ERID-211396

LA-UR-12-0606
February 2012
EP2012-0029

Stormwater Performance Monitoring in the Los Alamos/Pueblo Watershed during 2011

Los Alamos
NATIONAL LABORATORY
EST. 1943

Prepared by the Environmental Programs Directorate

EP2012-0029

Stormwater Performance Monitoring in the Los Alamos/Pueblo Watershed during 2011

February 2012

Responsible project manager:

Printed Name	Signature	Title	Organization	Date
Steve Veenis	for	Project Manager	Environmental Programs	2/24/12

Responsible LANS representative:

Printed Name	Signature	Title	Organization	Date
Michael J. Graham		Associate Director	Environmental Programs	24 Feb 12

Responsible DOE representative:

Printed Name	Signature	Title	Organization	Date
George J. Rael	for	Manager	DOE-LASO	2-28-2012

EXECUTIVE SUMMARY

This second annual monitoring report provides a summary of analytical data, discharge measurements, and precipitation associated with stormwater samples collected from the Los Alamos and Pueblo (LA/P) watershed from May 2011 to October 2011. Monitoring objectives include collecting data to evaluate the effect of watershed mitigations installed in the LA/P watershed on stream flow and sediment and contaminant transport. Watershed mitigations being evaluated include the DP Canyon grade-control structure (GCS) and associated floodplains; Pueblo Canyon wing ditch, willow planting, wetland, and GCS; the Los Alamos Canyon low-head weir; and the stormwater detention basins and associated willow planting below the Solid Waste Management Unit (SWMU) 01-001(f) drainage in Los Alamos Canyon. These mitigations have been implemented with the overall goal of working together to minimize the potentially erosive nature of stormwater runoff, to enhance deposition of sediment, and to reduce access of contaminated sediments to flood erosion.

Gage and sampling locations are situated within the LA/P watershed to monitor the hydrology and sediment transport along the length of the watershed, including stations that bound the mitigations. However, the topography, geology, geomorphology, and meteorology of the watershed are quite complex; thus, monitoring runoff and precipitation is also complex and challenging. Stage height, which is then converted to discharge using rating curves developed for each individual gage, is monitored at 5-min intervals at a series of gages using shaft-encoder float sensors, self-contained bubbler pressure sensors, and ultrasonic probe sensors. Precipitation data are collected across the Los Alamos National Laboratory (the Laboratory) by means of five meteorological towers and an extended rain gage network. Sampling for analyte suites specific to each gage is conducted using ISCO 3700 portable automated samplers configured to begin sampling routines when a preset stage height or after the peak of discharge is recorded at the data logger. Sampling equipment and the extended rain gage network are shut down during the winter months (December to March) and reactivated in the spring. In addition, samples were collected above and below constructed detention basins below the SWMU 01-001(f) drainage on August 19 and October 2, 2011, respectively, and in Graduation Canyon above the confluence with Pueblo Canyon on October 7, October 8, and October 27, 2011.

The Los Alamos Canyon watershed experienced a relatively large number of runoff events in 2011, including runoff from the Las Conchas burn area in the upper watersheds of Los Alamos and Guaje Canyons. Runoff from the burn area had high concentrations of suspended sediment, in part related to entrainment of ash. By contrast, Pueblo Canyon, not affected by the fire, had few runoff events in 2011 and no events from the upper watershed that extended through the length of wetland past the GCS and into lower Los Alamos Canyon. Attenuation of flow and associated sediment transport through this wetland is a primary goal of the sediment transport mitigation activities conducted in Pueblo Canyon, and this part of the watershed performed as desired in 2011.

The 2011 monitoring data in upper Los Alamos Canyon indicate a substantial reduction in suspended sediment concentration (SSC) as floods passed through the low-head weir and associated sediment retention basins. This structure is therefore performing as designed. By contrast, SSC was much higher at gaging station E109.9 in lower Los Alamos Canyon as a result of floods in Guaje Canyon from the Las Conchas burn area.

In DP Canyon, which primarily receives runoff from the Los Alamos townsite, direct comparison of runoff and sediment yield above and below the GCS and upstream floodplains was possible in one event in 2011, on August 19. Sediment yield decreased downstream between bounding stations (E038 and E039.1), which is consistent with the intent of activities in this canyon. Peak discharge between these gages also decreased, indicating attenuation of flood energy.

Analytical data collected from stormwater samples in 2011 indicate that for the 11 analytes exceeding the New Mexico Water Quality Control Commission water-quality standards (used as comparison values), only 1, total polychlorinated biphenyls (PCBs), has a recognized source at Laboratory sites and off-site transport. Off-site transport of PCBs in 2011 occurred only in Los Alamos Canyon, and the weir and associated sediment retention basins were effective at substantially reducing this transport. Concentrations of PCBs measured at E109.9 in lower Los Alamos Canyon are similar to those measured in upper Los Alamos Canyon above Laboratory sites, at E026, and are consistent with the transport of PCBs from the Las Conchas burn area down Guaje Canyon. PCBs in the burn area have a source in atmospheric fallout. The transport of radionuclides in stormwater that have a Laboratory source was also substantially reduced by the settling of sediment above the weir. Continued monitoring in 2012 is expected to further confirm the sediment transport mitigation structures and associated wetlands and floodplains in the LA/P watershed are performing as intended.

CONTENTS

Figures

Tables

Appendixes

Acronyms and Abbreviations

AWM	approval with modifications
BMP	best management practice
cfs	cubic feet per second
Consent Order	Compliance Order on Consent
DOE	Department of Energy (U.S.)
EPA	Environmental Protection Agency (U.S.)
GCS	grade-control structure
IMWP	interim measures work plan
Laboratory	Los Alamos National Laboratory
LANL	Los Alamos National Laboratory
LA/P	Los Alamos and Pueblo
LIDAR	light detecting and ranging
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
PCB	polychlorinated biphenyl
RPD	relative percent difference
RPF	Records Processing Facility
SIMWP	supplemental interim measures work plan
SSC	suspended sediment concentration
SWMU	solid waste management unit
TA	technical area
TAL	target analyte list (EPA)
TCDD	tetrachlorodibenzodioxin
TEF	toxicity equivalency factor
TEQ	toxic equivalency quotient

1.0 INTRODUCTION

Los Alamos National Laboratory (LANL or the Laboratory) is a multidisciplinary research facility under the U.S. Department of Energy (DOE) that is managed by Los Alamos National Security, LLC. The Laboratory is located in north-central New Mexico approximately 60 mi northeast of Albuquerque and 20 mi northwest of Santa Fe. The Laboratory site comprises an area of 40 mi^2, mostly on the Pajarito Plateau, which consists of a series of mesas separated by eastward-draining canyons. It also includes part of White Rock Canyon along the Rio Grande to the east.

This second annual monitoring report provides a summary of analytical data, discharge measurements, and precipitation associated with stormwater collected from the Los Alamos and Pueblo (LA/P) watershed from May 2011 to October 2011. This annual monitoring report is being prepared pursuant to the New Mexico Environment Department– (NMED-) issued approval with modifications (AWM) of June 3, 2011 (NMED 2011, 203705) for the “2011 Monitoring Plan for Los Alamos and Pueblo Canyons Sediment Transport Mitigation Project” (LANL 2011, 201578). This monitoring plan was generated to support the NMED-approved “Interim Measure Work Plan to Mitigate Contaminated Sediment Transport in Los Alamos and Pueblo Canyons” (IMWP) (LANL 2008, 101714) and the “Supplemental Interim Measures Work Plan to Mitigate Contaminated Sediment Transport in Los Alamos and Pueblo Canyons” (SIMWP) (LANL 2008, 105716).

Monitoring objectives include collecting data to evaluate the effect of watershed mitigations installed in the LA/P watershed on stream flow and sediment and contaminant transport. The discussion of flow and analytical results for suspended sediment and constituent concentrations is focused to evaluate overall watershed performance with specific emphasis on effects of the mitigations implemented per the IMWP and SIMWP.

The NMED AWM (NMED 2011, 203705) also directed the Laboratory to monitor stormwater above and below the detention basins below the Solid Waste Management Unit (SWMU) 01-001(f) drainage in upper Los Alamos Canyon and in Graduation Canyon above the confluence with Pueblo Canyon.

The watershed addressed in this monitoring report is potentially contaminated with both hazardous and radioactive components. Corrective actions at the Laboratory are subject to a Compliance Order on Consent (the Consent Order). Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to the NMED in accordance with DOE policy.

Watershed mitigations being evaluated include the DP Canyon grade-control structure (GCS) and associated floodplains; Pueblo Canyon wing ditch, willow planting, wetlands, and GCS; the Los Alamos Canyon low-head weir; and the stormwater detention basins and associated willow planting below the SWMU 01-001(f) drainage in Los Alamos Canyon.

1.1 Project Goals

The mitigations specified in the IMWP and SIMWP have been implemented with the overall goal of working together to minimize the potentially erosive nature of stormwater runoff, to enhance deposition of sediment, and to reduce or eliminate the susceptibility of contaminated sediments to flood erosion. Figure 1.0-1 shows the locations of the mitigations and monitoring stations, including stream gages, in the LA/P watershed. In the Pueblo Canyon watershed, the central focus of the mitigations is to maintain a physically, hydrologically, and biologically functioning wetland that can work to reduce peak flows and trap suspended solids because of the presence of thick wetland vegetation. Stabilization and enhancement of the wetland were partially addressed with installation of a GCS that is designed to inhibit headcutting at the terminus of the wetland and to potentially promote establishment of additional riparian or wetland vegetation beyond the current terminus of the wetland. Mitigations in upper portions of Pueblo Canyon above the wetland are designed primarily to reduce the flood peaks and to enhance channel/floodplain interaction before floods reach the wetland. Gages are situated within the watershed to monitor the overall hydrology and sediment transport along the length of the watershed, including stations that bound the wetland.

In DP and Los Alamos Canyons, mitigations included stabilizing and potentially partially burying the channel and adjacent floodplains in reach DP-2 in DP Canyon, which is a source of contaminants that are entrained in frequent floods that originate from a portion of the Los Alamos townsite. A GCS was installed in the lower part of reach DP-2 with a height that may encourage channel aggradation, thus reducing the potential for erosion of contaminated sediment deposits in adjacent banks during floods. Channel aggradation in reach DP-2 should also encourage spreading of floodwaters, thus reducing peak discharge because of transmission loss within the reach and enhancing sediment deposition. Lower flood peaks should also reduce the erosion of contaminated sediment deposits downcanyon of the GCS. Mitigations in Los Alamos Canyon several kilometers below the DP Canyon confluence involved the removal of accumulated sediment behind the low-head weir to increase the residence time of floodwaters and enhance settling of suspended solids and associated contaminants.

Additional mitigations were implemented in Los Alamos Canyon under a separate administrative requirement (NMED 2009, 105858) to address polychlorinated biphenyl (PCB) contamination associated with SWMU 01-001(f). The mitigation actions at that location involved removing contaminated sediment from the canyon wall and constructing detention basins at the bottom of the associated hillside drainage to promote the settling of contaminated sediments in runoff from the canyon wall.

This report presents data collected in 2011 in the context of performance of these mitigations and associated wetlands and floodplains by evaluating various metrics for performance, including flow (peak discharge and total discharge) and analytical results for sediment and constituent concentrations. The nature of precipitation events that generate floods is also evaluated as an integral part of the analysis.

2.0 DISCHARGE AND PRECIPITATION MEASUREMENTS AND SAMPLING IN THE LA/P WATERSHED

Measurements of discharge and surface-water sampling were conducted at 13 gages in the LA/P watershed in 2011. Gages located at five concrete, trapezoidal, supercritical-flow flumes are designated Los Alamos above the Rio Grande (E109.9), Los Alamos below low-head weir (E050.1), Pueblo below grade-control structure (E060.1), DP below grade-control structure (E039.1), and Los Alamos above low-head weir (E042.1). Eight other gages that complete the monitoring network in the LA/P watershed are designated as Pueblo above Acid (E055), South Fork of Acid Canyon (E055.5), Acid above Pueblo (E056), Los Alamos below Ice Rink (E026), Los Alamos above DP Canyon (E030), DP above Technical Area 21 (E038), Pueblo above the wastewater treatment plant (E059), and DP above Los Alamos Canyon (E040). Figure 1.0-1 shows the locations of stream gages and watershed mitigations within the Laboratory's property boundary and on adjacent land owned by the County of Los Alamos.

Stage height was monitored at 5-min intervals in the LA/P watershed at the gages identified above. Sutron 8210 and 9210 data loggers stored each recorded stage-height measurement as it was made. Discharge was computed for each 5-min stage measurement using rating curves for each individual gage. Shaft-encoder float sensors installed in stilling wells were used to measure water levels at E026, E030, E039.1, E042.1, E050.1, E059, E060.1, E099, and E109.9. Self-contained bubbler pressure sensors (Sutron Accubar) were used to measure water levels at E038, E055, E055.5, and E056 and provide backup sensing at E109.9, E050.1, and E060.1. An ultrasonic probe sensor (Siemens Miltronics "The Probe") was used to measure water levels at E040. During 2011, approximately 1,000,000 individual stage measurements were recorded at the 13 gage stations monitored within the LA/P watershed.

A complete record of 5-min stage height measurements made for the monitoring period from June 1, 2011, to October 31, 2011, exists at E030, E039.1, E040, E042.1, E050.1, E055, E055.5, E056 and E059. As discussed below, 5-min stage height measurements are incomplete at E026, E038, E060.1, E099, and E109.9.

- Five-min stage height measurements are incomplete at E026 between August 24 at 12:50 and August 29 at 00:00 because the equipment malfunctioned.
- Five-min stage height measurements are incomplete at E038 between August 29 at 09:45 and September 2 at 13:10 and between September 13 at 09:05 and September 16 at 09:45. Both periods of missing data are because the equipment malfunctioned.
- Five-min stage height measurements are incomplete at E060.1 on August 8 between 07:35 and 14:05 for unknown reasons. No other gage recorded discharge during the period when E060.1 was inoperative.
- Five-min stage height measurements are incomplete at E099 between June 1 at 00:00 and July 12 at 00:05, July 21 at 14:44 and July 30 at 07:05, July 31 at 22:50 and August 1 at 06:59, September 8 at 12:20 and September 10 at 04:10, September 10 between 4:25 and 9:35, and October 4 at 23:35 and October 17 at 11:15 because power at the site was insufficient. Five-min stage height measurements are incomplete at E099 between August 5 at 15:55 and August 23 at 11:10 because of severe sedimentation in the stilling well associated with floods from the Las Conchas burn area.
- Five-min stage height measurements are incomplete at E109.9 between August 21 at 15:30 and August 22 at 15:50, August 22 at 19:10 and August 23 at 05:55, September 4 between 21:05 and 21:40, and September 7 between 13:10 and 15:15. All periods of missing data are because of equipment malfunctions, including severe sedimentation in the stilling well associated with floods from the Las Conchas burn area.

Discharge measurements during sampling at E109.9 on August 26 were not recorded by either the bubbler or the encoder. As a result, peak discharge was estimated from the high water mark left by the storm and recorded on camera. No usable hydrograph is associated with this runoff event.

Stormwater programs at the Laboratory use precipitation data collected at the Laboratory's meteorological towers that are reported on the LANL Weather Machine. In addition, a seasonal, extended rain gage network is deployed during the months of April to November to coincide with stormwater monitoring periods. Using a geographic information system, stormwater monitoring stations are assigned to an individual rain gage using the method of Thiessen polygons. Rain gages, meteorological towers, Thiessen polygons, and the drainage area for each stream gage associated with the LA/P watershed are presented in Figure 2.0-1.

Sampling was conducted using ISCO 3700 portable automated samplers. At E026, E038, E039.1, E042.1, E050.1, E059, E060.1, and E109.9 two ISCO samplers were installed. At locations where two samplers were installed, one sampler was configured with a 24-bottle carousel to monitor primarily suspended sediment concentration (SSC), and the second sampler was configured with a 12-bottle carousel to monitor inorganic and organic chemicals and radionuclides. At locations where a single sampler was installed, the sampler was configured with a 12-bottle carousel to monitor SSC, inorganic and organic chemicals, and radionuclides. Sampler intake lines were uniformly set above the bottom of the channel or gage and were placed perpendicularly to the direction of flow. The placement of trip levels and sampler intake lines is presented in Table 2.0-1.

Sampling equipment at gages in LA/P watershed was shut down during the winter months and reactivated in the spring. During the 2011 monitoring period, requests for field personnel to inspect activated gages and sampling equipment were issued weekly. During 2011, gaging and sampling equipment at E050.1, E060.1, and E109.9 were connected via telemetry to operator computer terminals, allowing near real-time access to gage discharge measurements and battery state of charge. Because ISCO samplers and data loggers were not set up to provide alarms notifying operators of sample collection events, inspectors were sent to the boundary stations at E026, E050.1, E060.1, E099, and E109.9 when rainfall exceeded 0.25 in. in 30 min or when E050.1, E060.1 or E109.9 telemetry readings indicated discharge had occurred.

2.1 Sampling at the Detention Basins below the SWMU 01-001(f) Drainage and in Graduation Canyon

In 2011, stormwater samples were collected with automated samplers above and below two constructed detention basins below the SWMU 01-001(f) drainage on August 19 and October 2, respectively. Stormwater discharge on August 19 ponded in the basins, and sampling was not triggered below the lower basin. Because of the lack of precipitation at surrounding rain gages on October 2, because of the lack of discharge at the inlet to the upper basin, and because SSC and unfiltered metals concentrations on October 2 are similar to concentrations observed at E030, it is inferred that stormwater from Los Alamos Canyon backed up through the culvert and was sampled in the wetland below the lower detention basin. Sampling locations were identified as CO111041, at the inlet to the upper basin, and CO101038, above the culvert at the terminus of the wetland below the lower basin. Sampling locations and stormwater control features at the detention basins below the SWMU 01-001(f) drainage are identified in Figure 2.1-1.

In 2011, an automated sampler was used to collect samples from station CO115002 in Graduation Canyon above the confluence with Pueblo Canyon on October 7 and 8 and on October 27. The sampling location is shown in Figure 1.0-1.

2.2 Sampling at the Gage Stations in the LA/P Watershed

During the monitoring period (June 1 to October 31, 2011), 22 runoff events were sampled and analyzed for inorganic and organic chemicals, radionuclides, and SSC from 1 or more of the 13 gage stations in the LA/P watershed. A total of 49 sampling events occurred, with a sampling event defined as the collection of one or more samples from a specific gaging station during a specific runoff event. Maximum daily discharge at all gages on days when flow reached or exceeded 5 cubic feet per second (cfs) at E050.1, E060.1, or E109.9, or 10 cfs at the other gages or on other days when samples were collected is presented in Table 2.2-1. Table 2.2-1 also presents a summary of which runoff events were or were not sampled at each station. During 2011, the threshold discharge at a station was reached 64 times, and sampling was conducted 42 of these times. This results in an overall sampling efficiency of 66%. Samples were collected on the following days and discharges even though flows did not meet the sampling threshold: 9 cfs at E038 on August 2; 4 cfs at E038 on August 15; 7 cfs at E038 on September 4; 9 cfs at E038 on October 4; 1 cfs at E038 on October 12; 9 cfs at E042.1 on October 4; and 1 cfs at E109.9 on August 22. Samples were also collected at E038 on September 1, a day with unknown discharge. Sampling in Los Alamos Canyon in 2011 was affected at many stations by ash and sediment-laden runoff events from the Las Conchas burn area that caused channel changes and often clogged the sample intakes. Other deviations from the planned sampling are noted below and in section 5.2.

E026: Samples were collected from two runoff events at E026 during 2011. Because previous runoff changed the channel configuration, the gage was isolated from low flows and did not collect a discharge of 14 cfs on October 2.

E030: Samples were collected from four runoff events at E030 during 2011. All runoff events exceeding 10 cfs were sampled.

E038: Samples were collected from 11 runoff events at E038 during 2011, including 6 events with discharge below the 10 cfs sampling threshold. The sampler at E038 collected water on July 28, and samples were retrieved during the following inspection on August 2. As a result, the E038 sampler was full and did not collect during discharge of 97 cfs on August 1. The sampler at E038 collected water on August 2, and samples were retrieved during the following inspection on August 10. As a result, the E038 sampler was full and did not collect during discharges of 43 cfs on August 3, 42 cfs on August 4, and 73 cfs on August 5. The sampler at E038 collected water on August 19, and samples were retrieved during the following inspection on August 24. As a result, the E038 sampler was full and did not collect during discharge of 238 cfs on August 21

E039.1: Samples were collected from four runoff events at E039.1 during 2011. The sampler at E039.1 collected water on August 4, and samples were retrieved during the following inspection on August 10. As a result, the E039.1 sampler was full and did not collect water during discharge of 28 cfs on August 5. The sampler at E039.1 collected water on August 19, and samples were retrieved during the following inspection on August 24. As a result, the E039.1 sampler was full and did not collect during discharge of 290 cfs on August 21.

E040: No samples were collected at E040 during 2011. Discharge on August 5 was not collected because the sampler had been triggered before the storm, possibly by an animal or an equipment malfunction. Discharges on August 19 and August 21 could not be sampled because the sampler intake was clogged. The August 19 runoff event buried the sampler intake beneath approximately 1 ft of coarse sand and gravel. No other discharges exceeding 10 cfs occurred at E040 during 2011.

E042.1: Samples were collected from eight runoff events at E042.1 during 2011. The sampler at E042.1 collected water on August 19, and samples were retrieved during the following inspection on August 22. As a result, the E042.1 sampler was full and did not collect water during discharge of 93 cfs on August 21.

E050.1: Samples were collected from eight runoff events at E050.1 during 2011. All discharges exceeding 5 cfs were sampled.

E055: No samples were collected at E055 during 2011. Discharges exceeding 10 cfs occurred on August 19 and August 21. A programming error at the data logger affecting samplers triggered by bubblers prevented sampling from being initiated correctly. The programming error was corrected on August 25. No discharges after August 25 exceeded 10 cfs.

E055.5: Samples were collected from one runoff event at E055.5 during 2011, on August 19, although an incomplete set of bottles was collected. A programming error at the data logger affecting samplers triggered by bubblers prevented sampling from being initiated correctly. One runoff event exceeding 10 cfs on August 21 was missed because previous samples had not been retrieved. The programming error was corrected on August 25. No discharges after August 25 exceeded 10 cfs.

E056: No samples were collected at E056 during 2011. Discharges exceeding 10 cfs occurred on August 19 and August 21. A programming error at the data logger affecting samplers triggered by bubblers prevented sampling from being initiated correctly. The programming error was corrected on August 25. No discharges after August 25 exceeded 10 cfs.

E059: Samples were collected from two runoff events at E059 during 2011. All discharges exceeding 10 cfs were sampled.

E060.1: No samples were collected at E060.1 during 2011. No flows at this gage exceeded 5 cfs.

E109.9: Samples were collected from nine runoff events at E109.9 during 2011. Discharge on August 13, October 4, and October 7 did not cause the encoder to exceed the 0.4-ft triggering stage height. However, discharges exceeding 5 cfs on these days were recorded based on bubbler measurements and indicated by high water marks recorded by the on-site camera. Discharges of 610 cfs on August 21 and 340 cfs on September 1 were not sampled because sediment clogged the intake tubing of both automated pump samplers before stormwater samples could be collected.

2.3 Samples Collected in the LA/P Watershed

Sample suites presented in the monitoring plan vary according to the monitoring location and are based on key indicator constituents for a given portion of the watershed. Following the Las Conchas fire, americium-241 was added to the analytical suite at E026 and E030, and cyanide was added at all stream gages downstream from the burn area in Los Alamos Canyon (E026, E030, E042.1, E050.1, and E109.9). Analyses were obtained from stormwater collected at sampling locations as presented in Table 2.3-1. In cases where insufficient water was collected to perform all planned analyses, analyses were prioritized in the order presented in this table. Additional prioritization factors are discussed in section 2.5. Up to 24 samples were collected for SSC analysis from a single ISCO sampler containing a 24-bottle carousel at the lower watershed gages (E042.1, E050.1, E059, E060.1, and E109.9), gages in upper DP Canyon (E038 and E039.1), and the upstream gage in Los Alamos Canyon, downstream from the Las Conchas burn area (E026) (Figures 1.0-1 and 2.0-1). SSC analyses at all other locations were obtained from the first and last sample in an ISCO sampler containing a 12-bottle carousel. Target analyte list (TAL) metals were analyzed in filtered and unfiltered samples at all locations. Radionuclides were analyzed in filtered and unfiltered samples at E109.9. All other analyses were conducted from unfiltered samples. Sample collection times were recorded for each individual sample bottle filled, which allowed more precise estimation of discharge and SSC at the time samples were collected.

Analyses were conducted using the analytical methods presented in Table 2.3-2. Detection limits are provided for comparison purposes but are affected by sample-specific factors that are not known fully until after sample analysis is complete. Such sample-specific factors can include available sample volume, matrix interferences, and dilution required by high SSC.

The complete list of samples collected and analyses requested at each gage station is presented in Table 2.3-3. Hydrographs showing variations in discharge at each gage during each storm event resulting in sample collection were prepared. These hydrographs are overlaid with precipitation measured at associated rain gages and SSC and are presented in Appendix A.

Stormwater runoff events in the ephemeral channels of the Pajarito Plateau are typically characterized by rapidly increasing flow to a peak and then a gradually declining recessional limb (e.g., Becker 1991, 015317; Dale 1996, 958930; Malmon 2002, 076038; Malmon et al. 2007, 100194; LANL 2011, 207072). To characterize the transport of indicator constituents during runoff events, analyses were conducted from multiple samples collected during the period of flow. Previous work indicated contaminant concentrations in samples collected before the peak can be highly variable and have limited value in regard to evaluating contaminant transport. To meet the NMED requirement that samples for evaluating contaminant concentrations not be collected before the runoff peak (NMED 2011, 203705), the ISCO samplers were programmed to begin sampling for inorganic and organic chemicals and radionuclides 10 min after the peak. At the lower watershed gages and gage E026, downstream from the Las Conchas burn area, sampling for SSC began at the start of flow and continued for 30 min at a high frequency to characterize the rapidly changing conditions early in each runoff event. After 30 min, the sampling frequency for SSC was reduced to characterize the more gradually changing conditions on the recessional limb of the hydrograph.

At all stations, sampling was initiated using a signal from a Sutron 8210 or 9210 data logger. The data logger received stage height measurements from an encoder, bubbler, or probe, after which sampling began at each automated pump sampler independently based on control logic programmed into the data logger. The data logger triggered sampling immediately as discharge exceeded the triggering stage height for SSC or 10 min following a local maximum discharge that exceeded the triggering stage height for other analytes. Automated pump samplers used at the Laboratory will fill 1-L sample bottles in 50 to 75 s, depending on the distance of the sampler to the sample collection point. Tables 2.3-4, 2.3-5, and 2.3-6 show idealized sampling sequences for each gage based on idealized 60-s bottle fill times.

At stations E055, E055.5, E056, E030, and E040, outfitted with a single automated sampler containing 12 1-L poly or glass bottles, sampling began 10 min following a local maximum discharge. Sample bottles were filled sequentially without a programmed delay between bottles. Table 2.3-4 shows the idealized sampling sequence for these gages.

At stations E026, E038, E039.1, E042.1, E050.1, E059, and E060.1, sampling was triggered at two samplers at each gage by discharges exceeding 5 cfs or 10 cfs. One sampler was fitted with a 12-bottle carousel, and a second sampler was fitted with a 24-bottle carousel. Sampling began in the 24-carousel sampler immediately following the triggering discharge. Sampling began in the 12-carousel sampler 10 min following a local maximum discharge exceeding 5 or 10 cfs. In the sampler fitted with a 24-bottle carousel, a delay of 3 min was programmed to lapse between filling each of the first 11 bottles. Remaining bottles in the 24-carousel sampler were filled with a 20-min delay between each bottle. In the samplers fitted with a 12-bottle carousel at E026, E038, and E039.1, after a 10-min delay following the local maximum discharge, all 12 sample bottles were filled with no programmed delay between each bottle. In the samplers fitted with a 12-bottle carousel at E042.1, E050.1, E059, and E060.1, after a 10-min delay following the local maximum discharge, the first six sample bottles were filled with no delay between each bottle. The six remaining bottles were filled in pairs with a programmed delay of 45 min between each pair. All bottles in the 24-bottle carousel were filled within 290 min from after sampling began. At E026, E038, and E039.1, all bottles in the 12-bottle carousel were filled within 12 min after sampling began. At E042.1, E050.1, E059, and E060.1 all bottles in the 12-bottle carousel were filled within 152 min after sampling began. Table 2.3-5 shows the idealized sampling sequence for these gages.

At E109.9, sampling was triggered at two samplers by discharges exceeding 5 cfs. One sampler was fitted with a 12-bottle carousel, and a second sampler was fitted with a 24-bottle carousel. Sampling began in the 24-carousel sampler immediately following the triggering discharge. Sampling began in the 12-carousel sampler 10 min following a local maximum discharge exceeding 5 cfs. In the sampler fitted with a 24-bottle carousel, a 2-min delay was programmed between filling each of the first 16 bottles. Remaining bottles in the 24-carousel sampler were filled with a 20-min delay between each bottle. In the sampler fitted with a 12-bottle carousel, after an initial 10-min delay following a local maximum discharge, the first six sample bottles were filled with no delay between each bottle. The six remaining bottles were filled in pairs with a delay of 45 min between each pair. All bottles in the 24-bottle carousel were filled in 190 min after sampling began. All bottles in the 12-bottle carousel were filled within 152 min from initiation of sampling. Table 2.3-6 shows the idealized sampling protocol for this gage.

2.4 Damage and Repairs

During 2011, field crews were authorized to perform inspections weekly at gages and samplers in the LA/P watershed. Inspections were also authorized to occur at sampling and stage measurement equipment on the day following rain that resulted in discharge at E050.1, E060.1, or E109.9 or rain that exceeded 0.25 in. in 30-min intensity at any associated rain gage. Additionally, flumes at E039.1, E042.1, E050.1, E060.1, and E109.9 were inspected for sedimentation after each rain event and cleaned on the first workday after sedimentation occurred. If inspectors were unable repair damaged equipment at the time of inspection, additional resources were made available as quickly as possible to make any repairs. The flume at E109.9 was cleared of sediment 19 times during the 2011 monitoring season.

2.5 Deviations from Work Plan

During the 2011 monitoring period, several deviations from the approved monitoring plan (LANL 2011, 201578; NMED 2011, 203705) that occurred are described in this section. Some deviations related to sample collection are also discussed in section 2.2.

2.5.1 Deviations from Approved Monitoring Plan

In its AWD (NMED 2011, 203705), NMED recommended programming the automated samplers to begin collecting samples for the purpose of chemical evaluations 30 min after the sampler was triggered by a prescribed flow to help avoid sampling before the peak of each runoff event. As an alternative, automated samplers were programmed to begin collecting samples for the purpose of chemical evaluation 10 min after peak discharge was detected. The implemented sampling strategy helped ensure samples were collected consistently following the peak.

Because of the Las Conchas fire, the analytical suite was enhanced to include additional analytes that were elevated in stormwater after the Cerro Grande fire (Gallaher and Koch 2004, 088747) to help evaluate the effects of the fire on analytes in stormwater. At gages in Los Alamos Canyon expected to contain ash in stormwater (E026, E030, E042.1, E050.1, and E109.9), cyanide was added to the analytical suite. Cyanide was also added to the Pueblo Canyon stations for comparison. Additionally, at E026 and E030, americium-241 was added to the analytical suite.

Additionally, isotopic uranium analyses were obtained at the sampling location in Graduation Canyon, although they had not been required by NMED (2011, 203705).

2.5.2 Sample Collection Deviations

Not all samples could be removed from the samplers and the samplers restored to ready condition within 72 h of a stormwater runoff event, as NMED requested in its AWM (NMED 2011, 203705). Forty-nine sampling events occurred at gage stations during 2011. Samples from 35 sampling events were retrieved from the samplers and the samplers restored to ready condition within 72 h of sample collection. Fourteen sampling events resulted in sample collections that did not achieve the 72-h goal. These deviations are presented in Table 2.5-1 and discussed below.

Timely sample retrieval was not achieved within 72 h for four sampling events when rain occurred on Thursday because the time to mobilize the field crew on Friday was insufficient and samples cannot be retrieved on weekends. Runoff samples from the afternoon of Thursday, September 15, were not retrieved until the following Monday, September 19, at E039.1, E050.1, and E042.1. Runoff samples from the afternoon of Thursday, July 28, were not retrieved until the following Monday, August 1, at E109.9.

Samples could not be retrieved within 72 h during two sampling events in DP Canyon when access was not allowed because of runoff-related road damage and site-specific safety issues. Runoff on the afternoon of Friday, August 19, was not retrieved until the following Wednesday, August 24, at E039.1 and E038. Access to E039.1 and E038 was denied by the Technical Area 21 (TA-21) operations center on Monday, August 22, and again on Tuesday, August 23, preventing timely sample retrieval at E038 and E039.1.

Samples could not be retrieved within 72 h for three sampling events because road damage prevented site access. Access to Pueblo Canyon was restricted because of construction and road damage after storms on August 21. In Pueblo Canyon, runoff samples from the afternoon of Friday, August 19, were not retrieved until the following Tuesday, August 23, at E059 and Wednesday, August 24, at E055.5. Access to Los Alamos Canyon was restricted between September 5 and September 12 because of road damage caused by post-fire flooding. Runoff samples from the afternoon of Sunday, September 4 were not retrieved until the following Tuesday, September 13 at E030.

Samples could not be retrieved within 72 h for one sampling event in DP Canyon because of the Laboratory closure during the Las Conchas fire and associated post-closure start-up requirements. Runoff samples from Saturday, July 2, were not retrieved until the first inspection at the gage following the Las Conchas fire on Monday, July 11.

Samples could not be retrieved within 72 h for four sampling events in DP Canyon because personnel were occupied at higher-priority gages. Runoff samples from the afternoon of Thursday, August 4, were not retrieved until the following Wednesday, August 10, at E039.1. Runoff samples from the morning of Wednesday, October 12, were not retrieved until the following Monday, October 17, at E038. Runoff samples from the afternoon of Tuesday, August 2, were not retrieved until the following Thursday, August 10, at E038. Runoff samples from the afternoon of Wednesday, September 7, were not retrieved until the following Tuesday, September 13, at E038.

2.5.3 Analytical Suite Deviations

The Laboratory did not analyze runoff from each runoff event for all constituents in the analytical suites listed in Tables 2.3-4, 2.3-5, and 2.3-6. Instead, analyses were performed as presented in Table 2.3-3. Deviations between the planned and performed analyses occurred because (1) incomplete sample volumes were collected, (2) organic chemical analyses could only be conducted on samples collected in glass bottles, (3) boron analyzed as an addition to the TAL metal suite could only be conducted on samples collected in polyethylene bottles, and (4) detection limit requirements for volumes had to be met, as specified in Table 2.3-2. Table 2.5-2 contains a more complete prioritization matrix that was used to help guide submission of samples for analyses during 2011. Deviations from specific analytical suites during 2011 are described below, and the reasons for each deviation are listed in Table 2.5-3, which presents the completeness of each sampling event.

SSC analyses at E026 on August 22 are not correlated with other analyses. Only three samples could be collected in the 24-bottle sampler at 12:24, 12:29, and 12:32 before the distributor arm jammed and samples could not be collected. The 12-carousel sampler began sampling at 12:51 and collected water in each bottle until 13:07. None of the bottles from the 12-bottle sampler was used for analysis of SSC.

Because 19 to 35 min elapsed between the final SSC analysis and other analyses, no inference can be made about SSC at the time samples were collected for chemical analyses.

At E026 on September 4, the 24-bottle sampler failed to collect stormwater because of a distributor arm jam. As a result, repeat analyses of SSC through the hydrograph were not conducted. Analyses from the 12-bottle sampler were rearranged to perform SSC from the first and last bottle collected.

At E038 on August 13, the 24-bottle sampler failed to collect stormwater because of a power cable failure. As a result, repeat analyses of SSC through the hydrograph were not conducted. Analyses from the 12-bottle sampler were rearranged to perform SSC from the first and last bottle collected.

At E038 on September 1, the 12-bottle sampler failed to detect stormwater, and as a result no water was collected in glass bottles. Analyses from the 24-bottle sampler were rearranged to perform chemical analyses. Because organic chemicals could not be analyzed from samples collected in polyethylene bottles, analyses for PCB congeners and dioxins and furans were not conducted.

At E039.1 on August 1, the 12-bottle sampler failed to detect stormwater, and as a result no water was collected in glass bottles. Analyses from the 24-bottle sampler were rearranged to perform chemical analyses. Because organic chemicals could not be analyzed from the samples collected in polyethylene bottles, analyses for PCB congeners and dioxins and furans were not conducted.

At E042.1 on August 19, 7 L of water was collected in the 12-bottle sampler and no liquid was detected at the 24-bottle sampler. Subsequent inspections found the sampling intake was silted. Analyses from the 12-bottle sampler were rearranged to perform SSC from the first and last bottle collected. Because of the limited sample volume, the lowest priority analyses (gross alpha, gross beta, cyanide, radium-226, and radium-228) and repeat analyses of PCB congeners, gamma spectroscopy, and isotopic plutonium were not conducted.

At E042.1 on August 22, 7 L of water was collected in the 24-bottle sampler and 11 L of water was collected from the 12-bottle sampler. Subsequent inspections found the sampling intakes were silted. Because of the limited sample volume, the lowest priority analyses, radium-226 and radium-228, were not conducted.

At E042.1 on September 7, 7.3 L of water was collected in the 24-bottle sampler and 4 L of water was collected from the 12-bottle sampler. Subsequent inspections found the sampling intake was silted. Planned analyses from the 12-bottle and 24-bottle samplers were rearranged. Repeat analyses of PCB congeners, gamma spectroscopy and isotopic plutonium were not conducted.

At E042.1 on September 10, 6 L of water was collected in the 12-bottle sampler and no water was collected from the 24-bottle sampler because of a power failure. Because four runoff events had been sampled with greater discharges at E042.1, the samples collected were analyzed for SSC, and no chemical analyses were conducted.

At E042.1 on September 15, 2 L of water was collected in the 12-bottle sampler and no water was collected from the 24-bottle sampler. Subsequent inspections found the sampling intake was silted. Because four runoff events had been sampled with greater discharges at E042.1, the samples collected were analyzed for SSC, and no chemical analyses were conducted.

At E042.1 on October 2, 6 L of water was collected from the 12-carousel automated sampler. No water was collected in the 24-bottle sampler because of pump tubing failure. Analyses from the 12-bottle sampler were rearranged to perform SSC from the first and last bottle collected. Because of the limited sample volume, all repeat analyses of gamma spectroscopy, isotopic plutonium, and PCB congeners and the lowest priority analyses, radium-226 and radium-228, were not conducted.

At E042.1 on October 4, 2011, 4 L of water was collected from the 12-bottle sampler and 11 L of water was collected in the 24-bottle sampler. The runoff duration was too short to allow collection of sufficient volume for all planned analyses and the intake was found to be silted during the subsequent inspection. Because of the limited sample volume all repeat analyses of gamma spectroscopy, isotopic plutonium, and PCB congeners were canceled.

Analytical measurements at E050.1 from samples collected after 23:58 on October 4 and 5 could not be correlated with SSC. The 24-bottle sampler began sampling at 23:31 on October 4 but could collect only 10 bottles for SSC. The distributor arm jammed after sampling bottle 10. The 12-bottle sampler began sampling at 23:36 on October 4 and continued to collect samples at 00:36, 01:21 and 02:06 on October 5. These last three samples were submitted for repeat analyses for PCB congeners, isotopic uranium, isotopic plutonium, and americium-241 and by gamma spectroscopy.

At E055.5 on August 19, only 2 L of water was collected in the automated sampler because of a programming error. Because of the limited sample volume, only the two highest analytical priorities, SSC and PCB congeners, were requested. Isotopic plutonium, dioxins and furans, TAL metals, hardness, gross alpha, and a bounding SSC analysis were not conducted.

At E059 on August 19, the 12-bottle sampler failed to initiate sampling because of a programming error. The 24-bottle sampler collected 7 L of stormwater. Analyses from the 24-bottle sampler were rearranged to perform chemical analyses. Because organic chemical analyses are not able to be obtained from samples collected in polyethylene bottles, analyses for PCB congeners and dioxins and furans were not conducted. Repeat analyses of PCB congeners, gamma spectroscopy, and isotopic plutonium were also not conducted.

At E059 on August 21, 7 L of water was collected by the 12-bottle sampler. The 24-bottle sampler was full from the runoff event on August 19, and was not able to collect additional stormwater. Analyses from the 12-bottle sampler were rearranged to perform SSC from the first and last bottle collected. Because of the limited sample volume the lowest priority analyses (gross alpha, gross beta, cyanide, radium-226, and radium-228), and repeat analyses of PCB congeners, gamma spectroscopy, and isotopic plutonium were not conducted.

At E109.9 on July 22, July 28, and August 3, samples collected in automated pump samplers could not be treated as liquid by the analytical laboratory. Because of high concentrations of ash from the Las Conchas burn area, the samples collected on July 22 contained as much as 53% solid material, the samples collected on July 28 contained as much as 52% solid material, and the samples collected on August 3 contained as much as 51% solid material. Samples collected for chemical analyses were prepared as solids, concentrations were adjusted based on the moisture percentage, and the results were reported in units of mass, or activity, of the constituent per mass of sample. Hardness cannot be calculated for solid matrices.

At E109.9 on July 22, 5.9 L of sample were collected by the 12-bottle sampler and 6.7 L of water was collected by the 24-bottle sampler. Subsequent inspections found the sampler intake was silted. Because of the limited sample volume the lowest priority analyses (cyanide, gross alpha, gross beta, radium-226, and radium-228) were not conducted. Because of the high solid content SSC analyses were also not conducted. Because of the high solids content analyses of filtered TAL metals, boron, uranium, gamma spectroscopy, isotopic plutonium, isotopic uranium, americium-241, strontium-90, radium-226 and filtered radium-228 were not conducted. Because of the limited volume repeat analyses of PCB congeners, gamma spectroscopy, isotopic plutonium, isotopic uranium, and americium-241 were not conducted.

At E109.9 on July 28, 2.6 L of sample was collected by the 12-bottle sampler, and 8.8 L of sample was collected by the 24-bottle sampler. Subsequent inspections found the sampling intake was silted. Because only 1 L of sample was collected in glass, the lower priority organic analyses, dioxins and furans, were not conducted. Analyses from the 12-bottle and 24-bottle samplers were rearranged to perform SSC analyses from the first and last bottles collected. Because of the high solids content analyses of filtered TAL metals, boron, uranium, gamma spectroscopy, isotopic plutonium, isotopic uranium, americium-241, strontium-90, radium-226 and filtered radium-228 were not conducted. Because of the limited volume, repeat analyses of PCB congeners, gamma spectroscopy, isotopic plutonium, isotopic uranium, and americium-241 were not conducted.

At E109.9 on August 3, 8.25 L of sample was collected by the 12-bottle sampler, and 0.25 L of sample was collected by the 24-bottle sampler. Subsequent inspections found the sampling intake was silted. Analyses from the 12-bottle and 24-bottle samplers were rearranged to perform SSC analyses from the first and last bottles collected. Because of the high solids content analyses of filtered TAL metals, boron, uranium, gamma spectroscopy, isotopic plutonium, isotopic uranium, americium-241, strontium-90, radium-226 and filtered radium-228 were not conducted. Because of the limited volume repeat analyses of PCB congeners, gamma spectroscopy, isotopic plutonium, isotopic uranium, and americium-241 were not conducted.

At E109.9 on August 5, 6.9 L of sample was collected by the 12-bottle sampler, and 7.3 L of sample was collected by the 24-bottle sampler. Subsequent inspections found the sampling intake was silted. Analyses from the 12- and 24-bottle samplers were rearranged to perform SSC analyses from the first and last bottles collected. Because of the high solids content analyses of filtered TAL metals, boron, uranium, gamma spectroscopy, isotopic plutonium, isotopic uranium, americium-241, strontium-90, radium-226 and filtered radium-228 were not conducted. Because of the limited volume, repeat analyses of PCB congeners, gamma spectroscopy, isotopic plutonium, isotopic uranium, and americium-241 were not conducted.

Analytical measurements at E109.9 from samples collected after 15:50 on August 5 could not be correlated with SSC. The 24-bottle sampler began sampling at 15:20 but could complete sampling of only 13 bottles for SSC. The 12-bottle sampler began sampling at 15:31 and collected samples at 16:21, 17:06, and 17:51. These last three samples were submitted for analyses of PCB congeners, dioxins and furans, radium-226, radium-228, and strontium-90.

At E109.9 on August 22, both 12-bottle and 24-bottle samplers' intakes were silted and samples could not be collected as planned. Instead, field crews performed grab sampling to collect 12 L of stormwater directly into sample bottles. Analyses were rearranged to perform SSC analyses from the first and last bottles collected. Because of the limited sample volume, filtered analyses of radium-226 and radium-228 were not conducted. Because of the limited sample volume and compressed sample collection duration, repeat analyses of PCB congeners, gamma spectroscopy, isotopic plutonium, isotopic uranium, and americium-241 were not conducted.

At E109.9 on August 26, no water was collected in the 24-bottle sampler, 3.9 L was collected in glass, and 2.9 L was collected in polyethylene from the 12-carousel sampler. Subsequent inspections found the sampling intake was silted. Analyses from the 12-bottle sampler were rearranged to perform SSC analyses from the first and last bottles collected. Because of the limited sample volume analyses of filtered gamma spectroscopy, isotopic plutonium, isotopic uranium, americium-241, strontium-90, radium-226 and filtered radium-228 were not conducted. Because of the limited volume repeat analyses of PCB congeners, gamma spectroscopy, isotopic plutonium, isotopic uranium, and americium-241 were not conducted.

At E109.9 on September 4, 0.9 L of water was collected in glass bottles in the 12-bottle sampler, and no stormwater was collected in the 24-bottle sampler. Subsequent inspections found the sampling intake was silted. Because of the limited volume and concerns about detection limits, only TAL metals, gross alpha, and gross beta analyses were conducted. SSC, PCB congener, isotopic plutonium, gamma-spectroscopy radionuclides, isotopic uranium, americium-241, strontium-90, dioxins and furans, radium-226, and radium-228 analyses were not conducted.

At E109.9 on September 7, both 12- and 24-bottle samplers' intakes were silted and samples could not be collected. Instead, field crews performed grab sampling to collect 12 L of stormwater directly into sample bottles. Analyses were rearranged to perform SSC analyses from the first and last bottles collected. Because of the limited sample volume filtered analyses of gamma spectroscopy, isotopic plutonium, isotopic uranium, americium-241, strontium-90, radium-226, and radium-228 were not conducted. Because of the limited sample volume and compressed sample collection duration repeat analyses of PCB congeners, gamma spectroscopy, isotopic plutonium, isotopic uranium, and americium-241 were not conducted.

At E109.9 on September 10, 8.5 L of sample was collected in the 12-bottle sampler and 21 L of sample was collected in the 24-bottle sampler. Because sample collection was not complete, the third repeat analyses of PCB congeners, gamma spectroscopy, isotopic plutonium, isotopic uranium, and americium-241 were not conducted.

3.0 WATERSHED HYDROLOGY

The topography, geology, geomorphology, and meteorology of the LA/P watershed are quite complex and include mesas, canyons, and large elevation gradients; alluvium, volcanic tuff, pumice, and basalt; ephemeral streams, evolving stream networks (both laterally and vertically), and sediment-laden stream discharge; winter snowfall that can create spring snowmelt, intense summer monsoonal rainfall, and occasional late summer to fall tropical storm activity. Consequently, monitoring of the LA/P watershed runoff is also complex and challenging.

3.1 Drainage Areas and Impermeable Surfaces

Drainage areas unique to each gage station (Figure 2.0-1) were developed using the ArcHydro Data Model in ArcGIS. Model inputs were developed using an elevation grid created from 4-ft light detecting and ranging (LIDAR) images, a digital elevation model from 2000, surface-water drainage culverts from the Laboratory and the County of Los Alamos, and manual site-specific controls based on field assessments. Each drainage area defines the area that drains to the particular gage station from either the next upstream gage station or the headwaters of the watershed as determined by the model inputs.

The impermeable surface area was derived from the urban-sparse-bare rock land cover type within the taxonomic-level classification system developed in the Land Cover Map for the Eastern Jemez Region (McKown et al. 2003, 087150). The specific grid data set selected to provide the land cover type was the quarter-hectare smoothed taxonomic level. Within each gage station drainage area, the urban-sparse-bare rock land cover type was spatially queried for total acreage based upon the number of 50-ft × 50-ft grid cells that fell within the drainage boundary. This total area was then divided by the total area of the entire drainage area to derive the percent impermeable surface area. The following assumptions were made in determining the percent impermeable surface area: (1) the only available land cover data were from 2002–2003, and therefore, newer impermeable surfaces may not be captured; and (2) urban-sparse-bare rock grid cells that may have overlapped two drainage areas were spatially queried based upon where the center of the cell resided rather than the exact amount of each cell that fell within each drainage area.

A significant factor in the frequency of discharge at each gage is the ratio of permeable to impermeable surface area discharging to the gage or within the canyon drainage (Table 3.1-1). The Las Conchas fire affected this relationship because of soil hydrophobicity (infiltration decreases), lack of vegetation (through fall increases and evapotranspiration decreases), and lack of litter (infiltration decreases) following a medium- to high-intensity forest fire, leading to an increase in runoff, as occurred after the Cerro Grande fire (Gallaher and Koch 2004, 088747). The effect of the fire was particularly evident at E109.9, which measures discharge from a total drainage area of 37,800 acres, with 11% impermeable surface area before the fire and an additional 13% of the watershed experiencing high- or moderate-severity burn during the fire. Gage E109.9 recorded discharge greater than 5 cfs only 4 times during the 2010 monitoring period (pre-fire) and 15 times during the 2011 monitoring period (post-fire).

It is instructive to examine SSC statistics (Figure 3.1-1) for each station with respect to the cumulative drainage area (Figure 3.1-2) because particular correlations between the two are quite high (Table 3.1-2). In general, the high positive correlations signify that the larger the drainage area, the greater the concentration of suspended sediments in the runoff (i.e., maximum and upper quartile of SSC are positively correlated with drainage area). However, the total and permeable surface areas are more highly correlated to SSC than the impermeable surface area, suggesting the amount of sediment in the runoff is strongly related to the permeable surface area contributing to a station. This is counter to the concept that converting permeable surfaces to impermeable surfaces can increase the peak and shorten the duration of a hydrograph (Weng 2001, 111760; Huang et al. 2008, 111755), thereby creating a conduit for sediment to reach the stream and increasing SSC measured at a gage. This effect is most likely because of the influence of the Las Conchas fire, which created a similar impermeable “conduit” for sediment transmission and greatly increased the supply of sediment, in part ash-laden, from the upper watersheds of Los Alamos and Guaje Canyons (as observed in the large volume of ash and sediment at E109.9 and elsewhere in Los Alamos Canyon).

3.2 Water and Sediment Transmission

Figure 3.2-1 is a flow diagram of the LA/P watershed displaying each gage station and the location of sediment transport mitigation sites. For the sampled runoff events, Figure 3.2-2 shows hydrographs for each canyon from upstream to downstream; thus, it is useful to consider the progression of the gage stations downstream while examining the hydrographs. In addition, Figure 3.2-3 shows hydrographs for E050.1, E060.1, and E109.9, which are boundary stations for the LA/P watershed, and E099, which is a baseline station (E099 does not have a reliable rating curve, thus stage height is displayed in this figure). Tables 3.2-1 through 3.2-4 summarize the flood bore transmission downstream for each canyon, including travel time of flood bore from the upstream to the downstream station, peak discharges of the flood bore at the station, and the percent reduction in peak discharge between the stations for every sampled runoff event in 2011. The flood bore is defined as the leading edge of the storm hydrograph as it transmits downcanyon, and peak discharge is the maximum flow rate measured during a flood. Focus was placed on peak discharge because it is related to stream power, and in ephemeral streams in semiarid climates, the greater the stream power, the greater the erosive force, hence the greater the sediment transport (Bagnold 1977, 111753; Graf 1983, 111754; Lane et al. 1994, 111757). Also, it should be noted that the peak discharges presented in Tables 3.2-1 through 3.2-4 are conceptually different from those presented in Table 2.2-1 because of temporal resolution; that is, Table 2.2-1 shows daily peak discharges (midnight to midnight), and Tables 3.2-1 through 3.2-4 show peak discharges for a particular runoff event.

As flood bores move from upstream to downstream, peak discharge can either increase by means of alluvial groundwater and/or tributary contributions or decrease because of transmission losses (infiltration). In some events, downstream stations experienced flow before upstream stations did because of inputs from intermediate tributary drainages. This occurred in 2011 in Los Alamos Canyon during large storm events on September 1 (E042.1 to E050.1) and September 4 (E040 to E042.1). In addition, on September 15, between E026 and E030, flow reached E030 before it reached E026. Because of the extremely localized precipitation in this area, travel times and peak discharge increases or decreases vary substantially (Tables 3.2-1 through 3.2-4). Also, little to no relationship exists between peak discharge magnitudes, travel times between stations, or peak discharge increases or decreases. However, a summary of the peak discharge increases and decreases (Tables 3.2-5 and 3.2-6) between stations provides insight into the stream network.

In the upper watershed of Acid Canyon (E055.5 to E056), the peak discharge increased in 9 of 10 events (81% average increase), indicating this channel section tends to gain rather than lose volume. These increases are probably largely associated with runoff down main Acid Canyon above the south fork (where E055.5 is located). From E056 to E059, the peak discharge decreased in all 10 events (84% average decrease), denoting a losing channel. In the upper watershed of Pueblo Canyon (E055 to E059), the peak discharge decreased in 8 of 10 events (100% average decrease), also indicating this channel section tends to lose rather than gain volume (with the exception of larger events, in which the channel gained volume). Walnut and Kwage Canyons, between E056 and E059, are possible sources of additional runoff during large events in this area. From E059 to E060.1, the two runoff events measured at E059 did not transmit to E060.1, including a particularly large event of 131 cfs. Two small runoff events were measured at E060.1 that were not recorded at E059, indicating more localized rainfall. In the stretch from E060.1 to E109.9, peak discharge increased in all 18 events (100% average increase), indicating this channel section tends to gain rather than lose volume. Additional runoff contributions to E109.9 can come from Guaje Canyon (E099), upper Los Alamos Canyon (E050.1), or smaller tributary drainages. Guaje Canyon is monitored for flow, although the wide open channel makes it difficult to develop a reliable rating curve. However, when the station was operational, increases in stage height were measured at E099 during all 10 events when E109.9 also measured discharge (Figure 3.2-3), indicating runoff from Guaje Canyon contributed to discharge at E109.9. Discharge was measured at E060.1 on September 7 (4 cfs), which may have contributed to discharge at E109.9. Also, it should be noted that between E055, E056, and E059 to E060.1, which have flow paths that traverse the sediment transport mitigation sites in Pueblo Canyon, the peak discharge decreased for 20 of 24 events, indicating the flow magnitude is being reduced through this area, which is a primary goal of the mitigation actions.

In DP Canyon, the upper channel (E038 to E039.1) traverses the DP Canyon GCS and upstream floodplains. The fact that the peak discharge decreased in 19 of 22 runoff events (85% average decrease) indicates flow magnitude is being reduced through this area, which is a primary goal of the mitigation actions. From E039.1 to E040, many more decreases in peak discharge than increases occurred (11 of 14 events, 65% average decrease), indicating further reduction in flood magnitude. In Los Alamos Canyon, the peak discharge increased in the upper watershed (E026 to E030) for 7 of 9 events (79% average increase), probably from additional runoff from tributary drainages between E026 and E030 and the difference in percent of impermeable area draining to the two stations (30% at E030 in contrast to 2% at E026). Farther down Los Alamos Canyon, the confluence with DP Canyon (below E040) is located just downstream of E030, with E042.1 located a short distance above the Los Alamos Canyon low-head weir. From E030 to E042.1, the peak discharge increased in 13 of 15 events (76% average increase) and from E040 to E042.1, the peak discharge increased in 11 of 15 events

(89% average increase), indicating this part of Los Alamos Canyon tends to gain rather than lose runoff volume.

The Los Alamos Canyon low-head weir is located between E042.1 and E050.1, through which the peak discharge decreased for all 12 runoff events (48% average decrease). For two runoff events, no flow occurred at E050.1 (100% average decrease). Flow is reduced through the weir and the upstream sediment retention basins, allowing sediment to settle out of suspension; thus, this mitigation feature is performing as designed. In the lower part of Los Alamos Canyon, between E050.1 and E109.9, the peak discharge increased for 17 of 21 runoff events (86% average increase) and decreased for 4 events (72% average decrease), indicating this section tends to gain rather than lose volume. Discharge was measured at E050.1 for 11 events, 9 of which may have contributed to discharge at E109.9 (no discharge was measured at E109.9 for the other 2 events). For these nine runoff events, stage height measured at E099 in Guaje Canyon increased during six of them, and E099 was not operational during the other three; these relationships indicate that runoff from Guaje Canyon contributed to discharge measured at E109.9 in multiple events (Figure 3.2-3).

Figure 3.2-4 shows the hydrograph and sedigraph for each station sampled through all or most of the duration of a runoff event plotted as time since the peak. Table 3.2-7 shows the Pearson's correlation coefficients between discharge and SSC for these stations and runoff events. Concurrent times as well as various time lags are displayed. Pearson's correlation coefficients are computed as follows:

$$corr_{Q_t,SSC_t} = \frac{\sum_{t=0}^{n}(Q_t-\bar{Q})(SSC_t-\overline{SSC})}{\sqrt{\sum_{t=0}^{n}(Q_t-\bar{Q})^2\sum_{t=0}^{n}(SSC_t-\overline{SSC})^2}}$$ **Equation 3.2-1**

where Q_t is the discharge at time t, SSC_t is the SSC at time t, n is the number of measurements to be correlated ($t = 1, 2, \ldots, n$), and

$$\bar{Q} = \frac{\sum_{t=0}^{n} Q_t}{n}$$ **Equation 3.2-2**

$$\overline{SSC} = \frac{\sum_{t=0}^{n} SSC_t}{n}$$ **Equation 3.2-3**

The peak SSC can occur after the peak discharge; thus, lags between 0 and 30 min are presented with the discharge lagging behind the SSC to align the peaks (after 30 min, the correlations were reduced for all of the stations and all of the runoff events). For example, when computing the Pearson's correlation coefficient between Q_t and SSC_{t+5}, the SSC time series begins 5 min after the discharge time series.

For stations E038, E039.1, E042.1, E050.1, and E109.9, discharge is reasonably positively correlated to SSC with a 0- to 5-min time lag. The exceptions are runoff events with two or more peaks and SSC samples collected before the peak discharge, which are not as well correlated as those collected after the peak discharge. Figure 3.2-5 shows the linear relationship between sediment yield and runoff volume for the stations where SSC was measured throughout the runoff event; Table 3.2-8 contains the values shown in Figure 3.2-5. Although SSC and instantaneous discharge are not always highly correlated as a result of localized precipitation, sediment availability, or antecedent conditions, the linear relationship between sediment yield and runoff volume for a watershed is well established (Onodera et al. 1993, 111759; Nichols 2006, 111758; Mingguo et al. 2007, 111756). However, the Las Conchas fire undoubtedly affected this relationship, which is not as robust for the 2011 monitoring period as it was during the 2010 monitoring period (LANL 2011, 207072).

The runoff volume for each event was computed as follows

$$V = \sum_{i=0}^{n} Q(t_i)(t_{i+1} - t_i) \quad ,$$ **Equation 3.2-4**

where n = the number of instantaneous discharge measurements taken throughout the runoff event,

t = the time, i, at which an instantaneous discharge measurement is taken, and

$Q(t_i)$ = the discharge (ft^3/s) at time t_i (multiplied by 60 to convert from ft^3/s to ft^3/min).

The mass of sediment for each runoff event was computed by

$$M = \sum_{j=0}^{n} Q(t_j)(t_{j+1} - t_j)\, SSC(t_j) \quad ,$$ **Equation 3.2-5**

where n = the number of SSC samples taken throughout the storm event,

t_j = the time, j, at which an SSC sample is taken,

$Q(t_j)$ = the discharge (ft^3/s) at time t_j interpolated from the instantaneous discharge measurements taken at time t_i (multiplied by 60 to convert from ft^3/s to ft^3/min), and

$SSC(t_j)$ = SSC (mg/L) at time t_j (multiplied by 28.3×10^{-6} to convert from mg/L to kg/ft^3).

In Appendix A, plots of discharge (hydrographs), precipitation (hyetographs), and SSC (sedigraphs) versus time are displayed for each date and station when samples were collected. The precipitation shown is associated with the precipitation-station-based Thiessen polygons that overlay the individual gage's watershed area, thus are potentially contributing to the discharge measured at the station. As expected, discharge lags precipitation, and when several pulses occur in the hyetograph, consequential peaks occur in the hydrograph. SSC is much less predictable, with no definitive trend between SSC magnitude, peak discharge, or time to peak.

3.3 Impact and Efficiency of Watershed Mitigations

The DP and Pueblo Canyon GCSs were constructed to help reduce erosive flood energy and to cause upstream aggradation to bury existing stream channels, potentially bury existing floodplain deposits, and in Pueblo Canyon, to stabilize an eroding wetland. As a result, the GCSs should help reduce sediment transported during flood events. The Pueblo Canyon wing ditch was designed to divert floodwater from the main channel into an adjacent abandoned channel, spreading water more broadly over a wetland and decreasing surface water flow velocities. Willows were planted in Pueblo Canyon to aid in surface stabilization, flow reduction, and sediment accumulation.

DP Canyon during 2011: Sampling conducted in DP Canyon on August 19 was performed above (E038) and below (E039.1) the GCS and associated floodplains. Analyses performed from samples collected during this runoff event allow direct evaluation of changes in flow and sediment transport through this part of DP Canyon. This particular event had two peak discharges at both stations, the first of which was 40 min apart and the second of which was 15 min apart (Figure 3.3-1). Samples collected for SSC analyses initiated and concluded sample collection at both stations. Sample collection began within 5 min of initial discharge (triggered above 10 cfs for both stations). For E038 and E039.1, the calculated sediment yield is 18.2 and 16.9 tons, respectively (Table 3.2-8). Between these two stations for this event, the average relative percent difference (RPD) is a 7% decrease in sediment yield.

Decreasing stormwater velocity allows for infiltration to be increased. Increasing infiltration reduces the distance that a storm surge travels in the stream channel and decreases the distance that sediment and associated contaminants entrained in the water column travel. Increasing infiltration reduces peak discharge (see Figure 3.3-1) but can also decrease the total volume of stormwater passing through a gage station. Throughout 2011, the peak discharge decreased in 19 of 22 runoff events between E038 and E039.1, with an average decrease of 85% (Table 3.2-6). For the August 19 event, the runoff volume was 12.0 and 14.3 acre-feet for E038 and E039.1, respectively (Table 3.2-8). Between these two stations for this storm, the average RPD is a 17% increase in runoff volume. The increase in runoff volume between E038 and E039.1 was probably because of additional contributions from local runoff.

In addition to examining coinciding sampling events, watershed mitigation performance can be assessed by examining overall statistics for 2011. Figure 3-3.3 shows box and whisker plots for E038 and E039.1 for both SSC and peak discharge. These plots indicate slight reductions in SSC and peak discharge (i.e., erosive force) through this part of DP Canyon, consistent with the goals of the sediment transport mitigation activities.

Pueblo Canyon during 2011: No sampling was performed in Pueblo Canyon above (E059) and below (E060.1) the GCS and upstream wetland for the same runoff event because no events were large enough to sample at E060.1. Therefore, overall statistics for 2011 must be used to assess performance. Figure 3.3-3 shows box and whisker plots for E059 and E060.1 for both SSC and peak discharge. As these plots indicate, runoff was effectively attenuated through the Pueblo Canyon wetland in 2011, resulting in no transport from the upper watershed into lower Los Alamos Canyon. This is consistent with the goals of the sediment transport mitigation activities.

Los Alamos Canyon during 2011: Sampling conducted in Los Alamos Canyon on August 22, September 4, 7, 10, and 15, and October 2 and 4, was performed above (E042.1) and below (E050.1) the low-head weir. Analyses performed from samples collected during these runoff events allow direct evaluation of the effect of the weir and associated basins on flow and sediment transport. Each event had downstream decreases in peak discharge and total runoff volume, and data from four of the five events also show downstream decreases in SSC (Figure 3.3-2). The only exception for SSC was on August 22, when the SSC sampler at E042.1 could not collect samples near the peak, probably because of high SSC. On average for the events sampled throughout the hydrograph (excluding September 15 and October 2), the sediment yield was 463 and 253 tons for E042.1 and E050.1, respectively (Table 3.2-8), an average RPD of 59%. Differences in calculated sediment yield between E042.1 and E050.1 in two relatively large runoff events sampled through the hydrograph on August 22 and September 4 indicate a trapping efficiency for suspended sediment of 39% and 31%, respectively. Trapping efficiency is expected to be higher in smaller events and events early in the season before the retention basins have filled with water. Throughout 2011, the peak discharge decreased in all 12 runoff events between E042.1 and E050.1, with an average decrease of 48% (Table 3.2-6). On average for the events sampled throughout the hydrograph (excluding September 15 and October 2), the runoff volume was 9.0 and 9.6 acre-feet for E042.1 and E050.1, respectively (Table 3.2-8), an average relative percent increase of 4%. This increase may have resulted from runoff in a local tributary between E042.1 and E050.1.

In addition to examining coinciding sampling events, performance of the weir and upstream sediment retention basins can be assessed by examining overall statistics for 2011. Figure 3-3.3 shows box and whisker plots for E042.1 and E050.1 for both SSC and peak discharge. These plots show major reductions in SSC and smaller reductions in peak discharge; thus, the weir is performing well.

4.0 ANALYTICAL RESULTS

Appendix B contains all analytical results obtained from stormwater runoff samples collected in the LA/P watershed during 2011. Data packages for these analyses are included on a DVD accompanying this report.

4.1 Data Exceptions

Stormwater samples collected at E109.9 on July 22, July 28, and August 3 could not be analyzed as liquid samples. The sediment concentrations were great enough that samples were analyzed as having solid matrix using solid sample preparation methods and solid sample analytical techniques. These solid matrix analytical results are presented separately from other stormwater analytical results in Appendix B.

