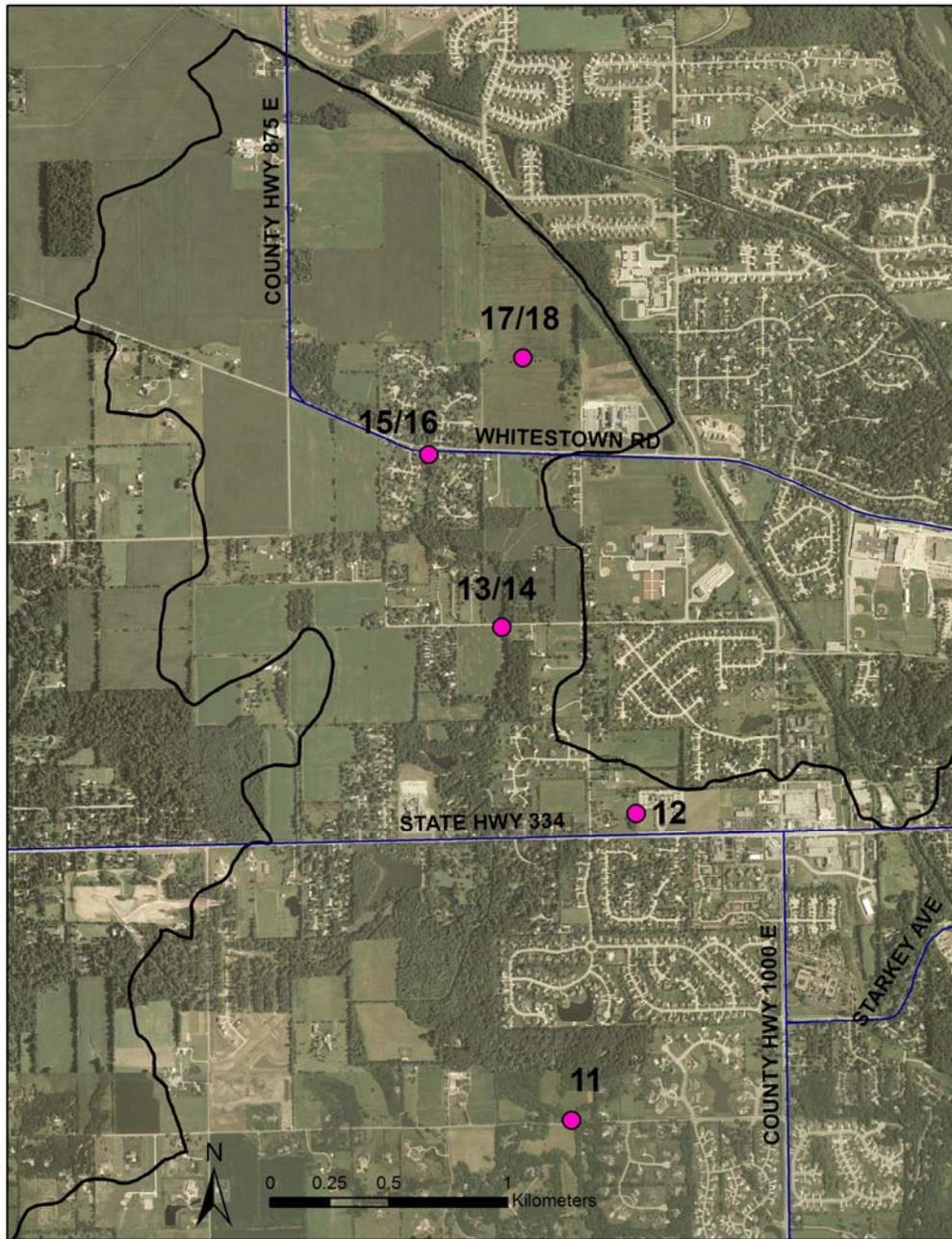
Figure 11: Box plots of pre-, during, and post-storm event nitrate, dissolved organic carbon, and soluble reactive phosphorus concentrations for Storms 1, 2, and 3 in Watersheds A and M. Note: Y-axis scale changes.

Watershed A Rain Gage Locations



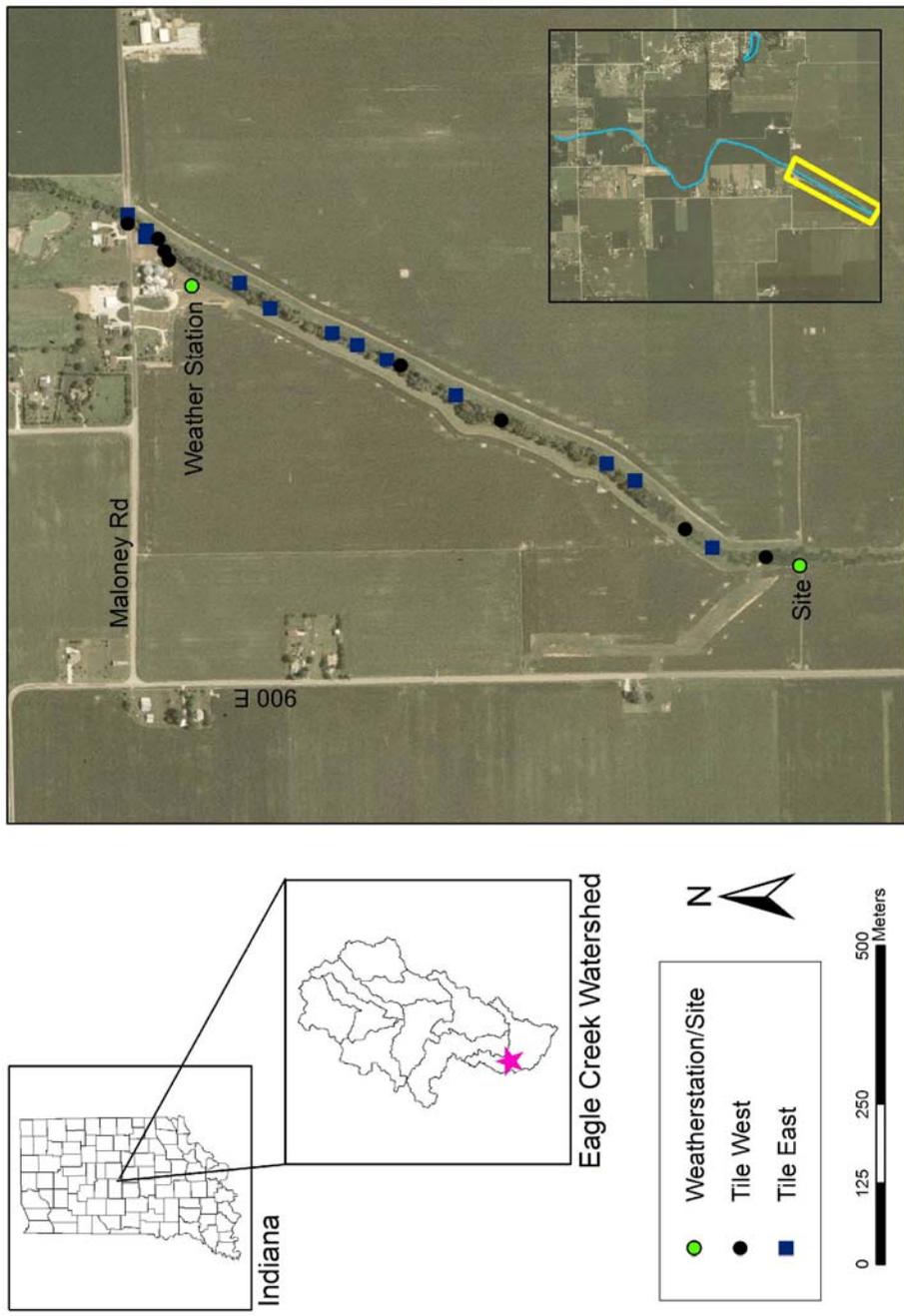
Appendix A. Map of rain gage locations in Watershed A.

Watershed M Rain Gage Locations

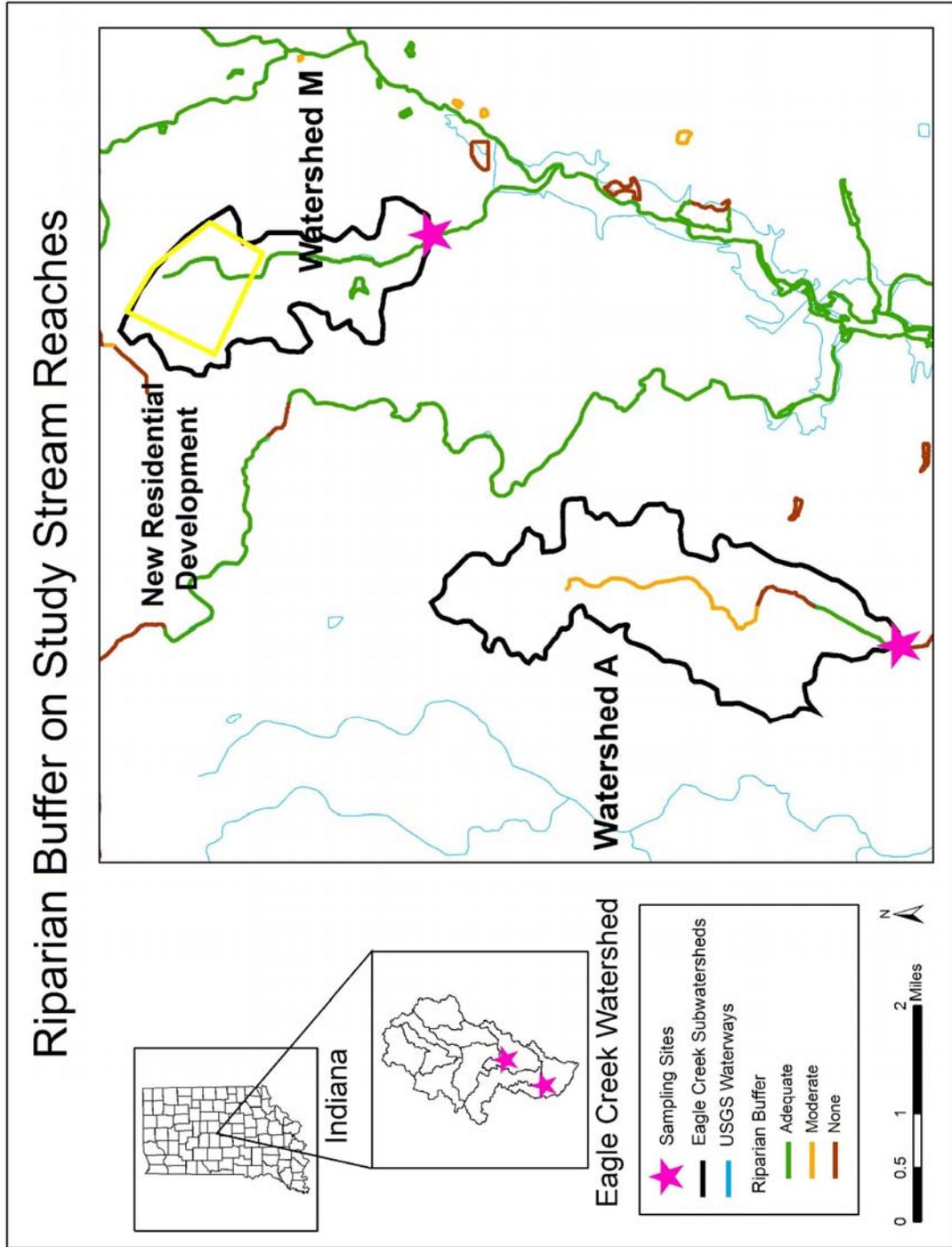


Appendix A (continued). Map of rain gage locations in Watershed M.

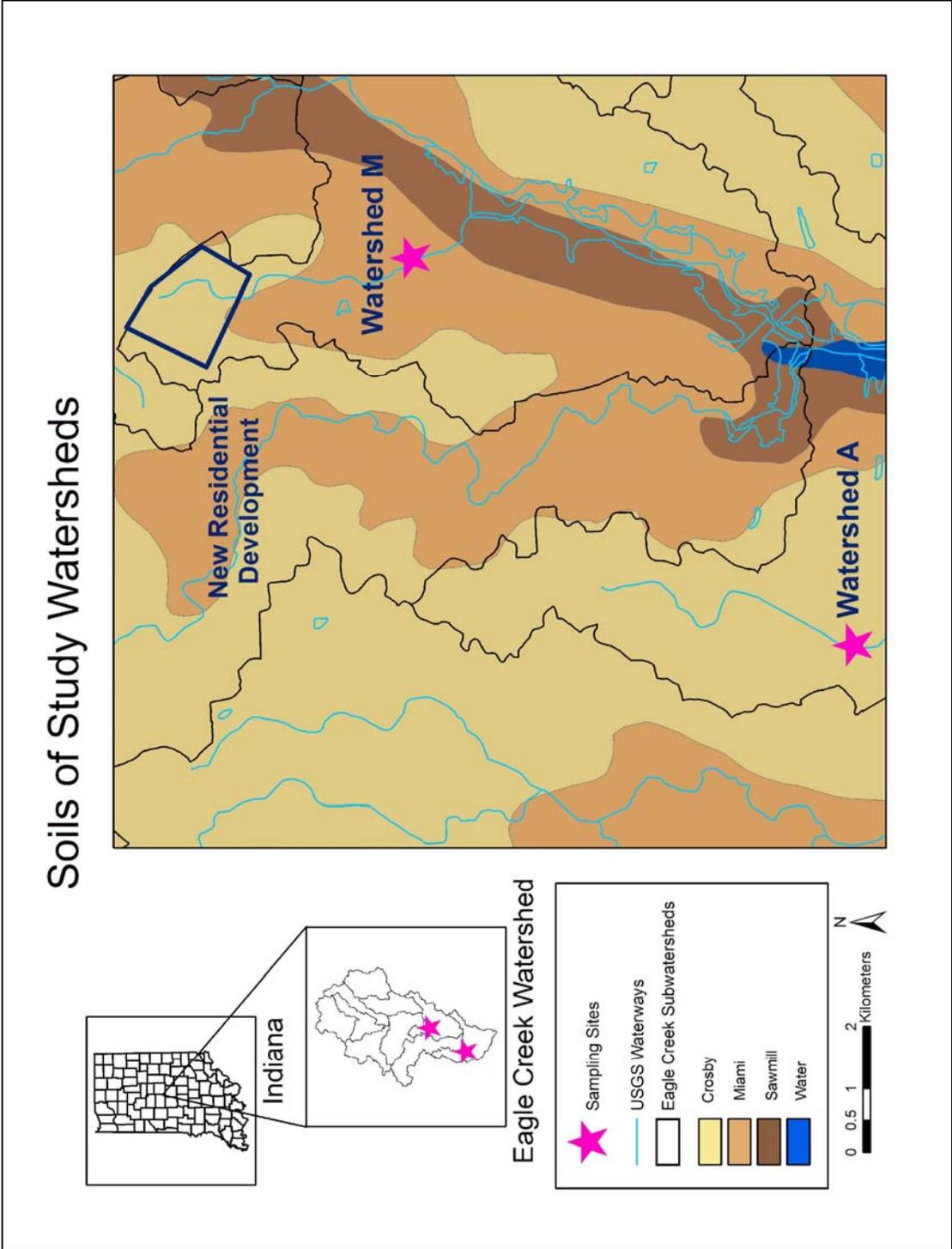
School Branch Tile Drain Locations



Appendix A (continued). Map of tile drains near Watershed A sampling site.



Appendix A (continued). Map of riparian buffer in Watershed A and M (adapted from Tedesco et al., 2005).

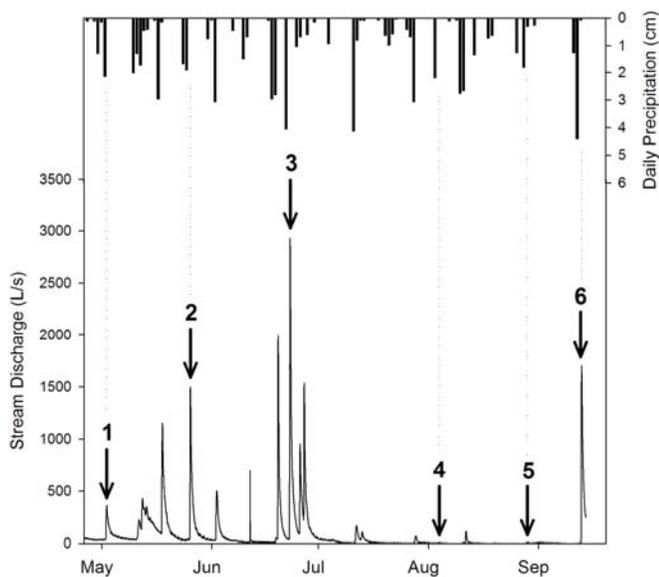


Appendix A (continued). Map of soils in Watershed A and M.

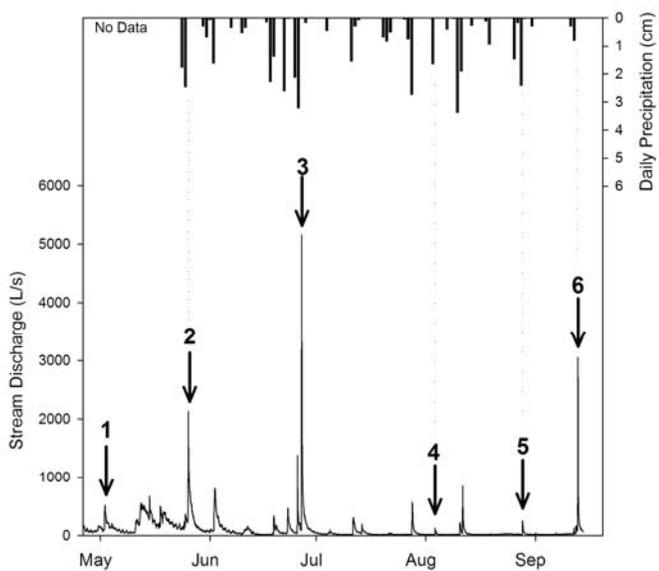


Appendix A (continued). Map of piezometer nests and tile drains Watershed A.

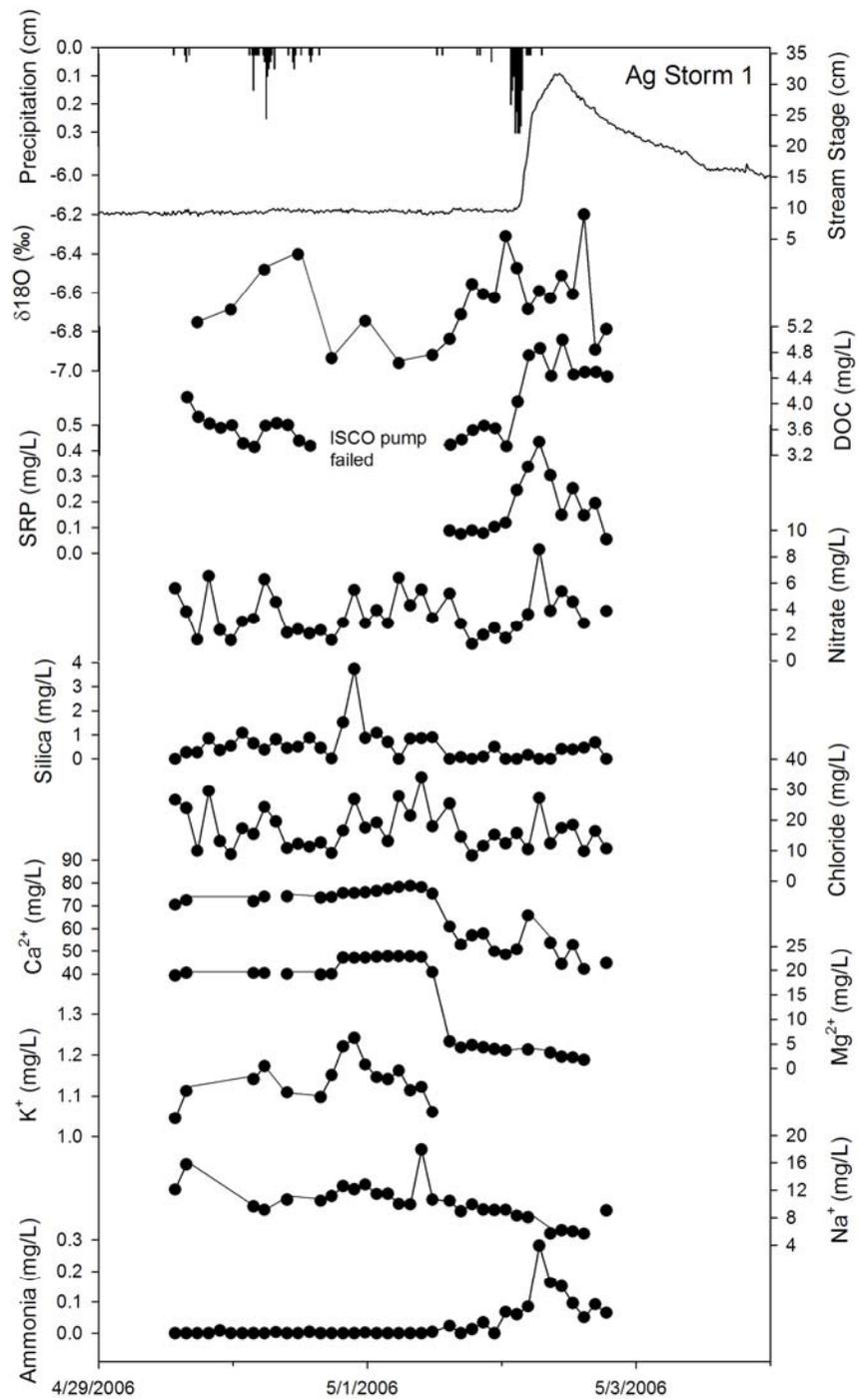
Agricultural Watershed Storm Events



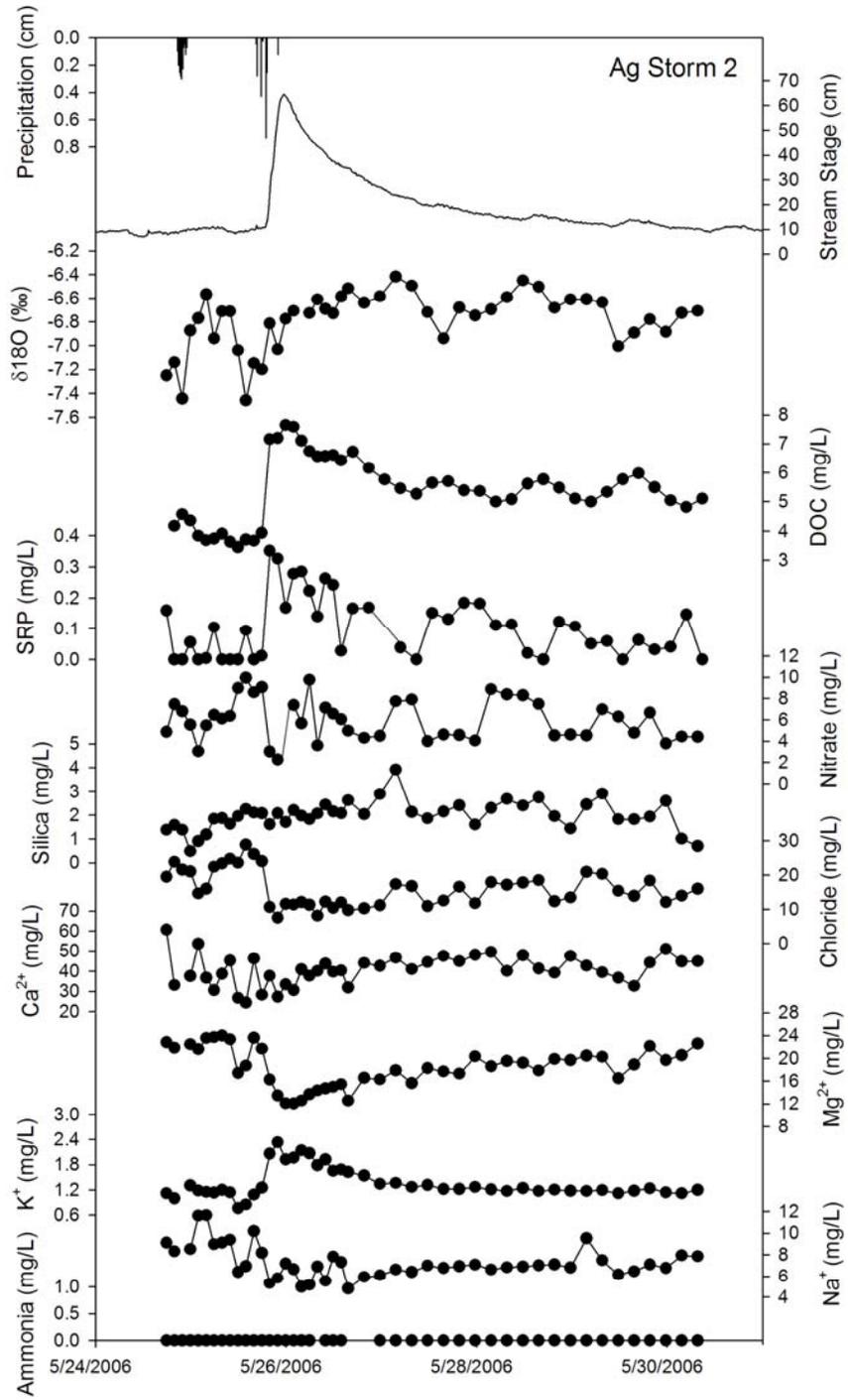
Mixed Land Use Watershed Storm Events



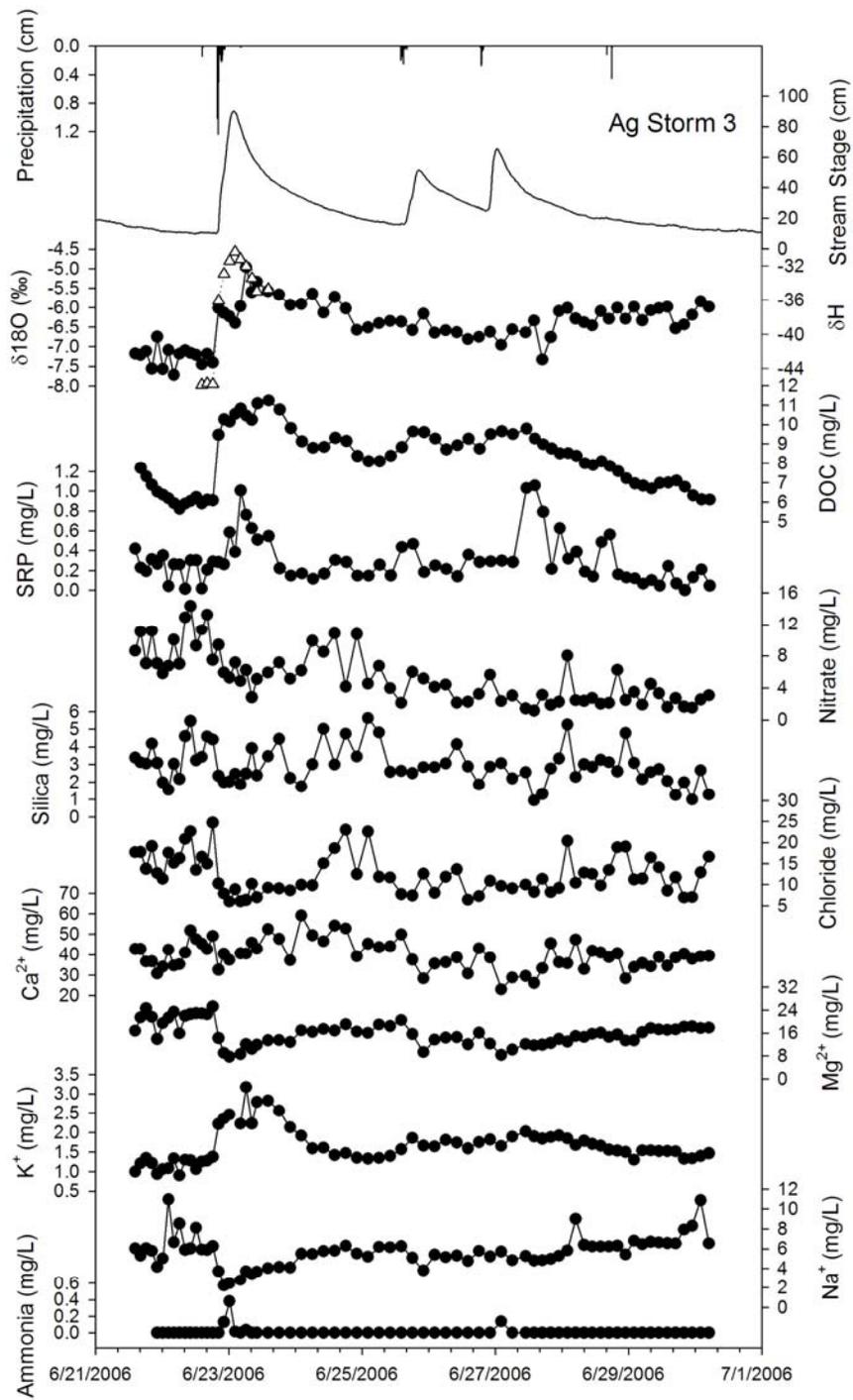
Appendix B. Storms sampled in Watershed A and M (1, 2, 3, 4, 5, 6 indicate Storms 1, 2, 3, 4, 5, 6).



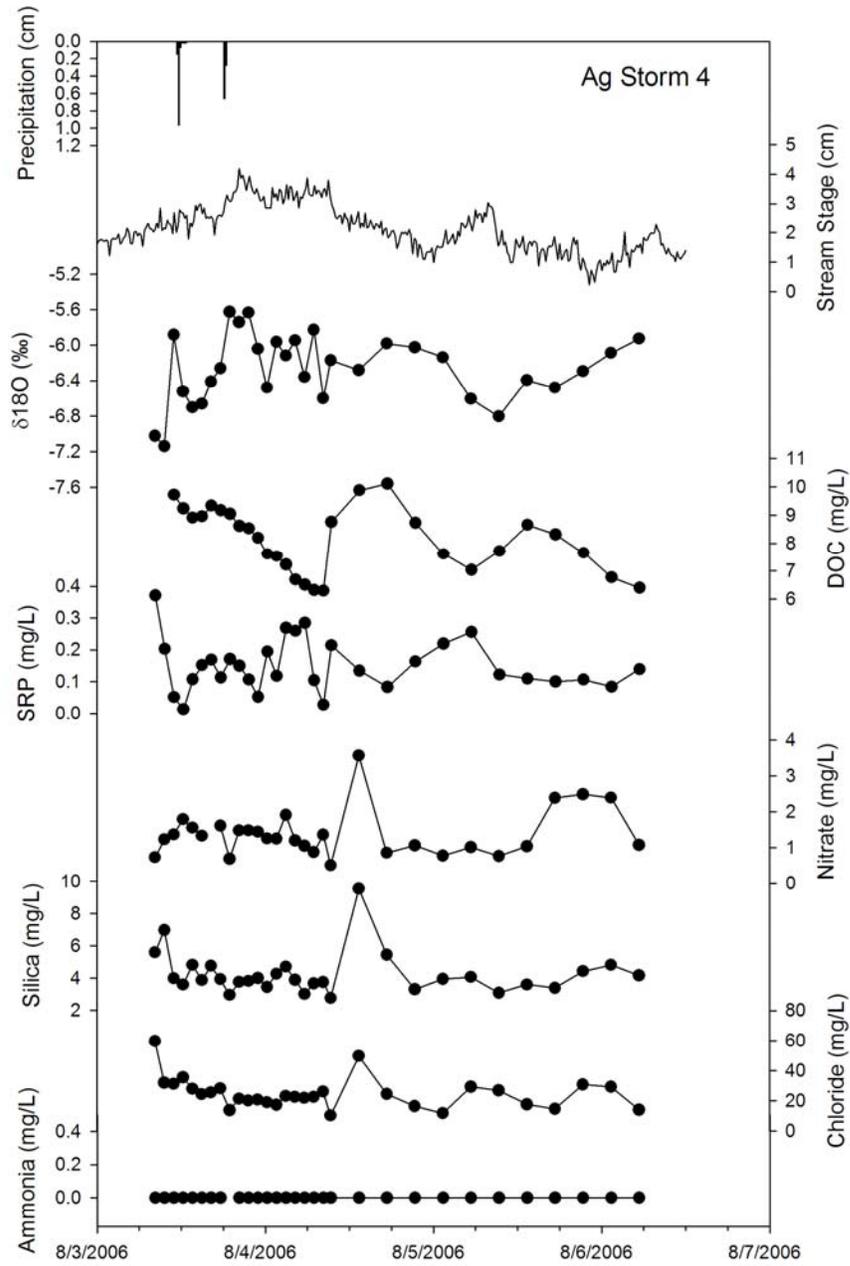
Appendix C. Chemograph for Watershed A Storm 1.



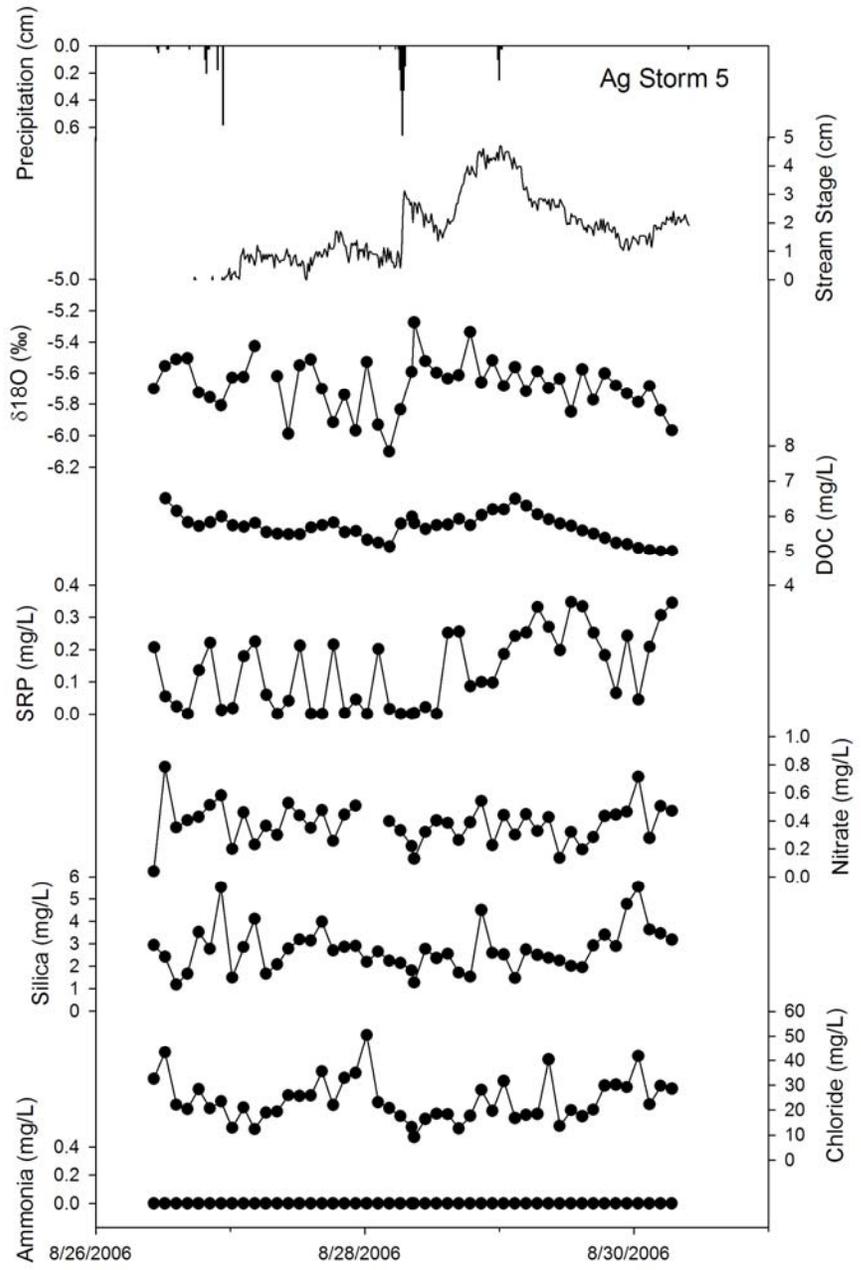
Appendix C (continued). Chemograph for Watershed A Storm 2.



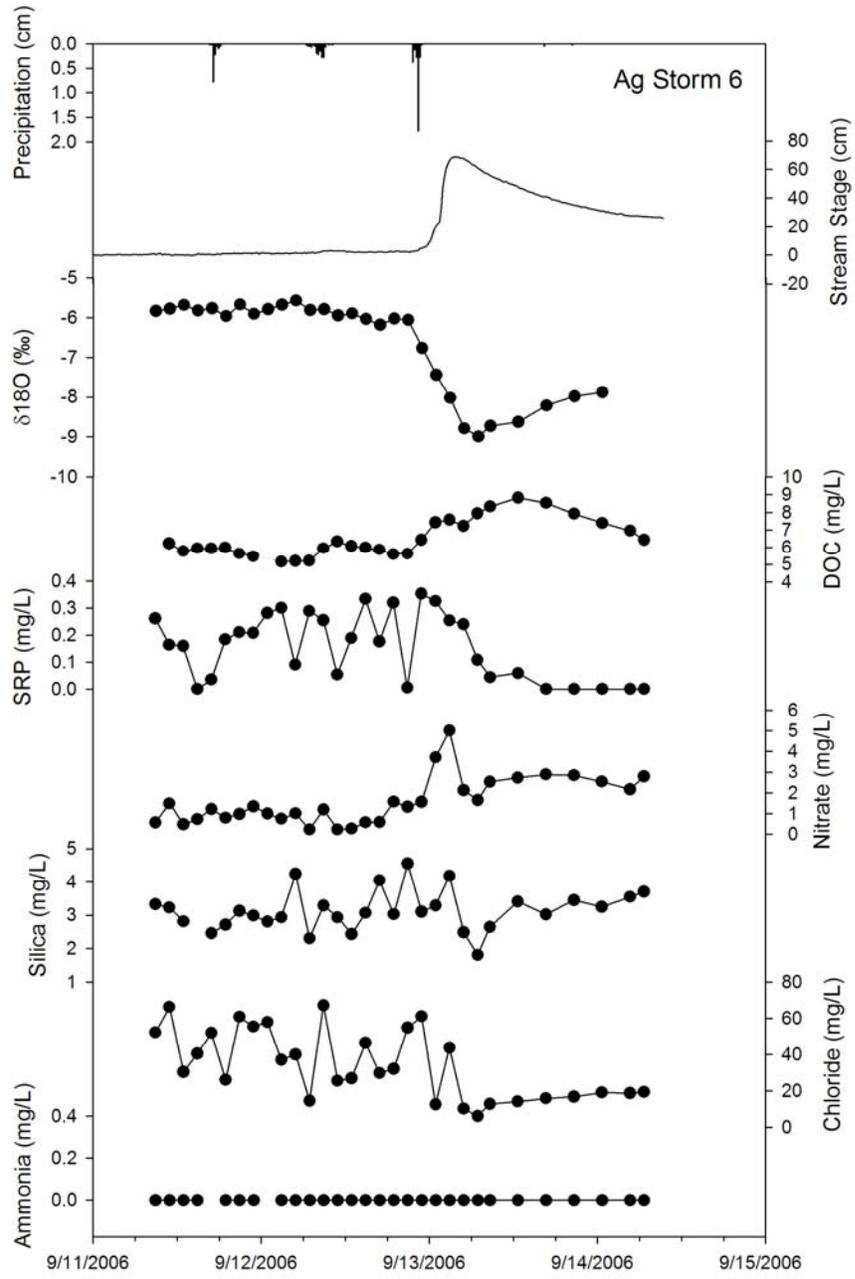
Appendix C (continued). Chemograph for Watershed A Storm 3.



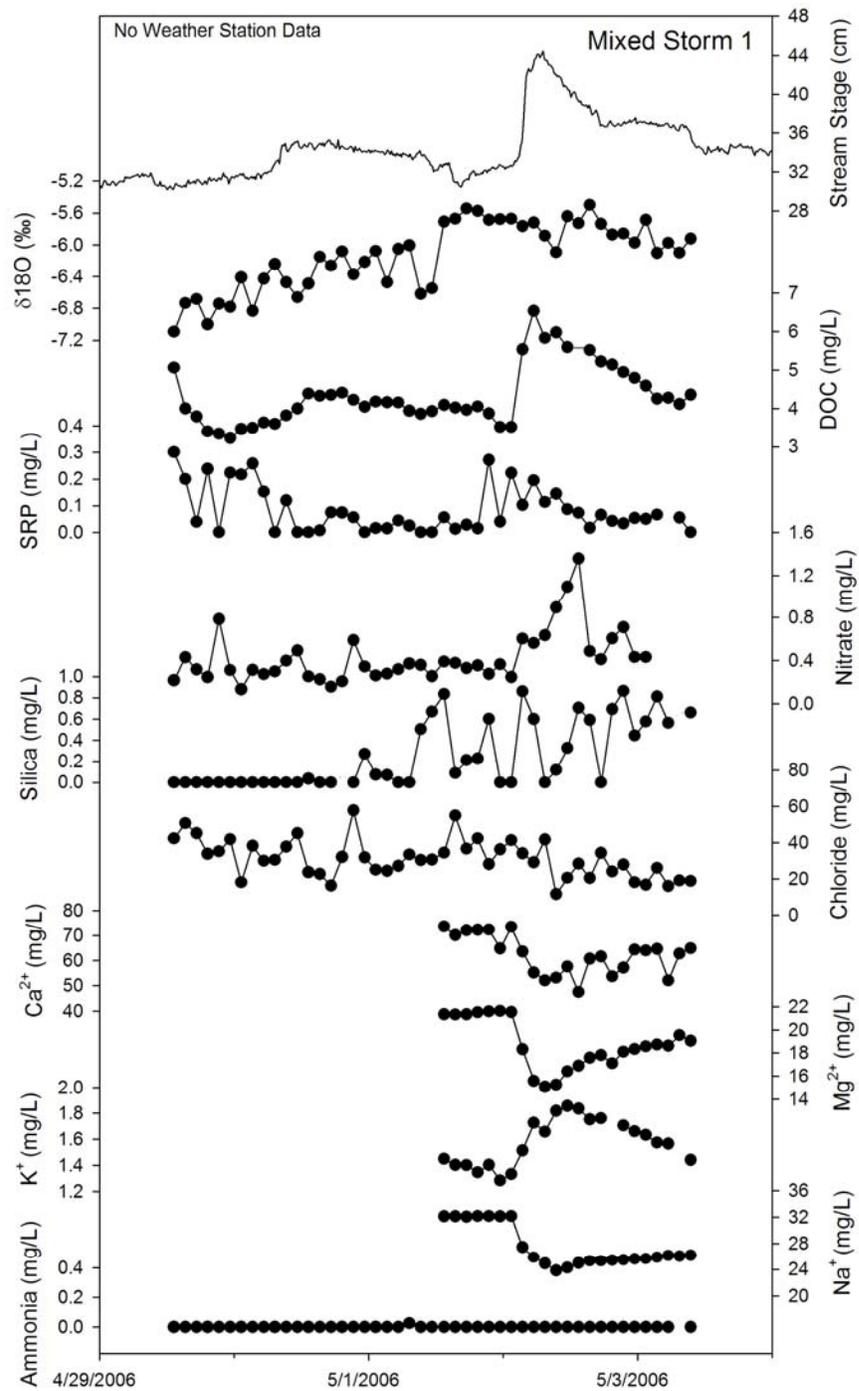
Appendix C (continued). Chemograph for Watershed A Storm 4.



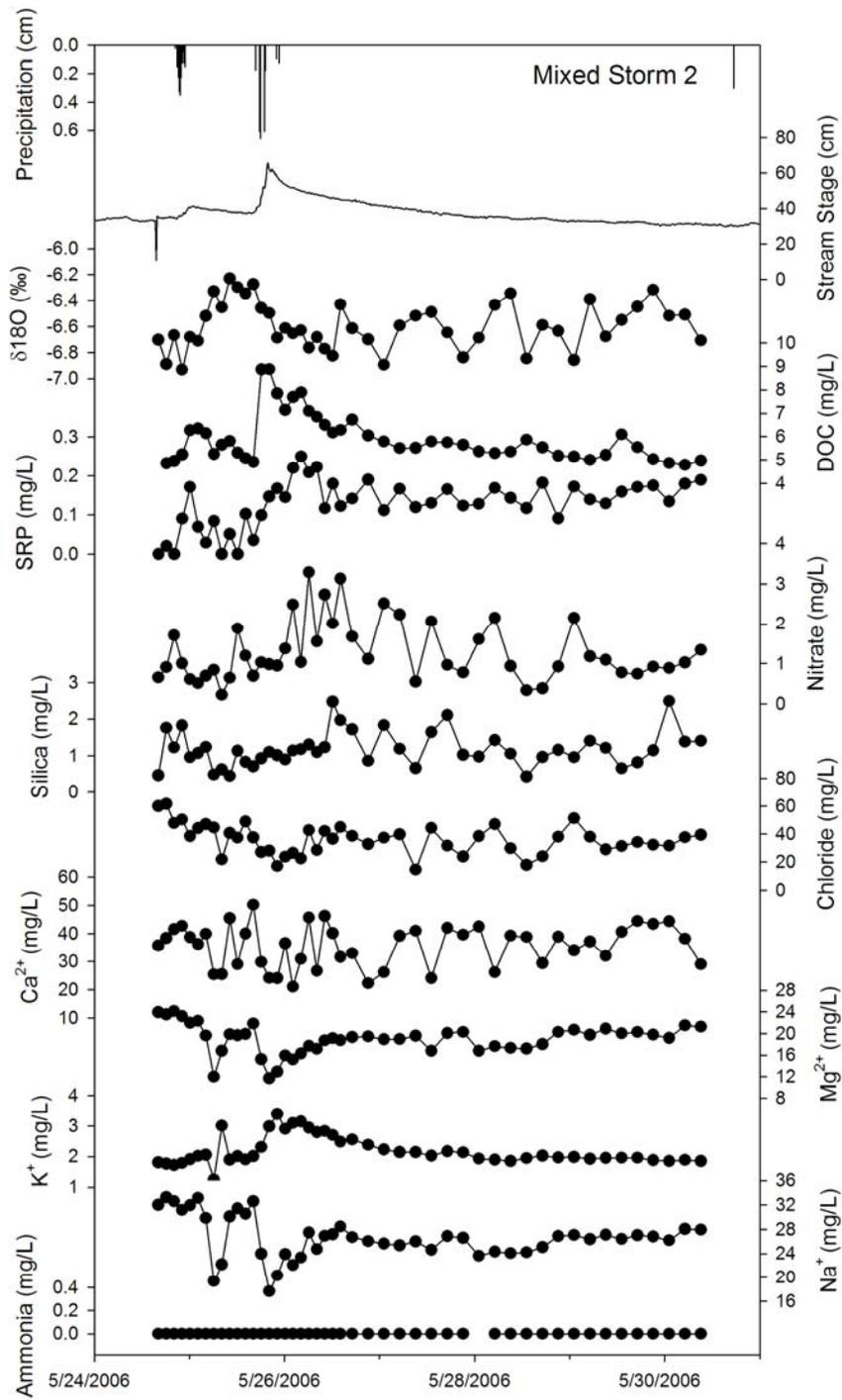
Appendix C (continued). Chemograph for Watershed A Storm 5.



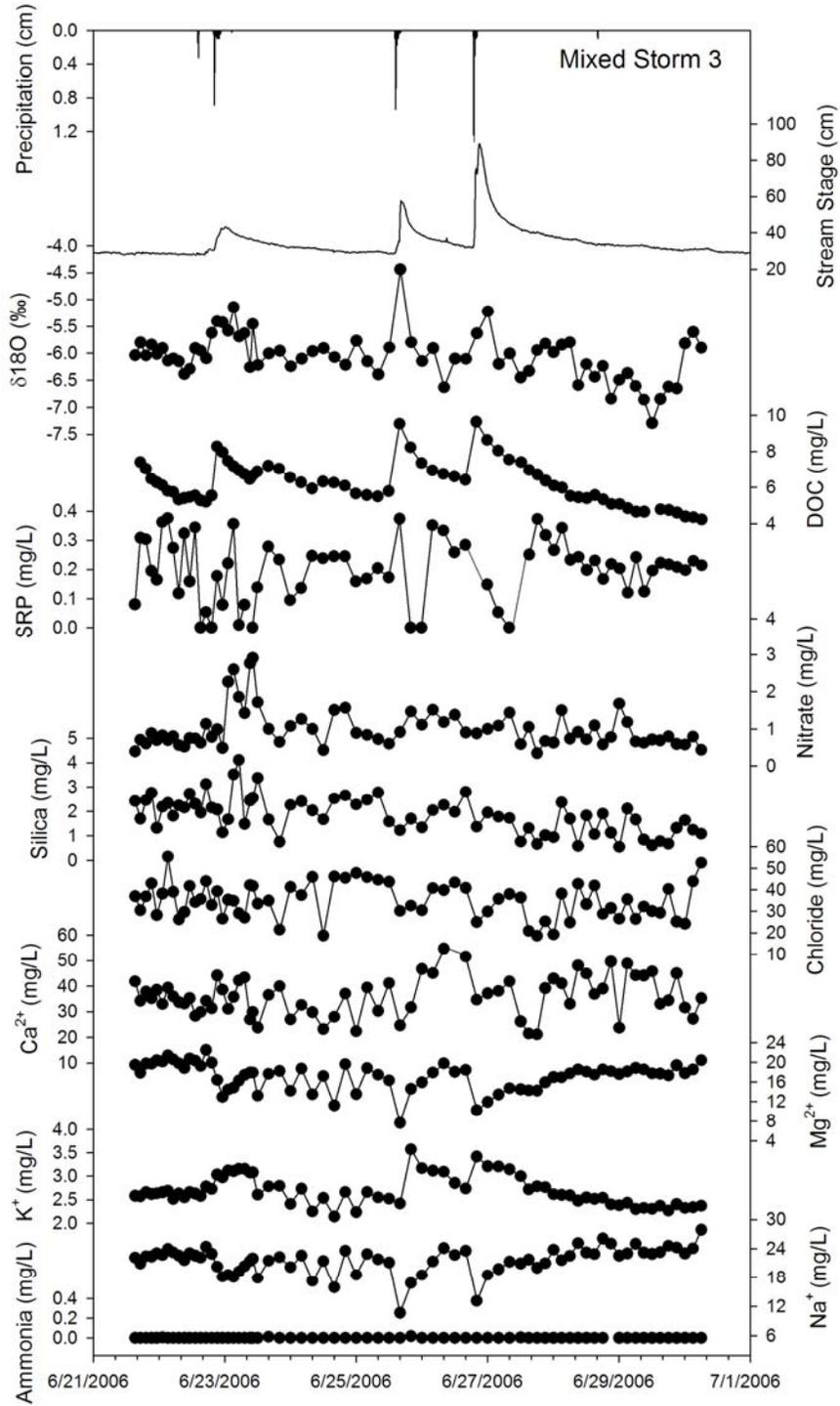
Appendix C (continued). Chemograph for Watershed A Storm 6.



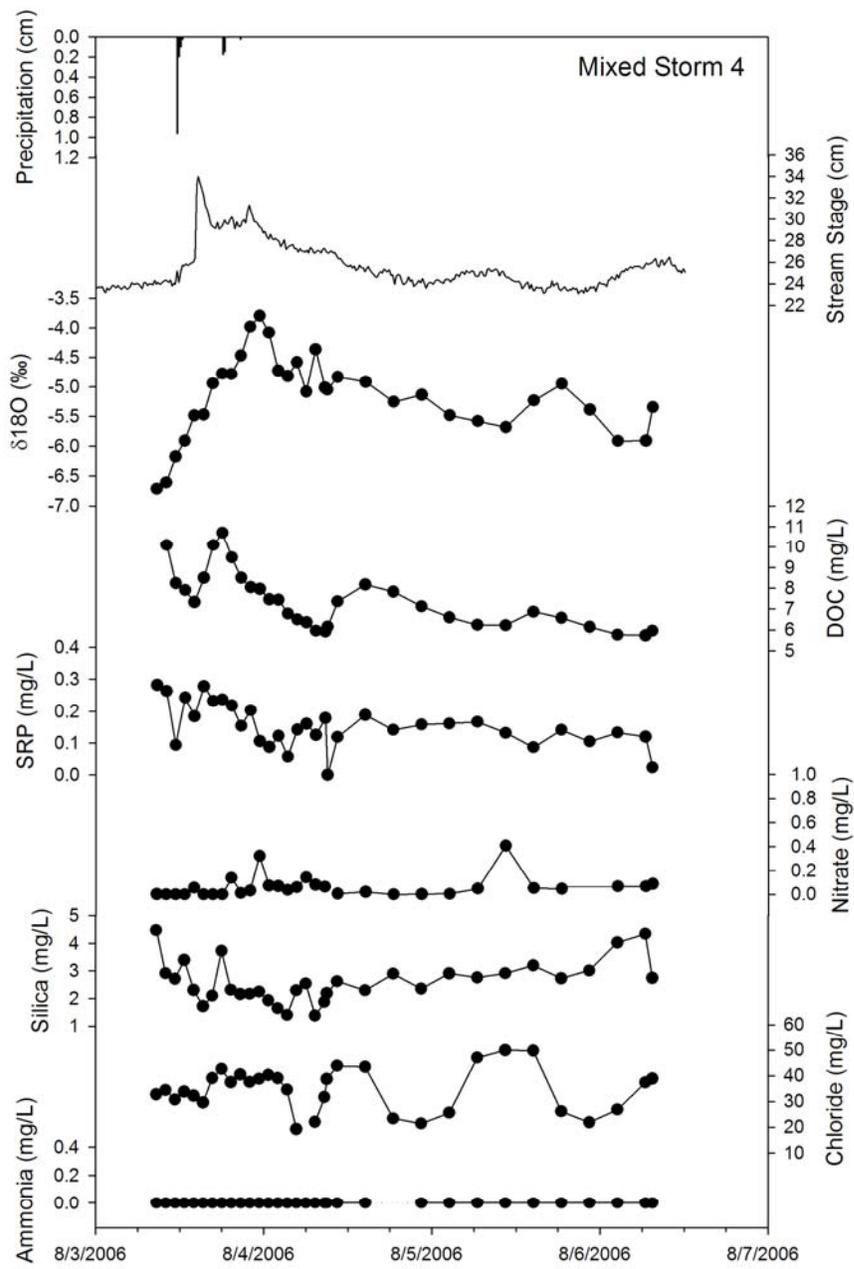
Appendix C (continued). Chemograph for Watershed M Storm 1.



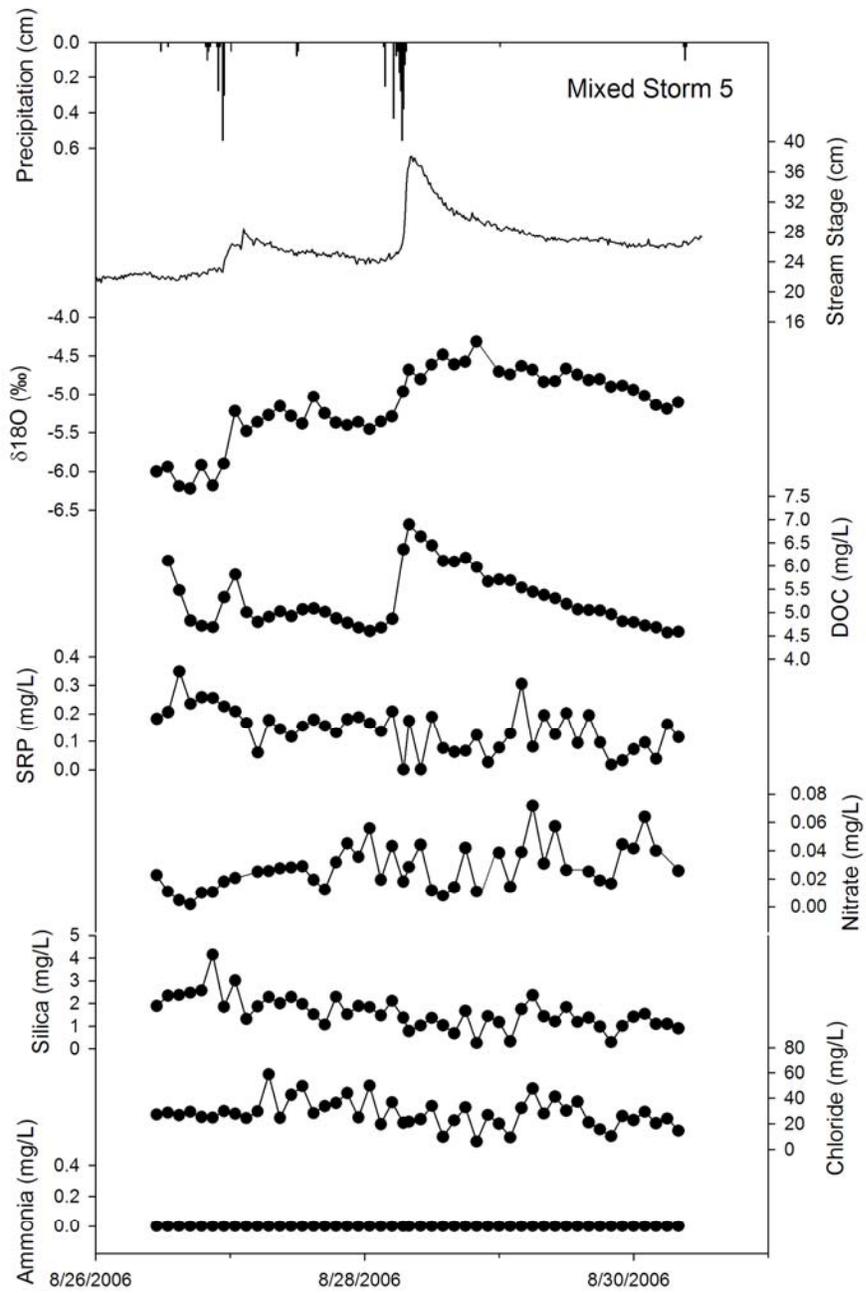
Appendix C (continued). Chemograph for Watershed M Storm 2.



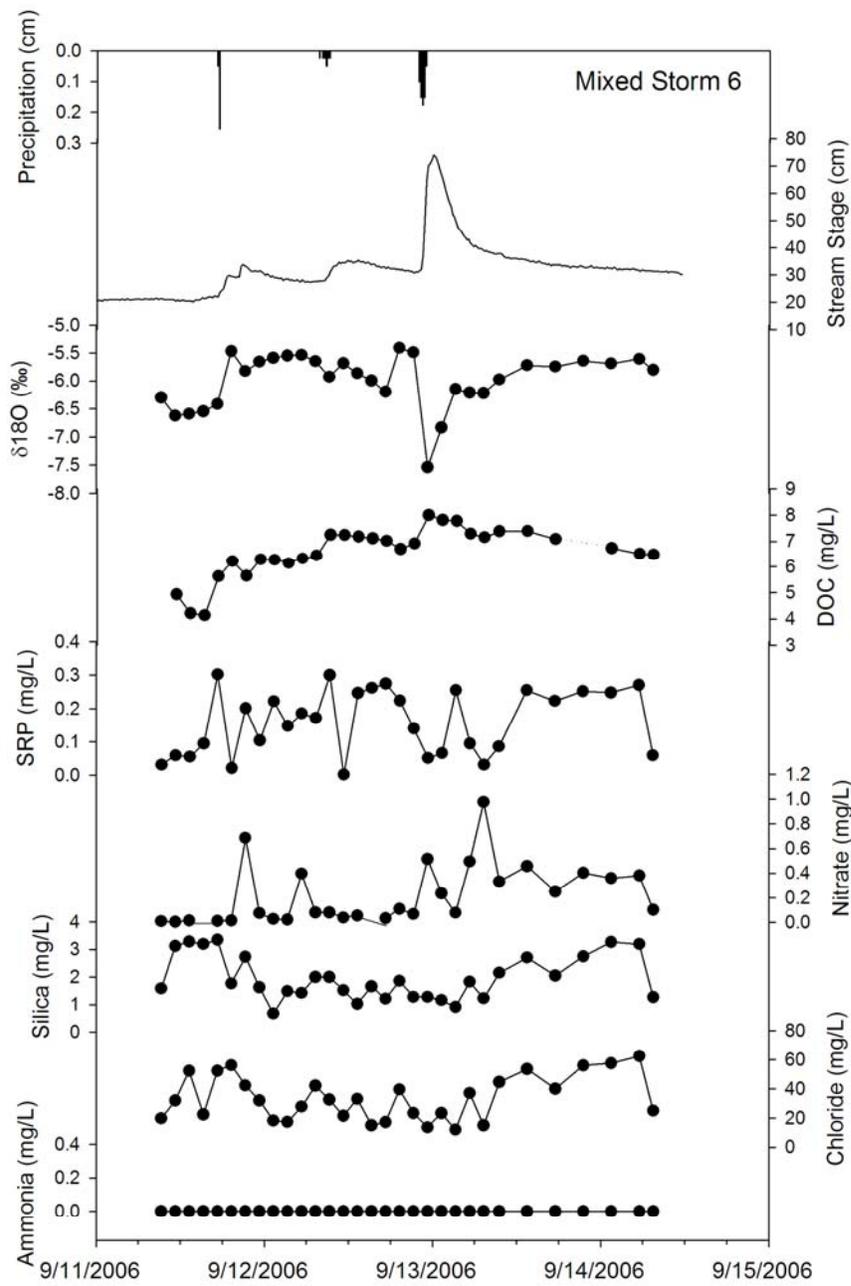
Appendix C (continued). Chemograph for Watershed M Storm 3.



Appendix C (continued). Chemograph for Watershed M Storm 4.

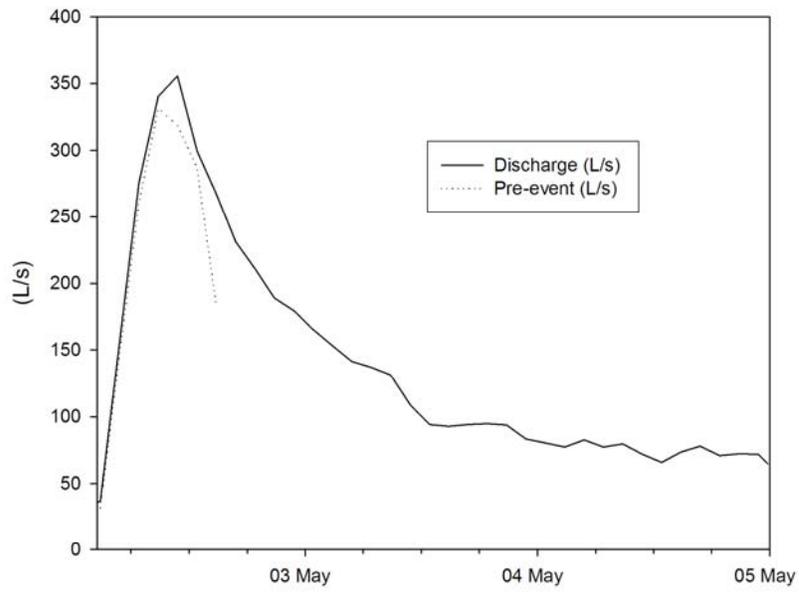


Appendix C (continued). Chemograph for Watershed M Storm 5.

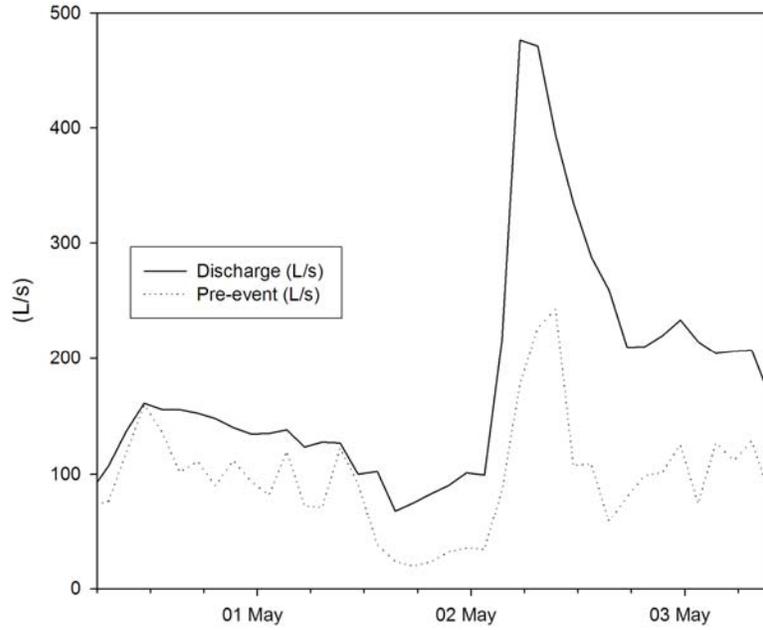


Appendix C (continued). Chemograph for Watershed M Storm 6.

Watershed A Storm 1

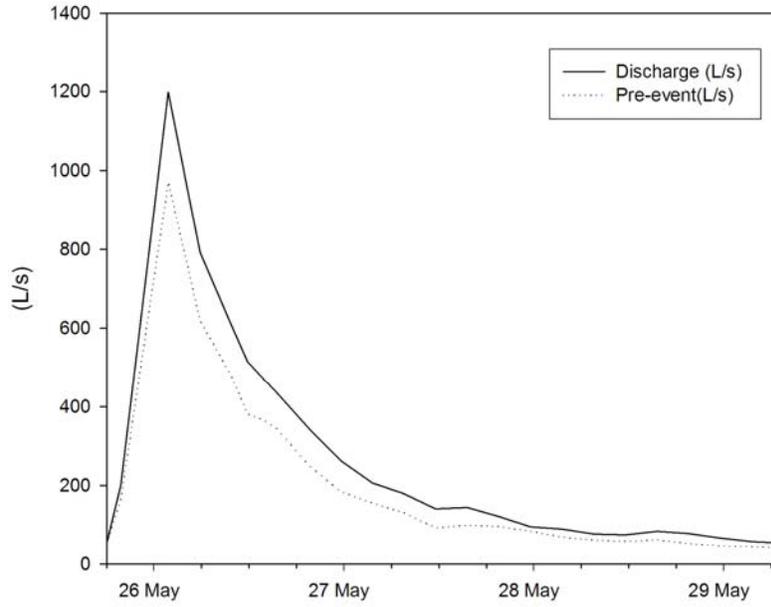


Watershed M Storm 1

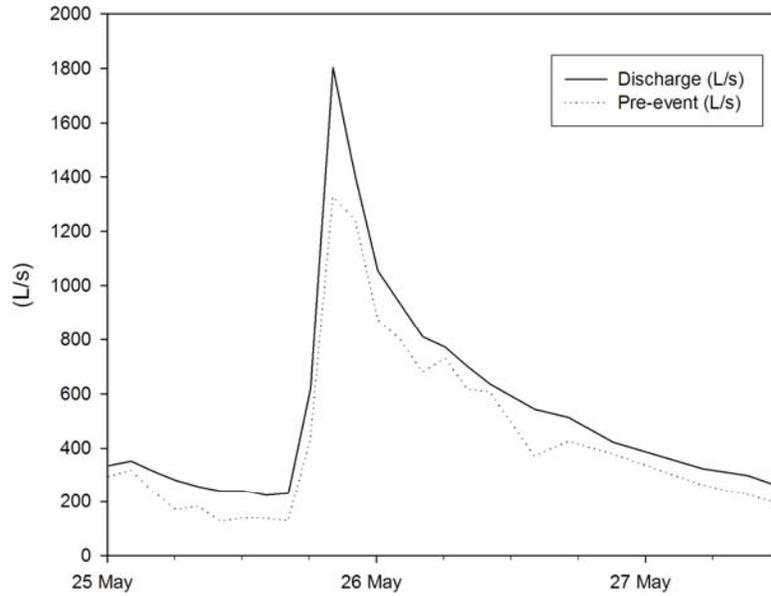


Appendix D. Hydrograph separation for Watershed A and M (Storm 1).

Watershed A Storm 2

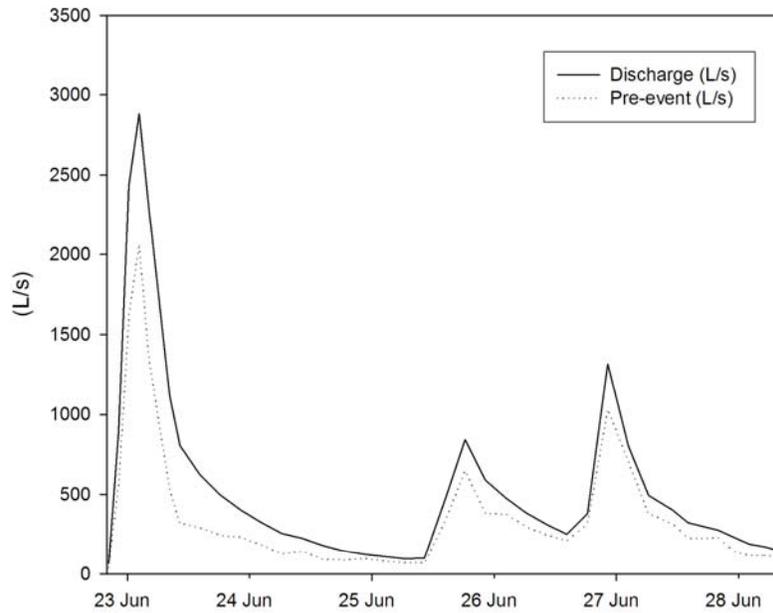


Watershed M Storm 2

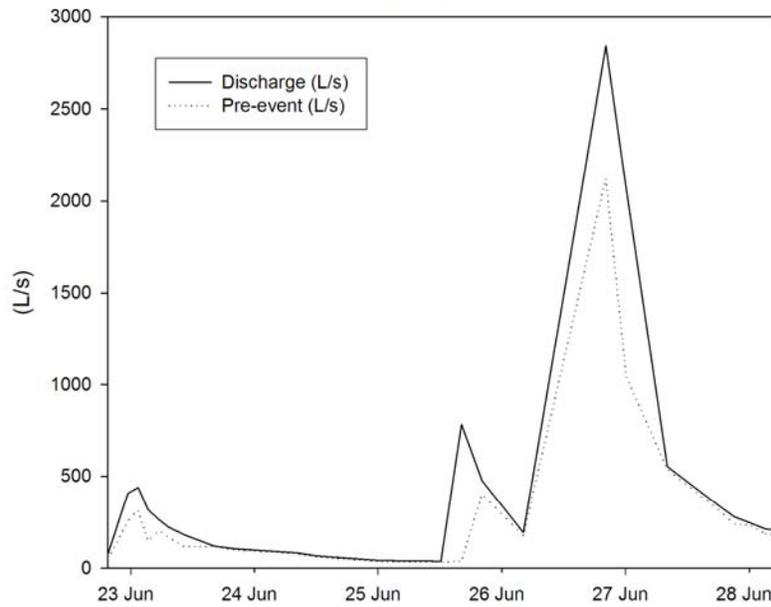


Appendix D (continued). Hydrograph separation for Watershed A and M (Storm 2).

Watershed A Storm 3

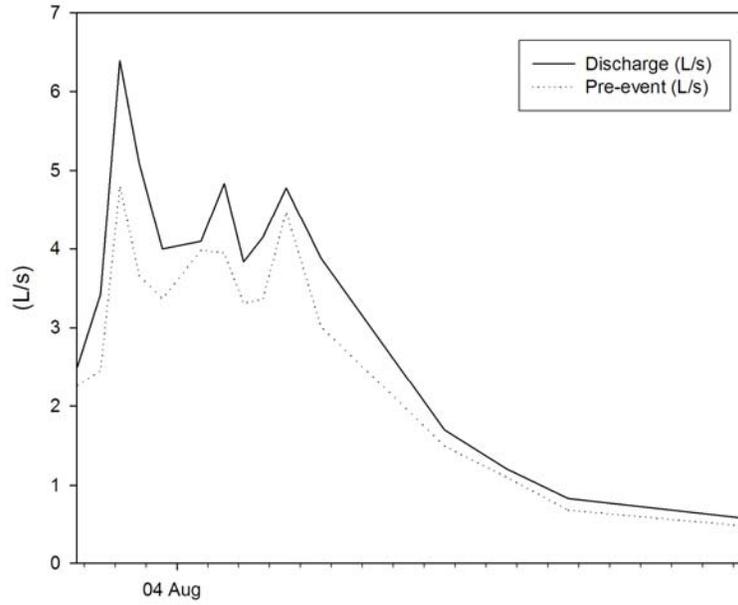


Watershed M Storm 3

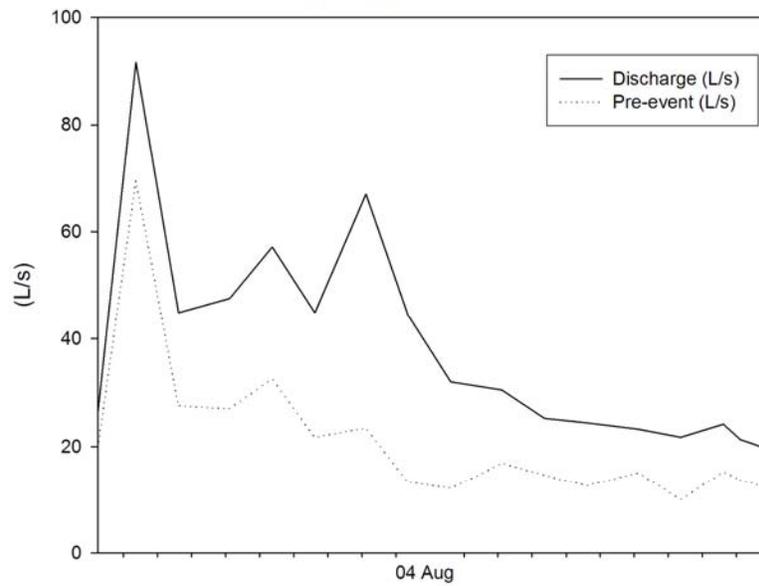


Appendix D (continued). Hydrograph separation for Watershed A and M (Storm 3).