The first storm introducing ash from the Las Conchas fire into upper Los Alamos Canyon occurred on August 22. Samples collected at E026, E030, E042.1, and E050.1 from August 22 to the end of the monitoring period contained elevated SSC that included an ash component. Additionally, the samples collected at E059 during 2011 contained high SSC. The analytical laboratory analyzed these samples containing high SSC with varying degrees of success. When the SSC was over 5000 mg/L and analytical techniques were not adjusted appropriately to compensate for the increased solid component, americium-241, isotopic plutonium, and isotopic uranium activities were underreported. This underreporting of radionuclide results affects samples collected at E026 on September 4; E030 on August 22 and September 4; E042.1 on September 7; E050.1 on August 22, September 4, and September 7; E059 on August 19 and August 21; and E109.9 on August 26, September 7, and September 10.

Discharge measurements during sampling at E109.9 on August 22 were not recorded by either the bubbler or encoder. As a result, peak discharge was estimated from recorded camera images. However, the camera was not operational until sampling was completed. The hydrograph shown in Figure 3.2-2 at E109.9 occurs after sample collection. No association can be made between discharge and the samples collected during this storm at E109.9.

The sample preparation method used for inductively coupled plasma optical emission spectroscopy and mass spectroscopy, U.S. Environmental Protection Agency (EPA) Method 200.2, for TAL metals (excluding mercury) applies only to samples containing less than 1% suspended solid material, or 10,000 mg/L SSC. Several samples prepared by EPA Method 200.2 exceeded this 1% solid maximum so provide unreliable estimates of constituent concentration. Samples containing greater than 1% suspended sediment were collected at E026 on September 4; E030 on August 22, September 4, and October 2; E042.1 on August 22, September 4, September 7, October 2 and October 4; E050.1 on August 22; E059 on August 19; and E109.9 on August 5, August 22, August 26, September 7, and September 10. Regression plots of analyte concentration versus SSC indicate that analyte concentrations are underreported in these samples as well as in samples with SSC between 5000 mg/L and 10,000 mg/L.

4.2 Analytes Exceeding Comparison Values

As explained in the IMWP, several actions were taken as part of an interim measure under Section VII.B of the Consent Order to mitigate transport of contaminated sediments in the LA/P watershed (LANL 2008, 101714). The analytical results from monitoring are presented and evaluated within this context. The mitigation actions were not undertaken with the objective of reducing concentrations of water-borne contaminants to specific levels, and the analytical results are therefore not compared with water-quality standards or other criteria for that purpose or to evaluate compliance with regulatory requirements. For this report, monitoring results are compared with water-quality standards to narrow the list of specific constituents for conceptual model discussions in this report and to provide a basis for potential future revisions to the analytical suites. The New Mexico Water Quality Control Commission (NMWQCC) Standards for Interstate and Intrastate Surface Waters (New Mexico Administrative Code 20.6.4) establish surface water standards for New Mexico. The NMWQCC classifies all surface water within the Laboratory boundary with segment-specific designated uses. The LA/P stream segments are classified as ephemeral or intermittent, with designated uses of limited aquatic life, livestock watering, wildlife habitat, and secondary contact. Some of the standards are for total concentrations, which are compared with data from unfiltered surface water samples. Other standards are for dissolved concentrations, which are compared with data from filtered samples. Table 4.2-1 presents the NMWQCC standards that were used as numeric values for comparison with monitoring results for the purposes stated above. When chemicals have comparison values for multiple designated uses, the smallest value was selected to compare with analytical results. Table 4.2-2 presents the comparison of detected analytical results from 2011 with the standards in Table 4.2-1. Analytical constituents most frequently detected above these comparison values are total PCBs, total cyanide, dioxins and furans, and gross alpha. Table 4.2-3 presents a summary of analytes detected above the comparison values, and the distribution and sources of these analytes are discussed below.

Aluminum was detected above the comparison value of 658 µg/L in 19% of the filtered samples analyzed in 2011, with a maximum result of 1770 µg/L from E042.1. Aluminum is a natural component of soil and is not known to be derived from Laboratory operations in any significant quantity and is also elevated above 658 µg/L in background areas on the Pajarito Plateau (LANL 2009, 108621; LANL 2010, 111232; LANL 2011, 207072). Therefore, most or all of this aluminum may be naturally occurring.

Arsenic was detected above the comparison value of 9 µg/L in a single filtered sample analyzed in 2011, at 10.1 µg/L from E109.9. Similarly, arsenic was only detected above 9 µg/L at E109.9 in the stormwater samples collected in 2010 (LANL 2011, 207072). The absence of arsenic above 9 µg/L in the LA/P watershed closer to Laboratory sources indicates this arsenic is probably derived from natural sources in the Guaje Canyon watershed.

Copper was detected above the comparison value of 4.3 µg/L in 14% of the filtered samples analyzed in 2011, with a maximum result of 10.2 µg/L from E038 near the head of DP Canyon. Half the results above 4.3 µg/L were from E038, and the remaining results were from single samples at three stations downstream in DP and Los Alamos Canyons. This spatial distribution indicates a source for the copper in runoff from the Los Alamos townsite, which is consistent with studies from other urban areas (Breault and Granato 2000, 082310).

Manganese was detected above the comparison value of 2000 µg/L in 21% of the filtered samples analyzed in 2011, with a maximum result of 4500 µg/L from E030. All results above 2000 µg/L were obtained from Los Alamos Canyon stations, including a result of 3990 µg/L from E026 upstream from Laboratory sources. No samples collected in 2010 had manganese above 2000 µg/L (LANL 2011, 207072), and these data indicate a source for the manganese in the Las Conchas burn area. Similarly, analyses of ash, sediment, and stormwater after the Cerro Grande fire indicated that elevated manganese had a source in the Cerro Grande burn area (Katzman et al. 2001, 072660; Kraig et al. 2002, 085536; Gallaher and Koch 2004, 088747; LANL 2004, 087390).

Mercury was detected above the comparison value of 0.77 µg/L in a single unfiltered sample analyzed in 2011, at 2.6 µg/L from E030, in Los Alamos Canyon above DP Canyon. Mercury was also detected above 0.77 µg/L from E030 in 2010 (LANL 2011, 207072). Previous sediment investigations indicated the presence of low concentrations of mercury in this part of Los Alamos Canyon that may have been derived from TA-21 (LANL 2004, 087390).

Selenium was detected above the comparison value of 5 µg/L in 17% of the unfiltered samples analyzed in 2011, with a maximum result of 17.4 µg/L from E042.1. All results above 5 µg/L were obtained from Los Alamos Canyon stations, including a result of 6.9 µg/L from E026 upstream from Laboratory sources. No samples collected in 2010 had selenium above 5 µg/L (LANL 2011, 207072), and these data indicate a source for the selenium in the Las Conchas burn area. Similarly, analyses of ash, sediment, and stormwater after the Cerro Grande fire indicated that elevated selenium had a source in the Cerro Grande burn area (Kraig et al. 2002, 085536; Gallaher and Koch 2004, 088747; LANL 2004, 087390).

Total cyanide was detected above the comparison value of 5.2 µg/L in 83% of the unfiltered samples analyzed in 2011, with a maximum result of 168 µg/L from E109.9. Both samples from E026, upstream of Laboratory sources, had total cyanide above 5.2 µg/L, at 41.3 µg/L and 47.7 µg/L, indicating a source in the Las Conchas burn area. Similarly, analyses of sediment and stormwater after the Cerro Grande fire indicated that elevated cyanide had a source in the Cerro Grande burn area (Gallaher and Koch 2004, 088747; LANL 2004, 087390).

Dioxin and furan congeners were detected in 89% of the samples analyzed in 2011, and these results were converted to concentrations equivalent in toxicity (toxic equivalency quotients [TEQs]) to 2,3,7,8-tetrachlorodibenzodioxin (2,3,7,8-TCDD) for comparison with the NMWQCC standard. The TEQs were calculated using the toxicity equivalency factors (TEFs) presented in Table 4.2-4 (Van den Berg et al. 2006, 106990). The detected concentration of each congener was multiplied by its TEF, and these products were summed for each detected congener to obtain the TEQ for a sample. The TEQs for each sample analyzed for dioxins and furans are presented in Table 4.2-5, and range over 3 orders of magnitude (4.1×10^{-8} to 4.0×10^{-5} µg/L). The comparison value of 5.1×10^{-8} µg/L was exceeded in 83% of the samples, and the data indicate multiple sources for dioxins and furans throughout the LA/P watershed. The maximum calculated TEQ was 4.0×10^{-5} µg/L from E042.1 and E059, indicating sources in both upper Los Alamos and Pueblo Canyons. The maximum calculated TEQ at E026 in 2011 (1.7×10^{-5} µg/L), in Los Alamos Canyon upstream from Laboratory sources, is similar to that measured at other stations and indicates a natural source for elevated dioxins and furans in the Las Conchas burn area. Lower concentrations, up to 1.5×10^{-6} µg/L, were measured at E038 in upper DP Canyon, indicating a partial source in runoff from the Los Alamos townsite.

PCBs were detected above the comparison value of 6.4×10^{-4} µg/L in all of the unfiltered samples analyzed in 2011, with a maximum result of 9.07 µg/L from station C0111041 in the drainage below SWMU 01-001(f), a known PCB source, and above the associated detention basins. Results at E026, upstream from Laboratory sources, were as high as 0.295 µg/L on August 22 and indicate a source for PCBs in the Las Conchas burn area. The maximum result at E109.9 was similar, 0.302 µg/L, and was from a runoff event in Guaje Canyon on August 26 that was also derived from the Las Conchas burn area. The source of the PCBs in the Las Conchas burn area is atmospheric fallout. Results above 0.302 µg/L were obtained from four samples from the main stream channel of upper Los Alamos Canyon (0.34 µg/L to 0.953 µg/L, stations E030, E042.1, and E050.1) and probably indicate some remobilization of PCBs previously documented in sediment deposits along the channel (LANL 2004, 087390). The one sample in Pueblo Canyon analyzed for PCBs in 2011 had the second highest result in the 2011 samples, 1.72 µg/L at E059. Lower concentrations were measured in DP Canyon, with a maximum of 0.101 µg/L at E038 and indicate a Los Alamos townsite source. The PCBs in Los Alamos and Pueblo Canyons measured in 2011 therefore have a combination of sources from Laboratory sites, the Los Alamos townsite, and atmospheric fallout.

Gross alpha was detected above the comparison value of 15 pCi/L in 80% of the unfiltered samples analyzed in 2011, with a maximum result of 5140 pCi/L from E109.9 on August 5. This runoff event was from Guaje Canyon and was derived from the Las Conchas burn area. Results of 2190 pCi/L and

3790 pCi/L were also obtained from E026, in Los Alamos Canyon upstream from Laboratory sources, and also represent runoff from the Las Conchas burn area. These data indicate primarily natural sources for the gross alpha measured in the 2011 stormwater samples, which is consistent with previous data from the Pajarito Plateau (LANL 2009, 108621; LANL 2010, 111232; LANL 2011, 207316).

The NMWQCC standard for radium is for the sum of radium-226 and radium-228, and the comparison value of 30 pCi/L was exceeded by 35% of the unfiltered samples analyzed in 2011. The maximum result of 109 pCi/L was from E109.9 on August 22, in a runoff event originating in Guaje Canyon. These data indicate primarily natural sources for the radium measured in the 2011 stormwater samples, which is consistent with previous results showing radium-226 and radium-228 above 30 pCi/L in background areas on the Pajarito Plateau (LANL 2011, 207316).

In summary, of the 11 analytes that have one or more results above comparison values in the 2011 stormwater samples, only 1, total PCBs, has an inferred primary source at Laboratory sites and detectable off-site transport. Therefore, the transport of PCBs is an appropriate focus for evaluation of the performance of the sediment transport mitigation actions in the LA/P watershed.

4.3 Detected Radionuclides with Known Laboratory Sources

Most radionuclides do not have standards, but several have known Laboratory sources in the LA/P watershed and are potentially important for performance monitoring. Table 4.3-1 presents a summary of where these radionuclides were detected in the 2011 stormwater samples and their inferred primary sources, and Figure 4.3-1 plots these concentrations as a function of distance from the Rio Grande. The distribution and sources of these analytes are discussed below. Some of the data for most of these radionuclides (all except cesium-137 and strontium-90) are affected by sample preparation issues that were discussed in section 4.1, resulting in underreporting of concentrations.

Americium-241 has its maximum detected result at E042.1, in Los Alamos Canyon above the low-head weir, which is consistent with a known source at TA-21 into DP Canyon (LANL 2004, 087390). Additional known Laboratory sources at TA-1 and TA-45 in upper Los Alamos Canyon and Acid Canyon probably account for some lower concentrations at E030 and E059. Concentrations are much lower at E050.1, below the weir, than at E042.1, suggesting that most of the americium-241 in upper Los Alamos Canyon settled out in the retention basins above the weir, although the E050.1 results are probably in part underreported. Two results at E109.9 in lower Los Alamos Canyon are higher than detected at E050.1: 5.95 pCi/L on August 5 and 13.6 pCi/L on August 22, compared with a maximum of 1.32 pCi/L at E050.1. The August 22 sample was collected about 55 min after the peak discharge at E050.1 and probably represents the arrival of runoff from upper Los Alamos Canyon. In contrast, the August 5 event had a source in Guaje Canyon in the Las Conchas burn area, suggesting a source in Las Conchas ash. Americium-241 was also elevated in stormwater samples collected in Guaje and Rendija Canyons in 2000 that contained ash from the Cerro Grande burn area (Gallaher and Koch 2004, 088747).

Cesium-137 was only detected at E042.1 and E050.1 and had a maximum result at E042.1. These results are consistent with a known source at TA-21 into DP Canyon (LANL 2004, 087390). The absence of cesium-137 detects in DP Canyon below the GCS, at E039.1, indicates the cesium-137 is probably derived from the erosion of post-1942 sediment deposits downstream from the GCS within DP or Los Alamos Canyons. The absence of cesium-137 detects in E026 and E109.9 stormwater samples, which had a source in the Las Conchas burn area, indicates that ash from the burn area is not a significant source of cesium-137. This contrasts with results after the Cerro Grande fire, when cesium-137 was elevated in ash-bearing sediment and stormwater samples (Katzman et al. 2001, 072660; Kraig et al. 2002, 085536; Gallaher and Koch 2004, 088747; LANL 2004, 087390).

Plutonium-238 was detected only at E042.1, E050.1, and E109.9 and had a maximum result at E109.9. These results are consistent with a known source at TA-21 into DP Canyon (LANL 2004, 087390). The detected result at E109.9 was in a sample of runoff from August 22 where americium-241 was also elevated and probably represents the arrival of runoff from upper Los Alamos Canyon. Concentrations are much lower at E050.1, below the weir, than at E042.1, suggesting most of the plutonium-238 in upper Los Alamos Canyon settled out in the retention basins above the weir, although some of the E050.1 results are probably underreported.

Plutonium-239/240 had a maximum result at E042.1, consistent with known releases upcanyon in TA-21 and TA-01 (LANL 2004, 087390). As with americium-241 and plutonium-238, concentrations are much lower at E050.1, below the weir, than at E042.1, suggesting most of the plutonium-239/240 in upper Los Alamos Canyon settled out in the retention basins above the weir, although some of the E050.1 results are probably underreported. The highest detected result at E109.9 was in a sample of runoff from August 22 where americium-241 and plutonium-238 were also elevated and probably represents the arrival of runoff from upper Los Alamos Canyon. The only other detected result at E109.9 was in a sample collected on August 5 where americium-241 is also elevated. The August 5 runoff event had a source in the Las Conchas burn area in Guaje Canyon, and similar concentrations of plutonium-239/240 were detected in stormwater samples collected in Guaje and Rendija Canyons in 2000 that contained ash from the Cerro Grande burn area (10 pCi/L to 20 pCi/L in 2000 compared with 16.9 pCi/L on August 5, 2011) (Gallaher and Koch 2004, 088747).

Strontium-90 had a maximum result, 46.6 pCi/L, at E109.9 in a sample of stormwater that was derived from the Las Conchas burn area in Guaje Canyon. Strontium-90 was also elevated in fire-affected samples from E026, upstream from Laboratory sources, with detected concentrations up to 31.7 pCi/L. Similar concentrations were measured at the other fire-affected stations in upper Los Alamos Canyon (E030, E042.1, and E050.1), indicating the primary source for the strontium-90 measured in 2011 is ash from the burn area. This finding is consistent with results after the Cerro Grande fire, when strontium-90 was detected at up to 90 pCi/L in Guaje and Rendija Canyons (Gallaher and Koch 2004, 088747).

Uranium-234, uranium-235/236, and uranium-238 have very similar distributions in the 2011 stormwater samples, with the highest concentrations measured in samples with high SSC from E042.1 or E109.9. As discussed in section 4.4, strong positive correlations occur between the concentration of these uranium isotopes and SSC throughout the LA/P watershed, indicating most or all of the uranium in the 2011 stormwater samples is naturally occurring. This finding is consistent with results from sediment investigations in the LA/P watershed that indicate small releases of uranium in the watershed and limited downstream transport from the sources (LANL 2004, 087390).

In summary, four radionuclides detected in the 2011 LA/P stormwater samples have inferred primary sources at Laboratory sites and are an appropriate focus for evaluation of the performance of the sediment transport mitigation actions in the watershed: americium-241, cesium-137, plutonium-238, and plutonium-239/240. Historically, cesium-137 in upper Los Alamos Canyon and plutonium-239/240 in Pueblo Canyon have been determined to be the most important radionuclides in sediment for evaluating potential Laboratory impacts (LANL 2004, 087390). Unfortunately, the 2011 data for americium-241, plutonium-238, and plutonium-239/240 are affected by sample preparation issues associated with high ash and sediment concentrations after the Las Conchas fire, which affect the utility of these data.

4.4 Relationships between Discharge, SSC, and Contaminant Concentrations

Discharge was calculated from stage height using a rating curve, which is the relationship between discharge in cubic feet per second and height of the water in feet, developed for each individual gage.

Stage height was measured at 5-min intervals, logged continuously during each sampled storm event. SSC was measured up to 22 times at E026, E038, E039.1, E042.1, E050.1, E059, and E060.1 during the first 290 min of each storm. SSC was measured up to 18 times at E109.9 during the first 190 min of each storm. At other gages, SSC was measured immediately before and following sampling for inorganic and organic chemicals and radionuclides.

SSC and instantaneous discharge estimates were calculated for each sample using a linear relationship between the two corresponding analytically determined SSCs or the two corresponding discharge measurements, as follows

$$y = mx+b, \qquad \textbf{Equation 4.4-1}$$

where *y* = the calculated SSC or discharge at the time of sample collection,

m = the slope of the line,

x = the time differential in minutes between SSC sample collection or discharge measurements, and

b = the concentration of analytically determined sediment before sample analyses or corresponding discharge measurements.

The slope *m* is determined by dividing the difference in SSC or discharge by the difference in time, in minutes, between SSC sample collection or discharge measurements before and after analytical sample collection . Using this equation, SSC and instantaneous discharge were calculated for each sample collected. The calculated SSCs and instantaneous discharges are presented in Table 4.4-1.

Relationships between calculated SSC, calculated instantaneous discharge, and analytical results can be used to evaluate sediment transport in the LA/P watershed. This evaluation in turn provides insight into performance of watershed mitigations conducted in the watershed and the usefulness of future monitoring strategies.

Analyte concentrations, including SSC, generally show a poor correlation to instantaneous discharge in stormwater on the Pajarito Plateau (Malmon 2002, 076038; LANL 2011, 207072). The relationship of calculated, instantaneous discharge to SSC in LA/P stormwater samples collected during 2011 is displayed in Figure 4.4-1. Therefore, discharge measurements alone cannot be used to estimate the flux of sediment or associated constituents.

In contrast, SSC is commonly positively correlated with concentrations of inorganic chemicals and radionuclides in unfiltered samples (LANL 2011, 207072). Figure 4.4-2 shows relationships between SSC and the concentrations of 15 frequently detected inorganic chemicals and radionuclides in the LA/P stormwater samples from 2011, excluding sample results with analytical problems identified in section 4.1. Strong positive correlations between SSC and analyte concentrations for samples collected throughout the watershed, such as aluminum, beryllium, uranium-234, and uranium-238, are consistent with naturally occurring constituents. Weak positive correlations can result from the presence of contaminants at one or more locations, indicated as outliers in the data set. For example, poor correlations between SSC and copper and zinc in this data set result from elevated concentrations in a sample collected on July 2 from E038 in upper DP Canyon, which receives runoff from the Los Alamos townsite. Copper and zinc are common contaminants found in urban runoff (Breault and Granato 2000, 082310). Weak positive correlations can also occur when there is local background variability associated with geologic units. For example, geologic units in Guaje Canyon are different from those found in upper Los Alamos and Pueblo Canyons (Griggs and Hem 1964, 092516; Smith et al. 1970, 009752), and stormwater samples collected at E109.9 in lower Los Alamos Canyon can be expected to show some differences from samples collected at the other LA/P gages. In addition, many of the 2011 stormwater samples contain variable percentages of ash from the Las Conchas burn area, and concentrations of analytes such as barium and manganese that are elevated in ash (Katzman et al. 2001, 072660; Kraig et al. 2002, 085536; LANL 2004, 087390) can be expected to show additional variability.

Analytes present as contaminants at significant levels above background will have strong spatial variability and no expected systematic correlations between analyte concentration and SSC in a watershed-scale data set. Two examples from the LA/P watershed, plutonium-239/240 and total PCBs, are shown in Figure 4.4-3 for the 2011 stormwater samples. Correlations may be better at specific gaging stations because the source areas for runoff and associated sediment may be similar between runoff events, although considerable variability still exists in the LA/P data set. As an example, the relationships between plutonium-239/240 and total PCBs to SSC at E050.1 during 2011 are shown in Figure 4.4-4. The relatively poor correlations at this station may be partly associated with different percentages of the flow in each event being derived from the Las Conchas burn area, townsite runoff into DP Canyon, and runoff from other parts of the upper Los Alamos Canyon watershed. In addition, much of the contaminant load is probably derived from erosion of stream bank sediments containing variable concentrations of plutonium-239/240, PCBs, and other analytes, and some variability in contaminant concentrations within events and between events is to be expected.

Because SSC varies widely between samples, it is useful to convert concentrations of inorganic and organic chemicals and radionuclide in stormwater (µg/L or pCi/L) to concentrations in sediment (mg/kg or pCi/g). These calculated sediment concentrations are most useful for analytes that have a strong association with sediment particles, and less useful for analytes such as strontium-90, boron, calcium, and sodium that are present in the dissolved load. However, these calculated sediment concentrations are affected by uncertainties in the calculated SSC for each sample, and are expected to differ from direct analyses of sediment separated from these samples. Excluding sample results with analytical problems identified in Section 4.1, Table 4.4-2 presents the calculated sediment concentrations of inorganic chemicals, Table 4.4-3 presents concentrations for radionuclides, and Table 4.4-4 presents concentrations for total PCBs. Tables 4.4-2 and 4.4-3 include the Laboratory's sediment background values (BVs) (LANL 1998, 059730) for comparison, although these comparisons are affected by particle-size effects. Specifically, the background sediment samples used to develop the BVs have relatively low silt and clay content (McDonald et al. 2003, 076084), and concentrations of many analytes may be higher in stormwater samples with higher silt and clay content. For example, the highest calculated concentrations of total PCBs in the 2011 samples from the LA/P gages are in samples from E050.1 that have very low SSC (0.1 mg/kg to 0.5 mg/kg total PCBs in samples with 300 mg/L to 800 mg/L suspended sediment), as shown in Figure 4.4-5. These were samples on recessional limbs of hydrographs that probably had high percentages of clay in suspension, and that were probably associated with relatively little mass transport.

At E042.1 on August 22, high SSC prevented the 24-bottle sampler from collecting stormwater during peak discharge. Thus, the extrapolated SSC was underestimated for samples collected for chemical analyses shortly after the peak using the 12-bottle sampler, resulting in overestimates of concentrations of inorganic chemicals and radionuclides in the entrained sediment. To better represent SSC during sample collection near the peak, it was estimated using the observed concentration of the four uranium-238 analyses obtained during this runoff event at E042.1. The average calculated uranium-238 concentration in the three later samples collected on August 22 at E042.1 is 6.59 pCi/g. Assuming the same uranium-238 concentration in the sample collected near the August 22 peak, with 400 pCi/L at 14:39, yields a calculated SSC of 60,700 mg/L, not 22,600 mg/L as previously estimated [(400 pCi/L) * (1000 mg/g) / (6.59 pCi/g) = 60,700 mg/L]. This estimate of SSC was applied to each sample collected at

E042.1 on August 22 between 14:21 and 15:28 (Tables 4.4-2 to 4.4-4) and is also used in the calculated sediment yield in Table 3.2-8.

4.5 Stormwater Sampling below SWMU 01-001(f) and in Graduation Canyon

Analytical results for the stormwater sample collected at the inlet to the upper detention basin below the SWMU 01-001(f) drainage on August 19, 2011, represents initial runoff from the hillside. The highest concentration of total PCBs detected in stormwater from the LA/P watershed during 2011, 9.07 µg/L, was measured in this sample. For comparison, during 2010 total PCBs were detected in the upper detention basin at 15.1 µg/L (LANL 2011, 207072). Total PCBs were much lower in the sample collected below the detention basins on October 2, 2011, at 0.0116 µg/L. As discussed in section 2.1, this later sample probably represents runoff in the main Los Alamos Canyon channel that backed up through the culvert. Results from both samples collected at the inlet to the upper detention basin, at location CO111041, and below the lower detention basin, at location CO101038, are presented in Table 4.5-1.

Stormwater samples were collected in Graduation Canyon on October 7 and October 27 at location CO115002. Total PCBs were detected in these samples at 0.00363 µg/L and 0.00673 µg/L, respectively. All analytical results for samples collected from this location are presented in Table 4.5-2.

5.0 CONCLUSIONS

The Los Alamos Canyon watershed experienced a relatively large number of runoff events in 2011, including runoff from the Las Conchas burn area in the upper watersheds of Los Alamos Canyon and Guaje Canyon. Runoff from the burn area had high concentrations of suspended sediment, in part related to entrainment of ash. In contrast, Pueblo Canyon, not affected by the fire, had few runoff events in 2011, and no events from the upper watershed that extended through the length of wetland past the GCS and into lower Los Alamos Canyon. Attenuation of flow and associated sediment transport through this wetland is a primary goal of the sediment transport mitigation activities conducted in Pueblo Canyon, and this part of the watershed performed as intended in 2011.

The 2011 monitoring data in upper Los Alamos Canyon indicate a substantial reduction in SSC as floods passed through the low-head weir and associated sediment retention basins. This structure is therefore performing as designed. In contrast, SSC was much higher at gaging station E109.9 in lower Los Alamos Canyon as a result of floods in Guaje Canyon from the Las Conchas burn area.

In DP Canyon, which primarily receives runoff from the Los Alamos townsite, direct comparison of runoff and sediment yield above and below the GCS and upstream floodplains was possible in one event in 2011, on August 19. A reduction in sediment yield was observed between bounding stations (E038 and E039.1), which is consistent with the intent of activities in this canyon. Decreases in peak discharge between these gages also occurred, indicating attenuation of flood energy.

Analytical data collected from stormwater samples in 2011 indicate that for the 11 analytes exceeding NMWQCC water-quality standards (used as comparison values), only 1, total PCBs, has a recognized source at Laboratory sites and off-site transport. Off-site transport of PCBs in 2011 occurred only in Los Alamos Canyon, and the weir and associated sediment retention basins were effective at substantially reducing this transport. Concentrations of PCBs measured at E109.9 in lower Los Alamos Canyon are similar to those measured in upper Los Alamos Canyon above Laboratory sites, at E026, and are consistent with the transport of PCBs from the Las Conchas burn area down Guaje Canyon. PCBs in the burn area have a source in atmospheric fallout. The transport of radionuclides in stormwater that have a Laboratory source was also substantially reduced by the settling of sediment above the weir. Continued monitoring in 2012 is expected to further confirm the sediment transport mitigation structures and associated wetlands and floodplains in the LA/P watershed are performing as intended.

6.0 REFERENCES AND MAP DATA SOURCES

6.1 References

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority.

Bagnold, R.A., April 1977. "Bed Load Transport by Natural Rivers," *Water Resources Research,* Vol. 13, No. 2, pp. 303–312. (Bagnold 1977, 111753)

Becker, N.M., 1991. "Influence of Hydraulic and Geomorphologic Components of a Semi-Arid Watershed on Depleted Uranium Transport," PhD dissertation, Civil and Environmental Engineering, University of Wisconsin, Madison, Wisconsin. (Becker 1991, 015317)

Breault, R.F., and G.E. Granato, 2000. "A Synopsis of Technical Issues of Concern for Monitoring Trace Elements in Highway and Urban Runoff," U.S. Geological Survey Open-File Report 00-422, Denver, Colorado. (Breault and Granato 2000, 082310)

Dale, M.R., 1996. "Preliminary Assessment of Radionuclide Transport Via Storm-Water Runoff in Los Alamos Canyon, New Mexico," New Mexico Geological Society Guidebook: 47th Field Conference, Jemez Mountains Region, New Mexico, pp. 469–472. (Dale 1996, 958930)

Gallaher, B.M., and R.J. Koch, September 2004. "Cerro Grande Fire Impacts to Water Quality and Stream Flow near Los Alamos National Laboratory: Results of Four Years of Monitoring," Los Alamos National Laboratory report LA-14177, Los Alamos, New Mexico. (Gallaher and Koch 2004, 088747)

Graf, W.L., September 1983. "Downstream Changes in Stream Power in the Henry Mountains, Utah," *Annals of the Association of American Geographers,* Vol. 73, No. 3, pp. 373–387. (Graf 1983, 111754)

Griggs, R.L., and J.D. Hem, 1964. "Geology and Ground-Water Resources of the Los Alamos Area, New Mexico," U.S. Geological Survey Water Supply Paper 1753, Washington, D.C. (Griggs and Hem 1964, 092516)

Huang, H., S. Cheng, J. Wen, and J. Lee, June 30, 2008. "Effect of Growing Watershed Imperviousness on Hydrograph Parameters and Peak Discharge," *Hydrological Processes,* Vol. 22, No. 13, pp. 2075–2085. (Huang et al. 2008, 111755)

Katzman, D., R. Ryti, and S. Reneau, 2001. "Cerro Grande Ash as a Source of Elevated Radionuclides and Metals," in *Water, Watersheds, and Land Use in New Mexico, Impacts of Population Growth on Natural Resources, Santa Fe Region 2001*, New Mexico Bureau of Mines and Mineral Resources, Socorro, New Mexico. (Katzman et al. 2001, 072660)

Kraig, D.H., R. Ryti, D. Katzman, T. Buhl, B. Gallaher, and P. Fresquez, March 2002. "Radiological and Nonradiological Effects After the Cerro Grande Fire," Los Alamos National Laboratory report LA-13914, Los Alamos, New Mexico. (Kraig et al. 2002, 085536)

Lane, L.J., M.H. Nichols, M. Hernandez, C. Manetsch, and W.R. Osterkamp, December 12–16, 1994. "Variability in Discharge, Stream Power, and Particle-Size Distributions in Ephemeral-Stream Channel Systems," in *Variability in Stream Erosion and Sediment Transport*, Proceedings of the Canberra Symposium, December 12–16, 1994, International Association of Hydrological Sciences publication no. 224, pp. 335–342. (Lane et al. 1994, 111757)

LANL (Los Alamos National Laboratory), September 22, 1998. "Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory," Los Alamos National Laboratory document LA-UR-98-4847, Los Alamos, New Mexico. (LANL 1998, 059730)

LANL (Los Alamos National Laboratory), April 2004. "Los Alamos and Pueblo Canyons Investigation Report," Los Alamos National Laboratory document LA-UR-04-2714, Los Alamos, New Mexico. (LANL 2004, 087390)

LANL (Los Alamos National Laboratory), February 2008. "Interim Measure Work Plan to Mitigate Contaminated Sediment Transport in Los Alamos and Pueblo Canyons," Los Alamos National Laboratory document LA-UR-08-1071, Los Alamos, New Mexico. (LANL 2008, 101714)

LANL (Los Alamos National Laboratory), October 2008. "Supplemental Interim Measures Work Plan to Mitigate Contaminated Sediment Transport in Los Alamos and Pueblo Canyons," Los Alamos National Laboratory document LA-UR-08-6588, Los Alamos, New Mexico. (LANL 2008, 105716)

LANL (Los Alamos National Laboratory), September 2009. "Environmental Surveillance at Los Alamos during 2008," Los Alamos National Laboratory report LA-14407-ENV, Los Alamos, New Mexico. (LANL 2009, 108621)

LANL (Los Alamos National Laboratory), September 2010. "Environmental Surveillance at Los Alamos during 2009," Los Alamos National Laboratory report LA-14427-ENV, Los Alamos, New Mexico. (LANL 2010, 111232)

LANL (Los Alamos National Laboratory), March 2011. "2011 Monitoring Plan for Los Alamos and Pueblo Canyons Sediment Transport Mitigation Project," Los Alamos National Laboratory document LA-UR-11-0943, Los Alamos, New Mexico. (LANL 2011, 201578)

LANL (Los Alamos National Laboratory), September 2011. "Stormwater Performance Monitoring in the Los Alamos/Pueblo Watershed During 2010, Revision 1," Los Alamos National Laboratory document LA-UR-11-5459, Los Alamos, New Mexico. (LANL 2011, 207072)

LANL (Los Alamos National Laboratory), September 2011. "Los Alamos National Laboratory Environmental Report 2010," Los Alamos National Laboratory report LA-14445-ENV, Los Alamos, New Mexico. (LANL 2011, 207316)

Malmon, D.V., June 2002. "Sediment Trajectories Through a Semiarid Valley," Ph.D. dissertation, University of California, Santa Barbara, California. (Malmon 2002, 076038)

Malmon, D.V., S.L. Reneau, D. Katzman, A. Lavine, and J. Lyman, 2007. "Suspended Sediment Transport in an Ephemeral Stream Following Wildfire," *Journal of Geophysical Research,* Vol. 112, F02006, 16 pp. (Malmon et al. 2007, 100194)

McDonald, E., R.T. Ryti, S.L. Reneau, and D. Carlson, May 2, 2003. "Natural Background Geochemistry and Statistical Analysis of Sediments, Los Alamos National Laboratory," Los Alamos National Laboratory document LA-UR-03-2661, Los Alamos, New Mexico. (McDonald et al. 2003, 076084)

McKown, B., S.W. Koch, R.G. Balice, and P. Neville, June 2003. "Land Cover Map for the Eastern Jemez Region," Los Alamos National Laboratory report LA-14029, Los Alamos, New Mexico. (McKown et al. 2003, 087150)

Mingguo, Z., C. Qiangguo, and C. Hao, September 2007. "Effect of Vegetation on Runoff-Sediment Yield Relationship at Different Spatial Scales in Hilly Areas of the Loess Plateau, North China," *Acta Ecologica Sinica,* Vol. 27, No. 9, pp. 3572–3581. (Mingguo et al. 2007, 111756)

Nichols, M.H., January 2006. "Measured Sediment Yield Rates from Semiarid Rangeland Watersheds," *Rangeland Ecology and Management,* Vol. 59, No. 1, pp. 55–62. (Nichols 2006, 111758)

NMED (New Mexico Environment Department), May 5, 2009. "Approval with Modifications, Los Alamos Site Monitoring Area 2 (LA-SMA-2) Interim Measure and Monitoring Plan to Mitigate Contaminated Sediment Transport in Los Alamos Canyon," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2009, 105858)

NMED (New Mexico Environment Department), June 3, 2011. "Approval with Modifications, 2011 Monitoring Plan for Los Alamos and Pueblo Canyons Sediment Transport Mitigation Project," New Mexico Environment Department letter to G.J. Rael (DOE-LASO) and M.J. Graham (LANL) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico. (NMED 2011, 203705)

Onodera, S., J. Wakui, H. Morishita, and E. Matsumoto, July 1993. "Seasonal Variation of Sediment Yield on a Gentle Slope in Semi-Arid Region, Tanzania," in *Sediment Problems: Strategies for Monitoring, Prediction and Control*, Proceedings of the Yokohama Symposium, July 1993, International Association of Hydrological Sciences publication no. 217, pp. 29–37. (Onodera et al. 1993, 111759)

Smith, R.L., R.A. Bailey, and C.S. Ross, 1970. "Geologic Map of the Jemez Mountains, New Mexico," U.S. Geological Survey Miscellaneous Investigations Series, Map I-571, Washington, D.C. (Smith et al. 1970, 009752)

Van den Berg, M., L. Birnbaum, M. Denison, M. De Vito, W. Farland, M. Feeley, H. Fiedler, H. Hakansson, A. Hanberg, L. Haws, M. Rose, S. Safe, D. Schrenk, C. Tohyama, A. Tritscher, J. Tuomisto, M. Tysklind, N. Walker, and R.E. Peterson, 2006. "The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds," *Toxicological Sciences,* Vol. 93, No. 2, pp. 223–241. (Van den Berg et al. 2006, 106990)

Weng, Q., December 2001. "Modeling Urban Growth Effects on Surface Runoff with the Integration of Remote Sensing and GIS," *Environmental Management,* Vol. 28, No. 6, pp. 737–748. (Weng 2001, 111760)

6.2 Map Data Sources

Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 29 November 2010.

Summer/Winter rain gage locations and networks; Los Alamos National Laboratory, Environmental Programs; Unpublished 2010 project data, Project 10-0027.

Gage stations; Los Alamos National Laboratory, Environmental Programs; Unpublished 2011 project data, Project 11-0002; locations based on WQDB data pull from January 5, 2011.

Gage drainage areas; Los Alamos National Laboratory, Environmental Programs; Unpublished 2011 project data, Project 11-0002; areas developed using the ArcHydro data model.

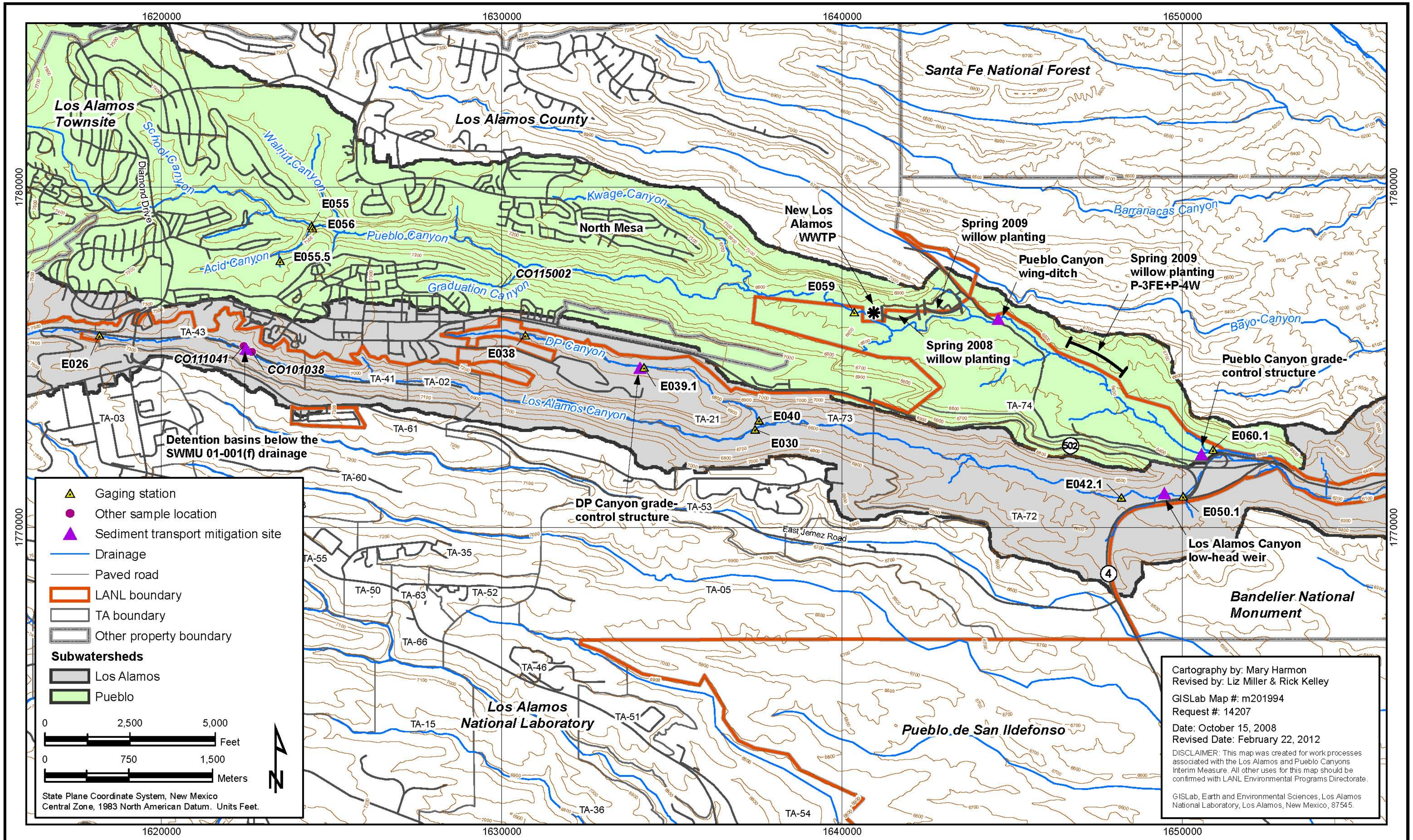


Figure 1.0-1 Los Alamos and Pueblo Canyons showing monitoring locations and sediment transport mitigation sites

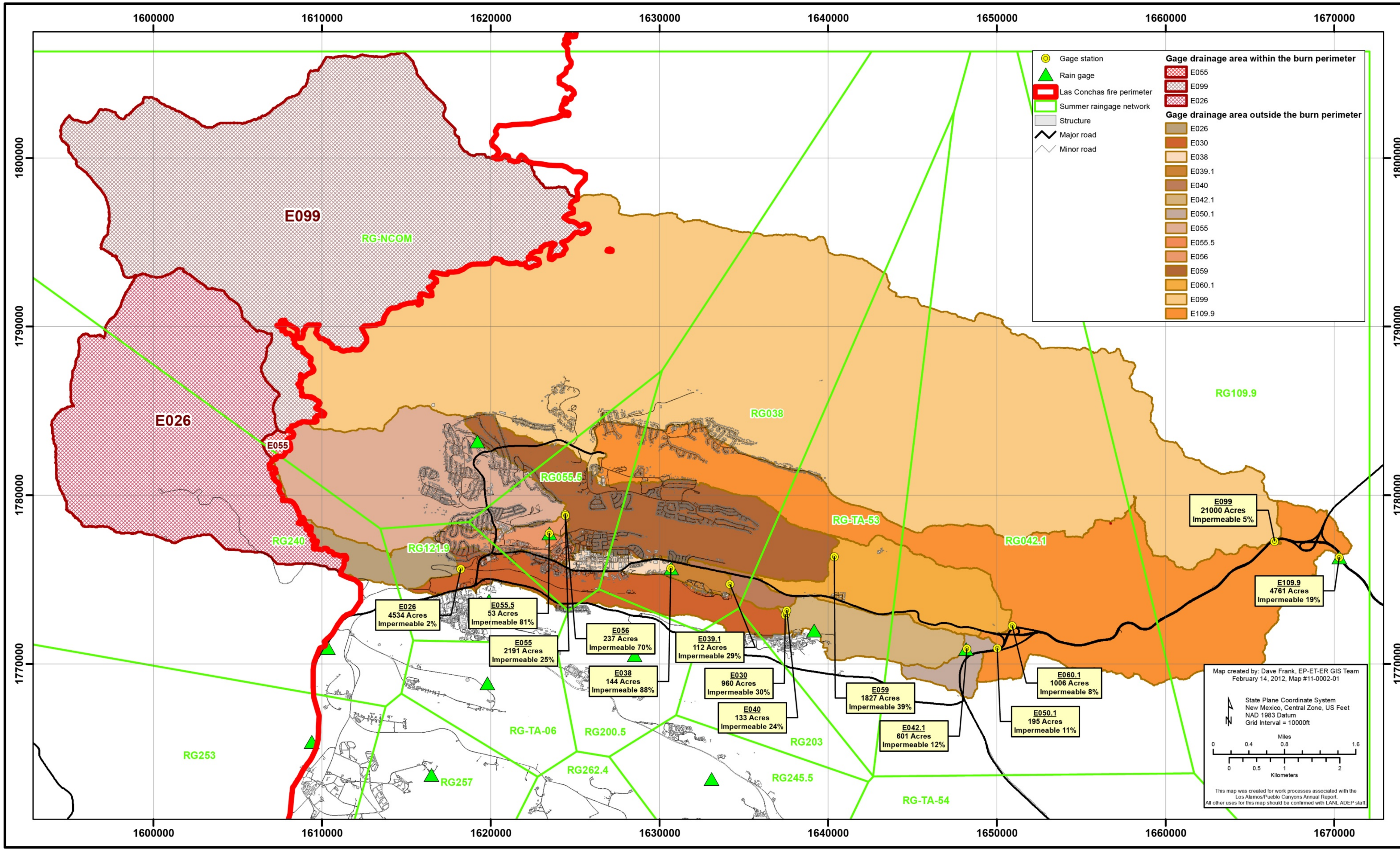


Figure 2.0-1 Los Alamos Canyon watershed showing drainage areas for each stream gage and associated rain gages, Thiessen polygons, and extent of the Las Conchas burn area

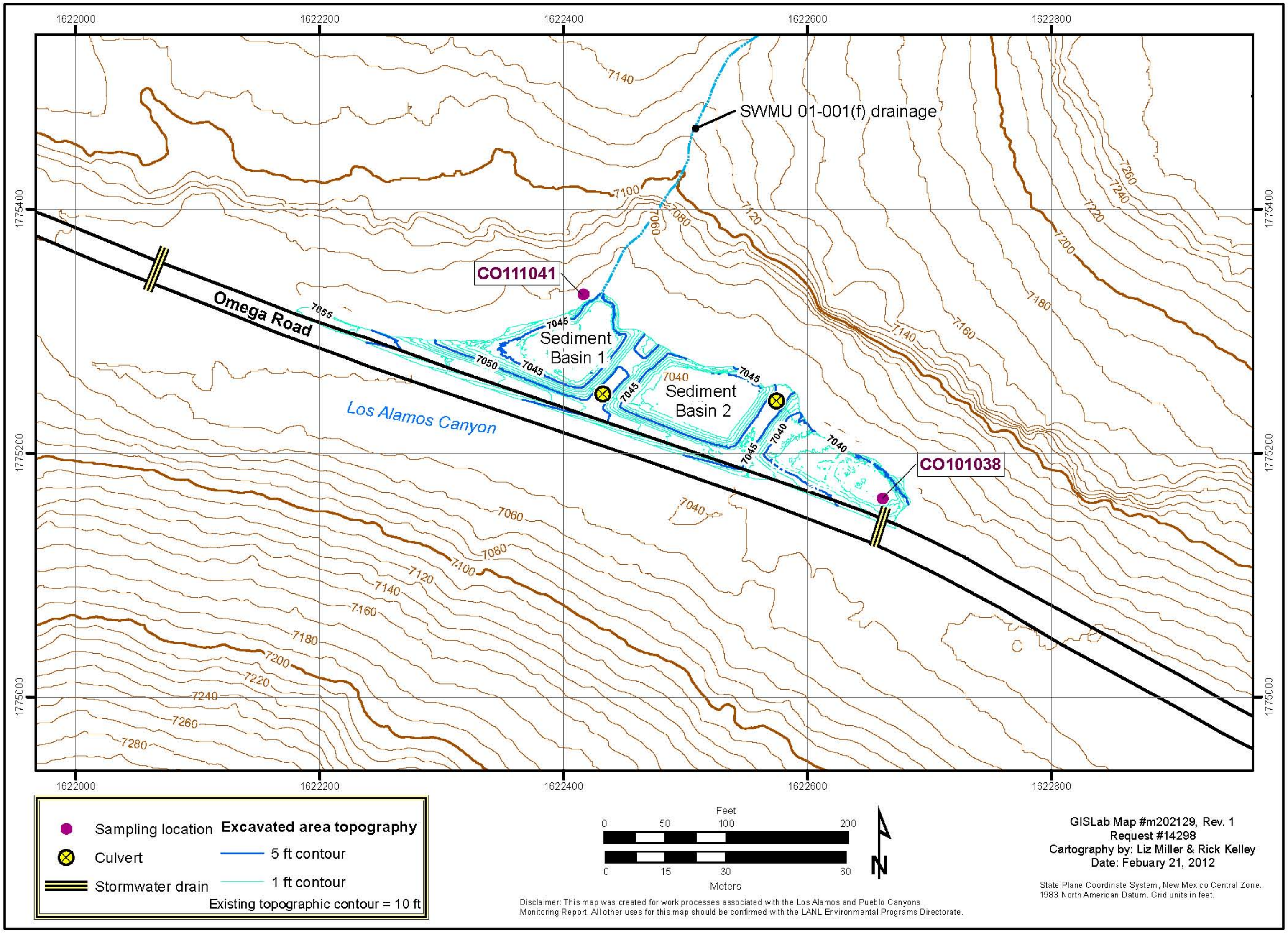


Figure 2.1-1 Sediment detention basins and sampling locations below the SWMU 01-001(f) drainage

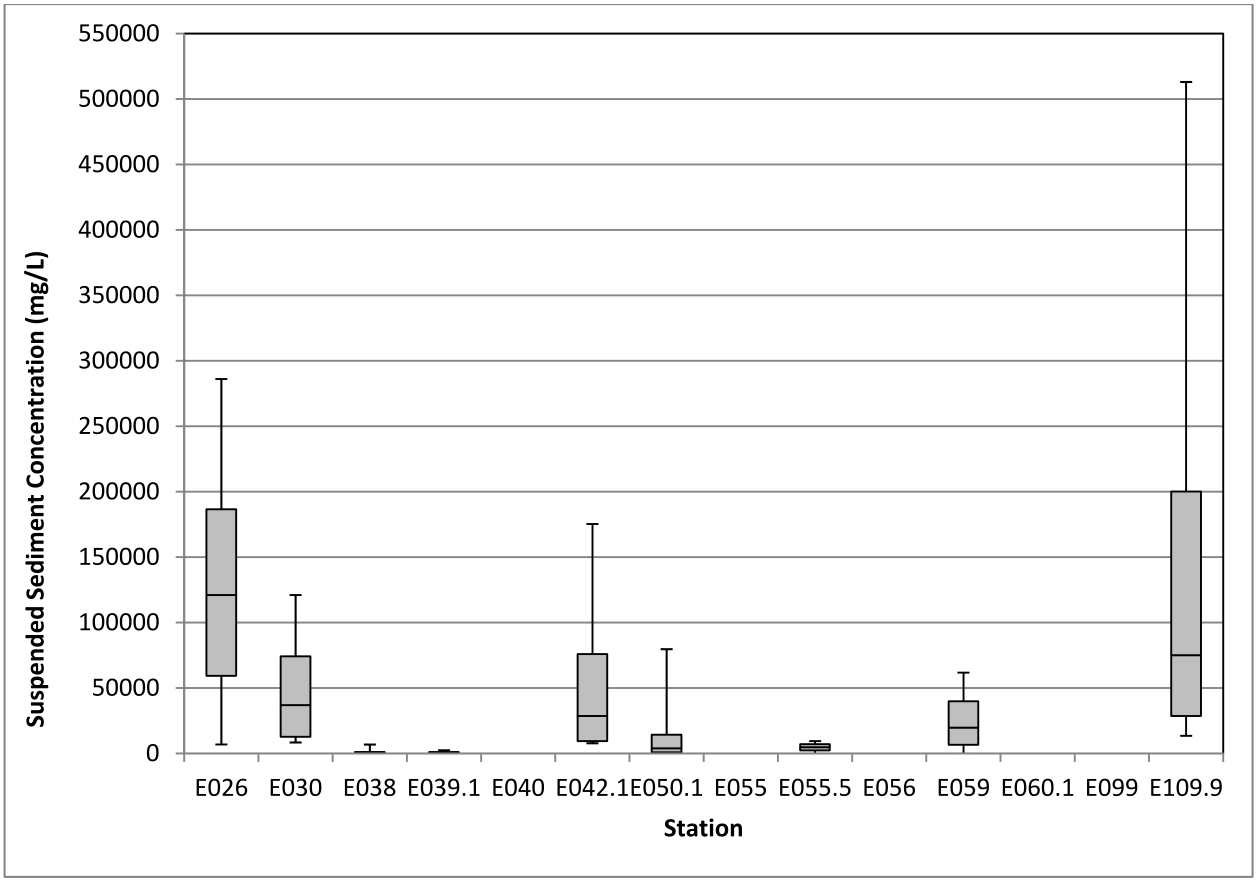


Figure 3.1-1 Box and whisker plot of SSC for each station (no SSC samples were collected at E040, E055, E056, E060.1, or E099). The SSC associated with the sample collected on 8/22 at 14:39 for station E042.1 is estimated based on uranium concentrations collected at three other times during this storm.

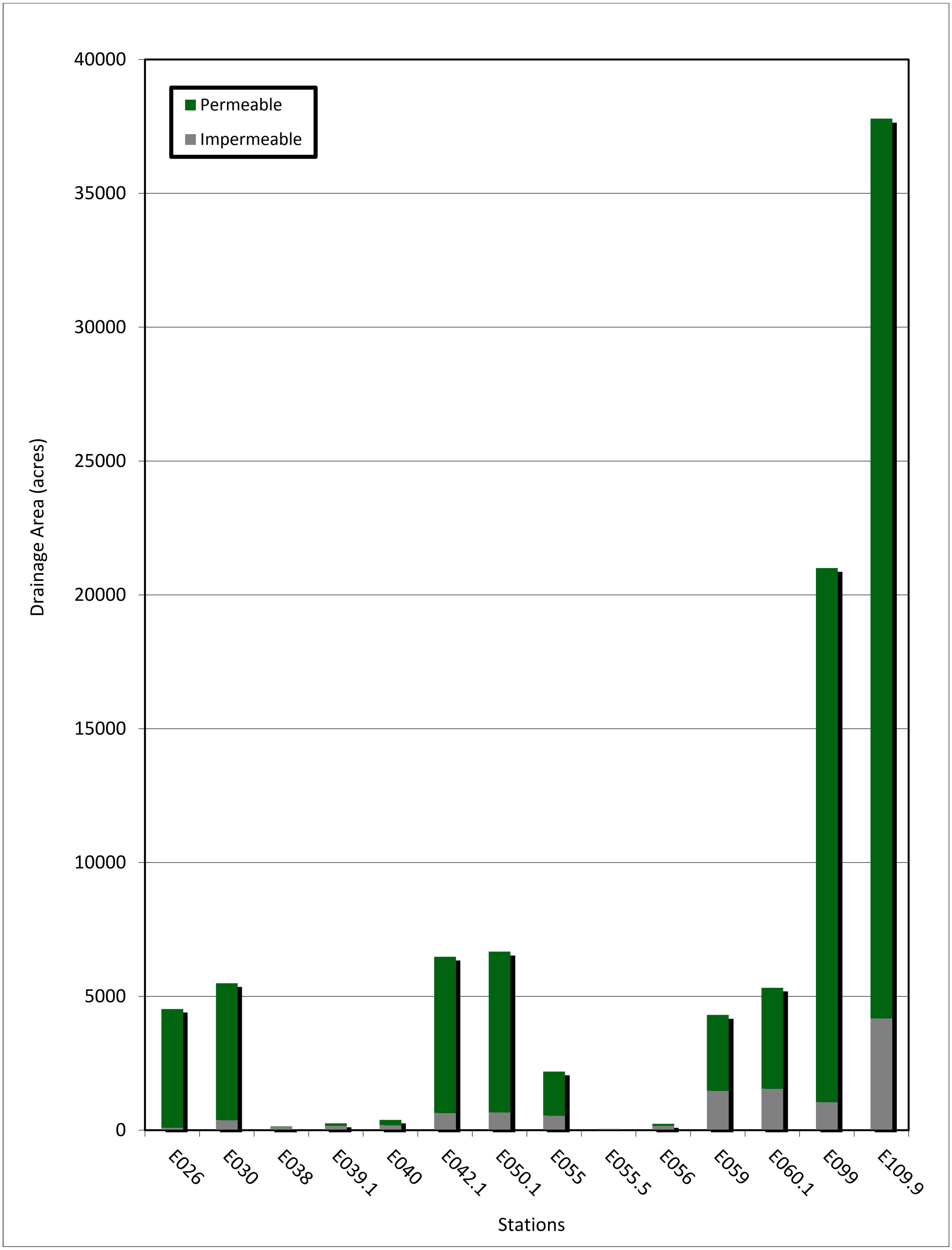


Figure 3.1-2 Cumulative drainage area and fraction of permeable/impermeable area for each LA/P gaging station

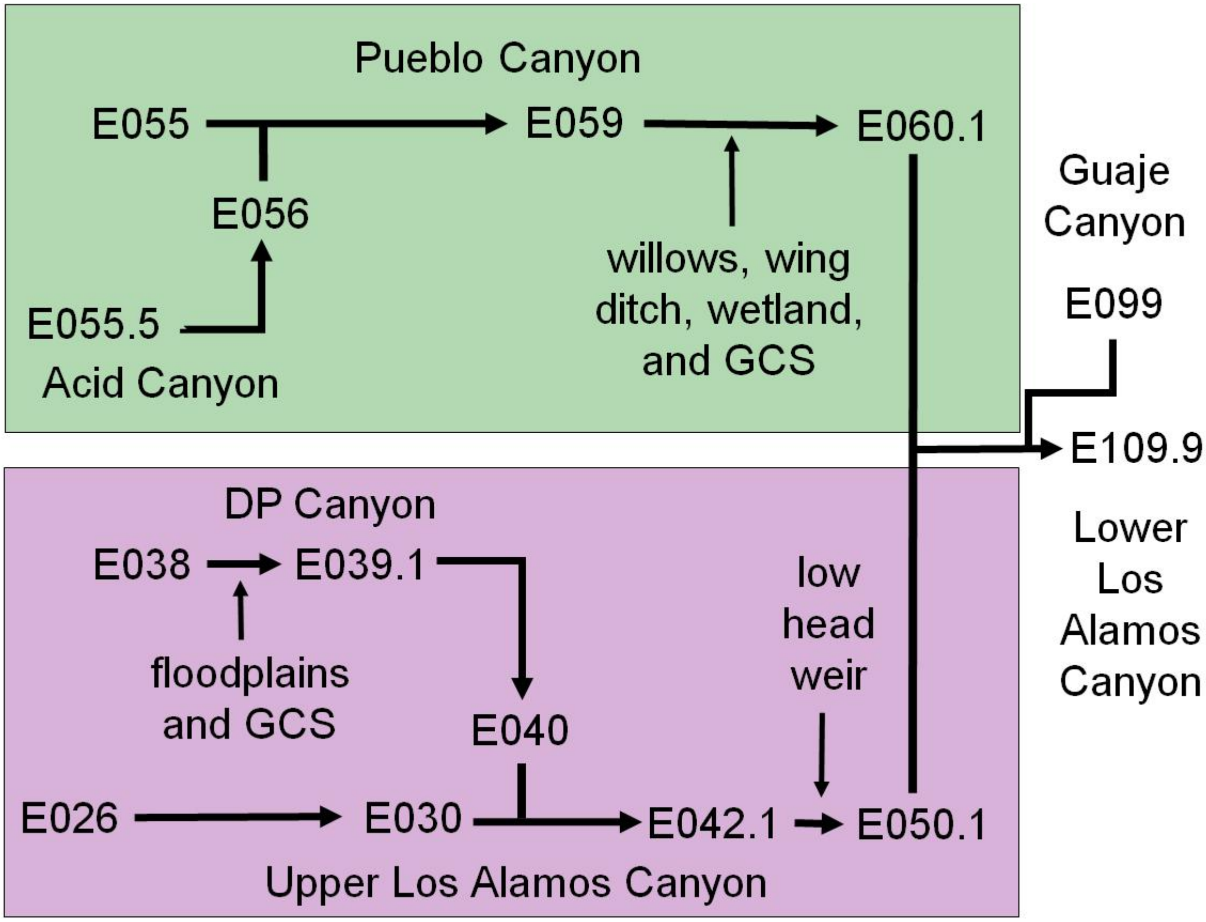
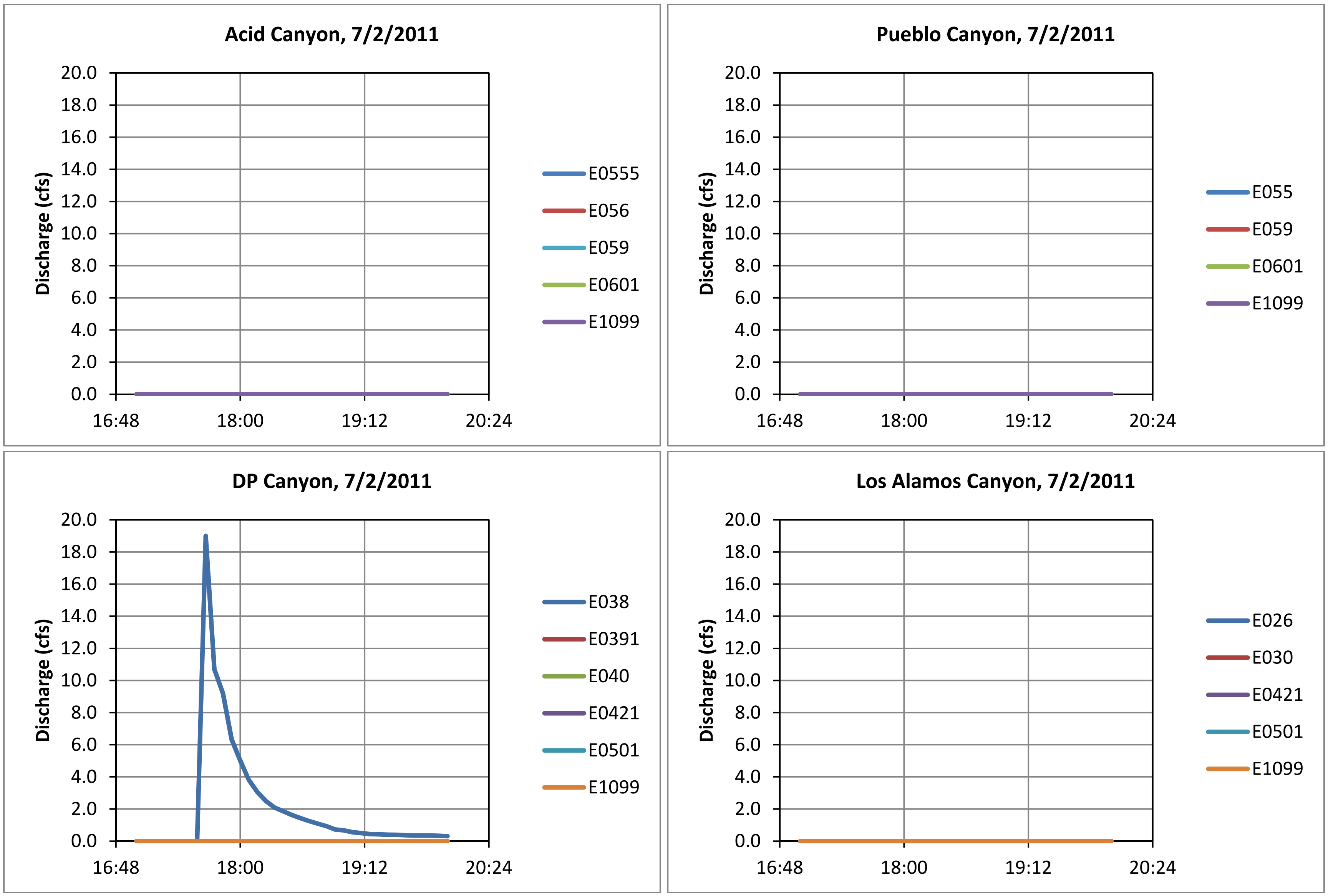
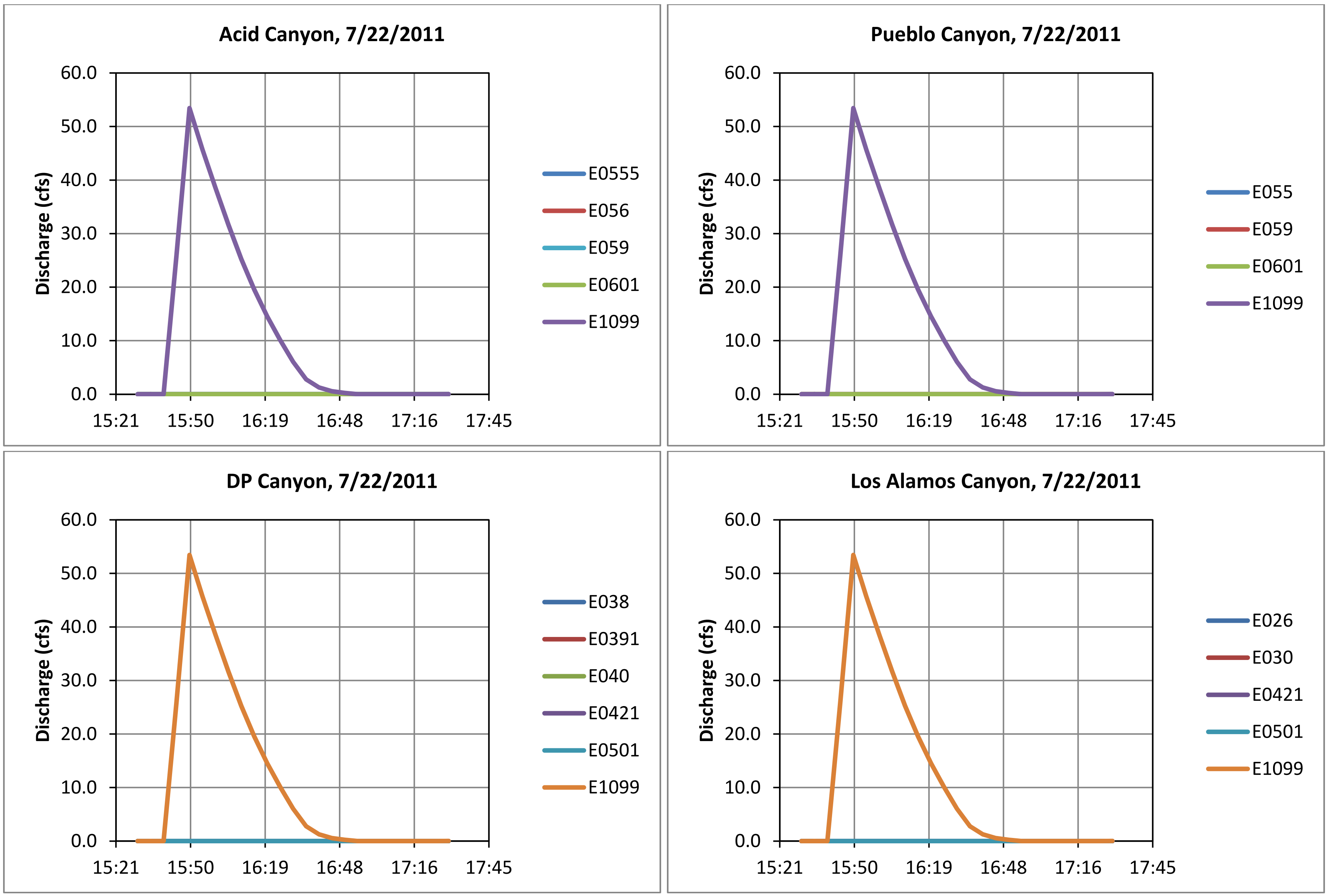