Watershed A Storm 4

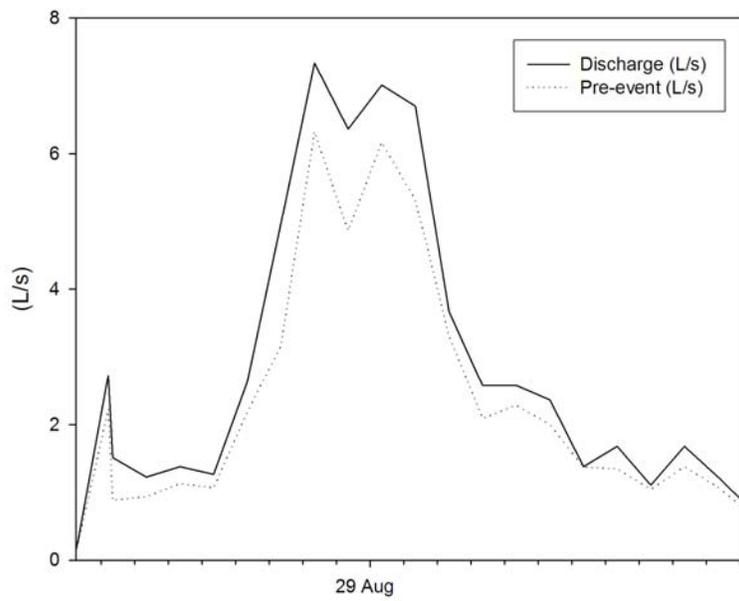


Watershed M Storm 4

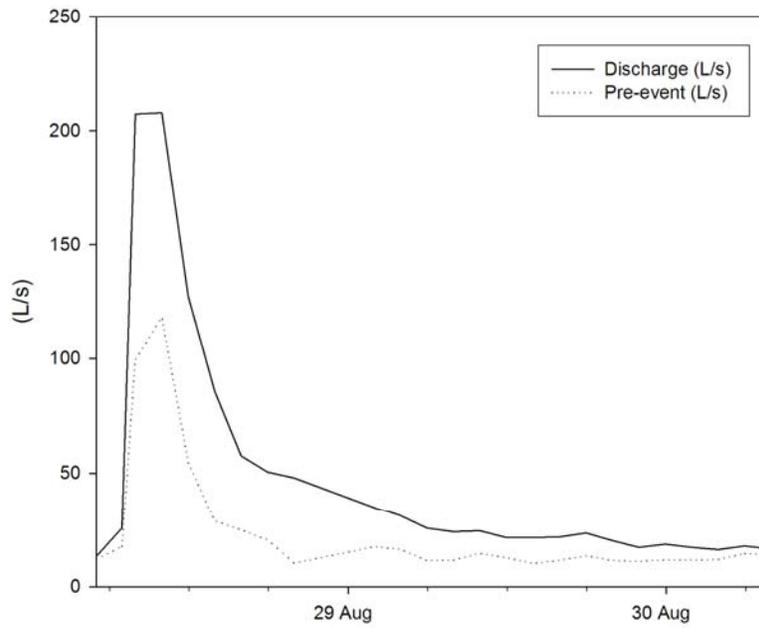


Appendix D (continued). Hydrograph separation for Watershed A and M (Storm 4).

Watershed A Storm 5

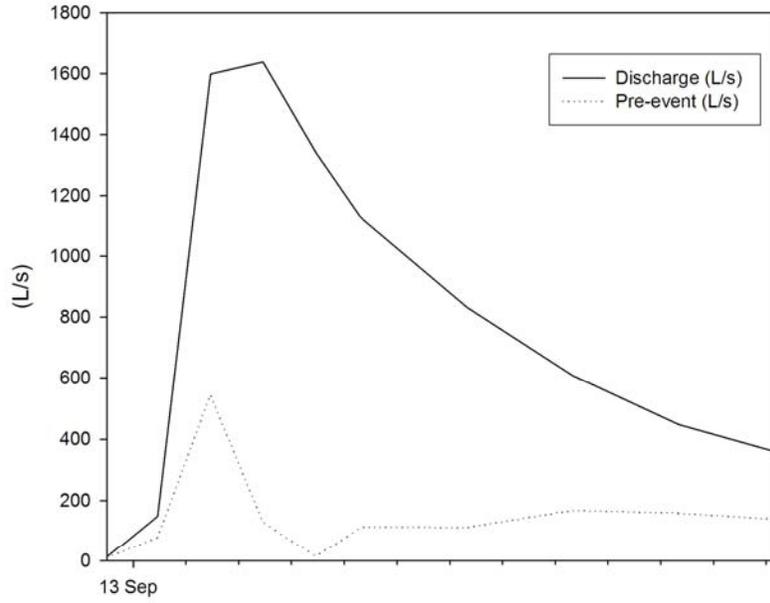


Watershed M Storm 5

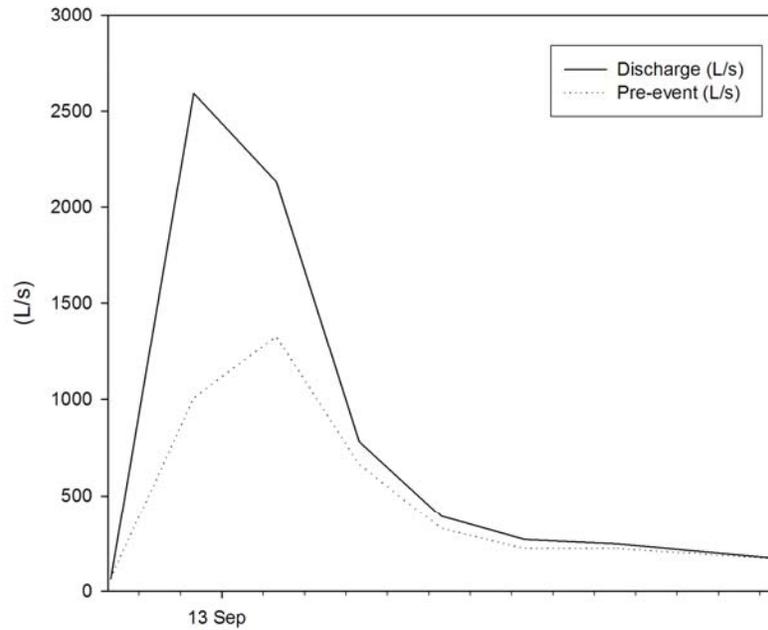


Appendix D (continued). Hydrograph separation for Watershed A and M (Storm 5).

Watershed A Storm 6

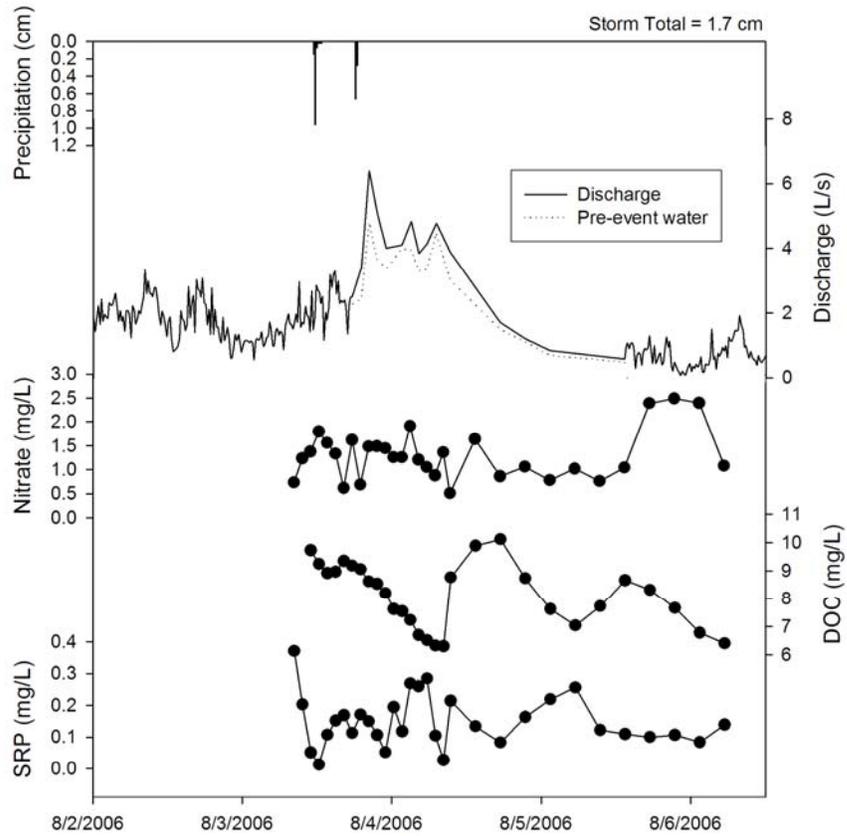


Watershed M Storm 6



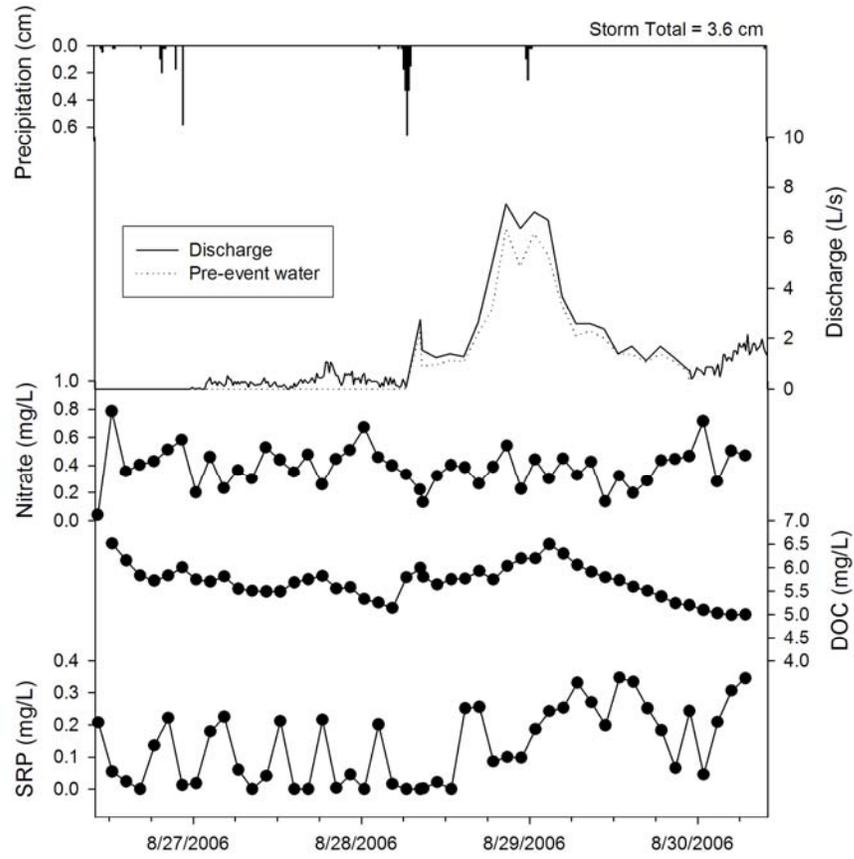
Appendix D (continued). Hydrograph separation for Watershed A and M (Storm 6).

Agricultural Watershed Storm 4



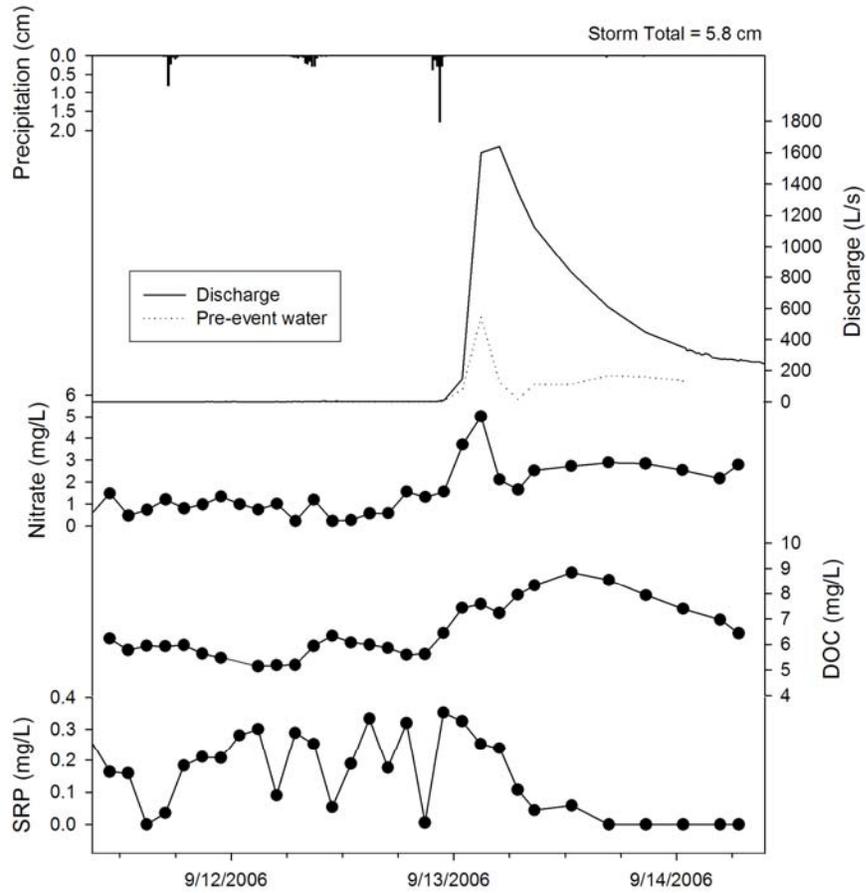
Appendix E. Hydrograph separation and nutrients for Watershed A Storm 4.

Agricultural Watershed Storm 5



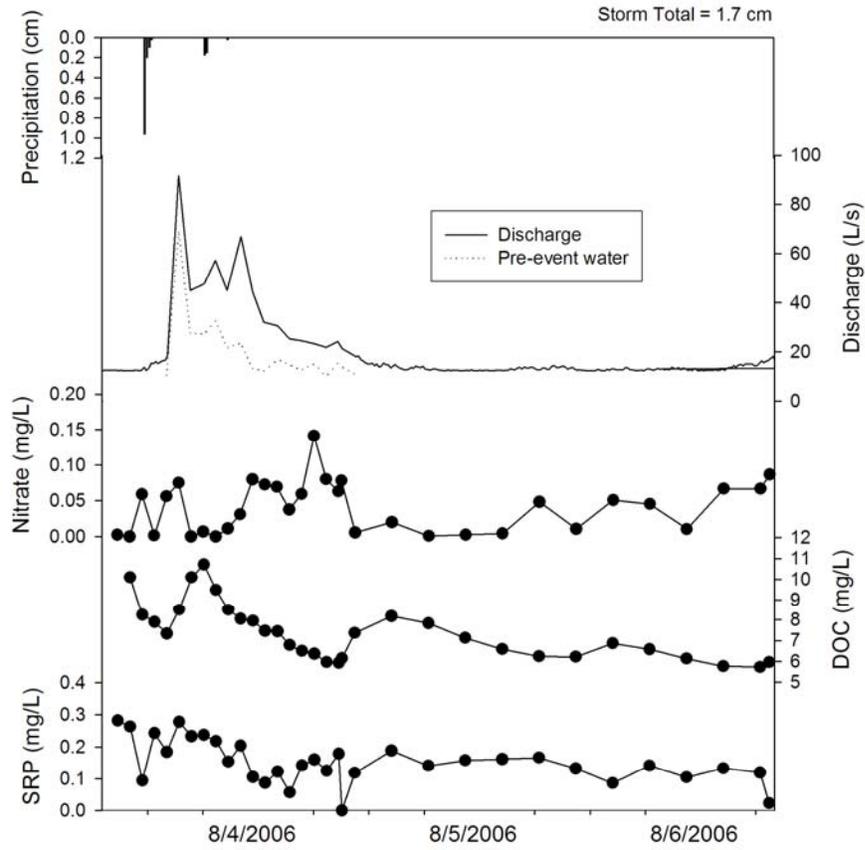
Appendix E (continued). Hydrograph separation and nutrients for Watershed A Storm 5.

Agricultural Watershed Storm 6



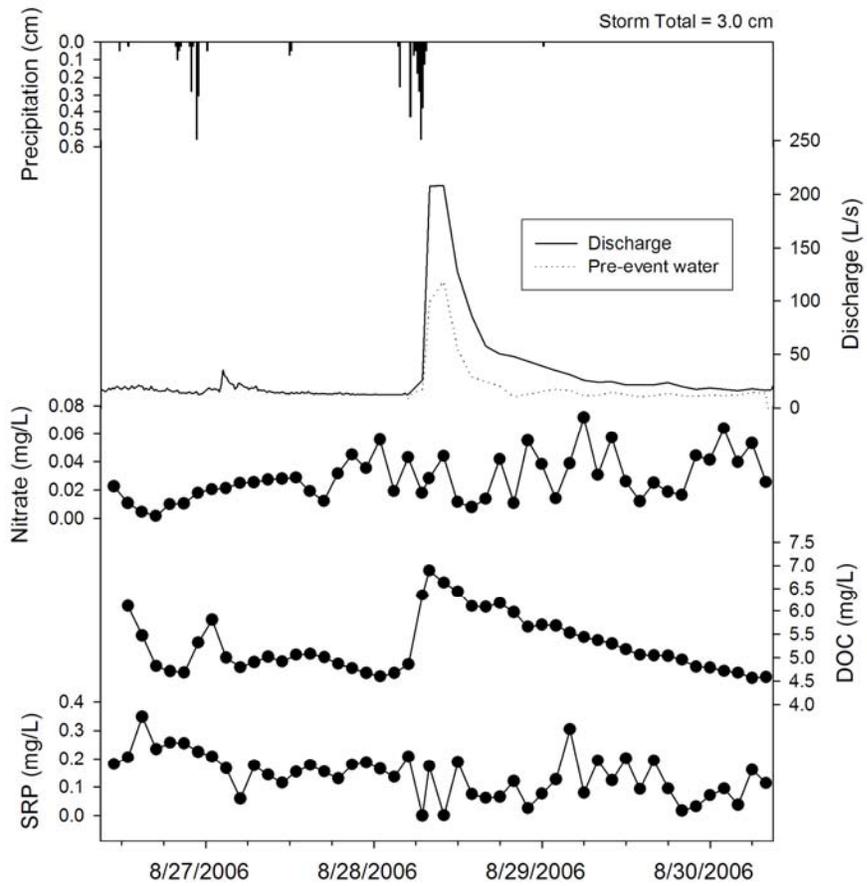
Appendix E (continued). Hydrograph separation and nutrients for Watershed A Storm 6.

Mixed Land Use Watershed Storm 4



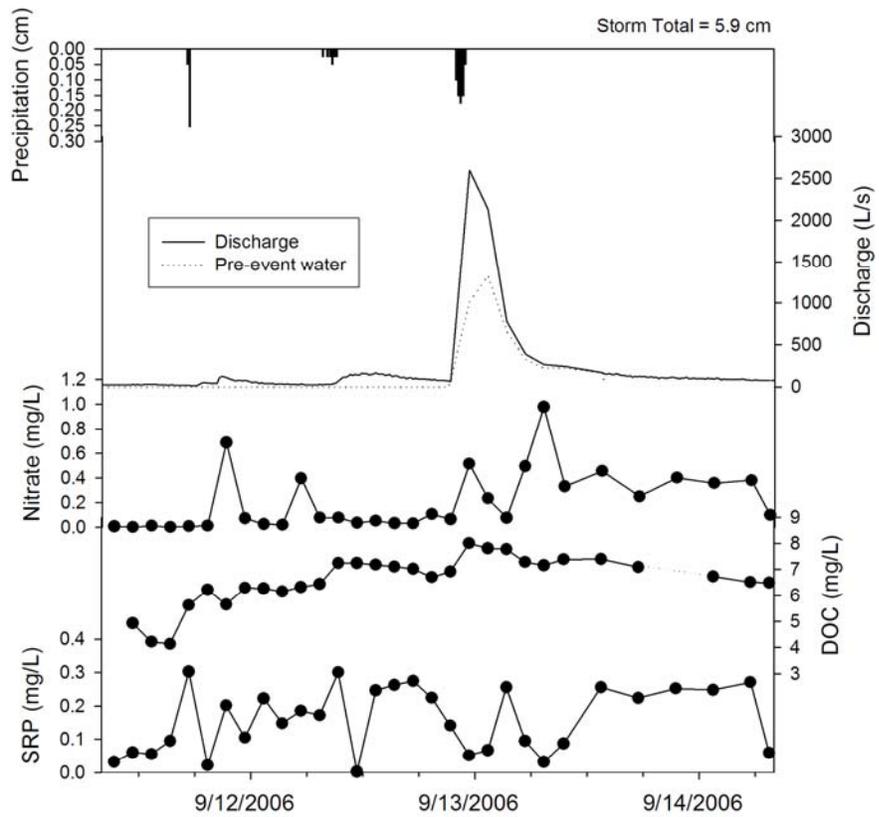
Appendix E (continued). Hydrograph separation and nutrients for Watershed M Storm 4.

Mixed Land Use Watershed Storm 5

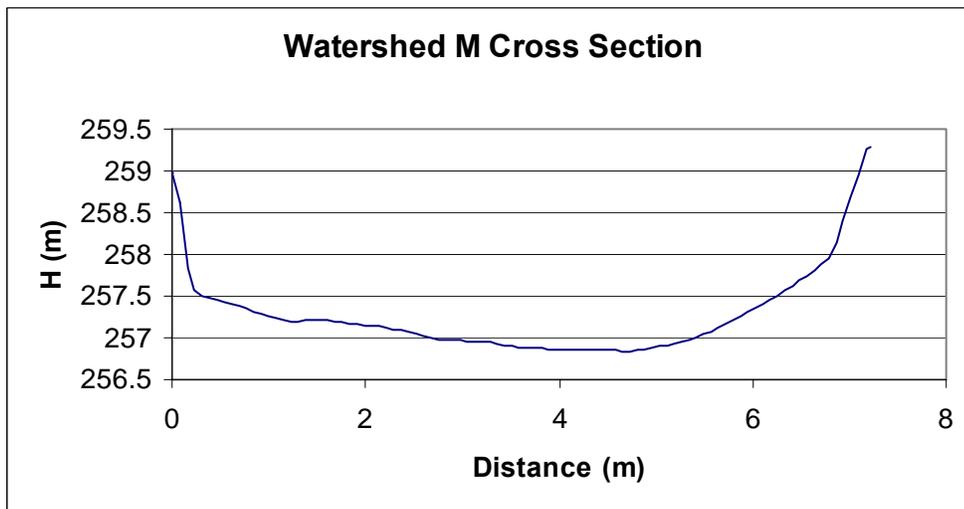
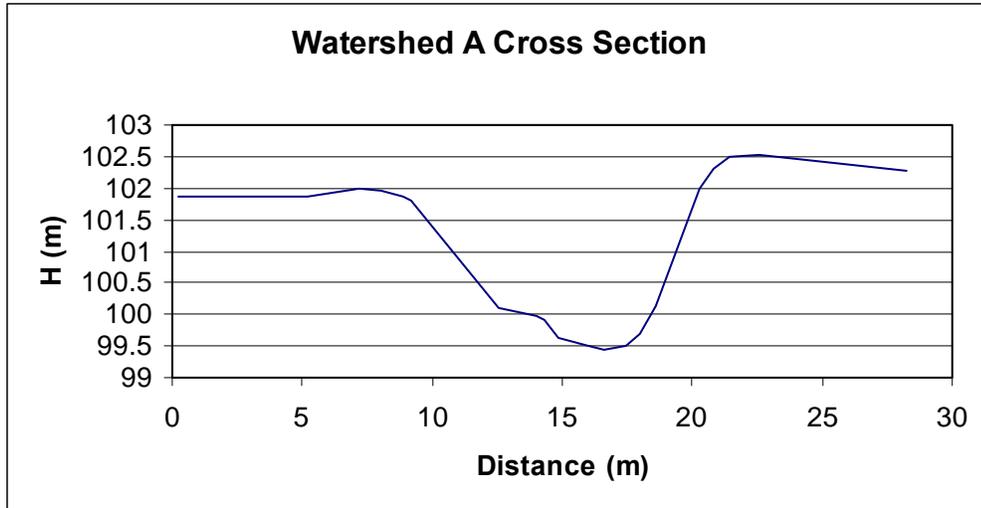


Appendix E (continued). Hydrograph separation and nutrients for Watershed M Storm 5.

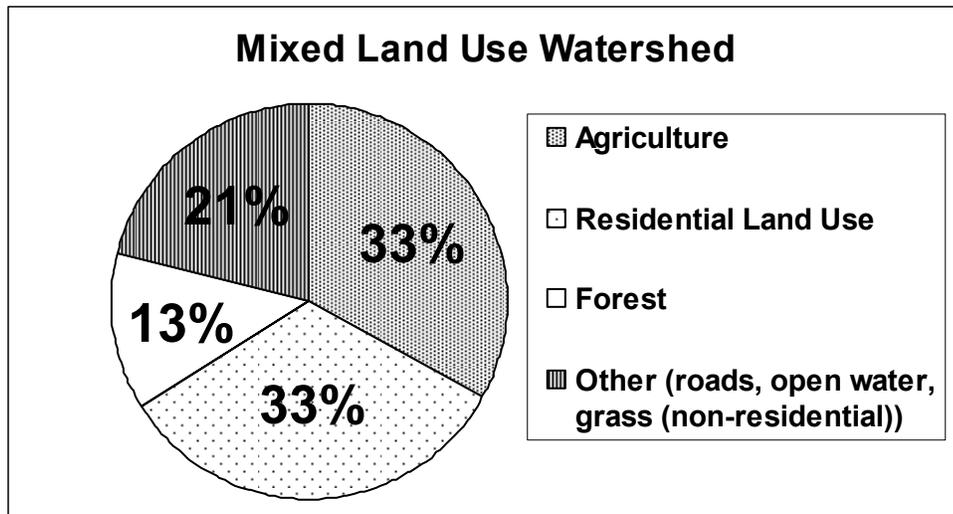
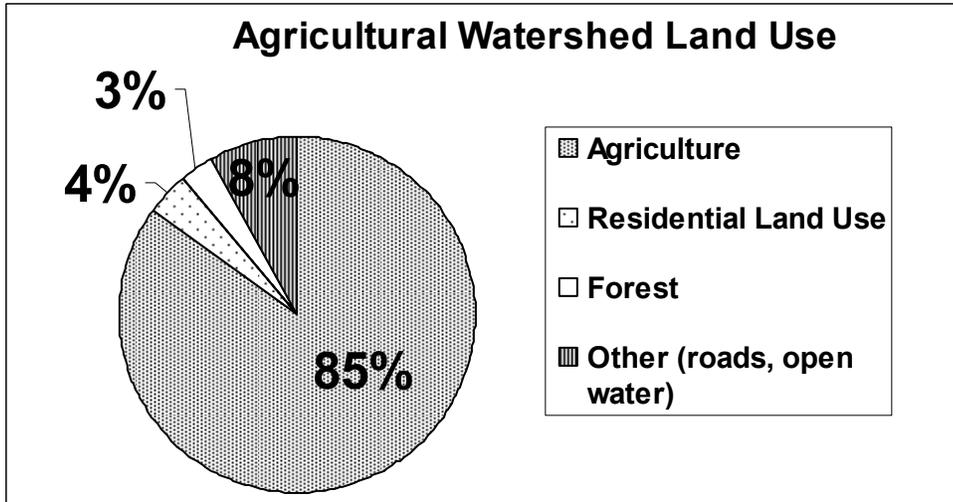
Mixed Land Use Watershed Storm 6



Appendix E (continued). Hydrograph separation and nutrients for Watershed M Storm 6.



Appendix F. Watershed A and M sampling location cross sections.



Appendix G. Land use pie charts for Watershed A and M.

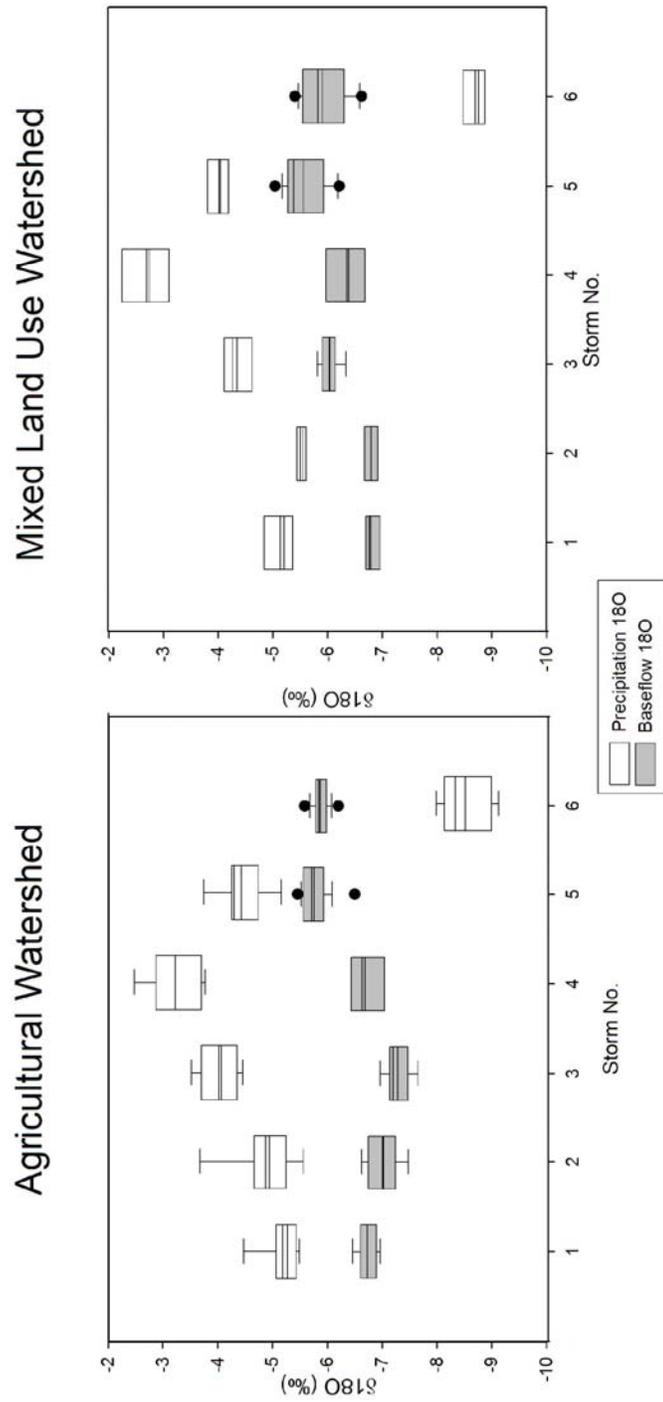
	Watershed A		Watershed M		
Piezometers	nest 1	554921	4415013	560713	4421254
	nest 2	554879	4414953	560705	4421262
	nest 3	554860	4414899	560705	4421263
	nest 4	554833	4414851		
	nest 5	554779	4414778		
	nest 6	554909	4414900		
	nest 7	554880	4414843		
	nest 8	554848	4414775		
	nest 9	554809	4414690		
	nest 10	554789	4414646		
Rain gages	RG1	554860	4414899	560713	4421254
	RG2	554921	4415013	560986	4422552
	RG3	554880	4414843	560419	4423338
	RG4	555041	4415225	560112	4424071
	RG5	554549	4414279	560508	4424477
	RG6	555444	4417123		
	RG7	555426	4417911		
	RG8	555128	4418127		
	RG9	555104	4418906		
	RG10	555089	4420052		
Weather Station		555000	4415189	554559	4414234
Tile Drains	TD4	555041	4415225		
	TD7	554908	4414929		
	TD5	554874	4414861		
	TD9	554827	4414774		
	TD6	554788	4414703		
	TD10	554720	4414537		

Appendix H. Piezometer, rain gage, weather station, and tile drain UTM coordinates.

AG		Date (2006)	Water table (BGS*)	7 day Antecedent Precipitation (cm)	Bulk Precipitation (cm)	Average Intensity (cm/hr)	Maximum intensity (cm/hr)
Storm No.							
1		2-May	90.1	1.7	2.8	0.51	1.80
2		25-May	80.3	1.9	3.6	1.31	2.84
3		22-Jun	52.4	5.9	5.8	0.76	5.26
4		3-Aug	121.5	3.8	1.7	1.43	6.86
5		28-Aug	132.9	1.3	3.6	0.84	3.30
6		13-Sep	143.3	2.8	5.8	2.42	6.15

Mixed		Date (2006)	Water table (BGS*)	7 day Antecedent Precipitation (cm)	Bulk Precipitation (cm)	Average Intensity (cm/hr)	Maximum intensity (cm/hr)
Storm No.							
1		2-May	84.5	n/a	2.7	n/a	n/a
2		25-May	82.7	1.9	3.4	2.96	4.55
3		22-Jun	86.0	3.8	8.0	0.96	6.22
4		3-Aug	88.0	3.1	1.7	1.36	4.19
5		28-Aug	95.5	1.7	3.0	0.88	9.80
6		13-Sep	100.5	0.5	5.9	1.12	2.74

Appendix I. Storm descriptions for Watershed A and M, Storms 1 through 6. BGS = water level below ground surface.



Appendix J. $\delta^{18}\text{O}$ box plots for stream baseflow and precipitation for Watersheds A and M, storms 1 through 6.

AG	Water table	Antecedent precip	Bulk precip	Avg intensity	Max intensity	Avg event	Avg preevent	Max event	Max preevent
Water table	1								
Antecedent precip	-0.49	1							
Bulk precip	0.21	0.01	1						
Avg intensity	0.60	0.01	0.59	1					
Max intensity	0.31	0.64	0.12	0.63	1				
Avg event	0.32	0.24	0.88	0.83	0.52	1			
Avg preevent	-0.32	-0.24	-0.88	-0.83	-0.52	-1	1		
Max event	0.29	0.27	0.91	0.70	0.46	0.97	-0.97	1	
Max preevent	-0.22	-0.41	-0.79	-0.70	-0.56	-0.95	0.95	-0.97	1

MIXED	Water table	Antecedent precip	Bulk precip	Avg intensity	Max intensity	Avg event	Avg preevent	Max event	Max preevent
Water table	1								
Antecedent precip	-0.70	1							
Bulk precip	0.71	-0.88	1						
Avg intensity	-0.62	-0.11	-0.02	1					
Max intensity	0.02	0.19	-0.40	-0.35	1				
Avg event	-0.14	0.25	-0.60	-0.28	0.53	1			
Avg preevent	0.14	-0.25	0.60	0.28	-0.53	-1	1		
Max event	-0.03	0.63	-0.44	-0.78	0.52	0.26	-0.26	1	
Max preevent	0.13	-0.46	0.59	0.04	0.01	-0.54	0.54	0.02	1

Appendix K. Correlation between storm characteristics and event and pre-event water contributions for Storms 1 through 6, Watersheds A and M.

		Nitrate (mg/L)	DOC (mg/L)	SRP (mg/L)
AG	Pre	3.74	5.82	0.13
	During	3.15	6.78	0.21
	Post	2.85	6.40	0.11
	average	3.25	6.33	0.15
MIXED	Pre	0.38	5.54	0.15
	During	0.60	6.37	0.16
	Post	0.49	5.30	0.14
	average	0.49	5.74	0.15

Watershed A		Storm 1	Storm 2	Storm 3	Storm 4	Storm 5	Storm 6
Nitrate (mg/L)	Pre	3.49	6.81	9.51	1.34	0.42	0.89
	During	3.90	6.22	4.40	1.21	0.36	2.82
	Post		4.18	2.78	1.58		
	average	3.69	5.74	5.56	1.38	0.39	1.85
DOC (mg/L)	Pre	3.74	4.24	6.35	9.29	5.69	5.62
	During	4.55	6.02	8.80	7.92	5.70	7.69
	Post		4.99	6.12	8.08		
	average	4.14	5.08	7.09	8.43	5.69	6.66
SRP (mg/L)	Pre	0.09	0.05	0.23	0.15	0.09	0.19
	During	0.23	0.15	0.34	0.16	0.18	0.17
	Post		0.06	0.13	0.14		
	average	0.16	0.09	0.23	0.15	0.13	0.18

Watershed M		Storm 1	Storm 2	Storm 3	Storm 4	Storm 5	Storm 6
Nitrate (mg/L)	Pre	0.33	1.07	0.76	0.02	0.02	0.07
	During	0.55	1.52	1.21	0.05	0.03	0.24
	Post		1.09	0.77	0.04	0.04	
	average	0.44	1.23	0.92	0.04	0.03	0.16
DOC (mg/L)	Pre	3.69	5.01	5.85	8.39	4.95	5.37
	During	4.63	6.38	6.95	7.73	5.72	6.81
	Post		5.28	4.73	6.46	4.73	
	average	4.16	5.56	5.84	7.53	5.13	6.09
SRP (mg/L)	Pre	0.13	0.04	0.22	0.21	0.18	0.11
	During	0.07	0.13	0.27	0.16	0.13	0.17
	Post		0.15	0.20	0.12	0.08	
	average	0.10	0.11	0.23	0.17	0.13	0.14

Appendix L. Pre-, during, and post-storm event nutrient concentrations between land uses. Pre-, during, and post-nutrient concentrations between storms in Watershed A and M.

	Storm 1	Storm 2 (pulse 1)	Storm 2 (pulse 2)	Storm 3 (pulse 1)	Storm 3 (pulse 2)	Storm 3 (pulse 3)	Storm 4	Storm 5	Storm 6
AG	Nitrate	CC	CC	n/a	CC	C	-	-	C
	Chloride	CC	CC	n/a	CC	C	-	-	C
	Silica	CC	C	n/a	C	CC	-	-	C
	Ammonia	C	-	n/a	C	-	-	-	-
	DOC	CC	CC	n/a	CC	C	-	-	C
	SRP	C	C	n/a	CC	C	-	-	C
	18O	CC	CC	n/a	CC	C	-	-	C
		CC	C	C	CC	CC	C	CC	C
MIXED	Nitrate	CC	C	C	CC	CC	C	CC	C
	Chloride	CC	C	C	CC	C	-	CC	CC
	Silica	C	C	C	CC	CC	-	CC	C
	Ammonia	-	-	-	-	-	-	-	-
	DOC	C	C	C	C	CC	CC	C	CC
	SRP	C	CC	CC	CC	C	CC	C	CC
	18O	C	C	C	C	C	-	C	CC
		C	C	C	C	C	-	C	CC

Appendix M. Nutrient hysteresis directions for Storms 1 through 6 in Watershed A and M (C=clockwise, CC=counterclockwise).

Appendix N(a). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl ⁻ (mg/L)	NH ₃ (mg/L)	NH ₄ (mg/L)	Ca ²⁺ (mg/L)	Mg ²⁺ (mg/L)	K ⁺ (mg/L)	Na ⁺ (mg/L)	Level (in)
182	1-150	4/29/06 0:00	3.48	<0.003	3.46	-7.15	0.22		2.06	4.61	0.12						
183	2-150	4/29/06 0:00	0.07	1.54	5.11	-8.03	0.22	1.18	1.22	1.22	0.04						
185	3-150	4/29/06 0:00	0.27	0.27	4.36	-7.43	0.22	1.56	2.45	2.45	<0.016						
187	4-150	4/29/06 0:00	0.12	<0.003	2.58	-7.25	0.22	2.02	4.77	4.77	<0.016						
188	5-90	4/29/06 0:00	0.16	<0.003	5.59	-7.47	0.22	2.55	3.32	3.32							
189	5-150	4/29/06 0:00	0.04	<0.003	5.12	-7.55	0.22	2.77	5.86	5.86	<0.016						
190	Stream	4/29/06 0:00	2.66	<0.003	2.62	-6.80	0.22	0.20	31.12	31.12	<0.016						
191	TD-10	4/29/06 0:00	5.31	<0.003	1.55	-7.10	0.22	1.46	7.92	7.92	<0.016						
192	10-90	4/29/06 0:00	0.14	<0.003	2.66	-7.26	0.22	1.93	10.67	10.67	<0.016						
193	10-150	4/29/06 0:00	0.22	<0.003	3.32	-7.32	0.22	2.36	21.33	21.33	0.05						
194	TD-6	4/29/06 0:00	3.16	<0.003	1.78	-6.95	0.22	1.87	4.24	4.24	<0.016						
195	9-150	4/29/06 0:00	0.04	<0.003	2.48	-7.13	0.20	1.73	5.42	5.42	<0.016						
196	8-90	4/29/06 0:00	0.52	<0.003	3.65	-7.15	0.20	2.11	4.91	4.91	<0.016						
197	8-150	4/29/06 0:00	1.47	0.03	2.76	-6.78	0.20	1.49	6.84	6.84	0.01						
198	TD-9	4/29/06 0:00	3.09	<0.003	1.46	-6.54	0.20	1.15	2.99	2.99	<0.016						
199	TD-5	4/29/06 0:00	3.00	<0.003	1.42	-6.91	0.20	0.57	3.35	3.35	<0.016						
200	7-150	4/29/06 0:00	0.77	0.64	2.48	-6.67	0.20	0.48	3.01	3.01	0.01						
201	6-150	4/29/06 0:00	0.18	0.20	2.76	-6.96	0.20	0.10	5.58	5.58	<0.016						
202	TD-4	4/29/06 0:00	6.03	0.15	3.24	-7.74	0.20	0.56	9.31	9.31	<0.016						
215	1-90, 3-90, 4-90	4/29/06 0:00	0.03					1.68	1.57	1.57	0.02	0.09	24.73	24.96	0.51	3.81	
242	Stream	4/29/06 13:43			6.69												
243	Stream	4/29/06 15:43			4.10												
244	Stream	4/29/06 17:43			3.79												
245	Stream	4/29/06 19:43			3.69												
246	Stream	4/29/06 21:43			3.62												
247	Stream	4/29/06 23:43			3.66												
248	Stream	4/30/06 1:43			3.38												
249	Stream	4/30/06 3:43			3.32												
250	Stream	4/30/06 5:43			3.66												
251	Stream	4/30/06 7:43			3.69												
252	Stream	4/30/06 9:43			3.67												
253	Stream	4/30/06 11:43			3.42												
254	Stream	4/30/06 13:43			3.34												
279	Stream	4/29/06 13:41	5.59					<0.013	26.55	26.55	<0.016	<0.02	70.40	18.91	1.05	12.12	
280	Stream	4/29/06 15:41	3.81					0.27	23.85	23.85	<0.016	<0.02	72.42	19.45	1.11	15.74	
281	Stream	4/29/06 19:41	6.52			-6.75	0.20	0.85	29.47	29.47	<0.016						
282	Stream	4/29/06 17:41	1.60					0.27	9.87	9.87	<0.016						
283	Stream	4/29/06 21:41	2.33					0.37	12.99	12.99	0.01						
284	Stream	4/29/06 23:41	1.54			-6.69	0.20	0.54	8.79	8.79	<0.016						
285	Stream	4/30/06 1:41	3.02					1.08	17.21	17.21	<0.016						
286	Stream	4/30/06 3:41	3.25					0.64	15.38	15.38	<0.016	<0.02	71.90	19.42	1.14	9.63	
287	Stream	4/30/06 5:41	6.27			-6.48	0.20	0.38	24.20	24.20	<0.016	0.03	74.01	19.42	1.17	9.15	
288	Stream	4/30/06 7:41	4.55					0.81	19.44	19.44	<0.016	<0.02	74.09	19.22	1.11	10.63	
289	Stream	4/30/06 9:41	2.13			-6.40	0.20	0.45	10.74	10.74	<0.016						
290	Stream	4/30/06 11:41	2.38					0.51	12.18	12.18	<0.016						
291	Stream	4/30/06 13:41	2.07					0.88	11.20	11.20	<0.016						
292	Stream	4/30/06 15:41	2.33			-6.94	0.20	0.45	12.57	12.57	<0.016	<0.02	73.56	19.11	1.10	10.47	
293	Stream	4/30/06 17:41	1.57					0.02	9.14	9.14	<0.016	<0.02	73.75	19.22	1.15	11.15	
294	Stream	4/30/06 19:41	2.94					0.94	16.44	16.44	<0.016	<0.02	75.62	22.55	1.22	12.62	
295	Stream	4/30/06 21:41	5.48					2.78	26.79	26.79	<0.016	<0.02	75.62	22.52	1.24	12.14	
296	Stream	4/30/06 23:41	2.88			-6.75	0.20	0.87	17.41	17.41	<0.016	<0.02	75.85	22.59	1.18	12.82	

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
297	Stream	5/1/06 1:41	3.92					1.09	19.10	<0.016	<0.02	76.42	22.73	1.15	11.45		
298	Stream	5/1/06 3:41	5.62					0.70	13.02	<0.016	<0.02	77.37	22.81	1.14	11.47		
299	Stream	5/1/06 5:41	6.39			-6.96	0.20	<0.013	27.73	<0.016	<0.02	78.26	22.83	1.16	10.01		
300	Stream	5/1/06 7:41	4.28					0.83	21.32	<0.016	<0.02	78.62	22.86	1.11	9.93		
301	Stream	5/1/06 9:41	5.49					0.86	34.01	<0.016	<0.02	78.13	22.72	1.12	17.91		
302	Stream	5/1/06 11:41	3.29			-6.92	0.20	0.90	17.83	<0.016	<0.02	75.32	19.59	1.06	10.61		
350	Stream	5/3/06 8:05	2.51	<0.003	2.56	-7.15	0.20	0.88	7.60	<0.016	0.03	23.55	13.84	0.79	5.32		
351	RG-5	5/3/06 0:00	0.25			-5.50	0.20	<0.013	0.37	0.15	0.12	<2.50	<1.20	0.23	<1.20		
353	1-150	5/3/06 0:00	2.74	0.25	3.29	-7.28	0.20	1.83	1.79	<0.016	0.08	27.49	15.14	0.42	3.59		
354	RG-2	5/3/06 0:00	0.30			-5.43	0.20	<0.013	0.00	0.72	0.50	<2.50	<1.20	<0.20	<1.20		
356	2-150	5/3/06 0:00	0.02	0.11	3.73	-7.79	0.20	1.35	0.65	<0.016	<0.02	16.15	10.23	0.33	3.35		
357	3-150	5/3/06 0:00	0.26	1.05	4.51	-7.39	0.20	1.06	0.84	<0.016	<0.02	18.58	12.31	0.26	2.25		
358	RG-1	5/3/06 0:00	0.45			-5.45	0.20	<0.013	0.28	0.84	0.60	<2.50	<1.20	<0.20	<1.20		
359	4-150	5/3/06 0:00	0.08	<0.003	3.21	-7.08	0.20	3.04	2.62	<0.016	0.15	19.20	20.14	0.68	2.97		
360	5-90	5/3/06 0:00	0.14	<0.003	4.22	-8.18	0.20	1.22	3.73	<0.016	<0.02	20.86	10.91	0.30	2.27		
361	5-150	5/3/06 0:00	0.18	<0.003	4.83	-7.10	0.20	3.67	2.96	<0.016	0.04	22.45	18.75	1.57	13.88		
362	RG-3	5/3/06 0:00	0.60			-5.19	0.20	<0.013	0.31	1.15							
363	TD-4	5/3/06 0:00	5.19	0.05	3.69	-7.38	0.20	3.39	6.59	<0.016	0.07	29.82	13.36	12.36	4.19		
364	TD-7	5/3/06 0:00	4.44	<0.003	1.57	-6.93	0.20	2.15	3.26	<0.016	<0.02	18.97	8.42	0.56	1.45		
365	6-150	5/3/06 0:00	0.37	0.05	3.02	-5.19	0.20	2.96	3.99	<0.016							
366	RG-4	5/3/06 0:00	0.26			-34.01											
367	TD-5	5/3/06 0:00	4.72	<0.003	1.75	-7.24	0.20	1.81	4.36	<0.016	0.44	<2.50	<1.20	0.64	<1.20		
368	7-150	5/3/06 0:00	1.20	0.08	2.23	-6.30	0.31	1.66	2.58	<0.016	<0.02	43.12	16.01	0.33	2.85		
369	TD-9	5/3/06 0:00	5.63	<0.003	1.84	-6.64	0.31	0.28	5.20	<0.016	<0.02	24.71	10.59	0.91	3.10		
370	8-90	5/3/06 0:00	1.09	<0.003	3.85	-6.86	0.31	1.68	1.55	<0.016	<0.02	18.30	6.89	0.60	3.20		
371	8-150	5/3/06 0:00	1.33	0.06	3.26	-6.48	0.31	1.74	3.77	<0.016	0.04	29.77	13.01	1.05	2.40		
372	TD-6	5/3/06 0:00	1.54		1.90	-6.68	0.31	<0.013	1.50	<0.016	<0.02	25.11	10.65	0.46	1.65		
373	9-150	5/3/06 0:00	0.04	<0.003	3.81	-6.39	0.31	1.12	5.43	<0.016	0.04	38.78	18.77	0.56	2.43		
374	10-90	5/3/06 0:00	0.02	0.03	2.90	-6.78	0.31	2.88	5.75	<0.016	<0.02	30.29	18.09	0.26	3.66		
375	10-150	5/3/06 0:00	0.25	0.03	2.65	-6.48	0.31	3.63	11.95	0.02	0.05	15.55	5.52	0.46	1.40		
376	TD-10	5/3/06 0:00	8.01	<0.003	3.17	-6.40	0.31	0.31	6.80	<0.016	<0.02	18.67	12.37	0.38	1.66		
377	RG-6	5/3/06 0:00	0.28			-5.40	0.31	<0.013	0.00	0.54	0.44	<2.50	<1.20	<0.20	<1.20		
378	RG-7	5/3/06 0:00	0.25			-4.70	0.31	<0.013	0.00	0.38	0.35	<5.00	<2.40	<0.40	<2.40		
379	RG-8	5/3/06 0:00	0.33			-4.45	0.31	<0.013	0.12	0.88							
380	RG-9	5/3/06 0:00	0.27			-5.26	0.31	<0.013	0.00	0.46							
381	RG-10	5/3/06 0:00	0.30			-5.29	0.31	<0.013	0.00	0.70	0.65	<2.50	<1.20	<0.20	<1.20		
397	Stream	5/1/06 14:45		0.09	3.36												
398	Stream	5/1/06 16:45		0.07	3.44												
399	Stream	5/1/06 18:45		0.09	3.58												
400	Stream	5/1/06 20:45		0.08	3.65												
401	Stream	5/1/06 22:45		0.10	3.61												
402	Stream	5/2/06 0:45		0.12	3.33												
403	Stream	5/2/06 2:45		0.24	4.03												
404	Stream	5/2/06 4:45		0.33	4.75												
405	Stream	5/2/06 6:45		0.43	4.86												
406	Stream	5/2/06 8:45		0.30	4.43												
407	Stream	5/2/06 10:45		0.15	4.99												
408	Stream	5/2/06 12:45		0.25	4.45												
409	Stream	5/2/06 14:45		0.15	4.49												
410	Stream	5/2/06 16:45		0.19	4.49												
411	Stream	5/2/06 18:45		0.05	4.42												

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl ⁻ (mg/L)	NH ₃ (mg/L)	NH ₄ (mg/L)	Ca ²⁺ (mg/L)	Mg ²⁺ (mg/L)	K ⁺ (mg/L)	Na ⁺ (mg/L)	Level (in)
458	Stream	5/1/06 14:45	5.20			-6.84	0.31		<0.013	25.34	0.02	0.20	60.88	5.48		10.47	
459	Stream	5/1/06 16:45	2.86			-6.71	0.31		0.07	14.48	<0.016	0.23	52.95	4.25		8.91	
460	Stream	5/1/06 18:45	1.27			-6.56	0.31		<0.013	8.29	0.01	1.59	57.03	4.75		9.93	
461	Stream	5/1/06 20:45	1.95			-6.61	0.31		0.09	11.47	0.03	0.14	57.81	4.30		9.17	
462	Stream	5/1/06 22:45	2.49			-6.63	0.31		0.50	15.17	<0.016	0.18	49.95	3.97		9.10	
463	Stream	5/2/06 0:45	1.73			-6.31	0.31		<0.013	12.28	0.07	0.06	48.52	3.69		9.13	
464	Stream	5/2/06 2:45	2.67			-6.47	0.31		<0.013	15.62	0.06	0.10	50.74	<12.00		8.30	
465	Stream	5/2/06 4:45	3.61			-6.68	0.31		0.16	10.42	0.08	0.12	65.73	3.84		8.05	
466	Stream	5/2/06 6:45	4.10			-6.59	0.31		<0.013	27.11	0.28						
467	Stream	5/2/06 8:45	3.87			-6.63	0.31		<0.013	12.24	0.16	0.28	53.79	3.23		5.70	
468	Stream	5/2/06 10:45	5.37			-6.51	0.31		0.40	17.29	0.15	0.24	44.33	2.37		6.15	
469	Stream	5/2/06 12:45	4.57			-6.61	0.31		0.39	18.37	0.09	0.44	52.83	2.26		6.01	
470	Stream	5/2/06 14:45	2.89			-6.20	0.31		0.47	9.74	0.05	0.14	42.08	1.74		5.66	
471	Stream	5/2/06 16:45	4.13			-6.89	0.31		0.68	16.36	0.09						
472	Stream	5/2/06 18:45	3.87			-6.79	0.31		<0.013	10.61	0.06	0.41	44.73	<12.00		9.06	
500	1-90	5/24/06 0:00	0.30	<0.003	7.46	-7.14	0.22		1.68	3.11	<0.016	0.06	64.48	16.11	0.26	3.08	
501	1-150	5/24/06 0:00	4.70	<0.003	3.51	-7.02	0.22		1.61	3.43	<0.016	0.07	72.59	19.68	0.37	3.82	
502	2-90	5/24/06 0:00	0.14			-7.79	0.22		2.39	1.74	<0.016	<0.06	40.07	9.89	0.35	1.98	
503	2-150	5/24/06 0:00	0.03	0.18	3.11	-7.57	0.29		2.89	4.80	<0.016	<0.06					
504	3-150	5/24/06 0:00	0.38	0.02	2.43	-7.68	0.22		2.49	1.61	<0.016	<0.06	68.73	19.74	0.24	2.82	
505	4-90	5/24/06 0:00	0.07	<0.003	2.58	-7.56	0.22		2.90	0.83	<0.016	<0.06	82.76	18.38	0.23	2.27	
506	4-150	5/24/06 0:00	0.22			-7.59	0.22		2.70	2.63	<0.016	0.04	62.82	28.69	0.51	3.14	
507	5-90	5/24/06 0:00	0.02			-7.40	0.29		1.99	1.63	<0.016	0.03	89.30	16.74	0.56	2.95	
508	5-150	5/24/06 0:00	0.23	<0.003	4.01	-6.73	0.29		6.14	4.33	<0.016	0.05	90.65	27.91	1.48	13.84	
509	Stream	5/24/06 0:00	4.66	<0.003	2.64	-6.88	0.29		2.16	15.33	<0.016	<0.04	33.52	12.20	0.60	4.87	
510	TD-4	5/24/06 0:00	6.90	0.09	3.02	-7.62	0.29		5.93	15.10	0.01	0.05	99.26	24.75	15.66	8.82	
511	6-150	5/24/06 0:00	0.48	0.15	2.86	-7.55	0.22		0.95	6.12	<0.016	0.04	72.56	25.86	0.44	5.12	
512	TD-7	5/24/06 0:00	7.69	<0.003	1.52	-7.82	0.22		2.50	4.20	<0.016	<0.06	70.45	18.91	0.55	2.74	
513	7-150	5/24/06 0:00	4.02	0.06	6.05	-7.71	0.22		2.86	2.96	<0.016	0.09	83.29	22.58	0.53	2.93	
514	TD-5	5/24/06 0:00	5.68	<0.003	1.65	-7.76	0.22		2.11	6.62	<0.016	<0.06	65.09	18.34	0.38	4.03	
515	8-90	5/24/06 0:00	0.02	<0.003	5.17	-7.83	0.22		2.16	2.61	<0.016	0.04	49.16	11.48	0.80	5.45	
516	8-150	5/24/06 0:00	2.44	0.02	2.74	-7.06	0.22		3.23	7.53	<0.016	0.13	73.13	18.81	0.82	2.66	
517	TD-9	5/24/06 0:00	5.29	<0.003	1.86	-7.55	0.22		2.36	5.82	<0.016	0.02	61.96	16.52	0.84	2.29	
518	9-150	5/24/06 0:00	0.02	<0.003	3.43	-7.15	0.22		0.95	5.24	<0.016	<0.06					
519	TD-6	5/24/06 0:00	4.16	<0.003	1.72	-7.72	0.22		1.93	5.20	<0.016	<0.06	64.38	17.08	0.50	1.91	
520	10-90	5/24/06 0:00	0.11	<0.003	2.83	-7.28	0.22		0.93	9.51	<0.016	0.02	88.28	26.25	0.31	5.17	
521	10-150	5/24/06 0:00	0.24	<0.003	3.04	-7.13	0.29		3.71	22.80	<0.016	0.06	84.73	28.95	0.69	3.91	
522	TD-10	5/24/06 0:00	2.95	<0.003	1.62	-7.49	0.22		2.66	4.22	<0.016	0.02	68.19	19.36	0.37	2.29	
550	RG-5	5/30/06 0:00				-4.73	0.22						<2.50	<1.20	0.34	3.70	
551	RG-1	5/30/06 0:00				-5.00	0.22						3.44	<1.20	1.83	<1.20	
552	RG-2	5/30/06 0:00				-4.89	0.22						2.53	<1.20	0.31	3.70	
553	RG-3	5/30/06 0:00				-3.58	0.22						<2.50	<1.20	0.75	<1.20	
554	RG-4	5/30/06 0:00				-4.48	0.22						<2.50	<1.20	3.58	<1.20	
555	Stream	5/24/06 17:54	4.86			-7.25	0.22		1.38	19.49	<0.016	0.04	60.64	22.79	1.12	8.30	
556	Stream	5/24/06 19:54	7.45			-7.14	0.22		1.58	23.82	<0.016	0.03	33.02	21.84	0.99	8.30	
560	Stream	5/24/06 21:54	6.78			-7.44	0.22		1.38	21.53	<0.016	0.03	37.55	22.47	1.30	8.51	
561	Stream	5/24/06 23:54	5.53			-6.87	0.22		0.48	21.01	<0.016	0.03	37.55	22.47	1.30	8.51	
562	Stream	5/25/06 1:54	3.04			-6.77	0.22		0.90	14.57	<0.016	0.03	53.61	21.58	1.18	11.60	
563	Stream	5/25/06 3:54	5.47			-6.77	0.29		1.18	15.93	<0.016	0.04	36.69	23.55	1.15	11.65	
564	Stream	5/25/06 5:54	6.45			-6.94	0.29		1.84	22.41	<0.016	0.03	30.49	23.71	1.13	8.96	
565	Stream	5/25/06 7:54	6.08		-6.51	-6.71	0.29	-46.65	1.87	23.34	<0.016	<0.02	38.58	23.99	1.20	9.12	

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
566	Stream	5/25/06 9:54	6.34		-6.91	-6.71	0.29	-47.59	1.62	24.68	<0.016	<0.02	45.20	23.31	1.14	9.38	
567	Stream	5/25/06 11:54	8.96		-7.48	-7.04	0.29	-47.04	1.95	23.51	<0.016	<0.02	26.67	17.42	0.76	6.39	
568	Stream	5/25/06 13:54	9.92		-6.03	-7.46	0.29	-46.86	2.26	28.81	<0.016	0.03	24.39	18.68	0.85	6.92	
569	Stream	5/25/06 15:54	8.55		-6.69	-7.15	0.29	-46.66	2.10	26.08	<0.016	<0.02	46.16	23.58	1.08	10.18	
570	Stream	5/25/06 17:54	9.05		-7.06	-7.20	0.29	-45.95	2.08	24.03	<0.016	<0.02	28.23	21.66	1.25	8.15	
571	Stream	5/25/06 19:54	3.00		-6.73	-6.81	0.29	-43.93	1.61	10.65	<0.016	0.02	37.66	16.26	2.06	5.30	
572	Stream	5/25/06 21:54	2.24		-6.73	-7.03	0.29	-43.67	2.08	7.53	<0.016	0.07	27.22	13.45	2.33	5.80	
573	Stream	5/25/06 23:54	17.45		-6.66	-6.77	0.29	-43.67	1.70	11.55	<0.016	0.03	33.40	12.07	1.92	7.17	
574	Stream	5/26/06 1:54	7.38		-6.86	-6.71	0.29	-43.42	2.21	11.34	<0.016	<0.02	30.55	12.02	1.96	6.64	
575	Stream	5/26/06 3:54	5.64		-6.50	-7.35	0.29	-44.37	1.97	12.08	<0.016	0.03	40.83	12.54	2.14	4.95	
576	Stream	5/26/06 5:54	9.74		-5.98	-6.73	0.29	-43.76	1.82	11.25	<0.016	0.05	37.68	13.65	2.07	5.16	
577	Stream	5/26/06 7:54	3.57		-5.65	-6.61	0.29	-44.09	2.07	8.09	0.02	0.06	40.15	14.30	1.78	6.90	
578	Stream	5/26/06 9:54	7.12		-6.69	-6.69	0.29	-44.09	2.44	12.20	<0.016	0.02	43.71	14.69	1.92	5.53	
579	Stream	5/26/06 11:54	6.56		-6.73	-6.73	0.29	-44.09	2.16	10.38	<0.016	<0.02	39.61	14.95	1.65	7.81	
580	Stream	5/26/06 13:54	6.02		-6.59	-6.59	0.29	-44.09	2.08	12.02	<0.016	0.02	40.28	15.44	1.68	7.29	
581	Stream	5/24/06 17:53		0.16	8.53												
582	Stream	5/24/06 19:53		<0.003	4.17												
583	Stream	5/24/06 21:53		<0.003	4.57												
584	Stream	5/24/06 23:53		0.06	4.36												
585	Stream	5/25/06 1:53		<0.003	3.83												
586	Stream	5/25/06 3:53		<0.003	3.68												
587	Stream	5/25/06 5:53		0.10	3.73												
588	Stream	5/25/06 7:53		<0.003	3.90												
589	Stream	5/25/06 9:53		<0.003	3.63												
590	Stream	5/25/06 11:53		<0.003	3.44												
591	Stream	5/25/06 13:53		0.09	3.71												
592	Stream	5/25/06 15:53		<0.003	3.67												
593	Stream	5/25/06 17:53		0.01	3.94												
594	Stream	5/25/06 19:53		0.35	7.16												
595	Stream	5/25/06 21:53		0.33	7.19												
596	Stream	5/25/06 23:53		0.17	7.65												
597	Stream	5/26/06 1:53		0.28	7.58												
598	Stream	5/26/06 3:53		0.29	7.10												
599	Stream	5/26/06 5:53		0.22	6.74												
600	Stream	5/26/06 7:53		0.14	6.56												
601	Stream	5/26/06 9:53		0.26	6.57												
602	Stream	5/26/06 11:53		0.24	6.60												
603	Stream	5/26/06 13:53		0.03	6.42												
604	RG-6	5/30/06 0:00				-4.89	0.22					0.14	<2.50	<1.20	3.18	<1.20	
605	RG-7	5/30/06 0:00				-5.21	0.22					0.29	<2.50	<1.20	0.29	<1.20	
606	RG-8	5/30/06 0:00				-5.06	0.22	-32.60				0.66	<2.50	<1.20	0.44	<1.20	
607	RG-9	5/30/06 0:00				-5.58	0.22					0.29	<2.50	<1.20	1.04	4.14	
608	RG-10	5/30/06 0:00				-5.39	0.22					0.30	<2.50	<1.20	0.33	<1.20	
675	1-90	5/30/06 0:00	0.86			-7.09	0.29		3.01	4.98	<0.016	0.08	37.37	16.08	0.35	3.34	
676	1-150	5/30/06 0:00	6.11	<0.003	2.86	-6.96	0.29		2.94	3.05	<0.016	0.04	49.39	22.66	0.50	4.03	
678	2-150	5/30/06 0:00	0.17	0.15	3.31	-7.71	0.29		0.67	0.40	<0.016	0.06	38.88	13.14	0.37	3.70	
679	3-150	5/30/06 0:00	0.37	0.01	2.40	-7.46	0.29		0.93	1.17	<0.016	<0.02	42.51	15.12	0.29	2.66	
680	4-90	5/30/06 0:00	0.03			-7.08	0.29		2.97	2.24	0.01	<0.02	26.50	25.35	0.37	8.44	
681	4-150	5/30/06 0:00	0.02	<0.003	2.93	-7.11	0.29		3.12	4.02	<0.016	0.05	45.28	21.83	0.55	2.88	
682	5-90	5/30/06 0:00	0.01	<0.003	3.83	-7.11	0.29		2.72	0.47	<0.016	<0.02	42.96	12.38	0.33	<0.02	
683	5-150	5/30/06 0:00	0.28	<0.003	4.17	-7.23	0.29		1.89	3.30	<0.016	0.05	30.92	20.40	1.67	9.70	

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl ⁻ (mg/L)	NH ₃ (mg/L)	NH ₄ (mg/L)	Ca ²⁺ (mg/L)	Mg ²⁺ (mg/L)	K ⁺ (mg/L)	Na ⁺ (mg/L)	Level (in)
684	TD-4	5/30/06 0:00	8.22	0.05	3.14	-7.60	0.29	14.90	3.99	14.90	<0.016	0.08	46.44	14.01		4.81	
685	Stream	5/30/06 0:00	4.73	<0.003	3.48	-6.92	0.29	15.45	1.31	15.45	0.08	<0.02	47.06	21.06	1.06	7.90	
686	6-150	5/30/06 0:00	0.99	<0.003	2.29	-7.00	0.29	3.88	2.23	3.88	<0.016	0.02	39.90	22.45	0.50	3.94	
687	TD-7	5/30/06 0:00	5.41	<0.003	1.24	-7.37	0.29	3.98	0.66	3.98	<0.016	<0.02	33.27	18.56	0.66	2.48	
688	7-150	5/30/06 0:00	1.76	0.02	4.98	-7.11	0.29	1.99	1.99	2.57	0.08	0.26	55.07	22.23	0.52	3.00	
689	TD-5	5/30/06 0:00	6.78	<0.003	1.43	-7.35	0.29	2.97	2.97	6.17	<0.016	<0.02	31.93	12.27	0.47	3.42	
690	8-90	5/30/06 0:00	0.00	<0.003	3.78	-6.91	0.29	3.06	3.06	2.13	<0.016	0.03	16.21	7.78	0.81	7.23	
691	8-150	5/30/06 0:00	2.59	0.05	2.93	-7.71	0.29	2.04	2.04	5.22	0.06	0.32	55.61	17.08	1.52	3.06	
692	9-150	5/30/06 0:00	0.01	<0.003	4.40	-7.04	0.29	2.19	2.19	3.44	<0.016	0.08	45.50	23.44	0.67	2.69	
693	TD-9	5/30/06 0:00	6.34	<0.003	1.78	-7.50	0.29	2.41	2.41	4.88	<0.016	0.05	51.62	14.33	1.00	2.12	
694	TD-6	5/30/06 0:00	4.43	<0.003	2.03	-7.47	0.29	5.16	1.36	5.16	<0.016	<0.02	46.53	15.04	0.60	2.25	
695	10-90	5/30/06 0:00		<0.003	3.15												
696	10-150	5/30/06 0:00	0.60	0.06	2.31	-6.95	0.23	19.94	1.77	19.94	0.03	0.12	49.48	26.33	1.07	4.31	
697	TD-10	5/30/06 0:00		<0.003	1.98	-6.98	0.23										
712	Stream	5/26/06 16:49		0.17	6.72												
713	Stream	5/26/06 20:49		0.17	6.16												
714	Stream	5/27/06 0:49		0.38	5.76												
715	Stream	5/27/06 4:49		0.04	5.46												
716	Stream	5/27/06 8:49		<0.003	5.27												
717	Stream	5/27/06 12:49		0.15	5.65												
718	Stream	5/27/06 16:49		0.13	5.70												
719	Stream	5/27/06 20:49		0.18	5.39												
720	Stream	5/28/06 0:49		0.18	5.37												
721	Stream	5/28/06 4:49		0.11	4.99												
722	Stream	5/28/06 8:49		0.11	5.08												
723	Stream	5/28/06 12:49		0.02	5.62												
724	Stream	5/28/06 16:49		<0.003	5.77												
725	Stream	5/28/06 20:49		0.12	5.48												
726	Stream	5/29/06 0:49		0.11	5.11												
727	Stream	5/29/06 4:49		0.05	5.00												
728	Stream	5/29/06 8:49		0.06	5.33												
729	Stream	5/29/06 12:49		<0.003	5.77												
730	Stream	5/29/06 16:49		0.06	5.98												
731	Stream	5/29/06 20:49		0.03	5.49												
732	Stream	5/30/06 0:49		0.04	5.05												
733	Stream	5/30/06 4:49		0.15	4.81												
734	Stream	5/30/06 8:49		<0.003	5.11												
758	Stream	5/26/06 15:39	4.95			-6.52	0.23	9.75	2.63	9.75	0.05	0.13	31.81	12.54	1.62	4.80	
759	Stream	5/26/06 19:39	4.30			-6.64	0.23	10.25	2.04	10.25	0.03	0.07	44.01	16.55	1.54	5.90	
760	Stream	5/26/06 23:39	4.48			-6.58	0.23	11.17	2.89	11.17	<0.016	0.06	42.58	16.27	1.34	6.06	
761	Stream	5/27/06 3:39	7.74			-6.42	0.23	17.34	3.92	17.34	<0.016	0.10	46.68	17.91	1.36	6.62	
762	Stream	5/27/06 7:39	7.89			-6.49	0.23	16.76	2.13	16.76	<0.016	0.09	40.93	15.61	1.26	6.39	
763	Stream	5/27/06 11:39	3.99			-6.72	0.23	10.89	1.86	10.89	<0.016	0.14	44.47	18.27	1.31	6.99	
764	Stream	5/27/06 15:39	4.61			-6.94	0.23	12.56	2.15	12.56	<0.016	0.14	47.59	17.68	1.22	6.77	
765	Stream	5/27/06 19:39	4.56			-6.68	0.23	16.54	2.42	16.54	<0.016	0.10	44.93	17.28	1.22	6.92	
766	Stream	5/27/06 23:39	4.04			-6.75	0.23	11.74	1.60	11.74	<0.016	0.10	48.07	20.34	1.26	7.08	
767	Stream	5/28/06 3:39	8.85			-6.69	0.23	17.88	2.30	17.88	<0.016	0.11	49.56	18.58	1.21	6.62	
768	Stream	5/28/06 7:39	8.38			-6.59	0.23	17.12	2.68	17.12	<0.016	0.09	40.14	19.53	1.17	6.83	
769	Stream	5/28/06 11:39	8.30			-6.45	0.23	17.81	2.40	17.81	<0.016	0.11	47.82	19.20	1.24	6.88	
770	Stream	5/28/06 15:39	7.47			-6.50	0.23	18.52	2.75	18.52	<0.016	0.07	41.25	17.82	1.17	7.01	
771	Stream	5/28/06 19:39	4.53			-6.68	0.23	12.30	1.95	12.30	<0.016	0.07	39.21	19.88	1.20	7.09	