Figure 3.2-1 Flow diagram of gage stations and sediment transport mitigation sites in the LA/P watershed



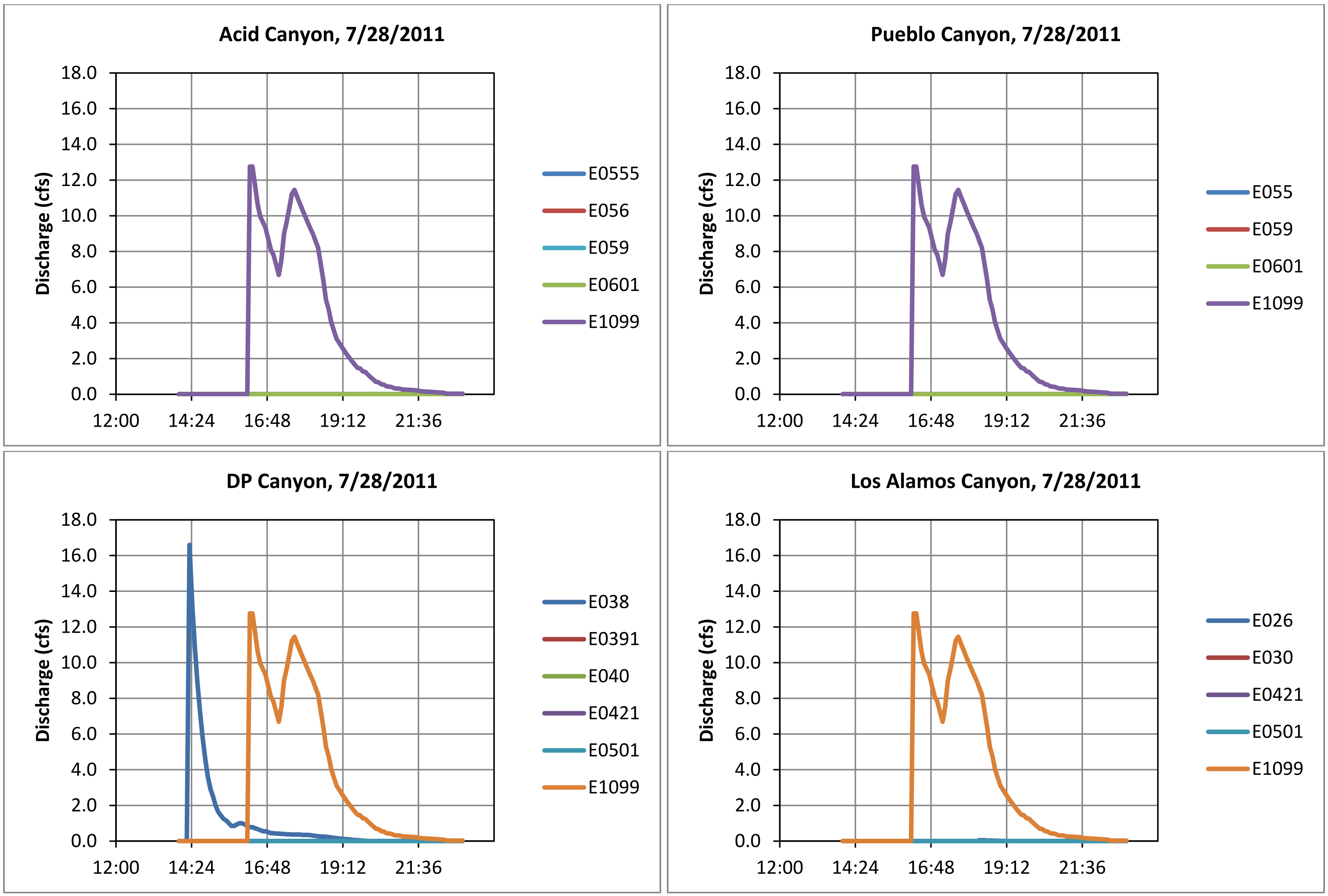
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 Hydrographs during each runoff event for each canyon from upstream to downstream reaches



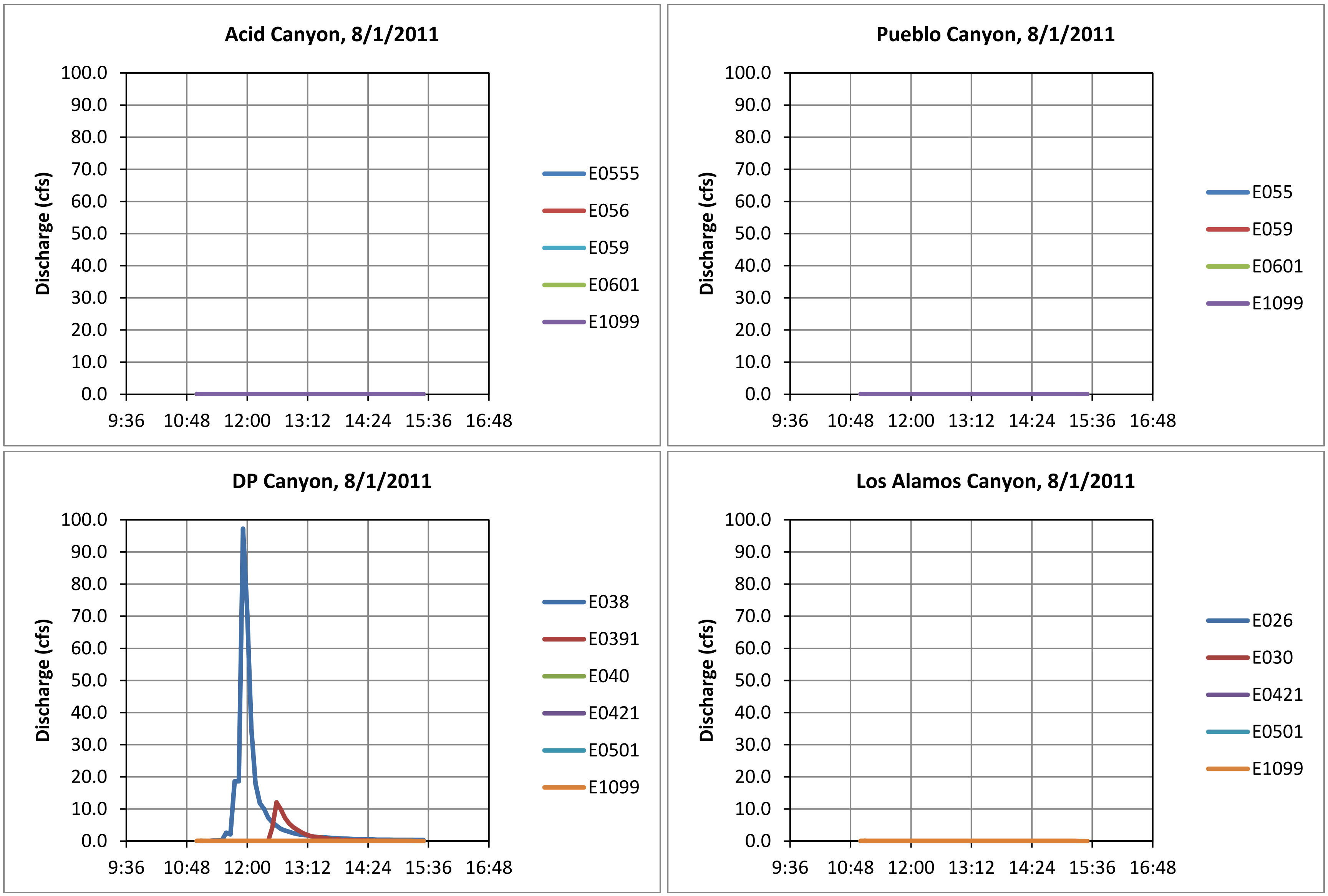
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



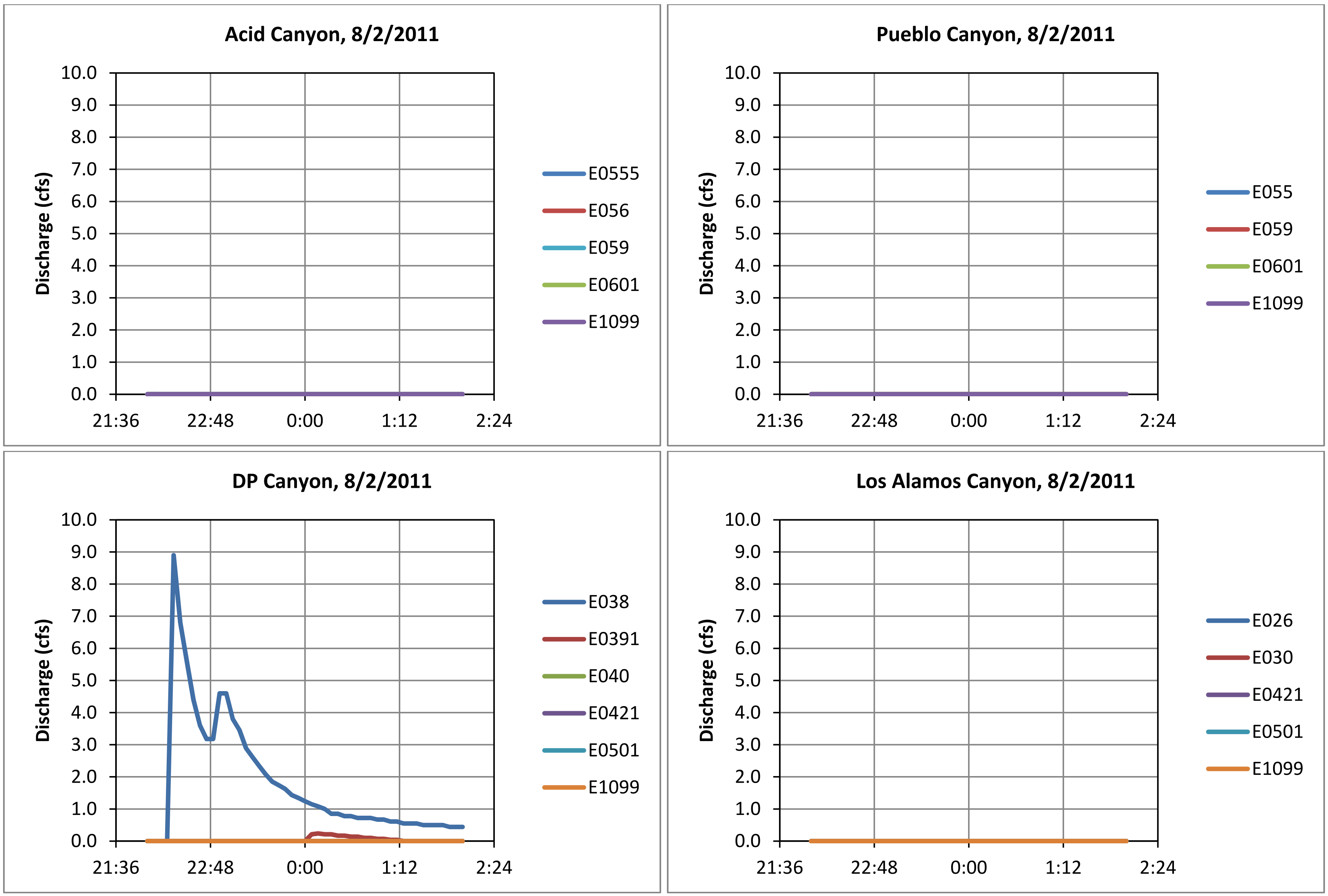
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoffg event for each canyon from upstream to downstream reaches



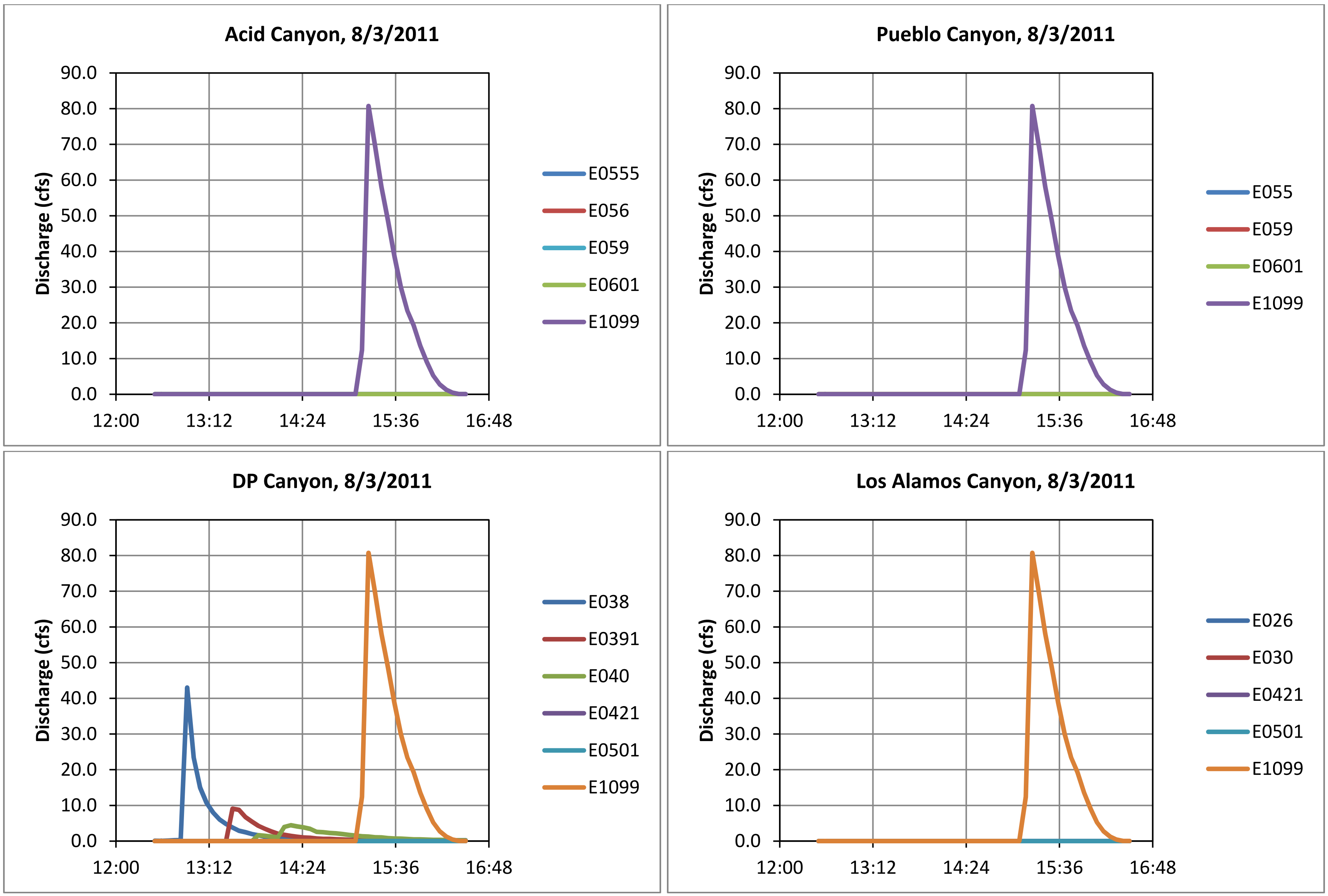
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



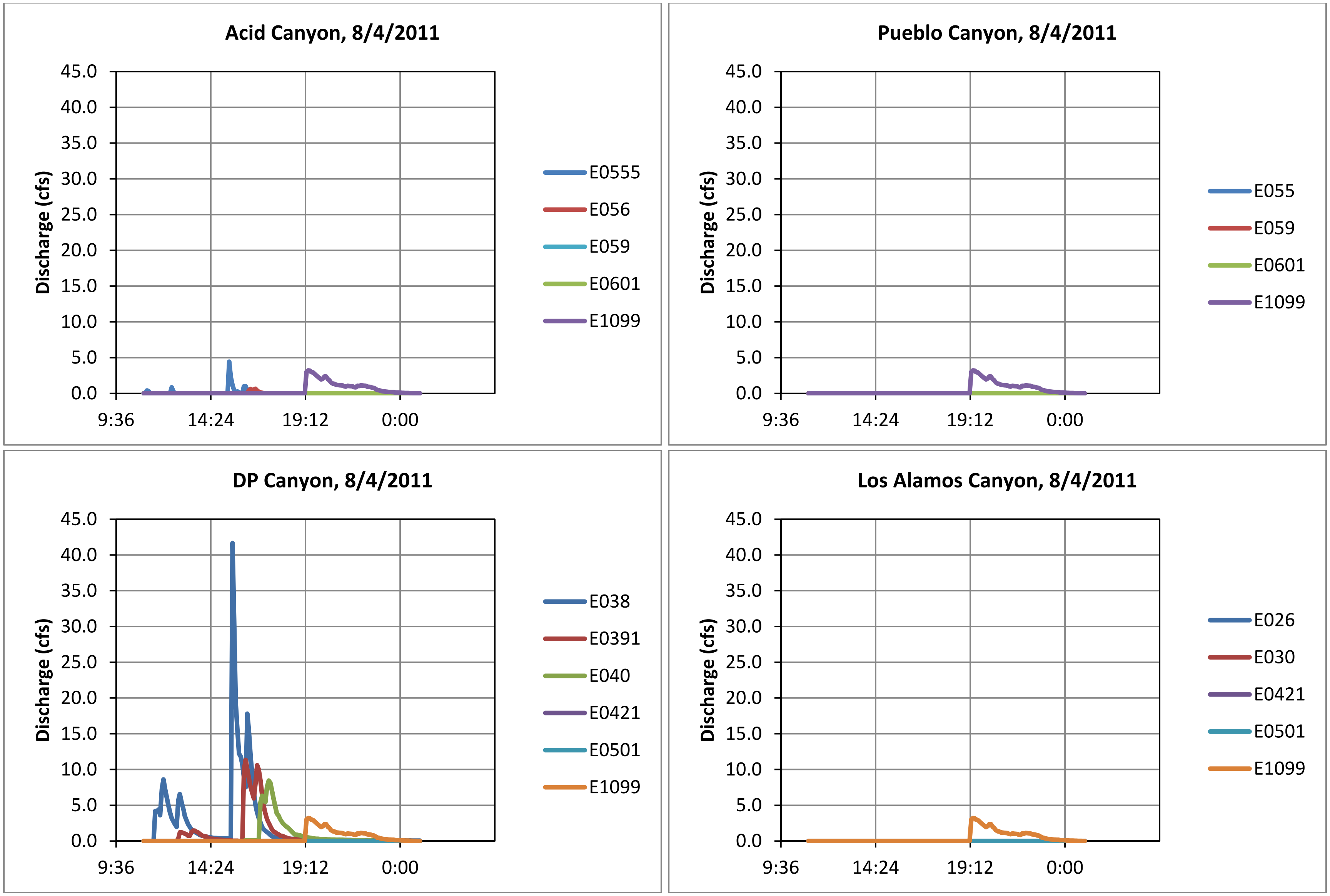
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



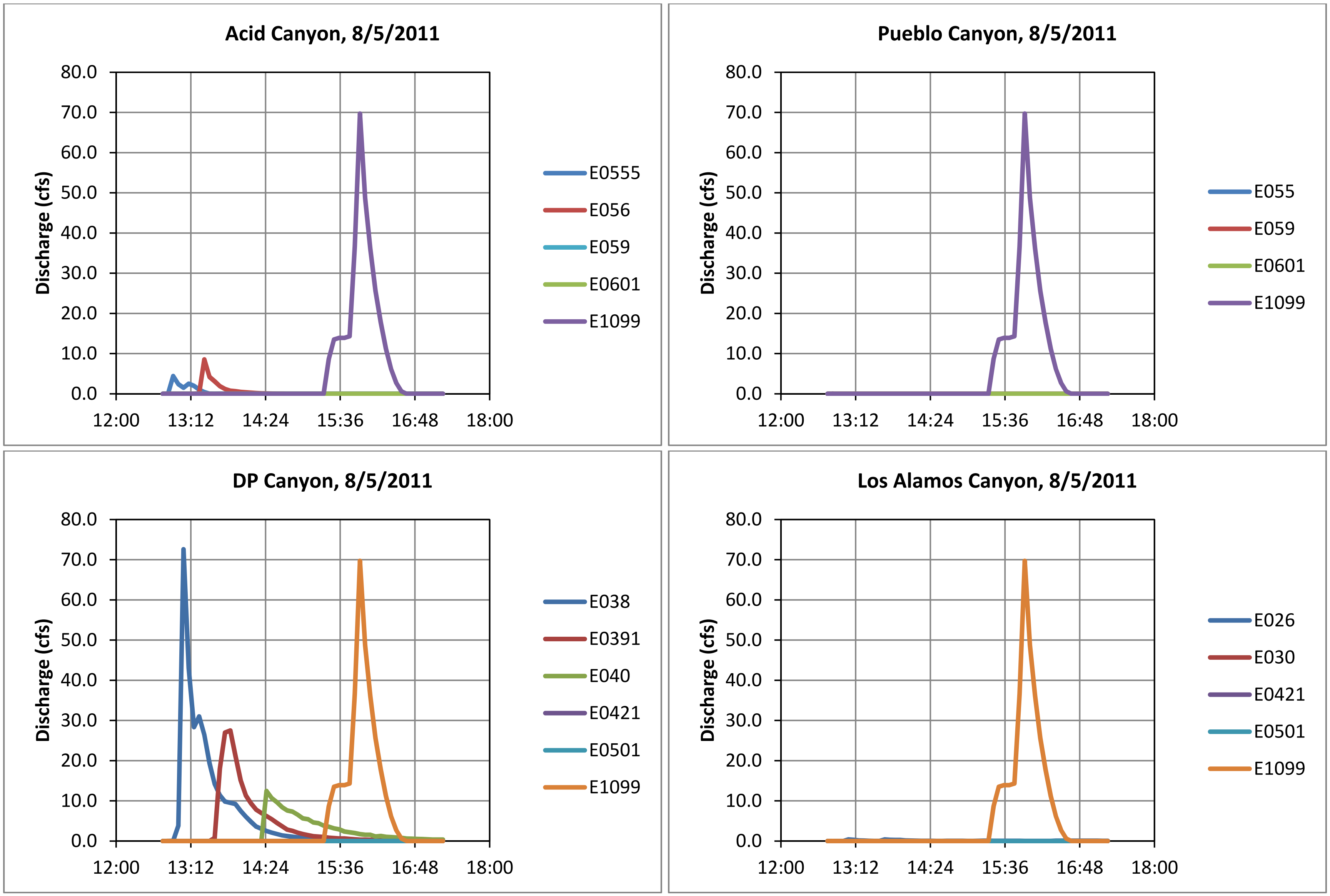
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



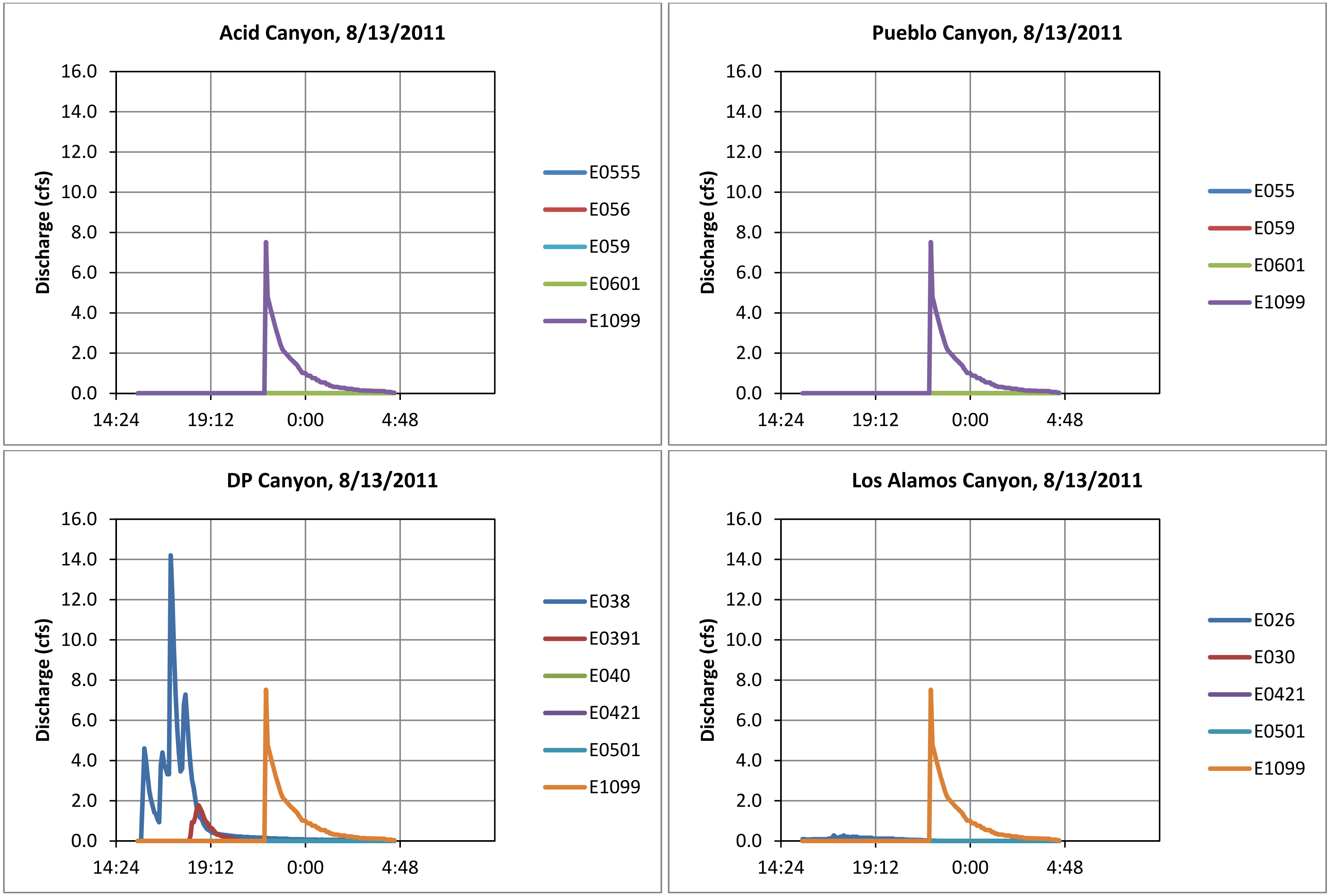
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



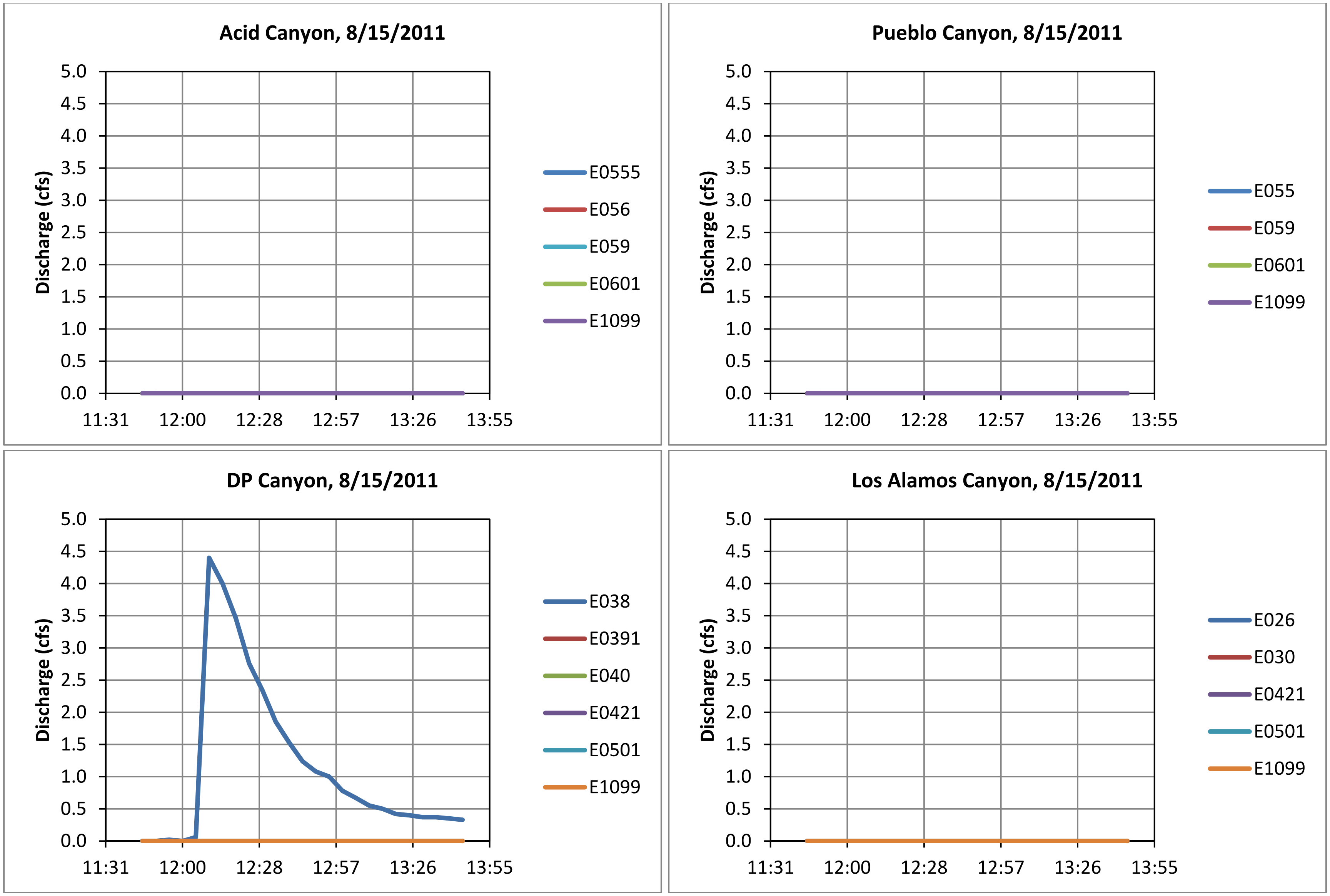
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



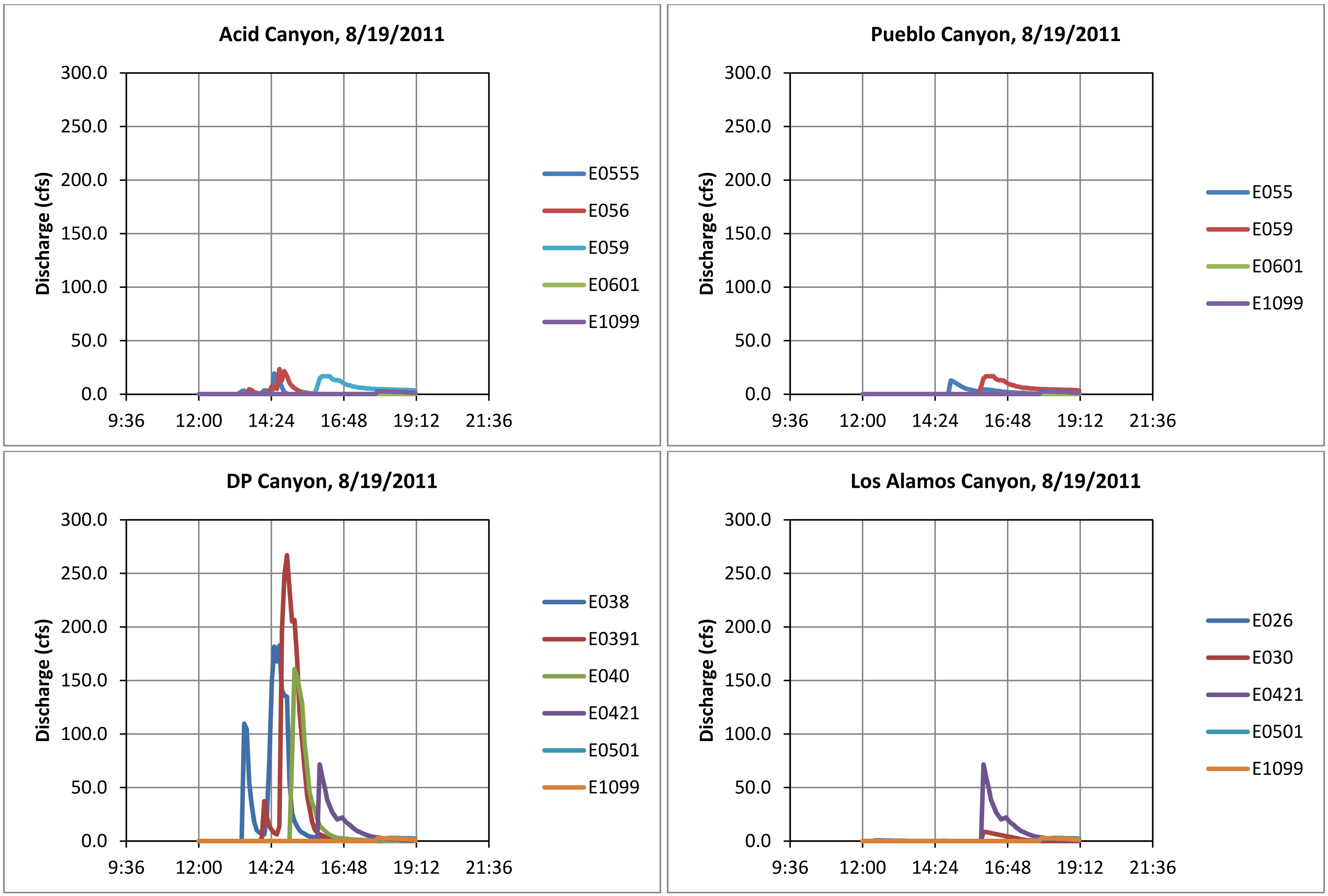
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



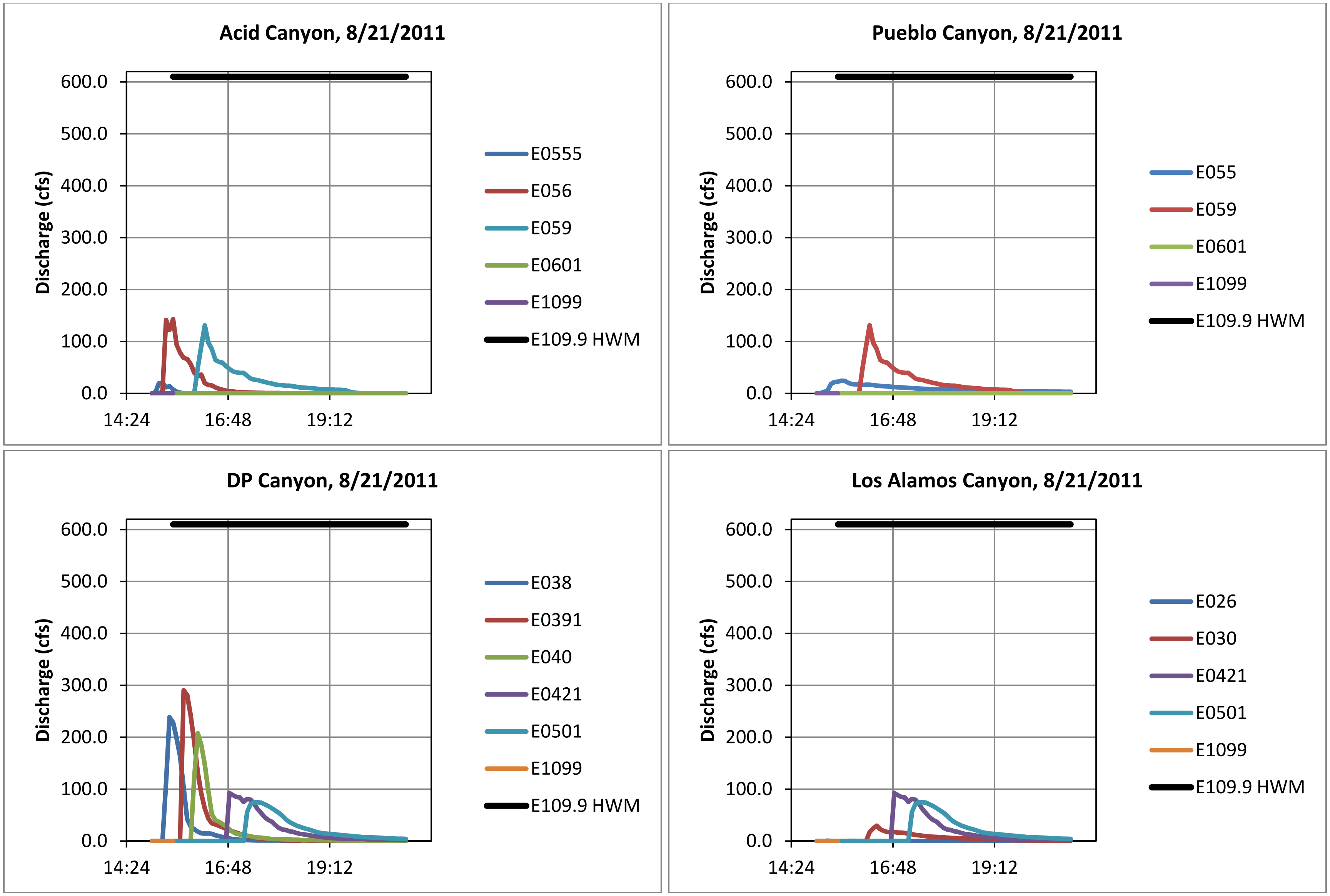
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



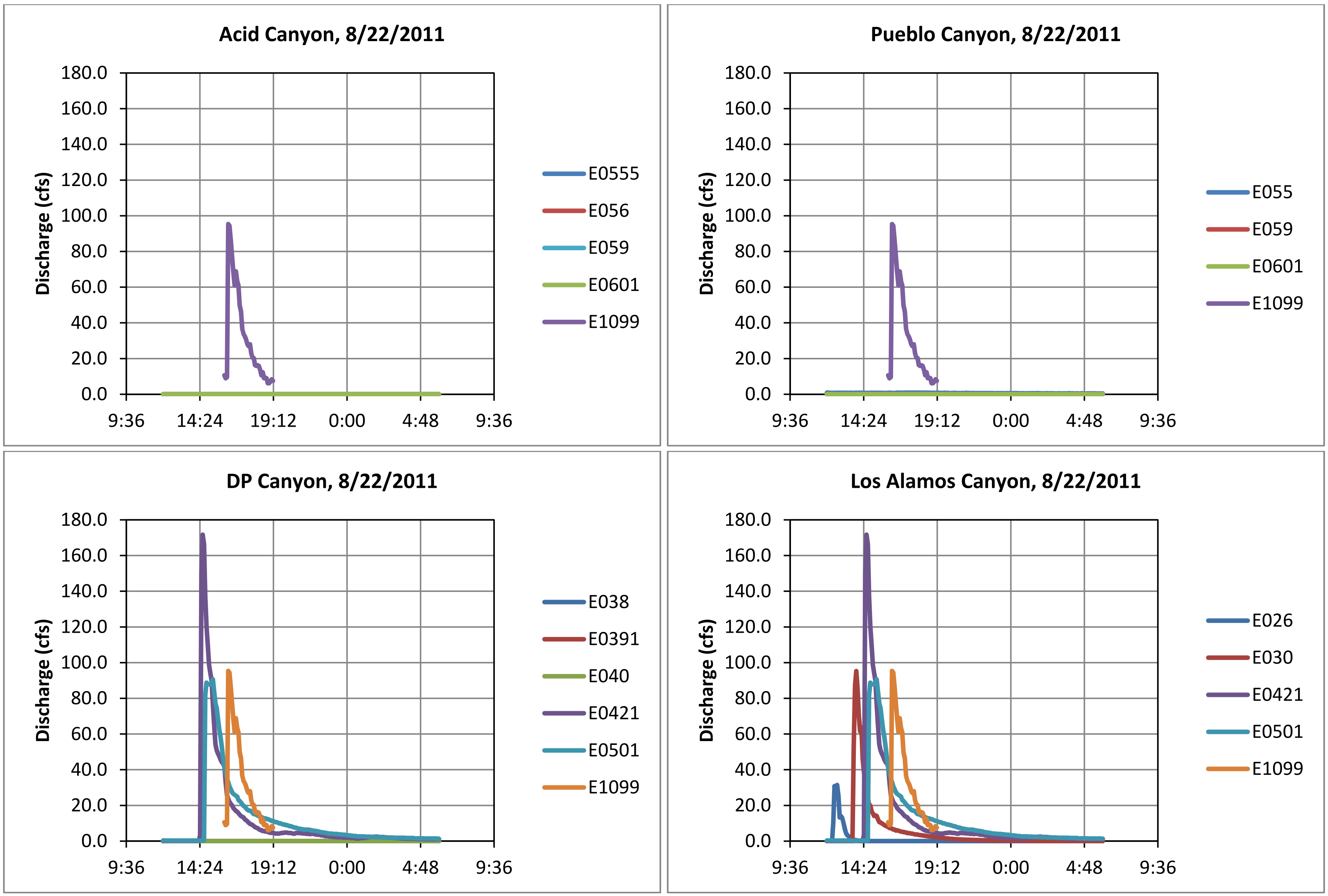
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



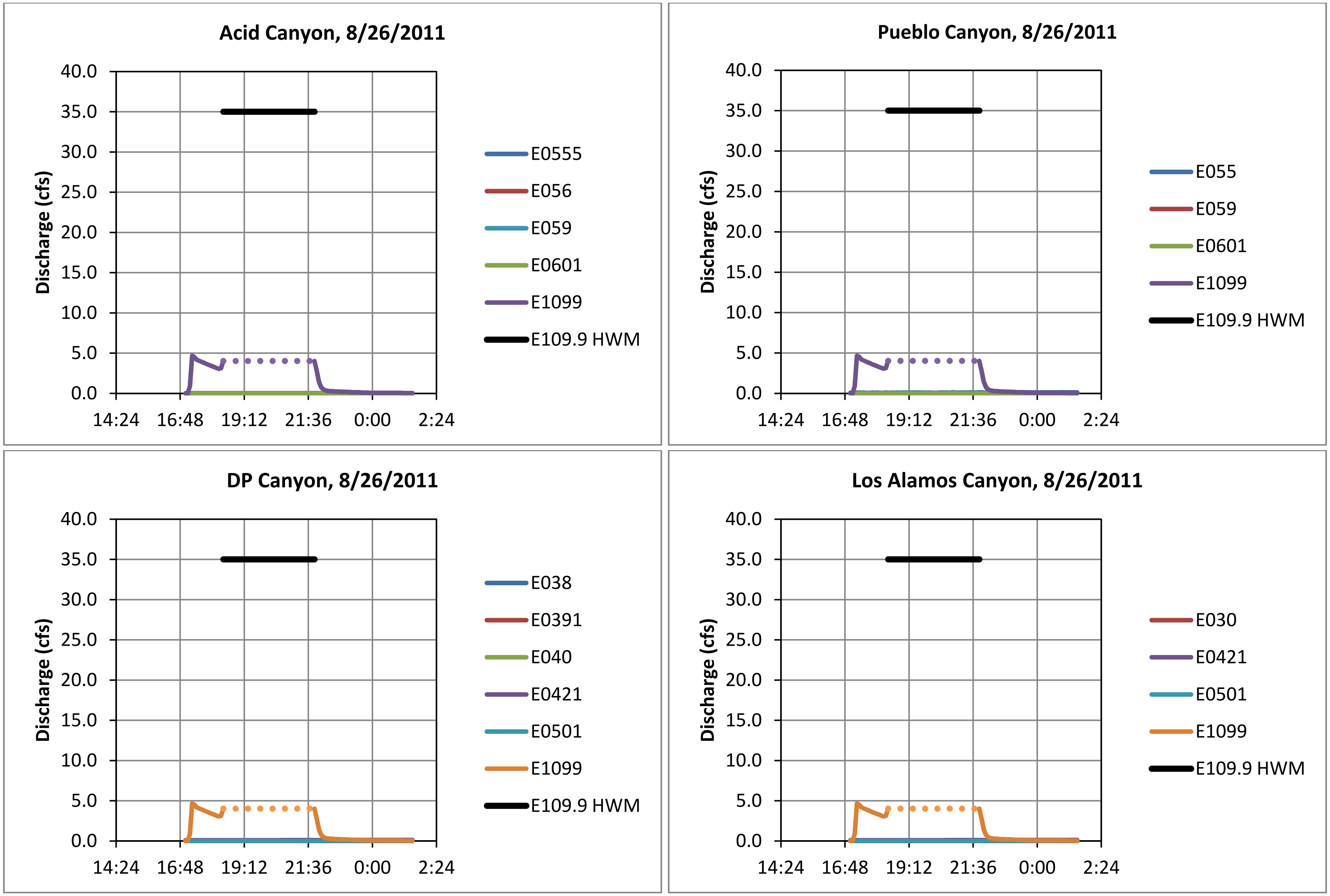
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



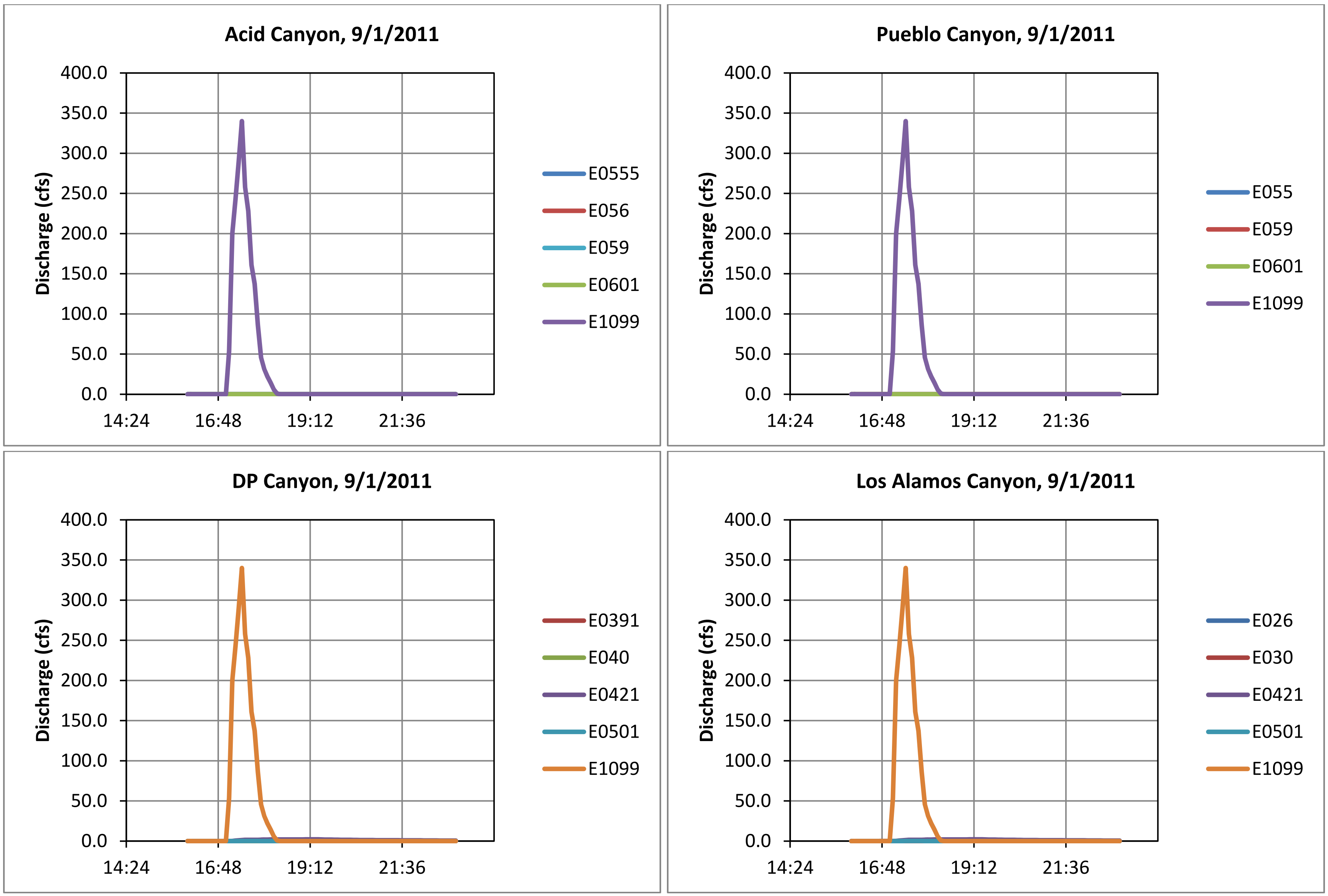
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



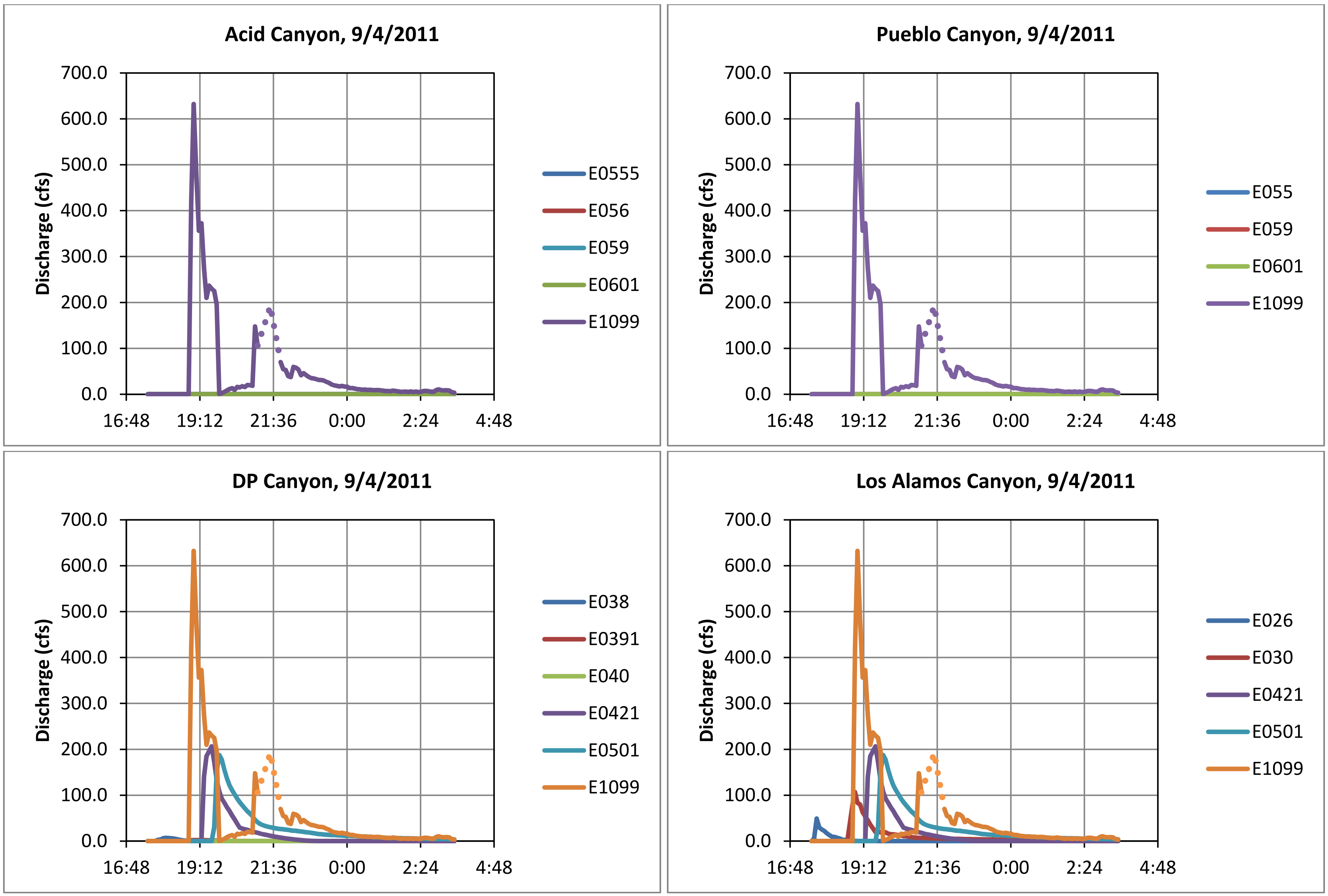
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



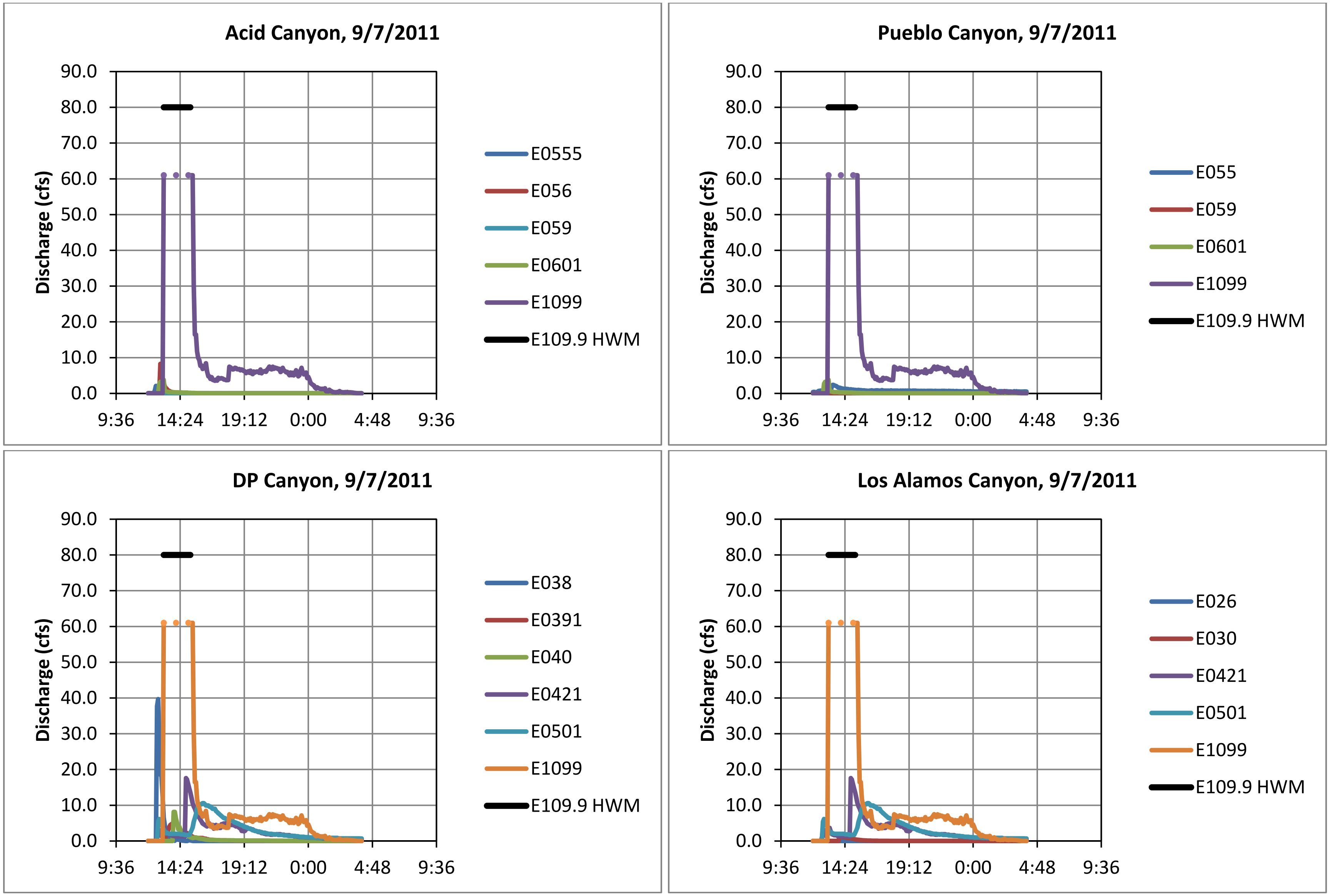
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



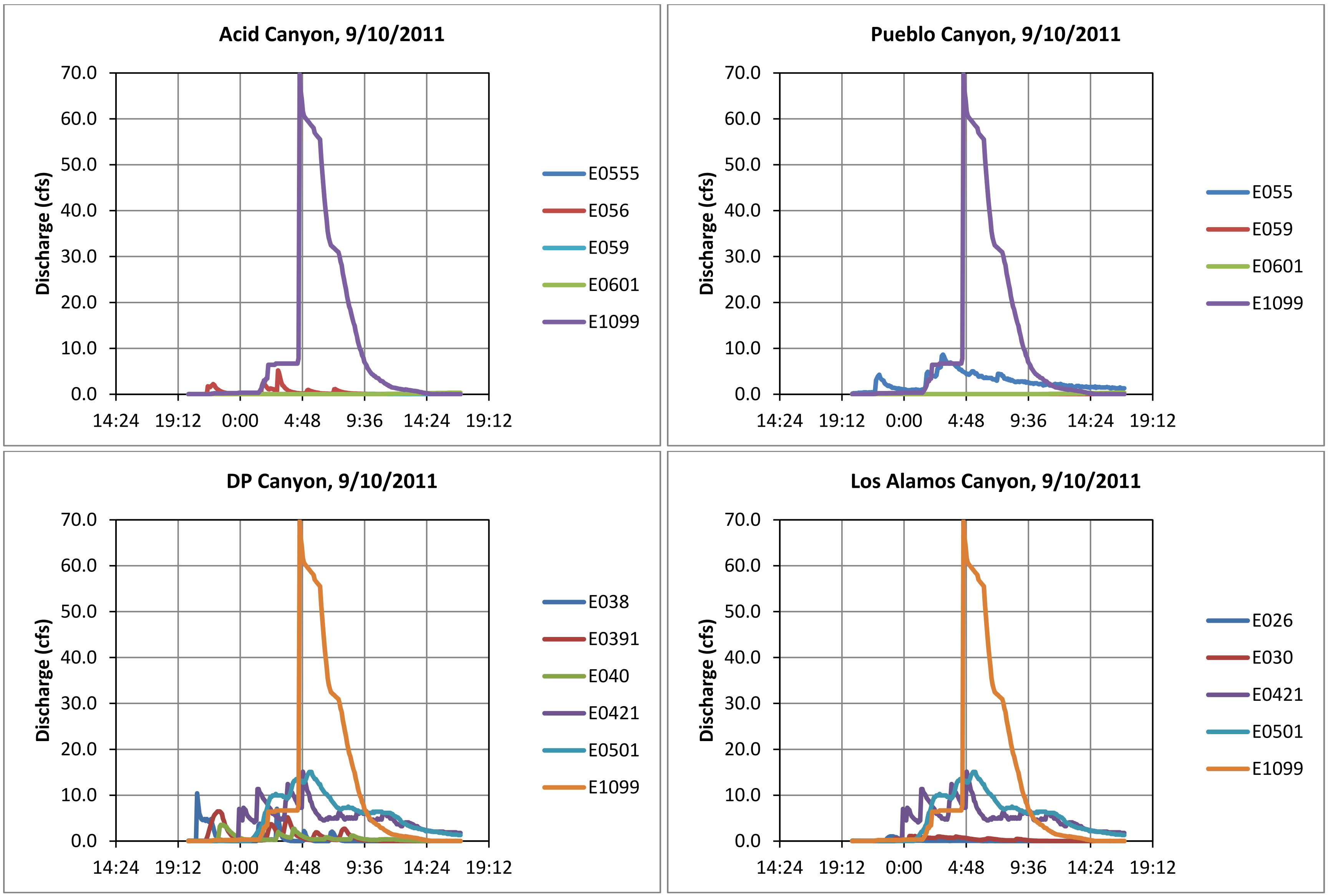
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



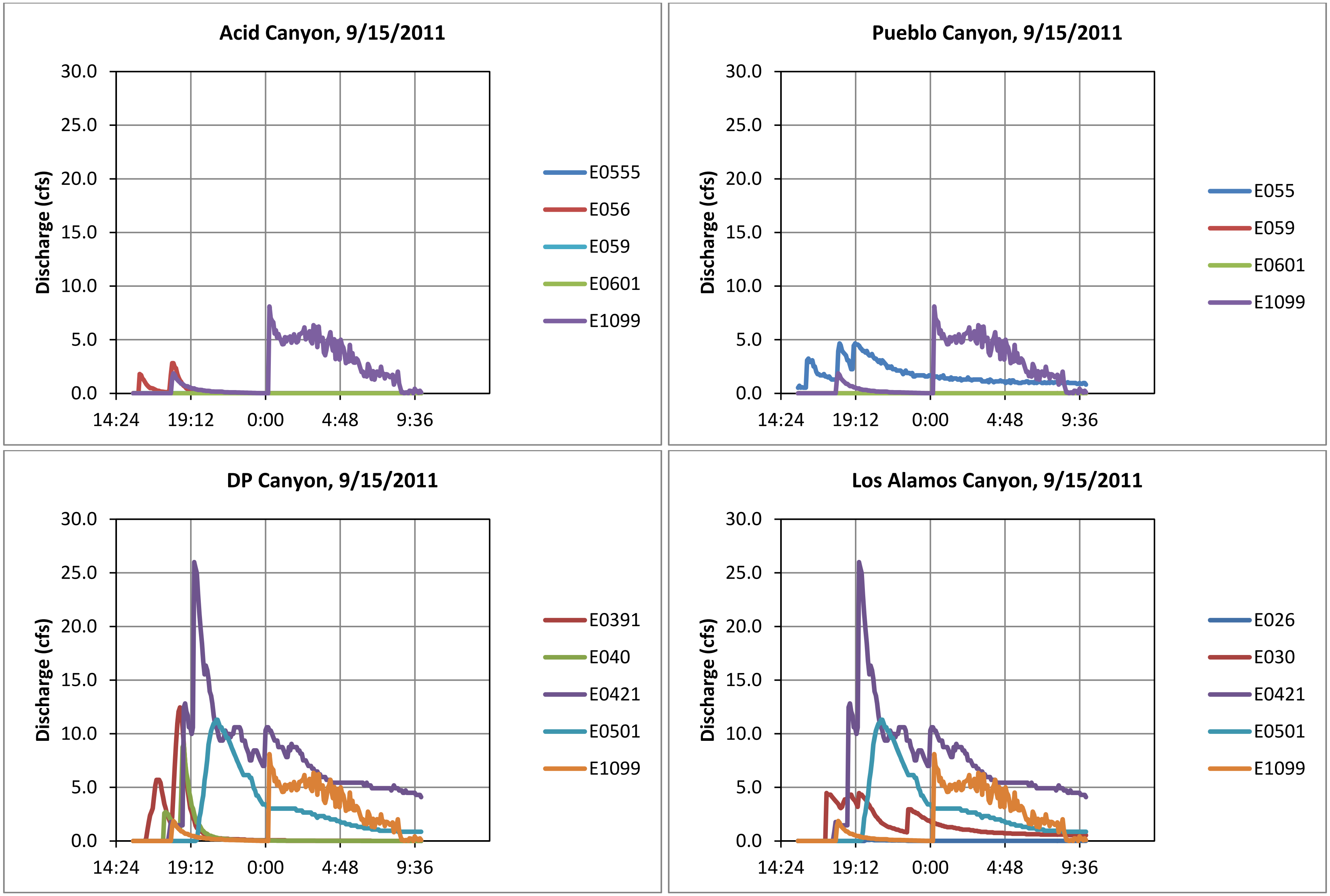
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



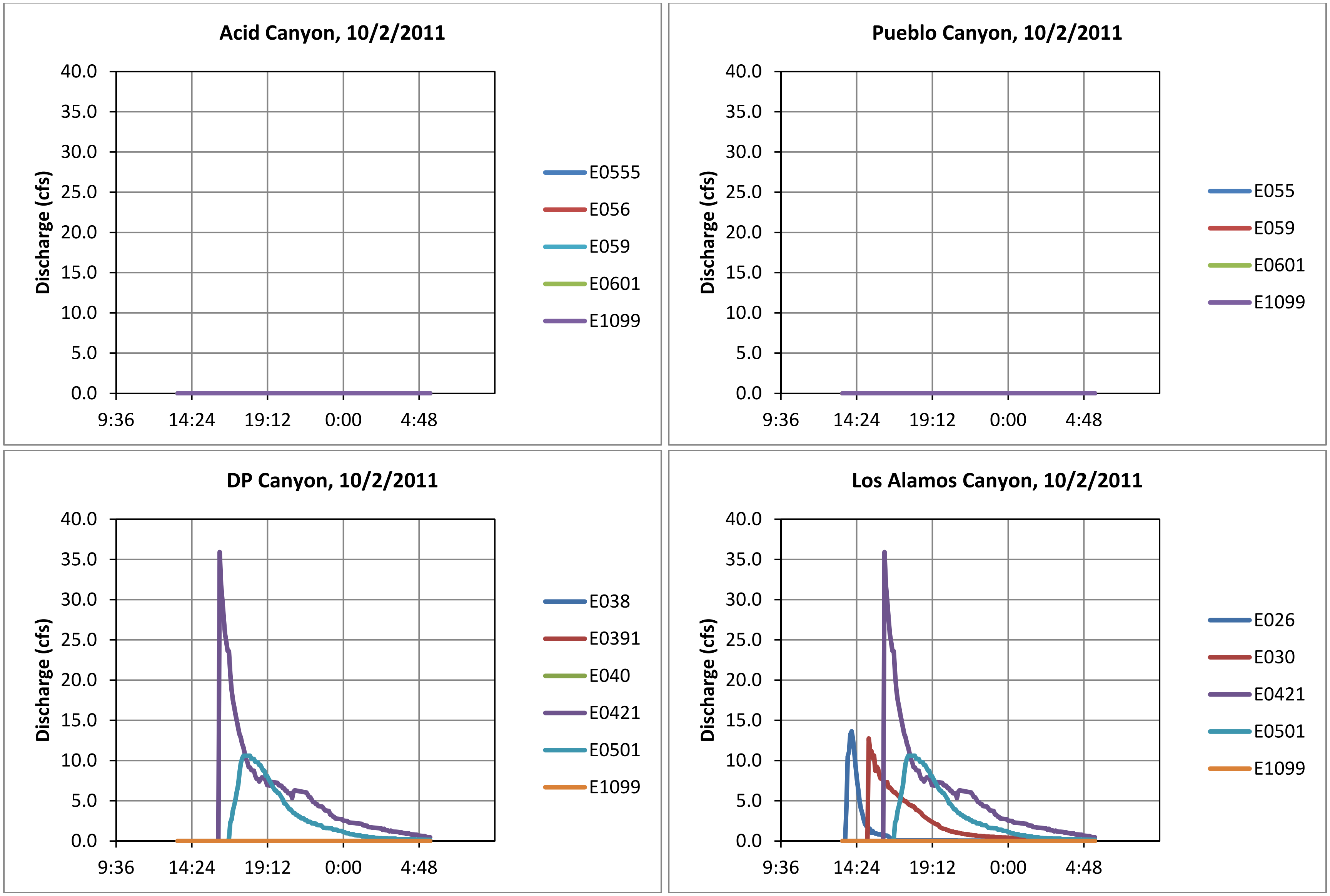
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



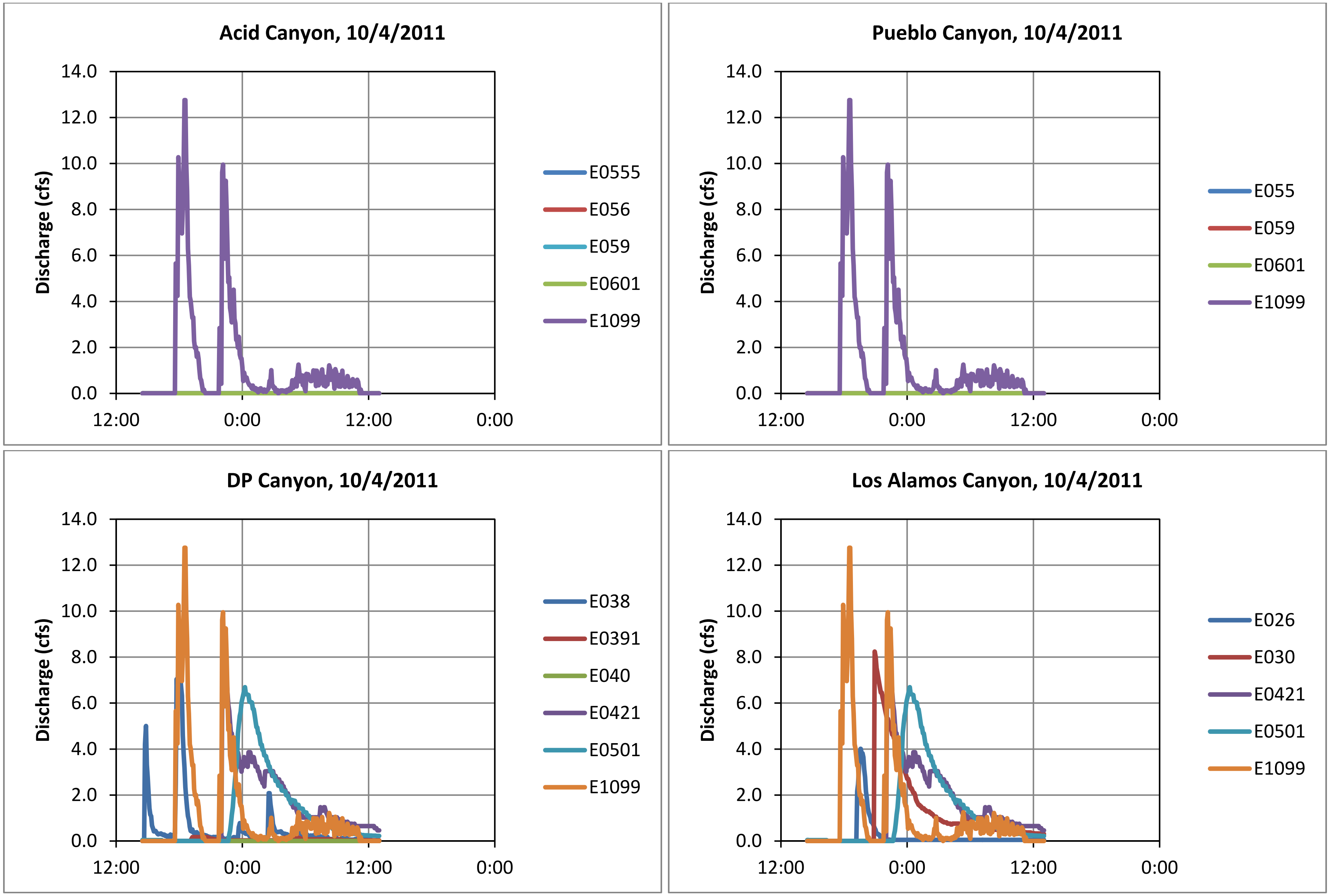
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



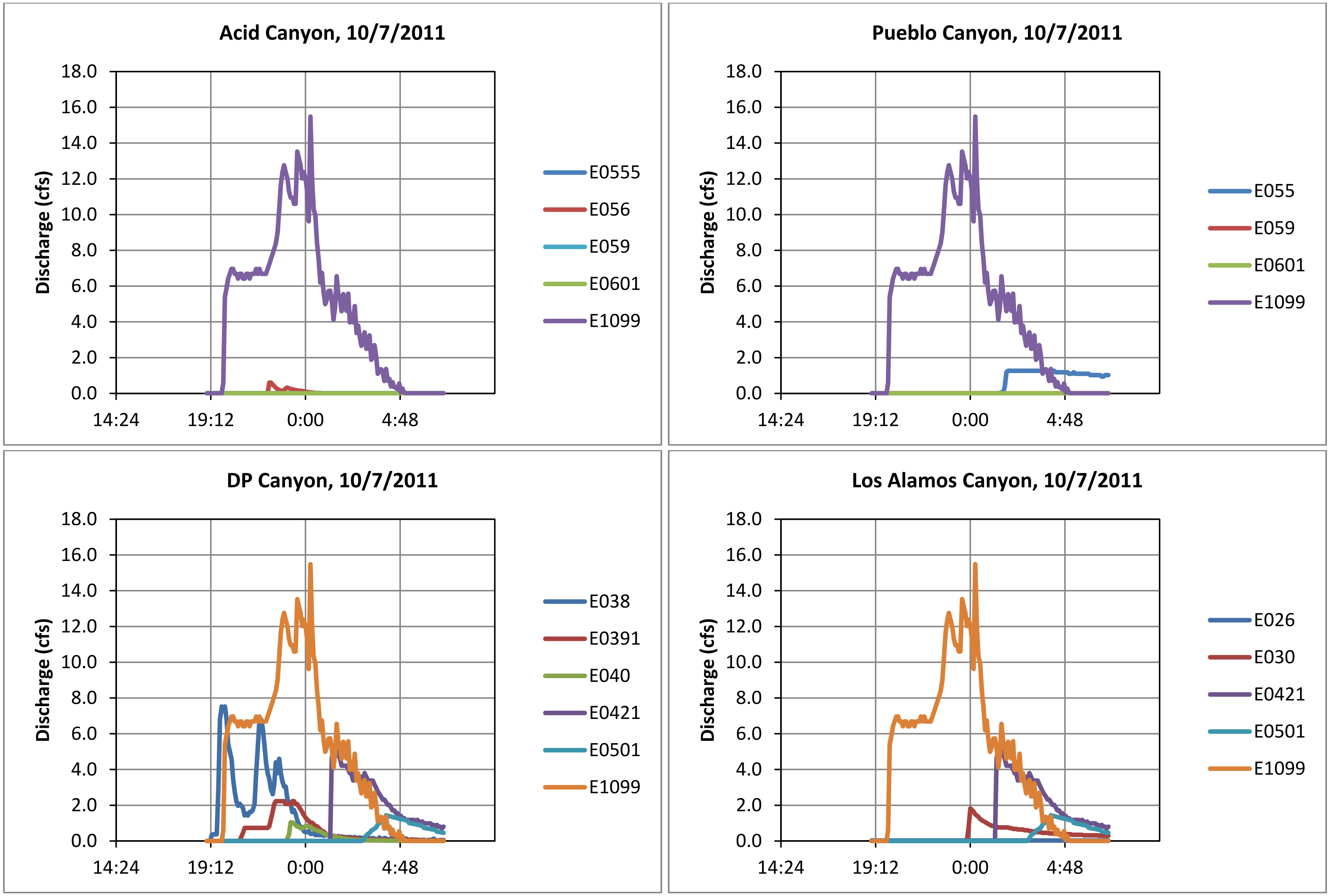
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



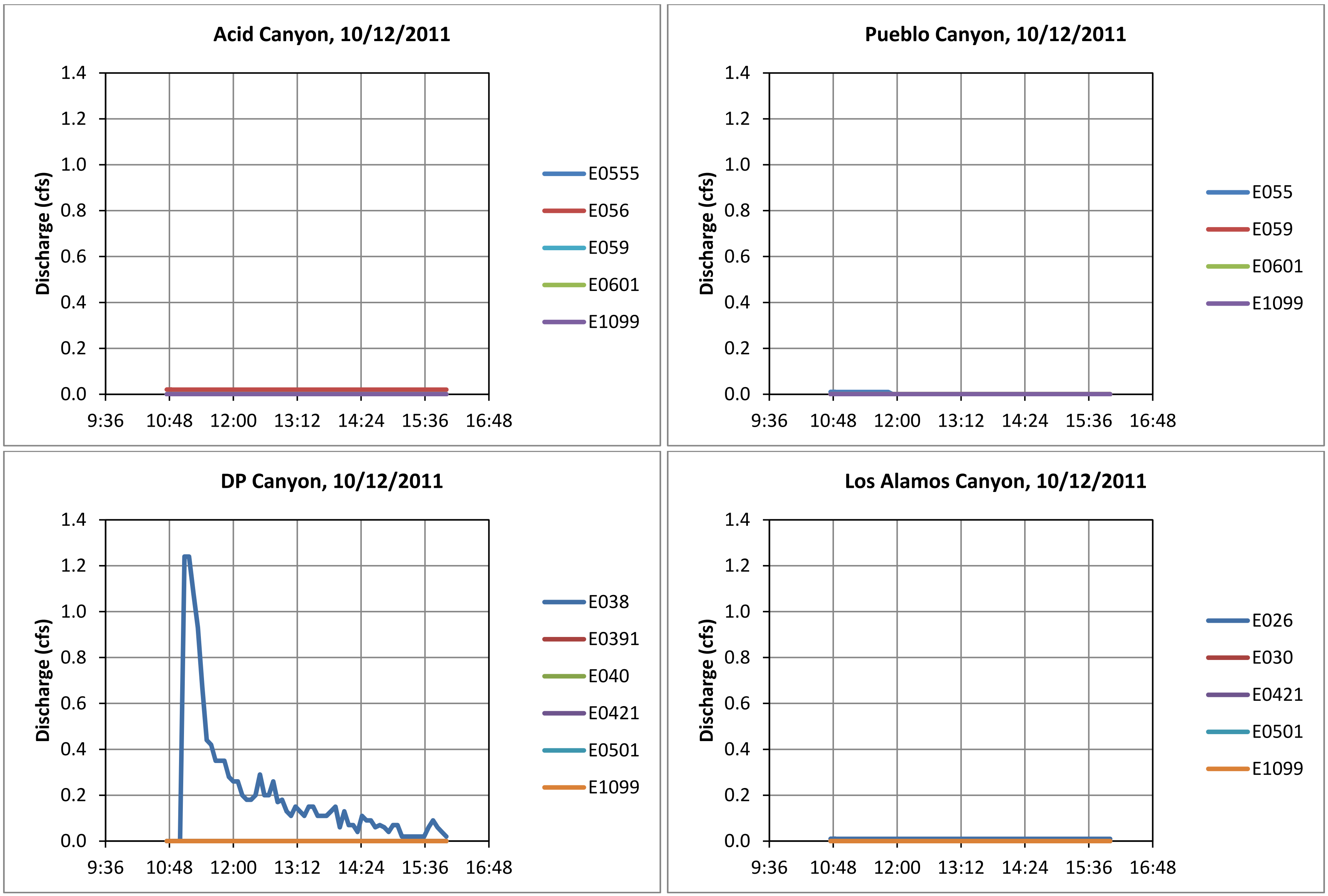
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



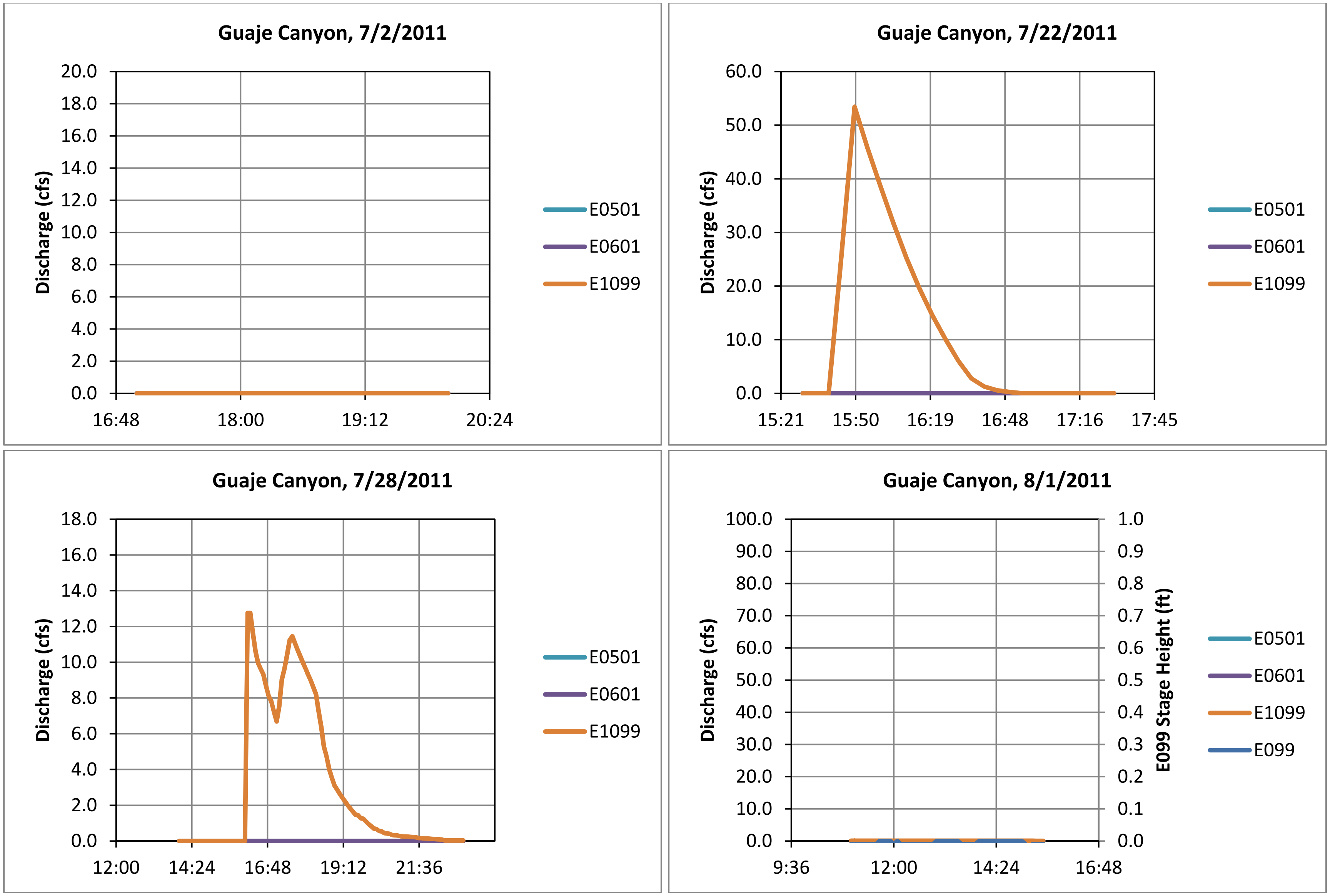
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



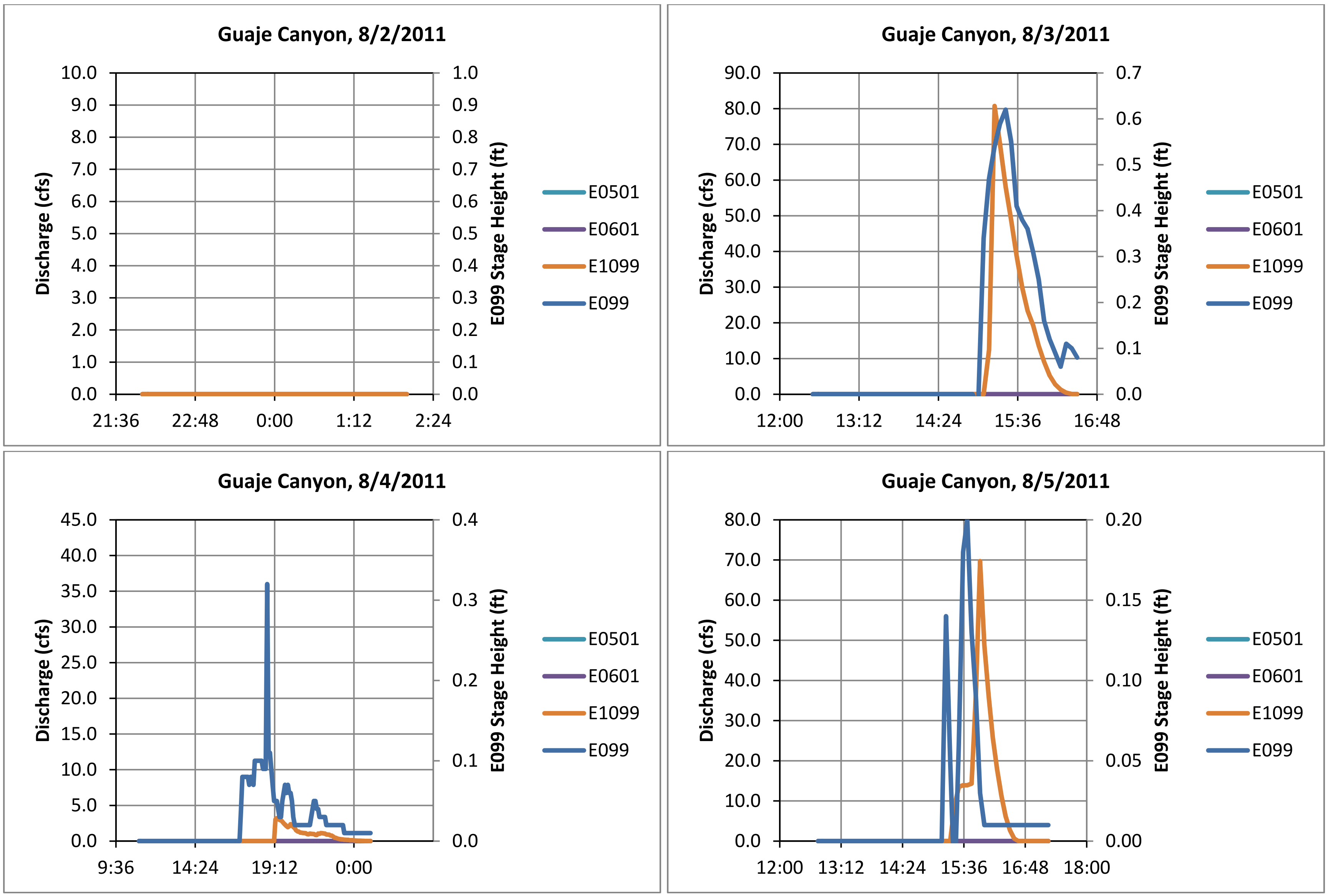
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-2 (continued) Hydrographs during each runoff event for each canyon from upstream to downstream reaches



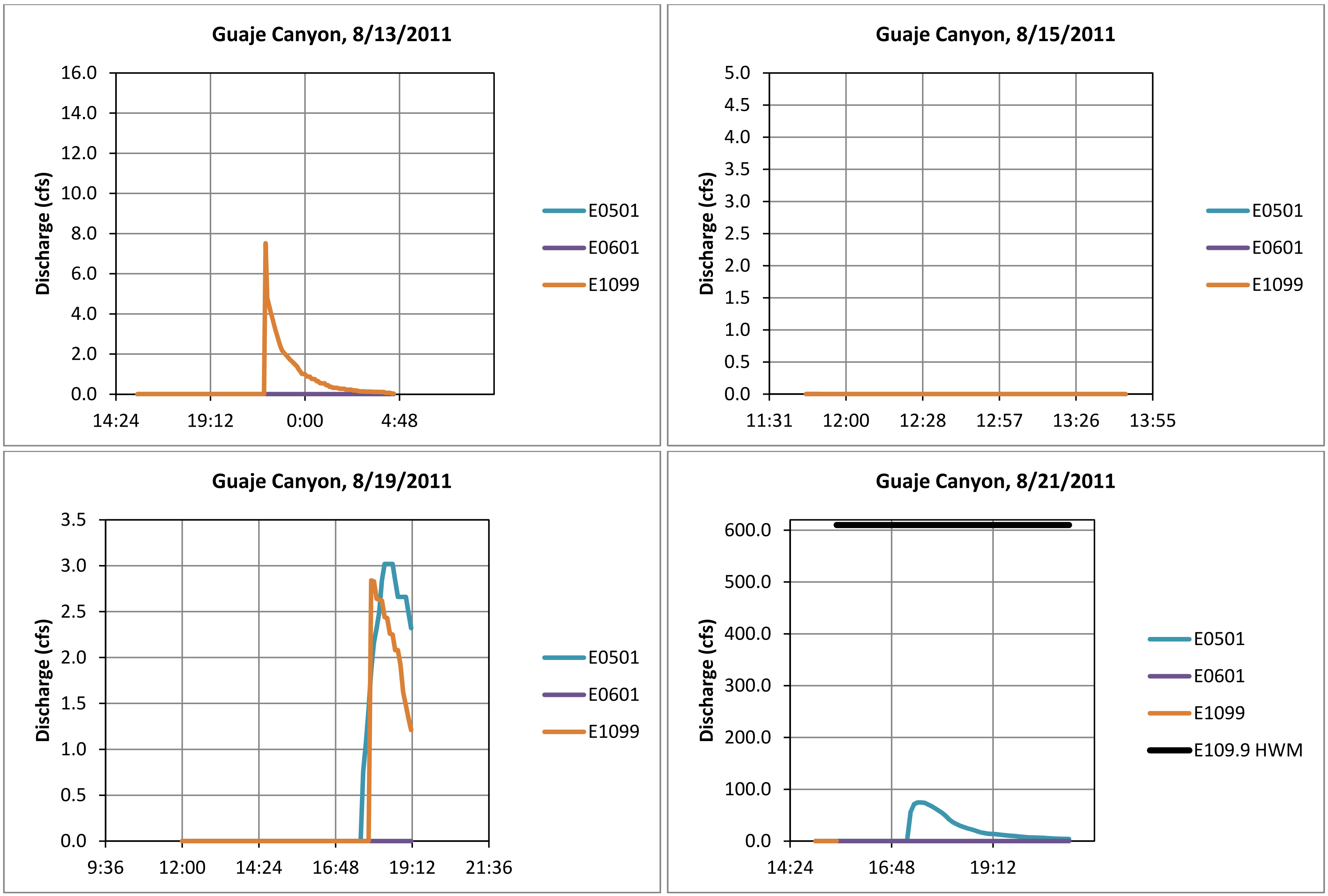
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-3 Hydrographs during each runoff event for gages E050.1, E060.1, E099, and E109.9



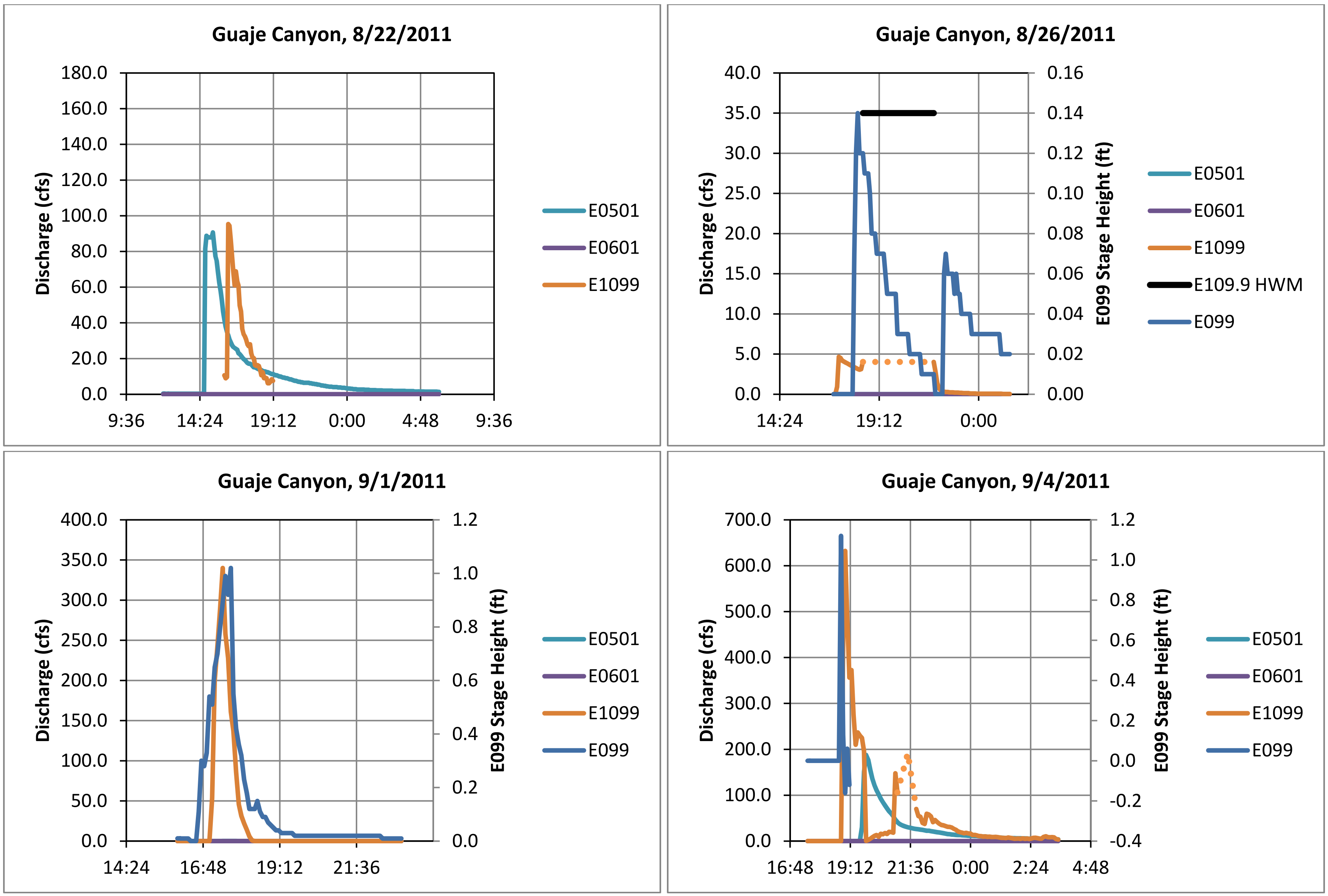
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-3 (continued) Hydrographs during each runoff event for gages E050.1, E060.1, E099, and E109.9



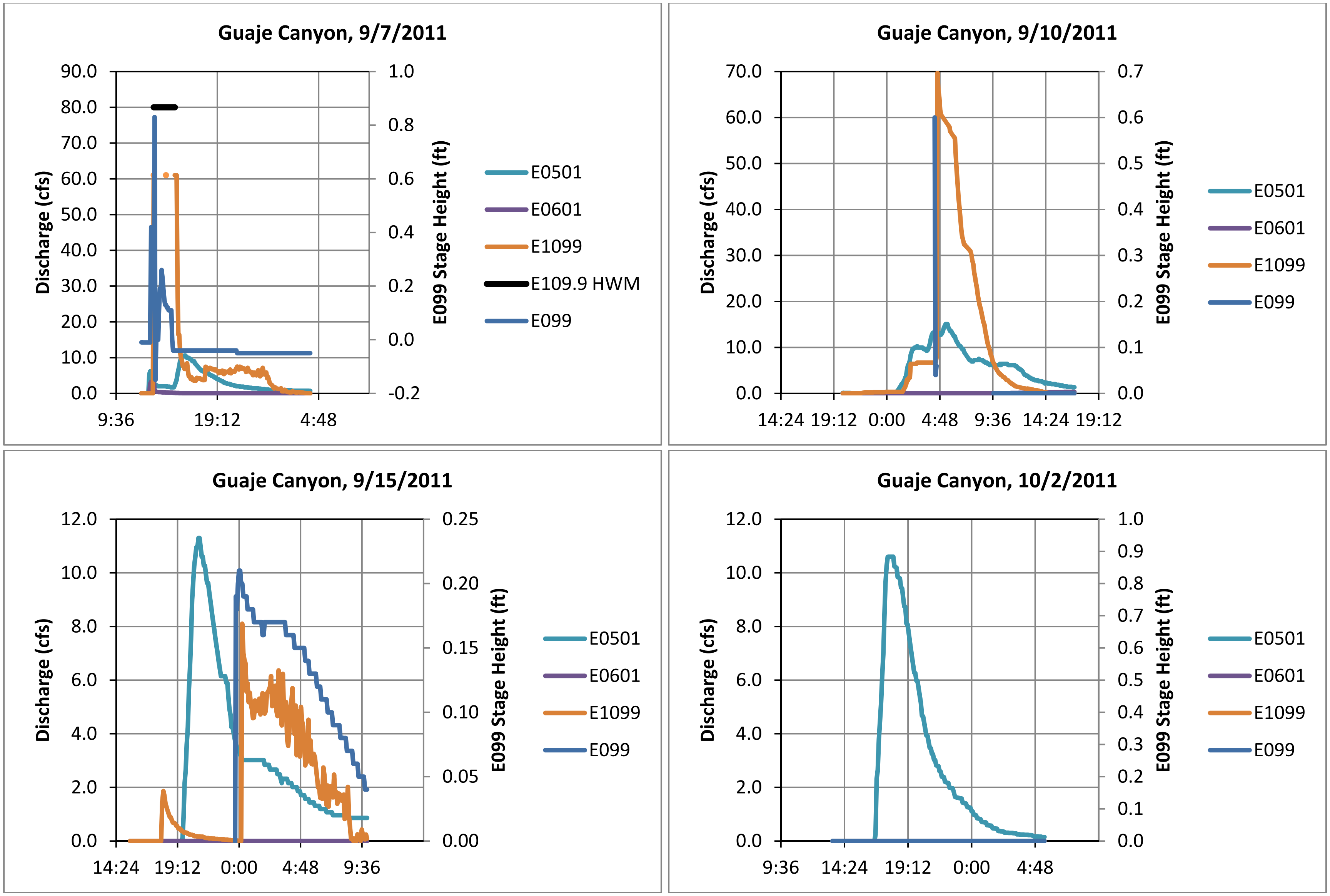
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-3 (continued) Hydrographs during each runoff event for gages E050.1, E060.1, E099, and E109.9



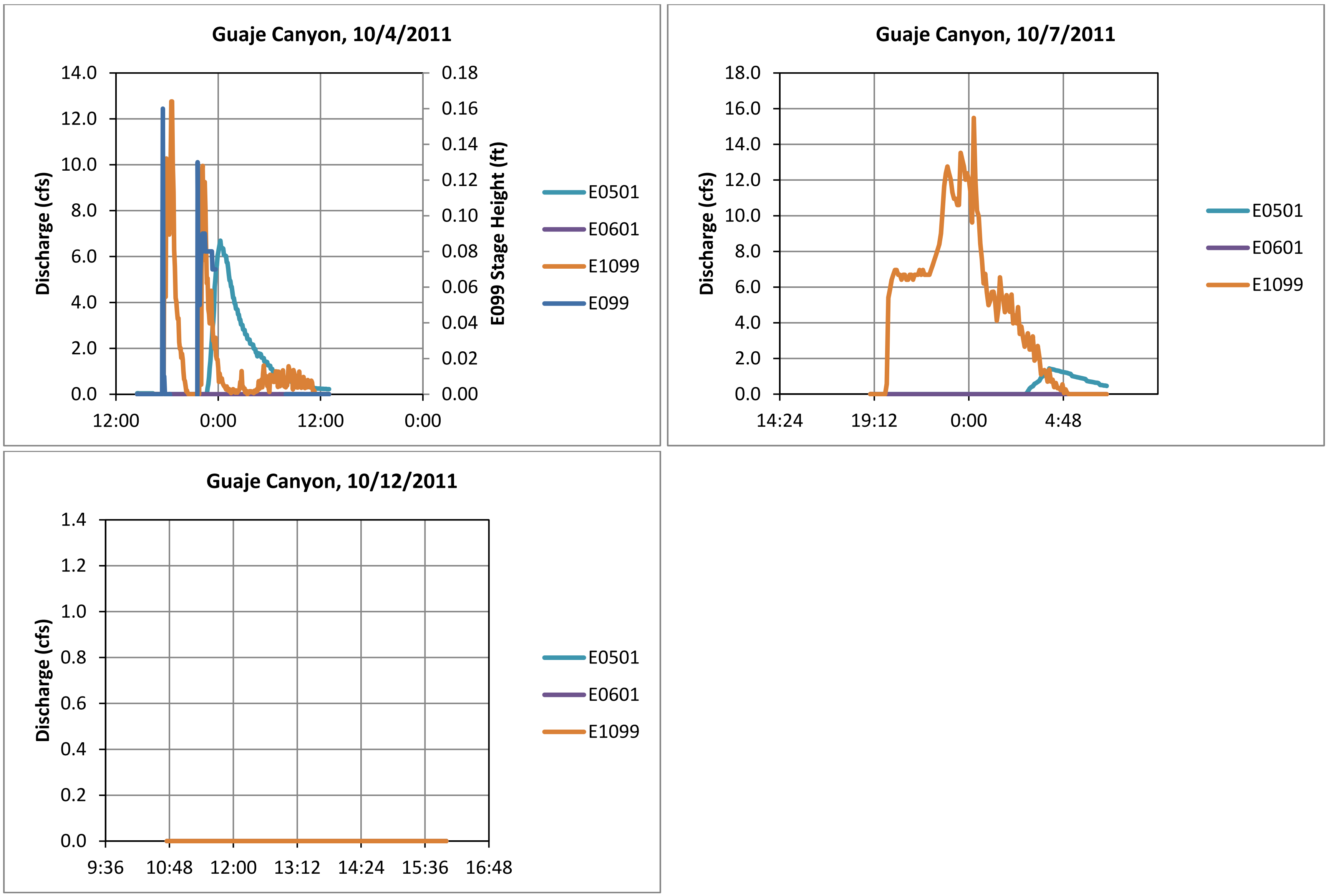
Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-3 (continued)   Hydrographs during each runoff event for gages E050.1, E060.1, E099, and E109.9



Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-3 (continued) Hydrographs during each runoff event for gages E050.1, E060.1, E099, and E109.9



Note: Dashed lines indicate questionable data due to equipment malfunctions and thick black lines indicate surveyed high water marks.

Figure 3.2-3 (continued) Hydrographs during each runoff event for gages E050.1, E060.1, E099, and E109.9

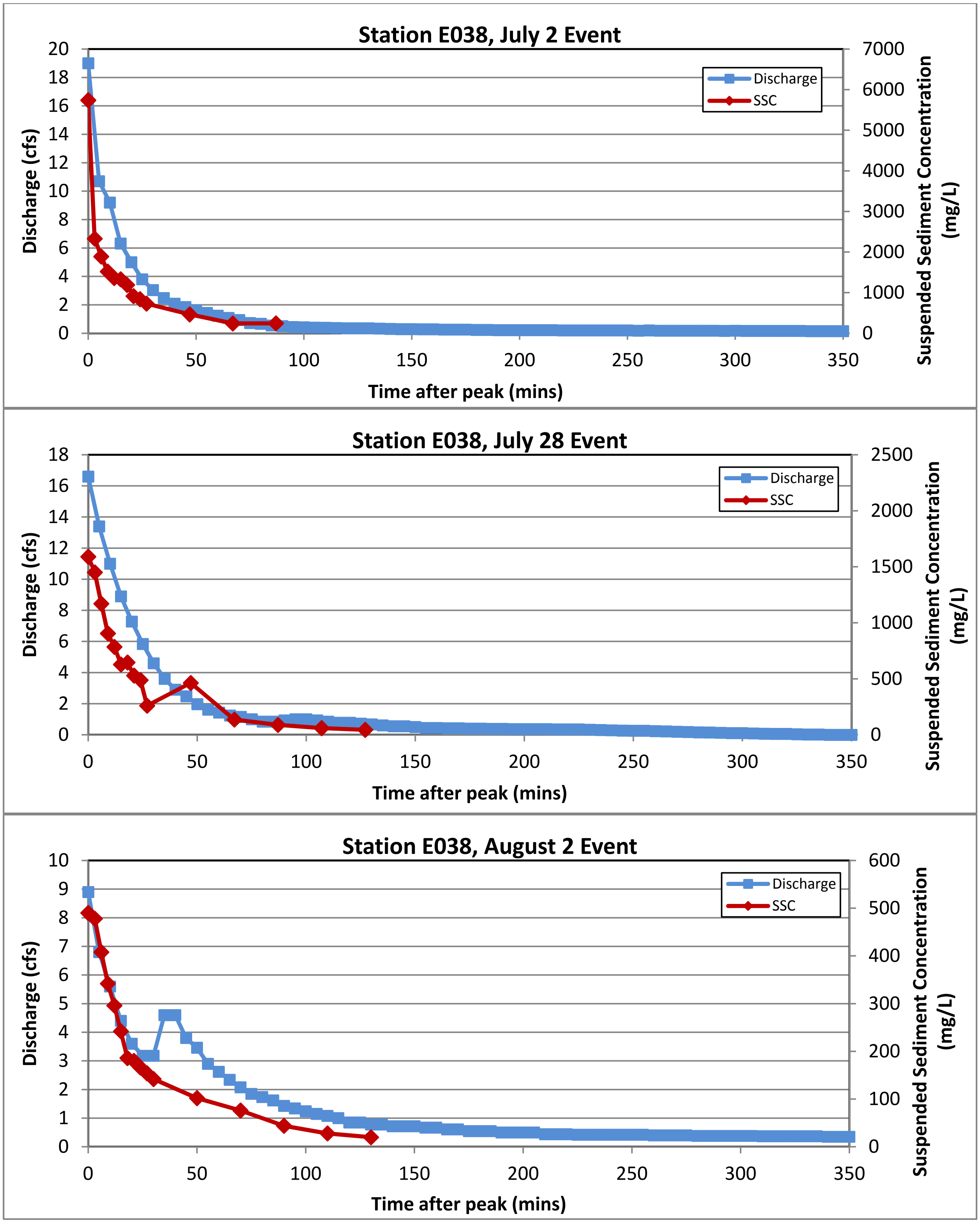


Figure 3.2-4 Discharge and SSC for sampled events at E038, E039.1, E042.1, E050.1, and E109.9

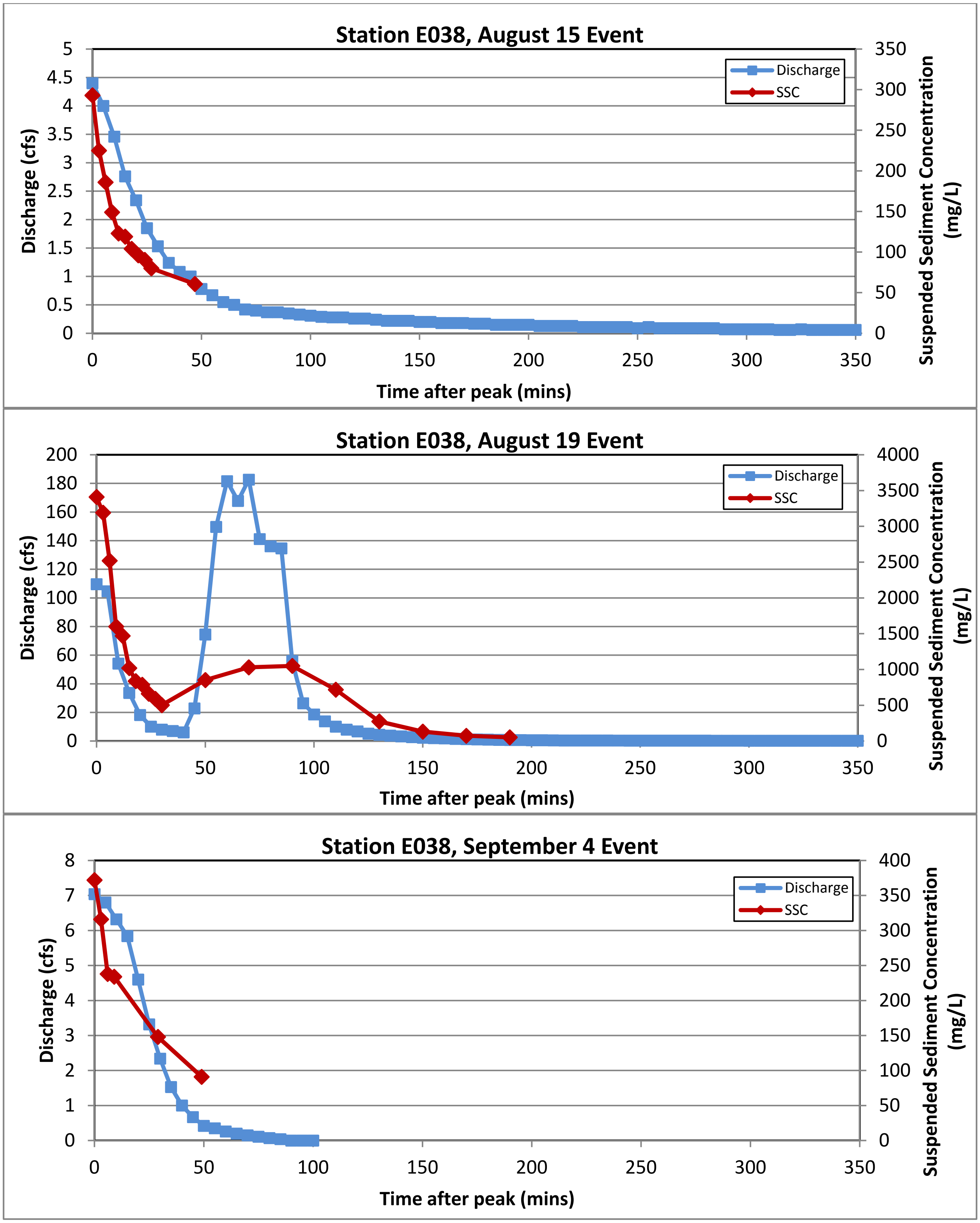


Figure 3.2-4 (continued) **Discharge and SSC for sampled events at E038, E039.1, E042.1, E050.1, and E109.9**

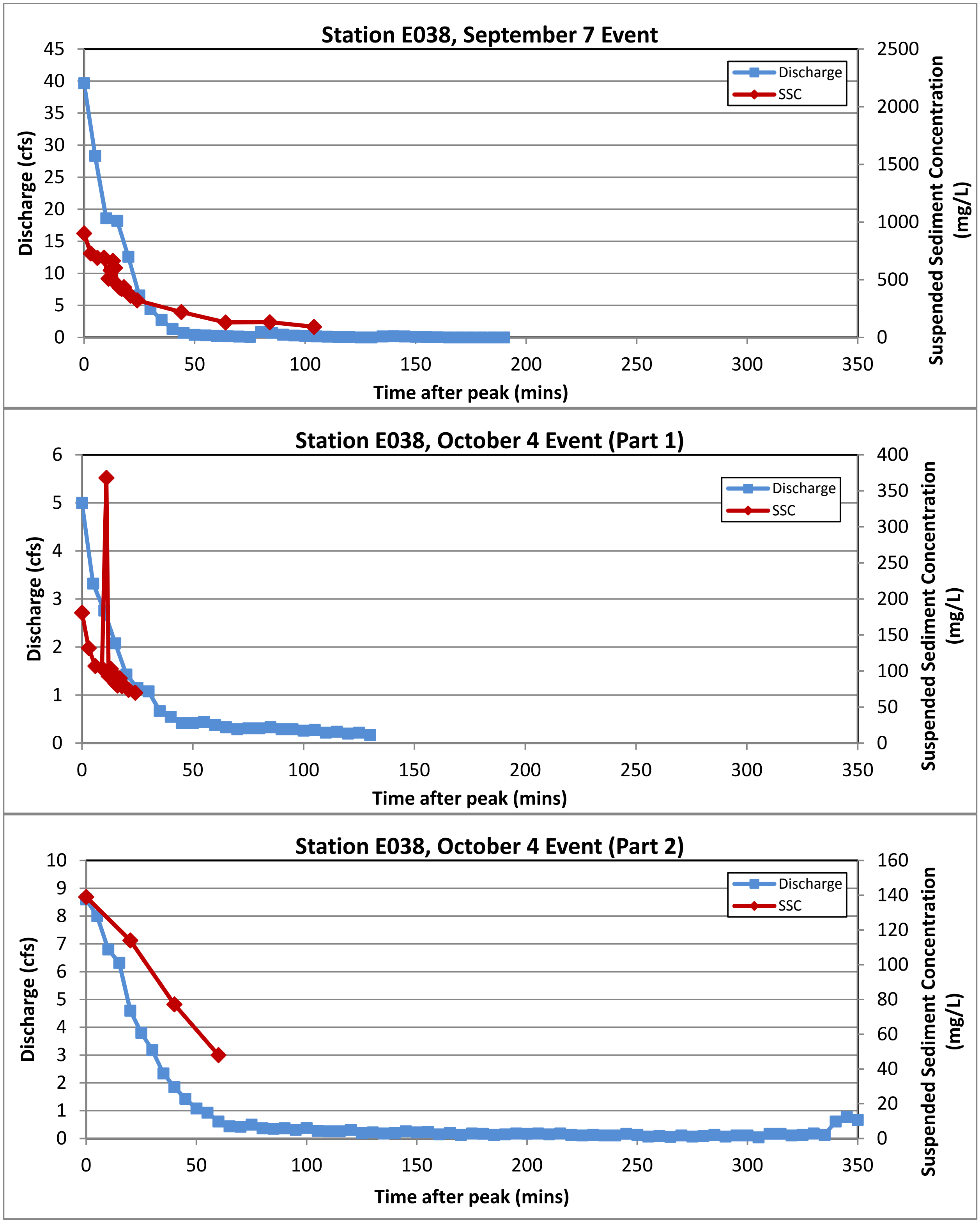


Figure 3.2-4 (continued) **Discharge and SSC for sampled events at E038, E039.1, E042.1, E050.1, and E109.9**

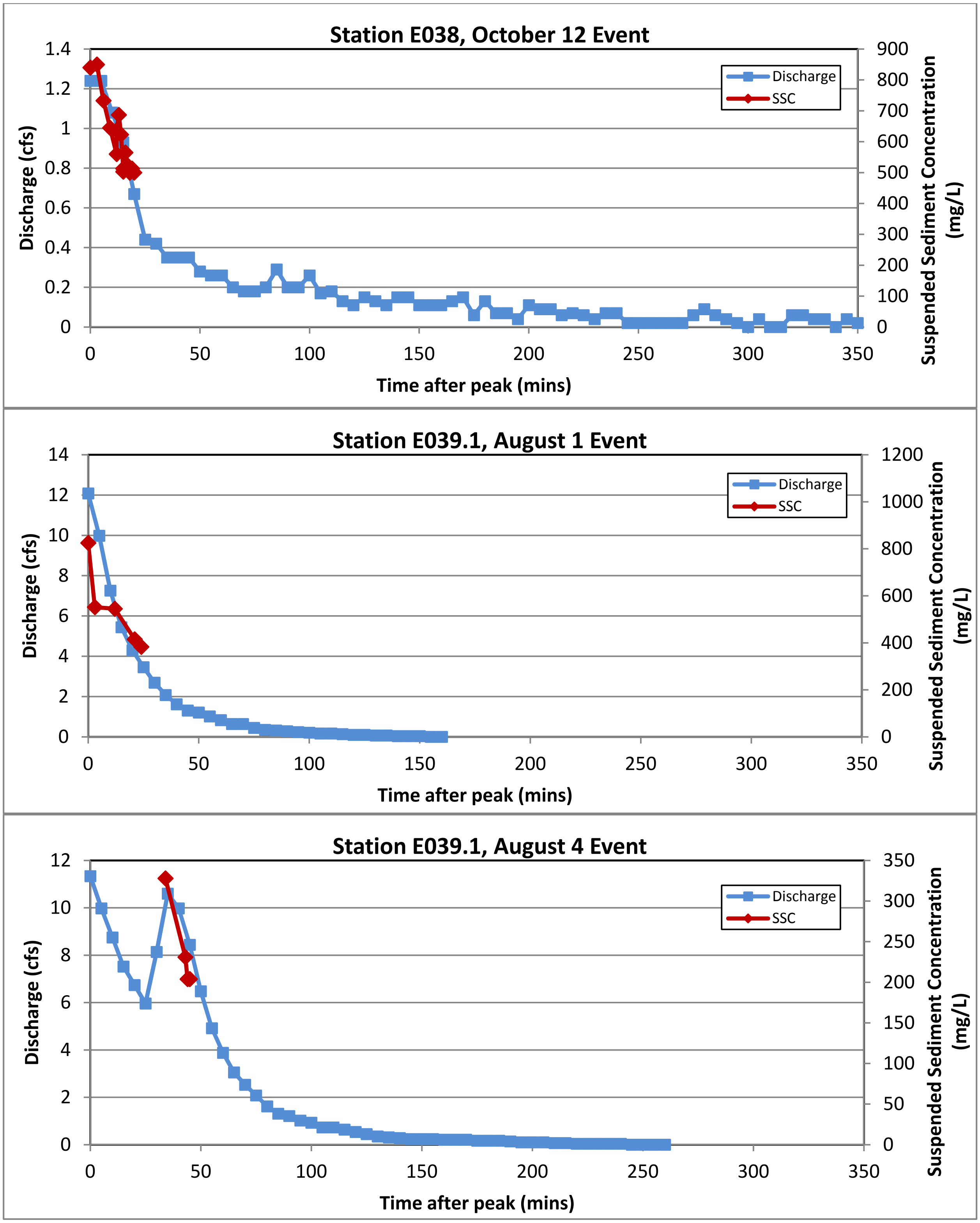


Figure 3.2-4 (continued) **Discharge and SSC for sampled events at E038, E039.1, E042.1, E050.1, and E109.9**

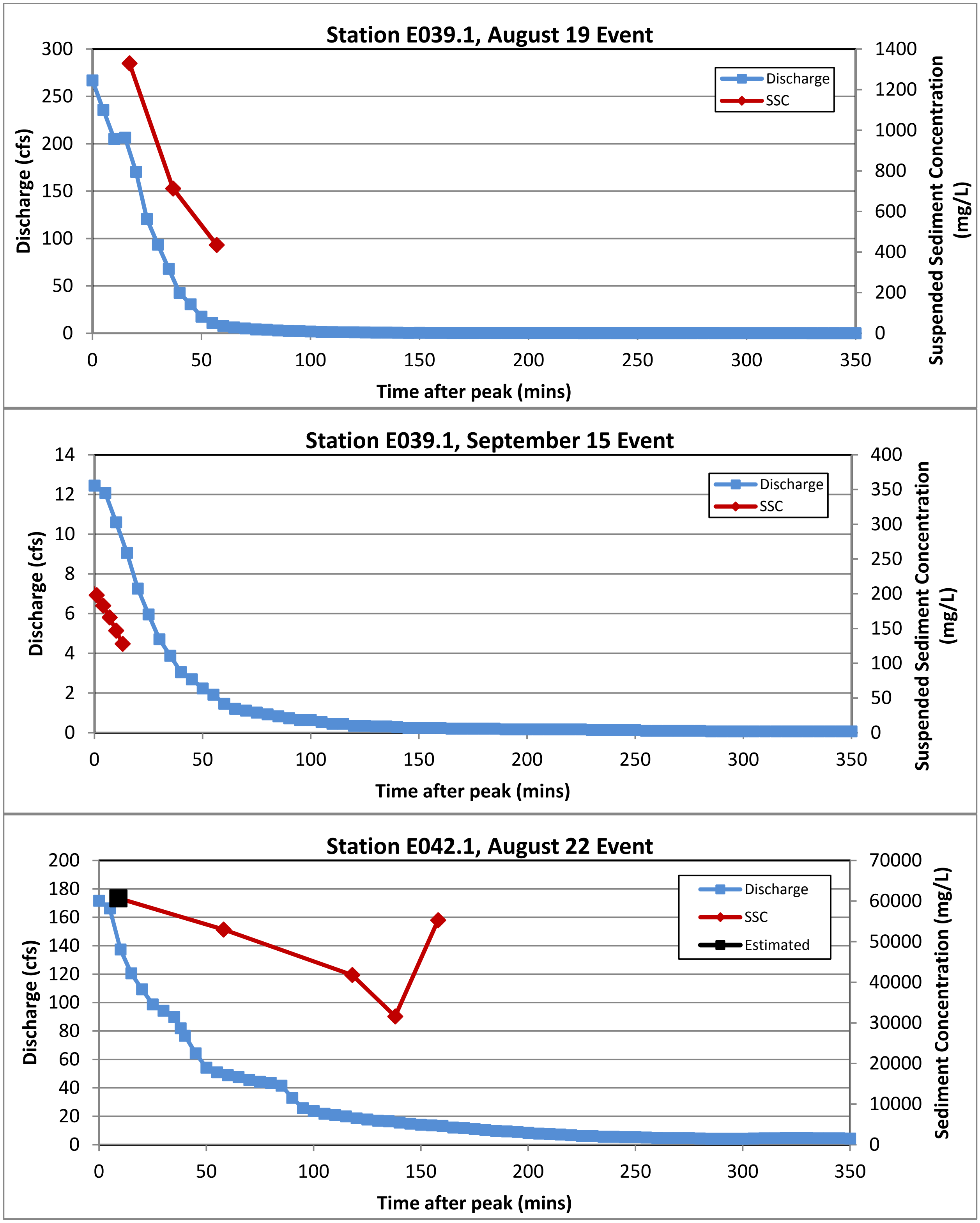


Figure 3.2-4 (continued) **Discharge and SSC for sampled events at E038, E039.1, E042.1, E050.1, and E109.9**

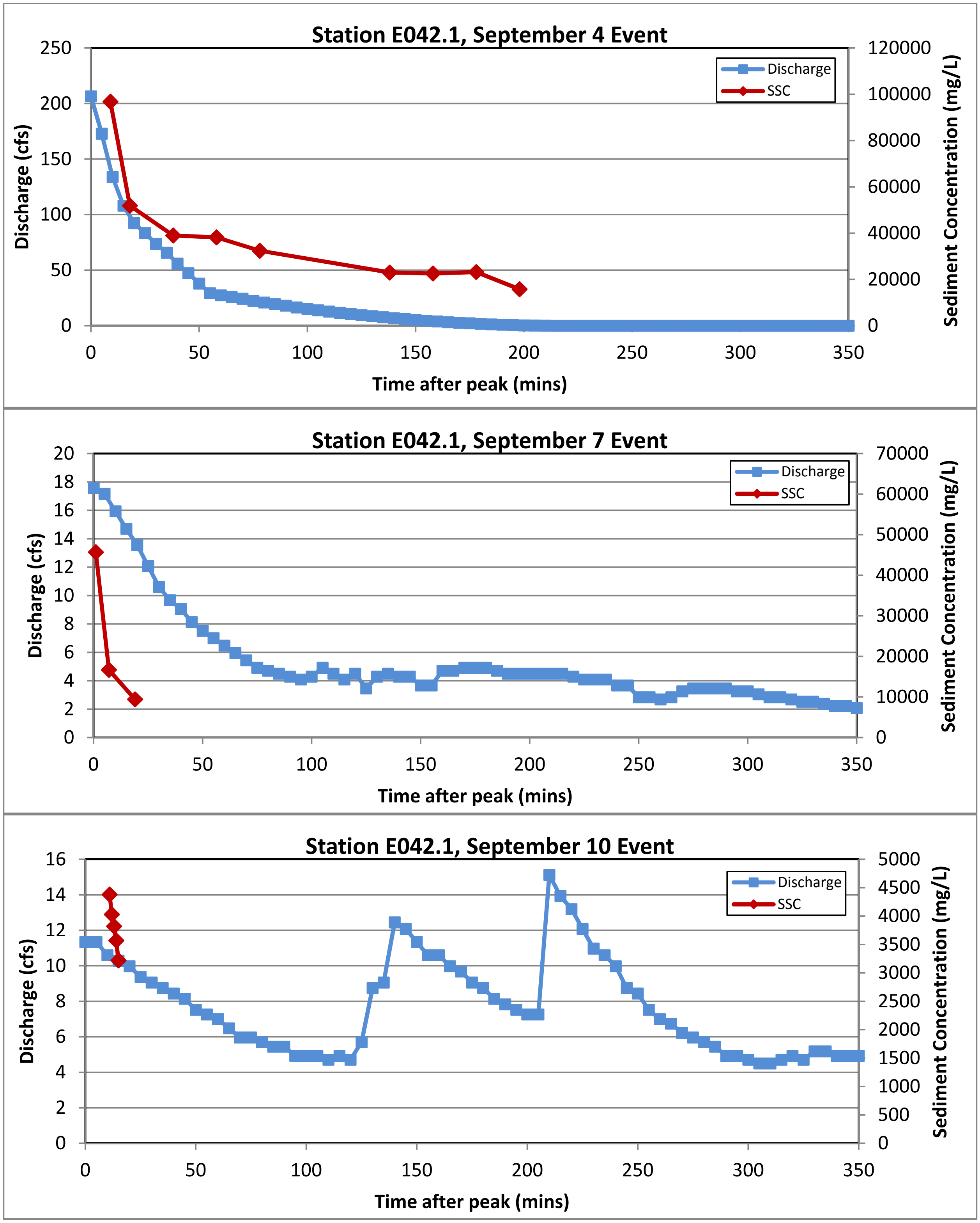
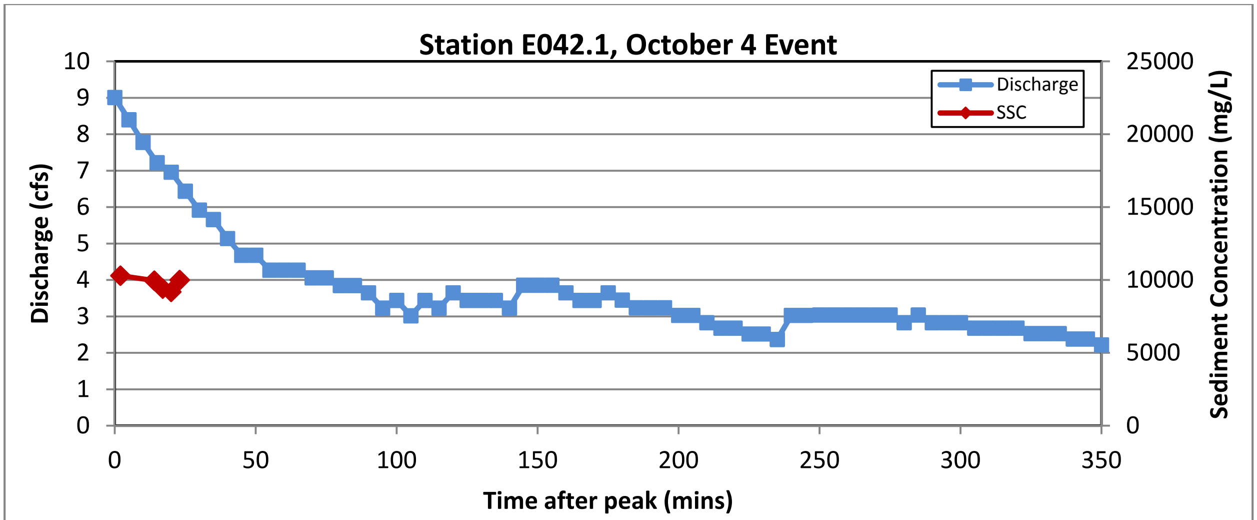
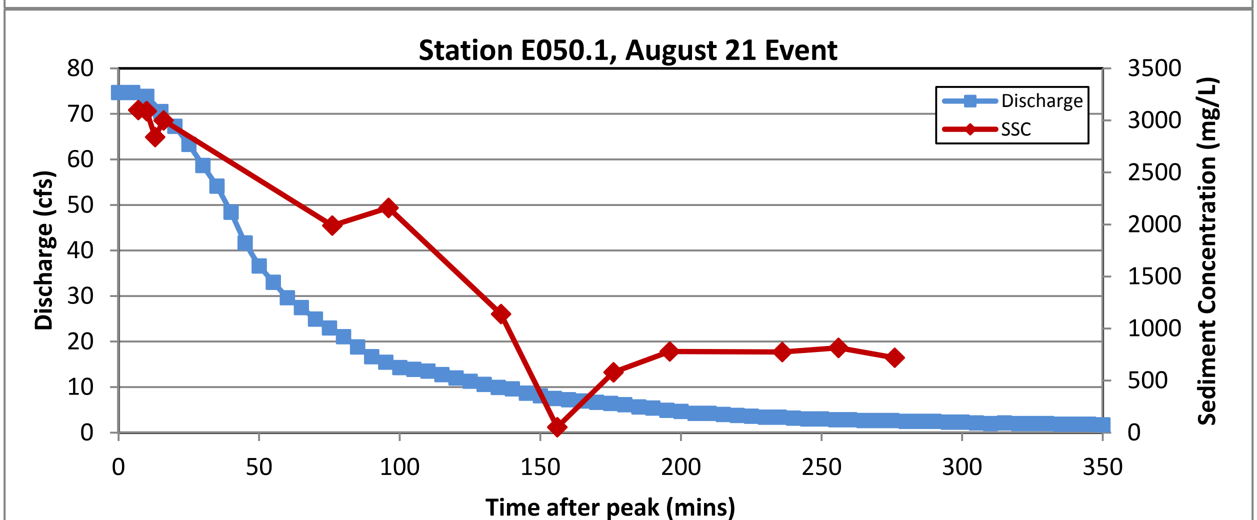


Figure 3.2-4 (continued) **Discharge and SSC for sampled events at E038, E039.1, E042.1, E050.1, and E109.9**





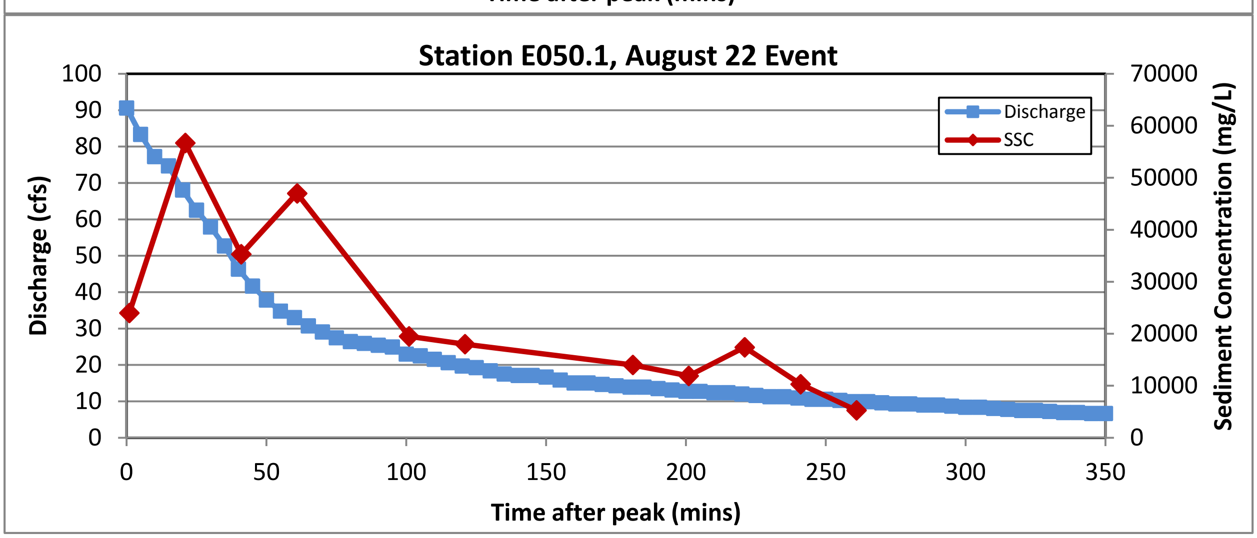


Figure 3.2-4 (continued) **Discharge and SSC for sampled events at E038, E039.1, E042.1, E050.1, and E109.9**