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	pH (‰)	Silica (mg/L)	Cl ⁻ (mg/L)	NH ₃ (mg/L)	NH ₄ (mg/L)	Ca ²⁺ (mg/L)	Mg ²⁺ (mg/L)	K ⁺ (mg/L)	Na ⁺ (mg/L)	Level (in)
772	Stream	5/28/06 23:39	4.61			-6.61	0.23		1.43	13.44	<0.016	0.05	47.51	19.67	1.18	6.81	
773	Stream	5/29/06 3:39	4.52			-6.61	0.23		2.45	20.87	<0.016	0.07	42.79	20.48	1.17	9.53	
774	Stream	5/29/06 7:39	6.96			-6.64	0.23		2.91	20.29	<0.016	0.04	39.48	20.25	1.19	7.48	
775	Stream	5/29/06 11:39	6.27			-7.01	0.23		1.83	15.33	<0.016	<0.02	36.61	16.47	1.12	6.15	
776	Stream	5/29/06 15:39	4.78			-6.89	0.23		1.82	13.86	<0.016	<0.02	32.61	18.89	1.18	6.46	
777	Stream	5/29/06 19:39	6.65			-6.78	0.23		1.93	18.39	<0.016	0.03	44.23	22.13	1.23	7.09	
778	Stream	5/29/06 23:39	3.76			-6.88	0.23		2.60	12.07	<0.016	<0.02	51.02	19.67	1.14	6.77	
779	Stream	5/30/06 3:39	4.41			-6.72	0.23		1.00	13.94	<0.016	0.03	44.82	20.52	1.11	7.93	
780	Stream	5/30/06 7:39	4.38			-6.71	0.23		0.69	15.95	<0.016	0.02	44.91	22.58	1.20	7.86	
851	1-150	6/20/06 0:00	1.87	<0.003	3.80	-7.72	0.23		1.44	2.16	<0.016	<0.02	54.10	22.13	0.51	6.14	
853	2-150	6/20/06 0:00	0.79	0.04	2.50	-8.22	0.23		1.97	0.55	<0.016	<0.02	39.10	16.89	0.49	4.13	
854	1-90, 3-90, 4-90	6/20/06 0:00	<0.026			-7.41	0.23		3.05	4.64	<0.016	0.03	27.29	19.00	0.47	5.52	
855	3-150	6/20/06 0:00	0.53	<0.003	2.12	-7.38	0.26		1.79	1.81	<0.016	0.02	27.30	13.64	0.38	2.11	
857	4-150	6/20/06 0:00	0.03	0.08	3.84	-6.70	0.26		2.29	3.71	<0.016	0.08	26.16	23.13	0.74	4.11	
858	5-90	6/20/06 0:00	0.07	<0.003	4.05	-7.16	0.26		2.33	0.79	<0.016	0.02	33.73	17.93	0.46	4.97	
859	5-150	6/20/06 0:00	0.09	<0.003	3.84	-7.25	0.26		3.05	2.97	<0.016	0.05	32.92	24.05	2.17	7.81	
860	TD-4	6/20/06 0:00	7.48	0.04	3.29	-7.40	0.26		3.11	12.17	<0.016	0.11	63.82	26.17	12.37	5.84	
861	TD-7	6/20/06 0:00	6.62	<0.003	1.43	-7.43	0.26		3.84	3.92	0.03	<0.02	26.13	20.52	1.25	2.78	
862	6-90	6/20/06 0:00	0.02	<0.003	6.35	-7.98	0.26		2.33	3.90	<0.016	0.07	44.93	18.78	2.86	2.83	
863	6-150	6/20/06 0:00	0.84	0.14	2.60	-6.79	0.26		2.00	4.69	<0.016	<0.02	32.17	27.05	0.69	4.33	
864	TD-5	6/20/06 0:00	2.97	<0.003	2.87	-7.30	0.26		1.61	3.41	<0.016	<0.02	42.80	16.87	0.84	5.44	
865	7-90	6/20/06 0:00	1.16	<0.003	6.06	-7.88	0.26		1.31	0.74	<0.016	<0.02	24.26	13.15	0.32	2.59	
866	7-150	6/20/06 0:00	0.62	0.01	6.91	-7.44	0.26		1.98	2.35	<0.016	<0.02	40.10	15.37	4.62	2.14	
867	TD-9	6/20/06 0:00	2.95	<0.003	3.18	-7.36	0.26		3.29	5.09	<0.016	<0.02	37.36	17.18	2.08	2.42	
868	8-90	6/20/06 0:00	<0.026		4.06	-7.18	0.26		2.19	4.64	<0.016	0.03	18.04	5.95	1.10	6.43	
869	8-150	6/20/06 0:00	0.33	0.01	6.82	-8.01	0.26		1.62	1.62	<0.016	<0.02	15.67	4.52	3.13	<1.20	
870	TD-6	6/20/06 0:00	5.94	0.00	1.81	-7.11	0.26		1.91	5.56	<0.016	<0.02	61.74	20.75	0.72	4.93	
871	9-150	6/20/06 0:00	0.02	<0.003	3.90	-7.19	0.26		3.39	5.79	0.18	0.18	35.87	28.58	0.91	3.13	
872	10-90	6/20/06 0:00	0.13	<0.003	4.30	-7.91	0.26		2.42	10.99	<0.016	0.02	30.68	18.14	0.61	3.05	
873	10-150	6/20/06 0:00	2.07	<0.003	2.49	-6.99	0.26		1.35	23.44	0.01	0.06	33.62	24.24	0.96	5.18	
874	TD-10	6/20/06 0:00	2.88	<0.003	5.24	-7.65	0.26		1.72	2.15	<0.016	<0.02	43.07	13.92	0.94	3.17	
875	Stream	6/20/06 0:00	12.33	0.08	5.11	-6.90	0.26		2.88	15.95	0.27	0.45	32.12	15.67	1.97	3.63	
886	Stream	6/23/06 9:49	7.25			-5.73	0.26		1.68	7.28	0.18	0.44	37.58	11.14	3.04	3.78	
887	RG-5	6/27/06 0:00	0.39			-3.83	0.26		0.01	0.20	0.19	0.33	<2.50	<1.20	0.46	<1.20	1.30
888	RG-1	6/27/06 0:00	0.46			-3.50	0.26		<0.013	0.28	0.23	0.36	<2.50	<1.20	0.93	<1.20	1.20
889	RG-2	6/27/06 0:00	0.35			-3.72	0.26		<0.013	0.40	0.25	0.23	<2.50	<1.20	0.77	<1.20	0.92
890	RG-3	6/27/06 0:00	0.18			-3.66	0.26		0.18	0.24	1.48	1.39	<2.50	<1.20	1.17	<1.20	1.25
891	RG-4	6/27/06 0:00	0.20			-4.17	0.26		0.40	0.33	1.56	1.32	<2.50	<1.20	1.02	<1.20	1.25
892	RG-6	6/27/06 0:00	0.24			-4.13	0.26		<0.013	0.37	0.20	0.33	<2.50	<1.20	0.30	<1.20	1.35
893	RG-7	6/27/06 0:00	0.23			-4.02	0.26		<0.013	0.14	0.27	0.32	<2.50	<1.20	<0.20	<1.20	1.70
894	RG-8	6/27/06 0:00	0.23			-4.41	0.26		<0.013	0	0.22	0.30	<2.50	<1.20	0.34	<1.20	1.85
895	RG-9	6/27/06 0:00	0.19			-4.33	0.26		0.26	0.93	0.72	0.79	<2.50	<1.20	4.22	<1.20	2.05
896	RG-10	6/27/06 0:00	0.25			-4.46	0.26		<0.013	0.45	0.29	0.37	<2.50	<1.20	0.28	<1.20	1.75
926	Stream	6/21/06 14:22		0.42	31.45												
927	Stream	6/21/06 16:22		0.23	7.74												
928	Stream	6/21/06 18:22		0.19	7.32												
929	Stream	6/21/06 20:22		0.31	6.88												
930	Stream	6/21/06 22:22		0.27	6.53												
931	Stream	6/22/06 0:22		0.35	6.36												
932	Stream	6/22/06 2:22		0.04	6.19												
933	Stream	6/22/06 4:22		0.26	5.93												

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	Silica (mg/L)	Cl ⁻ (mg/L)	NH ₃ (mg/L)	NH ₄ (mg/L)	Ca ²⁺ (mg/L)	Mg ²⁺ (mg/L)	K ⁺ (mg/L)	Na ⁺ (mg/L)	Level (in)
934	Stream	6/22/06 6:22		0.26	5.65											
935	Stream	6/22/06 8:22		0.01	5.92	-7.18	0.26	3.38	17.65	3.38	0.04	42.67	16.72	1.00	6.03	
936	Stream	6/22/06 10:22		0.30	6.04	-7.21	0.26	3.12	17.72	3.12	0.04	42.76	21.39	1.21	5.32	
937	Stream	6/22/06 12:22		0.30	6.25	-7.11	0.26	3.04	13.72	3.04	0.05	36.50	24.54	1.34	6.03	
938	Stream	6/22/06 14:22		0.02	5.92	-7.56	0.26	4.19	19.09	4.19	0.04	36.64	21.53	1.22	5.79	
939	Stream	6/22/06 16:22		0.21	6.11	-6.75	0.26	3.07	12.70	<0.016	0.05	30.73	13.90	0.94	4.16	
940	Stream	6/22/06 18:22		0.29	6.08	-7.22	0.26	1.97	11.33	<0.016	0.03	34.04	19.38	1.06	5.02	
941	Stream	6/22/06 20:22		0.28	9.46	-7.09	0.26	1.55	17.54	<0.016	0.02	42.43	21.27	1.08	10.94	
942	Stream	6/22/06 22:22		0.26	10.26	-7.72	0.26	3.03	15.13	<0.016	0.04	34.60	23.33	1.34	6.66	
943	Stream	6/23/06 0:22		0.58	10.13	-7.18	0.26	2.18	16.22	<0.016	0.02	35.23	15.85	0.90	8.52	
944	Stream	6/23/06 2:22		0.39	10.53	-7.10	0.26	4.60	20.84	<0.016	<0.02	40.94	21.95	1.30	5.88	
945	Stream	6/23/06 4:22		1.00	10.81	-7.16	0.26	5.46	22.63	<0.016	<0.02	51.78	22.58	1.28	6.03	
946	Stream	6/23/06 6:22		0.76	10.45	-7.21	0.26	3.24	13.44	<0.016	<0.02	47.62	22.84	1.06	8.10	
947	Stream	6/23/06 8:22		0.62	10.24	-7.45	0.26	3.42	16.58	<0.016	<0.02	45.28	22.81	1.25	5.92	
948	Stream	6/21/06 14:19	8.62			-7.18	0.26	46.05	14.92	<0.016	<0.02	42.63	22.44	1.28	5.87	
949	Stream	6/21/06 16:19	11.02			-7.18	0.26	45.69	24.68	<0.016	<0.02	49.07	25.20	1.37	6.24	
950	Stream	6/21/06 18:19	7.01			-7.40	0.26	36.04	10.21	<0.016	<0.02	32.50	14.14	2.22	3.71	
951	Stream	6/21/06 20:19	11.11			-6.14	0.26	32.91	7.87	0.15	0.18	40.29	9.02	2.36	2.19	
952	Stream	6/22/06 0:19	7.02			-6.23	0.26	2.02	5.94	0.15	0.20	37.43	7.72	2.47	2.41	
953	Stream	6/22/06 2:19	5.78			-6.40	0.26	2.46	8.84	0.07	0.03	40.51	8.64	2.22	2.77	
954	Stream	6/22/06 4:19	6.74			-5.97	0.26	2.47	6.32	0.03	<0.02	40.49	12.00	3.17	3.72	
955	Stream	6/22/06 6:19	10.01			-5.60	0.25	3.92	10.17	<0.016	<0.06	45.79	10.39	2.23	3.31	
956	Stream	6/22/06 8:19	6.97			-6.83	0.25	2.45	4.17	0.01	0.07	31.14	12.39	0.53	2.53	
957	Stream	6/22/06 10:19	12.90			-6.80	0.25	3.85	4.81	0.02	0.10	30.77	14.94	0.64	2.88	
958	Stream	6/22/06 12:19	9.25			-7.42	0.25	3.83	4.66	<0.016	<0.02	17.70	8.25	0.34	1.61	
959	Stream	6/22/06 14:19	11.27			-7.85	0.25	2.97	1.32	<0.016	0.04	29.78	13.70	0.49	5.46	
960	Stream	6/22/06 16:19	13.24			-6.99	0.25	2.97	3.09	<0.016	0.04	35.63	23.07	0.58	3.49	
961	Stream	6/22/06 18:19	7.46			-7.82	0.25	4.55	1.72	<0.016	0.02	34.24	18.62	0.31	2.83	
962	Stream	6/22/06 20:19	9.37			-6.55	0.25	3.78	4.99	0.08	0.19	32.31	27.46	0.78	5.29	
963	Stream	6/22/06 22:19	5.88			-6.99	0.25	3.43	1.18	<0.016	<0.02	63.90	22.95	0.58	3.73	
964	Stream	6/23/06 0:19	5.25			-6.49	0.25	5.85	5.25	<0.016	<0.02	41.53	27.13	1.88	9.18	
965	Stream	6/23/06 2:19	7.16			-7.04	0.25	3.76	16.03	0.05	0.17	64.85	27.05	19.35	6.93	
966	Stream	6/23/06 4:19	4.83			-6.53	0.25	3.26	8.00	<0.016	0.04	31.23	25.25	0.67	2.96	
967	Stream	6/23/06 6:19	6.19			-7.73	0.25	2.16	6.65	<0.016	<0.02	59.88	22.69	0.94	3.04	
968	Stream	6/23/06 8:19	6.19			-6.88	0.25	2.92	4.39	<0.016	<0.02	31.76	18.84	0.50	2.46	
969	Stream	6/23/06 10:19	2.81			-6.99	0.25	2.92	6.99	<0.016	<0.02	44.86	21.44	0.70	4.83	
1000	Stream	6/27/06 0:00	1.81			-6.88	0.25	3.25	5.91	<0.016	0.04	37.08	15.05	1.26	2.36	
1001	Stream	6/27/06 0:00	7.69	<0.003	2.25											
1002	Stream	6/27/06 0:00	0.19													
1003	Stream	6/27/06 0:00	0.27	0.20	3.51											
1005	Stream	6/27/06 0:00	0.90	0.11	2.34											
1006	Stream	6/27/06 0:00	0.03	<0.003	2.49											
1007	Stream	6/27/06 0:00	0.18	<0.003	3.02											
1008	Stream	6/27/06 0:00	<0.026		2.07											
1009	Stream	6/27/06 0:00	4.74	<0.003	2.49											
1010	TD-4	6/27/06 0:00	9.14	0.11	3.02											
1012	6-150	6/27/06 0:00	2.70	<0.003	2.07											
1013	TD-7	6/27/06 0:00	7.89	<0.003	1.06											
1015	7-150	6/27/06 0:00	3.66	<0.003	1.61											
1016	TD-5	6/27/06 0:00	7.40	<0.003	1.15											
1017	TD-9	6/27/06 0:00	5.20	<0.003	1.20											

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
1018	8-90	6/27/06 0:00	0.01	0.05	6.17	-5.55	0.25		3.25	4.29	<0.016	0.06	21.82	5.04	1.46	10.85	
1019	8-150	6/27/06 0:00	0.07	0.15	6.17	-3.90	0.25	1.13	1.77	1.77	0.11	0.16	19.68	2.45	4.05	<1.20	
1020	TD-6	6/27/06 0:00	5.04	<0.003	1.46	-7.16	0.25	3.20	6.48	6.48	<0.016	<0.02	44.68	15.39	0.73	2.36	
1021	9-150	6/27/06 0:00	0.31	<0.003	2.49	-6.46	0.25	3.76	5.95	5.95	0.10	0.19	37.33	26.94	0.85	3.05	
1022	10-90	6/27/06 0:00	0.03	<0.003	3.72	-6.86	0.25	3.91	12.72	12.72	<0.016	0.02	44.17	29.63	0.50	4.00	
1023	10-150	6/27/06 0:00	3.10	<0.003	1.76	-6.39	0.25	2.87	23.73	23.73	<0.016	0.05	44.62	28.91	1.10	4.42	
1024	TD-10	6/27/06 0:00	6.32	<0.003	1.56	-6.61	0.25	2.64	6.07	6.07	<0.016	<0.02	62.73	21.74	0.58	5.20	
1025	Stream	6/27/06 11:22	3.57	0.04	5.27	-6.28	0.25	2.58	10.62	10.62	<0.016	0.08	33.34	10.04	2.19	4.85	
1037	Stream	6/23/06 10:27		0.51	11.08												
1038	Stream	6/23/06 14:27		0.54	11.23												
1039	Stream	6/23/06 18:27		0.22	10.76												
1040	Stream	6/23/06 22:27		0.15	9.80												
1041	Stream	6/24/06 2:27		0.17	9.12												
1042	Stream	6/24/06 6:27		0.12	8.79												
1043	Stream	6/24/06 10:27		0.17	8.83												
1044	Stream	6/24/06 14:27		0.30	9.30												
1045	Stream	6/24/06 18:27		0.29	9.14												
1046	Stream	6/24/06 22:27		0.15	8.37												
1047	Stream	6/25/06 2:27		0.15	8.09												
1048	Stream	6/25/06 6:27		0.26	8.09												
1049	Stream	6/25/06 10:27		0.15	8.38												
1050	Stream	6/25/06 14:27		0.44	8.83												
1051	Stream	6/25/06 18:27		0.47	9.63												
1052	Stream	6/25/06 22:27		0.18	9.59												
1053	Stream	6/26/06 2:27		0.25	9.27												
1054	Stream	6/26/06 6:27		0.21	8.70												
1055	Stream	6/26/06 10:27		0.14	8.92												
1056	Stream	6/26/06 14:27		0.36	9.26												
1057	Stream	6/26/06 18:27		0.28	8.75												
1058	Stream	6/26/06 22:27		0.29	9.50												
1059	Stream	6/27/06 2:27		0.30	9.64												
1060	Stream	6/27/06 6:27		0.29	9.49												
1085	Stream	6/23/06 10:13	5.08			-5.34	0.25	-34.98	2.37	6.96	<0.016	0.09	42.82	11.82	2.79	3.66	
1086	Stream	6/23/06 14:13	5.89			-5.58	0.25	-34.70	3.46	9.21	<0.016	0.09	52.49	13.42	2.83	4.04	
1087	Stream	6/23/06 18:13	7.14			-5.66	0.80	4.44	4.44	9.06	<0.016	0.06	47.64	13.46	2.56	4.13	
1088	Stream	6/23/06 22:13	5.10			-5.93	0.25	2.22	8.59	8.59	<0.016	0.08	37.23	12.77	2.13	4.11	
1089	Stream	6/24/06 2:13	6.13			-5.91	0.25	1.74	9.89	9.89	<0.016	0.05	59.07	16.89	1.92	5.48	
1090	Stream	6/24/06 6:13	9.85			-5.65	0.25	3.00	9.79	9.79	<0.016	0.06	49.42	16.35	1.59	5.46	
1091	Stream	6/24/06 10:13	8.49			-6.13	0.25	5.01	15.00	15.00	<0.016	0.03	46.52	17.38	1.61	5.74	
1092	Stream	6/24/06 14:13	10.79			-6.03	0.25	2.99	18.62	18.62	<0.016	0.05	54.17	16.82	1.42	5.80	
1093	Stream	6/24/06 18:13	4.14			-6.57	0.38	4.74	22.98	22.98	<0.016	0.04	52.79	18.98	1.47	6.29	
1094	Stream	6/24/06 22:13	10.71			-6.57	0.38	3.45	12.42	12.42	<0.016	0.03	39.19	16.41	1.35	5.50	
1095	Stream	6/25/06 2:13	4.49			-6.51	0.38	5.62	22.56	22.56	<0.016	0.02	45.35	15.94	1.33	5.20	
1096	Stream	6/25/06 6:13	6.73			-6.40	0.38	4.82	11.78	11.78	<0.016	0.03	43.49	18.92	1.34	6.18	
1097	Stream	6/25/06 10:13	3.92			-6.35	0.38	2.57	11.66	11.66	<0.016	0.02	43.94	18.39	1.40	6.14	
1098	Stream	6/25/06 14:13	2.09			-6.37	0.38	2.62	7.66	7.66	<0.016	0.04	49.86	20.51	1.57	6.26	
1099	Stream	6/25/06 18:13	5.97			-6.58	0.38	2.49	7.40	7.40	<0.016	0.05	37.45	15.57	1.86	5.09	
1100	Stream	6/25/06 22:13	5.14			-6.16	0.38	2.84	12.54	12.54	<0.016	0.18	28.28	9.26	1.66	3.79	
1101	Stream	6/26/06 2:13	4.40			-6.65	0.38	2.84	8.01	8.01	<0.016	0.03	35.61	13.62	1.64	5.40	
1102	Stream	6/26/06 6:13	4.40			-6.58	0.38	3.05	11.83	11.83	<0.016	0.02	36.24	14.34	1.81	5.14	
1103	Stream	6/26/06 10:13	2.14			-6.64	0.80	4.14	13.62	13.62	<0.016	<0.02	38.60	14.51	1.74	5.31	

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl ⁻ (mg/L)	NH ₃ (mg/L)	NH ₄ (mg/L)	Ca ²⁺ (mg/L)	Mg ²⁺ (mg/L)	K ⁺ (mg/L)	Na ⁺ (mg/L)	Level (in)
1104	Stream	6/26/06 14:13	2.24			-6.81	0.38		2.87	6.37	<0.016	<0.02	30.74	11.98	1.59	4.78	
1105	Stream	6/26/06 18:13	3.22			-6.76	0.38		1.85	7.21	<0.016	<0.02	42.98	16.03	1.75	5.77	
1106	Stream	6/26/06 22:13	5.60			-6.62	0.38		2.86	10.87	<0.016	<0.02	38.49	12.23	1.82	5.22	
1107	Stream	6/27/06 2:13	2.32			-6.96	0.38		3.07	9.64	0.14	0.08	22.98	8.25	1.65	5.72	
1108	Stream	6/27/06 6:13	3.01			-6.56	0.38		2.20	9.06	<0.016	0.03	28.80	10.18	1.89	4.84	
1163	Stream	6/27/06 11:19		1.03	9.78												
1164	Stream	6/27/06 14:19		1.06	9.27												
1165	Stream	6/27/06 17:19		0.79	8.97												
1166	Stream	6/27/06 20:19		0.21	8.75												
1167	Stream	6/27/06 23:19		0.62	8.50												
1168	Stream	6/28/06 2:19		0.32	8.52												
1169	Stream	6/28/06 5:19		0.39	8.37												
1170	Stream	6/28/06 8:19		0.19	7.98												
1171	Stream	6/28/06 11:19		0.14	7.90												
1172	Stream	6/28/06 14:19		0.48	8.09												
1173	Stream	6/28/06 17:19		0.56	7.85												
1174	Stream	6/28/06 20:19		0.16	7.57												
1175	Stream	6/28/06 23:19		0.13	7.21												
1176	Stream	6/29/06 2:19		0.12	6.95												
1177	Stream	6/29/06 5:19		0.07	6.83												
1178	Stream	6/29/06 8:19		0.10	6.68												
1179	Stream	6/29/06 11:19		0.05	6.97												
1180	Stream	6/29/06 14:19		0.25	6.99												
1181	Stream	6/29/06 17:19		0.07	7.10												
1182	Stream	6/29/06 20:19		<0.003	6.78												
1183	Stream	6/29/06 23:19		0.13	6.33												
1184	Stream	6/30/06 2:19		0.21	6.13												
1185	Stream	6/30/06 5:19		0.05	6.11												
1209	Stream	6/27/06 11:02	1.41			-6.64	0.38		2.54	9.97	<0.016	0.05	29.47	12.07	2.02	5.26	
1210	Stream	6/27/06 14:02	1.15			-6.33	0.38		0.94	8.20	<0.016	0.04	26.01	11.60	1.90	4.82	
1211	Stream	6/27/06 17:02	3.10			-7.33	0.80		1.31	11.30	<0.016	0.04	33.23	11.86	1.84	4.85	
1212	Stream	6/27/06 20:02	1.85			-6.76	0.38		2.76	8.18	<0.016	0.04	45.55	12.48	1.88	4.96	
1213	Stream	6/27/06 23:02	2.24			-6.09	0.43		3.32	9.18	<0.016	0.04	36.22	13.88	1.92	5.28	
1214	Stream	6/28/06 2:02	8.00			-6.01	0.43		5.25	20.36	<0.016	0.04	35.68	12.91	1.85	5.81	
1215	Stream	6/28/06 5:02	2.43			-6.28	0.43		2.28	10.36	<0.016	0.04	47.31	14.89	1.67	9.00	
1216	Stream	6/28/06 8:02	2.35			-6.38	0.43		3.01	12.84	<0.016	0.02	32.78	14.59	1.78	6.39	
1217	Stream	6/28/06 11:02	2.72			-6.46	0.43		2.85	12.52	<0.016	<0.02	41.83	15.67	1.70	6.23	
1218	Stream	6/28/06 14:02	2.00			-6.09	0.43		3.26	9.77	<0.016	0.02	41.00	16.06	1.66	6.21	
1219	Stream	6/28/06 17:02	2.09			-6.29	0.43		3.12	13.48	<0.016	<0.02	38.86	14.58	1.66	6.22	
1220	Stream	6/28/06 20:02	6.21			-6.01	0.43		2.60	18.83	<0.016	<0.02	40.51	15.40	1.53	6.28	
1221	Stream	6/28/06 23:02	2.46			-6.29	0.43		4.77	19.01	<0.016	<0.02	28.28	13.32	1.50	5.42	
1222	Stream	6/29/06 2:02	3.47			-5.98	0.43		3.09	11.15	<0.016	0.60	33.75	13.41	1.30	6.81	
1223	Stream	6/29/06 5:02	1.88			-6.33	0.43		2.16	11.39	<0.016	0.03	35.82	16.19	1.54	6.46	
1224	Stream	6/29/06 8:02	4.47			-6.07	0.43		2.56	16.36	<0.016	<0.02	34.10	17.69	1.54	6.71	
1225	Stream	6/29/06 11:02	3.30			-6.02	0.43		2.73	14.09	<0.016	<0.02	38.80	17.20	1.52	6.63	
1226	Stream	6/29/06 14:02	1.57			-5.98	0.43		2.05	8.54	<0.016	<0.02	34.52	17.03	1.53	6.55	
1227	Stream	6/29/06 17:02	2.69			-6.53	0.43		1.25	11.72	<0.016	0.04	38.52	17.17	1.52	6.54	
1228	Stream	6/29/06 20:02	1.64			-6.44	0.43		1.99	6.87	<0.016	<0.02	40.28	18.10	1.33	7.93	
1229	Stream	6/29/06 23:02	1.49			-6.19	0.43		0.99	7.01	<0.016	<0.02	37.85	18.26	1.33	8.30	
1230	Stream	6/30/06 2:02	2.50			-5.84	0.43		2.66	12.86	<0.016	0.03	39.09	17.67	1.39	10.86	
1231	Stream	6/30/06 5:02	3.06			-5.98	0.43		1.27	16.59	<0.016	0.04	39.48	17.82	1.46	6.54	

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl ⁻ (mg/L)	NH ₃ (mg/L)	NH ₄ (mg/L)	Ca ²⁺ (mg/L)	Mg ²⁺ (mg/L)	K ⁺ (mg/L)	Na ⁺ (mg/L)	Level (in)
1232	1-150	8/2/06 0:00	5.74			-7.33	0.35	3.13	3.85	<0.016	0.11	34.11	19.07	0.52	3.16		
1233	2-150	8/2/06 0:00	0.88	0.60	4.29	-7.57	0.35	4.18	12.42	0.01	0.18	30.72	18.49	0.68	5.00		
1234	3-150	8/2/06 0:00	0.22			-6.50	0.35	6.02	10.41	1.44	<0.02	56.28	19.20	12.70	7.95		
1235	4-150	8/2/06 0:00	0.02			-6.35	0.35	3.18	6.54	3.83	<0.02	33.79	29.48	3.67	6.00		
1236	5-150	8/2/06 0:00	0.75			-6.74	0.35	4.51	7.82	<0.016	0.07	24.28	21.87	1.57	7.11		
1237	Stream	8/2/06 7:48	1.69	0.37	3.45	-6.69	0.35	2.58	21.07	<0.016	0.08	41.71	16.13	1.25	8.97		
1238	TD-4	8/2/06 0:00	6.48	0.09	3.23	-7.16	0.35	4.09	17.02	<0.016	0.09	44.35	19.60	22.76	5.59		
1239	7-150	8/2/06 0:00	5.27			-7.03	0.35	5.93	11.33	<0.016	0.14	53.34	18.83	6.62	3.43		
1241	8-150	8/2/06 0:00	1.78	<0.003	3.15	-7.51	0.35	3.83	8.06	0.01	0.13	32.14	20.40	1.45	3.25		
1242	10-150	8/2/06 0:00	3.58			-6.93	0.35	4.00	26.92	<0.016	0.04	33.90	24.50	0.94	3.53		
1243	TD-10	8/2/06 0:00	2.10		1.43	-7.40	0.35	1.19	4.96	<0.016	<0.02	54.25	21.52	0.69	2.86		
1244	9-150	8/2/06 0:00	0.01	<0.003		-7.34	0.35	3.91	6.71	0.08	0.08	29.87	23.49	0.48	2.77		
1245	6-150	8/2/06 0:00	2.14			-6.98	0.35	2.86	8.21	<0.016	0.05	37.97	18.24	2.78	2.52		
1255	RG-1	8/6/06 0:00	0.40			-3.78	0.35		0.39	0.31	0.25	2.86	<1.20	0.66	<1.20	0.80	
1256	RG-2	8/6/06 0:00	0.24			-3.04	0.35	<0.013	0.23	0.38	0.28	<2.50	<1.20	0.44	<1.20	0.62	
1257	RG-5	8/6/06 0:00	0.26			-3.53	0.35	<0.013	0.51	0.32	0.31	<2.50	<1.20	0.61	<1.20	0.68	
1258	Stream	8/4/06 9:30	1.31	0.04	3.91	-6.52	0.35	2.29	24.10	<0.016	0.04	32.82	12.91	1.43	9.97		
1259	RG-3	8/6/06 0:00	0.11			-3.14	0.35	0.13	0.22	1.09	0.98	<2.50	<1.20	0.64	<1.20	0.70	
1260	RG-4	8/6/06 0:00	0.12			-3.69	0.35	<0.013	0.30	0.08	0.12	2.56	<1.20	<0.200	<1.20	0.64	
1261	RG-6	8/6/06 0:00	0.32			-3.75	0.35	<0.013	0.32	0.54	0.64	<2.50	<1.20	1.54	<1.20	0.64	
1262	RG-7	8/6/06 0:00	0.24			-3.33	0.35	<0.013	0.19	0.40	0.42	<2.50	<1.20	0.41	<1.20	0.64	
1263	RG-8	8/6/06 0:00	0.24			-2.54	0.35	0.09	0.41	0.60	0.50	<2.50	<1.20	0.79	<1.20	0.60	
1264	RG-9	8/6/06 0:00	0.15			-2.99	0.35	<0.013	0.25	0.14	0.24	<2.50	<1.20	<0.200	<1.20	0.62	
1265	RG-10	8/6/06 0:00	0.14			-2.48	0.35	<0.013	0.23	0.35	0.45	<2.50	<1.20	0.61	<1.20	0.58	
1272	Stream	8/3/06 8:21		0.37	88.74												
1273	Stream	8/3/06 9:41		0.20	12.03												
1274	Stream	8/3/06 11:01		0.05	9.72												
1275	Stream	8/3/06 12:21		0.01	9.24												
1276	Stream	8/3/06 13:41		0.11	8.91												
1277	Stream	8/3/06 15:01		0.15	8.96												
1278	Stream	8/3/06 16:21		0.17	9.34												
1279	Stream	8/3/06 17:41		0.11	9.18												
1280	Stream	8/3/06 19:01		0.17	9.05												
1281	Stream	8/3/06 20:21		0.15	8.62												
1282	Stream	8/3/06 21:41		0.11	8.53												
1283	Stream	8/3/06 23:01		0.05	8.20												
1284	Stream	8/4/06 0:21		0.19	7.61												
1285	Stream	8/4/06 1:41		0.12	7.53												
1286	Stream	8/4/06 3:01		0.27	7.22												
1287	Stream	8/4/06 4:21		0.26	6.69												
1288	Stream	8/4/06 5:41		0.28	6.51												
1289	Stream	8/4/06 7:01		0.10	6.32												
1290	Stream	8/4/06 8:21		0.03	6.30												
1311	Stream	8/3/06 8:18				-7.02	0.35	5.59	59.53	<0.016	0.05	41.22	24.96	2.04	41.23		
1312	Stream	8/3/06 9:38				-7.14	0.35	6.97	31.94	<0.016	<0.02	29.82	18.60	1.58	20.24		
1313	Stream	8/3/06 10:58				-5.88	0.35	3.97	31.10	<0.016	<0.02	41.18	22.93	1.80	18.10		
1314	Stream	8/3/06 12:18				-6.52	0.35	3.59	35.50	<0.016	<0.02	39.26	22.48	1.93	19.68		
1315	Stream	8/3/06 13:38				-6.70	0.35	4.81	27.88	<0.016	<0.02	39.33	24.74	2.05	18.60		
1316	Stream	8/3/06 14:58				-6.66	0.35	3.86	24.24	<0.016	<0.02	41.08	24.57	2.05	16.58		

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	pH (‰)	Silica (mg/L)	Cl (mg/L)	NH ₃ (mg/L)	NH ₄ (mg/L)	Ca ²⁺ (mg/L)	Mg ²⁺ (mg/L)	K ⁺ (mg/L)	Na ⁺ (mg/L)	Level (in)
1317	Stream	8/3/06 16:18	0.61			-6.41	0.35		4.75	25.50	<0.016	<0.02	39.40	25.84	2.02	16.97	
1318	Stream	8/3/06 17:38	1.62			-6.26	0.35		3.91	28.13	<0.016	<0.02	32.68	24.27	2.12	15.30	
1319	Stream	8/3/06 18:58	0.69			-5.63	0.35		2.94	13.69	<0.016	<0.02	34.31	22.88	2.21	13.71	
1320	Stream	8/3/06 20:18	1.48			-5.74	0.35		3.75	21.43	<0.016	<0.02	35.17	22.60	2.38	13.09	
1321	Stream	8/3/06 21:38	1.48			-5.63	0.35		3.81	20.10	<0.016	<0.02	32.03	22.14	2.56	11.89	
1322	Stream	8/3/06 22:58	1.45			-6.04	0.35		3.98	20.79	<0.016	<0.02	27.71	21.38	2.62	11.70	
1323	Stream	8/4/06 0:18	1.26			-6.48	0.35		3.43	18.98	<0.016	<0.02	29.78	18.81	2.53	10.33	
1324	Stream	8/4/06 1:38	1.25			-5.96	0.35		4.24	17.34	<0.016	<0.02	32.17	20.25	2.60	10.77	
1325	Stream	8/4/06 2:58	1.91			-6.12	0.35		4.70	23.18	<0.016	<0.02	29.73	19.70	2.51	10.81	
1326	Stream	8/4/06 4:18	1.20			-5.95	0.35		3.87	22.46	<0.016	<0.02	33.06	19.80	2.30	11.00	
1327	Stream	8/4/06 5:38	1.05			-6.36	0.35		3.01	21.89	<0.016	<0.02	45.15	21.83	2.31	12.52	
1328	Stream	8/4/06 6:58	0.88			-5.83	0.35		3.65	22.44	<0.016	<0.02	31.72	19.87	2.19	13.39	
1329	Stream	8/4/06 8:18	1.36			-6.60	0.35		3.73	26.14	<0.016	<0.02	32.25	20.82	2.14	14.96	
1351	2-150	8/6/06 0:00	0.26	<0.003	2.74	-7.42	0.43		2.72	2.50	0.03	0.05	39.38	26.12	0.55	3.32	
1352	3-150	8/6/06 0:00	1.31	0.08	7.41	-7.14	0.43		2.61	1.76	0.06	0.28	37.53	25.79	0.90	3.76	
	1-150, 4-150, 5-150																
1355	150	8/6/06 0:00	4.50	<0.003	5.20	-6.76	0.43		3.32	2.32	0.02	0.38	39.41	30.75	1.54	6.31	
1356	Stream	8/6/06 9:30	0.75	<0.003	3.31	-6.45	0.43		3.13	9.47	<0.016	0.06	41.18	26.31	1.91	12.63	
1357	TD-4	8/6/06 0:00	2.95	<0.003	3.14	-7.34	0.43		3.95	8.73	<0.016	<0.02	73.85	27.20	17.85	6.75	
1361	8-150	8/6/06 0:00		<0.003	2.41	-6.83	0.43						35.44	24.81	1.25	3.50	
	6-150, 7-150, 10-150																
1363	150	8/6/06 0:00	4.75	<0.003	2.27	-7.18	0.43		3.66	13.68	<0.016	<0.02	33.01	22.65	1.54	2.95	
1364	TD-10	8/6/06 0:00	2.74	<0.003	1.10	-7.30	0.43		2.83	6.37	<0.016	0.04	38.71	27.32	0.76	3.46	
1373	Stream	8/4/06 9:29		0.21	8.76												
1374	Stream	8/4/06 13:29		0.13	9.88												
1375	Stream	8/4/06 17:29		0.08	10.11												
1376	Stream	8/4/06 21:29		0.16	8.73												
1377	Stream	8/5/06 1:29		0.22	7.61												
1378	Stream	8/5/06 5:29		0.26	7.03												
1379	Stream	8/5/06 9:29		0.12	7.71												
1380	Stream	8/5/06 13:29		0.11	8.66												
1381	Stream	8/5/06 17:29		0.10	8.32												
1382	Stream	8/5/06 21:29		0.11	7.65												
1383	Stream	8/6/06 1:29		0.08	6.77												
1384	Stream	8/6/06 5:29		0.14	6.40												
1398	Stream	8/4/06 9:23	0.51			-6.17	0.43		2.75	10.28	<0.016	<0.02	35.85	22.48	2.08	14.90	
1399	Stream	8/4/06 13:23	3.57			-6.28	0.43		9.54	49.59	<0.016	<0.02	25.54	14.40	1.34	9.12	
1400	Stream	8/4/06 17:23	0.86			-5.98	0.43		5.43	24.40	<0.016	<0.02	34.13	24.25	1.88	13.92	
1401	Stream	8/4/06 21:23	1.06			-6.02	0.43		3.30	16.36	<0.016	<0.02	34.64	18.86	1.60	10.91	
1402	Stream	8/5/06 1:23	0.78			-6.14	0.43		3.93	11.82	<0.016	<0.02	30.06	15.96	1.36	9.03	
1403	Stream	8/5/06 5:23	1.01			-6.61	0.43		4.06	29.26	<0.016	<0.02	37.38	20.37	1.64	23.81	
1404	Stream	8/5/06 9:23	0.76			-6.81	0.43		3.07	26.84	<0.016	<0.02	42.83	19.93	1.46	21.79	
1405	Stream	8/5/06 13:23	1.04			-6.40	0.43		3.59	17.61	<0.016	<0.02	32.59	19.65	1.57	14.24	
1406	Stream	8/5/06 17:23	2.39			-6.48	0.43		3.38	14.56	<0.016	0.08	32.11	18.04	1.57	11.83	
1407	Stream	8/5/06 21:23	2.49			-6.29	0.43		4.41	30.69	<0.016	<0.02	29.78	18.70	1.66	11.75	
1408	Stream	8/6/06 1:23	2.39			-6.09	0.43		4.81	29.16	<0.016	<0.02	37.35	16.18	1.37	9.04	
1409	Stream	8/6/06 5:23	1.08			-5.93	0.43		4.15	13.95	<0.016	0.04	46.22	25.63	1.91	12.83	
	1-150, 2-150, 3-150																
1464	150	8/25/06 0:00	0.78	1.47	7.84	-6.58	0.28		3.53	4.01	0.05	0.15	80.40	21.97	0.68	8.70	
1465	4-150, 5-150	8/25/06 0:00	0.64	2.39	7.00	-6.59	0.28		3.13	4.26	0.21	0.48	88.71	27.95	2.20	7.71	