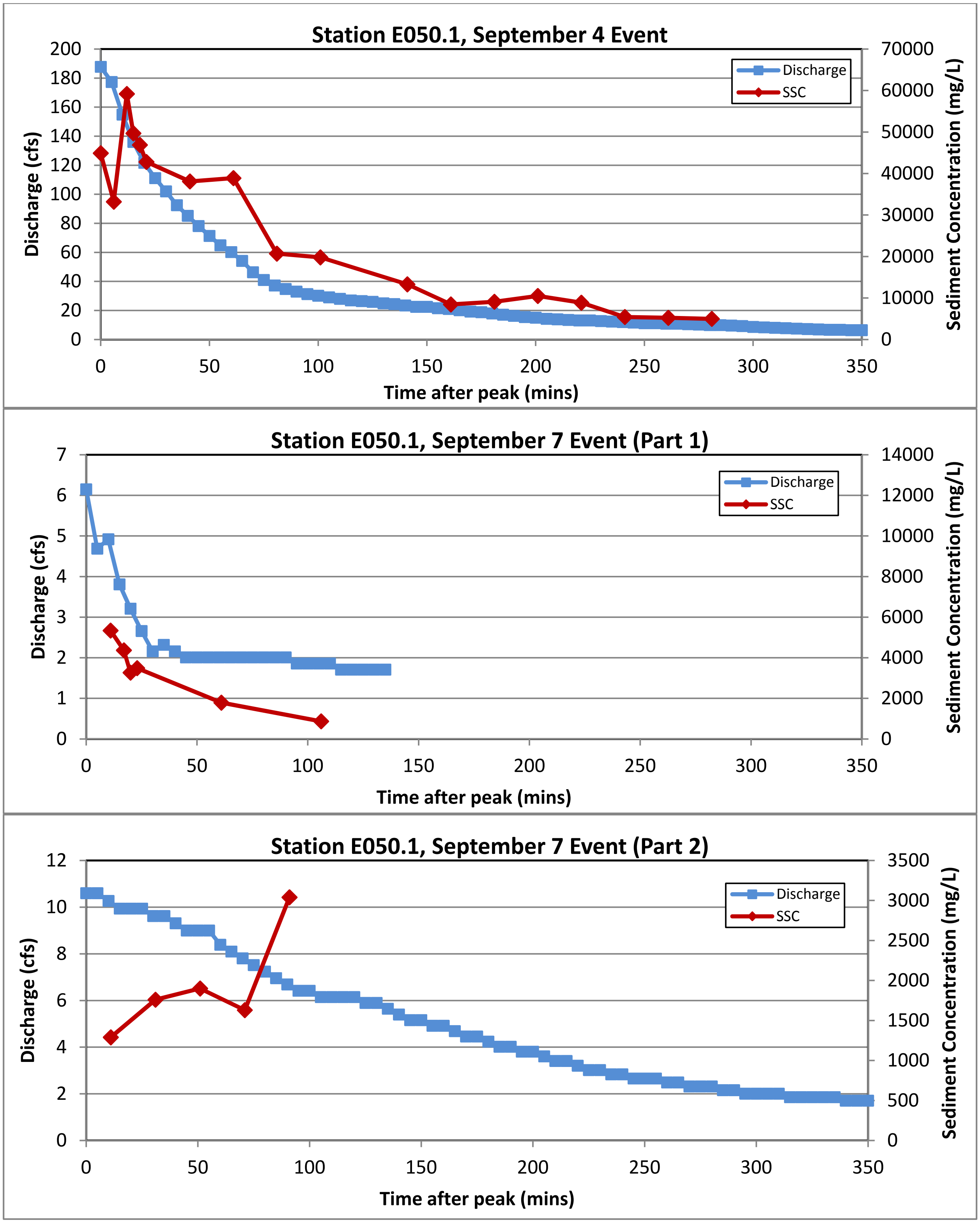


Figure 3.2-4 (continued) **Discharge and SSC for sampled events at E038, E039.1, E042.1, E050.1, and E109.9**

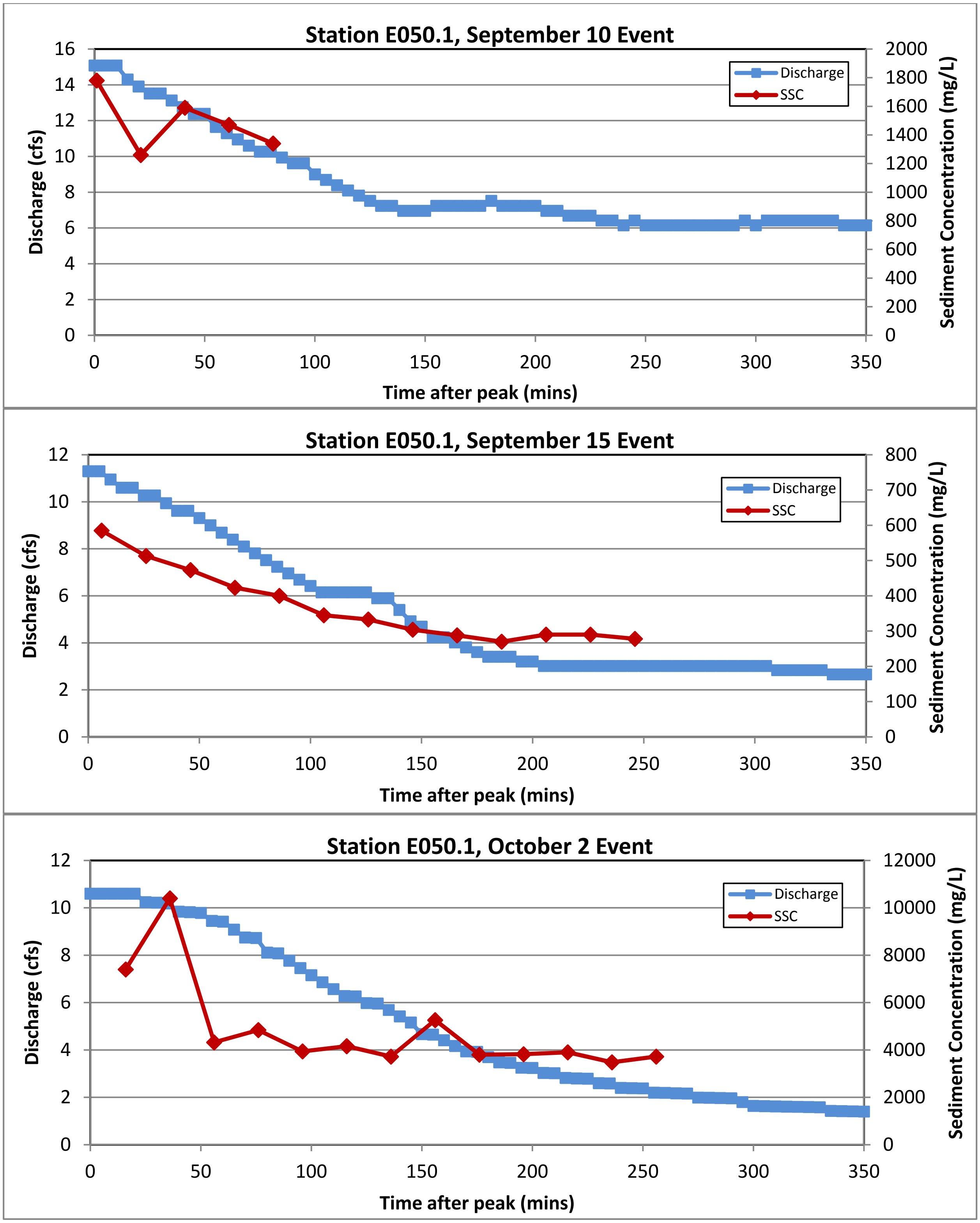


Figure 3.2-4 (continued) **Discharge and SSC for sampled events at E038, E039.1, E042.1, E050.1, and E109.9**

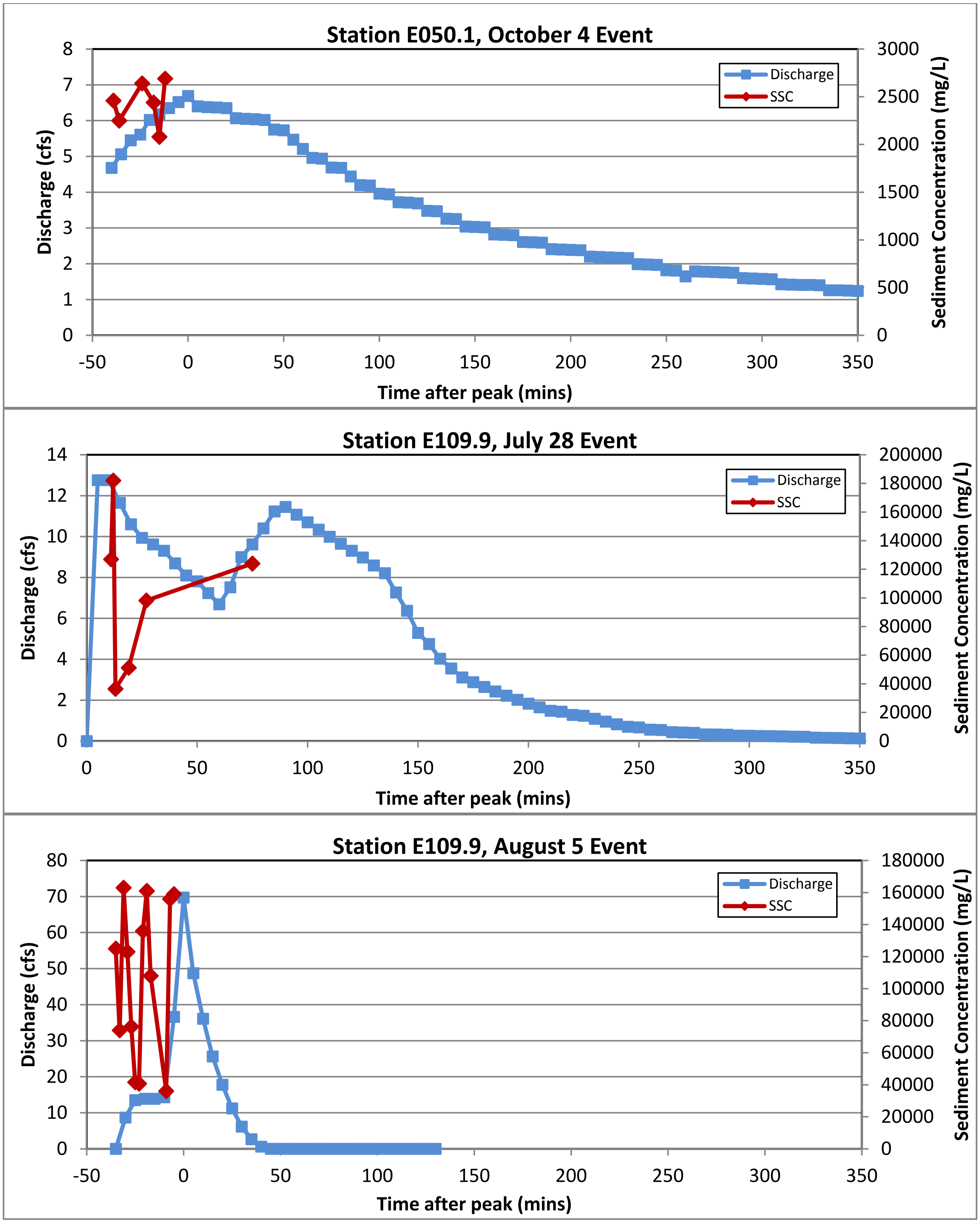


Figure 3.2-4 (continued) **Discharge and SSC for sampled events at E038, E039.1, E042.1, E050.1, and E109.9**

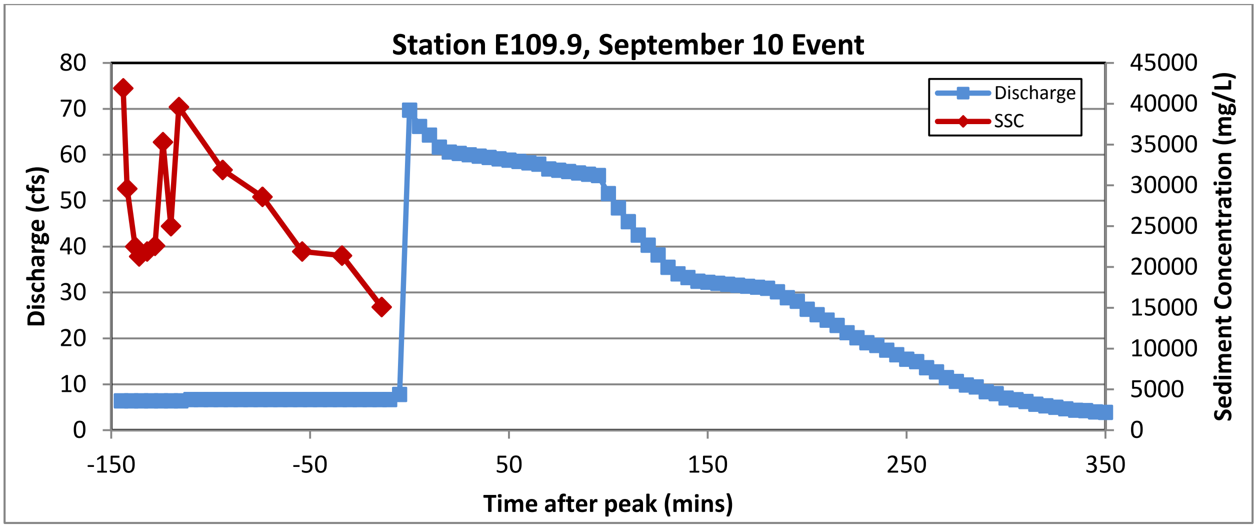


Figure 3.2-4 (continued) **Discharge and SSC for sampled events at E038, E039.1, E042.1, E050.1, and E109.9**

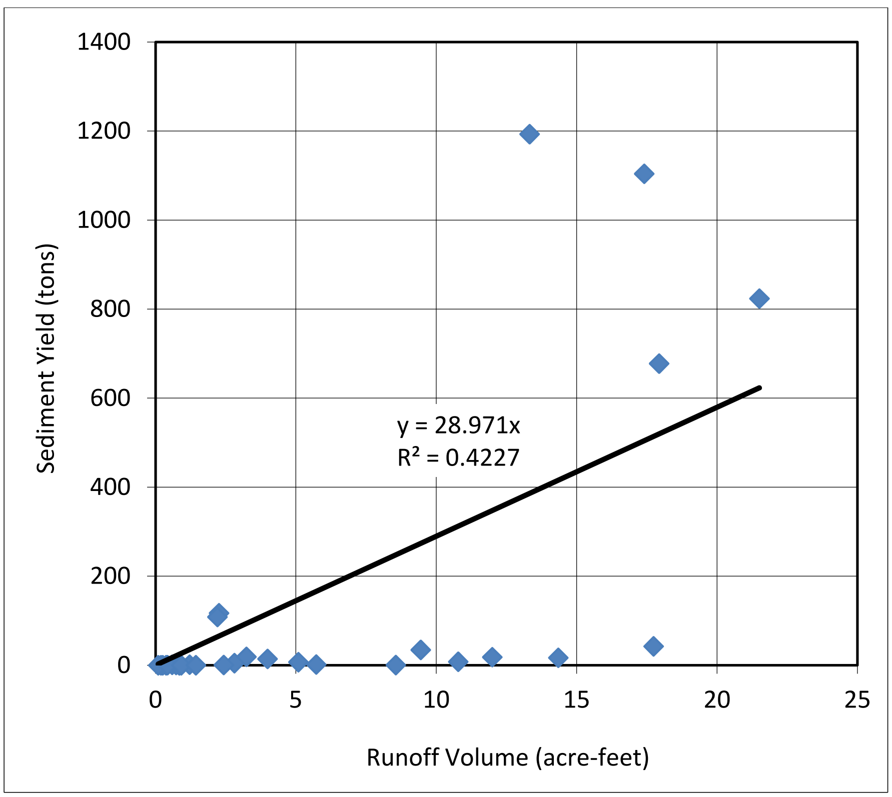


Figure 3.2-5 **Relationship between sediment yield and runoff volume**

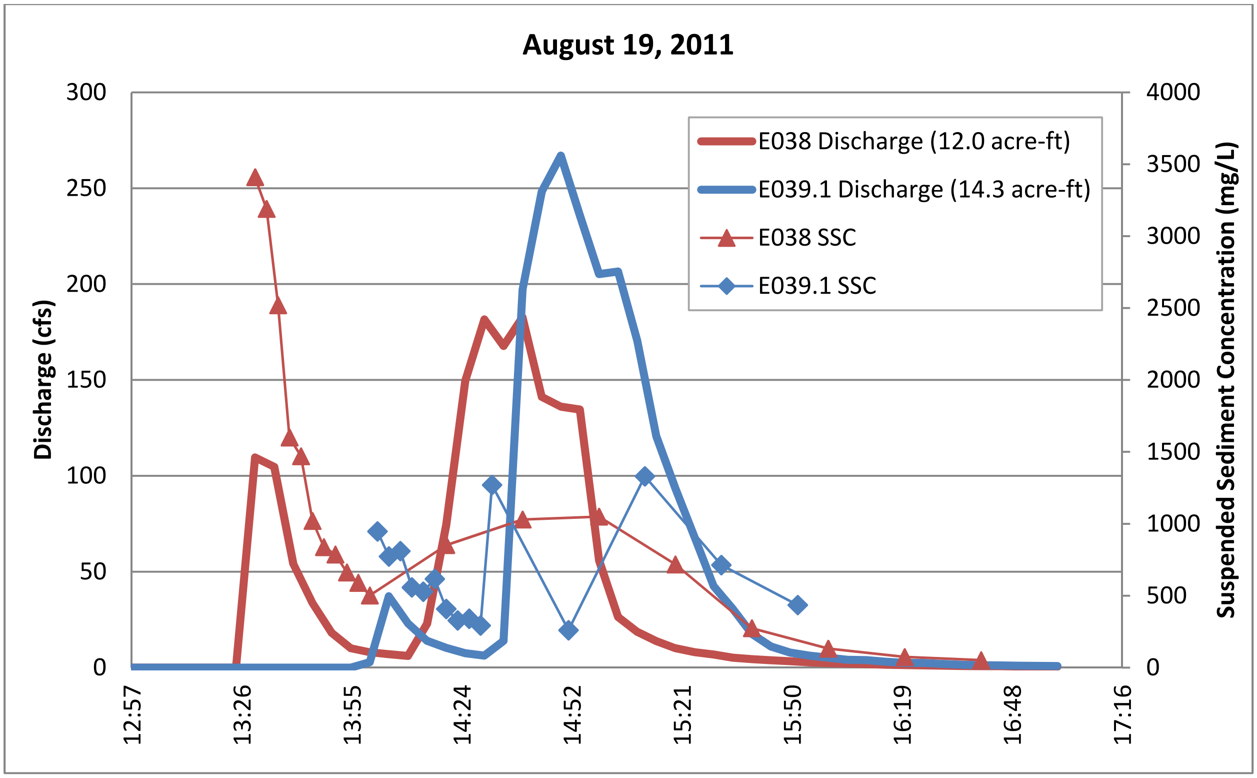
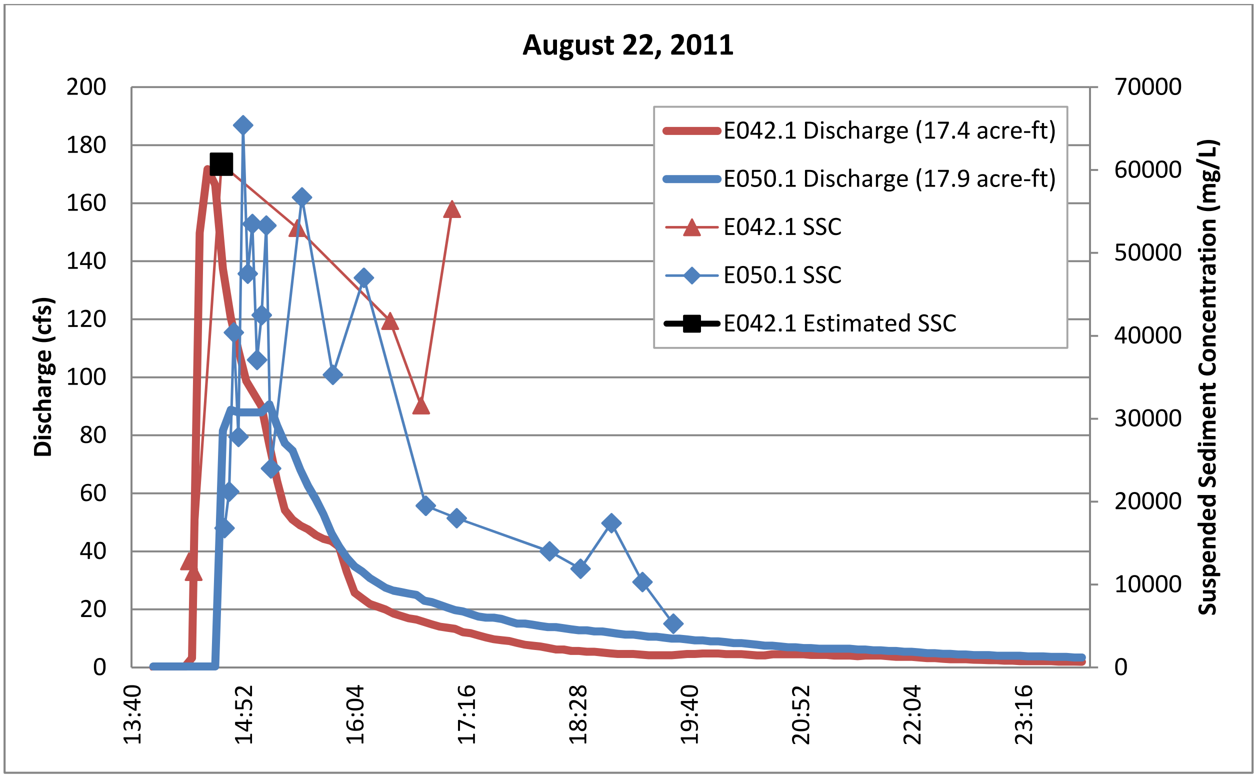


Figure 3.3-1 Discharge and SSC at E038 and E039.1 in DP Canyon on August 19, 2011



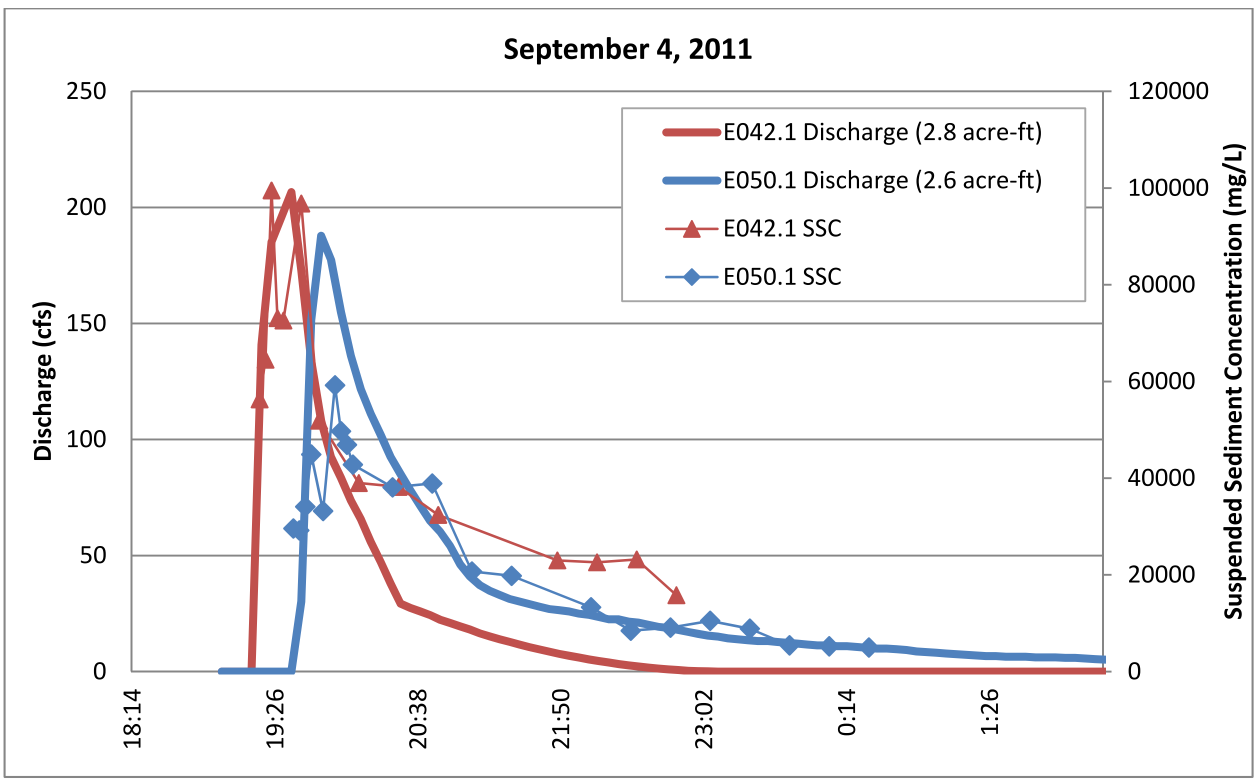
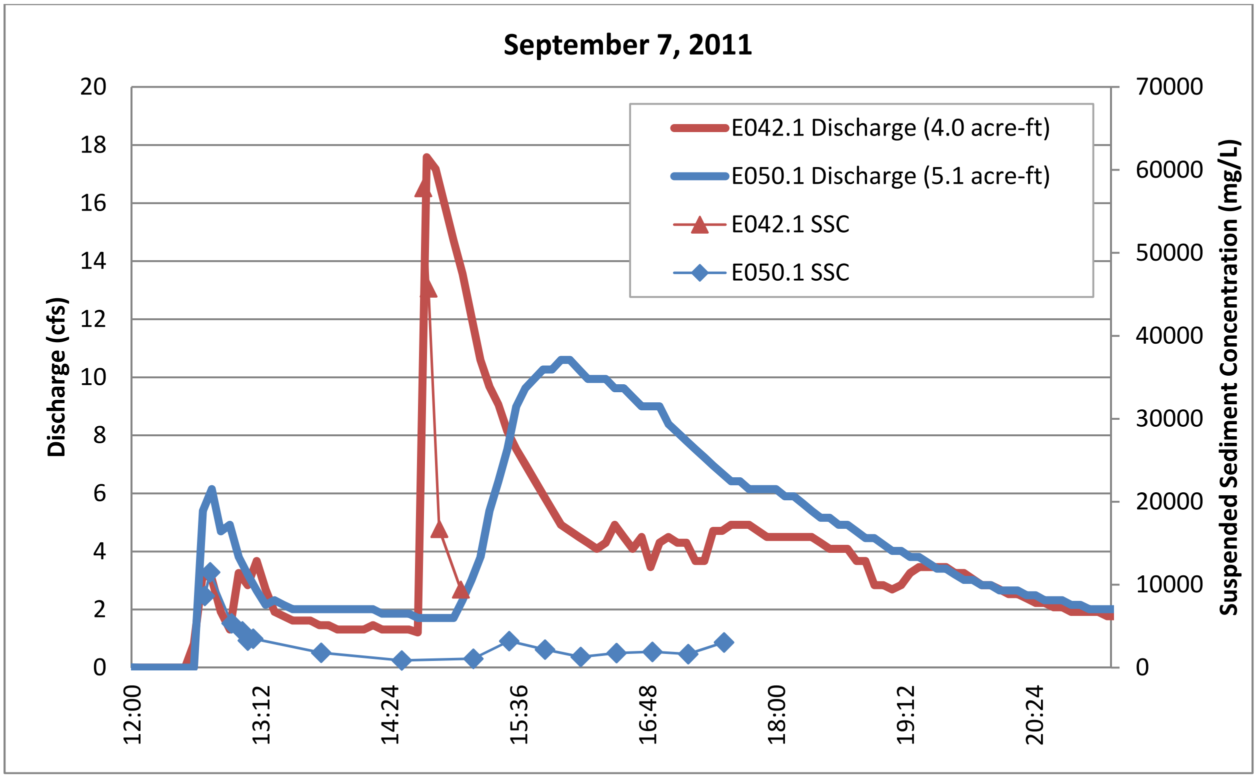


Figure 3.3-2 Discharge and SSC at E042.1 and E050.1 in upper Los Alamos Canyon on days when sampling of the same runoff event occurred



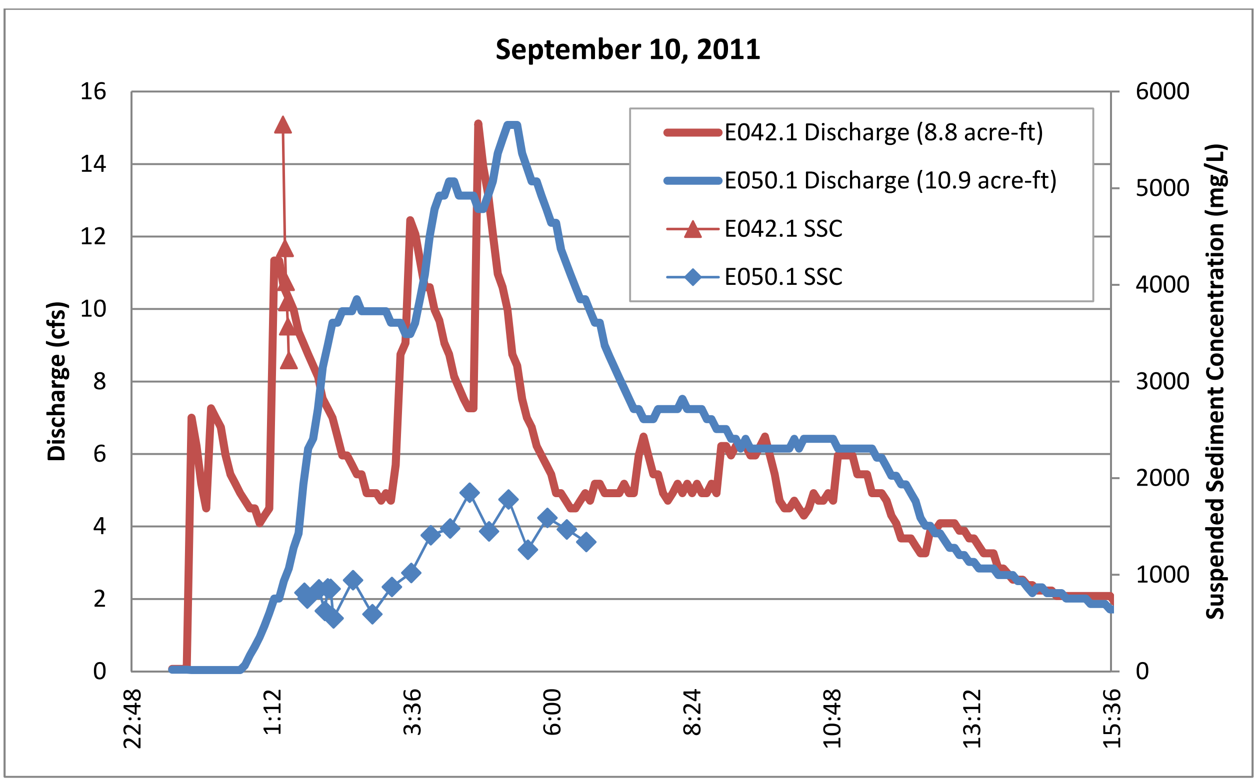
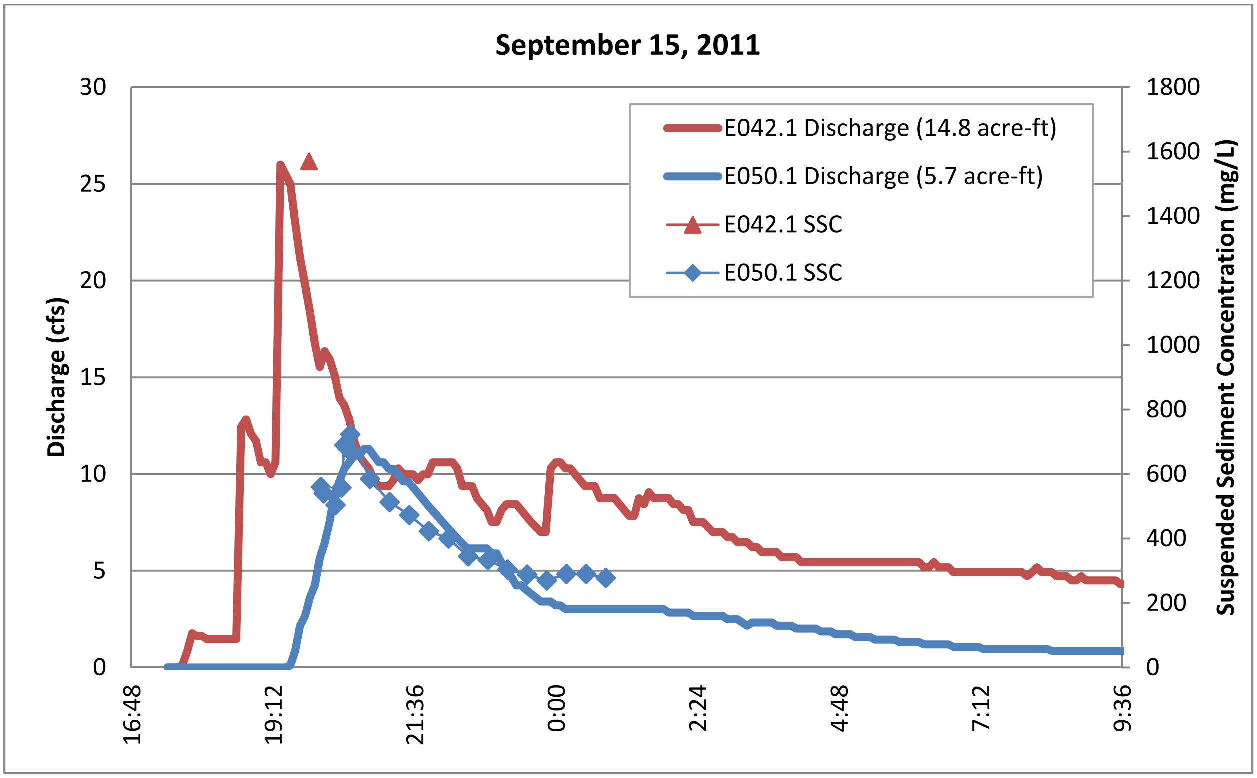


Figure 3.3-2 (continued) Discharge and SSC at E042.1 and E050.1 in upper Los Alamos Canyon on days when sampling of the same event occurred



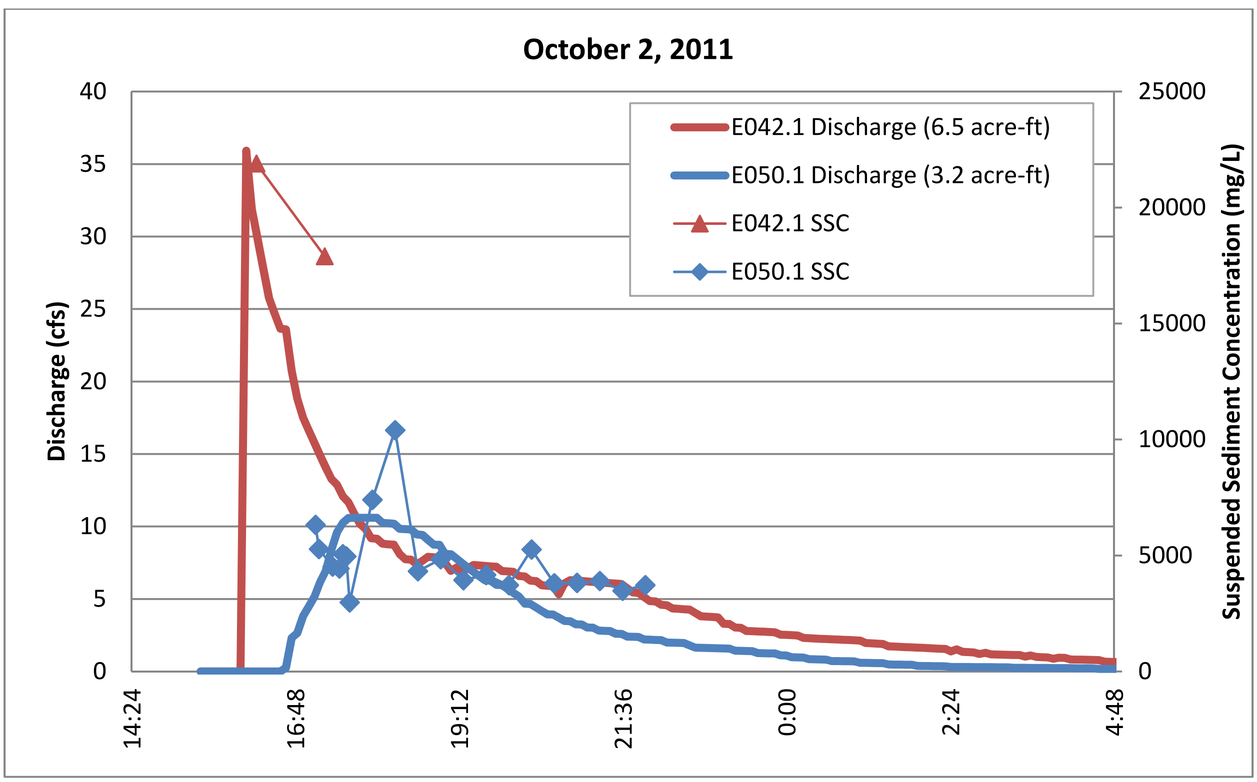


Figure 3.3-2 (continued) **Discharge and SSC at E042.1 and E050.1 in upper Los Alamos Canyon on days when sampling of the same event occurred**

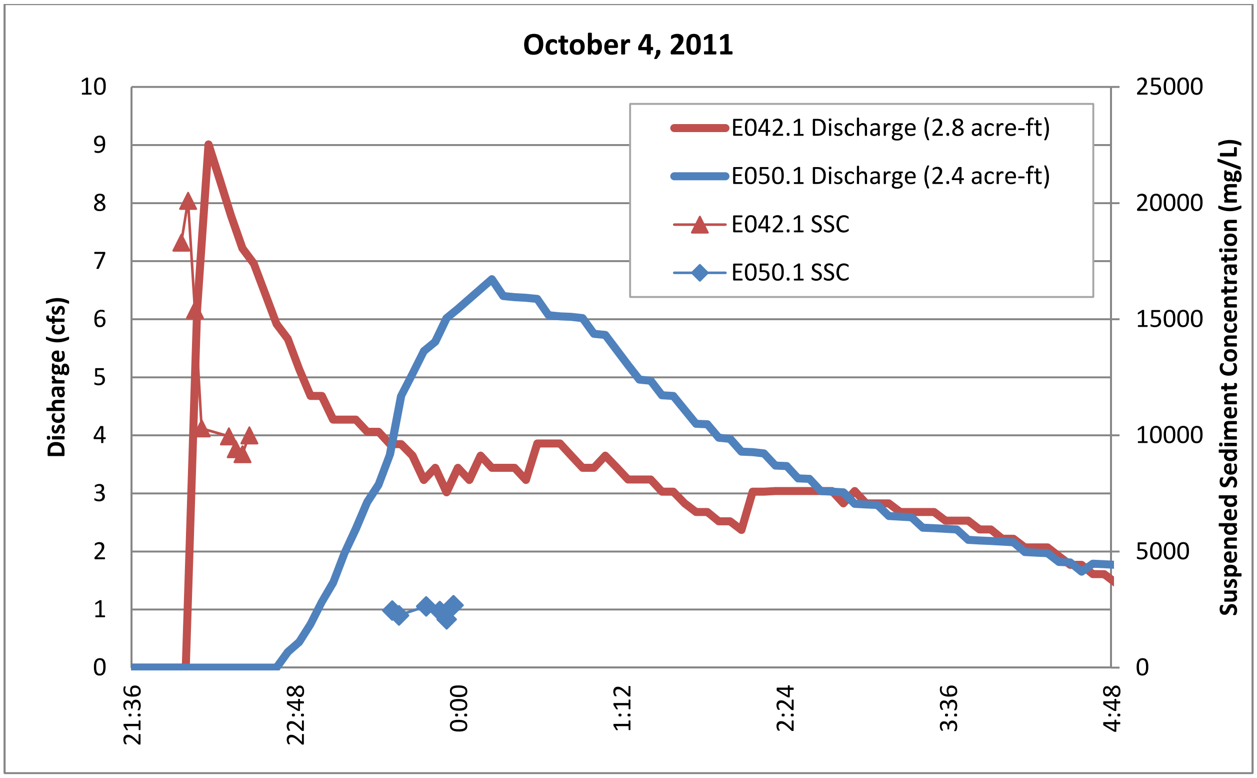


Figure 3.3-2 (continued) **Discharge and SSC at E042.1 and E050.1 in upper Los Alamos Canyon on days when sampling of the same event occurred**

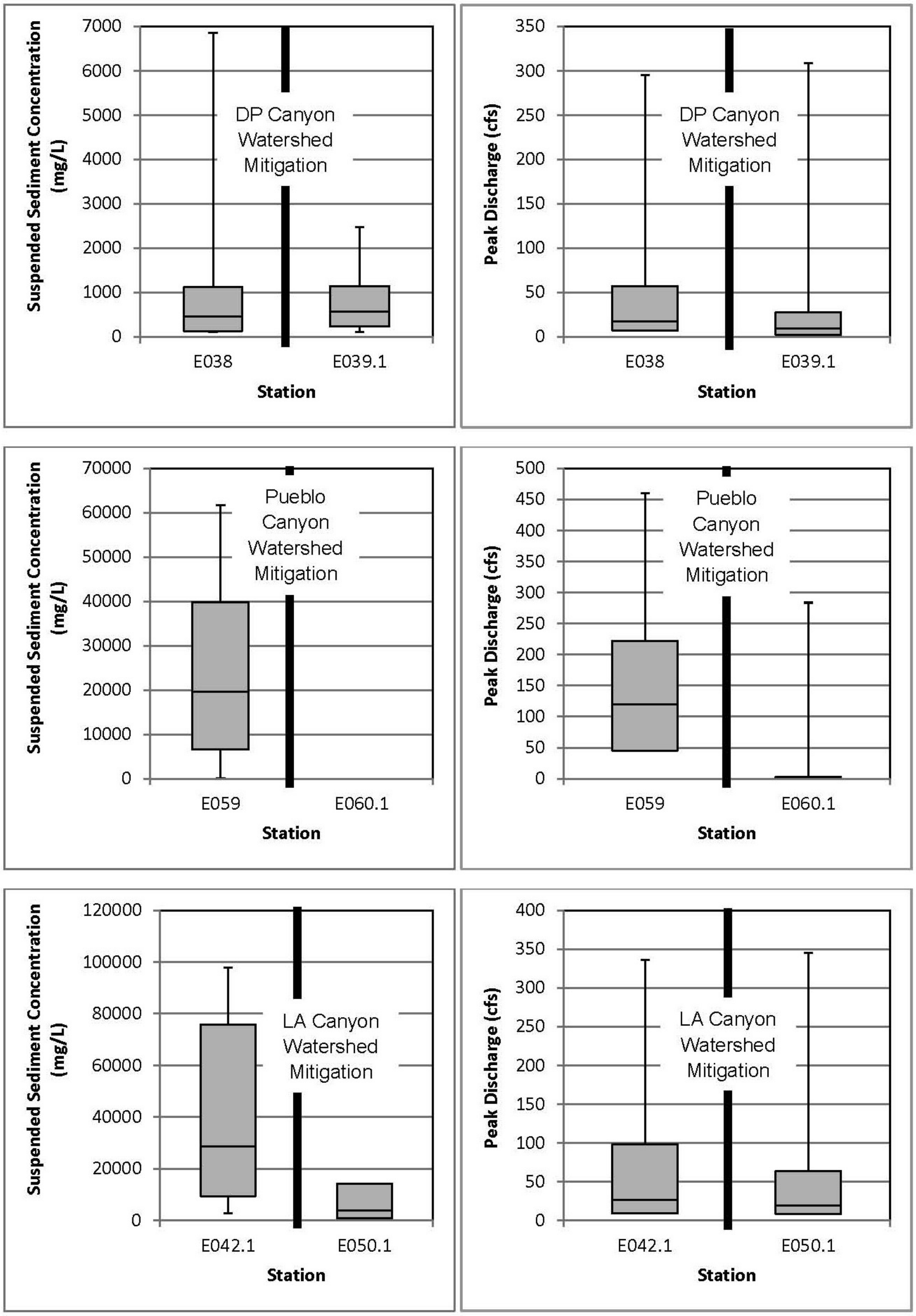


Figure 3.3-3 Box and whisker plot of SSC (top) and peak discharge (bottom) upstream and downstream of the DP Canyon watershed mitigation (left) and Pueblo Canyon watershed mitigations (right). The SSC associated with the sample collected on 8/22 at 14:39 for station E042.1 is estimated based on uranium concentrations collected at three other times during this storm.

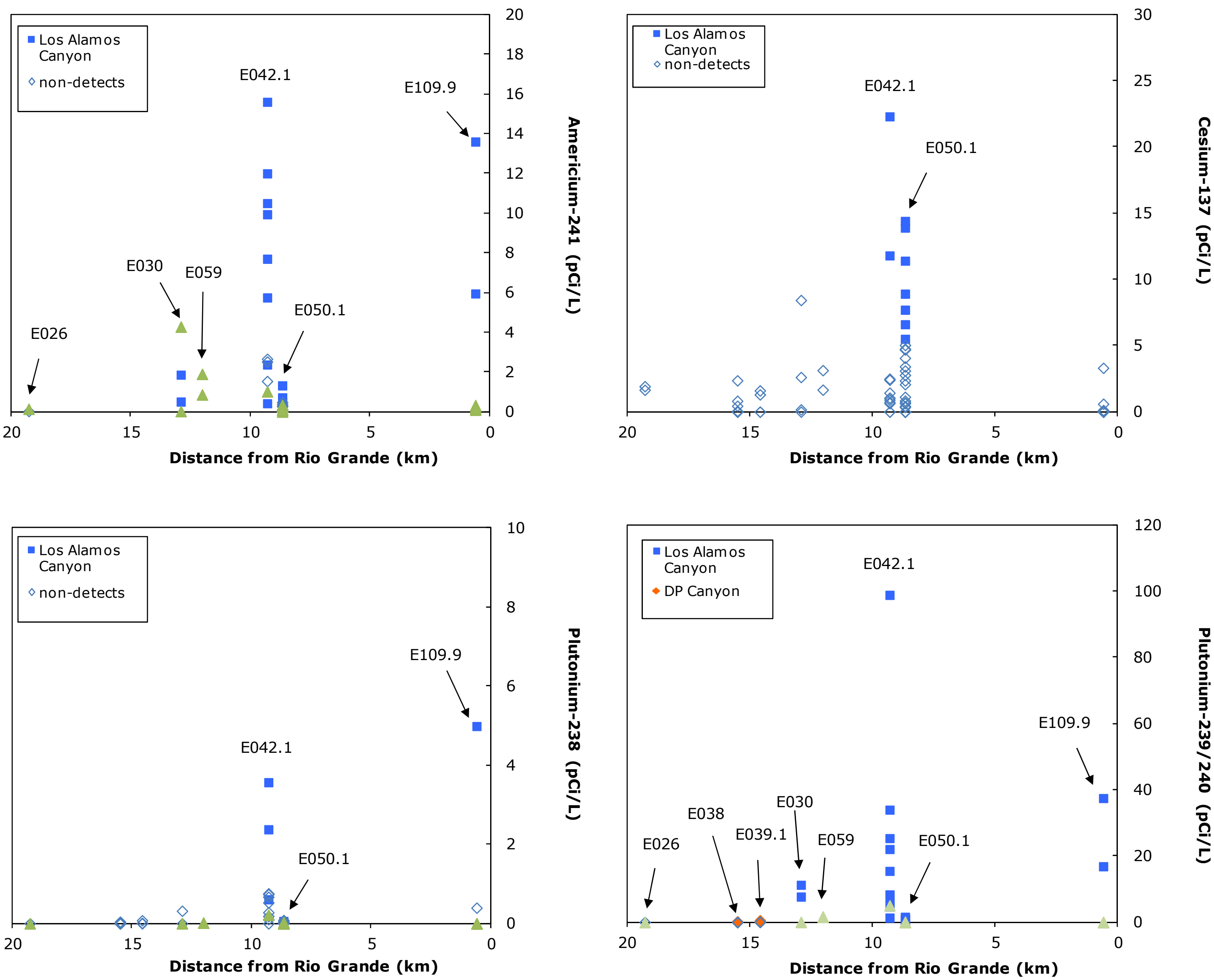


Figure 4.3-1 Radionuclide concentrations in 2011 LA/P stormwater samples versus distance from the Rio Grande

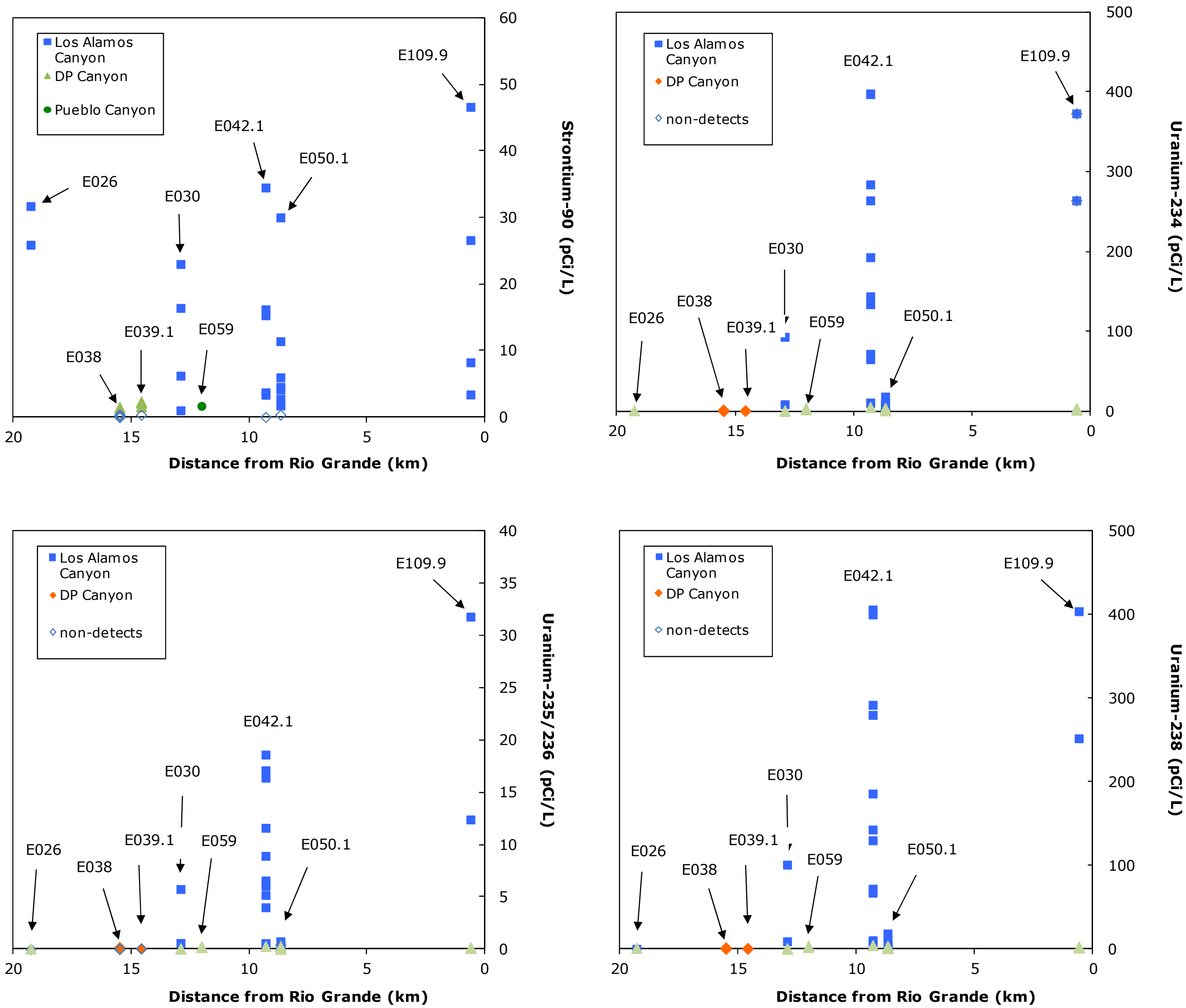


Figure 4.3-1 (continued) **Radionuclide concentrations in 2011 LA/P stormwater samples versus distance from the Rio Grande**

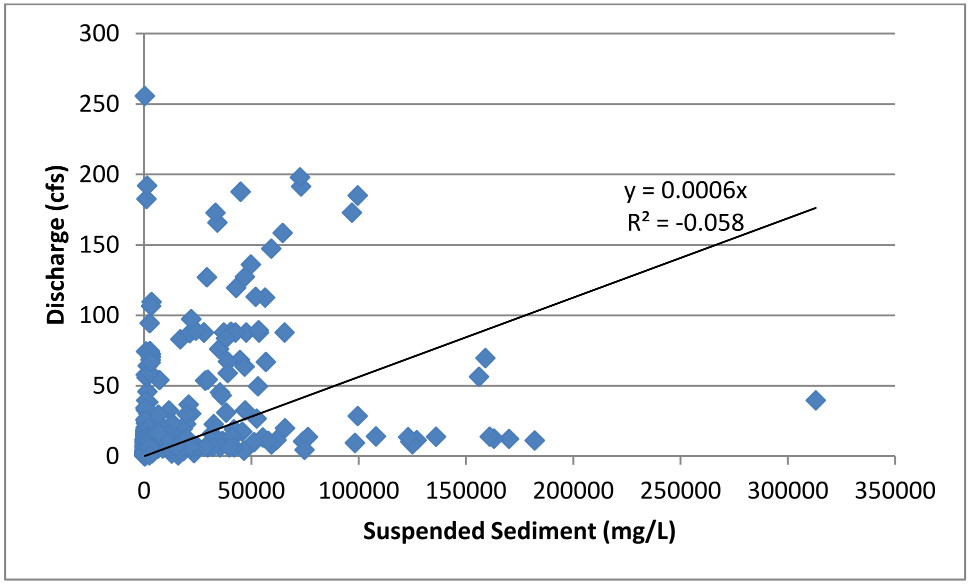


Figure 4.4-1 Relationship of SSC to discharge within the LA/P watershed in 2011

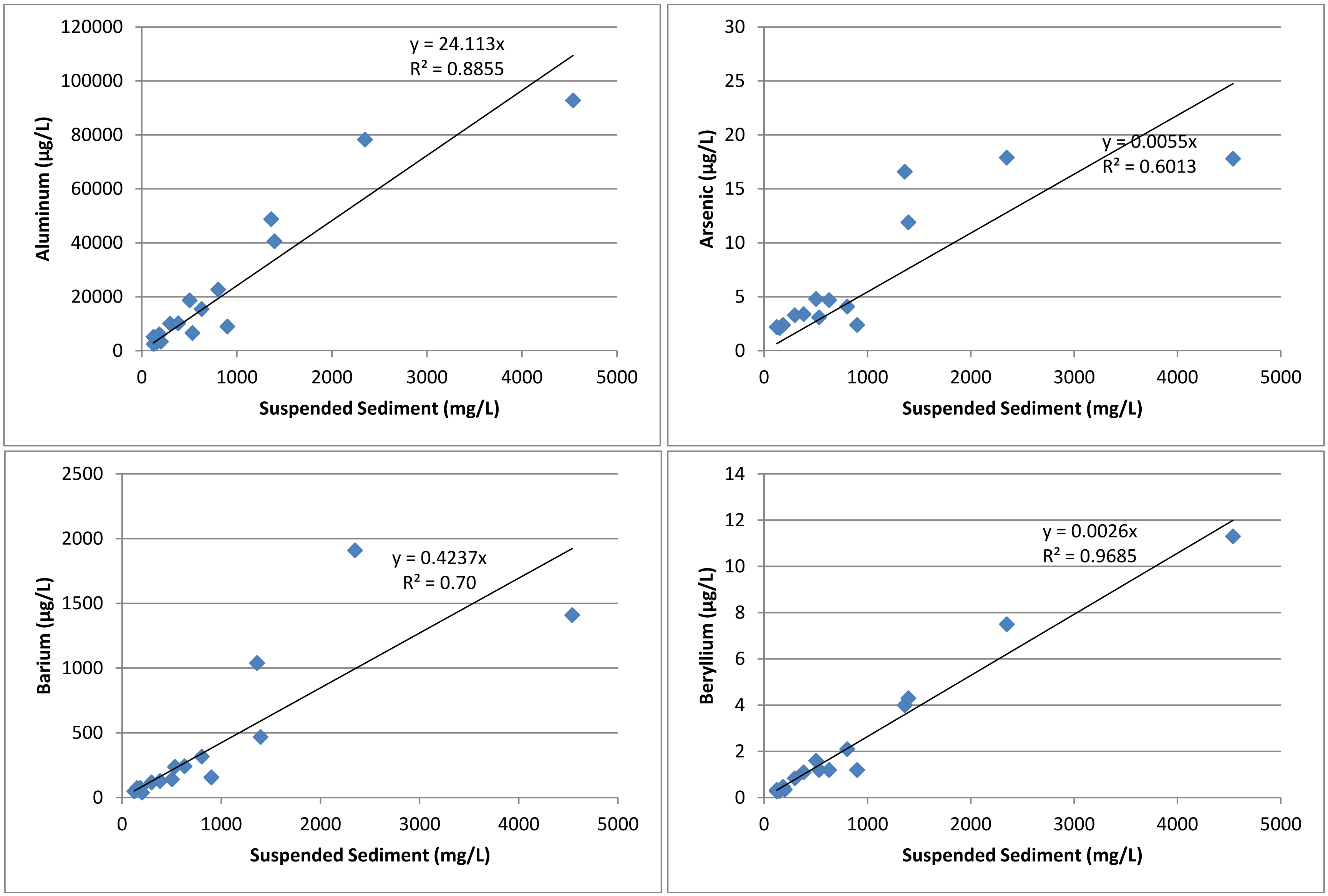


Figure 4.4-2 Relationship of SSC to other constituents in stormwater within the LA/P watershed in 2011

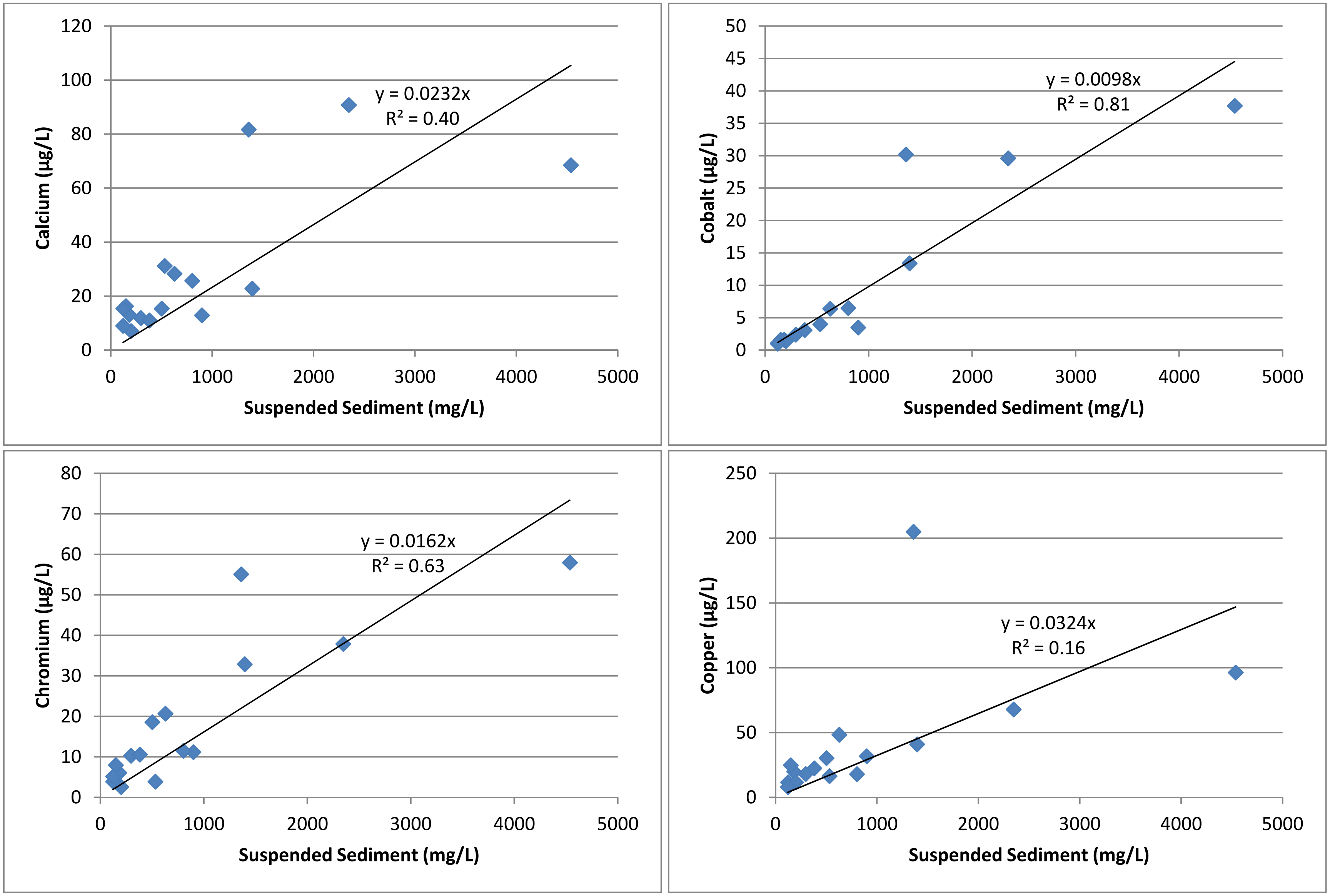


Figure 4.4-2 (continued) **Relationship of SSC to other constituents in stormwater within the LA/P watershed in 2011**

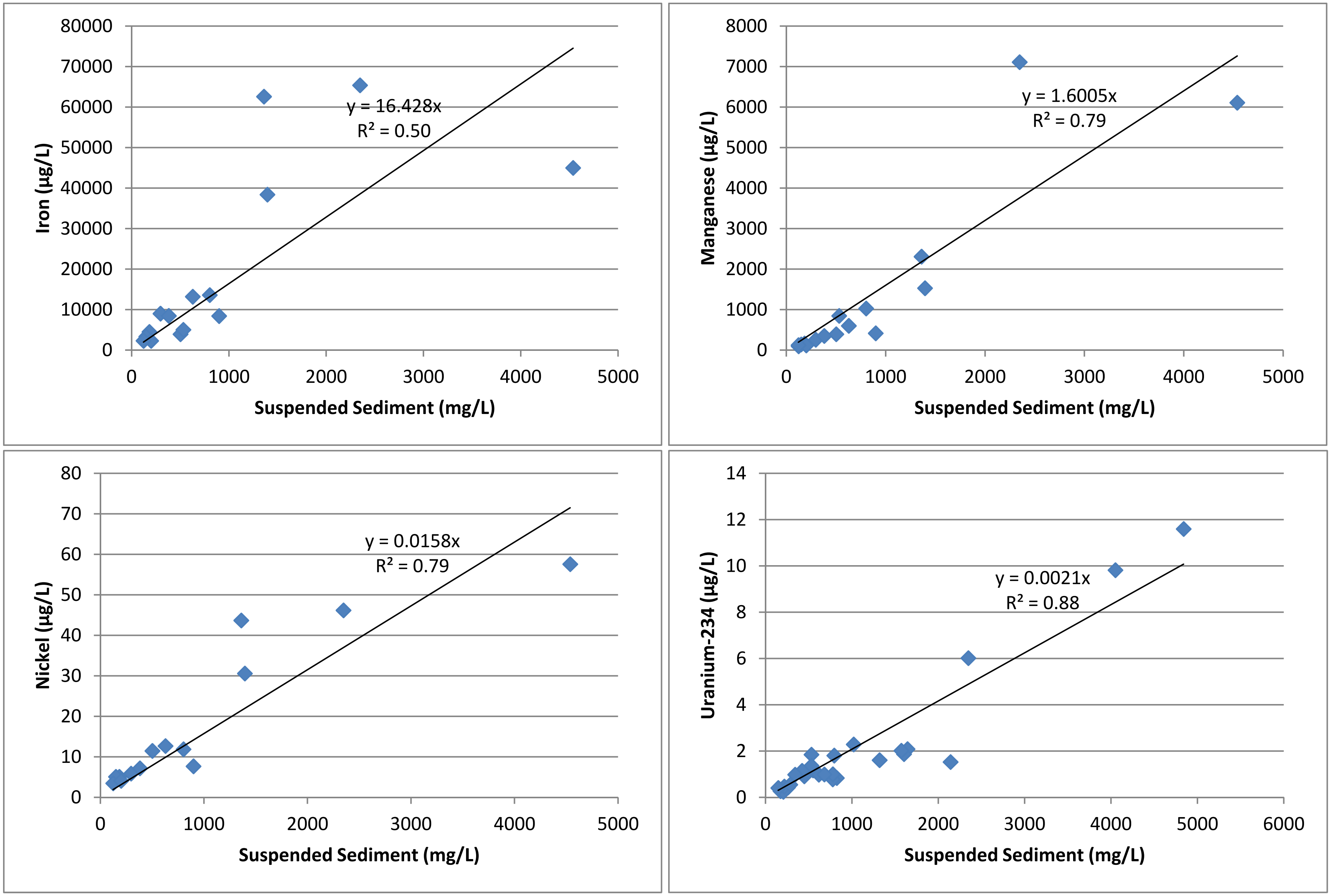


Figure 4.4-2 (continued) **Relationship of SSC to other constituents in stormwater within the LA/P watershed in 2011**

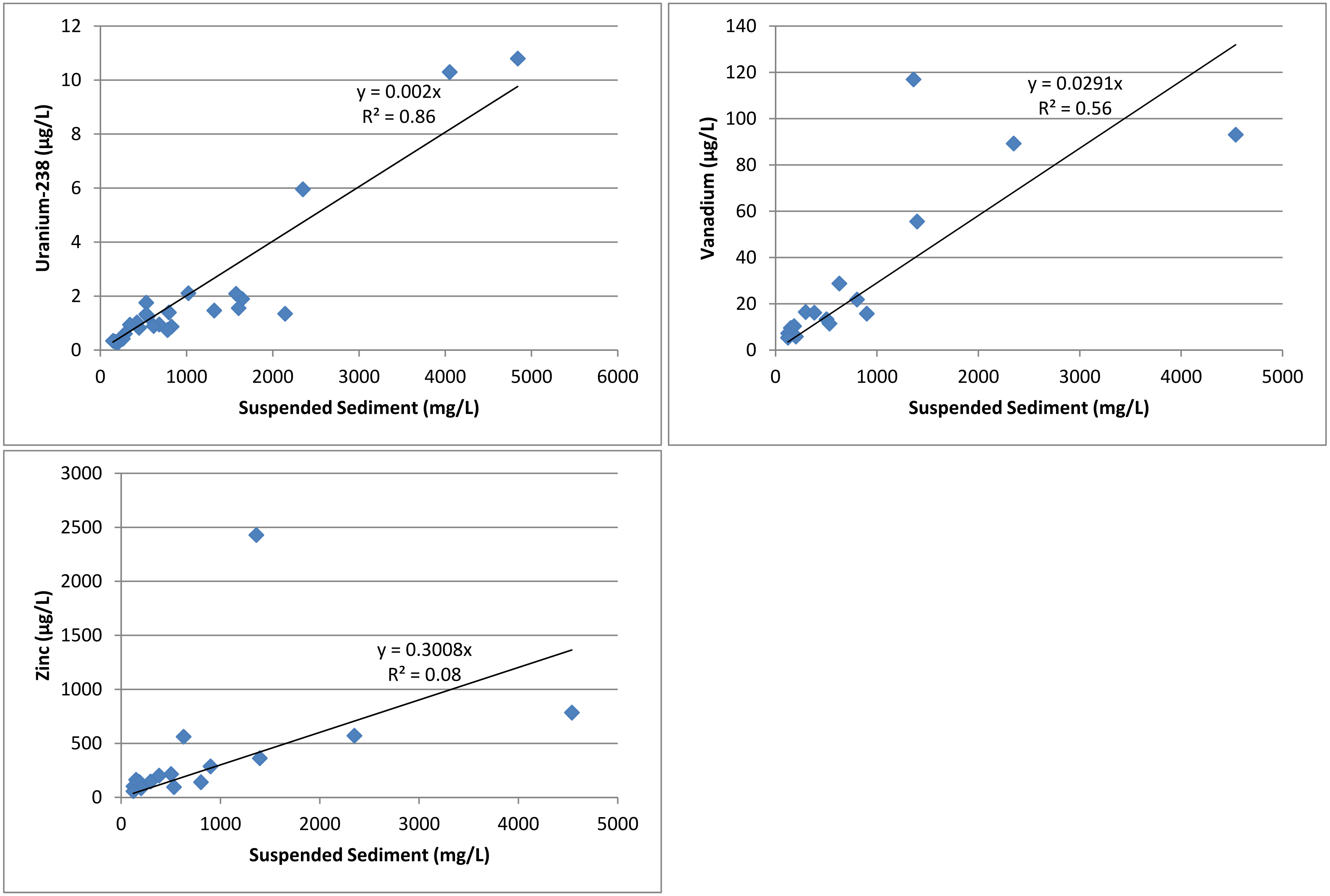


Figure 4.4-2 (continued) **Relationship of SSC to other constituents in stormwater within the LA/P watershed in 2011**

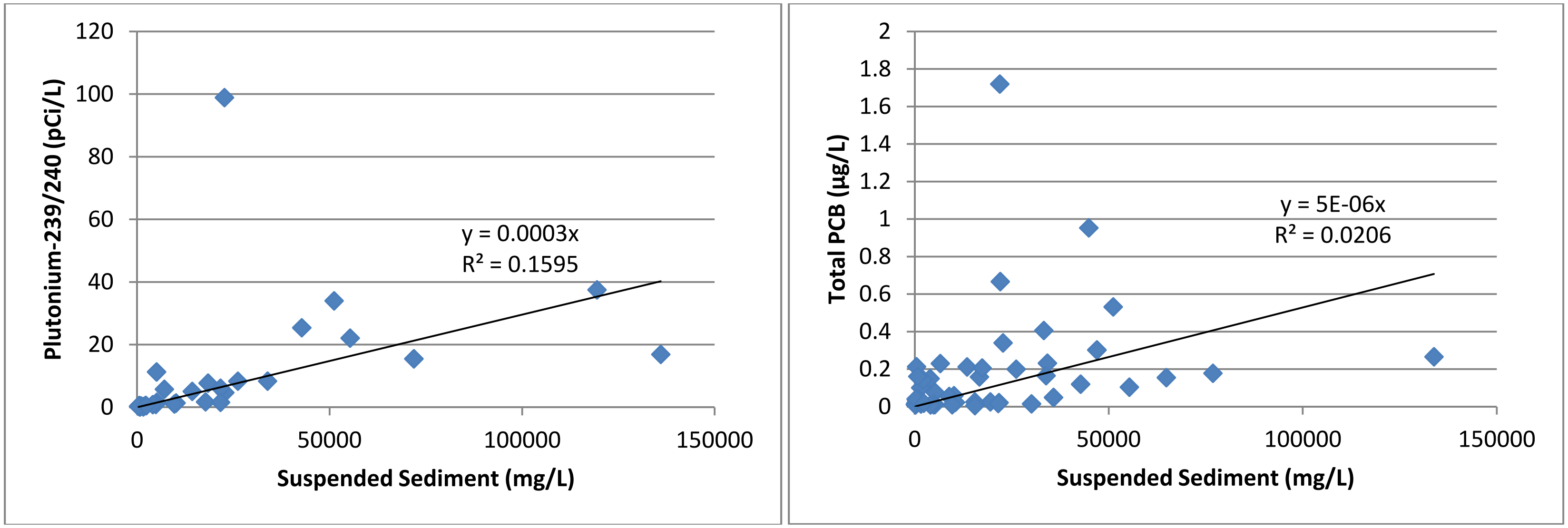


Figure 4.4-3 Relationship of SSC to plutonium-239/240 and total PCBs within the LA/P watershed in 2011

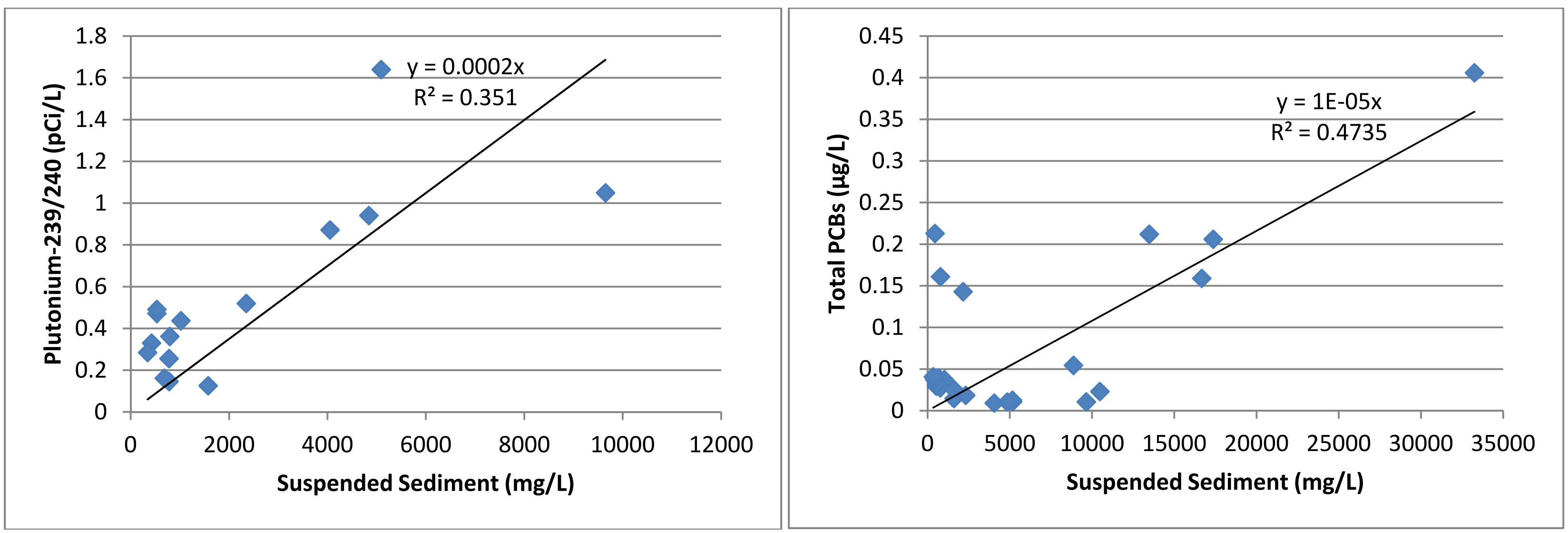


Figure 4.4-4 Relationship of SSC to plutonium-239/240 and total PCBs at E050.1 in 2011

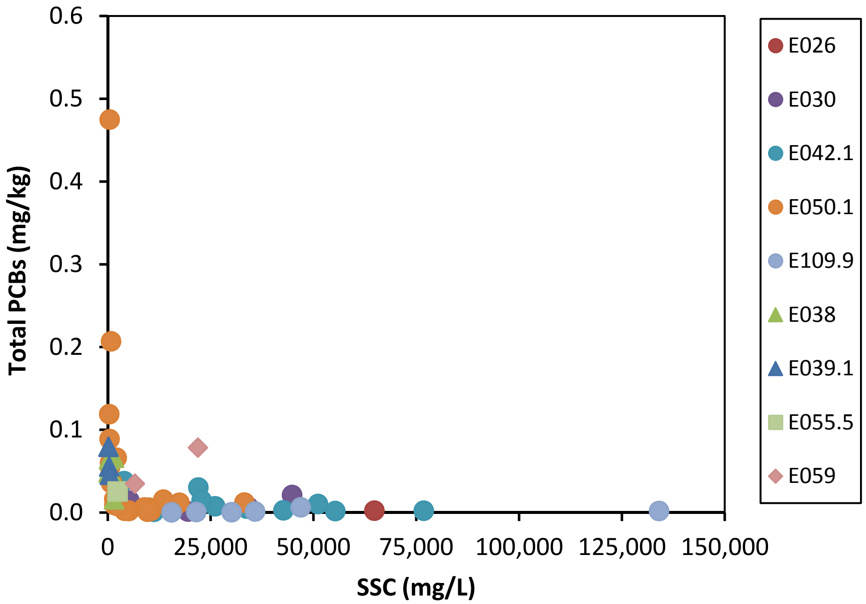


Figure 4.4-5 Calculated total PCB concentration in sediment versus SSC for 2011 LA/P stormwater samples

Table 2.0-1
Station Configuration at LA/P Gages

Gage	Stage Measurement Device	Communication Method with Gage Datalogger	Sampler Trip Level (aboveground)	Sampler Intake Level (aboveground)
E026	Encoder	Manual download	1.3 ft	4 in.
E030	Encoder	Manual download	1.54 ft	4 in.
E038	Bubbler	Dial-up modem	0.7 ft	4 in.
E039.1	Encoder	Manual download	0.58 ft	4 in.
E040	Probe	Manual download	2.73 ft	4 in.
E042.1	Encoder	Dial-up modem	0.58 ft	4 in.
E050.1	Encoder/bubbler	Radio telemetry	0.4 ft	2.4 in.
E055	Bubbler	Manual download	1.21 ft	4 in.
E055.5	Bubbler	Manual download	0.75 ft	4 in.
E056	Bubbler	Manual download	1.39 ft	4 in.
E059	Encoder	Manual download	0.58 ft	4 in.
E060.1	Encoder/bubbler	Radio telemetry	0.4 ft	2.4 in.
E099	Encoder	Manual download	0.9 ft	6 in.
E109.9	Encoder/bubbler	Radio telemetry	0.4 ft	2.4 in.

Table 2.2-1
Maximum Daily Discharge and Stormwater Sampling in the LA/P Watershed during 2011

Date	Los Alamos Canyon Discharge (cfs)								Pueblo and Acid Canyon Discharge (cfs)				
	DP Canyon			Los Alamos Canyon					Acid Canyon		Pueblo Canyon		
	E038	E039.1	E040	E026	E030	E042.1	E050.1	E109.9	E055.5	E056	E055	E059	E060.1
07/02/2011	19 S[a,b]	0 NS[c,d]	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS
07/22/2011	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	53 S	0 NS	0 NS	0 NS	0 NS	0 NS
07/28/2011	17 S	0 NS	0 NS	<1 NS[e]	0 NS	0 NS	0 NS	13 S	0 NS	0 NS	0 NS	0 NS	0 NS
08/01/2011	97 NS[f]	12 S	0 NS	0 NS	0 NS	0 NS	0 NS	<1 NS	0 NS	0 NS	0 NS	0 NS	0 NS
08/02/2011	9 S	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS
08/03/2011	43 NS	9 NS	4 NS	0 NS	0 NS	0 NS	0 NS	81 S	0 NS	0 NS	0 NS	0 NS	0 NS
08/04/2011	42 NS	11 S	8 NS	0 NS	0 NS	0 NS	0 NS	3 NS	4 NS	<1 NS	0 NS	0 NS	0 NS
08/05/2011	73 NS	28 NS	12 NS	<1 NS	0 NS	0 NS	0 NS	70 S	4 NS	9 NS	0 NS	0 NS	0 NS
08/13/2011	14 S	2 NS	0 NS	<1 NS	0 NS	0 NS	0 NS	8 NS	0 NS	0 NS	0 NS	0 NS	0 NS
08/15/2011	4 S	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS
08/19/2011	183 S	267 S	161 NS	<1 NS	8 NS	72 S	3 NS	3 NS	19 S	24 NS	13 NS	17 S	0 NS
08/21/2011	238 NS	290 NS	208 NS	<1 NS	30 S	93 NS	75 S	610 NS[g]	20 NS	143 NS	24 NS	131 S	0 NS
08/22/2011	0 NS	0 NS	<1 NS	31 S	95 S	172 S	91 S	95 S	0 NS	0 NS	2 NS	0 NS	0 NS
08/26/2011	0 NS	0 NS	0 NS	na[h] NS	0 NS	<1 NS	0 NS	35 S[g]	0 NS	0 NS	<1 NS	0 NS	0 NS
09/01/2011	na S	0 NS	0 NS	0 NS	<1 NS	2 NS	<1 NS	340 NS	0 NS	0 NS	0 NS	0 NS	0 NS
09/04/2011	7 S	2 NS	<1 NS	49 S	107 S	207 S	188 S	632 S	0 NS	0 NS	0 NS	0 NS	0 NS
09/07/2011	40 S	5 NS	8 NS	0 NS	1 NS	18 S	11 S	61 S	2 NS	8 NS	2 NS	0 NS	4 NS

Table 2.2-1 (continued)

Date	Los Alamos Canyon Discharge (cfs)								Pueblo and Acid Canyon Discharge (cfs)				
	DP Canyon			Los Alamos Canyon					Acid Canyon		Pueblo Canyon		
	E038	E039.1	E040	E026	E030	E042.1	E050.1	E109.9	E055.5	E056	E055	E059	E060.1
09/10/2011	7 NS	5 NS	3 NS	<1 NS	1 NS	15 S	15 S	70 S	0 NS	5 NS	9 NS	0 NS	<1 NS
09/15/2011	na NS	12 S	9 NS	<1 NS	4 NS	26 S	11 S	2 NS	0 NS	3 NS	5 NS	0 NS	0 NS
10/02/2011	0 NS	0 NS	0 NS	14 NS	13 S	36 S	11 S	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS
10/04/2011	9 S	<1 NS	0 NS	4 NS	8 NS	9 S	6 S	13 NS	0 NS	0 NS	0 NS	0 NS	0 NS
10/07/2011	8 NS	2 NS	1 NS	0 NS	<1 NS	0 NS	0 NS	14 NS	0 NS	<1 NS	0 NS	0 NS	0 NS
10/12/2011	1 S	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	0 NS	<1 NS	0 NS	0 NS

[a] S = Sample was collected.

[b] Green highlight in cell indicates one or more samples were collected on a day with recorded discharge at that station.

[c] NS = Sample was not collected.

[d] No highlight in cell indicates that no discharge occurred at that station.

[e] Yellow highlight in cell indicates no sample was collected on a day with recorded discharge below the triggering threshold at that station.

[f] Blue highlight in cell indicates no sample was collected on a day with recorded discharge above the triggering threshold at that station.

[g] Flow is estimated.

[h] na = Discharge information is not available. Cell is highlighted in grey.

Table 2.3-1
Locations and Analytical Suites for Stormwater Samples

Monitoring Group	Locations	Analytical Suite[a,b]
Upper Los Alamos Canyon gages	E038, E039.1, E040, E026, E030	SSC, PCBs (by Method 1668A), gamma spectroscopy radionuclides, isotopic plutonium, isotopic uranium, strontium-90, dioxins and furans, TAL metals, hardness, gross alpha, americium-241, cyanide[c]
Upper Pueblo Canyon gages	E055, E055.5, E056	SSC, PCBs (by method 1668A), isotopic plutonium, dioxins and furans, TAL metals, hardness, gross alpha
Lower watershed gages	E042.1, E050.1, E059, E060.1, E109.9	PCBs (by method 1668A), isotopic plutonium, gamma spectroscopy radionuclides, isotopic uranium, americium-241 (by alpha spectroscopy), strontium-90, dioxins and furans, TAL metals, hardness, gross alpha, gross beta, radium-226/radium-228, SSC, cyanide[d]
Detention basins and wetland below the SWMU 01-001(f) drainage	CO101038, CO101039, CO101040	TAL metals, hardness, PCBs (by method 1668A), isotopic uranium, total organic carbon, gross alpha, gross beta, SSC
Graduation Canyon below SWMU 00-019	CO115002	TAL metals, hardness, PCBs (by method 1668A), total organic carbon, gross alpha, gross beta, SSC

[a] Suites are listed in order of priority to guide analysis of limited water volumes. SSC is independent of prioritization because it is derived from separate sample bottles.

[b] Radionuclides will be analyzed in filtered and unfiltered samples at E109.9.

[c] Americium-241 and cyanide were not planned to be analyzed for samples collected at E038, E039.1, or E040.

[d] Cyanide were not planned to be analyzed for samples collected at E059 or E060.1.

Table 2.3-2
Analytical Requirements for Stormwater Samples

Analytical Suite	Method	Detection Limit	Upper Los Alamos Canyon	Upper Pueblo Canyon	Lower Watershed	Retention Basins and Wetland below the SWMU 01-001(f) Drainage	Graduation Canyon below SWMU 00-019
PCBs	EPA:1668A	25 pg/L	√[a]	√	√	√	√
Isotopic plutonium	HASL-300	0.5 pCi/L	√	√	√	—[b]	—
Gamma spectroscopy radionuclides	EPA:901.1	3 pCi/L (cesium-137)	√	—	√	—	—
Isotopic uranium	HASL-300	0.5 pCi/L	√	—	√	√	—
Americium-241	HASL-300	0.5 pCi/L	LC[c]	—	√	—	—
Strontium-90	EPA:905.0	0.5 pCi/L	√	—	√	—	—
TAL metals	EPA:200.7/200.8/245.2	Variable	√	√	√	√	√
Dioxins and furans	EPA:1613B	1.0 pg/L	√	√	√	—	—
Gross alpha	EPA:900	3 pCi/L	√	√	√	√	√
Gross beta	EPA:900	1 pCi/L	—	—	√	√	√
Radium-226/radium-228	EPA:903.1/EPA:904	0.5/0.5 pCi/L	—	—	√	—	—
SSC	EPA:160.2	10 mg/L	√	√	√	—	√
Total organic carbon	SW-846:9060	0.5 mg/L	—	—	—	√	√
Cyanide	EPA:335.4	0.0015 mg/L	LC[d]	—	LC[d]	—	—

[a] Monitoring required.

[b] Monitoring not requested.

[c] Analyses of americium-241 added to samples collected at E026 and E030 in response to Las Conchas fire.

[d] Analyses of cyanide added to samples collected at E026, E030, E042.1, E050.1, and E109.9 in response to Las Conchas fire.

Table 2.3-3
Summary of Samples Collected and Analyses Requested

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
CO101038	10/2/11 14:06	UF[a]	—[b]	—	—	—	—	—	—	—	—	—	11-25940[c]
CO101038	10/2/11 14:07	UF	—	—	—	—	—	—	—	—	—	—	12-14
CO101038	10/2/11 14:08	F[d]	—	—	—	—	—	—	—	11-25928	—	—	11-25928
CO101038	10/2/11 14:08	UF	—	—	—	—	—	—	—	11-25932	—	—	11-25932
CO101038	10/2/11 14:09	UF	—	—	—	11-25936[e]	—	—	—	—	—	—	—
CO101038	10/2/11 14:10	UF	—	—	—	—	—	—	11-25952	—	—	—	—
CO101038	10/2/11 14:11	UF	—	—	—	—	—	—	—	—	11-25950	—	—
CO101038	10/2/11 14:13	UF	—	—	—	—	—	—	—	—	—	—	11-25946
CO111041	8/19/11 13:23	UF	—	—	—	—	—	—	—	—	—	—	11-25976
CO111041	8/19/11 13:24	UF	—	—	—	11-25957[e]	—	—	—	—	—	—	—
CO111041	8/19/11 13:25	F	—	—	—	—	—	—	—	11-25977	—	—	11-25977
CO111041	8/19/11 13:26	UF	—	—	—	—	—	—	—	11-25961	—	—	11-25961
CO111041	8/19/11 13:27	UF	—	—	—	—	—	—	—	—	—	—	11-25975
CO111041	8/19/11 14:07	UF	—	—	—	—	—	—	11-25979	—	—	—	—
CO111041	8/19/11 14:09	UF	—	—	—	—	—	—	—	—	11-25978	—	—
CO111041	8/19/11 14:12	UF	—	—	—	—	—	—	—	—	—	—	11-26459
CO111041	8/19/11 14:13	UF	—	—	—	—	—	—	—	—	—	—	11-26460
CO115002	10/7/11 23:23	UF	—	—	—	—	—	—	—	—	—	—	11-28073
CO115002	10/7/11 23:25	F	—	—	—	—	—	—	—	11-28065	—	—	11-28065
CO115002	10/7/11 23:25	UF	—	—	—	—	—	—	—	11-28069	—	—	11-28069
CO115002	10/7/11 23:27	UF	—	—	—	—	—	—	—	—	11-28081	—	—

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
CO115002	10/7/11 23:35	UF	—	—	—	—	—	—	11-28085	—	—	—	—
CO115002	10/8/11 0:04	UF	—	—	—	11-28089[e]	—	—	—	—	—	—	11-28089
CO115002	10/8/11 0:30	UF	—	—	—	—	—	—	—	—	—	—	11-28079
CO115002	10/27/11 0:34	UF	—	—	—	—	—	—	—	—	—	—	11-28076
CO115002	10/27/11 0:37	F	—	—	—	—	—	—	—	11-28066	—	—	11-28066
CO115002	10/27/11 0:37	UF	—	—	—	—	—	—	—	11-28070	—	—	11-28070
CO115002	10/27/11 0:39	UF	—	—	—	—	—	—	—	—	11-28084	—	—
CO115002	10/27/11 0:43	UF	—	—	—	—	—	—	11-28088	—	—	—	—
CO115002	10/27/11 0:45	UF	—	—	—	11-28092[e]	—	—	—	—	—	—	11-28092
CO115002	10/27/11 0:47	UF	—	—	—	—	—	—	—	—	—	—	11-28077
E026	8/22/11 12:24	UF	—	—	—	—	—	—	—	—	—	—	11-25674
E026	8/22/11 12:29	UF	—	—	—	—	—	—	—	—	—	—	11-25644
E026	8/22/11 12:32	UF	—	—	—	—	—	—	—	—	—	—	11-25688
E026	8/22/11 12:51	F	—	—	—	—	—	—	—	11-14844	—	—	11-14844
E026	8/22/11 12:51	UF	—	—	—	—	—	—	—	11-15122	—	—	11-15122
E026	8/22/11 12:53	UF	—	—	—	11-15124[f]	—	—	—	—	—	—	—
E026	8/22/11 12:54	UF	—	—	—	—	—	—	—	—	—	11-15110	—
E026	8/22/11 12:57	UF	—	11-15117	—	—	—	—	—	—	—	—	—
E026	8/22/11 13:00	UF	11-15106	—	11-15106	—	11-15106	—	11-15106	—	—	—	—
E026	8/22/11 13:04	UF	—	—	—	—	—	—	—	—	—	—	11-26831
E026	8/22/11 13:06	UF	—	—	—	—	—	—	—	—	11-15102	—	—

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E026	9/4/11 17:57	UF	—	—	—	—	—	—	—	—	—	—	11-25673
E026	9/4/11 17:59	UF	—	—	—	—	—	—	—	—	11-15100	—	—
E026	9/4/11 18:00	UF	11-15104	—	11-15104	—	11-15104	—	11-15104	—	—	—	—
E026	9/4/11 18:02	UF	—	—	—	—	—	—	—	—	—	11-15109	—
E026	9/4/11 18:03	UF	—	11-15112	—	—	—	—	—	—	—	—	—
E026	9/4/11 18:04	UF	—	—	—	11-15123[f]	—	—	—	—	—	—	11-15123
E026	9/4/11 18:05	F	—	—	—	—	—	—	—	11-14845	—	—	11-14845
E026	9/4/11 18:05	UF	—	—	—	—	—	—	—	11-15113	—	—	11-15113
E026	9/4/11 18:07	UF	—	—	—	—	—	—	—	—	—	—	11-25666
E030	8/21/11 16:36	UF	—	—	—	—	—	—	—	—	—	—	11-15157
E030	8/21/11 16:37	UF	—	—	—	—	—	—	—	—	11-15152	—	—
E030	8/21/11 16:39	UF	11-15161	—	11-15161	—	11-15161	—	11-15161	—	—	—	—
E030	8/21/11 16:40	UF	—	—	—	—	—	—	—	—	—	11-15159	—
E030	8/21/11 16:41	UF	—	11-15147	—	—	—	—	—	—	—	—	—
E030	8/21/11 16:43	F	—	—	—	—	—	—	—	11-15153	—	—	11-15153
E030	8/21/11 16:43	UF	—	—	—	—	—	—	—	11-15144	—	—	11-15144
E030	8/21/11 16:44	UF	—	—	—	11-15146[f]	—	—	—	—	—	—	11-15146
E030	8/21/11 16:45	UF	—	—	—	—	—	—	—	—	—	—	11-15143
E030	8/22/11 14:06	UF	—	—	—	—	—	—	—	—	—	—	11-15130
E030	8/22/11 14:07	UF	—	—	—	—	—	—	—	—	11-15141	—	—
E030	8/22/11 14:09	UF	11-15162	—	11-15162	—	11-15162	—	11-15162	—	—	—	—

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E030	8/22/11 14:10	UF	—	—	—	—	—	—	—	—	—	11-15134	—
E030	8/22/11 14:11	UF	—	11-15160	—	—	—	—	—	—	—	—	—
E030	8/22/11 14:13	F	—	—	—	—	—	—	—	11-15154	—	—	11-15154
E030	8/22/11 14:13	UF	—	—	—	—	—	—	—	11-15149	—	—	11-15149
E030	8/22/11 14:14	UF	—	—	—	11-15139[f]	—	—	—	—	—	—	11-15139
E030	8/22/11 14:15	UF	—	—	—	—	—	—	—	—	—	—	11-15151
E030	9/4/11 19:06	UF	—	—	—	—	—	—	—	—	—	—	11-15136
E030	9/4/11 19:07	UF	—	—	—	—	—	—	—	—	11-15156	—	—
E030	9/4/11 19:09	UF	11-15155	—	11-15155	—	11-15155	—	11-15155	—	—	—	—
E030	9/4/11 19:10	UF	—	—	—	—	—	—	—	—	—	11-15158	—
E030	9/4/11 19:11	UF	—	11-15148	—	—	—	—	—	—	—	—	—
E030	9/4/11 19:13	F	—	—	—	—	—	—	—	11-15163	—	—	11-15163
E030	9/4/11 19:13	UF	—	—	—	—	—	—	—	11-15128	—	—	11-15128
E030	9/4/11 19:14	UF	—	—	—	11-15135[f]	—	—	—	—	—	—	11-15135
E030	9/4/11 19:15	UF	—	—	—	—	—	—	—	—	—	—	11-15137
E030	10/2/11 15:21	UF	—	—	—	—	—	—	—	—	—	—	11-15131
E030	10/2/11 15:22	UF	—	—	—	—	—	—	—	—	11-15145	—	—
E030	10/2/11 15:24	UF	11-15142	—	11-15142	—	11-15142	—	11-15142	—	—	—	—
E030	10/2/11 15:25	UF	—	—	—	—	—	—	—	—	—	11-15138	—
E030	10/2/11 15:26	UF	—	11-15150	—	—	—	—	—	—	—	—	—
E030	10/2/11 15:28	F	—	—	—	—	—	—	—	11-15140	—	—	11-15140

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E030	10/2/11 15:28	UF	—	—	—	—	—	—	—	11-15129	—	—	11-15129
E030	10/2/11 15:29	UF	—	—	—	11-15132[f]	—	—	—	—	—	—	11-15132
E030	10/2/11 15:30	UF	—	—	—	—	—	—	—	—	—	—	11-15133
E038	7/2/11 17:36	UF	—	—	—	—	—	—	—	—	—	—	11-14862
E038	7/2/11 17:39	UF	—	—	—	—	—	—	—	—	—	—	11-14864
E038	7/2/11 17:42	UF	—	—	—	—	—	—	—	—	—	—	11-14869
E038	7/2/11 17:45	UF	—	—	—	—	—	—	—	—	—	—	11-14870
E038	7/2/11 17:47	UF	—	—	11-14887	—	11-14887	—	11-14887	—	—	—	—
E038	7/2/11 17:48	UF	—	—	—	—	—	—	—	—	11-14840	—	11-14879
E038	7/2/11 17:50	UF	—	—	—	—	—	—	—	—	—	11-14890	—
E038	7/2/11 17:51	F	—	—	—	—	—	—	—	11-14836	—	—	11-14836
E038	7/2/11 17:51	UF	—	—	—	—	—	—	—	11-14898	—	—	11-14882
E038	7/2/11 17:52	UF	—	11-14894	—	—	—	—	—	—	—	—	—
E038	7/2/11 17:54	UF	—	—	—	11-14902[e,f]	—	—	—	—	—	—	11-14906
E038	7/2/11 17:57	UF	—	—	—	—	—	—	—	—	—	—	11-14911
E038	7/2/11 18:00	UF	—	—	—	—	—	—	—	—	—	—	11-14913
E038	7/2/11 18:03	UF	—	—	—	—	—	—	—	—	—	—	11-14914
E038	7/2/11 18:06	UF	—	—	—	—	—	—	—	—	—	—	11-14915
E038	7/2/11 18:26	UF	—	—	—	—	—	—	—	—	—	—	11-14916
E038	7/2/11 18:46	UF	—	—	—	—	—	—	—	—	—	—	11-14929
E038	7/2/11 19:06	UF	—	—	—	—	—	—	—	—	—	—	11-14931

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E038	7/28/11 14:20	UF	—	—	—	—	—	—	—	—	—	—	11-14863
E038	7/28/11 14:23	UF	—	—	—	—	—	—	—	—	—	—	11-14866
E038	7/28/11 14:26	UF	—	—	—	—	—	—	—	—	—	—	11-14873
E038	7/28/11 14:29	UF	—	—	—	—	—	—	—	—	—	—	11-14874
E038	7/28/11 14:31	UF	—	—	—	11-14901[e,f]	—	—	—	—	—	—	—
E038	7/28/11 14:32	UF	—	—	—	—	—	—	—	—	11-14841	—	11-14881
E038	7/28/11 14:34	UF	—	—	11-14886	—	11-14886	—	11-14886	—	—	—	—
E038	7/28/11 14:35	UF	—	—	—	—	—	—	—	—	—	—	11-14883
E038	7/28/11 14:38	F	—	—	—	—	—	—	—	11-14837	—	—	11-14837
E038	7/28/11 14:38	UF	—	—	—	—	—	—	—	11-14899	—	—	11-14899
E038	7/28/11 14:39	UF	—	—	—	—	—	—	—	—	—	11-14891	—
E038	7/28/11 14:41	UF	—	11-14893	—	—	—	—	—	—	—	—	11-14918
E038	7/28/11 14:44	UF	—	—	—	—	—	—	—	—	—	—	11-14923
E038	7/28/11 14:47	UF	—	—	—	—	—	—	—	—	—	—	11-14924
E038	7/28/11 14:50	UF	—	—	—	—	—	—	—	—	—	—	11-14925
E038	7/28/11 15:10	UF	—	—	—	—	—	—	—	—	—	—	11-14926
E038	7/28/11 15:30	UF	—	—	—	—	—	—	—	—	—	—	11-14928
E038	7/28/11 15:50	UF	—	—	—	—	—	—	—	—	—	—	11-14932
E038	7/28/11 16:10	UF	—	—	—	—	—	—	—	—	—	—	11-14941
E038	7/28/11 16:30	UF	—	—	—	—	—	—	—	—	—	—	11-14942
E038	8/2/11 22:20	UF	—	—	—	—	—	—	—	—	—	—	11-14861

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E038	8/2/11 22:23	UF	—	—	—	—	—	—	—	—	—	—	11-14865
E038	8/2/11 22:26	UF	—	—	—	—	—	—	—	—	—	—	11-14872
E038	8/2/11 22:29	UF	—	—	—	—	—	—	—	—	—	—	11-14875
E038	8/2/11 22:31	UF	—	—	—	11-14903[e,f]	—	—	—	—	—	—	—
E038	8/2/11 22:32	UF	—	—	—	—	—	—	—	—	11-14842	—	11-14876
E038	8/2/11 22:34	UF	—	—	11-14884	—	11-14884	—	11-14884	—	—	—	—
E038	8/2/11 22:35	UF	—	—	—	—	—	—	—	—	—	—	11-14880
E038	8/2/11 22:38	UF	—	—	—	—	—	—	—	—	—	11-14889	11-14907
E038	8/2/11 22:40	F	—	—	—	—	—	—	—	11-14838	—	—	11-14838
E038	8/2/11 22:40	UF	—	—	—	—	—	—	—	11-14897	—	—	11-14897
E038	8/2/11 22:41	UF	—	11-14895	—	—	—	—	—	—	—	—	11-14908
E038	8/2/11 22:44	UF	—	—	—	—	—	—	—	—	—	—	11-14910
E038	8/2/11 22:47	UF	—	—	—	—	—	—	—	—	—	—	11-14920
E038	8/2/11 22:50	UF	—	—	—	—	—	—	—	—	—	—	11-14921
E038	8/2/11 23:10	UF	—	—	—	—	—	—	—	—	—	—	11-14927
E038	8/2/11 23:30	UF	—	—	—	—	—	—	—	—	—	—	11-14930
E038	8/2/11 23:50	UF	—	—	—	—	—	—	—	—	—	—	11-14933
E038	8/3/11 0:10	UF	—	—	—	—	—	—	—	—	—	—	11-14936
E038	8/3/11 0:30	UF	—	—	—	—	—	—	—	—	—	—	11-14947
E038	8/13/11 15:56	UF	—	—	—	—	—	—	—	—	—	—	11-14860
E038	8/13/11 15:57	UF	—	—	—	—	—	—	—	—	11-14843	—	—

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E038	8/13/11 15:59	UF	—	—	—	—	—	—	—	—	—	11-14888	—
E038	8/13/11 16:00	UF	—	—	11-14885	—	11-14885	—	11-14885	—	—	—	—
E038	8/13/11 16:03	UF	—	—	—	11-14900[e,f]	—	—	—	—	—	—	—
E038	8/13/11 16:04	F	—	—	—	—	—	—	—	11-14839	—	—	11-14839
E038	8/13/11 16:04	UF	—	—	—	—	—	—	—	11-14896	—	—	11-14896
E038	8/13/11 16:05	UF	—	11-14892	—	—	—	—	—	—	—	—	—
E038	8/13/11 16:07	UF	—	—	—	—	—	—	—	—	—	—	11-14867
E038	8/15/11 12:05	UF	—	—	—	—	—	—	—	—	—	—	11-26232
E038	8/15/11 12:08	UF	—	—	—	—	—	—	—	—	—	—	11-26225
E038	8/15/11 12:11	UF	—	—	—	—	—	—	—	—	—	—	11-26229
E038	8/15/11 12:14	UF	—	—	—	—	—	—	—	—	—	—	11-26226
E038	8/15/11 12:17	UF	—	—	—	—	—	—	—	—	—	—	11-26099
E038	8/15/11 12:20	UF	—	—	—	—	—	—	—	—	—	—	11-26096
E038	8/15/11 12:23	UF	—	—	—	—	—	—	—	—	—	—	11-26107
E038	8/15/11 12:26	UF	—	—	—	—	—	—	—	—	—	—	11-26102
E038	8/15/11 12:29	UF	—	—	—	—	—	—	—	—	—	—	11-26130
E038	8/15/11 12:32	UF	—	—	—	—	—	—	—	—	—	—	11-26133
E038	8/15/11 12:35	UF	—	—	—	—	—	—	—	—	—	—	11-26129
E038	8/15/11 12:55	UF	—	—	—	—	—	—	—	—	—	—	11-26136
E038	8/19/11 13:30	UF	—	—	—	—	—	—	—	—	—	—	11-26273
E038	8/19/11 13:33	UF	—	—	—	—	—	—	—	—	—	—	11-26278

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E038	8/19/11 13:36	UF	—	—	—	—	—	—	—	—	—	—	11-26284
E038	8/19/11 13:39	UF	—	—	—	—	—	—	—	—	—	—	11-26291
E038	8/19/11 13:41	UF	—	—	—	—	—	—	—	—	11-26030	—	—
E038	8/19/11 13:42	UF	—	—	—	—	—	—	—	—	—	—	11-26106
E038	8/19/11 13:43	UF	—	—	11-26038	—	11-26038	—	11-26038	—	—	—	—
E038	8/19/11 13:44	UF	—	—	—	—	—	—	—	—	—	11-26046	—
E038	8/19/11 13:45	UF	—	11-26020	—	—	—	—	—	—	—	—	11-26100
E038	8/19/11 13:47	F	—	—	—	—	—	—	—	11-25996	—	—	11-25996
E038	8/19/11 13:47	UF	—	—	—	—	—	—	—	11-26008	—	—	11-26008
E038	8/19/11 13:48	UF	—	—	—	11-26054[e,f]	—	—	—	—	—	—	11-26098
E038	8/19/11 13:51	UF	—	—	—	—	—	—	—	—	—	—	11-26103
E038	8/19/11 13:54	UF	—	—	—	—	—	—	—	—	—	—	11-26139
E038	8/19/11 13:57	UF	—	—	—	—	—	—	—	—	—	—	11-26148
E038	8/19/11 14:00	UF	—	—	—	—	—	—	—	—	—	—	11-26151
E038	8/19/11 14:20	UF	—	—	—	—	—	—	—	—	—	—	11-26131
E038	8/19/11 14:40	UF	—	—	—	—	—	—	—	—	—	—	11-26167
E038	8/19/11 15:00	UF	—	—	—	—	—	—	—	—	—	—	11-26161
E038	8/19/11 15:20	UF	—	—	—	—	—	—	—	—	—	—	11-26180
E038	8/19/11 15:40	UF	—	—	—	—	—	—	—	—	—	—	11-26192
E038	8/19/11 16:00	UF	—	—	—	—	—	—	—	—	—	—	11-26181
E038	8/19/11 16:20	UF	—	—	—	—	—	—	—	—	—	—	11-26174

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E038	8/19/11 16:40	UF	—	—	—	—	—	—	—	—	—	—	11-26170
E038	9/1/11 18:29	UF	—	—	—	—	—	—	—	—	—	—	11-26270
E038	9/1/11 18:32	UF	—	—	—	—	—	—	—	—	—	—	11-26279
E038	9/1/11 18:35	UF	—	—	—	—	—	—	—	—	—	—	11-26283
E038	9/1/11 18:38	UF	—	—	—	—	—	—	—	—	—	—	11-26294
E038	9/1/11 18:41	UF	—	—	11-26039	—	11-26039	—	11-26039	—	—	—	—
E038	9/1/11 18:44	UF	—	—	—	—	—	—	—	—	—	11-26047	—
E038	9/1/11 18:47	UF	—	—	—	—	—	—	—	—	—	—	11-26120
E038	9/1/11 18:50	UF	—	—	—	11-26055[e,f]	—	—	—	—	—	—	—
E038	9/1/11 18:53	F	—	—	—	—	—	—	—	11-25997	—	—	11-25997
E038	9/1/11 18:53	UF	—	—	—	—	—	—	—	11-26009	—	—	11-26009
E038	9/1/11 18:56	UF	—	—	—	—	—	—	—	—	—	—	11-26143
E038	9/1/11 18:59	UF	—	—	—	—	—	—	—	—	—	—	11-26156
E038	9/1/11 19:19	UF	—	—	—	—	—	—	—	—	—	—	11-26128
E038	9/4/11 17:39	UF	—	—	—	—	—	—	—	—	—	—	11-26269
E038	9/4/11 17:42	UF	—	—	—	—	—	—	—	—	—	—	11-26280
E038	9/4/11 17:45	UF	—	—	—	—	—	—	—	—	—	—	11-26287
E038	9/4/11 17:48	UF	—	—	—	—	—	—	—	—	—	—	11-26295
E038	9/4/11 17:51	UF	—	—	—	—	—	—	—	—	—	—	11-26126
E038	9/4/11 17:54	UF	—	—	—	—	—	—	—	—	—	—	11-26117
E038	9/4/11 17:57	UF	—	—	—	—	—	—	—	—	—	—	11-26101

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E038	9/4/11 18:00	UF	—	—	—	—	—	—	—	—	—	—	11-26105
E038	9/4/11 18:03	UF	—	—	—	—	—	—	—	—	—	—	11-26127
E038	9/4/11 18:06	UF	—	—	—	—	—	—	—	—	—	—	11-26150
E038	9/4/11 18:09	UF	—	—	—	—	—	—	—	—	—	—	11-26149
E038	9/4/11 18:11	UF	—	—	—	—	—	—	—	—	11-26028	—	—
E038	9/4/11 18:13	UF	—	—	11-26036	—	11-26036	—	11-26036	—	—	—	—
E038	9/4/11 18:14	UF	—	—	—	—	—	—	—	—	—	11-26044	—
E038	9/4/11 18:15	UF	—	11-26022	—	—	—	—	—	—	—	—	—
E038	9/4/11 18:17	F	—	—	—	—	—	—	—	11-25998	—	—	11-25998
E038	9/4/11 18:17	UF	—	—	—	—	—	—	—	11-26010	—	—	11-26010
E038	9/4/11 18:18	UF	—	—	—	11-26052[e,f]	—	—	—	—	—	—	—
E038	9/4/11 18:29	UF	—	—	—	—	—	—	—	—	—	—	11-26155
E038	9/4/11 18:49	UF	—	—	—	—	—	—	—	—	—	—	11-26195
E038	9/7/11 12:39	UF	—	—	—	—	—	—	—	—	—	—	11-26268
E038	9/7/11 12:42	UF	—	—	—	—	—	—	—	—	—	—	11-26277
E038	9/7/11 12:45	UF	—	—	—	—	—	—	—	—	—	—	11-26282
E038	9/7/11 12:48	UF	—	—	—	—	—	—	—	—	—	—	11-26293
E038	9/7/11 12:51	UF	—	—	—	—	—	—	—	—	—	—	11-26123
E038	9/7/11 12:54	UF	—	—	—	—	—	—	—	—	—	—	11-26112
E038	9/7/11 12:56	UF	—	—	—	—	—	—	—	—	—	—	11-26175
E038	9/7/11 12:57	UF	—	—	—	—	—	—	—	—	—	—	11-26209

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E038	9/7/11 12:58	UF	—	—	—	—	—	—	—	—	—	—	11-26159
E038	9/7/11 12:59	UF	—	—	—	—	—	—	—	—	—	—	11-26160
E038	9/7/11 13:00	UF	—	—	—	—	—	—	—	—	—	—	11-26114
E038	9/7/11 13:01	UF	—	—	—	—	—	—	—	—	—	—	11-26254
E038	9/7/11 13:02	UF	—	—	—	—	—	—	—	—	—	—	11-26237
E038	9/7/11 13:03	UF	—	—	—	—	—	—	—	—	—	—	11-26158
E038	9/7/11 13:06	UF	—	—	—	—	—	—	—	—	—	—	11-26141
E038	9/7/11 13:09	UF	—	—	—	—	—	—	—	—	—	—	11-26142
E038	9/7/11 13:29	UF	—	—	—	—	—	—	—	—	—	—	11-26144
E038	9/7/11 13:49	UF	—	—	—	—	—	—	—	—	—	—	11-26217
E038	9/7/11 14:09	UF	—	—	—	—	—	—	—	—	—	—	11-26185
E038	9/7/11 14:29	UF	—	—	—	—	—	—	—	—	—	—	11-26208
E038	10/4/11 14:44	UF	—	—	—	—	—	—	—	—	—	—	11-26271
E038	10/4/11 14:47	UF	—	—	—	—	—	—	—	—	—	—	11-26275
E038	10/4/11 14:50	UF	—	—	—	—	—	—	—	—	—	—	11-26286
E038	10/4/11 14:53	UF	—	—	—	—	—	—	—	—	—	—	11-26292
E038	10/4/11 14:56	UF	—	—	—	—	—	—	—	—	—	—	11-26116
E038	10/4/11 14:59	UF	—	—	—	—	—	—	—	—	—	—	11-26097
E038	10/4/11 15:01	UF	—	—	—	—	—	—	—	—	—	—	11-26138
E038	10/4/11 15:02	UF	—	—	—	—	—	—	—	—	—	—	11-26109
E038	10/4/11 15:03	UF	—	—	—	—	—	—	—	—	—	—	11-26206

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E038	10/4/11 15:04	UF	—	—	—	—	—	—	—	—	—	—	11-26177
E038	10/4/11 15:05	UF	—	—	—	—	—	—	—	—	—	—	11-26113
E038	10/4/11 15:06	UF	—	—	—	—	—	—	—	—	—	—	11-26202
E038	10/4/11 15:07	UF	—	—	—	—	—	—	—	—	—	—	11-26189
E038	10/4/11 15:08	UF	—	—	—	—	—	—	—	—	—	—	11-26146
E038	10/4/11 15:11	UF	—	—	—	—	—	—	—	—	—	—	11-26140
E038	10/4/11 15:14	UF	—	—	—	—	—	—	—	—	—	—	11-26145
E038	10/4/11 17:54	UF	—	—	—	—	—	—	—	—	—	—	11-26212
E038	10/4/11 18:14	UF	—	—	—	—	—	—	—	—	—	—	11-26207
E038	10/4/11 18:34	UF	—	—	—	—	—	—	—	—	—	—	11-26242
E038	10/4/11 18:54	UF	—	—	—	—	—	—	—	—	—	—	11-26236
E038	10/12/11 11:04	UF	—	—	—	—	—	—	—	—	—	—	11-26274
E038	10/12/11 11:07	UF	—	—	—	—	—	—	—	—	—	—	11-26276
E038	10/12/11 11:10	UF	—	—	—	—	—	—	—	—	—	—	11-26285
E038	10/12/11 11:13	UF	—	—	—	—	—	—	—	—	—	—	11-26290
E038	10/12/11 11:16	UF	—	—	—	—	—	—	—	—	—	—	11-26119
E038	10/12/11 11:17	UF	—	—	—	—	—	—	—	—	—	—	11-26125
E038	10/12/11 11:18	UF	—	—	—	—	—	—	—	—	—	—	11-26134
E038	10/12/11 11:19	UF	—	—	—	—	—	—	—	—	—	—	11-26104
E038	10/12/11 11:20	UF	—	—	—	—	—	—	—	—	—	—	11-26137
E038	10/12/11 11:21	UF	—	—	—	—	—	—	—	—	—	—	11-26152

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E038	10/12/11 11:22	UF	—	—	—	—	—	—	—	—	—	—	11-26162
E038	10/12/11 11:23	UF	—	—	—	—	—	—	—	—	—	—	11-26165
E038	10/12/11 11:24	UF	—	—	—	—	—	—	—	—	—	—	11-26166
E039.1	8/1/11 12:30	UF	—	—	—	—	—	—	—	—	—	—	11-14991
E039.1	8/1/11 12:33	UF	—	—	—	—	—	—	—	—	—	—	11-15084
E039.1	8/1/11 12:36	UF	—	—	—	—	—	—	—	—	—	—	11-15040
E039.1	8/1/11 12:39	UF	—	—	11-15047	—	11-15047	—	11-15047	—	—	—	—
E039.1	8/1/11 12:42	UF	—	—	—	—	—	—	—	—	—	11-15093	—
E039.1	8/1/11 12:45	UF	—	—	—	—	—	—	—	—	—	—	11-15043
E039.1	8/1/11 12:48	F	—	—	—	—	—	—	—	11-15021	—	—	11-15021
E039.1	8/1/11 12:48	UF	—	—	—	—	—	—	—	11-15042	—	—	11-15042
E039.1	8/1/11 12:51	UF	—	—	—	11-14989[e,f]	—	—	—	—	—	—	—
E039.1	8/1/11 12:54	UF	—	—	—	—	—	—	—	—	—	—	11-15068
E039.1	8/1/11 12:57	UF	—	—	—	—	—	—	—	—	—	—	11-15046
E039.1	8/4/11 16:44	UF	—	—	—	—	—	—	—	—	—	—	11-14976
E039.1	8/4/11 16:45	UF	—	—	—	—	—	—	—	—	11-15055	—	—
E039.1	8/4/11 16:47	F	—	—	—	—	—	—	—	11-15065	—	—	11-15065
E039.1	8/4/11 16:47	UF	—	—	—	—	—	—	—	11-15076	—	—	11-15076
E039.1	8/4/11 16:48	UF	—	—	11-15008	—	11-15008	—	11-15008	—	—	—	—
E039.1	8/4/11 16:49	UF	—	11-15080	—	—	—	—	—	—	—	—	—
E039.1	8/4/11 16:51	UF	—	—	—	—	—	—	—	—	—	11-15092	—

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E039.1	8/4/11 16:52	UF	—	—	—	11-15087[e,f]	—	—	—	—	—	—	—
E039.1	8/4/11 16:53	UF	—	—	—	—	—	—	—	—	—	—	11-14980
E039.1	8/4/11 16:54	UF	—	—	—	—	—	—	—	—	—	—	11-14982
E039.1	8/4/11 16:55	UF	—	—	—	—	—	—	—	—	—	—	11-14983
E039.1	8/19/11 14:02	UF	—	—	—	—	—	—	—	—	—	—	11-15003
E039.1	8/19/11 14:05	UF	—	—	—	—	—	—	—	—	—	—	11-15012
E039.1	8/19/11 14:08	UF	—	—	—	—	—	—	—	—	—	—	11-14984
E039.1	8/19/11 14:11	UF	—	—	—	—	—	—	—	—	—	—	11-15041
E039.1	8/19/11 14:14	UF	—	—	—	—	—	—	—	—	—	—	11-15000
E039.1	8/19/11 14:17	UF	—	—	11-14986	—	11-14986	—	11-14986	—	—	—	11-15037
E039.1	8/19/11 14:18	UF	—	—	—	—	—	—	—	—	—	11-15063	—
E039.1	8/19/11 14:19	UF	—	—	—	—	—	—	—	—	11-15024	—	—
E039.1	8/19/11 14:20	UF	—	—	—	—	—	—	—	—	—	—	11-15062
E039.1	8/19/11 14:21	F	—	—	—	—	—	—	—	11-15038	—	—	11-15038
E039.1	8/19/11 14:21	UF	—	—	—	—	—	—	—	11-15095	—	—	11-15095
E039.1	8/19/11 14:22	UF	—	—	—	11-15085[e,f]	—	—	—	—	—	—	—
E039.1	8/19/11 14:23	UF	—	11-14992	—	—	—	—	—	—	—	—	11-15010
E039.1	8/19/11 14:26	UF	—	—	—	—	—	—	—	—	—	—	11-15098
E039.1	8/19/11 14:29	UF	—	—	—	—	—	—	—	—	—	—	11-15004
E039.1	8/19/11 14:32	UF	—	—	—	—	—	—	—	—	—	—	11-15096
E039.1	8/19/11 14:52	UF	—	—	—	—	—	—	—	—	—	—	11-14996

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E039.1	8/19/11 15:12	UF	—	—	—	—	—	—	—	—	—	—	11-14978
E039.1	8/19/11 15:32	UF	—	—	—	—	—	—	—	—	—	—	11-14979
E039.1	8/19/11 15:52	UF	—	—	—	—	—	—	—	—	—	—	11-15097
E039.1	9/15/11 18:13	UF	—	—	—	—	—	—	—	—	—	—	11-15066
E039.1	9/15/11 18:16	UF	—	—	—	—	—	—	—	—	—	—	11-15086
E039.1	9/15/11 18:19	UF	—	—	—	—	—	—	—	—	—	—	11-15032
E039.1	9/15/11 18:22	UF	—	—	—	—	—	—	—	—	—	—	11-15064
E039.1	9/15/11 18:25	UF	—	—	—	—	—	—	—	—	—	—	11-15060
E039.1	9/15/11 18:28	UF	—	—	—	—	—	—	—	—	—	—	11-15045
E039.1	9/15/11 18:31	UF	—	—	—	—	—	—	—	—	—	—	11-15048
E039.1	9/15/11 18:34	UF	—	—	—	—	—	—	—	—	—	—	11-15027
E039.1	9/15/11 18:37	UF	—	—	—	—	—	—	—	—	—	—	11-15022
E039.1	9/15/11 18:38	UF	—	—	—	—	—	—	—	—	11-15033	—	—
E039.1	9/15/11 18:40	UF	—	—	11-15051	—	11-15051	—	11-15051	—	—	—	11-15099
E039.1	9/15/11 18:41	UF	—	—	—	—	—	—	—	—	—	11-15081	—
E039.1	9/15/11 18:42	UF	—	11-15053	—	—	—	—	—	—	—	—	—
E039.1	9/15/11 18:43	UF	—	—	—	—	—	—	—	—	—	—	11-14999
E039.1	9/15/11 18:44	F	—	—	—	—	—	—	—	11-15075	—	—	11-15075
E039.1	9/15/11 18:44	UF	—	—	—	—	—	—	—	11-15059	—	—	11-15059
E039.1	9/15/11 18:45	UF	—	—	—	11-15011[e,f]	—	—	—	—	—	—	—
E042.1	8/19/11 16:03	UF	—	—	—	—	—	—	—	—	—	—	11-15930

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E042.1	8/19/11 16:04	UF	11-15686	—	11-15686	—	11-15686	—	11-15686	—	—	—	—
E042.1	8/19/11 16:05	UF	—	—	—	—	—	—	—	—	—	11-15706	—
E042.1	8/19/11 16:06	UF	—	11-15710	—	—	—	—	—	—	—	—	—
E042.1	8/19/11 16:07	F	—	—	—	—	—	—	—	11-15669	—	—	11-15669
E042.1	8/19/11 16:07	UF	—	—	—	—	—	—	—	11-15714	—	—	11-15714
E042.1	8/19/11 17:03	UF	—	—	—	—	—	—	—	—	11-15678	—	11-15933
E042.1	8/22/11 14:18	UF	—	—	—	—	—	—	—	—	—	—	11-15945
E042.1	8/22/11 14:21	UF	—	—	—	—	—	—	—	—	—	—	11-15982
E042.1	8/22/11 14:38	UF	—	—	—	—	—	—	—	—	11-15674	—	—
E042.1	8/22/11 14:39	UF	11-15688	—	11-15688	—	11-15688	—	11-15688	—	—	—	—
E042.1	8/22/11 14:40	UF	—	—	—	—	—	—	—	—	—	11-15708	—
E042.1	8/22/11 14:41	UF	—	11-15712	—	—	—	—	—	—	—	—	—
E042.1	8/22/11 14:42	F	—	—	—	—	—	—	—	11-15670	—	—	11-15670
E042.1	8/22/11 14:42	UF	—	—	—	—	—	—	—	11-15716	—	—	11-15716
E042.1	8/22/11 15:28	UF	—	—	—	—	—	—	—	—	—	—	11-15940
E042.1	8/22/11 15:38	UF	11-25583	—	11-25583	—	11-25583	—	11-25583	—	11-15680	—	—
E042.1	8/22/11 15:48	UF	—	—	—	11-15720	—	—	—	—	—	—	11-15720
E042.1	8/22/11 16:23	UF	11-25604	—	11-25604	—	11-25604	—	11-25604	—	11-15684	—	—
E042.1	8/22/11 16:28	UF	—	—	—	—	—	—	—	—	—	—	11-16005
E042.1	8/22/11 16:48	UF	—	—	—	—	—	—	—	—	—	—	11-15970
E042.1	8/22/11 17:08	UF	11-25627	—	11-25627	—	11-25627	—	11-25627	—	11-15691	—	11-15990

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E042.1	9/4/11 19:19	UF	—	—	—	—	—	—	—	—	—	—	11-15951
E042.1	9/4/11 19:22	UF	—	—	—	—	—	—	—	—	—	—	11-15986
E042.1	9/4/11 19:25	UF	—	—	—	—	—	—	—	—	—	—	11-16009
E042.1	9/4/11 19:28	UF	—	—	—	—	—	—	—	—	—	—	11-15957
E042.1	9/4/11 19:31	UF	—	—	—	—	—	—	—	—	—	—	11-16019
E042.1	9/4/11 19:34	UF	—	—	—	11-15717	—	—	—	—	—	—	11-15717
E042.1	9/4/11 19:40	UF	—	—	—	—	—	—	—	—	—	—	11-15956
E042.1	9/4/11 19:43	UF	—	—	—	—	—	11-15949	—	—	—	—	—
E042.1	9/4/11 19:44	UF	—	—	—	—	—	—	—	—	11-15675	—	—
E042.1	9/4/11 19:45	UF	11-15685	—	11-15685	—	11-15685	—	11-15685	—	—	—	—
E042.1	9/4/11 19:46	UF	—	—	—	—	—	—	—	—	—	11-15705	—
E042.1	9/4/11 19:47	UF	—	11-15709	—	—	—	—	—	—	—	—	—
E042.1	9/4/11 19:48	F	—	—	—	—	—	—	—	11-15671	—	—	11-15671
E042.1	9/4/11 19:48	UF	—	—	—	—	—	—	—	11-15713	—	—	11-15713
E042.1	9/4/11 19:49	UF	—	—	—	—	—	—	—	—	—	—	11-16017
E042.1	9/4/11 20:09	UF	—	—	—	—	—	—	—	—	—	—	11-16011
E042.1	9/4/11 20:29	UF	—	—	—	—	—	—	—	—	—	—	11-15932
E042.1	9/4/11 20:44	UF	11-25574	—	11-25574	—	11-25574	—	11-25574	—	11-15677	—	—
E042.1	9/4/11 20:49	UF	—	—	—	—	—	—	—	—	—	—	11-15934
E042.1	9/4/11 21:29	UF	11-25595	—	11-25595	—	11-25595	—	11-25595	—	11-15681	—	—
E042.1	9/4/11 21:49	UF	—	—	—	—	—	—	—	—	—	—	11-15987

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E042.1	9/4/11 22:09	UF	—	—	—	—	—	—	—	—	—	—	11-15992
E042.1	9/4/11 22:14	UF	11-25632	—	11-25632	—	11-25632	—	11-25632	—	11-15690	—	—
E042.1	9/4/11 22:29	UF	—	—	—	—	—	—	—	—	—	—	11-15937
E042.1	9/4/11 22:49	UF	—	—	—	—	—	—	—	—	—	—	11-16004
E042.1	9/7/11 14:43	UF	—	—	—	—	—	—	—	—	—	—	11-15997
E042.1	9/7/11 14:46	UF	—	—	—	—	—	—	—	—	—	—	11-16010
E042.1	9/7/11 14:49	F	—	—	—	—	—	—	—	11-15672	—	—	11-15672
E042.1	9/7/11 14:49	UF	—	—	—	—	—	—	—	11-15715	—	—	11-15715
E042.1	9/7/11 14:52	UF	—	—	—	—	—	—	—	—	—	—	11-15972
E042.1	9/7/11 14:54	UF	—	—	—	—	—	—	—	—	11-15676	—	—
E042.1	9/7/11 14:55	UF	—	—	—	—	—	11-15991	—	—	—	—	—
E042.1	9/7/11 14:56	UF	11-15687	—	11-15687	—	11-15687	—	11-15687	—	—	—	—
E042.1	9/7/11 14:57	UF	—	11-15711	—	—	—	—	—	—	—	11-15707	—
E042.1	9/7/11 15:01	UF	—	—	—	11-15719	—	—	—	—	—	—	11-15719
E042.1	9/7/11 15:04	UF	—	—	—	—	—	—	—	—	—	—	11-15967
E042.1	9/10/11 01:24	UF	—	—	—	—	—	—	—	—	—	—	11-27776
E042.1	9/10/11 01:26	UF	—	—	—	—	—	—	—	—	—	—	11-27809
E042.1	9/10/11 01:27	UF	—	—	—	—	—	—	—	—	—	—	11-27671
E042.1	9/10/11 01:28	UF	—	—	—	—	—	—	—	—	—	—	11-27907
E042.1	9/10/11 01:29	UF	—	—	—	—	—	—	—	—	—	—	11-27791
E042.1	9/10/11 01:30	UF	—	—	—	—	—	—	—	—	—	—	11-27706

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E042.1	9/15/11 19:49	UF	—	—	—	—	—	—	—	—	—	—	11-27673
E042.1	10/2/11 16:14	UF	—	—	—	—	—	—	—	—	—	—	11-27817
E042.1	10/2/11 16:15	F	—	—	—	—	—	—	—	11-27699	—	—	11-27699
E042.1	10/2/11 16:15	UF	—	—	—	11-27767	—	—	—	11-27660	—	—	11-27660
E042.1	10/2/11 16:16	UF	—	—	—	—	—	—	—	—	—	11-27647	—
E042.1	10/2/11 16:17	UF	—	—	—	—	—	—	—	—	11-27719	—	—
E042.1	10/2/11 16:18	UF	11-27709	—	11-27709	—	11-27709	—	11-27709	—	—	—	—
E042.1	10/2/11 17:14	UF	—	11-27750	—	—	—	—	—	—	—	—	11-27652
E042.1	10/4/11 21:58	UF	—	—	—	—	—	—	—	—	—	—	11-27731
E042.1	10/4/11 22:01	UF	—	—	—	—	—	—	—	—	—	—	11-27729
E042.1	10/4/11 22:04	UF	—	—	—	—	—	—	—	—	—	—	11-27887
E042.1	10/4/11 22:07	UF	—	—	—	—	—	—	—	—	—	—	11-27834
E042.1	10/4/11 22:10	UF	—	—	—	—	—	11-27810	—	—	—	—	—
E042.1	10/4/11 22:13	F	—	—	—	—	—	—	—	11-27857	—	—	11-27857
E042.1	10/4/11 22:13	UF	—	—	—	11-27869	—	—	—	11-27666	—	—	11-27666
E042.1	10/4/11 22:14	UF	—	—	—	—	—	—	—	—	11-27816	—	—
E042.1	10/4/11 22:15	UF	11-27923	—	11-27923	—	11-27923	—	11-27923	—	—	—	—
E042.1	10/4/11 22:17	UF	—	—	—	—	—	—	—	—	—	11-27815	—
E042.1	10/4/11 22:18	UF	—	11-27841	—	—	—	—	—	—	—	—	—
E042.1	10/4/11 22:19	UF	—	—	—	—	—	—	—	—	—	—	11-27917
E042.1	10/4/11 22:22	UF	—	—	—	—	—	—	—	—	—	—	11-27845

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E042.1	10/4/11 22:25	UF	—	—	—	—	—	—	—	—	—	—	11-27637
E042.1	10/4/11 22:28	UF	—	—	—	—	—	—	—	—	—	—	11-27856
E050.1	8/21/11 17:11	UF	—	—	—	—	—	—	—	—	—	—	11-16088
E050.1	8/21/11 17:14	UF	—	—	—	—	—	—	—	—	—	—	11-16064
E050.1	8/21/11 17:17	UF	—	—	—	—	—	—	—	—	—	—	11-16092
E050.1	8/21/11 17:20	UF	—	—	—	—	—	—	—	—	—	—	11-16047
E050.1	8/21/11 17:23	UF	—	—	—	—	—	11-16111	—	—	—	—	—
E050.1	8/21/11 17:32	UF	—	—	—	—	—	—	—	—	—	—	11-16107
E050.1	8/21/11 17:35	UF	—	—	—	—	—	—	—	—	—	—	11-16078
E050.1	8/21/11 17:38	UF	—	—	—	—	—	—	—	—	—	—	11-16059
E050.1	8/21/11 17:41	UF	—	—	—	—	—	—	—	—	—	—	11-16036
E050.1	8/21/11 18:31	UF	—	—	—	—	—	—	—	—	11-15722	—	—
E050.1	8/21/11 18:32	UF	11-15754	—	11-15754	—	11-15754	—	11-15754	—	—	—	—
E050.1	8/21/11 18:34	UF	—	—	—	—	—	—	—	—	—	11-15740	—
E050.1	8/21/11 18:35	UF	—	11-15739	—	—	—	—	—	—	—	—	—
E050.1	8/21/11 18:41	UF	—	—	—	—	—	—	—	—	—	—	11-16112
E050.1	8/21/11 19:01	UF	—	—	—	—	—	—	—	—	—	—	11-16021
E050.1	8/21/11 19:31	F	—	—	—	—	—	—	—	11-15761	—	—	11-15761
E050.1	8/21/11 19:31	UF	—	—	—	11-15757	—	—	—	11-15723	—	—	11-15723
E050.1	8/21/11 19:41	UF	—	—	—	—	—	—	—	—	—	—	11-16060
E050.1	8/21/11 20:01	UF	—	—	—	—	—	—	—	—	—	—	11-16090