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	pH (‰)	Silica (mg/L)	Cl ⁻ (mg/L)	NH ₃ (mg/L)	NH ₄ (mg/L)	Ca ²⁺ (mg/L)	Mg ²⁺ (mg/L)	K ⁺ (mg/L)	Na ⁺ (mg/L)	Level (in)
1466	Stream	8/25/06 9:30	0.56	<0.003	3.57	-5.80	0.28		3.36	19.28	<0.016	0.06	90.14	23.51	1.90	19.59	
1467	TD-4	8/25/06 0:00	3.10	<0.003	2.96	-6.80	0.28		3.61	9.24	<0.016	0.03	103.51	25.45	18.80	6.95	
1469	8-150	8/25/06 0:00	0.03	<0.003	4.39	-6.76	0.28		3.07	4.41	<0.016	<0.02	83.50	22.56	1.13	5.80	
1471	TD-10	8/25/06 0:00	1.21	<0.003	1.43	-7.16	0.28		1.77	7.45	0.01	<0.04	83.63	23.45	0.29	3.44	
1472	6-150,10-150	8/25/06 0:00	0.88			-6.57	0.28		3.16	6.71	<0.016	0.03	93.50	26.88	1.09	8.39	
1481	RG-1	8/30/06 0:00				-4.26	0.28					<0.02	6.61	1.46	8.45	<1.20	
1482	RG-2	8/30/06 0:00				-5.06	0.28					0.83	<2.50	<1.20	0.57	<1.20	
1483	RG-5	8/30/06 0:00				-5.16	0.28					0.45	<2.50	<1.20	0.45	<1.20	
1484	Stream	8/28/06 8:30	0.28	0.02	4.76	-5.65	0.28		1.41	14.17	0.05	0.06	42.25	20.14	2.37	14.15	
1485	RG-3	8/30/06 0:00				-4.38	0.28					0.78	<2.50	<1.20	0.45	<1.20	
1486	RG-6	8/30/06 0:00				-4.29	0.28					0.77	<2.50	<1.20	0.84	<1.20	
1487	RG-7	8/30/06 0:00				-4.42	0.28					0.45	<2.50	<1.20	0.50	<1.20	
1488	RG-8	8/30/06 0:00				-4.30	0.28					0.71	<2.50	<1.20	0.50	<1.20	
1489	RG-9	8/30/06 0:00				-4.26	0.28					1.41	<2.50	<1.20	0.66	<1.20	
1490	RG-10	8/30/06 0:00				-3.75	0.28					0.85	<2.50	<1.20	0.78	<1.20	
1521	Stream	8/26/06 10:27		0.21	27.20												
1522	Stream	8/26/06 12:27		0.05	6.51												
1523	Stream	8/26/06 14:27		0.02	6.15												
1524	Stream	8/26/06 16:27		<0.003	5.83												
1525	Stream	8/26/06 18:27		0.14	5.72												
1526	Stream	8/26/06 20:27		0.22	5.83												
1527	Stream	8/26/06 22:27		0.01	6.00												
1528	Stream	8/27/06 0:27		0.02	5.74												
1529	Stream	8/27/06 2:27		0.18	5.70												
1530	Stream	8/27/06 4:27		0.22	5.81												
1531	Stream	8/27/06 6:27		0.06	5.55												
1532	Stream	8/27/06 8:27		<0.003	5.50												
1533	Stream	8/27/06 10:27		0.04	5.49												
1534	Stream	8/27/06 12:27		0.21	5.49												
1535	Stream	8/27/06 14:27		<0.003	5.68												
1536	Stream	8/27/06 16:27		<0.003	5.75												
1537	Stream	8/27/06 18:27		0.22	5.82												
1538	Stream	8/27/06 20:27		<0.003	5.55												
1539	Stream	8/27/06 22:27		0.04	5.58												
1540	Stream	8/28/06 0:27		<0.003	5.33												
1541	Stream	8/28/06 2:27		0.20	5.25												
1542	Stream	8/28/06 4:27		0.02	5.14												
1543	Stream	8/28/06 6:27		<0.003	5.79												
1544	Stream	8/28/06 8:27		<0.003	5.99												
1545	Stream	8/26/06 10:23	0.04			-5.70	0.28		2.94	32.52	<0.016	<0.02	49.61	27.34	2.02	25.41	
1546	Stream	8/26/06 12:23	0.78			-5.55	0.28		2.42	43.17	<0.016	<0.02	28.66	25.77	1.89	21.26	
1547	Stream	8/26/06 14:23	0.35			-5.51	0.28		1.18	22.11	<0.016	0.04	86.70	23.41	1.78	20.02	
1548	Stream	8/26/06 16:23	0.40			-5.51	0.28		1.66	20.35	<0.016	0.06	86.88	23.41	1.82	19.95	
1549	Stream	8/26/06 18:23	0.43			-5.72	0.28		3.52	28.35	<0.016	<0.02	36.87	26.04	1.94	20.16	
1550	Stream	8/26/06 20:23	0.51			-5.76	0.28		2.77	20.64	<0.016	<0.02	64.40	26.26	2.02	19.72	
1551	Stream	8/26/06 22:23	0.58			-5.81	0.28		5.53	23.48	<0.016	<0.02	84.34	22.68	1.97	20.77	
1552	Stream	8/27/06 0:23	0.20			-5.63	0.28		1.49	12.84	<0.016	<0.02	47.62	25.34	2.19	20.19	
1553	Stream	8/27/06 2:23	0.46			-5.62	0.28		2.85	21.03	<0.016	<0.02	48.13	26.04	2.24	18.65	
1554	Stream	8/27/06 4:23	0.23			-5.43	0.28		4.11	12.33	<0.016	<0.02	48.27	25.83	2.26	17.63	
1555	Stream	8/27/06 6:23	0.36			-6.55	0.28		1.66	18.95	<0.016	<0.02	77.78	26.26	2.24	17.68	

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl ⁻ (mg/L)	NH ₃ (mg/L)	NH ₄ (mg/L)	Ca ²⁺ (mg/L)	Mg ²⁺ (mg/L)	K ⁺ (mg/L)	Na ⁺ (mg/L)	Level (in)
1556	Stream	8/27/06 8:23	0.30			-5.62	0.28		2.08	19.40	<0.016	<0.02	51.92	25.19	2.20	16.24	
1557	Stream	8/27/06 10:23	0.53			-5.99	0.28		2.78	25.89	<0.016	0.11	83.55	22.17	2.12	17.06	
1558	Stream	8/27/06 12:23	0.44			-5.55	0.28		3.18	25.62	<0.016	<0.02	47.99	25.21	2.17	21.40	
1559	Stream	8/27/06 14:23	0.35			-5.51	0.28		3.13	25.82	<0.016	<0.02	82.54	22.79	2.10	24.33	
1560	Stream	8/27/06 16:23	0.48			-5.70	0.28		3.98	35.51	<0.016	<0.02	82.48	22.47	2.11	24.93	
1561	Stream	8/27/06 18:23	0.26			-5.91	0.28		2.69	22.02	<0.016	<0.02	33.99	25.19	2.23	24.25	
1562	Stream	8/27/06 20:23	0.44			-5.74	0.28		2.85	32.83	<0.016	<0.02	40.26	25.38	2.26	25.25	
1563	Stream	8/27/06 22:23	0.51			-5.97	0.28		2.89	34.91	<0.016	<0.02	34.81	25.22	2.24	25.45	
1564	Stream	8/28/06 0:23	0.67			-5.53	0.28		2.18	50.38	<0.016	<0.02	28.70	24.94	2.20	22.18	
1565	Stream	8/28/06 2:23	0.46			-5.93	0.28		2.65	23.14	<0.016	<0.02	83.37	22.71	2.10	20.91	
1566	Stream	8/28/06 4:23	0.40			-6.10	0.28		2.24	20.78	<0.016	<0.02	82.34	22.28	2.06	19.11	
1567	Stream	8/28/06 6:23	0.33			-5.83	0.28		2.14	17.57	<0.016	<0.02	37.92	21.87	2.32	15.70	
1568	Stream	8/28/06 8:23	0.22			-5.59	0.26		1.81	13.14	<0.016	<0.02	68.01	18.12	2.34	13.90	
1598	5-150	8/30/06 0:00		<0.003	4.14	-7.14	0.26					<0.02	55.22	31.38	1.29	12.58	
1599	1-150,2-150,3-																
1599	150,4-150	8/30/06 0:00	0.31	1.13	5.28	-7.13	0.26		1.44	2.52	0.07	0.07	63.03	28.18	1.29	4.76	
1600	Stream	8/30/06 9:50	0.50	<0.003	4.36	-5.64	0.26		3.34	24.60	<0.016	0.02	50.41	23.75	2.24	20.89	
1601	TD-4	8/30/06 0:00	3.56	0.01	2.50	-6.87	0.26		3.08	6.86	<0.016	<0.06	88.08	25.39	19.94	7.12	
1602	6-150	8/30/06 0:00				-6.86	0.26						40.97	30.57	1.41	3.32	
1603	8-150	8/30/06 0:00	0.20	<0.003	3.34	-6.97	0.26		2.84	4.03	<0.016	0.03	48.94	23.59	1.40	3.52	
1604	TD-10	8/30/06 0:00	1.71	<0.003	1.09	-6.95	0.26		2.03	5.82	<0.016	<0.02	55.96	24.31	0.65	3.60	
1612	Stream	8/28/06 8:51	0.07	<0.003	5.80												
1613	Stream	8/28/06 10:51		0.02	5.64												
1614	Stream	8/28/06 12:51		<0.003	5.75												
1615	Stream	8/28/06 14:51		0.25	5.76												
1616	Stream	8/28/06 16:51		0.26	5.92												
1617	Stream	8/28/06 18:51		0.09	5.74												
1618	Stream	8/28/06 20:51		0.10	6.03												
1619	Stream	8/28/06 22:51		0.10	6.19												
1620	Stream	8/29/06 0:51		0.19	6.19												
1621	Stream	8/29/06 2:51		0.24	6.49												
1622	Stream	8/29/06 4:51		0.25	6.30												
1623	Stream	8/29/06 6:51		0.33	6.06												
1624	Stream	8/29/06 8:51		0.27	5.91												
1625	Stream	8/29/06 10:51		0.20	5.79												
1626	Stream	8/29/06 12:51		0.35	5.73												
1627	Stream	8/29/06 14:51		0.33	5.59												
1628	Stream	8/29/06 16:51		0.25	5.50												
1629	Stream	8/29/06 18:51		0.18	5.38												
1630	Stream	8/29/06 20:51		0.07	5.24												
1631	Stream	8/29/06 22:51	<0.026	0.04	5.20												
1632	Stream	8/30/06 0:51		0.04	5.09												
1633	Stream	8/30/06 2:51		0.21	5.03												
1634	Stream	8/30/06 4:51		0.31	4.99												
1635	Stream	8/30/06 6:51		0.35	5.00												
1660	Stream	8/28/06 8:48	0.13			-5.28	0.26		1.26	9.13	<0.016	0.08	42.80	19.97	2.33	12.64	
1661	Stream	8/28/06 10:48	0.32			-5.52	0.26		2.77	16.44	<0.016	0.04	24.40	17.13	2.32	13.10	
1662	Stream	8/28/06 12:48	0.40			-5.60	0.26		2.36	18.52	<0.016	0.03	25.67	17.69	2.36	13.03	
1663	Stream	8/28/06 14:48	0.39			-5.63	0.26		2.54	18.29	<0.016	0.04	18.87	18.31	2.38	12.02	
1664	Stream	8/28/06 16:48	0.26			-5.61	0.26		1.70	12.64	<0.016	0.03	29.09	18.97	2.55	11.02	
1665	Stream	8/28/06 18:48	0.39			-5.34	0.26		1.52	17.62	<0.016	0.03	25.85	18.89	2.88	13.32	

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
1666	Stream	8/28/06 20:48	0.54			-5.66	0.26		4.50	28.06	<0.016	0.03	17.89	16.66	2.92	15.46	
1667	Stream	8/28/06 22:48	0.23			-5.52	0.26		2.59	19.68	<0.016	0.02	31.15	24.07	2.80	23.94	
1668	Stream	8/29/06 0:48	0.44			-5.68	0.26		2.51	31.60	<0.016	0.02	31.91	20.87	2.41	23.93	
1669	Stream	8/29/06 2:48	0.30			-5.56	0.26		1.46	16.75	<0.016	0.03	30.84	19.37	2.67	19.26	
1670	Stream	8/29/06 4:48	0.45			-5.72	0.26		2.74	18.06	<0.016	<0.02	26.78	19.01	2.63	18.02	
1671	Stream	8/29/06 6:48	0.33			-5.59	0.26		2.50	18.37	<0.016	0.02	28.45	18.02	2.42	17.37	
1672	Stream	8/29/06 8:48	0.43			-5.70	0.26		2.36	40.36	<0.016	0.04	23.37	18.88	2.27	27.49	
1673	Stream	8/29/06 10:48	0.14			-5.64	0.26		2.25	13.62	<0.016	0.03	31.80	21.36	2.20	25.19	
1674	Stream	8/29/06 12:48	0.32			-5.85	0.26		2.01	19.94	<0.016	0.24	29.86	22.08	2.16	23.59	
1675	Stream	8/29/06 14:48	0.20			-5.58	0.26		1.94	17.51	<0.016	0.03	28.69	21.31	2.07	21.74	
1676	Stream	8/29/06 16:48	0.28			-5.77	0.26		2.92	20.11	<0.016	0.03	31.47	21.94	2.06	21.49	
1677	Stream	8/29/06 18:48	0.43			-5.60	0.26		3.39	29.82	<0.016	0.03	33.12	22.74	2.04	21.91	
1678	Stream	8/29/06 20:48	0.44			-5.68	0.26		2.88	30.16	<0.016	0.05	32.32	23.05	2.04	22.29	
1679	Stream	8/29/06 22:48	0.46			-5.73	0.26		4.77	29.21	<0.016	0.02	27.43	23.05	2.01	21.78	
1680	Stream	8/30/06 0:48	0.71			-5.79	0.26		5.54	41.71	<0.016	0.10	34.30	21.33	1.95	20.45	
1681	Stream	8/30/06 2:48	0.28			-5.68	0.26		3.62	22.29	<0.016	0.03	31.40	22.76	1.95	21.17	
1682	Stream	8/30/06 4:48	0.50			-5.84	0.11		3.45	29.69	<0.016	<0.02	29.86	23.18	1.97	20.72	
1683	Stream	8/30/06 6:48	0.47			-5.97	0.11		3.17	28.53	<0.016	0.02	30.28	23.03	1.92	20.64	
1712	150.5-150	9/10/06 0:00	1.33	0.77	5.34				8.40	8.58	<0.016	0.03	41.59	27.39	1.10	5.89	
1713	Stream	9/10/06 12:55	1.29	0.30	4.12	-5.79	0.11		2.37	46.09	<0.016	<0.02	37.76	13.64	1.27	15.57	
1714	Stream	9/10/06 12:56	1.43	<0.003	4.26	-5.65	0.11		2.68	44.59	<0.016	0.04	56.88	25.96	2.04	25.90	
1715	TD-4	9/10/06 0:00	8.43	0.15	2.63	-6.97	0.11		8.00	27.29	0.06	<0.04	66.19	31.32	23.75	9.14	
1718	6-150.8-150	9/10/06 0:00	1.61			-7.12	0.11		4.02	11.38	0.12	0.20	29.09	16.33	1.39	2.86	
1728	Stream	9/13/06 8:20	1.97	0.17	7.60	-8.79	0.09		2.52	6.10	<0.016	<0.04	45.14	21.04	2.81	19.28	
1730	Stream	9/11/06 8:54		0.26	28.62												
1731	Stream	9/11/06 10:54		0.16	6.23												
1732	Stream	9/11/06 12:54		0.16	5.78												
1733	Stream	9/11/06 14:54		<0.003	5.95												
1734	Stream	9/11/06 16:54		0.04	5.93												
1735	Stream	9/11/06 18:54		0.18	5.97												
1736	Stream	9/11/06 20:54		0.21	5.64												
1737	Stream	9/11/06 22:54		0.21	5.47												
1738	Stream	9/12/06 0:54		0.28	2.49												
1739	Stream	9/12/06 2:54		0.30	5.15												
1740	Stream	9/12/06 4:54		0.09	5.19												
1741	Stream	9/12/06 6:54		0.29	5.20												
1742	Stream	9/12/06 8:54		0.25	5.94												
1743	Stream	9/12/06 10:54		0.05	6.34												
1744	Stream	9/12/06 12:54		0.19	6.07												
1745	Stream	9/12/06 14:54		0.33	5.99												
1746	Stream	9/12/06 16:54		0.18	5.86												
1747	Stream	9/12/06 18:54		0.32	5.60												
1748	Stream	9/12/06 20:54		0.01	5.63												
1749	Stream	9/12/06 22:54		0.35	6.44												
1750	Stream	9/13/06 0:54		0.32	7.43												
1751	Stream	9/13/06 2:54		0.25	7.58												
1752	Stream	9/13/06 4:54		0.24	7.23												
1753	Stream	9/13/06 6:54		0.11	7.94												
1778	Stream	9/11/06 8:56	0.56			-5.84	0.09		3.32	52.19	<0.016	<0.02	33.86	18.79	1.78	17.71	

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
1779	Stream	9/11/06 10:56	1.48			-5.78	0.09		3.22	66.32	<0.016	0.14	47.34	25.82	3.12	30.09	
1780	Stream	9/11/06 12:56	0.47			-5.68	0.09		2.81	30.36	<0.016	<0.02	25.67	13.91	1.37	13.61	
1781	Stream	9/11/06 14:56	0.73			-5.83	0.09		2.70	40.47	<0.016	<0.04	45.35	34.02	2.25	35.68	
1782	Stream	9/11/06 16:56	1.21			-5.77	0.09		2.46	51.94	<0.016	<0.04	43.31	29.58	2.40	24.63	
1783	Stream	9/11/06 18:56	0.79			-5.96	0.09		2.71	26.06	<0.016	<0.04	41.24	22.55	1.97	19.62	
1784	Stream	9/11/06 20:56	0.98			-5.67	0.09		3.13	60.87	<0.016	<0.02	29.91	12.31	1.56	12.60	
1785	Stream	9/11/06 22:56	1.34			-5.91	0.09		2.99	55.44	<0.016	<0.04	75.58	28.37	2.92	26.45	
1786	Stream	9/12/06 0:56	1.00			-5.79	0.09		2.81	57.93	<0.016	0.49	78.51	31.79	1.70	23.94	
1787	Stream	9/12/06 2:56	0.75			-5.68	0.09		2.94	37.09	<0.016	<0.04	44.12	27.46	2.80	23.27	
1788	Stream	9/12/06 4:56	1.00			-5.57	0.09		2.51	40.02	<0.016	<0.04	41.00	29.51	2.74	25.81	
1789	Stream	9/12/06 6:56	0.23			-5.81	0.09		2.30	14.63	<0.016	<0.04	56.23	29.97	3.19	26.56	
1790	Stream	9/12/06 8:56	1.19			-5.79	0.09		3.29	67.19	<0.016	0.11	11.73	11.73	1.85	11.66	
1791	Stream	9/12/06 10:56	0.23			-5.95	0.09		2.93	25.48	<0.016	<0.04	58.84	58.84	3.20	22.83	
1792	Stream	9/12/06 12:56	0.27			-5.90	0.09		2.43	26.92	<0.016	<0.04	41.09	41.09	3.53	25.09	
1793	Stream	9/12/06 14:56	0.57			-6.03	0.09		3.06	46.43	<0.016	<0.04	37.45	37.45	3.26	23.79	
1794	Stream	9/12/06 16:56	0.58			-6.18	0.09		4.04	29.73	<0.016	0.15	29.57	29.57	3.46	4.86	
1795	Stream	9/12/06 18:56	1.57			-6.03	0.09		3.02	32.09	<0.016	0.04	43.28	43.28	3.07	22.11	
1796	Stream	9/12/06 20:56	1.32			-6.06	0.09		4.55	54.81	<0.016	<0.04	49.61	49.61	2.17	26.27	
1797	Stream	9/12/06 22:56	1.56			-6.77	0.09		3.10	61.14	<0.016	0.07	43.34	16.63	3.69	21.03	
1798	Stream	9/13/06 0:56	3.71			-7.45	0.09		3.28	12.53	<0.016	0.04	36.78	13.38	4.20	8.30	
1799	Stream	9/13/06 2:56	5.01			-8.02	0.09		4.18	43.69	<0.016	0.10	38.53	12.39	4.68	11.75	
1800	Stream	9/13/06 4:56	2.12			-8.79	0.09		2.48	10.26	<0.016	0.05	30.11	8.10	3.58	5.24	
1801	Stream	9/13/06 6:56	1.65			-8.99	0.09		1.80	6.22	<0.016	0.05	23.87	7.60	3.56	4.26	
1826	RG-1	9/14/06 0:00				-7.97	0.11		3.73	2.36	<0.016	0.82	46.82	26.20	0.62	3.77	1.95
1828	2-150	9/14/06 0:00	0.15	<0.003	2.87	-8.14	0.11		4.94	3.62	0.01	0.06	<2.50	<1.20	0.41	<1.20	1.70
1829	RG-2	9/14/06 0:00	0.25	0.20	2.48	-7.06	0.11		5.17	6.18	0.04	0.13	33.53	30.55	0.93	3.84	
1830	3-150	9/14/06 0:00	0.59			-7.31	0.11		5.37	5.31	0.02	0.02	42.44	29.70	1.54	6.96	
1831	4-150	9/14/06 0:00	1.10	0.02	4.39	-6.99	0.11		4.95	17.39	<0.016	0.08	94.91	30.48	25.03	6.77	
1833	1-150,5-150	9/14/06 0:00				-8.13	0.11		2.25	7.95	<0.016	0.48	<2.50	<1.20	0.39	<1.20	1.72
1834	RG-5	9/14/06 0:00				-7.66	0.11		3.77	8.16	<0.016	0.02	57.49	28.80	0.88	6.79	1.65
1835	Stream	9/14/06 9:20				-7.00	0.11		4.39	13.05	<0.016	0.02	39.37	22.21	1.22	4.06	
1842	TD-4	9/14/06 0:00	12.48	0.06	5.88	-8.38	0.11		4.39	13.05	<0.016	0.02	59.03	24.23	0.88	3.48	
1843	RG-3	9/14/06 0:00		0.15	2.88	-8.38	0.11		3.39	12.96	<0.016	0.39	<2.50	<1.20	0.34	<1.20	2.65
1845	RG-4	9/14/06 0:00				-8.22	0.11		3.68	18.72	<0.016	0.27	<2.50	<1.20	0.21	<1.20	2.95
1846	TD-5	9/14/06 0:00	3.79	<0.003	1.31	-8.22	0.11					0.27	<2.50	<1.20	0.21	<1.20	3.05
1848	8-150	9/14/06 0:00	1.13	<0.003	3.11	-7.10	0.11		2.25	7.95	<0.016	0.26	<2.50	<1.20	<0.20	<1.20	2.95
	6-150,9-150,10-					-8.29	0.11		3.77	8.16	<0.016	0.35	<2.50	<1.20	<0.20	<1.20	2.60
1851	150	9/14/06 0:00	2.13	0.17	2.62	-7.04	0.11		4.39	13.05	<0.016	0.02	59.03	24.23	0.88	3.48	
1852	TD-10	9/14/06 0:00	4.67	<0.003	1.39	-7.07	0.11		3.39	12.96	<0.016	0.39	<2.50	<1.20	0.34	<1.20	2.65
1853	RG-6	9/14/06 0:00				-9.09	0.11		3.68	18.72	<0.016	0.27	<2.50	<1.20	0.21	<1.20	2.95
1854	RG-7	9/14/06 0:00				-8.17	0.11					0.27	<2.50	<1.20	0.21	<1.20	3.05
1855	RG-8	9/14/06 0:00				-9.97	0.11					0.26	<2.50	<1.20	<0.20	<1.20	2.95
1856	RG-9	9/14/06 0:00				-8.93	0.11					0.26	<2.50	<1.20	<0.20	<1.20	2.95
1857	RG-10	9/14/06 0:00				-8.29	0.11					0.35	<2.50	<1.20	<0.20	<1.20	2.60
1883	Stream	9/13/06 8:43		0.04	8.33												
1884	Stream	9/13/06 12:43		0.06	8.83												
1885	Stream	9/13/06 16:43		<0.003	8.53												
1886	Stream	9/13/06 20:43		<0.003	7.93												
1887	Stream	9/14/06 0:43		<0.003	7.39												
1888	Stream	9/14/06 4:43		<0.003	6.96												
1889	Stream	9/14/06 6:43		<0.003	6.43												

Appendix N(a)(continued). Water Chemistry Results for All Samples Collected in Watershed A.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
1897	Stream	9/13/06 8:40	2.53			-8.73	0.09		2.64	12.83	<0.016	0.03	32.27	9.90	3.74	5.03	
1898	Stream	9/13/06 12:40	2.72			-8.63	0.09		3.41	14.18	<0.016	0.05	33.11	10.63	3.60	5.57	
1899	Stream	9/13/06 16:40	2.89			-8.21	0.09		3.02	15.94	<0.016	0.03	40.43	11.36	3.22	5.71	
1900	Stream	9/13/06 20:40	2.84			-7.98	0.09		3.44	16.76	<0.016	<0.02	48.28	13.84	3.00	5.95	
1901	Stream	9/14/06 0:40	2.54			-7.89	0.09		3.24	19.18	<0.016	<0.02	49.17	13.74	2.63	6.14	
1902	Stream	9/14/06 4:40	2.17						3.55	18.78	<0.016	0.02	55.17	16.50	2.57	8.10	
1903	Stream	9/14/06 6:40	2.79						3.70	19.38	<0.016	0.02	48.63	15.53	2.32	7.20	

Appendix N(b). Water Chemistry Results for All Samples Collected in Watershed M.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
45	Seep	4/7/06 12:00				-7.60	0.22										
204	3-150	4/29/06 0:00	<0.026	0.51	18.16	-6.95	0.20		4.31	31.85	0.42						
206	2-150	4/29/06 0:00	<0.026	0.61	17.94	-7.77	0.20		1.13	18.26	0.91						
208	1-150	4/29/06 0:00	<0.026	1.25	6.34	-7.28	0.20		0.07	44.27	0.34						
209	Stream	4/29/06 0:00	0.38	<0.003	2.88	-7.11	0.20		<0.013	40.31	0.03						
210	1-90,2-90,3-90	4/29/06 0:00	<0.026	0.07	9.04	-7.70	0.20		0.34	17.00	0.13						
211	ChurchPond	4/29/06 0:00	0.05	<0.003	6.49	-5.14	0.20		<0.013	9.74	<0.016						
212	Pipe	4/29/06 0:00	2.78	<0.003	1.79	-7.25	0.20		<0.013	30.66	<0.016						
213	CobblePond(H)	4/29/06 0:00	0.50	<0.003	4.02	-5.28	0.20		0.46	6.03	0.09						
214	CobblePond(E)	4/29/06 0:00	0.05	<0.003	6.91	-4.19	0.20		<0.013	70.04	<0.016						
216	Stream	5/1/06 13:25			3.30	-6.26	0.20										
218	Stream	4/29/06 13:19		0.30	5.06												
219	Stream	4/29/06 15:19		0.20	3.99												
220	Stream	4/29/06 17:19		0.04	3.78												
221	Stream	4/29/06 19:19		0.24	3.39												
222	Stream	4/29/06 21:19		<0.003	3.33												
223	Stream	4/29/06 23:19		0.22	3.23												
224	Stream	4/30/06 1:19		0.22	3.46												
225	Stream	4/30/06 3:19		0.26	3.49												
226	Stream	4/30/06 5:19		0.15	3.63												
227	Stream	4/30/06 7:19		<0.003	3.59												
228	Stream	4/30/06 9:19		0.12	3.81												
229	Stream	4/30/06 11:19		<0.003	3.99												
230	Stream	4/30/06 13:19		<0.003	4.38												
231	Stream	4/30/06 15:19		0.01	4.33												
232	Stream	4/30/06 17:19		0.07	4.35												
233	Stream	4/30/06 19:19		0.07	4.41												
234	Stream	4/30/06 21:19		0.06	4.22												
235	Stream	4/30/06 23:19		<0.003	4.04												
236	Stream	5/1/06 1:19		0.02	4.18												
237	Stream	5/1/06 3:19		0.01	4.16												
238	Stream	5/1/06 5:19		0.04	4.15												
239	Stream	5/1/06 7:19		0.02	3.93												
240	Stream	5/1/06 9:19		<0.003	3.85												
241	Stream	5/1/06 11:19		<0.003	3.92												
255	Stream	4/29/06 13:19	0.21			-7.09	0.20		<0.013	42.33	<0.016						
256	Stream	4/29/06 15:19	0.43			-6.74	0.20		<0.013	50.69	<0.016						
257	Stream	4/29/06 17:19	0.32			-6.68	0.20		<0.013	45.19	<0.016						
258	Stream	4/29/06 19:19	0.24			-7.00	0.20		<0.013	33.87	<0.016						
259	Stream	4/29/06 21:19	0.78			-6.74	0.20		<0.013	35.16	<0.016						
260	Stream	4/29/06 23:19	0.31			-6.78	0.20		<0.013	41.79	<0.016						
261	Stream	4/30/06 1:19	0.13			-6.41	0.20		<0.013	18.17	<0.016						
262	Stream	4/30/06 3:19	0.31			-6.83	0.20		<0.013	38.35	<0.016						
263	Stream	4/30/06 5:19	0.27			-6.43	0.20		<0.013	29.98	<0.016						
264	Stream	4/30/06 7:19	0.30			-6.24	0.20		<0.013	30.49	<0.016						
265	Stream	4/30/06 9:19	0.40			-6.47	0.20		<0.013	37.81	<0.016						
266	Stream	4/30/06 11:19	0.49			-6.66	0.20		<0.013	45.24	<0.016						
267	Stream	4/30/06 13:19	0.25			-6.49	0.20		0.04	23.74	<0.016						
268	Stream	4/30/06 15:19	0.22			-6.15	0.20		<0.013	22.71	<0.016						
269	Stream	4/30/06 17:19	0.15			-6.26	0.20		<0.013	16.27	<0.016						

Appendix N(b)(continued). Water Chemistry Results for All Samples Collected in Watershed M.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	$\delta^2\text{H}$ (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
270	Stream	4/30/06 19:19	0.21			-6.08	0.20		0.23	32.12	<0.016						
271	Stream	4/30/06 21:19	0.59			-6.37	0.20		<0.013	57.85	<0.016						
272	Stream	4/30/06 23:19	0.34			-6.21	0.20		0.27	31.80	<0.016						
273	Stream	5/1/06 1:19	0.26			-6.08	0.20		0.07	25.05	<0.016						
274	Stream	5/1/06 3:19	0.28			-6.47	0.20		0.07	24.52	<0.016						
275	Stream	5/1/06 5:19	0.32			-6.05	0.20		<0.013	27.11	<0.016						
276	Stream	5/1/06 7:19	0.37			-6.01	0.20		0.50	33.45	<0.016						
277	Stream	5/1/06 9:19	0.36			-6.62	0.20		0.50	30.41	<0.016						
278	Stream	5/1/06 11:19	0.25			-6.55	0.20		0.67	30.65	<0.016						
382	RG-11	5/3/06 0:00	0.03			-4.77	0.31		<0.013	0.28	<0.016	0.02	<2.50	<1.20	2.77	<1.20	1.05
383	1-90	5/3/06 0:00	0.01			-6.65	0.31		4.04	23.58	<0.016						
384	1-150	5/3/06 0:00	<0.026			-6.94	0.31		2.47	31.12	<0.016	<0.02	14.80	11.90	1.38	19.95	
385	Stream	5/3/06 0:00	0.35	<0.003	4.18	-5.84	0.31		0.98	15.04	<0.016						
386	2-90	5/3/06 0:00	0.01			-5.91	0.31		9.23	42.44	0.49						
387	2-150	5/3/06 0:00	<0.026	0.13	15.11	-7.11	0.31	3.26	3.26	16.88	0.21						
388	3-90	5/3/06 0:00	<0.026	<0.003	6.56	-7.00	0.31	3.51	10.87	10.87	0.06						
389	3-150	5/3/06 0:00	<0.026	0.02	15.84	-6.08	0.31	2.85	28.53	0.09							
390	ChurchPond	5/3/06 0:00	0.99	<0.003	6.15	-4.38	0.31	0.87	13.63	<0.016							
391	RG-13/14	5/3/06 0:00	0.12			-5.34	0.31		<0.013	0.38	0.08						
392	Pipe	5/3/06 0:00	4.11	<0.003	2.27	-6.79	0.31	1.37	24.53	<0.016							
393	RG-15/16	5/3/06 0:00	0.41			-5.39	0.31		<0.013	0.20	0.44						
394	RG-17/18	5/3/06 0:00	0.32			-5.11	0.31		<0.013	0.44	0.62						
395	CobblePond(H)	5/3/06 0:00	0.28			-4.80	0.31		0.43	5.44	<0.016						
396	CobblePond(E)	5/3/06 0:00	0.02			-3.42	0.31		<0.013	13.29	<0.016						
412	Stream	5/1/06 13:29		0.06	4.09												
413	Stream	5/1/06 15:29		0.01	4.02												
414	Stream	5/1/06 17:29		0.03	3.96												
415	Stream	5/1/06 19:29		0.01	4.05												
416	Stream	5/1/06 21:29		0.27	3.87												
417	Stream	5/1/06 23:29		0.04	3.51												
418	Stream	5/2/06 1:29		0.22	3.51												
419	Stream	5/2/06 3:29		0.10	5.53												
420	Stream	5/2/06 5:29		0.20	6.54												
421	Stream	5/2/06 7:29		0.11	5.83												
422	Stream	5/2/06 9:29		0.15	5.98												
423	Stream	5/2/06 11:29		0.09	5.59												
424	Stream	5/2/06 13:29		0.07	3.87												
425	Stream	5/2/06 15:29		0.02	5.51												
426	Stream	5/2/06 17:29		0.07	5.22												
427	Stream	5/2/06 19:29		0.04	5.14												
428	Stream	5/2/06 21:29		0.03	4.94												
429	Stream	5/2/06 23:29		0.05	4.79												
430	Stream	5/3/06 1:29		0.05	4.58												
431	Stream	5/3/06 3:29		0.07	4.25												
432	Stream	5/3/06 5:29		0.30	4.27												
433	Stream	5/3/06 7:29		0.06	4.11												
434	Stream	5/3/06 9:29		<0.003	4.36												
435	Stream	5/1/06 13:30	0.39			-5.71	0.31		0.83	34.38	<0.016	<0.02	73.62	21.34	1.45	32.10	1.05
436	Stream	5/1/06 15:30	0.38			-5.67	0.31		0.09	54.89	<0.016	<0.02	70.16	21.32	1.40	32.10	1.10
437	Stream	5/1/06 17:30	0.33			-5.54	0.31		0.21	36.65	<0.016	<0.02	72.15	21.34	1.40	32.07	1.00