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E050.1	8/21/11 20:16	UF	11-25605	—	11-25605	—	11-25605	—	11-25605	—	11-15742	—	—
E050.1	8/21/11 20:21	UF	—	—	—	—	—	—	—	—	—	—	11-16076
E050.1	8/21/11 20:41	UF	—	—	—	—	—	—	—	—	—	—	11-16026
E050.1	8/21/11 21:01	UF	11-25614	—	11-25614	—	11-25614	—	11-25614	—	11-15755	—	—
E050.1	8/21/11 21:21	UF	—	—	—	—	—	—	—	—	—	—	11-16051
E050.1	8/21/11 21:41	UF	—	—	—	—	—	—	—	—	—	—	11-16062
E050.1	8/21/11 22:01	UF	—	—	—	—	—	—	—	—	—	—	11-16034
E050.1	8/22/11 14:41	UF	—	—	—	—	—	—	—	—	—	—	11-16049
E050.1	8/22/11 14:44	UF	—	—	—	—	—	—	—	—	—	—	11-16083
E050.1	8/22/11 14:47	UF	—	—	—	—	—	—	—	—	—	—	11-16043
E050.1	8/22/11 14:50	UF	—	—	—	—	—	—	—	—	—	—	11-16050
E050.1	8/22/11 14:53	UF	—	—	—	—	—	—	—	—	—	—	11-16053
E050.1	8/22/11 14:56	UF	—	—	—	—	—	—	—	—	—	—	11-16093
E050.1	8/22/11 14:59	UF	—	—	—	—	—	—	—	—	—	—	11-16086
E050.1	8/22/11 15:02	UF	—	—	—	—	—	—	—	—	—	—	11-16080
E050.1	8/22/11 15:05	UF	—	—	—	—	—	—	—	—	—	—	11-16033
E050.1	8/22/11 15:08	UF	—	—	—	—	—	—	—	—	—	—	11-16029
E050.1	8/22/11 15:11	UF	—	—	—	—	—	—	—	—	—	—	11-16061
E050.1	8/22/11 15:31	UF	—	—	—	—	—	—	—	—	—	—	11-16030
E050.1	8/22/11 15:51	UF	—	—	—	—	—	—	—	—	—	—	11-16063
E050.1	8/22/11 16:11	UF	—	—	—	—	—	—	—	—	—	—	11-16057

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E050.1	8/22/11 16:31	UF	—	—	—	11-15764	—	—	—	—	11-15744	—	11-15764
E050.1	8/22/11 16:32	UF	11-15767	—	11-15767	—	11-15767	—	11-15767	—	—	—	—
E050.1	8/22/11 16:33	UF	—	—	—	—	—	—	—	—	—	11-15724	—
E050.1	8/22/11 16:34	UF	—	11-15759	—	—	—	—	—	—	—	—	—
E050.1	8/22/11 16:35	F	—	—	—	—	—	—	—	11-15758	—	—	11-15758
E050.1	8/22/11 16:35	UF	—	—	—	—	—	—	—	11-15747	—	—	11-15747
E050.1	8/22/11 16:51	UF	—	—	—	—	—	—	—	—	—	—	11-16079
E050.1	8/22/11 17:11	UF	—	—	—	—	—	—	—	—	—	—	11-16108
E050.1	8/22/11 17:31	UF	11-25590	—	11-25590	—	11-25590	11-16101	11-25590	—	11-15749	—	—
E050.1	8/22/11 18:11	UF	—	—	—	—	—	—	—	—	—	—	11-16071
E050.1	8/22/11 18:16	UF	11-25594	—	11-25594	—	11-25594	—	11-25594	—	11-15751	—	—
E050.1	8/22/11 18:31	UF	—	—	—	—	—	—	—	—	—	—	11-16110
E050.1	8/22/11 18:51	UF	—	—	—	—	—	—	—	—	—	—	11-16106
E050.1	8/22/11 19:01	UF	11-25629	—	11-25629	—	11-25629	—	11-25629	—	11-15771	—	—
E050.1	8/22/11 19:11	UF	—	—	—	—	—	—	—	—	—	—	11-16098
E050.1	8/22/11 19:31	UF	—	—	—	—	—	—	—	—	—	—	11-16073
E050.1	9/4/11 19:36	UF	—	—	—	—	—	—	—	—	—	—	11-16027
E050.1	9/4/11 19:39	UF	—	—	—	—	—	—	—	—	—	—	11-16089
E050.1	9/4/11 19:42	UF	—	—	—	—	—	—	—	—	—	—	11-16055
E050.1	9/4/11 19:45	UF	—	—	—	—	—	—	—	—	—	—	11-16103
E050.1	9/4/11 19:48	UF	—	—	—	—	—	11-16045	—	—	—	—	—

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E050.1	9/4/11 19:51	UF	—	—	—	—	—	—	—	—	—	—	11-16069
E050.1	9/4/11 19:57	UF	—	—	—	—	—	—	—	—	—	—	11-16031
E050.1	9/4/11 20:00	UF	—	—	—	—	—	—	—	—	—	—	11-16081
E050.1	9/4/11 20:03	UF	—	—	—	—	—	—	—	—	—	—	11-16104
E050.1	9/4/11 20:06	UF	—	—	—	—	—	—	—	—	—	—	11-16038
E050.1	9/4/11 20:26	UF	—	—	—	—	—	—	—	—	—	—	11-16054
E050.1	9/4/11 20:46	UF	—	—	—	—	—	—	—	—	—	—	11-16075
E050.1	9/4/11 21:06	UF	—	—	—	—	—	—	—	—	—	—	11-16052
E050.1	9/4/11 21:26	UF	—	—	—	—	—	—	—	—	—	—	11-16070
E050.1	9/4/11 21:41	UF	—	—	—	—	—	—	—	—	11-15732	—	—
E050.1	9/4/11 21:43	UF	11-15753	—	11-15753	—	11-15753	—	11-15753	—	—	—	—
E050.1	9/4/11 21:44	UF	—	—	—	—	—	—	—	—	—	11-15728	—
E050.1	9/4/11 21:45	UF	—	11-15750	—	—	—	—	—	—	—	—	—
E050.1	9/4/11 22:06	UF	—	—	—	—	—	—	—	—	—	—	11-16091
E050.1	9/4/11 22:26	UF	—	—	—	—	—	—	—	—	—	—	11-16105
E050.1	9/4/11 22:41	F	—	—	—	—	—	—	—	11-15756	—	—	11-15756
E050.1	9/4/11 22:41	UF	—	—	—	11-15768	—	—	—	11-15737	—	—	11-15737
E050.1	9/4/11 22:46	UF	—	—	—	—	—	—	—	—	—	—	11-16023
E050.1	9/4/11 23:06	UF	—	—	—	—	—	—	—	—	—	—	11-16077
E050.1	9/4/11 23:26	UF	11-25613	—	11-25613	—	11-25613	—	11-25613	—	11-15743	—	11-16109
E050.1	9/4/11 23:46	UF	—	—	—	—	—	—	—	—	—	—	11-16048

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E050.1	9/5/11 0:06	UF	—	—	—	—	—	—	—	—	—	—	11-16037
E050.1	9/5/11 0:11	UF	11-25622	—	11-25622	—	11-25622	—	11-25622	—	11-15762	—	—
E050.1	9/5/11 0:26	UF	—	—	—	—	—	—	—	—	—	—	11-16032
E050.1	9/7/11 12:41	UF	—	—	—	—	—	—	—	—	—	—	11-16102
E050.1	9/7/11 12:44	UF	—	—	—	—	—	—	—	—	—	—	11-16099
E050.1	9/7/11 12:46	UF	—	—	—	—	—	—	—	—	11-15725	—	—
E050.1	9/7/11 12:47	F	—	—	—	—	—	—	—	11-15772	—	—	11-15772
E050.1	9/7/11 12:47	UF	—	—	—	—	—	—	—	11-15726	—	—	11-15726
E050.1	9/7/11 12:48	UF	11-15760	—	11-15760	—	11-15760	—	11-15760	—	—	—	—
E050.1	9/7/11 12:49	UF	—	—	—	—	—	—	—	—	—	11-15748	—
E050.1	9/7/11 12:50	UF	—	11-15735	—	11-15770	—	—	—	—	—	—	11-15770
E050.1	9/7/11 12:53	UF	—	—	—	—	—	11-16095	—	—	—	—	—
E050.1	9/7/11 12:56	UF	—	—	—	—	—	—	—	—	—	—	11-16072
E050.1	9/7/11 13:02	UF	—	—	—	—	—	—	—	—	—	—	11-16082
E050.1	9/7/11 13:05	UF	—	—	—	—	—	—	—	—	—	—	11-16097
E050.1	9/7/11 13:08	UF	—	—	—	—	—	—	—	—	—	—	11-16024
E050.1	9/7/11 13:46	UF	—	—	—	—	—	—	—	—	—	—	11-16022
E050.1	9/7/11 14:31	UF	—	—	—	—	—	—	—	—	—	—	11-16100
E050.1	9/7/11 15:11	UF	—	—	—	—	—	—	—	—	—	—	11-16028
E050.1	9/7/11 15:16	UF	11-25630	—	11-25630	—	11-25630	—	11-25630	—	11-15769	—	—
E050.1	9/7/11 15:31	UF	—	—	—	—	—	—	—	—	—	—	11-16041

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E050.1	9/7/11 15:51	UF	—	—	—	—	—	11-16096	—	—	—	—	11-16096
E050.1	9/7/11 16:11	UF	—	—	—	—	—	—	—	—	—	—	11-16042
E050.1	9/7/11 16:31	UF	—	—	—	—	—	—	—	—	—	—	11-16044
E050.1	9/7/11 16:51	UF	—	—	—	—	—	—	—	—	—	—	11-16066
E050.1	9/7/11 17:11	UF	—	—	—	—	—	—	—	—	—	—	11-16058
E050.1	9/7/11 17:31	UF	—	—	—	—	—	—	—	—	—	—	11-16065
E050.1	9/10/11 13:46	UF	—	—	—	—	—	—	—	—	—	—	11-27291
E050.1	9/10/11 13:49	UF	—	—	—	—	—	—	—	—	—	—	11-27301
E050.1	9/10/11 13:51	UF	—	—	—	—	—	—	—	—	11-27493	—	—
E050.1	9/10/11 01:52	UF	11-27536	—	11-27536	11-27565	11-27536	—	11-27536	—	—	—	11-27565
E050.1	9/10/11 01:54	UF	11-27549	—	11-27549	—	11-27549	—	11-27549	—	—	11-27549	—
E050.1	9/10/11 01:55	F	—	—	—	—	—	—	—	11-27571	—	—	11-27571
E050.1	9/10/11 01:55	UF	—	11-27471	—	—	—	—	—	11-27583	—	—	11-27583
E050.1	9/10/11 01:58	UF	—	—	—	—	—	11-27485	—	—	—	—	—
E050.1	9/10/11 02:01	UF	—	—	—	—	—	—	—	—	—	—	11-27333
E050.1	9/10/11 02:07	UF	—	—	—	—	—	—	—	—	—	—	11-27352
E050.1	9/10/11 02:10	UF	—	—	—	—	—	—	—	—	—	—	11-27326
E050.1	9/10/11 02:13	UF	—	—	—	—	—	—	—	—	—	—	11-27336
E050.1	9/10/11 02:16	UF	—	—	—	—	—	—	—	—	—	—	11-27404
E050.1	9/10/11 02:36	UF	—	—	—	—	—	—	—	—	—	—	11-27410
E050.1	9/10/11 02:51	UF	11-27533	—	11-27533	—	11-27533	—	11-27533	—	11-27499	—	—

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E050.1	9/10/11 02:56	UF	—	—	—	—	—	—	—	—	—	—	11-27366
E050.1	9/10/11 03:16	UF	—	—	—	—	—	—	—	—	—	—	11-27402
E050.1	9/10/11 03:36	UF	11-27539	—	11-27539	—	11-27539	—	11-27539	—	11-27515	—	11-27380
E050.1	9/10/11 03:56	UF	—	—	—	—	—	—	—	—	—	—	11-27399
E050.1	9/10/11 04:16	UF	—	—	—	—	—	—	—	—	—	—	11-27396
E050.1	9/10/11 04:21	UF	11-27553	—	11-27553	—	11-27553	—	11-27553	—	11-27511	11-27553	—
E050.1	9/10/11 04:36	UF	—	—	—	—	—	—	—	—	—	—	11-27393
E050.1	9/10/11 04:56	UF	—	—	—	—	—	—	—	—	—	—	11-27429
E050.1	9/10/11 05:16	UF	—	—	—	—	—	—	—	—	—	—	11-27448
E050.1	9/10/11 05:36	UF	—	—	—	—	—	—	—	—	—	—	11-27422
E050.1	9/10/11 05:56	UF	—	—	—	—	—	—	—	—	—	—	11-27432
E050.1	9/10/11 06:16	UF	—	—	—	—	—	—	—	—	—	—	11-27466
E050.1	9/10/11 06:36	UF	—	—	—	—	—	—	—	—	—	—	11-27465
E050.1	9/15/11 20:01	UF	—	—	—	—	—	—	—	—	—	—	11-27292
E050.1	9/15/11 20:04	UF	—	—	—	—	—	—	—	—	—	—	11-27304
E050.1	9/15/11 20:06	UF	—	—	—	—	—	—	—	—	11-27489	—	—
E050.1	9/15/11 20:07	F	—	—	—	—	—	—	—	11-27572	—	—	11-27572
E050.1	9/15/11 20:07	UF	11-27542	—	11-27542	—	11-27542	—	11-27542	11-27584	—	—	11-27584
E050.1	9/15/11 20:09	UF	—	—	—	—	—	—	—	—	—	11-27545	—
E050.1	9/15/11 20:10	UF	—	11-27472	—	11-27561	—	—	—	—	—	—	11-27561
E050.1	9/15/11 20:13	UF	—	—	—	—	—	11-27481	—	—	—	—	—

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E050.1	9/15/11 20:16	UF	—	—	—	—	—	—	—	—	—	—	11-27335
E050.1	9/15/11 20:22	UF	—	—	—	—	—	—	—	—	—	—	11-27327
E050.1	9/15/11 20:25	UF	—	—	—	—	—	—	—	—	—	—	11-27337
E050.1	9/15/11 20:28	UF	—	—	—	—	—	—	—	—	—	—	11-27338
E050.1	9/15/11 20:31	UF	—	—	—	—	—	—	—	—	—	—	11-27365
E050.1	9/15/11 20:51	UF	—	—	—	—	—	—	—	—	—	—	11-27394
E050.1	9/15/11 21:06	UF	11-27541	—	11-27541	—	11-27541	—	11-27541	—	11-27500	—	—
E050.1	9/15/11 21:11	UF	—	—	—	—	—	—	—	—	—	—	11-27372
E050.1	9/15/11 21:31	UF	—	—	—	—	—	—	—	—	—	—	11-27417
E050.1	9/15/11 21:51	UF	11-27525	—	11-27525	—	11-27525	—	11-27525	—	11-27516	—	11-27382
E050.1	9/15/11 22:11	UF	—	—	—	—	—	—	—	—	—	—	11-27375
E050.1	9/15/11 22:31	UF	—	—	—	—	—	—	—	—	—	—	11-27377
E050.1	9/15/11 22:36	UF	11-27558	—	11-27558	—	11-27558	—	11-27558	—	11-27507	—	—
E050.1	9/15/11 22:51	UF	—	—	—	—	—	—	—	—	—	—	11-27391
E050.1	9/15/11 23:11	UF	—	—	—	—	—	—	—	—	—	—	11-27431
E050.1	9/15/11 23:31	UF	—	—	—	—	—	—	—	—	—	—	11-27423
E050.1	9/15/11 23:51	UF	—	—	—	—	—	—	—	—	—	—	11-27433
E050.1	9/16/11 0:11	UF	—	—	—	—	—	—	—	—	—	—	11-27434
E050.1	9/16/11 0:31	UF	—	—	—	—	—	—	—	—	—	—	11-27463
E050.1	9/16/11 0:51	UF	—	—	—	—	—	—	—	—	—	—	11-27455
E050.1	10/2/11 17:06	UF	—	—	—	—	—	—	—	—	—	—	11-27293

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E050.1	10/2/11 17:09	UF	—	—	—	—	—	—	—	—	—	—	11-27305
E050.1	10/2/11 17:11	UF	—	—	—	—	—	—	—	—	11-27487	—	—
E050.1	10/2/11 17:12	F	—	—	—	—	—	—	—	11-27573	—	—	11-27573
E050.1	10/2/11 17:12	UF	11-27524	—	11-27524	—	11-27524	—	11-27524	11-27585	—	—	11-27585
E050.1	10/2/11 17:13	UF	—	—	—	—	—	—	—	—	—	11-27543	—
E050.1	10/2/11 17:14	UF	—	11-27473	—	—	—	—	—	—	—	—	—
E050.1	10/2/11 17:15	UF	—	—	—	11-27559	—	—	—	—	—	—	11-27559
E050.1	10/2/11 17:18	UF	—	—	—	—	—	11-27479	—	—	—	—	—
E050.1	10/2/11 17:21	UF	—	—	—	—	—	—	—	—	—	—	11-27334
E050.1	10/2/11 17:27	UF	—	—	—	—	—	—	—	—	—	—	11-27348
E050.1	10/2/11 17:30	UF	—	—	—	—	—	—	—	—	—	—	11-27332
E050.1	10/2/11 17:33	UF	—	—	—	—	—	—	—	—	—	—	11-27347
E050.1	10/2/11 17:36	UF	—	—	—	—	—	—	—	—	—	—	11-27395
E050.1	10/2/11 17:56	UF	—	—	—	—	—	—	—	—	—	—	11-27383
E050.1	10/2/11 18:11	UF	11-27534	—	11-27534	—	11-27534	—	11-27534	—	11-27495	—	—
E050.1	10/2/11 18:16	UF	—	—	—	—	—	—	—	—	—	—	11-27363
E050.1	10/2/11 18:36	UF	—	—	—	—	—	—	—	—	—	—	11-27408
E050.1	10/2/11 18:56	UF	11-27526	—	11-27526	—	11-27526	—	11-27526	—	11-27512	—	11-27360
E050.1	10/2/11 19:16	UF	—	—	—	—	—	—	—	—	—	—	11-27401
E050.1	10/2/11 19:36	UF	—	—	—	—	—	—	—	—	—	—	11-27403
E050.1	10/2/11 19:41	UF	11-27551	—	11-27551	—	11-27551	—	11-27551	—	11-27514	—	—

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E050.1	10/2/11 19:56	UF	—	—	—	—	—	—	—	—	—	—	11-27413
E050.1	10/2/11 20:16	UF	—	—	—	—	—	—	—	—	—	—	11-27430
E050.1	10/2/11 20:36	UF	—	—	—	—	—	—	—	—	—	—	11-27444
E050.1	10/2/11 20:56	UF	—	—	—	—	—	—	—	—	—	—	11-27428
E050.1	10/2/11 21:16	UF	—	—	—	—	—	—	—	—	—	—	11-27443
E050.1	10/2/11 21:36	UF	—	—	—	—	—	—	—	—	—	—	11-27456
E050.1	10/2/11 21:56	UF	—	—	—	—	—	—	—	—	—	—	11-27461
E050.1	10/4/11 23:31	UF	—	—	—	—	—	—	—	—	—	—	11-27294
E050.1	10/4/11 23:34	UF	—	—	—	—	—	—	—	—	—	—	11-27302
E050.1	10/4/11 23:36	UF	—	—	—	—	—	—	—	—	11-27492	—	—
E050.1	10/4/11 23:37	F	—	—	—	—	—	—	—	11-27574	—	—	11-27574
E050.1	10/4/11 23:37	UF	11-27520	—	11-27520	—	11-27520	—	11-27520	11-27586	—	—	11-27586
E050.1	10/4/11 23:39	UF	—	—	—	—	—	—	—	—	—	11-27548	—
E050.1	10/4/11 23:40	UF	—	11-27474	—	11-27564	—	—	—	—	—	—	11-27564
E050.1	10/4/11 23:43	UF	—	—	—	—	—	11-27484	—	—	—	—	—
E050.1	10/4/11 23:46	UF	—	—	—	—	—	—	—	—	—	—	11-27343
E050.1	10/4/11 23:52	UF	—	—	—	—	—	—	—	—	—	—	11-27340
E050.1	10/4/11 23:55	UF	—	—	—	—	—	—	—	—	—	—	11-27351
E050.1	10/4/11 23:58	UF	—	—	—	—	—	—	—	—	—	—	11-27344
E050.1	10/5/11 0:36	UF	11-27521	—	11-27521	—	11-27521	—	11-27521	—	11-27497	—	—
E050.1	10/5/11 1:21	UF	11-27523	—	11-27523	—	11-27523	—	11-27523	—	11-27505	—	—

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E050.1	10/5/11 2:06	UF	11-27552	—	11-27552	—	11-27552	—	11-27552	—	11-27509	—	—
E055.5	8/19/11 14:03	UF	—	—	—	—	—	—	—	—	—	—	11-15648
E055.5	8/19/11 14:05	UF	—	—	—	—	—	—	—	—	11-15653	—	—
E059	8/19/11 16:04	UF	—	—	—	—	—	—	—	—	—	—	11-16180
E059	8/19/11 16:07	UF	11-25603	—	11-25603	—	11-25603	—	11-25603	—	—	—	—
E059	8/19/11 16:10	UF	—	—	—	—	—	—	—	—	—	11-15790	—
E059	8/19/11 16:13	F	—	—	—	—	—	—	—	11-15811	—	—	11-15811
E059	8/19/11 16:13	UF	—	—	—	—	—	—	—	11-15775	—	—	11-15775
E059	8/19/11 16:16	UF	—	—	—	11-15807	—	—	—	—	—	—	11-15807
E059	8/19/11 16:19	UF	—	—	—	—	—	11-16203	—	—	—	—	—
E059	8/19/11 16:25	UF	—	—	—	—	—	—	—	—	—	—	11-16151
E059	8/21/11 16:24	UF	—	—	—	—	—	—	—	—	11-15794	—	—
E059	8/21/11 16:25	UF	—	—	—	—	—	—	—	—	—	—	11-16141
E059	8/21/11 16:26	UF	11-15801	—	11-15801	—	11-15801	—	11-15801	—	—	—	—
E059	8/21/11 16:27	UF	—	11-15809	—	—	—	—	—	—	—	—	—
E059	8/21/11 16:28	UF	—	—	—	—	—	—	—	—	—	11-15776	—
E059	8/21/11 17:24	UF	—	—	—	—	—	—	—	—	11-15798	—	11-16121
E109.9	7/22/11 15:57	n/a[g]	11-15908	—	11-15908	—	11-15908	—	11-15908	11-15879	—	—	—
E109.9	7/22/11 15:58	n/a	—	—	—	—	—	—	—	—	—	11-15894	—
E109.9	7/22/11 15:59	n/a	—	—	—	—	—	—	—	—	11-15878	—	—
E109.9	7/22/11 16:46	n/a	—	11-15893	—	—	—	—	—	—	—	—	—

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E109.9	7/28/11 16:21	UF	—	—	—	—	—	—	—	—	—	—	11-16319
E109.9	7/28/11 16:22	UF	—	—	—	—	—	—	—	—	—	—	11-16336
E109.9	7/28/11 16:23	n/a	11-25815	—	11-25815	—	11-25815	—	11-25815	—	—	—	—
E109.9	7/28/11 16:23	UF	—	—	—	—	—	—	—	—	—	—	11-16339
E109.9	7/28/11 16:25	n/a	—	—	—	—	—	—	—	11-25899	—	—	—
E109.9	7/28/11 16:27	n/a	—	—	—	—	—	—	—	—	—	11-25811	—
E109.9	7/28/11 16:29	UF	—	—	—	—	—	—	—	—	—	—	11-16326
E109.9	7/28/11 16:30	n/a	—	—	—	—	—	11-25827	—	—	—	—	—
E109.9	7/28/11 16:35	n/a	—	—	—	11-25823	—	—	—	—	—	—	11-25823
E109.9	7/28/11 16:37	UF	—	—	—	—	—	—	—	—	—	—	11-16335
E109.9	7/28/11 17:25	n/a	—	—	—	—	—	—	—	—	11-25808	—	—
E109.9	7/28/11 17:25	UF	—	—	—	—	—	—	—	—	—	—	11-16341
E109.9	8/3/11 15:05	UF	—	—	—	—	—	—	—	—	—	—	11-16306
E109.9	8/3/11 15:07	UF	—	—	—	—	—	—	—	—	—	—	11-16317
E109.9	8/3/11 15:16	n/a	—	—	—	—	—	—	—	—	11-25809	—	—
E109.9	8/3/11 15:18	n/a	11-25817	—	11-25817	—	11-25817	—	11-25817	—	—	—	—
E109.9	8/3/11 15:19	n/a	—	—	—	—	—	—	—	—	—	11-25813	—
E109.9	8/3/11 16:06	n/a	—	—	—	11-25825	—	—	—	11-25896	—	—	—
E109.9	8/3/11 16:51	n/a	—	—	—	—	—	11-25829	—	—	—	—	—
E109.9	8/3/11 17:36	n/a	—	11-25821	—	—	—	—	—	—	—	—	11-25902
E109.9	8/5/11 15:20	UF	—	—	—	—	—	—	—	—	—	—	11-16305

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E109.9	8/5/11 15:22	UF	—	—	—	—	—	—	—	—	—	—	11-16318
E109.9	8/5/11 15:24	UF	—	—	—	—	—	—	—	—	—	—	11-16322
E109.9	8/5/11 15:26	UF	—	—	—	—	—	—	—	—	—	—	11-16327
E109.9	8/5/11 15:28	UF	—	—	—	—	—	—	—	—	—	—	11-16329
E109.9	8/5/11 15:30	UF	—	—	—	—	—	—	—	—	—	—	11-16352
E109.9	8/5/11 15:32	UF	—	—	—	—	—	—	—	—	—	—	11-16344
E109.9	8/5/11 15:33	F	—	—	—	—	—	—	—	11-15926	—	—	11-15926
E109.9	8/5/11 15:33	UF	—	—	—	—	—	—	—	11-15881	—	—	11-15881
E109.9	8/5/11 15:34	UF	11-15914	—	11-15914	—	11-15914	—	11-15914	—	—	—	11-25866
E109.9	8/5/11 15:35	UF	—	—	—	11-15924[e]	—	—	—	—	—	—	11-15924
E109.9	8/5/11 15:36	UF	—	—	—	—	—	—	—	—	—	—	11-16337
E109.9	8/5/11 15:38	UF	—	—	—	—	—	—	—	—	—	—	11-25857
E109.9	8/5/11 15:46	UF	—	—	—	—	—	—	—	—	—	—	11-25855
E109.9	8/5/11 15:48	UF	—	—	—	—	—	—	—	—	—	—	11-16350
E109.9	8/5/11 15:50	UF	—	—	—	—	—	—	—	—	—	—	11-25870
E109.9	8/5/11 16:21	F	—	—	—	—	—	—	—	—	—	11-16300	—
E109.9	8/5/11 16:21	UF	—	—	—	—	—	—	—	—	11-15901	—	—
E109.9	8/5/11 17:06	UF	—	—	—	—	—	11-16304	—	—	—	—	—
E109.9	8/5/11 17:51	UF	—	11-15889	—	—	—	—	—	—	—	—	—
E109.9	8/22/11 15:37	UF	—	—	—	—	—	—	—	—	—	—	11-26590
E109.9	8/22/11 15:38	UF	—	—	—	—	—	—	—	—	11-26474	—	—

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E109.9	8/22/11 15:39	UF	—	11-26560	—	—	—	—	—	—	—	—	—
E109.9	8/22/11 15:40	UF	11-26487	—	11-26487	—	11-26487	—	11-26487	—	—	—	—
E109.9	8/22/11 15:41	F	—	—	—	—	—	—	—	11-26580	—	—	11-26580
E109.9	8/22/11 15:41	UF	—	—	—	—	—	—	—	11-26576	—	—	11-26576
E109.9	8/22/11 15:42	UF	—	—	—	11-26568	—	—	—	—	—	—	11-26568
E109.9	8/22/11 15:43	UF	—	—	—	—	—	11-26600	—	—	—	—	—
E109.9	8/22/11 15:45	UF	—	—	—	—	—	—	—	—	—	11-26546	—
E109.9	8/22/11 15:46	F	11-26614	—	11-26614	—	11-26614	—	11-26614	—	—	—	—
E109.9	8/22/11 15:47	F	—	—	—	—	—	—	—	—	—	11-26628	—
E109.9	8/22/11 15:48	UF	—	—	—	—	—	—	—	—	—	—	11-26632
E109.9	8/26/11 17:12	UF	—	—	—	—	—	—	—	—	—	—	11-26591
E109.9	8/26/11 17:13	UF	—	—	—	11-26569	—	—	—	—	—	—	11-26569
E109.9	8/26/11 17:14	UF	11-26492	—	11-26492	—	11-26492	—	11-26492	—	—	—	—
E109.9	8/26/11 17:15	UF	—	11-26561	—	—	—	—	—	—	—	—	—
E109.9	8/26/11 17:16	F	—	—	—	—	—	—	—	11-26579	—	—	11-26579
E109.9	8/26/11 17:16	UF	—	—	—	—	—	—	—	11-26577	—	—	11-26577
E109.9	8/26/11 19:20	UF	—	—	—	—	—	—	—	—	11-26475	—	—
E109.9	8/26/11 19:21	UF	—	—	—	—	—	—	—	—	—	11-26547	—
E109.9	8/26/11 19:22	UF	—	—	—	—	—	—	—	—	—	—	11-26631
E109.9	9/4/11 20:46	F	—	—	—	—	—	—	—	11-26585	—	—	11-26585
E109.9	9/4/11 20:46	UF	—	—	—	—	—	—	—	11-26573	—	—	11-26573

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E109.9	9/4/11 22:16	UF	—	—	—	11-26565[e]	—	—	—	—	—	—	—
E109.9	9/7/11 16:34	UF	—	—	—	11-26563	—	—	—	—	11-26477	—	11-26563
E109.9	9/7/11 16:35	UF	11-26500	—	11-26500	—	11-26500	—	11-26500	—	—	—	—
E109.9	9/7/11 16:36	F	—	—	—	—	—	—	—	11-26582	—	—	11-26582
E109.9	9/7/11 16:36	UF	—	11-26555	—	—	—	—	—	11-26571	—	—	11-26571
E109.9	9/7/11 16:37	UF	—	—	—	—	—	—	—	—	—	11-26549	11-26633
E109.9	9/10/11 2:06	UF	—	—	—	—	—	—	—	—	—	—	11-26594
E109.9	9/10/11 2:07	UF	—	—	—	—	—	—	—	—	11-26478	—	—
E109.9	9/10/11 2:08	UF	11-26491	—	11-26491	—	11-26491	—	11-26491	—	—	—	11-26630
E109.9	9/10/11 2:09	UF	—	—	—	—	—	—	—	—	—	11-26550	—
E109.9	9/10/11 2:10	UF	—	11-26559	—	11-26567	—	—	—	—	—	—	11-26567
E109.9	9/10/11 2:11	F	—	—	—	—	—	—	—	11-26584	—	—	11-26584
E109.9	9/10/11 2:11	UF	—	—	—	—	—	—	—	11-26575	—	—	11-26575
E109.9	9/10/11 2:12	UF	—	—	—	—	—	—	—	—	—	—	11-26649
E109.9	9/10/11 2:14	UF	—	—	—	—	—	—	—	—	—	—	11-26653
E109.9	9/10/11 2:16	F	11-26615	—	11-26615	—	11-26615	—	11-26615	—	—	—	—
E109.9	9/10/11 2:18	UF	—	—	—	—	—	—	—	—	—	—	11-26679
E109.9	9/10/11 2:20	F	—	—	—	—	—	—	—	—	—	11-26627	—
E109.9	9/10/11 2:22	UF	—	—	—	—	—	—	—	—	—	—	11-26664
E109.9	9/10/11 2:24	UF	—	—	—	—	—	11-26598	—	—	—	—	—
E109.9	9/10/11 2:26	UF	—	—	—	—	—	—	—	—	—	—	11-26663

Table 2.3-3 (continued)

Station	Collection Date and Time	Field Prep	Americium-241	Dioxins and Furans	Gamma Spectroscopy	Gross Alpha, Gross Beta, and Total Cyanide	Isotopic Plutonium	Isotopic Radium	Isotopic Uranium	TAL Metals, Boron, Uranium, and Hardness	PCB Congeners	Strontium-90	SSC
E109.9	9/10/11 2:30	UF	—	—	—	—	—	—	—	—	—	—	11-26672
E109.9	9/10/11 2:32	UF	—	—	—	—	—	11-26608	—	—	—	—	—
E109.9	9/10/11 2:34	UF	—	—	—	—	—	—	—	—	—	—	11-26752
E109.9	9/10/11 2:56	UF	—	—	—	—	—	—	—	—	—	—	11-26709
E109.9	9/10/11 3:07	UF	11-26505	—	11-26505	—	11-26505	—	11-26505	—	11-26507	—	—
E109.9	9/10/11 3:16	UF	—	—	—	—	—	—	—	—	—	—	11-26741
E109.9	9/10/11 3:36	UF	—	—	—	—	—	—	—	—	—	—	11-26723
E109.9	9/10/11 3:52	UF	11-26521	—	11-26521	—	11-26521	—	11-26521	—	11-26529	—	—
E109.9	9/10/11 3:56	UF	—	—	—	—	—	—	—	—	—	—	11-26714
E109.9	9/10/11 4:16	UF	—	—	—	—	—	—	—	—	—	—	11-26736

[a] UF = Unfiltered.
[b] — = Analysis not requested.
[c] Sample number (WTLAP prefix not shown).
[d] F = Filtered.
[e] Total cyanide analysis not conducted on this sample.
[f] Gross beta analysis not conducted on this sample.
[g] n/a = Not applicable.

Table 2.3-4
Sampling Sequence for Collection of Stormwater Samples at E055, E055.5, E056, E030, and E040

	E055, E055.5, and E056		E030 (Fire Affected)		E040	
Sample Bottle	Start Time (min), 12 Bottle ISCO	Analytical Suites	Start Time (min), 12 Bottle ISCO	Analytical Suites	Start Time (min), 12 Bottle ISCO	Analytical Suites
1	Max+10	SSC	Max+10	SSC	Max+10	SSC
2	Max+11	PCBs	Max+11	PCBs	Max+11	PCBs
3	Max+12	PCBs	Max+12	PCBs	Max+12	PCBs
4	Max+13	Isotopic plutonium	Max+13	Gamma spectroscopy; isotopic plutonium; americium-241; isotopic uranium	Max+13	Gamma spectroscopy; isotopic plutonium; americium-241; isotopic uranium
5	Max+14	Dioxins and furans	Max+14	Sr-90	Max+14	Sr-90
6	Max+15	Dioxins and furans	Max+15	Dioxins and furans	Max+15	Dioxins and furans
7	Max+16	TAL metals; boron; total uranium F/UF*	Max+16	Dioxins and furans	Max+16	Dioxins and furans
8	Max+17	Gross alpha	Max+17	TAL metals; boron; total uranium F/UF	Max+17	TAL metals; boron; total uranium F/UF
9	Max+18	SSC	Max+18	Gross alpha; cyanide	Max+18	Gross alpha
10	Max+19	Extra bottle	Max+19	SSC	Max+19	SSC
11	Max+20	Extra bottle	Max+20	Extra bottle	Max+20	Extra bottle
12	Max+21	Extra bottle	Max+21	Extra bottle	Max+21	Extra bottle

Note: All analyses are for unfiltered samples unless otherwise noted.
* F/UF = Analyses of both filtered and unfiltered splits.

Table 2.3-5
Sampling Sequence for Collection of Stormwater Samples at E026, E038, E039.1, E042.1, E050.1, E059, and E060.1

	E026 (Fire Affected)		E038 and E039.1		E042.1 and E050.1 (Fire Affected)		E059 and E060.1		E026, E038, and E039.1		E059, E060.1, E042.1, and E050.1	
Sample Bottle	**Start Time (min), 12 Bottle ISCO**	**Analytical Suites**	**Start Time (min), 12 Bottle ISCO**	**Analytical Suites**	**Start Time (min), 12 Bottle ISCO**	**Analytical Suites, 12 Bottle ISCO**	**Start Time (min), 12 Bottle ISCO**	**Analytical Suites, 12 Bottle ISCO**	**Start Time (min), 24 Bottle ISCO**	**Analytical Suites, 24 Bottle ISCO**	**Start Time (min), 24 Bottle ISCO**	**Analytical Suites, 24 Bottle ISCO**
1	Max+10	PCBs	Max+10	PCBs	Max+10	PCBs	Max+10	PCBs	Trigger	SSC	Trigger	SSC
2	Max+11	PCBs	Max+11	PCBs	Max+11	Gamma spectroscopy; isotopic plutonium; americium-241; isotopic uranium	Max+11	Gamma spectroscopy; isotopic plutonium; americium-241; isotopic uranium	Trigger+3	SSC	Trigger+3	SSC
3	Max+12	Gamma spectroscopy; isotopic plutonium; americium-241; isotopic uranium	Max+12	Gamma spectroscopy; isotopic plutonium; isotopic uranium	Max+12	Strontium-90	Max+12	Strontium-90	Trigger+6	SSC	Trigger+6	SSC
4	Max+13	Strontium-90	Max+13	Strontium-90	Max+13	Dioxins and furans	Max+13	Dioxins and furans	Trigger+9	SSC	Trigger+9	SSC
5	Max+14	Dioxins and furans	Max+14	Dioxins and furans	Max+14	TAL metals; boron; total uranium F/UF[a]	Max+14	TAL metals; boron; total uranium F/UF	Trigger+12	SSC	Trigger+12	Ra-226
6	Max+15	Dioxins and furans	Max+15	Dioxins and furans	Max+15	Gross alpha/beta; cyanide	Max+15	Gross Alpha/beta	Trigger+15	SSC	Trigger+15	SSC
7	Max+16	TAL metals; boron; total uranium F/UF	Max+16	TAL metals; boron; total uranium F/UF	Max+60	PCBs	Max+60	PCBs	Trigger+18	SSC	Trigger+18	Ra-228

Table 2.3-5 (continued)

	E026 (Fire Affected)		E038 and E039.1		E042.1 and E050.1 (Fire Affected)		E059 and E060.1		E026, E038, and E039.1		E059, E060.1, E042.1, and E050.1	
Sample Bottle	Start Time (min), 12 Bottle ISCO	Analytical Suites	Start Time (min), 12 Bottle ISCO	Analytical Suites	Start Time (min), 12 Bottle ISCO	Analytical Suites, 12 Bottle ISCO	Start Time (min), 12 Bottle ISCO	Analytical Suites, 12 Bottle ISCO	Start Time (min), 24 Bottle ISCO	Analytical Suites, 24 Bottle ISCO	Start Time (min), 24 Bottle ISCO	Analytical Suites, 24 Bottle ISCO
8	Max+17	Gross alpha; cyanide	Max+17	Gross Alpha	Max+61	Gamma spectroscopy; isotopic plutonium	Max+61	Gamma spectroscopy; isotopic plutonium	Trigger+21	SSC	Trigger+21	SSC
9	Max+18	Extra bottle	Max+18	Extra bottle	Max +105	PCBs	Max +105	PCBs	Trigger+24	SSC	Trigger+24	SSC
10	Max+19	Extra bottle	Max+19	Extra bottle	Max +106	Gamma spectroscopy; isotopic plutonium	Max +106	Gamma spectroscopy; isotopic plutonium	Trigger+27	SSC	Trigger+27	SSC
11	Max+20	Extra bottle	Max+20	Extra bottle	Max +150	PCBs	Max +150	PCBs	Trigger+30	SSC	Trigger+30	SSC
12	Max+21	Extra bottle	Max+21	Extra bottle	Max +151	Gamma spectroscopy; isotopic plutonium	Max +151	Gamma spectroscopy; isotopic plutonium	Trigger+50	SSC	Trigger+50	SSC
13	—[b]	—	—	—	—	—	—	—	Trigger+70	SSC	Trigger+70	SSC
14	—	—	—	—	—	—	—	—	Trigger+90	SSC	Trigger+90	SSC
15	—	—	—	—	—	—	—	—	Trigger +110	SSC	Trigger +110	SSC
16	—	—	—	—	—	—	—	—	Trigger +130	SSC	Trigger +130	SSC
17	—	—	—	—	—	—	—	—	Trigger +150	SSC	Trigger +150	SSC
18	—	—	—	—	—	—	—	—	Trigger +170	SSC	Trigger +170	SSC

Table 2.3-5 (continued)

	E026 (Fire Affected)		E038 and E039.1		E042.1 and E050.1 (Fire Affected)		E059 and E060.1		E026, E038, and E039.1		E059, E060.1, E042.1, and E050.1	
19	—	—	—	—	—	—	—	—	Trigger +190	SSC	Trigger +190	SSC
20	—	—	—	—	—	—	—	—	Trigger +210	SSC	Trigger +210	SSC
21	—	—	—	—	—	—	—	—	Trigger +230	SSC	Trigger +230	SSC
22	—	—	—	—	—	—	—	—	Trigger +250	SSC	Trigger +250	SSC
23	—	—	—	—	—	—	—	—	Trigger +270	SSC	Trigger +270	SSC
24	—	—	—	—	—	—	—	—	Trigger +290	SSC	Trigger +290	SSC

Note: All analyses are for unfiltered samples unless otherwise noted.

[a] F/UF = Analyses of both filtered and unfiltered splits.

[b] — = Not applicable.

Table 2.3-6
Sampling Sequence for Collection of Stormwater Samples at E109.9

Sample Bottle	E109.9 (Fire Affected)			
	Start Time (min), 12 Bottle ISCO	Analytical Suites, 12 Bottle ISCO	Start Time (min), 24 Bottle ISCO	Analytical Suites, 24 Bottle ISCO
1	Max+10	PCB	Trigger	SSC
2	Max+11	Gamma spectroscopy; isotopic plutonium; americium-241; isotopic uranium	Trigger+2	SSC
3	Max+12	Strontium-90	Trigger+4	SSC
4	Max+13	Dioxins and furans	Trigger+6	SSC
5	Max+14	TAL metals; boron; total uranium F/UF[a]	Trigger+8	SSC
6	Max+15	Gross alpha/beta F/UF; cyanide	Trigger+10	Gamma spectroscopy; isotopic plutonium; americium-241; isotopic uranium F[b]
7	Max+60	PCBs	Trigger+12	SSC
8	Max+61	Gamma spectroscopy; isotopic plutonium; americium-241; isotopic uranium	Trigger+14	Strontium-90 F
9	Max+105	PCBs	Trigger+16	SSC
10	Max+106	Gamma spectroscopy; isotopic plutonium; americium-241; isotopic uranium	Trigger+18	Radium-226
11	Max+150	PCBs	Trigger+20	SSC
12	Max+151	Gamma spectroscopy; isotopic plutonium; americium-241; isotopic uranium	Trigger+22	Radium-228
13	—[c]	—	Trigger+24	SSC
14	—	—	Trigger+26	Radium-226 F
15	—	—	Trigger+28	SSC
16	—	—	Trigger+30	Radium-228 F
17	—	—	Trigger+50	SSC
18	—	—	Trigger+70	SSC
19	—	—	Trigger+90	SSC
20	—	—	Trigger+110	SSC
21	—	—	Trigger+130	SSC
22	—	—	Trigger+150	SSC
23	—	—	Trigger+170	SSC
24	—	—	Trigger+190	SSC

Note: All analyses are for unfiltered samples unless otherwise noted.
[a] F/UF = Analyses of both filtered and unfiltered splits.
[b] F = Filtered.
[c] — = Not applicable.

Table 2.5-1
Sample Collection Deviations in the LA/P Watershed in 2011

Station	Sample Collection Date and Time	Sample Retrieval Date and Time	Collection to Retrieval Interval (h)
E039.1	9/15/2011 18:13	9/19/2011 9:45	88
E050.1	9/15/2011 20:01	9/19/2011 12:17	88
E042.1	9/15/2011 19:49	9/19/2011 13:01	89
E109.9	7/28/2011 16:22	8/1/2011 14:15	94
E059	8/19/2011 16:04	8/23/2011 14:30	94
E039.1	8/19/2011 14:02	8/24/2011 10:24	116
E038	8/19/2011 13:30	8/24/2011 11:26	118
E055.5	8/19/11 14:03	8/24/2011 15:26	121
E038	10/12/2011 11:04	10/17/2011 14:15	123
E039.1	8/4/2011 16:02	8/10/2011 13:06	141
E038	9/7/2011 12:39	9/13/2011 15:30	147
E038	8/2/2011 22:20	8/10/2011 9:35	179
E030	9/4/2011 19:06	9/13/2011 13:05	210
E038	7/2/2011 17:36	7/11/2011 13:00	211

Table 2.5-2
Factors Contributing to Analytical Suite Prioritization

Upper Los Alamos Canyon Gages	Priority	Analytical Suite	Glass Bottle	Polyethylene Bottle	Minimum Volume Required (L)
E026, E030, E038, E039.1, E040	1	PCBs	Yes	No	1
	2	Gamma spectroscopy, Iso Pu, Iso U, Am-241[a]	Yes	Yes	1
	3	Strontium-90	Yes	Yes	1
	4	Dioxins and furans	Yes	No	1
	5	TAL Metals + B + U (F/UF[b])	No	Yes	0.25/0.25
	6	Gross Alpha	Yes	Yes	0.25
	7	Cyanide[a]	Yes	Yes	0.25
Upper Pueblo Canyon Gages					
E055, E055.5, E056	1	PCBs	Yes	No	1
	2	Iso Pu	Yes	Yes	1
	3	Dioxins and furans	Yes	No	1
	4	TAL Metals + B + U (F/UF)	No	Yes	0.25/0.25
	5	Gross Alpha	Yes	Yes	0.25

Table 2.5-2 (continued)

Lower Watershed Gages	Priority	Analytical Suite	Glass Bottle	Polyethylene Bottle	Minimum Volume Required (L)
E042.1, E050.1, E059, E060.1, E109.9	1	PCBs	Yes	No	1
	2	Gamma spectroscopy, Iso Pu, Iso U, Am-241	Yes	Yes	1
	3	Strontium-90	Yes	Yes	1
	4	Dioxins and furans	Yes	No	1
	5	TAL Metals + B + U (F/UF)	No	Yes	0.25/0.25
	6	Gross Alpha/Gross Beta	Yes	Yes	0.25
	7	Radium-226/Radium-228	Yes	Yes	2
	8	Cyanide*	Yes	Yes	0.25
Retention Basin and Wetland below the SWMU 01-001(f) Drainage					
CO111041, CO101038	1	TAL Metals + B + U (F/UF)	No	Yes	0.25/0.25
	2	PCBs	Yes	No	1
	3	Iso U	Yes	Yes	1
	4	Total organic carbon	Yes	Yes	0.04
	5	Gross Alpha/Gross Beta	Yes	Yes	0.25
Graduation Canyon below SWMU 00-019					
C0115002	1	TAL Metals + B + U (F/UF)	No	Yes	0.25/0.25
	2	PCBs	Yes	No	1
	3	Iso U	Yes	Yes	1
	4	Total organic carbon	Yes	Yes	0.04
	5	Gross Alpha/Gross Beta	Yes	Yes	0.25

[a] Americium-241 and cyanide were added to analytical suite in response to the Las Conchas fire.

[b] F/UF = Analyses of both filtered and unfiltered splits.

Table 2.5-3
Completeness of 2011 LA/P Stormwater Sampling Events

Station	Collection Date	Maximum SSC (mg/L)	All Potential Samples Collected? 12-Bottle Sampler	All Potential Samples Collected? 24-Bottle Sampler	Sampling Completeness Comment
E026	8/22/2011	99,500	Yes	**No**	Discharge > 10 cfs for 45 min. 24-bottle sampler: bottles 1–3 collected samples, bottles 4–15 missed samples, bottles 16–24 no liquid detected; sampler distributor arm jammed preventing sample collection. Sampler intake silted.
E026	9/4/2011	65,600	Yes	**No**	Peak discharge >10 cfs for 45 min. 24-bottle sampler: no liquid detected; sampler distributor arm jammed preventing sample collection. Sampler intake silted.
E030	8/21/2011	5370	Yes	n/a*	Discharge >10 cfs for 80 min: Sampling began 10 min after peak discharge.
E030	8/22/2011	46,800	Yes	n/a	Discharge >10 cfs for 110 min: Sampling began 10 min after peak discharge.
E030	9/4/2011	34,900	Yes	n/a	Discharge >10 cfs for 115 min: Sampling began 10 min after peak discharge.
E030	10/2/2011	20,000	Yes	n/a	Discharge >10 cfs for 25 min: Sampling began 10 min after peak discharge.
E038	7/2/2011	5740	Yes	Yes	Discharge >10 cfs for 10 min: Sampling duration 70 min.
E038	7/28/2011	2030	Yes	Yes	Discharge >10 cfs for 15 min: Sampling duration 130 min.
E038	8/2/2011	490	Yes	Yes	Discharge >10 cfs for 0 min: Sampling duration 70 min.
E038	8/13/2011	197	Yes	**No**	Discharge >10 cfs for 10 min: 12-bottle sampler: sampling duration 11 min. 24-bottle sampler power cable damaged preventing sampling.
E038	8/15/2011	331	Yes	Yes	Discharge >10 cfs for 0 min: Sampling duration 50 min.
E038	8/19/2011	3,410	Yes	Yes	Discharge >10 cfs for 30 min first peak, 15 min <10 cfs, 70 min second peak. Sampling duration 190 min uninterrupted.
E038	9/1/2011	392	**No**	Yes	Discharge not recorded: Sampling duration 50 min.
E038	9/4/2011	372	Yes	Yes	Discharge >10 cfs for 0 min: Sampling duration 70 min.
E038	9/7/2011	1910	Yes	Yes	Discharge >10 cfs for 25 min: Sampling duration 110 min.
E038	10/4/2011	368	Yes	Yes	Discharge >10 cfs for 0 min: Sampling duration 30 min first peak, 60 min second peak. 160 min without sample collection between peaks.
E038	10/12/2011	850	Yes	Yes	Discharge >10 cfs for 0 min: Sampling duration 15 min.
E039.1	8/1/2011	956	**No**	Yes	Discharge >10 cfs for 5 min: Sampling duration 27 min. 12-bottle sampler detected no liquid.

Table 2.5-3 (continued)

Station	Collection Date	Maximum SSC (mg/L)	All Potential Samples Collected?		Sampling Completeness Comment
			12-Bottle Sampler	24-Bottle Sampler	
E039.1	8/4/2011	328	Yes	Yes	Discharge >10 cfs for 40 min: Sampling duration 50 min
E039.1	8/19/2011	1330	Yes	Yes	Discharge >10 cfs for 20 min first peak, 15 min <10 cfs, 70 min second peak. Sampling duration 110 min.
E039.1	9/15/2011	346	Yes	Yes	Discharge >10 cfs for 20 min: Sampling duration 33 min.
E042.1	8/19/2011	7100	**No**	**No**	Discharge >10 cfs for 75 min: 12-bottle sampler: sampling duration 60 min, subsequent repeat analyses failed to collect samples. 24-bottle sampler failed to collect samples. Subsequent inspection found silt blocking intake.
E042.1	8/22/2011	55,300	Yes	**No**	Discharge >10 cfs for 190 min. 12-bottle sampler: sampling duration 150 min. 24-bottle sampler collected 2 samples, missed next 10 samples, collected 2 samples, missed 1 sample, collected 2 samples, then missed final 6 samples. Subsequent inspection found silt blocking intake.
E042.1	9/4/2011	99,500	Yes	Yes	Discharge >10 cfs for 140 min: Sampling duration 200 min.
E042.1	9/7/2011	57,800	**No**	**No**	Discharge >10 cfs for 35 min: 12-bottle sampler: sampling duration 3 min. 24-bottle sampler: sampling duration 21 min. Subsequent inspection found silt blocking intake.
E042.1	9/10/2011	5660	**No**	**No**	Discharge >10 cfs for 75 min: 12-bottle sampler: sampling duration 6 min, all repeat analyses failed to collect samples. 24-bottle sampler experienced power failure causing all planned samples to be missed.
E042.1	9/15/2011	1570	**No**	**No**	Discharge >10 cfs for 190 min. 12-bottle sampler collected 2 L. 24-bottle sampler off during storm.
E042.1	10/2/2011	21,900	Yes	**No**	Discharge >10 cfs for 105 min: Sampling duration 60 min. Pump tubing failed on 24-bottle sampler, preventing sample collection.
E042.1	10/4/2011	20,100	Yes	Yes	Discharge >10 cfs for 0 min: Sampling duration 30 min.
E050.1	8/21/2011	3100	Yes	Yes	Discharge >5 cfs for 205 min: Sampling duration 290 min.
E050.1	8/22/2011	65,400	Yes	Yes	Peak discharge >5 cfs for 455 min. Sampling duration 290 min.
E050.1	9/4/2011	59,200	Yes	Yes	Peak discharge >5 cfs for 625 min. Sampling duration 290 min.
E050.1	9/7/2011	11,500	Yes	Yes	Peak 1 discharge >5 cfs for 10 min. Peak 2 discharge >5 cfs for 195 min. Sample collection not successful during residual flow between peak discharges.
E050.1	9/10/2011	1850	Yes	Yes	Discharge >5 cfs for 625 min: Sampling duration 290 min.

Table 2.5-3 (continued)

Station	Collection Date	Maximum SSC (mg/L)	All Potential Samples Collected?		Sampling Completeness Comment
			12-Bottle Sampler	24-Bottle Sampler	
E050.1	9/15/2011	723	Yes	Yes	Discharge >5 cfs for 190 min: Sampling duration 290 min.
E050.1	10/2/2011	10,400	Yes	Yes	Discharge >5 cfs for 185 min: Sampling duration 290 min.
E050.1	10/4/2011	2690	Yes	**No**	Discharge >5 cfs for 100 min: 12-bottle sampler duration 170 min. 24-bottle sampler duration 27 min because of distributor arm jam.
E055.5	8/19/2011	2370	**No**	n/a	Sutron programming error prevented complete sample collection.
E059	8/19/2011	19,600	**No**	Yes	Peak discharge >10 cfs for 50 min. 12-bottle sampler failed to begin sampling because of a programming error. 24-bottle sampler: sampling duration 21 min.
E059	8/21/2011	21,900	**No**	**No**	Discharge >10 cfs for 165 min. 12-bottle sampler: sampling duration 60 min but could not detect liquid for repeat samples. 24-bottle sampler full from runoff event on 8/19/2011 and did not collect samples.
E109.9	7/22/2011	>500,000	**No**	**No**	Peak discharge >5 cfs for 50 min. 12-bottle sampler: bottles 1, 5, 6, 9–12 no liquid detected, bottle 8 collected 0.9 L. 24-bottle sampler: bottle 18 collected 0.7 L, bottles 1–10, 13, 15, 17, 21–24 no liquid detected. Sampler intakes silted.
E109.9	7/28/2011	>500,000	**No**	**No**	Peak discharge >5 cfs for 150 min. 12-bottle sampler: bottles 3 and 4 collected <1 L No liquid detected in bottles 1, 2, 5, 6, 9–12. 24-bottle sampler: 0.8 L collected in bottle 6. No liquid detected in bottles 1–5, 15–24. Sampler intakes silted.
E109.9	8/3/2011	>500,000	**No**	**No**	Peak discharge >5 cfs for 60 min. 12-bottle sampler: bottles 3, 4, 7–12 collected <1 L, no liquid detected in bottles 5 and 6. 24-bottle sampler: collected 0.2 L in bottle 1, collected 0.05 L in bottle 2, no liquid detected in bottles 3–24. Sampler intakes silted.
E109.9	8/5/2011	163,000	**No**	**No**	Peak discharge >5 cfs for 65 min. 12-bottle sampler: collected <1 L in bottles 2 and 4, no liquid detected in bottles 1, 5, 6, 12. 24-bottle sampler: collected <1 L in bottles 1–10, 14–16. No liquid detected in bottles 11–13 and 17–24. Sampler intakes silted.
E109.9	8/22/2011	141,000	**No**	**No**	Peak discharge >5 cfs for 195 min. Grab samples collected during sample inspection. Automated samplers intakes silted and not functioning.
E109.9	8/26/2011	74,700	**No**	**No**	Peak discharge >5 cfs for 0 min. 12-bottle sampler: collected <1 L bottles 2, 3, 4, 5, no liquid detected in bottles 6, 7, 8, 12. 24-bottle sampler: no liquid detected. Sampler intake silted.

Table 2.5-3 (continued)

Station	Collection Date	Maximum SSC (mg/L)	All Potential Samples Collected?		Sampling Completeness Comment
			12-Bottle Sampler	24-Bottle Sampler	
E109.9	9/4/2011	Not available	**No**	**No**	Peak discharge >5 cfs for 475 min. 12-bottle sampler: collected 0.7 L in bottle 7. Collected 0.2 L in bottle 11. 12-bottle sampler: samples missed in bottles 1–6, 7–10, 12. 24-bottle sampler: no liquid detected. Samper intakes silted.
E109.9	9/7/2011	16,300	**No**	**No**	Peak discharge >5 cfs for 65 min. Grab samples collected during sample inspection. Automated samplers intakes silted and not functioning.
E109.9	9/10/2011	41,900	**No**	**No**	Discharge >5 cfs for 470 min. Sampling duration 130 min. Could not collect discharge in last 3 samples of 24-bottle sampler and last 2 samples of 12-bottle sampler .

Note: Bold indicates samples could not be collected.

* n/a = Not applicable.

Table 3.1-1
Drainage Areas, Impermeable Surface Percentages, and Las Conchas Fire Burn Areas in the Los Alamos Canyon Watershed

Canyon	Gage	Drainage to Gage (acres)	Impermeable Surface (%)[a]	Las Conchas Fire, High and Moderate Burn Severity (%)
Acid	E055.5	53	81	0
Acid[b]	E056	237	70	0
Acid	Acid Canyon above E056	290	72	0
Pueblo	E055	2191	25	0
Pueblo[b]	E059	1827	39	0
Pueblo[b]	E060.1	1006	8	0
Pueblo	Pueblo Canyon above E060.1	5310	29	0
DP	E038	144	88	0
DP[b]	E039.1	112	29	0
DP[b]	E040	133	24	0
DP	DP Canyon above E039.1	256	62	0
DP	DP Canyon above E040	388	49	0
LA	E026	4534	2	42
LA[b]	E030	960	30	0
LA[b]	E042.1	601	12	0
LA[b]	E050.1	195	11	0
LA[b]	E109.9 (including Guaje Canyon)	25,800	8	12
LA	Los Alamos Canyon above E050.1	6680	10	29
LA	Los Alamos, Pueblo, and Guaje Canyons above E109.9	37,800	11	13
LA[b]	Los Alamos Canyon between E050.1, E060.1, and E109.9	4761	19	0
Guaje	E099	21,000	5	15

[a] Percent of impermeable surface does not account for hydrophobic soils in the Las Conchas burn area.

[b] Drainage area shown in this row does not extend to head of watershed above gage, excluding areas of subwatersheds that are also shown in this table.

Table 3.1-2
Correlation Matrix between Cumulative Drainage Area and SSC Statistics

Surface Type	Lower Quartile	Maximum	Median	Minimum	Upper Quartile
Total	0.36	0.97	0.52	0.01	0.86
Impermeable	0.21	0.87	0.38	-0.12	0.75
Permeable	0.37	0.98	0.54	0.03	0.87

Table 3.2-1
Travel Time of Flood Bore, Peak Discharges, Increase or Decrease in Peak Discharge, and Percent Increase/Decrease in Peak Discharge from Upstream to Downstream Stations for All 2011 Runoff Events in Acid Canyon

Date	Travel Time from E055.5 to E056 (min)	Peak Discharge (cfs)		+/–[a]	%[a]	Travel Time from E056 to E059 (min)	Peak Discharge (cfs)		+/–	%	Travel Time from E059 to E060.1 (min)	Peak Discharge (cfs)		+/–	%	Travel Time from E060.1 to E109.9 (min)	Peak Discharge (cfs)		+/–	%
		E055.5	E056				E056	E059				E059	E060.1				E060.1	E109.9		
7/2	—[b]	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
7/22	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	53	+	100
7/28	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	13	+	100
8/1	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	1	+	100
8/2	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
8/3	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	81	+	100
8/4	80	4	1	–	86	—	1	0	–	100	—	0	0	N	N	—	0	3	+	100
8/5	30	4	9	+	48	—	9	0	–	100	—	0	0	N	N	—	0	70	+	100
8/13	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	8	+	100
8/15	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
8/19	10	19	24	+	17	85	24	17	–	28	—	17	0	–	100	—	0	3	+	100
8/21	15	20	143	+	86	45	143	131	–	8	—	131	0	–	100	—	0	610[c]	+	100
8/22	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	95[c]	+	100
8/26	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	35[c]	+	100
9/1	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	340[c]	+	100
9/4	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	632[c]	+	100
9/7	20	2	8	+	75	—	8	0	–	100	—	0	4	+	100	n/a[d]	4	80[c]	+	95
9/10	—	0	5	+	100	—	5	0	–	100	—	0	0.35	+	100	-350	0.35	70	G	G
	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
9/15	—	0	3	+	100	—	3	0	–	100	—	0	0	N	N	—	0	2	+	100
	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N

Table 3.2-1 (continued)

Date	Travel Time from E055.5 to E056 (min)	Peak Discharge (cfs)		+/–[a]	%[a]	Travel Time from E056 to E059 (min)	Peak Discharge (cfs)		+/–	%	Travel Time from E059 to E060.1 (min)	Peak Discharge (cfs)		+/–	%	Travel Time from E060.1 to E109.9 (min)	Peak Discharge (cfs)		+/–	%
		E055.5	E056				E056	E059				E059	E060.1				E060.1	E109.9		
	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
10/2	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
10/4	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	13	+	100
	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	10	+	100
10/7	—	0	0.06	+	100	—	0.06	0	–	100	—	0	0	N	N	—	0	15	+	100
10/12	—	0	0.02	+	100	—	0.02	0	–	100	—	0	0	N	N	—	0	0	N	N
10/27	—	0	0.09	+	100	—	0.09	0	–	100	—	0	0	N	N	—	0	0	N	N
Min	10	2	0.02	—	17	45	0.02	17	—	8	0	17	1	—	100	—	0.35	1	—	95
Mean	31	2	7	—	81	65	7	5	—	84	0	5	0	—	100	—	0.15	79	—	100
Max	80	20	143	—	100	85	143	131	—	100	0	131	4	—	100	—	4	632	—	100

[a] + = Increase; – = decrease; N = no change in peak discharges; G = negative travel time (i.e., no transmission from upstream gage; event measured at downstream gage has different source).

[b] — = Result not obtained.

[c] Flow is estimated.

[d] n/a = Not applicable.

Table 3.2-2
Travel Time of Flood Bore, Peak Discharges, Increase or Decrease in Peak Discharge, and Percent Increase/Decrease in Peak Discharge from Upstream to Downstream Stations for All 2011 Runoff Events in Pueblo Canyon

Date	Travel Time from E055 to E059 (min)	Peak Discharge (cfs)		+/–[a]	%[a]	Travel Time from E059 to E060.1 (min)	Peak Discharge (cfs)		+/–	%	Travel Time from E060.1 to E109.9 (min)	Peak Discharge (cfs)		+/–	%
		E055	E059				E059	E060.1				E060.1	E109.9		
7/2	—[b]	0	0	N	N	—	0	0	N	N	—	0	0	N	N
7/22	—	0	0	N	N	—	0	0	N	N	—	0	53	+	100
7/28	—	0	0	N	N	—	0	0	N	N	—	0	13	+	100
8/1	—	0	0	N	N	—	0	0	N	N	—	0	1	+	100
8/2	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
8/3	—	0	0	N	N	—	0	0	N	N	—	0	81	+	100
8/4	—	0	0	N	N	—	0	0	N	N	—	0	3	+	100
8/5	—	0	0	N	N	—	0	0	N	N	—	0	70	+	100
8/13	—	0	0	N	N	—	0	0	N	N	—	0	8	+	100
8/15	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
8/19	70	13	17	+	24	—	17	0	–	100	—	0	3	+	100
8/21	40	24	131	+	81	—	131	0	–	100	—	0	610[c]	+	100
8/22	—	2	0	–	100	—	0	0	N	N	—	0	95[c]	+	100
8/26	—	0.33	0	–	100	—	0	0	N	N	—	0	35[c]	+	100
9/1	—	0	0	N	N	—	0	0	N	N	—	0	340[c]	+	100
9/4	—	0	0	N	N	—	0	0	N	N	—	0	632[c]	+	100
9/7	—	2	0	–	100	—	0	4	+	100	n/a[d]	4	80[c]	+	95
9/10	—	9	0	–	100	—	0	0.35	+	100	-350	0.35	70	G	G
	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
9/15	—	5	0	–	100	—	0	0	N	N	—	0	2	+	100
	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
10/2	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N

Table 3.2-2 (continued)

Date	Travel Time from E055 to E059 (min)	Peak Discharge (cfs)		+/–[a]	%[a]	Travel Time from E059 to E060.1 (min)	Peak Discharge (cfs)		+/–	%	Travel Time from E060.1 to E109.9 (min)	Peak Discharge (cfs)		+/–	%
		E055	E059				E059	E060.1				E060.1	E109.9		
10/4	—	0	0	N	N	—	0	0	N	N	—	0	13	+	100
	—	0	0	N	N	—	0	0	N	N	—	0	10	+	100
10/7	—	1	0	–	100	—	0	0	N	N	—	0	15	+	100
10/12	—	0.11	0	–	100	—	0	0	N	N	—	0	0	N	N
10/27	—	1	0	–	100	—	0	0	N	N	—	0	0	N	N
Min	40	0.11	17	—	24	—	17	0.35	—	100	—	0.35	1	—	95
Mean	55	2	5	—	91	—	5	0.15	—	100	—	0.15	79	—	100
Max	70	24	131	—	100	—	131	4	—	100	—	4	632	—	100

[a] + = Increase; – = decrease; N = no change in peak discharges; G = negative travel time (i.e., no transmission from upstream gage; event measured at downstream gage has different source).

[b] — = Result not obtained.

[c] Flow is estimated.

[d] n/a = Not applicable.