Appendix N(b)(continued). Water Chemistry Results for All Samples Collected in Watershed M.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
438	Stream	5/1/06 19:30	0.35			-5.57	0.31		0.23	42.31	<0.016	<0.02	72.32	21.51	1.35	32.15	
439	Stream	5/1/06 21:30	0.27			-5.69	0.31		0.60	28.18	<0.016	<0.02	72.34	21.59	1.40	32.15	
440	Stream	5/1/06 23:30	0.36			-5.68	0.31		<0.013	36.26	<0.016	<0.02	64.81	21.64	1.28	32.13	
441	Stream	5/2/06 1:30	0.24			-5.67	0.31		<0.013	41.35	<0.016	<0.02	73.44	21.54	1.33	32.17	
442	Stream	5/2/06 3:30	0.60			-5.77	0.31		0.86	34.05	<0.016	<0.02	63.56	18.31	1.51	27.48	
443	Stream	5/2/06 5:30	0.29			-5.72	0.31		0.60	29.17	<0.016	<0.02	55.22	15.57	1.73	25.87	
444	Stream	5/2/06 7:30	0.74			-5.89	0.31		<0.013	41.77	<0.016	<0.02	52.12	15.07	1.66	24.90	
445	Stream	5/2/06 9:30	0.16			-6.09	0.31		0.12	11.70	<0.016	<0.02	53.16	15.24	1.82	23.83	
446	Stream	5/2/06 11:30	0.31			-5.64	0.31		0.33	20.62	<0.016	<0.02	57.63	16.40	1.86	24.26	
447	Stream	5/2/06 13:30	0.71			-5.73	0.31		0.70	28.43	<0.016	<0.02	47.50	16.88	1.84	24.98	
448	Stream	5/2/06 15:30	0.48			-5.50	0.31		0.59	20.49	<0.016	<0.02	60.70	17.58	1.75	25.34	
449	Stream	5/2/06 17:30	0.41			-5.74	0.31		<0.013	34.31	<0.016	<0.02	61.60	17.83	1.76	25.36	
450	Stream	5/2/06 19:30	0.60			-5.87	0.31		0.69	24.14	<0.016	<0.02	53.76	17.10	1.17	25.44	
451	Stream	5/2/06 21:30	0.71			-5.86	0.31		0.86	27.96	<0.016	<0.02	57.20	18.12	1.71	25.52	
452	Stream	5/2/06 23:30	0.43			-5.97	0.31		0.44	18.17	<0.016	<0.02	64.36	18.35	1.66	25.64	
453	Stream	5/3/06 1:30	0.43			-5.69	0.31		0.57	16.78	<0.016	<0.02	64.03	18.57	1.63	25.70	
454	Stream	5/3/06 3:30	1.11			-6.10	0.31		0.81	26.01	<0.016	<0.02	64.61	18.73	1.57	25.89	
455	Stream	5/3/06 5:30	0.37			-5.98	0.31		0.56	16.05	<0.016	<0.02	52.13	18.63	1.57	26.13	
456	Stream	5/3/06 7:30	3.48			-6.10	0.31		0.65	19.14	<0.016	<0.02	62.73	19.53	<0.200	26.06	
457	Stream	5/3/06 9:30	0.94			-5.92	0.31		0.66	18.88	<0.016	<0.02	64.94	19.06	1.44	26.17	
523	Stream	5/24/06 0:00	0.95	<0.003	3.12	-7.24	0.22		2.11	49.68	<0.016	0.05	72.33	20.47	1.14	28.77	
524	1-90	5/24/06 0:00		<0.003	4.32	-7.49	0.22		3.23	46.59	<0.016	0.44	<7.50	<3.60	2.51	36.52	
525	1-150	5/24/06 0:00	<0.026			-7.49	0.22		1.90	42.41	0.61	0.04	99.90	32.40	1.47	36.69	
526	2-90	5/24/06 0:00	<0.026			-6.98	0.22										
527	2-150	5/24/06 0:00		<0.003	11.81												
528	3-90	5/24/06 0:00	<0.026			-7.67	0.22		4.21	22.48	0.11						
529	3-150	5/24/06 0:00	0.13	<0.003	9.03				4.28	41.71	0.17	0.33	123.75	30.91	1.44	17.81	
530	ChurchPond	5/24/06 0:00	0.01	<0.003	5.54	-6.67	0.80	-56.25	0.97	21.11	<0.016	<0.0600	42.71	10.26	2.28	14.96	
531	Pipe	5/24/06 0:00	5.50	<0.003	2.40	-6.82	0.29		1.46	40.07	<0.016	<0.0600	66.83	18.86	0.69	19.74	
532	CobblePond(H)	5/24/06 0:00	0.05	<0.003	4.66	-5.81	0.22		<0.013	9.68	<0.016	<0.0400	23.05	12.33	1.87	5.31	
533	CobblePond(E)	5/24/06 0:00	<0.026	<0.003	7.06	-4.02	0.22		0.02	35.73	<0.016	0.09	38.94	9.57	2.06	22.87	
609	Stream	5/24/06 16:11	0.65	<0.003	11.19	-6.70	0.29		0.46	60.09	<0.016	<0.02	35.72	23.89	1.80	32.01	
610	Stream	5/24/06 16:13	0.91			-6.89	0.29		1.76	61.73	<0.016	0.02	38.39	23.50	1.76	33.23	
610	Stream	5/24/06 18:11		0.02	4.86				1.22	47.85	<0.016	<0.02	41.50	24.13	1.71	32.57	
611	Stream	5/24/06 18:13	1.70			-6.67	0.29		1.82	50.33	<0.016	<0.02	42.68	23.15	1.78	31.16	
611	Stream	5/24/06 20:11		<0.003	4.95	-6.93	0.29		0.95	38.49	<0.016	<0.02	38.68	21.95	1.91	31.91	
611	Stream	5/24/06 20:13	1.00			-6.68	0.29		1.07	44.18	<0.016	<0.02	36.16	22.31	2.02	33.15	
612	Stream	5/24/06 22:11	0.61	0.09	5.23	-6.71	0.29		1.23	47.04	<0.016	<0.02	39.86	19.59	2.05	29.86	
612	Stream	5/24/06 22:13	0.61	0.17	6.27	-6.71	0.29		0.48	44.69	<0.016	0.04	25.41	11.98	1.25	19.32	
613	Stream	5/25/06 0:11	0.51	0.07	6.34	-6.52	0.29		0.62	21.85	<0.016	0.52	25.56	16.79	3.00	22.22	
613	Stream	5/25/06 0:13	0.69	0.03	6.13	-6.33	0.29		0.44	40.77	<0.016	<0.02	45.40	19.84	1.89	30.11	
614	Stream	5/25/06 2:11	0.84	0.08	5.24	-6.45	0.29										
614	Stream	5/25/06 2:13	0.22	<0.003	5.65	-6.23	0.29										
614	Stream	5/25/06 2:13	0.69			-6.89	0.29										
615	Stream	5/25/06 4:11	0.84	0.08	5.24	-6.45	0.29										
615	Stream	5/25/06 4:13	0.22	<0.003	5.65	-6.23	0.29										
616	Stream	5/25/06 6:11	0.84	0.08	5.24	-6.45	0.29										
616	Stream	5/25/06 6:13	0.22	<0.003	5.65	-6.23	0.29										
617	Stream	5/25/06 8:11	0.22	<0.003	5.65	-6.23	0.29										
617	Stream	5/25/06 8:13	0.22	<0.003	5.65	-6.23	0.29										
618	Stream	5/25/06 10:11	0.64			-6.89	0.29										

Appendix N(b)(continued). Water Chemistry Results for All Samples Collected in Watershed M.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
618	Stream	5/25/06 10:13		0.05	5.81												
619	Stream	5/25/06 12:11	1.88			-6.30	0.29	1.13	37.47	<0.016	<0.02	29.08	19.64	2.01	31.43		
619	Stream	5/25/06 12:13		<0.003	5.30	-6.35	0.29	0.82	48.93	<0.016	<0.02	39.93	19.90	1.90	30.56		
620	Stream	5/25/06 14:11	1.19		5.06	-6.27	0.29	0.70	37.49	<0.016	<0.02	50.18	21.81	2.00	32.57		
620	Stream	5/25/06 14:13	0.69		4.91	-6.46	0.29	0.92	27.03	<0.016	0.02	29.84	15.20	2.31	23.99		
621	Stream	5/25/06 16:11	1.03		8.86	-6.50	0.29	1.10	28.09	<0.016	0.04	24.18	11.69	2.98	17.65		
622	Stream	5/25/06 18:11	0.98		8.87	-6.69	0.29	1.01	17.03	<0.016	0.13	24.09	12.91	3.39	20.32		
622	Stream	5/25/06 18:13	0.95		7.84	-6.61	0.29	0.89	23.75	<0.016	<0.02	36.44	15.89	2.90	23.90		
623	Stream	5/25/06 20:11	1.37		7.14	-6.65	0.29	1.14	26.43	<0.016	<0.02	21.01	15.16	3.09	22.09		
623	Stream	5/25/06 20:13	2.48		7.68	-6.63	0.29	1.17	22.48	<0.016	<0.02	30.91	16.30	3.14	23.36		
624	Stream	5/25/06 22:11	1.03		7.88	-6.76	0.29	1.30	42.71	<0.016	<0.02	45.64	17.67	2.94	27.48		
624	Stream	5/25/06 22:13	3.29		7.09	-6.68	0.29	1.09	28.54	<0.016	<0.02	26.72	17.12	2.79	24.72		
625	Stream	5/26/06 0:11	1.55		6.84	-6.77	0.29	1.23	42.13	<0.016	<0.02	46.21	18.70	2.83	26.93		
625	Stream	5/26/06 0:13	2.73		6.50	-6.83	0.29	2.47	36.60	<0.016	<0.02	40.11	19.10	2.70	27.19		
626	Stream	5/26/06 2:11	2.00		6.17	-6.43	0.29	1.96	45.05	<0.016	<0.02	31.62	18.73	2.48	28.48		
626	Stream	5/26/06 2:13	3.13		6.28	-6.22	0.22										
627	Stream	5/26/06 4:11				-5.15	0.22										
627	Stream	5/26/06 4:13				-5.63	0.22										
628	Stream	5/26/06 6:11				-5.45	0.22										
628	Stream	5/26/06 6:13				-5.58	0.22										
629	Stream	5/26/06 8:11				-5.46	0.22										
629	Stream	5/26/06 8:13				-5.51	0.22										
630	Stream	5/26/06 10:11				-5.52	0.22										
630	Stream	5/26/06 10:13				-6.22	0.22										
631	Stream	5/26/06 12:11				-5.15	0.22										
631	Stream	5/26/06 12:13				-5.63	0.22										
632	Stream	5/26/06 14:11				-5.45	0.22										
632	Stream	5/26/06 14:13				-5.58	0.22										
657	Stream	5/30/06 0:00	0.01	<0.003	4.72	-5.52	0.22	1.19	34.34	0.03	0.18	<2.50	<1.20	0.23	<1.20	<1.20	1.25
658	RG-11	5/30/06 0:00	<0.026	0.02	10.92	-7.37	0.23	3.92	16.18	0.23	0.85	38.74	26.39	1.56	32.88		
658	RG-12	5/30/06 0:00			12.21												
659	RG-13	5/30/06 0:00	0.01	<0.003	12.70	-6.42	0.23	6.01	49.49	0.22	0.45	48.82	28.19	1.64	17.43		
660	RG-14	5/30/06 0:00	0.03	0.14	12.70	-6.42	0.23	1.38	22.21	0.65	0.83	52.18	24.68	1.55	22.72		
661	RG-15	5/30/06 0:00	1.43	<0.003	3.70	-6.37	0.23	1.55	81.19	<0.016	<0.02	25.77	17.99	1.75	25.02		
662	RG-16	5/30/06 0:00	0.02	<0.003	5.93	-6.74	0.23	0.43	21.96	<0.016	<0.02	28.18	7.79	2.54	12.15		
663	RG-17	5/30/06 0:00	6.43	<0.003	2.46	-6.69	0.23	-47.59	38.25	<0.016	0.03	24.10	16.78	0.79	17.24		
664	RG-18	5/30/06 0:00	0.91	<0.003	5.99	-5.32	0.23	-40.52	8.79	<0.016	0.05	32.30	12.80	2.61	6.01		
701	1-150	5/30/06 0:00	<0.026	<0.003	7.40	-3.61	0.23	-34.73	30.57	<0.016	<0.02	28.53	9.05	2.52	21.86		
703	2-150	5/30/06 0:00			6.73												
704	3-90	5/30/06 0:00	0.14	0.19	6.04												
705	3-150	5/30/06 0:00	0.11	0.11	5.79												
706	1-90,2-90,3-90	5/30/06 0:00															
707	Stream	5/30/06 0:00															
708	ChurchPond	5/30/06 0:00															
709	Pipe	5/30/06 0:00															
710	CobblePond(H)	5/30/06 0:00															
711	CobblePond(E)	5/26/06 17:08															
736	Stream	5/26/06 21:08															
737	Stream	5/27/06 1:08															

Appendix N(b)(continued). Water Chemistry Results for All Samples Collected in Watershed M.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ (‰) error	$\delta^{18}\text{O}$ (‰) error	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
738	Stream	5/27/06 5:08		0.17	5.50												
739	Stream	5/27/06 9:08		0.12	5.51												
740	Stream	5/27/06 13:08		0.13	5.78												
741	Stream	5/27/06 17:08		0.17	5.75												
742	Stream	5/27/06 21:08		0.12	5.65												
743	Stream	5/28/06 1:08		0.13	5.36												
744	Stream	5/28/06 5:08		0.17	5.29												
745	Stream	5/28/06 9:08		0.14	5.35												
746	Stream	5/28/06 13:08		0.12	5.86												
747	Stream	5/28/06 17:08		0.18	5.53												
748	Stream	5/28/06 21:08		0.09	5.18												
749	Stream	5/29/06 1:08		0.17	5.14												
750	Stream	5/29/06 5:08		0.14	5.00												
751	Stream	5/29/06 9:08		0.13	5.21												
752	Stream	5/29/06 13:08		0.16	6.09												
753	Stream	5/29/06 17:08		0.17	5.54												
754	Stream	5/29/06 21:08		0.17	5.02												
755	Stream	5/30/06 1:08		0.13	4.86												
756	Stream	5/30/06 5:08		0.18	4.78												
757	Stream	5/30/06 9:08		0.19	4.96												
781	Stream	5/26/06 17:08	1.66			-6.61	0.23	1.72	38.63	<0.016	0.13	0.13	32.94	19.31	2.56	26.72	
782	Stream	5/26/06 21:08	1.11			-6.70	0.23	0.85	32.78	<0.016	0.12	0.12	22.29	19.45	2.37	26.07	
783	Stream	5/27/06 1:08	2.51			-6.90	0.23	1.83	37.42	<0.016	0.09	0.09	26.24	18.93	2.23	25.65	
784	Stream	5/27/06 5:08	2.24			-6.59	0.23	1.18	39.85	<0.016	0.09	0.09	39.15	18.94	2.13	25.37	
785	Stream	5/27/06 9:08	3.45			-6.52	0.23	0.65	14.54	<0.016	0.09	0.09	40.92	19.56	2.14	26.01	
786	Stream	5/27/06 13:08	2.06			-6.49	0.23	1.64	44.40	<0.016	0.07	0.07	24.12	16.78	2.02	24.62	
787	Stream	5/27/06 17:08	0.96			-6.65	0.23	2.10	31.69	<0.016	0.06	0.06	42.01	20.05	2.17	26.90	
788	Stream	5/27/06 21:08	0.77			-6.84	0.23	1.02	23.94	<0.016	0.06	0.06	39.52	20.27	2.13	26.61	
789	Stream	5/28/06 1:08	1.60			-6.69	0.23	0.97	38.47	<0.016	0.07	0.07	42.43	16.75	1.93	23.63	
790	Stream	5/28/06 5:08	2.15			-6.43	0.23	1.42	47.02	<0.016	0.07	0.07	26.27	17.63	1.89	24.34	
791	Stream	5/28/06 9:08	0.93			-6.34	0.23	1.05	29.74	<0.016	0.09	0.09	39.22	17.30	1.84	24.07	
792	Stream	5/28/06 13:08	0.34			-6.85	0.23	0.42	17.91	<0.016	0.04	0.04	38.74	17.20	1.95	24.23	
793	Stream	5/28/06 17:08	0.38			-6.59	0.23	0.96	23.99	<0.016	0.21	0.21	29.47	17.99	2.02	25.07	
794	Stream	5/28/06 21:08	0.92			-6.63	0.23	1.15	36.07	<0.016	0.04	0.04	38.85	20.29	1.97	26.89	
795	Stream	5/29/06 1:08	2.16			-6.86	0.23	0.96	51.40	<0.016	0.05	0.05	33.96	20.67	1.98	27.07	
796	Stream	5/29/06 5:08	1.18			-6.39	0.23	1.40	37.98	<0.016	0.04	0.04	37.13	19.73	1.92	26.39	
797	Stream	5/29/06 9:08	1.09			-6.68	0.23	1.21	29.10	<0.016	0.03	0.03	32.03	20.86	1.95	27.11	
798	Stream	5/29/06 13:08	0.77			-6.55	0.23	0.65	31.38	<0.016	<0.02	<0.02	40.55	20.01	1.96	26.41	
799	Stream	5/29/06 17:08	0.74			-6.45	0.23	0.81	34.30	<0.016	<0.02	<0.02	44.39	20.26	1.96	27.05	
800	Stream	5/29/06 21:08	0.92			-6.32	0.23	1.14	32.36	<0.016	<0.02	<0.02	43.37	19.76	1.87	26.82	
801	Stream	5/30/06 1:08	0.89			-6.52	0.23	2.49	31.59	<0.016	<0.02	<0.02	44.29	19.14	1.84	26.19	
802	Stream	5/30/06 5:08	1.02			-6.51	0.23	1.38	37.68	<0.016	0.02	0.02	38.11	21.49	1.89	28.05	
803	Stream	5/30/06 9:08	1.33			-6.71	0.23	1.40	39.47	<0.016	<0.02	<0.02	29.03	21.24	1.84	27.94	
876	Stream	6/20/06 0:00	1.43	<0.003	4.31	-6.05	0.26	2.50	35.58	<0.016	<0.02	<0.02	21.80	12.20	2.09	14.13	
878	2-150	6/20/06 0:00	0.97	<0.003	10.11	-7.31	0.26	6.01	21.04	0.37	0.85	0.85	42.81	41.25	2.32	28.70	
880	3-150	6/20/06 0:00	0.01	<0.003	8.57	-6.54	0.26	4.27	34.70	0.12	0.48	0.48	53.99	36.33	2.52	21.74	
881	2-90, 3-90	6/20/06 0:00	<0.026			-7.33	0.26	5.35	45.92	0.28	0.54	0.54	45.69	31.02	1.72	22.42	
882	ChurchPond	6/20/06 0:00	0.01	<0.003	6.10	-6.52	0.26	1.88	33.99	<0.016	0.05	0.05	29.22	10.77	2.37	12.82	
883	Pipe	6/20/06 0:00	6.71	0.09	2.29	-7.34	0.26	1.88	33.99	<0.016	0.04	0.04	35.51	21.87	1.33	14.03	
884	CobblePond(H)	6/20/06 0:00	0.94	<0.003	6.25	-5.32	0.26	0.74	14.80	<0.016	0.02	0.02	15.34	9.11	2.48	5.47	

Appendix N(b)(continued). Water Chemistry Results for All Samples Collected in Watershed M.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
885	CobblePond(E)	6/20/06 0:00	0.01	<0.003	7.94	-3.59	0.26	0.26		0.55	48.43	<0.016	<0.02	20.86	11.26	2.92	23.26	
897	Stream	6/23/06 12:15	2.89	<0.003		-5.46	0.26			2.77	44.77	<0.016	0.03	36.18	18.22	2.97	23.68	
898	RG-11	6/27/06 0:00	0.35			-4.43	0.26	-19.93		0.15	0.68	<0.016	<0.02	4.81	4.52	7.66	<1.20	1.10
899	RG-12	6/27/06 0:00	0.27			-4.13	0.26			<0.013	0.16	0.29	0.37	<2.50	<1.20	0.20	<1.20	0.82
900	RG-13	6/27/06 0:00	0.54	<0.003	3.90	-4.28	0.26			<0.013	0.12	0.51	0.46	<2.50	<1.20	<0.200	<1.20	0.92
900	RG-14	6/27/06 0:00	0.54	<0.003	3.90	-4.28	0.26			<0.013	0.12	0.51					<1.20	0.92
901	RG-15	6/27/06 0:00	0.27	<0.003	3.99	-4.84	0.26			<0.013	0.16	0.41	0.44	<2.50	<1.20	<0.200	<1.20	0.88
901	RG-16	6/27/06 0:00	0.27	<0.003	3.99	-4.84	0.26			<0.013	0.16	0.41					3.49	0.88
902	RG-17	6/27/06 0:00	0.41	<0.003	4.26	-4.12	0.26			<0.013	1.59	0.27	0.22	2.57	<1.20	0.28		0.84
902	RG-18	6/27/06 0:00	0.41	<0.003	4.26	-4.12	0.26			<0.013	1.59	0.27						0.84
903	Stream	6/21/06 15:12		0.08	22.16													
904	Stream	6/21/06 17:12		0.31	7.40													
905	Stream	6/21/06 19:12		0.30	7.04													
906	Stream	6/21/06 21:12		0.20	6.48													
907	Stream	6/21/06 23:12		0.16	6.27													
908	Stream	6/22/06 1:12		0.36	6.12													
909	Stream	6/22/06 3:12		0.38	5.80													
910	Stream	6/22/06 5:12		0.27	5.74													
911	Stream	6/22/06 7:12		0.12	5.34													
912	Stream	6/22/06 9:12		0.32	5.41													
913	Stream	6/22/06 11:12		0.16	5.46													
914	Stream	6/22/06 13:12		0.34	5.55													
915	Stream	6/22/06 15:12		<0.003	5.28													
916	Stream	6/22/06 17:12		0.05	5.19													
917	Stream	6/22/06 19:12		<0.003	5.55													
918	Stream	6/22/06 21:12		0.18	8.27													
919	Stream	6/22/06 23:12		0.08	7.95													
920	Stream	6/23/06 1:12		0.22	7.48													
921	Stream	6/23/06 3:12		0.36	7.18													
922	Stream	6/23/06 5:12		0.01	6.94													
923	Stream	6/23/06 7:12		0.08	6.75													
924	Stream	6/23/06 9:12		0.62	6.46													
925	Stream	6/23/06 10:12		<0.003	6.65													
970	Stream	6/21/06 15:16	0.38			-6.04	0.25			2.42	37.02	<0.016	<0.02	41.79	19.45	2.58	22.18	
971	Stream	6/21/06 17:16	0.70			-5.80	0.25			1.69	30.41	<0.016	<0.02	34.14	17.86	2.57	20.98	
972	Stream	6/21/06 19:16	0.60			-6.04	0.25			2.46	36.91	<0.016	<0.02	37.78	19.71	2.66	22.45	
973	Stream	6/21/06 21:16	0.88			-5.84	0.25			2.75	43.01	<0.016	<0.02	35.07	19.67	2.62	22.40	
974	Stream	6/21/06 23:16	0.70			-6.02	0.25	-43.11		1.32	28.27	<0.016	<0.02	38.43	20.34	2.63	23.05	
975	Stream	6/22/06 1:16	0.82			-6.14	0.25			2.19	38.18	<0.016	<0.02	32.83	20.16	2.66	22.76	
976	Stream	6/22/06 3:16	0.69			-5.91	0.25			2.35	55.32	<0.016	<0.02	39.31	21.34	2.69	23.91	
977	Stream	6/22/06 5:16	0.80			-6.10	0.25			1.81	38.95	<0.016	<0.02	35.86	20.56	2.51	23.23	
978	Stream	6/22/06 7:16	0.56			-6.15	0.25			2.24	26.20	<0.016	<0.02	33.62	19.78	2.63	22.59	
979	Stream	6/22/06 9:16	0.52			-6.29	0.25	-42.88		2.15	29.61	<0.016	<0.02	32.98	18.82	2.55	21.68	
980	Stream	6/22/06 11:16	0.75			-6.29	0.25			2.72	41.73	<0.016	<0.02	35.16	20.69	2.66	23.02	
981	Stream	6/22/06 13:16	0.74			-5.91	0.25			2.30	34.25	<0.016	<0.02	28.26	20.27	2.63	22.55	
982	Stream	6/22/06 15:16	0.62			-5.95	0.25	-43.00		1.95	35.70	<0.016	<0.02	29.80	19.25	2.58	22.16	
983	Stream	6/22/06 17:16	1.13			-6.09	0.25			3.12	44.03	<0.016	<0.02	34.15	22.47	2.78	24.38	
984	Stream	6/22/06 19:16	0.78			-5.62	0.25			2.08	32.87	<0.016	<0.02	31.21	19.90	2.72	22.93	
985	Stream	6/22/06 21:16	0.98			-5.41	0.25	-37.11		2.08	39.25	<0.016	<0.02	44.04	16.37	3.03	20.27	
986	Stream	6/22/06 23:16	0.49			-5.43	0.25			1.13	26.45	<0.016	<0.02	38.47	12.93	2.98	18.16	

Appendix N(b)(continued). Water Chemistry Results for All Samples Collected in Watershed M.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
987	Stream	6/23/06 1:16	2.27			-5.58	0.25		1.67	35.29	<0.016	<0.02	30.93	14.44	3.12	18.55	
988	Stream	6/23/06 3:16	2.59			-5.14	0.25	-37.50	3.51	34.80	<0.016	<0.02	35.68	14.82	3.10	18.04	
989	Stream	6/23/06 5:16	1.85			-5.69	0.25		4.10	29.04	<0.016	<0.02	42.08	16.23	3.16	19.25	
990	Stream	6/23/06 7:16	1.42			-5.63	0.25		1.48	27.00	<0.016	<0.02	43.28	17.41	3.16	20.38	
991	Stream	6/23/06 9:16	2.76			-6.26	0.25		2.45	42.13	<0.016	<0.02	26.85	17.91	3.07	21.47	
992	Stream	6/23/06 10:16	2.90			-5.46	0.25		2.56	41.77	<0.016	<0.02	29.76	17.90	3.08	21.93	
1026	1-90	6/27/06 0:00	0.15	0.02	4.14	-6.70	0.25		1.91	46.72	<0.016	0.06	31.25	46.14	1.83	53.78	
1027	1-150	6/27/06 0:00	0.06	<0.003	4.04	-6.28	0.25		5.67	49.42	0.02	0.16	55.80	50.43	2.93	43.77	
1028	2-90	6/27/06 0:00	0.01			-6.32	0.25		4.48	27.22	0.60	0.93	78.08	40.84	2.23	38.67	
1029	2-150	6/27/06 0:00	0.01	<0.003	8.39	-7.23	0.25		4.09	11.86	0.36	0.83	67.04	45.45	2.21	31.39	
1030	3-90	6/27/06 0:00	0.12	<0.003	5.40	-6.83	0.25		1.61	18.69	0.02	0.15	38.95	17.35	1.74	13.43	
1031	3-150	6/27/06 0:00	<0.026	<0.003	8.14	-6.33	0.25		9.34	47.61	0.24	0.59	56.59	28.31	1.89	17.49	
1032	Stream	6/27/06 12:51	2.32	<0.003	5.45	-6.37	0.25		1.44	39.27	<0.016	0.05	26.38	11.57	2.61	17.48	
1033	ChurchPond	6/27/06 0:00		<0.003	5.32	-5.86	0.25		2.53	38.77	0.06	0.12	26.72	9.15	2.26	12.91	
1034	Pipe	6/27/06 0:00	4.09	<0.003	5.22	-6.34	0.25		0.84	12.95	<0.016	0.08	17.12	6.29	2.52	3.85	
1035	CobblePond(H)	6/27/06 0:00	1.32	<0.003	4.96	-5.33	0.25		0.97	40.29	0.01	<0.02	22.08	8.57	2.73	17.71	
1036	CobblePond(E)	6/27/06 0:00	<0.026	<0.003	7.15	-3.22	0.25	-31.83									
1061	Stream	6/23/06 11:57		0.14	6.87												
1062	Stream	6/23/06 15:57		0.28	7.19												
1063	Stream	6/23/06 19:57		0.23	7.04												
1064	Stream	6/23/06 23:57		0.09	6.55												
1065	Stream	6/24/06 3:57		0.14	6.27												
1066	Stream	6/24/06 7:57		0.25	5.93												
1067	Stream	6/24/06 11:57		0.24	6.32												
1068	Stream	6/24/06 15:57		0.24	6.26												
1069	Stream	6/24/06 19:57		0.24	6.09												
1070	Stream	6/24/06 23:57		0.16	5.66												
1071	Stream	6/25/06 3:57		0.17	5.57												
1072	Stream	6/25/06 7:57		0.20	5.50												
1073	Stream	6/25/06 11:57		0.17	5.79												
1074	Stream	6/25/06 15:57		0.37	9.53												
1075	Stream	6/25/06 19:57		<0.003	8.22												
1076	Stream	6/25/06 23:57		<0.003	7.34												
1077	Stream	6/26/06 3:57		0.35	6.94												
1078	Stream	6/26/06 7:57		0.33	6.75												
1079	Stream	6/26/06 11:57		0.26	6.61												
1080	Stream	6/26/06 15:57		0.28	6.42												
1081	Stream	6/26/06 19:57		0.89	9.63												
1082	Stream	6/26/06 23:57		0.15	8.63												
1083	Stream	6/27/06 3:57		0.05	8.04												
1084	Stream	6/27/06 7:57		<0.003	7.54												
1109	Stream	6/23/06 12:07	1.71			-6.22	0.38		3.37	33.54	<0.016	0.13	23.74	13.16	2.60	17.84	
1110	Stream	6/23/06 16:07	0.99			-6.00	0.38		1.66	34.92	<0.016	0.20	36.45	17.65	2.78	21.56	
1111	Stream	6/23/06 20:07	0.64			-5.96	0.38	-40.11	0.74	21.50	<0.016	0.09	39.87	18.19	2.79	22.27	
1112	Stream	6/24/06 0:07	1.07			-6.25	0.38		2.26	41.19	<0.016	0.09	26.90	14.14	2.41	20.20	
1113	Stream	6/24/06 4:07	1.26			-6.10	0.38	-41.33	2.41	37.43	<0.016	0.09	32.54	18.69	2.73	22.55	
1114	Stream	6/24/06 8:07	1.00			-5.96	0.38		2.03	45.89	<0.016	0.07	29.68	13.43	2.25	17.22	
1115	Stream	6/24/06 12:07	0.43			-5.91	0.38		1.67	18.75	<0.016	0.07	23.14	17.15	2.53	21.47	
1116	Stream	6/24/06 16:07	1.50			-6.08	0.38		2.53	46.10	<0.016	0.07	27.85	11.15	2.14	15.90	
1117	Stream	6/24/06 20:07	1.56			-6.21	0.38		2.65	45.51	<0.016	0.05	37.01	19.56	2.66	23.60	

Appendix N(b)(continued). Water Chemistry Results for All Samples Collected in Watershed M.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
1118	Stream	6/25/06 0:07	0.89			-5.77	0.38		2.27	47.71	<0.016	0.04	22.27	13.49	2.23	18.56	
1119	Stream	6/25/06 4:07	0.83			-6.15	0.38	-41.69	2.47	45.76	<0.016	0.07	39.36	18.76	2.66	22.92	
1120	Stream	6/25/06 8:07	0.72			-6.39	0.38	-41.55	2.77	44.57	<0.016	0.04	30.17	17.44	2.55	21.80	
1121	Stream	6/25/06 12:07	0.60			-5.90	0.38	-41.55	1.58	43.72	<0.016	0.02	41.09	16.29	2.52	21.14	
1122	Stream	6/25/06 16:07	0.91		-6.82	-4.44	0.80	-42.78	1.22	30.19	<0.016	0.04	24.59	7.65	2.42	10.63	
1123	Stream	6/25/06 20:07	1.46			-5.80	0.38	-41.49	1.70	32.63	<0.016	0.10	31.54	14.58	3.57	16.77	
1124	Stream	6/26/06 0:07	1.11			-6.14	0.38	-42.39	1.34	30.48	<0.016	0.07	46.60	15.87	3.17	18.51	
1125	Stream	6/26/06 4:07	1.51			-5.91	0.38	-41.53	2.04	40.73	<0.016	0.06	44.98	17.88	3.12	21.36	
1126	Stream	6/26/06 8:07	1.18			-6.63	0.38	-42.29	2.27	39.80	<0.016	0.04	54.62	19.75	3.09	24.09	
1127	Stream	6/26/06 12:07	1.37			-6.10	0.38	-43.15	1.97	43.41	<0.016	0.02	22.50	18.02	2.85	22.73	
1128	Stream	6/26/06 16:07	0.90			-6.11	0.38	-43.07	2.80	40.83	<0.016	0.03	51.53	18.41	2.73	23.55	
1129	Stream	6/26/06 20:07	0.88		-7.09	-5.63	0.80	-41.64	1.36	24.96	<0.016	0.04	34.52	10.20	3.41	13.13	
1130	Stream	6/27/06 0:07	0.99		-6.27	-5.22	0.80	-41.96	1.95	29.85	<0.016	0.03	37.05	11.92	3.21	18.51	
1131	Stream	6/27/06 4:07	1.08			-6.20	0.38	-41.68	1.78	35.77	<0.016	<0.02	38.05	13.39	3.21	19.79	
1132	Stream	6/27/06 8:07	1.43			-6.01	0.38	-42.25	1.72	37.99	<0.016	0.03	41.75	14.69	3.14	21.32	
1140	Stream	6/27/06 12:20		0.85	7.40												
1141	Stream	6/27/06 15:20		0.25	6.97												
1142	Stream	6/27/06 18:20		0.37	6.71												
1143	Stream	6/27/06 21:20		0.32	6.37												
1144	Stream	6/28/06 0:20		0.27	6.09												
1145	Stream	6/28/06 3:20		0.34	5.98												
1146	Stream	6/28/06 6:20		0.23	5.52												
1147	Stream	6/28/06 9:20		0.24	5.45												
1148	Stream	6/28/06 12:20		0.20	5.41												
1149	Stream	6/28/06 15:20		0.23	5.57												
1150	Stream	6/28/06 18:20		0.17	5.33												
1151	Stream	6/28/06 21:20		0.22	5.08												
1152	Stream	6/29/06 0:20		0.20	5.07												
1153	Stream	6/29/06 3:20		0.12	4.84												
1154	Stream	6/29/06 6:20		0.24	4.65												
1155	Stream	6/29/06 9:20		0.12	4.65												
1156	Stream	6/29/06 12:20		0.20	4.79												
1157	Stream	6/29/06 15:20		0.22	4.75												
1158	Stream	6/29/06 18:20		0.22	4.75												
1159	Stream	6/29/06 21:20		0.21	4.61												
1160	Stream	6/30/06 0:20		0.20	4.38												
1161	Stream	6/30/06 3:20		0.23	4.35												
1162	Stream	6/30/06 6:20		0.21	4.22												
1186	Stream	6/27/06 12:09	0.58			-6.45	0.38		0.75	36.33	<0.016	0.07	26.14	14.48	3.00	20.96	
1187	Stream	6/27/06 15:09	1.05			-6.33	0.38		1.31	20.79	<0.016	0.12	21.42	14.23	2.71	21.75	
1188	Stream	6/27/06 18:09	0.34			-5.94	0.38		0.65	18.57	<0.016	0.05	21.10	14.20	2.78	20.07	
1189	Stream	6/27/06 21:09	0.67			-5.82	0.38		1.02	25.32	<0.016	0.03	39.11	15.89	2.76	21.02	
1190	Stream	6/28/06 0:09	0.63			-5.98	0.38		0.93	19.21	<0.016	0.04	42.89	16.99	2.61	23.78	
1191	Stream	6/28/06 3:09	1.50			-5.84	0.38		2.37	38.21	<0.016	0.05	41.01	16.91	2.60	21.62	
1192	Stream	6/28/06 6:09	0.73		-6.12	-5.80	0.80		1.69	24.74	<0.016	0.03	32.94	17.73	2.59	22.55	
1193	Stream	6/28/06 9:09	0.91			-6.59	0.38		0.57	42.73	<0.016	0.03	47.95	18.53	2.48	25.12	
1194	Stream	6/28/06 12:09	0.71			-6.20	0.38		1.83	33.27	<0.016	<0.02	44.80	18.06	2.54	23.21	
1195	Stream	6/28/06 15:09	1.09			-6.44	0.38		1.06	41.97	<0.016	0.06	36.80	17.42	2.51	22.91	
1196	Stream	6/28/06 18:09	0.58			-6.24	0.38		1.90	28.74	<0.016	0.03	38.92	18.50	2.54	26.08	
1197	Stream	6/28/06 21:09	0.77			-6.85	0.38		1.12	31.52	<0.016	0.06	49.51	18.16	2.40	25.06	

Appendix N(b)(continued). Water Chemistry Results for All Samples Collected in Watershed M.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
1198	Stream	6/29/06 0:09	1.68			-6.50	0.38		0.54	26.51	<0.016	<0.02	23.65	17.57	2.38	22.58	
1199	Stream	6/29/06 3:09	1.18			-6.37	0.38		2.11	35.56	<0.016	<0.02	48.75	18.10	2.43	23.03	
1200	Stream	6/29/06 6:09	0.65			-6.61	0.38		1.66	26.39	<0.016	0.06	44.21	18.81	2.30	24.98	
1201	Stream	6/29/06 9:09	0.62			-6.86	0.38		0.84	32.22	<0.016	<0.02	44.01	18.52	2.32	23.21	
1202	Stream	6/29/06 12:09	0.71			-7.29	0.80		0.60	30.10	<0.016	<0.02	45.69	17.73	2.30	22.95	
1203	Stream	6/29/06 15:09	0.68			-6.85	0.38		0.77	29.29	<0.016	<0.02	32.97	17.68	2.37	23.31	
1204	Stream	6/29/06 18:09	0.79			-6.62	0.38		0.66	40.35	<0.016	<0.02	34.32	17.29	2.26	24.59	
1205	Stream	6/29/06 21:09	0.59			-6.66	0.38		1.32	25.18	<0.016	<0.02	44.89	19.34	2.40	24.22	
1206	Stream	6/30/06 0:09	0.57		-6.75	-5.82	0.80		1.63	24.23	<0.016	<0.02	31.49	17.78	2.32	23.02	
1207	Stream	6/30/06 3:09	0.78		-6.06	-5.61	0.80		1.24	43.89	<0.016	<0.02	27.11	18.50	2.33	24.04	
1208	Stream	6/30/06 6:09	0.43		-6.79	-5.90	0.80		1.08	52.53	<0.016	0.02	35.19	20.39	2.37	27.90	
1246	Stream	8/2/06 0:00	0.32		3.30	-5.52	0.35		1.85	46.54	<0.016	0.03	35.67	17.92	2.20	22.72	
1250	2-150, 3-150	8/2/06 0:00	1.11		8.11	-6.47	0.35		5.04	42.23	0.92	0.51					
1251	ChurchPond	8/2/06 0:00	<0.026		5.62	-5.37	0.35		1.34	9.99	<0.016	<0.02	28.70	6.91	1.82	8.04	
1252	Pipe	8/2/06 0:00	1.86		<0.003	-6.95	0.35		1.79	159.72	<0.016	0.06	49.47	24.27	1.34	79.59	
1253	CobblePond(H)	8/2/06 0:00	0.09		5.52	-4.59	0.35		1.51	19.03	<0.016	0.08	26.92	14.49	3.76	8.39	
1254	CobblePond(E)	8/2/06 0:00	0.03		7.43	-1.53	0.26		<0.013	30.61	<0.016	<0.02	14.52	5.73	2.15	12.40	
1266	RG-11	8/6/06 0:00	0.37			-2.76	0.35		0.63	2.19	<0.016	<0.02	10.76	3.31	10.80	<1.20	0.38
1267	Stream	8/4/06 10:40	0.24		4.52	-5.03	0.35		2.47	27.04	<0.016	0.02	32.28	17.92	3.20	21.57	
1268	RG-12	8/6/06 0:00	0.26			-3.30	0.35		<0.013	0.21	0.48	0.66	3.23	<1.20	0.61	<1.20	0.52
1269	RG-13/14	8/6/06 0:00	0.16			-2.11	0.35		<0.013	0.49	0.21	0.18	<2.50	<1.20	<0.200	<1.20	0.76
1270	RG-15/16	8/6/06 0:00	0.14			-2.41	0.35		0.21	0.63	1.85	2.07	<2.50	<1.20	3.21	<1.20	0.86
1271	RG-17/18	8/6/06 0:00	0.63		4.26	-2.95	0.35		<0.013	3.46	0.45	0.42	7.15	2.15	1.51	2.49	0.78
1291	Stream	8/3/06 8:45			54.99												
1292	Stream	8/3/06 10:05		0.28	10.09												
1293	Stream	8/3/06 11:25		0.09	8.24												
1294	Stream	8/3/06 12:45		0.24	7.90												
1295	Stream	8/3/06 14:05		0.18	7.33												
1296	Stream	8/3/06 15:25		0.28	8.50												
1297	Stream	8/3/06 16:45		0.23	10.09												
1298	Stream	8/3/06 18:05		0.24	10.71												
1299	Stream	8/3/06 19:25		0.22	9.48												
1300	Stream	8/3/06 20:45		0.15	8.50												
1301	Stream	8/3/06 22:05		0.20	8.04												
1302	Stream	8/3/06 23:25		0.11	7.95												
1303	Stream	8/4/06 0:45		0.09	7.46												
1304	Stream	8/4/06 2:05		0.12	7.44												
1305	Stream	8/4/06 3:25		0.06	6.78												
1306	Stream	8/4/06 4:45		0.14	6.50												
1307	Stream	8/4/06 6:05		0.16	6.36												
1308	Stream	8/4/06 7:25		0.12	5.96												
1309	Stream	8/4/06 8:45		0.18	5.93												
1310	Stream	8/4/06 9:05		<0.003	6.15												
1330	Stream	8/3/06 8:42	<0.026			-6.71	0.35		4.48	32.71	<0.016	<0.02	44.57	21.79	2.67	24.28	
1331	Stream	8/3/06 10:02	<0.026			-6.61	0.35		2.91	34.45	<0.016	<0.02	30.77	23.74	2.61	26.68	
1332	Stream	8/3/06 11:22	0.06			-6.18	0.35		2.71	30.69	<0.016	<0.02	33.92	23.71	2.54	27.12	
1333	Stream	8/3/06 12:42	<0.026			-5.91	0.35		3.39	33.78	<0.016	<0.02	34.34	21.74	2.69	25.91	
1334	Stream	8/3/06 14:02	0.06			-5.48	0.35		2.30	32.17	<0.016	<0.02	31.60	20.33	2.81	24.96	
1335	Stream	8/3/06 15:22	0.07			-5.47	0.35		1.72	29.60	<0.016	<0.02	34.74	19.49	3.04	28.45	
1336	Stream	8/3/06 16:42	<0.026			-4.94	0.35		2.10	39.06	<0.016	<0.02	31.15	17.48	3.32	26.70	

Appendix N(b)(continued). Water Chemistry Results for All Samples Collected in Watershed M.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
1337	Stream	8/3/06 18:02	0.01			-4.78	0.35		3.27	42.62	<0.016	<0.02	30.46	16.15	3.43	23.09	
1338	Stream	8/3/06 19:22	<0.026			-4.78	0.35		2.31	37.42	<0.016	<0.02	22.90	15.14	3.32	22.14	
1339	Stream	8/3/06 20:42	0.01			-4.47	0.35		2.16	40.42	<0.016	<0.02	21.68	15.50	3.30	22.58	
1340	Stream	8/3/06 22:02	0.03			-3.98	0.35		2.17	37.55	<0.016	<0.02	21.67	14.83	3.23	21.07	
1341	Stream	8/3/06 23:22	0.08			-3.80	0.43		2.24	38.74	<0.016	<0.02	26.12	14.45	3.35	21.80	
1342	Stream	8/4/06 0:42	0.07			-4.08	0.43		1.93	40.26	<0.016	<0.02	23.25	15.14	3.44	23.45	
1343	Stream	8/4/06 2:02	0.07			-4.73	0.43		1.65	38.98	<0.016	<0.02	22.23	16.53	3.54	24.93	
1344	Stream	8/4/06 3:22	0.04			-4.82	0.43		1.40	34.59	<0.016	<0.02	24.35	17.03	3.55	24.07	
1345	Stream	8/4/06 4:42	0.06			-4.58	0.43		2.29	19.22	<0.016	<0.02	29.12	17.49	3.52	23.41	
1346	Stream	8/4/06 6:02	0.14			-5.08	0.43		2.54	43.23	<0.016	<0.02	20.41	17.70	3.54	23.15	
1347	Stream	8/4/06 7:22	0.08			-4.36	0.43		1.38	22.06	<0.016	<0.02	30.49	18.03	3.45	22.97	
1348	Stream	8/4/06 8:42	0.06			-5.02	0.43		1.87	31.70	<0.016	<0.02	32.55	18.15	3.36	22.79	
1349	Stream	8/4/06 9:02	0.08			-5.05	0.43		2.19	38.69	<0.016	0.04	21.18	17.90	3.24	22.41	
1365	Stream	8/6/06 11:05	1.23	<0.003	3.63	-5.37	0.43		2.45	25.35	<0.016	<0.02	38.51	19.70	2.68	28.02	
1368	2-150, 3-150	8/6/06 0:00	0.03	0.07	7.38	-6.56	0.43		6.04	24.39	0.13	0.56	46.00	29.84	1.55	19.40	
1369	ChurchPond	8/6/06 0:00	<0.026	<0.003	5.92	-5.15	0.43		2.17	12.19	<0.016	<0.02	19.06	5.52	1.73	6.65	
1370	Pipe	8/6/06 0:00	1.08	<0.003	1.89	-6.72	0.43		1.98	96.11	0.02	0.05	41.00	31.16	1.38	84.62	
1371	CobblePond(H)	8/6/06 0:00	0.97	<0.003	6.52	-3.85	0.43		1.31	7.51	<0.016	0.04	23.90	12.72	4.01	7.45	
1372	CobblePond(E)	8/6/06 0:00	<0.026	<0.003	7.52	-1.00	0.43		0.53	32.33	<0.016	<0.02	23.91	11.20	3.52	20.70	
1385	Stream	8/4/06 10:28		0.12	7.36												
1386	Stream	8/4/06 14:28		0.19	8.17												
1387	Stream	8/4/06 18:28		0.14	7.83												
1388	Stream	8/4/06 22:28		0.16	7.13												
1389	Stream	8/5/06 2:28		0.16	6.59												
1390	Stream	8/5/06 6:28		0.17	6.24												
1391	Stream	8/5/06 10:28		0.13	6.22												
1392	Stream	8/5/06 14:28		0.09	6.87												
1393	Stream	8/5/06 18:28		0.14	6.58												
1394	Stream	8/5/06 22:28		0.10	6.14												
1395	Stream	8/6/06 2:28		0.13	5.77												
1396	Stream	8/6/06 6:28		0.12	5.73												
1397	Stream	8/6/06 7:28		0.02	5.96												
1410	Stream	8/4/06 10:31	0.01			-4.84	0.43		2.63	43.85	<0.016	0.03	21.90	9.88	2.15	13.75	
1411	Stream	8/4/06 14:31	0.02			-4.92	0.43		2.30	43.43	<0.016	<0.02	24.48	12.82	2.42	16.63	
1412	Stream	8/4/06 18:31	<0.026			-5.26	0.43		2.90	23.40	<0.016	<0.02	33.74	17.60	2.89	22.07	
1413	Stream	8/4/06 22:31	<0.026			-5.14	0.43		2.35	21.39	<0.016	<0.02	33.01	17.20	2.69	22.26	
1414	Stream	8/5/06 2:31	<0.026			-5.48	0.43		2.91	25.66	<0.016	0.07	38.87	18.89	2.71	23.51	
1415	Stream	8/5/06 6:31	0.05			-5.58	0.43		2.76	46.98	<0.016	<0.02	29.32	20.98	2.72	25.43	
1416	Stream	8/5/06 10:31	0.01			-5.68	0.43		2.91	49.86	<0.016	0.05	31.92	19.85	2.58	24.37	
1417	Stream	8/5/06 14:31	0.05			-5.23	0.43		3.20	49.72	<0.016	0.03	26.45	19.15	2.53	24.26	
1418	Stream	8/5/06 18:31	0.05			-4.95	0.43		2.73	26.19	<0.016	<0.02	21.39	21.17	2.60	26.10	
1419	Stream	8/5/06 22:31	0.01			-5.39	0.43		3.02	21.86	<0.016	<0.02	28.58	21.68	2.53	26.87	
1420	Stream	8/6/06 2:31	0.07			-5.91	0.43		4.03	26.85	<0.016	0.05	34.73	22.04	2.47	27.57	
1421	Stream	8/6/06 6:31	0.07			-5.91	0.43		4.35	37.36	<0.016	<0.02	38.35	21.49	2.55	29.10	
1422	Stream	8/6/06 7:31	0.09			-5.35	0.43		2.74	38.85	<0.016	<0.02	32.48	20.04	2.55	28.60	
1473	Stream	8/25/06 11:30	0.31	<0.003	2.29	-6.08	0.28		2.01	26.13	0.01	<0.02	87.16	23.59	1.89	29.17	
1476	2-150, 3-150	8/25/06 0:00	0.06	<0.003	6.98	-6.09	0.28		7.85	44.45	0.18	0.48	59.98	30.54	1.80	20.59	
1477	ChurchPond	8/25/06 0:00	0.01	<0.003	5.64	-4.55	0.28		1.60	11.44	0.02	<0.02	39.56	9.57	7.94	10.17	
1478	Pipe	8/25/06 0:00	0.12	<0.003	2.22	-6.38	0.28		2.05	140.83	<0.016	<0.02	111.98	32.72	1.03	136.97	
1479	CobblePond(H)	8/25/06 0:00	1.36	<0.003	5.80	-3.98	0.28		0.78	13.18	<0.016	<0.02	27.48	16.19	4.66	9.44	

Appendix N(b)(continued). Water Chemistry Results for All Samples Collected in Watershed M.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl ⁻ (mg/L)	NH ₃ (mg/L)	NH ₄ (mg/L)	Ca ²⁺ (mg/L)	Mg ²⁺ (mg/L)	K ⁺ (mg/L)	Na ⁺ (mg/L)	Level (in)
1480	CobblePond(E)	8/25/06 0:00	<0.026	<0.003	8.51	-0.72	0.28		1.03	27.22	<0.016	<0.02	25.33	10.62	3.71	19.67	
1491	Stream	8/28/06 9:35	0.06	<0.003	4.92	-4.54	0.28		0.94	30.19	<0.016	0.03	32.80	17.37	3.26	33.66	
1492	RG-11	8/30/06 0:00				-4.09	0.28					0.63	7.31	<1.20	19.18	<1.20	1.22
1493	RG-12	8/30/06 0:00				-4.32	0.28					0.65	<2.50	<1.20	0.66	<1.20	1.41
1494	RG-13/14	8/30/06 0:00				-3.82	0.28					0.94	<2.50	<1.20	0.48	<1.20	1.22
1495	RG-15/16	8/30/06 0:00				-3.84	0.28					1.12	<2.50	<1.20	0.51	<1.20	0.97
1496	RG-17/18	8/30/06 0:00				-4.06	0.28					0.60	4.04	<1.20	0.33	1.51	1.01
1497	Stream	8/26/06 10:56		0.18	26.40												
1498	Stream	8/26/06 12:56		0.21	6.11												
1499	Stream	8/26/06 14:56		0.35	5.47												
1500	Stream	8/26/06 16:56		0.23	4.82												
1501	Stream	8/26/06 18:56		0.26	4.71												
1502	Stream	8/26/06 20:56		0.26	4.68												
1503	Stream	8/26/06 22:56		0.22	5.32												
1504	Stream	8/27/06 0:56		0.21	5.81												
1505	Stream	8/27/06 2:56		0.17	5.00												
1506	Stream	8/27/06 4:56		0.06	4.79												
1507	Stream	8/27/06 6:56		0.18	4.90												
1508	Stream	8/27/06 8:56		0.14	5.02												
1509	Stream	8/27/06 10:56		0.12	4.92												
1510	Stream	8/27/06 12:56		0.15	5.06												
1511	Stream	8/27/06 14:56		0.18	5.08												
1512	Stream	8/27/06 16:56		0.15	5.01												
1513	Stream	8/27/06 18:56		0.13	4.87												
1514	Stream	8/27/06 20:56		0.18	4.77												
1515	Stream	8/27/06 22:56		0.19	4.67												
1516	Stream	8/28/06 0:56		0.16	4.60												
1517	Stream	8/28/06 2:56		0.14	4.67												
1518	Stream	8/28/06 4:56		0.21	4.86												
1519	Stream	8/28/06 6:56		<0.003	6.35												
1520	Stream	8/28/06 7:56		0.17	6.89												
1569	Stream	8/26/06 10:53	0.02			-6.00	0.26		1.88	27.13	<0.016	<0.02	81.48	22.18	1.94	27.97	
1570	Stream	8/26/06 12:53	0.01			-5.94	0.26		2.34	28.47	<0.016	<0.02	82.55	22.58	1.93	27.83	
1571	Stream	8/26/06 14:53	<0.026			-6.19	0.26		2.36	26.65	<0.016	<0.02	83.24	22.78	1.88	27.66	
1572	Stream	8/26/06 16:53	<0.026			-6.22	0.26		2.46	29.23	<0.016	0.03	74.30	26.85	2.04	28.69	
1573	Stream	8/26/06 18:53	0.01			-5.92	0.26		2.56	25.28	<0.016	<0.02	36.01	25.55	2.00	26.52	
1574	Stream	8/26/06 20:53	0.01			-6.18	0.26		4.15	24.66	<0.016	<0.02	82.70	25.47	1.61	25.62	
1575	Stream	8/26/06 22:53	0.02			-5.90	0.26		1.84	29.76	<0.016	<0.02	66.21	25.83	2.23	27.28	
1576	Stream	8/27/06 0:53	0.02			-5.22	0.26		3.01	27.79	<0.016	<0.02	24.17	22.11	2.58	28.31	
1577	Stream	8/27/06 2:53	0.02			-5.48	0.26		1.31	24.25	<0.016	<0.02	73.10	20.24	2.31	26.75	
1578	Stream	8/27/06 4:53	0.02			-5.36	0.26		1.87	29.70	<0.016	<0.02	73.04	20.09	2.31	28.17	
1579	Stream	8/27/06 6:53	0.03			-5.27	0.26		2.28	58.59	<0.016	<0.02	72.10	22.58	2.16	31.37	
1580	Stream	8/27/06 8:53	0.03			-5.16	0.26		1.99	24.57	<0.016	<0.02	70.74	19.65	2.52	34.50	
1581	Stream	8/27/06 10:53	0.03			-5.28	0.26		2.28	42.63	<0.016	<0.02	70.19	22.20	2.25	34.37	
1582	Stream	8/27/06 12:53	0.03			-5.38	0.26		1.97	49.32	<0.016	<0.02	31.67	21.99	2.61	35.36	
1583	Stream	8/27/06 14:53	0.02			-5.03	0.26		1.51	28.27	<0.016	<0.02	69.59	21.99	2.29	34.39	
1584	Stream	8/27/06 16:53	0.01			-5.25	0.26		1.07	33.73	<0.016	<0.02	71.04	20.00	2.53	36.38	
1585	Stream	8/27/06 18:53	0.03			-5.37	0.26		2.29	36.24	<0.016	<0.02	34.43	22.98	2.61	36.46	
1586	Stream	8/27/06 20:53	0.05			-5.40	0.26		1.52	43.87	<0.016	<0.02	22.09	22.09	2.21	33.40	
1587	Stream	8/27/06 22:53	0.04			-5.36	0.26		1.88	24.94	<0.016	0.03	35.68	23.07	2.52	33.85	

Appendix N(b)(continued). Water Chemistry Results for All Samples Collected in Watershed M.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl ⁻ (mg/L)	NH ₃ (mg/L)	NH ₄ (mg/L)	Ca ²⁺ (mg/L)	Mg ²⁺ (mg/L)	K ⁺ (mg/L)	Na ⁺ (mg/L)	Level (in)
1588	Stream	8/28/06 0:53	0.06			-5.46	0.26		1.83	49.72	<0.016	<0.02	75.06	20.59	2.39	33.92	
1589	Stream	8/28/06 2:53	0.02			-5.36	0.26		1.47	19.59	<0.016	<0.02	74.62	20.57	2.44	33.16	
1590	Stream	8/28/06 4:53	0.04			-5.29	0.26		2.11	36.74	<0.016	<0.02	35.71	23.32	2.63	34.01	
1591	Stream	8/28/06 6:53	0.02			-4.96	0.26		1.37	20.56	<0.016	<0.02	61.24	17.03	2.58	28.53	
1592	Stream	8/28/06 7:53	0.03			-4.68	0.26		0.77	21.52	<0.016	<0.02	51.81	14.46	2.89	26.92	
1605	2-150, 3-150	8/30/06 0:00	0.08	0.02	7.24	-6.49	0.26		7.98	46.42	0.21	0.42	47.59	25.24	1.44	18.04	
1606	Stream	8/30/06 11:50	0.14	<0.003	4.55	-5.20	0.26		4.39	35.30	<0.016	<0.02	43.39	20.16	2.92	26.55	
1608	ChurchPond	8/30/06 0:00	0.02	<0.003	5.29	-4.36	0.26		1.23	9.82	<0.016	0.05	33.40	8.04	2.68	8.63	
1609	Pipe	8/30/06 0:00	1.16	<0.003	2.31	-6.87	0.26		1.50	108.55	<0.016	0.04	52.12	28.63	1.57	85.45	
1610	CobblePond(H)	8/30/06 0:00	0.15	<0.003	7.42	-3.96	0.26		0.47	10.31	<0.016	<0.02	18.03	13.23	4.35	8.57	
1611	CobblePond(E)	8/30/06 0:00	0.01	<0.003	6.76	-0.64	0.26		0.15	27.47	<0.016	0.02	20.68	9.97	2.96	18.18	
1636	Stream	8/28/06 10:00															
1637	Stream	8/28/06 12:00		0.19	6.44												
1638	Stream	8/28/06 14:00		0.08	6.10												
1639	Stream	8/28/06 16:00		0.06	6.09												
1640	Stream	8/28/06 18:00		0.07	6.17												
1641	Stream	8/28/06 20:00		0.12	5.97												
1642	Stream	8/28/06 22:00		0.03	5.66												
1643	Stream	8/29/06 0:00		0.08	5.70												
1644	Stream	8/29/06 2:00		0.13	5.69												
1645	Stream	8/29/06 4:00		0.30	5.53												
1646	Stream	8/29/06 6:00		0.08	5.44												
1647	Stream	8/29/06 8:00		0.19	5.37												
1648	Stream	8/29/06 10:00		0.12	5.30												
1649	Stream	8/29/06 12:00		0.20	5.17												
1650	Stream	8/29/06 14:00		0.09	5.06												
1651	Stream	8/29/06 16:00		0.19	5.05												
1652	Stream	8/29/06 18:00		0.10	5.04												
1653	Stream	8/29/06 20:00		0.02	4.96												
1654	Stream	8/29/06 22:00		0.03	4.81												
1655	Stream	8/30/06 0:00		0.07	4.79												
1656	Stream	8/30/06 2:00		0.09	4.71												
1657	Stream	8/30/06 4:00		0.04	4.68												
1658	Stream	8/30/06 6:00		0.16	4.56												
1659	Stream	8/30/06 8:00		0.11	4.59												
1684	Stream	8/28/06 9:58	0.04			-4.80	0.11		1.02	23.45	<0.016	0.04	41.08	16.70	2.55	30.10	
1685	Stream	8/28/06 11:58	0.01			-4.61	0.11		1.36	33.78	<0.016	0.04	40.64	15.62	2.53	26.78	
1686	Stream	8/28/06 13:58	0.01			-4.49	0.11		1.03	9.68	<0.016	0.14	27.45	13.57	2.46	24.22	
1687	Stream	8/28/06 15:58	0.01			-4.61	0.11		0.68	22.62	<0.016	0.06	27.63	14.83	2.46	25.64	
1688	Stream	8/28/06 17:58	0.04			-4.58	0.11		1.66	32.84	<0.016	0.04	27.09	14.53	2.43	25.56	
1689	Stream	8/28/06 19:58	0.01			-4.32	0.11		0.25	6.09	<0.016	0.04	29.55	14.41	2.40	25.33	
1690	Stream	8/28/06 21:58	0.06						1.44	26.81	<0.016	0.03	40.12	15.34	2.43	25.73	
1691	Stream	8/28/06 23:58	0.04			-4.71	0.11		1.17	19.96	<0.016	<0.02	34.12	14.40	2.43	23.63	
1692	Stream	8/29/06 1:58	0.01			-4.74	0.11		0.32	9.25	<0.016	<0.02	39.70	16.36	2.59	24.50	
1693	Stream	8/29/06 3:58	0.04			-4.63	0.11		1.74	32.29	<0.016	0.03	33.19	16.70	2.60	23.85	
1694	Stream	8/29/06 5:58	0.07			-4.68	0.11		2.36	47.41	<0.016	<0.0400	49.44	18.24	3.13	26.61	
1695	Stream	8/29/06 7:58	0.03			-4.84	0.11		1.43	27.86	<0.016	0.10	29.75	17.16	2.98	24.95	
1696	Stream	8/29/06 9:58	0.06			-4.83	0.11		1.20	41.09	<0.016	<0.0400	30.94	19.17	3.08	26.63	
1697	Stream	8/29/06 11:58	0.03			-4.67	0.11		1.84	30.22	<0.016	<0.0400	28.54	19.01	3.03	26.44	
1698	Stream	8/29/06 13:58	0.01			-4.75	0.11		1.18	37.30	<0.016	<0.0400	43.32	19.39	3.03	26.36	

Appendix N(b)(continued). Water Chemistry Results for All Samples Collected in Watershed M.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
1699	Stream	8/29/06 15:58	0.03			-4.81	0.11	1.36	21.03	<0.016	<0.0400	40.00	18.86	3.00	26.10		
1700	Stream	8/29/06 17:58	0.02			-4.80	0.11	0.97	15.61	<0.016	0.03	30.89	19.96	3.05	27.29		
1701	Stream	8/29/06 19:58	0.04			-4.80	0.11	0.29	10.20	<0.016	<0.0400	34.58	19.72	2.97	27.15		
1702	Stream	8/29/06 21:58	0.04			-4.89	0.11	1.00	25.85	<0.016	<0.0400	24.71	20.07	3.01	27.48		
1703	Stream	8/29/06 23:58	0.04			-4.94	0.11	1.41	22.74	<0.016	<0.0400	31.36	19.93	2.89	27.36		
1704	Stream	8/30/06 1:58	0.06			-5.02	0.11	1.53	29.42	<0.016	<0.0400	38.24	20.11	2.87	27.32		
1705	Stream	8/30/06 3:58	0.04			-5.14	0.11	1.09	20.35	<0.016	<0.0400	41.34	19.54	2.89	26.67		
1706	Stream	8/30/06 5:58	0.05			-5.19	0.11	1.10	24.05	<0.016	<0.0400	26.61	20.32	2.89	27.58		
1707	Stream	8/30/06 7:58	0.03			-5.11	0.11	0.89	14.57	<0.016	<0.0400	43.17	20.25	2.84	27.37		
1721	2-150, 3-150	9/10/06 0:00	1.48	<0.003	7.31	-6.50	0.11	6.78	45.56	0.31	<0.0400	47.65	32.51	3.25	33.04		
1722	Stream	9/10/06 14:10	0.23	<0.003	2.10	-6.51	0.11	2.56	49.77	<0.016	<0.0400	40.85	24.30	1.88	20.73		
1723	Stream	9/10/06 14:11	0.25	<0.003	2.61	-6.42	0.11	4.49	38.60	<0.016	0.05	45.76	33.70	2.51	35.00		
1724	ChurchPond	9/10/06 0:00	0.10	<0.003	5.25	-4.24	0.11	1.39	20.71	<0.016							
1725	Pipe	9/10/06 0:00	0.32	<0.003	1.76	-6.96	0.11	3.05	101.77	<0.016	0.05	49.67	42.12	1.83	183.59		
1726	CobblePond(H)	9/10/06 0:00	0.01	<0.003	5.98	-3.80	0.11	1.35	14.92	<0.016	<0.0400	33.82	21.26	5.35	12.95		
1727	CobblePond(E)	9/10/06 0:00	0.02	<0.003	6.96	-0.72	0.11	1.05	27.67	<0.016	0.03	30.50	14.30	3.22	26.28		
1729	Stream	9/14/06 0:00	0.22	<0.003	6.42	-6.02	0.09	0.87	18.51	<0.016	<0.0400	37.39	19.67	4.80	30.65		
1754	Stream	9/11/06 9:22		0.03	34.51												
1755	Stream	9/11/06 11:22		0.06	4.93												
1756	Stream	9/11/06 13:22		0.06	4.22												
1757	Stream	9/11/06 15:22		0.09	4.14												
1758	Stream	9/11/06 17:22		0.30	5.63												
1759	Stream	9/11/06 19:22		0.02	6.22												
1760	Stream	9/11/06 21:22		0.20	5.65												
1761	Stream	9/11/06 23:22		0.10	6.29												
1762	Stream	9/12/06 1:22		0.22	6.27												
1763	Stream	9/12/06 3:22		0.15	6.15												
1764	Stream	9/12/06 5:22		0.19	6.32												
1765	Stream	9/12/06 7:22		0.17	6.44												
1766	Stream	9/12/06 9:22		0.30	7.25												
1767	Stream	9/12/06 11:22		<0.003	7.24												
1768	Stream	9/12/06 13:22		0.25	7.18												
1769	Stream	9/12/06 15:22		0.26	7.11												
1770	Stream	9/12/06 17:22		0.27	7.02												
1771	Stream	9/12/06 19:22		0.22	6.70												
1772	Stream	9/12/06 21:22		0.14	6.92												
1773	Stream	9/12/06 23:22		0.05	8.00												
1774	Stream	9/13/06 1:22		0.07	7.81												
1775	Stream	9/13/06 3:22		0.26	7.78												
1776	Stream	9/13/06 5:22		0.09	7.29												
1777	Stream	9/13/06 7:22		0.03	7.15												
1802	Stream	9/11/06 9:18	0.01			-6.30	0.09	1.58	19.72	<0.016	<0.02	44.65	25.30	2.24	23.26		
1803	Stream	9/11/06 11:18	<0.026			-6.62	0.09	3.12	31.82	<0.016	<0.02	49.62	27.56	1.99	23.04		
1804	Stream	9/11/06 13:18	0.01			-6.59	0.09	3.28	52.27	<0.016	<0.02	37.78	25.93	1.95	22.27		
1805	Stream	9/11/06 15:18	<0.026			-6.55	0.09	3.20	22.27	<0.016	0.09	47.25	25.08	1.93	21.42		
1806	Stream	9/11/06 17:18	0.01			-6.41	0.09	3.35	52.25	<0.016	<0.02	29.02	24.62	2.20	22.12		
1807	Stream	9/11/06 19:18	0.01			-5.47	0.09	1.77	56.17	<0.016	<0.02	31.25	19.49	2.73	22.49		
1808	Stream	9/11/06 21:18	0.69			-5.82	0.09	2.73	42.88	<0.016	<0.02	32.00	19.77	2.99	28.61		
1809	Stream	9/11/06 23:18	0.07			-5.66	0.09	1.63	31.89	<0.016	0.04	36.39	19.32	3.48	30.52		
1810	Stream	9/12/06 1:18	0.03			-5.59	0.09	0.67	18.16	<0.016	<0.02	31.84	17.54	3.58	26.32		

Appendix N(b)(continued). Water Chemistry Results for All Samples Collected in Watershed M.

Sample	Description	Date	Nitrate (mg/L)	SRP (mg/L)	DOC (mg/L)	$\delta^{18}\text{O}$ (‰)	$\delta^{18}\text{O}$ error (‰)	δH (‰)	Silica (mg/L)	Cl^- (mg/L)	NH_3 (mg/L)	NH_4 (mg/L)	Ca^{2+} (mg/L)	Mg^{2+} (mg/L)	K^+ (mg/L)	Na^+ (mg/L)	Level (in)
1811	Stream	9/12/06 3:18	0.02			-5.55	0.09	1.49	17.22	17.22	<0.016	<0.02	39.68	17.10	3.60	27.89	
1812	Stream	9/12/06 5:18	0.40			-5.53	0.09	1.42	27.75	27.75	<0.016	<0.02	25.15	15.52	3.36	25.66	
1813	Stream	9/12/06 7:18	0.08			-5.65	0.09	2.00	41.96	48.40	<0.016	<0.02	48.40	18.48	3.38	26.52	
1814	Stream	9/12/06 9:18	0.08			-5.93	0.09	2.00	32.55	<0.016	<0.016	0.03	29.34	14.81	3.52	21.80	
1815	Stream	9/12/06 11:18	0.04			-5.69	0.09	1.52	21.42	<0.016	<0.016	<0.02	38.19	15.43	4.02	21.92	
1816	Stream	9/12/06 13:18	0.05			-5.86	0.09	1.02	32.98	<0.016	<0.016	0.05	23.71	13.30	3.59	19.07	
1817	Stream	9/12/06 15:18	0.03			-6.00	0.09	1.66	14.92	<0.016	<0.016	0.06	30.78	13.92	3.67	18.93	
1818	Stream	9/12/06 17:18	0.03			-6.20	0.09	1.21	17.09	<0.016	<0.016	0.03	32.56	14.89	3.85	19.55	
1819	Stream	9/12/06 19:18	0.11			-5.41	0.09	1.86	39.38	<0.016	<0.016	0.04	32.00	15.24	3.97	18.61	
1820	Stream	9/12/06 21:18	0.07			-5.49	0.09	1.28	23.26	<0.016	<0.016	<0.02	22.16	14.03	4.02	16.18	
1821	Stream	9/12/06 23:18	0.51			-7.54	0.09	1.28	13.57	<0.016	<0.016	0.03	20.76	9.10	3.63	11.80	
1822	Stream	9/13/06 1:18	0.23			-6.84	0.09	1.16	23.27	<0.016	<0.016	0.02	23.73	10.28	4.08	14.11	
1823	Stream	9/13/06 3:18	0.08			-6.15	0.09	0.91	11.92	<0.016	<0.016	0.04	32.73	13.45	4.39	16.80	
1824	Stream	9/13/06 5:18	0.49			-6.21	0.09	1.82	36.89	<0.016	<0.016	0.04	31.70	13.52	4.00	17.63	
1825	Stream	9/13/06 7:18	0.98			-6.22	0.09	1.22	14.91	<0.016	<0.016	0.05	30.37	14.60	4.03	18.82	
1858	Stream	9/14/06 0:00	0.53	<0.003	5.19	-5.59	0.11	2.78	64.21	<0.016	<0.016	0.03	25.11	16.76	3.48	23.87	
1859	RG-11	9/14/06 0:00				-8.90	0.11						4.22	<1.20	9.66	<1.20	2.80
1860	1-90	9/14/06 0:00	0.38	0.16	2.52			2.97	10.94	<0.016	<0.016	0.07	26.84	6.93	5.45	43.38	
1862	2-90	9/14/06 0:00	0.20					3.29	32.63	<0.016							
1866	2-150, 3-150	9/14/06 0:00	0.04	0.01	6.57	-6.50	0.11	5.67	45.82	0.20							
1867	RG-12	9/14/06 0:00				-8.46	0.11										
1868	ChurchPond	9/14/06 0:00	0.06	<0.003	4.69	-6.56	0.11	2.38	17.05	0.01							
1869	RG-13/14	9/14/06 0:00				-8.87	0.11										
1870	RG-15/16	9/14/06 0:00				-8.77	0.11										
1871	Pipe	9/14/06 0:00	3.57	<0.003	2.27	-7.11	0.09	2.92	132.04	0.01							
1872	RG-17/18	9/14/06 0:00				-8.53	0.09										
1873	CobblePond(H)	9/14/06 0:00	0.07	<0.003	7.02	-5.15	0.09	1.91	19.59	<0.016	<0.016	0.05	24.58	12.81	4.59	7.57	
1874	CobblePond(E)	9/14/06 0:00	0.01	<0.003	7.03	-1.86	0.09	0.57	38.57	<0.016	<0.016	<0.02	25.96	10.23	3.14	16.14	
1875	CobblePondOutlet	9/14/06 0:00	0.64	<0.003	7.24	-5.22	0.09	1.35	18.86	<0.016	<0.016	0.08	29.85	13.62	4.71	7.80	
1876	Stream	9/13/06 9:29	0.09	0.09	7.39												
1877	Stream	9/13/06 13:29	0.26	0.26	7.40												
1878	Stream	9/13/06 17:29	0.22	0.22	7.09												
1879	Stream	9/13/06 21:29	0.25	0.25	4.35												
1880	Stream	9/14/06 1:29	0.25	0.25	6.73												
1881	Stream	9/14/06 5:29	0.27	0.27	6.52												
1882	Stream	9/14/06 7:29	0.06	0.06	6.49												
1890	Stream	9/13/06 9:32	0.33			-5.98	0.09	2.15	44.61	<0.016	<0.016	0.04	39.36	14.45	4.00	19.66	
1891	Stream	9/13/06 13:32	0.46			-5.72	0.09	2.71	53.48	<0.016	<0.016	<0.02	37.69	16.45	3.98	21.97	
1892	Stream	9/13/06 17:32	0.25			-5.74	0.09	2.04	39.94	<0.016	<0.016	<0.02	38.52	15.55	3.79	22.32	
1893	Stream	9/13/06 21:32	0.40			-5.64	0.09	2.75	55.88	<0.016	<0.016	<0.02	34.96	17.82	3.80	23.83	
1894	Stream	9/14/06 1:32	0.36			-5.69	0.09	3.26	57.50	<0.016	<0.016	<0.02	31.30	16.19	3.68	23.19	
1895	Stream	9/14/06 5:32	0.38			-5.61	0.09	3.19	62.35	<0.016	<0.016	<0.02	47.50	17.68	3.63	24.17	
1896	Stream	9/14/06 7:32	0.10			-5.80	0.09	1.27	24.83	<0.016	<0.016	0.04	28.34	16.50	3.57	23.71	

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Curriculum Vitae

Laura E. Wagner

Education

8/05-09/07 M.S., Earth Sciences, concentration in Hydrology
Indiana University, Indianapolis, Indiana

Thesis: THE IMPACT OF STORM CHARACTERISTICS AND LAND
USE ON NUTRIENT EXPORT IN TWO GLACIATED
WATERSHEDS IN CENTRAL INDIANA, USA

8/00-12/04 B.S., Geological Sciences, Environmental Studies Certificate
University of Wisconsin, Madison, Wisconsin

Professional Experience

8/05-09/07 Research Assistant/Graduate Student, Indiana University,
Indianapolis, IN

6/01-09/07 Student Trainee (Hydrology), US Geological Survey, Middleton, WI

5/00-8/00 Field Technician, Archeological Consulting and Services, Verona, WI

Publications and Presentations

Wagner, Laura (2006). Nutrient Specific Flow paths During Storm Events in a
Midwestern Watershed. Research presented at the Central Indiana Water Resources
Partnership Annual Meeting, Indianapolis, IN.

Wagner, L., Vidon, P., Gray, M. (2006). Nutrient Specific Flow Paths During Storm
Events in a Midwestern Watershed. Research poster presented at the American Water
Resources Association Annual Meeting, Baltimore, MD.

Wagner, L., Vidon, P. (2005). Nutrient Specific Flow Paths During Storms. Research
poster presented at Indiana University Department of Geology Research Day.

Awards and Honors

2006 Graduate Student Organization Travel Grant Award

2005-2006 Mirsky Fellowship Recipient

2004-2005 Three STAR awards, US Geological Survey

2003 Recipient of the Paul Family Undergraduate Scholarship in Geology & Geophysics

2000-2004 Graduated with distinction; Dean's List, three semesters, University of Wisconsin