Table 3.2-3
Travel Time of Flood Bore, Peak Discharges, Increase or Decrease in Peak Discharge, and Percent Increase/Decrease in Peak Discharge from Upstream to Downstream Stations for All 2011 Runoff Events in DP Canyon

Date	Travel Time from E038 to E039.1 (min)	Peak Discharge (cfs)		+/–[a]	%[a]	Travel Time from E039.1 to E040 (min)	Peak Discharge (cfs)		+/–	%	Travel Time from E040 to E042.1 (min)	Peak Discharge (cfs)		+/–	%	Travel Time from E042.1 to E050.1 (min)	Peak Discharge (cfs)		+/–	%
		E038	E039.1				E039.1	E040				E040	E042.1				E042.1	E050.1		
7/2	—[b]	19	0	–	100	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
7/22	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
7/28	—	17	0	–	100	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
8/1	40	97	12	–	88	—	12	0	–	100	—	0	0	N	N	—	0	0	N	N
8/2	—	9	0	–	100	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
8/3	30	23	9	–	61	45	9	4	–	56	—	4	0	–	100	—	0	0	N	N
8/4	90	9	1	–	89	—	1	0	–	100	—	0	0	N	N	—	0	0	N	N
	—	0	0	N	N	70	0	8	+	100	—	8	0	N	N	—	0	0	N	N
8/5	50	73	21	–	71	30	21	12	–	43	—	12	0	–	100	—	0	0	N	N
8/13	85	14	2	–	86	—	2	0	–	100	—	0	0	N	N	—	0	0	N	N
8/15	—	4	0	–	100	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
8/19	40	110	37	–	66	—	37	0	–	100	40	0	72	+	100	140	72	3	–	96
	15	183	267	+	31	15	267	161	–	40	—	161	0	N	N	—	0	0	N	N
8/21	25	238	281	+	15	15	281	208	–	26	30	208	93	–	55	35	93	75	–	20
8/22	—	0	0	N	N	—	0	0	N	N	—	0	172	+	100	40	172	91	–	47
8/26	—	0	0	N	N	—	0	0	N	N	—	0	0.11	+	100	—	0.11	0	–	100
9/1	—	0	0	N	N	—	0	0	N	N	—	0	2	+	100	-100	2	0.18	G	G
9/4	60	7	2	–	71	100	2	0.19	–	91	-105	0.19	207	G	G	10	207	188	–	9
9/7	65	40	5	–	88	5	5	8	+	38	40	8	18	+	54	70	18	10	–	42
9/10	45	7	5	–	29	30	5	3	–	40	55	3	11	+	74	85	11	10	–	9
	—	0	0	N	N	—	0	0	N	N	30	0	15	+	100	30	15	15	–	0

Table 3.2-3 (continued)

Date	Travel Time from E038 to E039.1 (min)	Peak Discharge (cfs)		+/–[a]	%[a]	Travel Time from E039.1 to E040 (min)	Peak Discharge (cfs)		+/–	%	Travel Time from E040 to E042.1 (min)	Peak Discharge (cfs)		+/–	%	Travel Time from E042.1 to E050.1 (min)	Peak Discharge (cfs)		+/–	%
		E038	E039.1				E039.1	E040				E040	E042.1				E042.1	E050.1		
9/15	—	0	12	+	100	15	12	9	–	25	25	9	26	+	65	85	26	11	–	57
10/2	—	0	0	N	N	—	0	0	N	N	—	0	36	+	100	95	36	11	–	70
10/4	—	5	0	–	100	—	0	0	N	N	—	0	9	+	100	125	9	7	–	26
	—	9	0	–	100	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
10/7	—	8	0	–	100	45	0	1	+	100	—	1	0	–	100	—	0	0	N	N
	60	7	2	–	71	—	2	0	N	N	—	0	0	N	N	—	0	0	N	N
10/12	—	1	0	–	100	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
10/27	105	10	1	–	90	65	1	1	N	N	230	1	6	+	83	—	6	0	–	100
Min	15	1	1	—	15	5	1	0.19	—	25	25	0.19	0.11	—	54	10	0.11	0.18	—	0.3
Mean	55	31	23	—	80	40	23	14	—	68	64	14	23	—	89	72	23	15	—	48
Max	105	238	281	—	100	100	281	208	—	100	230	208	207	—	100	140	207	188	—	100

[a] + = Increase; – = decrease; N = no change in peak discharges; G = negative travel time (i.e., no transmission from upstream gage; event measured at downstream gage has different source).

[b] — = Result not obtained.

Table 3.2-4
Travel Time of Flood Bore, Peak Discharges, Increase or Decrease in Peak Discharge, and Percent Increase/Decrease in Peak Discharge from Upstream to Downstream Stations for All 2011 Runoff Events in Los Alamos Canyon

Date	Travel Time from E026 to E030 (min)	Peak Discharge (cfs) E026	Peak Discharge (cfs) E030	+/–[a]	%[a]	Travel Time from E030 to E042.1 (min)	Peak Discharge (cfs) E030	Peak Discharge (cfs) E042.1	+/–	%	Travel Time from E042.1 to E050.1 (min)	Peak Discharge (cfs) E042.1	Peak Discharge (cfs) E050.1	+/–	%	Travel Time from E050.1 to E109.9 (min)	Peak Discharge (cfs) E050.1	Peak Discharge (cfs) E109.9	+/–	%
7/2	—[b]	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
7/22	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	53	+	100
7/28	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	13	+	100
8/1	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	1	+	100
8/2	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
8/3	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	81	+	100
8/4	100	0.2	7	+	98	—	7	0	–	100	—	0	0	N	N	—	0	3	+	100
	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
8/5	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	70	+	100
8/13	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	8	+	100
8/15	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
8/19	210	1	8	+	88	10	8	72	+	89	140	72	3	–	96	25	3	3	–	6
	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
8/21	70	1	30	+	97	20	30	93	+	68	35	93	75	–	20	n/a[d]	75	610[c]	+	88
8/22	75	31	95	+	67	35	95	172	+	45	40	172	91	–	47	60	91	95[c]	+	4.9
8/26	—	0	0	N	N	—	0	0.11	+	100	—	0.11	0	–	100	—	0	35[c]	+	100
9/1	—	0	0	N	N	105	0	2	+	100	-100	2	0.18	G	G	—	0.18	340[c]	+	100
9/4	75	49	107	+	54	40	107	207	+	48	10	207	188	–	9	50	188	632[c]	+	70
9/7	75	1	1	N	N	45	1	18	+	94	70	18	10	–	42	n/a	10	80[c]	+	87
9/10	90	1	1	N	N	55	1	11	+	91	85	11	10	–	9	110	10	70	+	85
	—	0	0	N	N	—	0	15	+	100	30	15	15	–	0.3	—	15	0	–	100

Table 3.2-4 (continued)

Date	Travel Time from E026 to E030 (min)	Peak Discharge (cfs)		+/–[a]	%[a]	Travel Time from E030 to E042.1 (min)	Peak Discharge (cfs)		+/–	%	Travel Time from E042.1 to E050.1 (min)	Peak Discharge (cfs)		+/–	%	Travel Time from E050.1 to E109.9 (min)	Peak Discharge (cfs)		+/–	%
		E026	E030				E030	E042.1				E042.1	E050.1				E050.1	E109.9		
9/15	-155	0.12	4	G	G	125	4	26	+	85	85	26	11	–	57	165	11	2	–	84
10/2	65	14	13	–	7	55	13	36	+	64	95	36	11	–	70	—	11	0	–	100
10/4	80	4	8	+	50	50	8	9	+	11	125	9	7	–	26	125	7	10	+	33
	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	13	+	100
10/7	—	0	2	+	100	—	2	0	–	100	—	0	0	N	N	—	0	15	+	100
	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
10/12	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N	—	0	0	N	N
10/27	—	0.16	0.14	–	13	90	0.14	6	+	98	—	6	0	–	100	—	0	0	N	N
Min	65	0.12	0.14	—	7	10	0.14	0.11	—	11	10	0.11	0.18	—	0.3	25	0.18	1	—	5
Mean	93	4	10	—	64	45	10	23	—	79	72	23	15	—	48	89	15	79	—	84
Max	210	49	107	—	100	105	107	207	—	100	140	207	188	—	100	165	188	632	—	100

[a] + = Increase; – = decrease; N = no change in peak discharges; G = negative travel time (i.e., no transmission from upstream gage; event measured at downstream gage has different source).

[b] — = Result not obtained.

[c] Flow is estimated.

[d] n/a = Not applicable.

Table 3.2-5
Summary of Peak Discharge Increases/Decreases in Acid and Pueblo Canyons

Summary	E055.5 to E056	E056 to E059	E059 to E060.1	E055 to E059	E060.1 to E109.9
Number of Increases	9	0	2	2	18
Number of Decreases	1	10	2	8	0
Mean Increase (%)	81	0	100	53	100
Mean Decrease (%)	86	84	100	100	0

Table 3.2-6
Summary of Peak Discharge Increases/Decreases in DP and Los Alamos Canyons

Summary	E038 to E039.1	E039.1 to E040	E040 to E042.1	E026 to E030	E030 to E042.1	E042.1 to E050.1	E50.1 to E109.9
Number of Increases	3	3	11	7	13	0	17
Number of Decreases	19	11	4	2	2	12	4
Mean Increase (%)	49	79	89	79	76	0	86
Mean Decrease (%)	85	65	89	10	100	48	72

Table 3.2-7
Pearson's Correlation Coefficients between Discharge and SSC for Each Station Sampled during 2011

Time Lag	E038									
	7/2	7/28	8/2	8/15	8/19	9/4	9/7	10/4 (Part 1)	10/4 (Part 2)	10/12
Q_t, SSC_t	0.82	0.97	0.99	0.59	0.68	0.90	0.96	0.41	0.99	0.73
Q_t, SSC_{t-5}	0.91	0.96	0.98	0.89	0.52	0.85	0.95	0.41	0.94	0.88
Q_t, SSC_{t-10}	0.79	0.95	0.96	0.90	0.27	0.92	0.91	0.46	n/a[a]	0.86
Q_t, SSC_{t-15}	0.80	0.95	0.93	0.91	0.06	0.96	0.85	0.43	n/a	0.82
Q_t, SSC_{t-20}	0.81	0.94	0.88	0.95	-0.06	n/a	0.83	0.38	n/a	0.81
Q_t, SSC_{t-25}	0.76	0.95	0.84	0.88	-0.13	n/a	0.84	0.34	n/a	0.82
Q_t, SSC_{t-30}	0.73	0.97	0.85	0.90	-0.15	n/a	0.83	0.39	n/a	0.73

Table 3.2-7 (continued)

Time Lag	E039.1				E042.1				
	8/1	8/4	8/19	9/15	8/22[b]	9/4	9/7	9/10	10/4
Q_t, SSC_t	0.63	0.98	0.99	0.99	0.65	0.96	0.80	0.99	0.60
Q_t, SSC_{t-5}	0.95	0.95	n/a[a]	1.00	0.82	0.98	n/a	0.91	0.96
Q_t, SSC_{t-10}	n/a	n/a	n/a	1.00	0.99	0.98	n/a	0.92	n/a
Q_t, SSC_{t-15}	n/a	n/a	n/a	n/a	n/a	0.93	n/a	0.95	n/a
Q_t, SSC_{t-20}	n/a	n/a	n/a	n/a	n/a	1.00	n/a	n/a	n/a
Q_t, SSC_{t-25}	n/a	n/a	n/a	n/a	n/a	0.94	n/a	n/a	n/a
Q_t, SSC_{t-30}	n/a	n/a	n/a	n/a	n/a	0.98	n/a	n/a	n/a

Table 3.2-7 (continued)

Time Lag	E050.1									E109.9		
	8/21	8/22	9/4	9/7 (Part 1)	9/7 (Part 2)	9/10	9/15	10/2	10/4[c]	7/28	8/5[c]	9/10[c]
Q_t, SSC_t	0.92	0.63	0.88	0.97	-0.82	0.52	0.97	0.68	0.11	0.35	0.24	-0.33
Q_t, SSC_{t-5}	0.81	0.52	0.85	0.87	-0.48	0.32	0.98	0.71	-0.22	0.83	0.02	0.08
Q_t, SSC_{t-10}	0.71	0.51	0.81	0.96	-0.96	0.45	0.99	0.72	0.10	0.36	-0.13	0.11
Q_t, SSC_{t-15}	0.59	0.40	0.73	0.91	n/a	n/a	0.99	0.72	0.48	-0.96	0.40	0.39
Q_t, SSC_{t-20}	0.76	0.42	0.60	n/a	n/a	n/a	0.98	0.70	n/a	n/a	0.31	0.24
Q_t, SSC_{t-25}	0.73	0.08	0.52	n/a	n/a	n/a	0.96	0.73	n/a	n/a	-0.26	0.01
Q_t, SSC_{t-30}	0.80	0.15	0.47	n/a	n/a	n/a	0.95	0.76	n/a	n/a	-0.82	-0.42

Note: Maximum positive correlations are highlighted.

[a] n/a = Not applicable because data points are limited (fewer than three).

[b] The sediment concentration associated with the sample collected on 8/22 at 14:39 for station E042.1 is estimated based on uranium concentrations collected at three other times during this storm.

[c] Denotes events when all samples were taken before the peak of the hydrograph.

Table 3.2-8
Sediment Yield and Runoff Volume for LA/P Runoff Events in 2011

Station	Date	Sediment Yield (kg)	Runoff Volume (ft^3)	Sediment Yield (tons)	Runoff Volume (acre-feet)	Peak Discharge (cfs)
E038	7/2/2011	1013	25,659	1.1	0.6	19
E038	7/28/2011	647	31,791	0.7	0.7	17
E038	7/30/2011	na[a]	68,463	na	1.6	14
E038	7/31/2011	na	124,551	na	2.9	97
E038	8/2/2011	115	36,757	0.1	0.8	9
E038	8/3/2011	na	44,340	na	1.0	43
E038	8/4/2011	na	112,554	na	2.6	42
E038	8/5/2011	na	100,830	na	2.3	73
E038	8/15/2011	26	11,151	0.03	0.3	4
E038	8/19/2011	16,478	522,318	18.2	12.0	183
E038	8/21/2011	na	391,482	na	9.0	238
E038	8/28/2011	na	24,672	na	0.6	12
E038	9/4/2011	119	16,254	0.1	0.4	7
E038	9/7/2011	1218	52,809	1.3	1.2	40
E038	9/9/2011	na	26,985	na	0.6	10
E038	9/10/2011	na	15,672	na	0.4	7
E038	10/4/2011 (Part 1)	22	8266	0.02	0.2	5
E038	10/4/2011 (Part 2)	58	36,952	0.1	0.8	9
E038	10/5/2011	na	8829	na	0.2	2
E038	10/7/2011	na	58,285	na	1.3	8
E038	10/12/2011[b]	24	4092	0.03	0.1	1
E038	10/26/2011	na	77,577	na	1.8	10
E039.1	8/1/2011[b]	211	18,495	0.2	0.4	12
E039.1	8/3/2011	na	16,443	na	0.4	9
E039.1	8/4/2011[b]	50	39,939	0.1	0.9	11
E039.1	8/5/2011	na	56,025	na	1.3	28
E039.1	8/13/2011	na	5571	na	0.1	2
E039.1	8/19/2011	15,300	624,738	16.9	14.3	267
E039.1	8/21/2011	na	488,323	na	11.2	290
E039.1	9/4/2011	na	9779	na	0.2	2
E039.1	9/7/2011	na	28,579	na	0.7	5
E039.1	9/9/2011	na	31,537	na	0.7	7

Table 3.2-8 (continued)

Station	Date	Sediment Yield (kg)	Runoff Volume (ft^3)	Sediment Yield (tons)	Runoff Volume (acre-feet)	Peak Discharge (cfs)
E039.1	9/10/2011	na	42,491	na	1.0	5
E039.1	9/15/2011[b]	124	62,526	0.1	1.4	12
E039.1	10/7/2011	na	22,372	na	0.5	2
E039.1	10/26/2011	na	22,505	na	0.5	1
E042.1	8/21/2011	na	383,984	na	8.8	93
E042.1	8/22/2011	1,001,604[c]	758,054	1104[c]	17.4	172
E042.1	8/23/2011	na	56,337	na	1.3	2
E042.1	8/27/2011	na	89,638	na	2.1	3
E042.1	9/1/2011	na	61,319	na	1.4	2
E042.1	9/4/2011	1,082,406	580,221	1193	13.3	207
E042.1	9/6/2011	na	35,316	na	0.8	8
E042.1	9/7/2011[b]	12,916	173,632	14.2	4.0	18
E042.1	9/10/2011[b]	454	372,622	0.5	8.6	15
E042.1	9/16/2011	na	21,251	na	0.5	3
E042.1	9/30/2011	na	3451	na	0.1	2
E042.1	10/4/2011[b]	4361	122,370	4.8	2.8	9
E042.1	10/8/2011	na	65,629	na	1.5	5
E042.1	10/27/2011	na	138,099	na	3.2	6
E050.1	8/21/2011	31,296	411,324	34.5	9.4	75
E050.1	8/22/2011	614,817	781,137	678	17.9	91
E050.1	9/4/2011	747,355	936,809	824	21.5	188
E050.1	9/7/2011 (Part 1)	2490	43,807	2.7	1.0	6
E050.1	9/7/2011 (Part 2)[b]	3832	177,747	4.2	4.1	11
E050.1	9/10/2011[b]	7199	469,479	7.9	10.8	15
E050.1	9/15/2011	1524	249,257	1.7	5.7	11
E050.1	10/2/2011	17238	140,853	19.0	3.2	11
E050.1	10/4/2011[b]	598	105,776	0.7	2.4	6
E050.1	10/8/2011	na	23,334	na	0.5	1
E059	8/19/2011	na	169,044	na	3.9	17
E059	8/21/2011	na	399,141	na	9.2	131
E060.1	9/7/2011	na	7329	na	0.2	4
E060.1	9/10/2011	na	22,071	na	0.5	0.4
E109.9	7/27/2011	na	21,292	na	0.5	10

Table 3.2-8 (continued)

Station	Date	Sediment Yield (kg)	Runoff Volume (ft^3)	Sediment Yield (tons)	Runoff Volume (acre-feet)	Peak Discharge (cfs)
E109.9	7/28/2011[b]	106,278	98,349	117	2.3	13
E109.9	7/31/2011	na	14,850	na	0.3	1
E109.9	8/4/2011	na	21,196	na	0.5	3
E109.9	8/5/2011[b]	98,400	95,901	108	2.2	70
E109.9	8/13/2011	na	23,846	na	0.5	8
E109.9	8/20/2011	na	41,122	na	0.9	2
E109.9	8/28/2011	na	135,594	na	3.1	69
E109.9	9/1/2011	na	634,605	na	14.6	340
E109.9	9/5/2011	na	425,231	na	9.8	81
E109.9	9/6/2011	na	19,466	na	0.4	8
E109.9	9/10/2011[b]	38,561	772,617	42.5	17.7	70
E109.9	9/16/2011	na	119,591	na	2.7	8
E109.9	10/4/2011	na	49137	na	1.1	13
E109.9	10/7/2011	na	202,671	na	4.7	15

Note: Sediment yield and runoff volume were calculated only from sampled events with reliable hydrographs.

[a] na = Not available because storm event was not sampled, and thus no SSC values were obtained.

[b] Samples were not collected throughout the entire hydrograph (see Figure 3.2-4); thus, sediment yields may be underestimated.

[c] = The sediment concentration associated with the sample collected on 8/22 at 14:39 for Station E042.1 is estimated based on uranium concentrations collected at three other times during this storm.

Table 4.2-1
NMWQCC Surface Water Standards

Analytical Suite[a]	Analyte Code	Analyte Name	Field Prep	Acute Aquatic[b]	Human Health Persistent	Livestock Watering	Wildlife Habitat
DIOX/FUR	n/a[c]	Dioxin (TEQ)	UF	n/a	0.000000051	n/a	n/a
METALS	Al	Aluminum	F	658	n/a	n/a	n/a
METALS	Sb	Antimony	F	n/a	640	n/a	n/a
METALS	As	Arsenic	F	340	9	200	n/a
METALS	B	Boron	F	n/a	n/a	5000	n/a
METALS	Cd	Cadmium	F	0.59	n/a	50	n/a
METALS	Cr	Chromium	F	n/a	n/a	1000	n/a
METALS	Cr(III)	Chromium(III)	F	213	n/a	n/a	n/a
METALS	Co	Cobalt	F	n/a	n/a	1000	n/a
METALS	Cu	Copper	F	4.3	n/a	500	n/a
METALS	Pb	Lead	F	17	n/a	100	n/a
METALS	Mn	Manganese	F	2000	n/a	n/a	n/a
METALS	Hg	Mercury	F	1.4	n/a	n/a	n/a
METALS	Hg	Mercury	UF	n/a	n/a	10	0.77
METALS	Ni	Nickel	F	170	4600	n/a	n/a
METALS	Se	Selenium	F	n/a	4200	50	n/a
METALS	Se	Selenium	UF	20	n/a	n/a	5
METALS	Ag	Silver	F	0.41	n/a	n/a	n/a
METALS	Tl	Thallium	F	n/a	0.47	n/a	n/a
METALS	V	Vanadium	F	n/a	n/a	100	n/a
METALS	Zn	Zinc	F	54	26,000	25,000	n/a
WET_CHEM	CN(TOTAL)	Cyanide (Total)	UF	22	140	n/a	5.2
PCB_CONG	1336-36-3	Total PCB	UF	n/a	0.00064	n/a	0.014
RAD	GROSSA	Gross alpha	UF	n/a	n/a	15	n/a
RAD	Ra-226+228	Radium-226 and Radium-228	UF	n/a	n/a	30	n/a

[a] All units are µg/L except for RAD, which are pCi/L.

[b] Hardness-dependent values are calculated using a water hardness value of 30 mg $CaCO_3$/L.

[c] n/a = Not applicable.

Table 4.2-2
Maximum Detected Results By Station and Event
above Comparison Values in LA/P Stormwater Samples in 2011

Station	Collection Date	Aluminum	Arsenic	Copper	Manganese	Mercury	Selenium	Cyanide (Total)	2,3,7,8-TCDD TEQ	Total PCBs	Gross alpha	Radium-226 and Radium-228
Comparison Values[a]		**658**	**9**	**4.3**	**2000**	**0.8**	**5**	**5.2**	**0.000000051**	**0.00064**	**15**	**30**
Field Preparation		**F[b]**	**F**	**F**	**F**	**UF[c]**	**UF**	**UF**	**UF**	**UF**	**UF**	**UF**
CO101038	10/2/2011	—[d]	—	—	—	—	—	NA[e]	NA	0.0116	37.9	NA
CO111041	8/19/2011	—	—	—	—	—	—	NA	NA	9.07	41.3	NA
CO115002	10/7/2011	960	—	—	—	—	—	NA	NA	0.00363	—	NA
CO115002	10/27/2011	—	—	—	—	—	—	NA	NA	0.00673	—	NA
E026	8/22/2011	—	—	—	3990	—	6.9	41	4.1E-07	0.295	3790	NA
E026	9/4/2011	—	—	—	—	—	—	48	1.7E-05	0.155	2190	NA
E030	8/21/2011	1170	—	—	—	—	—	8.8	1.8E-06	0.0757	35.6	NA
E030	8/22/2011	—	—	—	3100	—	—	24	1.7E-05	0.953	6200	NA
E030	9/4/2011	—	—	—	4500	2.6	—	75	1.1E-05	0.232	2970	NA
E030	10/2/2011	—	—	—	—	—	11.1	32	7.8E-07	0.0255	329	NA
E038	7/2/2011	—	—	—	—	—	—	NA	1.5E-06	0.101	50.6	NA
E038	7/28/2011	—	—	5	—	—	—	NA	1.1E-07	0.0426	16.2	NA
E038	8/2/2011	—	—	6.4	—	—	—	NA	—	0.0191	—	NA
E038	8/13/2011	—	—	10	—	—	—	NA	—	0.00924	19.6	NA
E038	8/19/2011	—	—	—	—	—	—	NA	2.0E-07	0.0244	16.4	NA
E038	9/1/2011	—	—	—	—	—	—	NA	NA	NA	—	NA
E038	9/4/2011	—	—	—	—	—	—	NA	—	0.0111	—	NA
E039.1	8/1/2011	1050	—	5.8	—	—	—	NA	NA	NA	—	NA
E039.1	8/4/2011	715	—	—	—	—	—	NA	8.9E-08	0.0177	—	NA
E039.1	8/19/2011	805	—	—	—	—	—	NA	1.2E-07	0.0219	16.3	NA
E039.1	9/15/2011	—	—	—	—	—	—	NA	—	0.0127	—	NA
E042.1	8/19/2011	1770	—	—	—	—	—	NA	1.5E-07	0.15	NA	NA
E042.1	8/22/2011	—	—	5	2430	—	—	51	4.0E-05	0.667	2540	NA
E042.1	9/4/2011	—	—	—	2070	—	17.4	48	7.1E-07	0.34	3090	66.8
E042.1	9/7/2011	—	—	—	—	—	—	15	7.7E-08	0.025	426	—
E042.1	10/2/2011	—	—	—	—	—	—	17	1.1E-07	0.0218	1420	NA

Table 4.2-2 (continued)

Station	Collection Date	Aluminum	Arsenic	Copper	Manganese	Mercury	Selenium	Cyanide (Total)	2,3,7,8-TCDD TEQ	Total PCBs	Gross alpha	Radium-226 and Radium-228
Comparison Values[a]		**658**	**9**	**4.3**	**2000**	**0.8**	**5**	**5.2**	**0.000000051**	**0.00064**	**15**	**30**
Field Preparation		**F[b]**	**F**	**F**	**F**	**UF[c]**	**UF**	**UF**	**UF**	**UF**	**UF**	**UF**
E042.1	10/4/2011	—	—	—	—	—	—	17	6.7E-06	0.0588	340	—
E050.1	8/21/2011	1330	—	—	—	—	—	—	3.5E-06	0.213	63.3	—
E050.1	8/22/2011	—	—	—	2390	—	8.2	31	1.7E-05	0.406	2880	—
E050.1	9/4/2011	—	—	—	—	—	7.8	21	2.9E-06	0.206	579	50.3
E050.1	9/7/2011	—	—	—	—	—	—	8.1	1.7E-06	0.0231	153	—
E050.1	9/10/2011	—	—	—	—	—	—	—	1.3E-07	0.0393	36.7	—
E050.1	9/15/2011	—	—	—	—	—	—	—	1.4E-07	0.0408	22.1	—
E050.1	10/2/2011	—	—	—	—	—	—	13	5.9E-08	0.0126	373	—
E050.1	10/4/2011	—	—	—	—	—	—	9.2	9.3E-08	0.0185	110	—
E055.5	8/19/2011	NA	NA	NA	NA	NA	NA	NA	NA	0.0604	NA	NA
E059	8/19/2011	1070	—	—	—	—	—	6	NA	NA	300	—
E059	8/21/2011	NA	NA	NA	NA	NA	NA	NA	4.0E-05	1.72	NA	NA
E109.9	7/22/2011	n/a[f]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
E109.9	7/28/2011	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
E109.9	8/3/2011	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
E109.9	8/5/2011	—	10.1	—	4380	—	7.9	NA	4.1E-07	0.000723	5140	63.3
E109.9	8/22/2011	—	—	4.8	—	—	—	168	—	0.266	1100	109
E109.9	8/26/2011	—	—	—	2990	—	10.5	91	1.4E-05	0.302	2510	NA
E109.9	9/4/2011	—	—	—	2950	—	—	NA	NA	NA	4460	NA
E109.9	9/7/2011	—	—	—	—	—	—	—	—	0.00564	587	NA
E109.9	9/10/2011	—	—	—	—	—	—	13	1.0E-05	0.0494	810	57.6

Note: All units are µg/L, except gross alpha, radium-226, and radium-228 are in pCi/L.

[a] Hardness-dependent comparison values based on 30 mg $CaCO_3$/L hardness.

[b] F = Filtered.

[c] UF = Unfiltered.

[d] — = Analyte was not detected above comparison value.

[e] NA = Not analyzed.

[f] n/a = Not available; sediment content of sample was too high for standard water analysis, and sample was instead analyzed as sediment.

Table 4.2-3
Analytes above Comparison Values in 2011 Los Alamos and Pueblo Canyon Stormwater Samples

Analyte	Field Prep	Percent of Results Detected above Comparison Value	Stations with Detected Results above Comparison Value	Station with Maximum	Inferred Primary Source(s)[a]
Aluminum	F[b]	19%	CO115002, E030, E039.1, E042.1, E050.1, E059	E042.1	Naturally occurring soils
Arsenic	F	2%	E109.9	E109.9	Naturally occurring soils
Copper	F	14%	E038, E039.1, E042.1, E109.9	E038	Los Alamos townsite runoff
Manganese	F	21%	E026, E030, E042.1, E050.1, E109.9	E030	Ash from the Las Conchas burn area
Mercury	UF[c]	2%	E030	E030	TA-21
Selenium	UF	17%	E026, E030, E042.1, E050.1, E109.9	E042.1	Ash from the Las Conchas burn area
Cyanide (total)	UF	83%	E026, E030, E042.1, E050.1, E059, E109.9	E109.9	Ash from the Las Conchas burn area
2,3,7,8-TCDD TEQ	UF	83%	E026, E030, E038, E039.1, E042.1, E050.1, E059, E109.9	E042.1	Ash from the Las Conchas burn area, Los Alamos townsite runoff, and other natural and/or anthropogenic sources
Total PCBs	UF	100%	CO101038, CO111041, CO115002, E026, E030, E038, E039.1, E042.1, E050.1, E055.5, E059, E109.9	CO111041	Laboratory TAs, Los Alamos townsite runoff, and atmospheric fallout concentrated in ash from the Las Conchas fire
Gross alpha	UF	80%	CO111041, CO101038, E026, E030, E038, E039.1, E042.1, E050.1, E059, E109.9	E030	Naturally occurring soils
Radium-226 and radium-228	UF	35%	E042.1, E050.1, E109.9	E109.9	Naturally occurring soils

[a] Inferred primary sources are based on spatial distribution and previous results from investigations in the LA/P watershed.

[b] F = Filtered.

[c] UF = Unfiltered.

Table 4.2-4
Dioxin and Furan TEFs for the Dibenzodioxins and Dibenzofurans

Analyte Code	Analyte	TEF
35822-46-9	Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	0.01
67562-39-4	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	0.01
55673-89-7	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	0.01
39227-28-6	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	0.1
57653-85-7	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	0.1
19408-74-3	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	0.1
70648-26-9	Hexachlorodibenzofuran[1,2,3,4,7,8-]	0.1
57117-44-9	Hexachlorodibenzofuran[1,2,3,6,7,8-]	0.1
72918-21-9	Hexachlorodibenzofuran[1,2,3,7,8,9-]	0.1
60851-34-5	Hexachlorodibenzofuran[2,3,4,6,7,8-]	0.1
3268-87-9	Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	0.0003
39001-02-0	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	0.0003
40321-76-4	Pentachlorodibenzodioxin[1,2,3,7,8-]	1
57117-41-6	Pentachlorodibenzofuran[1,2,3,7,8-]	0.03
57117-31-4	Pentachlorodibenzofuran[2,3,4,7,8-]	0.3
1746-01-6	Tetrachlorodibenzodioxin[2,3,7,8-]	1
51207-31-9	Tetrachlorodibenzofuran[2,3,7,8-]	0.1

Table 4.2-5
Dioxin and Furan TEQs in 2011 Stormwater Samples

Station	Collection Date and Time	Sample ID	2,3,7,8-TCDD TEQ (µg/L)
E026	8/22/2011 12:57	WTLAP-11-15117	4.14E-07
E026	9/4/2011 18:03	WTLAP-11-15112	1.66E-05
E030	8/21/2011 16:41	WTLAP-11-15147	1.79E-06
E030	8/22/2011 14:11	WTLAP-11-15160	1.71E-05
E030	9/4/2011 19:11	WTLAP-11-15148	1.05E-05
E030	10/2/2011 15:26	WTLAP-11-15150	7.77E-07
E038	7/2/2011 17:52	WTLAP-11-14894	1.48E-06
E038	7/28/2011 14:41	WTLAP-11-14893	1.09E-07
E038	8/2/2011 22:41	WTLAP-11-14895	0
E038	8/13/2011 16:05	WTLAP-11-14892	0
E038	8/19/2011 13:45	WTLAP-11-26020	2.02E-07
E038	9/4/2011 18:15	WTLAP-11-26022	5.10E-08
E039.1	8/4/2011 16:49	WTLAP-11-15080	8.91E-08
E039.1	8/19/2011 14:23	WTLAP-11-14992	1.16E-07
E039.1	9/15/2011 18:42	WTLAP-11-15053	4.14E-08
E042.1	8/19/2011 16:06	WTLAP-11-15710	1.46E-07

Table 4.2-5 (continued)

Station	Collection Date and Time	Sample ID	2,3,7,8-TCDD TEQ (µg/L)
E042.1	8/22/2011 14:41	WTLAP-11-15712	4.00E-05
E042.1	9/4/2011 19:47	WTLAP-11-15709	7.12E-07
E042.1	9/7/2011 14:57	WTLAP-11-15711	7.71E-08
E042.1	10/2/2011 17:14	WTLAP-11-27750	1.10E-07
E042.1	10/4/2011 22:18	WTLAP-11-27841	6.65E-06
E050.1	8/21/2011 18:35	WTLAP-11-15739	3.50E-06
E050.1	8/22/2011 16:34	WTLAP-11-15759	1.70E-05
E050.1	9/4/2011 21:45	WTLAP-11-15750	2.93E-06
E050.1	9/7/2011 12:50	WTLAP-11-15735	1.65E-06
E050.1	9/10/2011 13:55	WTLAP-11-27471	1.34E-07
E050.1	9/15/2011 20:10	WTLAP-11-27472	1.44E-07
E050.1	10/2/2011 17:14	WTLAP-11-27473	5.85E-08
E050.1	10/4/2011 23:40	WTLAP-11-27474	9.27E-08
E059	8/21/2011 16:27	WTLAP-11-15809	3.96E-05
E109.9	8/5/2011 17:51	WTLAP-11-15889	4.08E-07
E109.9	8/22/2011 15:39	WTLAP-11-26560	0
E109.9	8/26/2011 17:15	WTLAP-11-26561	1.35E-05
E109.9	9/7/2011 16:36	WTLAP-11-26555	0
E109.9	9/10/2011 2:10	WTLAP-11-26559	1.01E-05

Table 4.3-1
Summary of Radionuclides with Known Laboratory Sources in 2011 LA/P Stormwater Samples

Analyte	Percent of Results Detected	Stations with Detected Results	Station with Maximum	Inferred Primary Source(s)*
Americium-241	77%	E026, E030, E042.1, E050.1, E059, E109.9	E042.1	TA-21, TA-01, TA-45
Cesium-137	13%	E042.1, E050.1	E042.1	TA-21
Plutonium-238	9%	E042.1, E050.1, E109.9	E109.9	TA-21
Plutonium-239/240	62%	E030, E038, E039.1, E042.1, E050.1, E059, E109.9	E042.1	TA-21, TA-01, TA-45
Strontium-90	76%	E026, E030, E038, E039.1, E042.1, E050.1, E059, E109.9	E109.9	Ash from the Las Conchas burn area
Uranium-234	97%	CO101038, CO111041, CO115002, E026, E030, E038, E039.1, E042.1, E050.1, E059, E109.9	E042.1	Naturally occurring soils
Uranium-235/236	76%	CO101038, CO111041, E030, E038, E039.1, E042.1, E050.1, E059, E109.9	E109.9	Naturally occurring soils
Uranium-238	99%	CO101038, CO111041, CO115002, E026, E030, E038, E039.1, E042.1, E050.1, E059, E109.9	E042.1	Naturally occurring soils

* Inferred primary sources are based on spatial distribution and previous results from investigations in the LA/P watershed.

Table 4.4-1
Calculated SSC and Instantaneous Discharge Determined for Each Sample Collected during 2011 in the LA/P Watershed

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
CO101038	10/2/11 14:06	UF[a]	WTLAP-11-25940	17,200	na[b]
CO101038	10/2/11 14:07	UF	WTLAP-12-14	16,000	na
CO101038	10/2/11 14:08	F[c]	WTLAP-11-25928	14,900	na
CO101038	10/2/11 14:08	UF	WTLAP-11-25932	14,900	na
CO101038	10/2/11 14:09	UF	WTLAP-11-25936	13,700	na
CO101038	10/2/11 14:10	UF	WTLAP-11-25952	12,600	na
CO101038	10/2/11 14:11	UF	WTLAP-11-25950	11,400	na
CO101038	10/2/11 14:13	UF	WTLAP-11-25946	9140	na
CO111041	8/19/11 13:23	UF	WTLAP-11-25976	936	na
CO111041	8/19/11 13:24	UF	WTLAP-11-25957	865	na
CO111041	8/19/11 13:25	F	WTLAP-11-25977	794	na
CO111041	8/19/11 13:26	UF	WTLAP-11-25961	723	na
CO111041	8/19/11 13:27	UF	WTLAP-11-25975	652	na
CO111041	8/19/11 14:07	UF	WTLAP-11-25979	436	na
CO111041	8/19/11 14:09	UF	WTLAP-11-25978	426	na
CO111041	8/19/11 14:12	UF	WTLAP-11-26459	409	na
CO111041	8/19/11 14:13	UF	WTLAP-11-26460	404	na
CO115002	10/7/11 23:23	UF	WTLAP-11-28073	44	na
CO115002	10/7/11 23:25	F	WTLAP-11-28065	43	na
CO115002	10/7/11 23:25	UF	WTLAP-11-28069	43	na
CO115002	10/7/11 23:27	UF	WTLAP-11-28081	42	na
CO115002	10/7/11 23:35	UF	WTLAP-11-28085	39	na
CO115002	10/8/11 0:04	UF	WTLAP-11-28089	27	na
CO115002	10/8/11 0:30	UF	WTLAP-11-28079	16	na
CO115002	10/27/11 0:34	UF	WTLAP-11-28076	28	na
CO115002	10/27/11 0:37	F	WTLAP-11-28066	26	na
CO115002	10/27/11 0:37	UF	WTLAP-11-28070	26	na
CO115002	10/27/11 0:39	UF	WTLAP-11-28084	24	na
CO115002	10/27/11 0:43	UF	WTLAP-11-28088	21	na
CO115002	10/27/11 0:45	UF	WTLAP-11-28092	20	na
CO115002	10/27/11 0:47	UF	WTLAP-11-28077	18	na
E026	8/22/11 12:24	UF	WTLAP-11-25674	59,300	8.4
E026	8/22/11 12:29	UF	WTLAP-11-25644	52,400	26.8
E026	8/22/11 12:32	UF	WTLAP-11-25688	99,500	28.6
E026	8/22/11 12:51	F	WTLAP-11-14844	na	13.4

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E026	8/22/11 12:51	UF	WTLAP-11-15122	na	13.4
E026	8/22/11 12:53	UF	WTLAP-11-15124	na	13.7
E026	8/22/11 12:54	UF	WTLAP-11-15110	na	13.9
E026	8/22/11 12:57	UF	WTLAP-11-15117	na	13.6
E026	8/22/11 13:00	UF	WTLAP-11-15106	na	12.9
E026	8/22/11 13:04	UF	WTLAP-11-26831	na	10.7
E026	8/22/11 13:06	UF	WTLAP-11-15102	na	9.52
E026	9/4/11 17:57	UF	WTLAP-11-25673	65,600	20
E026	9/4/11 17:59	UF	WTLAP-11-15100	64,800	18
E026	9/4/11 18:00	UF	WTLAP-11-15104	64,400	17.1
E026	9/4/11 18:02	UF	WTLAP-11-15109	63,600	15.4
E026	9/4/11 18:03	UF	WTLAP-11-15112	63,300	14.6
E026	9/4/11 18:04	UF	WTLAP-11-15123	62,900	13.7
E026	9/4/11 18:05	F	WTLAP-11-14845	62,500	12.9
E026	9/4/11 18:05	UF	WTLAP-11-15113	62,500	12.9
E026	9/4/11 18:07	UF	WTLAP-11-25666	61,700	11.6
E030	8/21/11 16:36	UF	WTLAP-11-15157	5370	19.1
E030	8/21/11 16:37	UF	WTLAP-11-15152	5250	18.7
E030	8/21/11 16:39	UF	WTLAP-11-15161	5010	17.9
E030	8/21/11 16:40	UF	WTLAP-11-15159	4890	17.4
E030	8/21/11 16:41	UF	WTLAP-11-15147	4780	17.4
E030	8/21/11 16:43	F	WTLAP-11-15153	4540	17.4
E030	8/21/11 16:43	UF	WTLAP-11-15144	4540	17.4
E030	8/21/11 16:44	UF	WTLAP-11-15146	4420	17.4
E030	8/21/11 16:45	UF	WTLAP-11-15143	4300	17.4
E030	8/22/11 14:06	UF	WTLAP-11-15130	44,600	68.4
E030	8/22/11 14:07	UF	WTLAP-11-15141	44,800	66.7
E030	8/22/11 14:09	UF	WTLAP-11-15162	45,300	63.3
E030	8/22/11 14:10	UF	WTLAP-11-15134	45,600	61.6
E030	8/22/11 14:11	UF	WTLAP-11-15160	45,800	62
E030	8/22/11 14:13	F	WTLAP-11-15154	46,300	62.8
E030	8/22/11 14:13	UF	WTLAP-11-15149	46,300	62.8
E030	8/22/11 14:14	UF	WTLAP-11-15139	46,600	63.2
E030	8/22/11 14:15	UF	WTLAP-11-15151	46,800	63.6
E030	9/4/11 19:06	UF	WTLAP-11-15136	34,900	76.2
E030	9/4/11 19:07	UF	WTLAP-11-15156	34,200	72.8
E030	9/4/11 19:09	UF	WTLAP-11-15155	32,700	66

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E030	9/4/11 19:10	UF	WTLAP-11-15158	32,000	62.6
E030	9/4/11 19:11	UF	WTLAP-11-15148	31,300	60.8
E030	9/4/11 19:13	F	WTLAP-11-15163	29,800	57.3
E030	9/4/11 19:13	UF	WTLAP-11-15128	29,800	57.3
E030	9/4/11 19:14	UF	WTLAP-11-15135	29,100	55.5
E030	9/4/11 19:15	UF	WTLAP-11-15137	28,400	53.7
E030	10/2/11 15:21	UF	WTLAP-11-15131	20,000	11
E030	10/2/11 15:22	UF	WTLAP-11-15145	19,500	10.8
E030	10/2/11 15:24	UF	WTLAP-11-15142	18,400	10.5
E030	10/2/11 15:25	UF	WTLAP-11-15138	17,900	10.3
E030	10/2/11 15:26	UF	WTLAP-11-15150	17,300	10.4
E030	10/2/11 15:28	F	WTLAP-11-15140	16,300	10.5
E030	10/2/11 15:28	UF	WTLAP-11-15129	16,300	10.5
E030	10/2/11 15:29	UF	WTLAP-11-15132	15,700	10.6
E030	10/2/11 15:30	UF	WTLAP-11-15133	15,200	10.6
E038	7/2/11 17:36	UF	WTLAP-11-14862	3370	3.8
E038	7/2/11 17:39	UF	WTLAP-11-14864	5740	15.2
E038	7/2/11 17:42	UF	WTLAP-11-14869	2330	15.7
E038	7/2/11 17:45	UF	WTLAP-11-14870	1890	10.7
E038	7/2/11 17:47	UF	WTLAP-11-14887	1640	10.1
E038	7/2/11 17:48	UF	WTLAP-11-14840	1520	9.8
E038	7/2/11 17:48	UF	WTLAP-11-14879	1520	9.8
E038	7/2/11 17:50	UF	WTLAP-11-14890	1410	9.2
E038	7/2/11 17:51	F	WTLAP-11-14836	1360	8.62
E038	7/2/11 17:51	UF	WTLAP-11-14882	1360	8.62
E038	7/2/11 17:51	UF	WTLAP-11-14898	1360	8.62
E038	7/2/11 17:52	UF	WTLAP-11-14894	1350	8.05
E038	7/2/11 17:54	UF	WTLAP-11-14902	1330	6.9
E038	7/2/11 17:54	UF	WTLAP-11-14906	1330	6.9
E038	7/2/11 17:57	UF	WTLAP-11-14911	1190	5.79
E038	7/2/11 18:00	UF	WTLAP-11-14913	915	5
E038	7/2/11 18:03	UF	WTLAP-11-14914	840	4.28
E038	7/2/11 18:06	UF	WTLAP-11-14915	730	3.65
E038	7/2/11 18:26	UF	WTLAP-11-14916	465	1.8
E038	7/2/11 18:46	UF	WTLAP-11-14929	242	1.05
E038	7/2/11 19:06	UF	WTLAP-11-14931	244	0.54
E038	7/28/11 14:20	UF	WTLAP-11-14863	2030	16.6

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E038	7/28/11 14:23	UF	WTLAP-11-14866	1590	14.7
E038	7/28/11 14:26	UF	WTLAP-11-14873	1450	12.9
E038	7/28/11 14:29	UF	WTLAP-11-14874	1170	11.5
E038	7/28/11 14:31	UF	WTLAP-11-14901	993	10.6
E038	7/28/11 14:32	UF	WTLAP-11-14841	905	10.2
E038	7/28/11 14:32	UF	WTLAP-11-14881	905	10.2
E038	7/28/11 14:34	UF	WTLAP-11-14886	825	9.32
E038	7/28/11 14:35	UF	WTLAP-11-14883	785	8.9
E038	7/28/11 14:38	F	WTLAP-11-14837	628	7.93
E038	7/28/11 14:38	UF	WTLAP-11-14899	628	7.93
E038	7/28/11 14:38	UF	WTLAP-11-14904	628	7.93
E038	7/28/11 14:39	UF	WTLAP-11-14891	634	7.6
E038	7/28/11 14:41	UF	WTLAP-11-14893	646	6.99
E038	7/28/11 14:41	UF	WTLAP-11-14918	646	6.99
E038	7/28/11 14:44	UF	WTLAP-11-14923	529	6.13
E038	7/28/11 14:47	UF	WTLAP-11-14924	488	5.34
E038	7/28/11 14:50	UF	WTLAP-11-14925	260	4.6
E038	7/28/11 15:10	UF	WTLAP-11-14926	463	1.97
E038	7/28/11 15:30	UF	WTLAP-11-14928	136	1.15
E038	7/28/11 15:50	UF	WTLAP-11-14932	88	0.93
E038	7/28/11 16:10	UF	WTLAP-11-14941	60	0.85
E038	7/28/11 16:30	UF	WTLAP-11-14942	45	0.67
E038	8/2/11 22:20	UF	WTLAP-11-14861	490	8.9
E038	8/2/11 22:23	UF	WTLAP-11-14865	478	7.64
E038	8/2/11 22:26	UF	WTLAP-11-14872	408	6.56
E038	8/2/11 22:29	UF	WTLAP-11-14875	342	5.84
E038	8/2/11 22:31	UF	WTLAP-11-14903	311	5.36
E038	8/2/11 22:32	UF	WTLAP-11-14842	296	5.12
E038	8/2/11 22:32	UF	WTLAP-11-14876	296	5.12
E038	8/2/11 22:34	UF	WTLAP-11-14884	260	4.64
E038	8/2/11 22:35	UF	WTLAP-11-14880	242	4.4
E038	8/2/11 22:38	UF	WTLAP-11-14889	186	3.92
E038	8/2/11 22:38	UF	WTLAP-11-14907	186	3.92
E038	8/2/11 22:40	F	WTLAP-11-14838	182	3.6
E038	8/2/11 22:40	UF	WTLAP-11-14897	182	3.6
E038	8/2/11 22:41	UF	WTLAP-11-14895	180	3.52
E038	8/2/11 22:41	UF	WTLAP-11-14908	180	3.52

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E038	8/2/11 22:44	UF	WTLAP-11-14910	166	3.26
E038	8/2/11 22:47	UF	WTLAP-11-14920	154	3.18
E038	8/2/11 22:50	UF	WTLAP-11-14921	142	3.18
E038	8/2/11 23:10	UF	WTLAP-11-14927	102	3.46
E038	8/2/11 23:10	UF	WTLAP-11-14927	102	3.46
E038	8/2/11 23:30	UF	WTLAP-11-14930	76	2.08
E038	8/2/11 23:30	UF	WTLAP-11-14930	76	2.08
E038	8/2/11 23:50	UF	WTLAP-11-14933	44	1.43
E038	8/3/11 0:10	UF	WTLAP-11-14936	28	1.08
E038	8/3/11 0:30	UF	WTLAP-11-14947	20	0.78
E038	8/13/11 15:56	UF	WTLAP-11-14860	197	3.84
E038	8/13/11 15:57	UF	WTLAP-11-14843	191	3.67
E038	8/13/11 15:59	UF	WTLAP-11-14888	179	3.34
E038	8/13/11 16:00	UF	WTLAP-11-14885	173	3.18
E038	8/13/11 16:03	UF	WTLAP-11-14900	155	2.76
E038	8/13/11 16:04	F	WTLAP-11-14839	149	2.62
E038	8/13/11 16:04	UF	WTLAP-11-14896	149	2.62
E038	8/13/11 16:05	UF	WTLAP-11-14892	143	2.48
E038	8/13/11 16:07	UF	WTLAP-11-14867	131	2.32
E038	8/15/11 12:05	UF	WTLAP-11-26232	331	0.06
E038	8/15/11 12:08	UF	WTLAP-11-26225	293	2.66
E038	8/15/11 12:11	UF	WTLAP-11-26229	225	4.32
E038	8/15/11 12:14	UF	WTLAP-11-26226	186	4.08
E038	8/15/11 12:17	UF	WTLAP-11-26099	149	3.78
E038	8/15/11 12:20	UF	WTLAP-11-26096	123	3.46
E038	8/15/11 12:23	UF	WTLAP-11-26107	119	3.04
E038	8/15/11 12:26	UF	WTLAP-11-26102	104	2.68
E038	8/15/11 12:29	UF	WTLAP-11-26130	96	2.42
E038	8/15/11 12:32	UF	WTLAP-11-26133	90	2.14
E038	8/15/11 12:35	UF	WTLAP-11-26129	80	1.85
E038	8/15/11 12:55	UF	WTLAP-11-26136	61	1
E038	8/19/11 13:30	UF	WTLAP-11-26273	3410	110
E038	8/19/11 13:33	UF	WTLAP-11-26278	3190	107
E038	8/19/11 13:36	UF	WTLAP-11-26284	2520	94.6
E038	8/19/11 13:39	UF	WTLAP-11-26291	1600	64.2
E038	8/19/11 13:41	UF	WTLAP-11-26030	1510	50
E038	8/19/11 13:42	UF	WTLAP-11-26106	1470	45.9

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E038	8/19/11 13:43	UF	WTLAP-11-26038	1320	41.8
E038	8/19/11 13:44	UF	WTLAP-11-26046	1170	37.8
E038	8/19/11 13:45	UF	WTLAP-11-26020	1020	33.7
E038	8/19/11 13:45	UF	WTLAP-11-26100	1020	33.7
E038	8/19/11 13:47	F	WTLAP-11-25996	899	27.5
E038	8/19/11 13:47	UF	WTLAP-11-26008	899	27.5
E038	8/19/11 13:48	UF	WTLAP-11-26054	838	24.4
E038	8/19/11 13:48	UF	WTLAP-11-26098	838	24.4
E038	8/19/11 13:51	UF	WTLAP-11-26103	787	16.6
E038	8/19/11 13:54	UF	WTLAP-11-26139	662	11.7
E038	8/19/11 13:57	UF	WTLAP-11-26148	590	9.26
E038	8/19/11 14:00	UF	WTLAP-11-26151	502	8
E038	8/19/11 14:20	UF	WTLAP-11-26131	852	74.4
E038	8/19/11 14:40	UF	WTLAP-11-26167	1030	183
E038	8/19/11 15:00	UF	WTLAP-11-26161	1050	56
E038	8/19/11 15:20	UF	WTLAP-11-26180	718	10.1
E038	8/19/11 15:40	UF	WTLAP-11-26192	274	4.4
E038	8/19/11 15:40	UF	WTLAP-11-26192	274	4.4
E038	8/19/11 16:00	UF	WTLAP-11-26181	132	2.34
E038	8/19/11 16:20	UF	WTLAP-11-26174	74	1.34
E038	8/19/11 16:20	UF	WTLAP-11-26174	74	1.34
E038	8/19/11 16:40	UF	WTLAP-11-26170	52	0.78
E038	9/1/11 18:29	UF	WTLAP-11-26270	392	na
E038	9/1/11 18:32	UF	WTLAP-11-26279	384	na
E038	9/1/11 18:35	UF	WTLAP-11-26283	291	na
E038	9/1/11 18:38	UF	WTLAP-11-26294	233	na
E038	9/1/11 18:41	UF	WTLAP-11-26039	206	na
E038	9/1/11 18:44	UF	WTLAP-11-26047	179	na
E038	9/1/11 18:47	UF	WTLAP-11-26120	152	na
E038	9/1/11 18:50	UF	WTLAP-11-26055	137	na
E038	9/1/11 18:53	F	WTLAP-11-25997	123	na
E038	9/1/11 18:53	UF	WTLAP-11-26009	123	na
E038	9/1/11 18:56	UF	WTLAP-11-26143	108	na
E038	9/1/11 18:59	UF	WTLAP-11-26156	94	na
E038	9/1/11 19:19	UF	WTLAP-11-26128	78	na
E038	9/4/11 17:39	UF	WTLAP-11-26269	292	0.352
E038	9/4/11 17:42	UF	WTLAP-11-26280	294	1.37

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E038	9/4/11 17:45	UF	WTLAP-11-26287	194	2.76
E038	9/4/11 17:48	UF	WTLAP-11-26295	192	3.26
E038	9/4/11 17:51	UF	WTLAP-11-26126	250	4.14
E038	9/4/11 17:54	UF	WTLAP-11-26117	336	5.78
E038	9/4/11 17:57	UF	WTLAP-11-26101	336	6.61
E038	9/4/11 18:00	UF	WTLAP-11-26105	372	7.04
E038	9/4/11 18:03	UF	WTLAP-11-26127	316	6.9
E038	9/4/11 18:06	UF	WTLAP-11-26150	238	6.7
E038	9/4/11 18:09	UF	WTLAP-11-26149	234	6.42
E038	9/4/11 18:11	UF	WTLAP-11-26028	225	6.22
E038	9/4/11 18:13	UF	WTLAP-11-26036	217	6.03
E038	9/4/11 18:14	UF	WTLAP-11-26044	212	5.94
E038	9/4/11 18:15	UF	WTLAP-11-26022	208	5.84
E038	9/4/11 18:17	F	WTLAP-11-25998	200	5.34
E038	9/4/11 18:17	UF	WTLAP-11-26010	200	5.34
E038	9/4/11 18:18	UF	WTLAP-11-26052	195	5.1
E038	9/4/11 18:29	UF	WTLAP-11-26155	148	2.54
E038	9/4/11 18:49	UF	WTLAP-11-26195	91	0.47
E038	9/7/11 12:39	UF	WTLAP-11-26268	1910	30.1
E038	9/7/11 12:42	UF	WTLAP-11-26277	1850	38.5
E038	9/7/11 12:45	UF	WTLAP-11-26282	902	39.7
E038	9/7/11 12:48	UF	WTLAP-11-26293	728	32.9
E038	9/7/11 12:51	UF	WTLAP-11-26123	690	26.4
E038	9/7/11 12:54	UF	WTLAP-11-26112	692	20.5
E038	9/7/11 12:56	UF	WTLAP-11-26175	510	18.5
E038	9/7/11 12:57	UF	WTLAP-11-26209	582	18.4
E038	9/7/11 12:58	UF	WTLAP-11-26159	664	18.4
E038	9/7/11 12:59	UF	WTLAP-11-26160	604	18.3
E038	9/7/11 13:00	UF	WTLAP-11-26114	456	18.2
E038	9/7/11 13:01	UF	WTLAP-11-26254	433	17.1
E038	9/7/11 13:02	UF	WTLAP-11-26237	421	16
E038	9/7/11 13:03	UF	WTLAP-11-26158	436	14.8
E038	9/7/11 13:06	UF	WTLAP-11-26141	362	11.4
E038	9/7/11 13:09	UF	WTLAP-11-26142	322	7.77
E038	9/7/11 13:29	UF	WTLAP-11-26144	220	0.844
E038	9/7/11 13:49	UF	WTLAP-11-26217	130	0.212
E038	9/7/11 14:09	UF	WTLAP-11-26185	132	0.746

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E038	9/7/11 14:29	UF	WTLAP-11-26208	92	0.192
E038	10/4/11 14:44	UF	WTLAP-11-26271	176	3.36
E038	10/4/11 14:47	UF	WTLAP-11-26275	175	4.52
E038	10/4/11 14:50	UF	WTLAP-11-26286	181	5
E038	10/4/11 14:53	UF	WTLAP-11-26292	132	3.99
E038	10/4/11 14:56	UF	WTLAP-11-26116	107	3.21
E038	10/4/11 14:59	UF	WTLAP-11-26097	104	2.87
E038	10/4/11 15:01	UF	WTLAP-11-26138	368	2.62
E038	10/4/11 15:02	UF	WTLAP-11-26109	93	2.49
E038	10/4/11 15:02	UF	WTLAP-11-26213	93	2.49
E038	10/4/11 15:02	UF	WTLAP-11-26213	101	2.49
E038	10/4/11 15:03	UF	WTLAP-11-26206	103	2.35
E038	10/4/11 15:04	UF	WTLAP-11-26177	97	2.22
E038	10/4/11 15:05	UF	WTLAP-11-26113	83	2.08
E038	10/4/11 15:05	UF	WTLAP-11-26113	91	2.08
E038	10/4/11 15:05	UF	WTLAP-11-26169	83	2.08
E038	10/4/11 15:05	UF	WTLAP-11-26169	91	2.08
E038	10/4/11 15:06	UF	WTLAP-11-26202	80	1.95
E038	10/4/11 15:07	UF	WTLAP-11-26189	90	1.82
E038	10/4/11 15:08	UF	WTLAP-11-26146	79	1.69
E038	10/4/11 15:08	UF	WTLAP-11-26241	79	1.69
E038	10/4/11 15:08	UF	WTLAP-11-26241	83	1.69
E038	10/4/11 15:11	UF	WTLAP-11-26140	74	1.37
E038	10/4/11 15:14	UF	WTLAP-11-26145	70	1.21
E038	10/4/11 17:54	UF	WTLAP-11-26212	139	7.47
E038	10/4/11 18:14	UF	WTLAP-11-26207	114	6.42
E038	10/4/11 18:34	UF	WTLAP-11-26242	77	2.51
E038	10/4/11 18:54	UF	WTLAP-11-26236	48	0.96
E038	10/12/11 11:04	UF	WTLAP-11-26274	840	0.992
E038	10/12/11 11:07	UF	WTLAP-11-26276	850	1.24
E038	10/12/11 11:10	UF	WTLAP-11-26285	733	1.24
E038	10/12/11 11:13	UF	WTLAP-11-26290	645	1.14
E038	10/12/11 11:16	UF	WTLAP-11-26119	560	1.05
E038	10/12/11 11:16	UF	WTLAP-11-26124	637	1.05
E038	10/12/11 11:17	UF	WTLAP-11-26125	687	1.02
E038	10/12/11 11:18	UF	WTLAP-11-26134	623	0.99
E038	10/12/11 11:19	UF	WTLAP-11-26104	503	0.96

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E038	10/12/11 11:19	UF	WTLAP-11-26135	503	0.96
E038	10/12/11 11:19	UF	WTLAP-11-26135	513	0.96
E038	10/12/11 11:20	UF	WTLAP-11-26137	565	0.93
E038	10/12/11 11:21	UF	WTLAP-11-26152	523	0.878
E038	10/12/11 11:22	UF	WTLAP-11-26162	500	0.826
E038	10/12/11 11:23	UF	WTLAP-11-26165	513	0.774
E038	10/12/11 11:24	UF	WTLAP-11-26166	500	0.722
E039.1	8/1/11 12:30	UF	WTLAP-11-14991	956	4.3
E039.1	8/1/11 12:33	UF	WTLAP-11-15084	825	8.97
E039.1	8/1/11 12:36	UF	WTLAP-11-15040	552	11.7
E039.1	8/1/11 12:39	UF	WTLAP-11-15047	550	10.4
E039.1	8/1/11 12:42	UF	WTLAP-11-15093	547	8.89
E039.1	8/1/11 12:45	UF	WTLAP-11-15043	545	7.26
E039.1	8/1/11 12:48	F	WTLAP-11-15021	502	6.17
E039.1	8/1/11 12:48	UF	WTLAP-11-15042	502	6.17
E039.1	8/1/11 12:51	UF	WTLAP-11-14989	458	5.21
E039.1	8/1/11 12:54	UF	WTLAP-11-15068	415	4.53
E039.1	8/1/11 12:57	UF	WTLAP-11-15046	383	3.96
E039.1	8/4/11 16:44	UF	WTLAP-11-14976	328	10.1
E039.1	8/4/11 16:45	UF	WTLAP-11-15055	317	10.6
E039.1	8/4/11 16:47	F	WTLAP-11-15065	296	10.4
E039.1	8/4/11 16:47	UF	WTLAP-11-15076	296	10.4
E039.1	8/4/11 16:48	UF	WTLAP-11-15008	285	10.2
E039.1	8/4/11 16:49	UF	WTLAP-11-15080	274	10.1
E039.1	8/4/11 16:51	UF	WTLAP-11-15092	253	9.67
E039.1	8/4/11 16:52	UF	WTLAP-11-15087	242	9.36
E039.1	8/4/11 16:53	UF	WTLAP-11-14980	231	9.06
E039.1	8/4/11 16:54	UF	WTLAP-11-14982	204	8.75
E039.1	8/4/11 16:55	UF	WTLAP-11-14983	204	8.44
E039.1	8/19/11 14:02	UF	WTLAP-11-15003	947	1.14
E039.1	8/19/11 14:05	UF	WTLAP-11-15012	773	2.84
E039.1	8/19/11 14:08	UF	WTLAP-11-14984	810	23.5
E039.1	8/19/11 14:11	UF	WTLAP-11-15041	558	34.4
E039.1	8/19/11 14:14	UF	WTLAP-11-15000	528	25.8
E039.1	8/19/11 14:17	UF	WTLAP-11-14986	617	19.4
E039.1	8/19/11 14:17	UF	WTLAP-11-15037	617	19.4
E039.1	8/19/11 14:18	UF	WTLAP-11-15063	547	17.6

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E039.1	8/19/11 14:19	UF	WTLAP-11-15024	478	15.7
E039.1	8/19/11 14:20	UF	WTLAP-11-15062	408	13.9
E039.1	8/19/11 14:21	F	WTLAP-11-15038	381	13.2
E039.1	8/19/11 14:21	UF	WTLAP-11-15095	381	13.2
E039.1	8/19/11 14:22	UF	WTLAP-11-15085	355	12.5
E039.1	8/19/11 14:23	UF	WTLAP-11-14992	328	11.7
E039.1	8/19/11 14:23	UF	WTLAP-11-15010	328	11.7
E039.1	8/19/11 14:26	UF	WTLAP-11-15098	340	9.74
E039.1	8/19/11 14:29	UF	WTLAP-11-15004	293	8.07
E039.1	8/19/11 14:32	UF	WTLAP-11-15096	1270	7
E039.1	8/19/11 14:52	UF	WTLAP-11-14996	260	256
E039.1	8/19/11 15:12	UF	WTLAP-11-14978	1330	192
E039.1	8/19/11 15:32	UF	WTLAP-11-14979	713	57.8
E039.1	8/19/11 15:52	UF	WTLAP-11-15097	435	9.71
E039.1	9/15/11 18:13	UF	WTLAP-11-15066	346	8.24
E039.1	9/15/11 18:16	UF	WTLAP-11-15086	318	9.44
E039.1	9/15/11 18:19	UF	WTLAP-11-15032	294	10.6
E039.1	9/15/11 18:22	UF	WTLAP-11-15064	260	11.4
E039.1	9/15/11 18:25	UF	WTLAP-11-15060	231	12.1
E039.1	9/15/11 18:28	UF	WTLAP-11-15045	217	12.3
E039.1	9/15/11 18:31	UF	WTLAP-11-15048	198	12.4
E039.1	9/15/11 18:34	UF	WTLAP-11-15027	183	12.2
E039.1	9/15/11 18:37	UF	WTLAP-11-15022	166	11.5
E039.1	9/15/11 18:38	UF	WTLAP-11-15033	160	11.2
E039.1	9/15/11 18:40	UF	WTLAP-11-15051	147	10.6
E039.1	9/15/11 18:40	UF	WTLAP-11-15099	147	10.6
E039.1	9/15/11 18:41	UF	WTLAP-11-15081	141	10.3
E039.1	9/15/11 18:42	UF	WTLAP-11-15053	134	9.98
E039.1	9/15/11 18:43	UF	WTLAP-11-14999	128	9.68
E039.1	9/15/11 18:44	F	WTLAP-11-15075	122	9.37
E039.1	9/15/11 18:44	UF	WTLAP-11-15059	122	9.37
E039.1	9/15/11 18:45	UF	WTLAP-11-15011	115	9.06
E042.1	8/19/11 16:03	UF	WTLAP-11-15930	7100	54.1
E042.1	8/19/11 16:04	UF	WTLAP-11-15686	7050	52.3
E042.1	8/19/11 16:05	UF	WTLAP-11-15706	7000	50.4
E042.1	8/19/11 16:06	UF	WTLAP-11-15710	6940	48.1
E042.1	8/19/11 16:07	F	WTLAP-11-15669	6890	45.7

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E042.1	8/19/11 16:07	UF	WTLAP-11-15714	6890	45.7
E042.1	8/19/11 17:03	UF	WTLAP-11-15678	3950	11.7
E042.1	8/19/11 17:03	UF	WTLAP-11-15933	3950	11.7
E042.1	8/22/11 14:18	UF	WTLAP-11-15945	12,800	1.98
E042.1	8/22/11 14:21	UF	WTLAP-11-15982	11,500	32.6
E042.1	8/22/11 14:38	UF	WTLAP-11-15674	60,700[d]	149
E042.1	8/22/11 14:39	UF	WTLAP-11-15688	60,700[d]	143
E042.1	8/22/11 14:40	UF	WTLAP-11-15708	60,700[d]	137
E042.1	8/22/11 14:41	UF	WTLAP-11-15712	60,700[d]	134
E042.1	8/22/11 14:42	F	WTLAP-11-15670	60,700[d]	131
E042.1	8/22/11 14:42	UF	WTLAP-11-15716	60,700[d]	131
E042.1	8/22/11 15:28	UF	WTLAP-11-15940	53,000	49.7
E042.1	8/22/11 15:38	UF	WTLAP-11-15680	51,100	46.4
E042.1	8/22/11 15:38	UF	WTLAP-11-25583	51,100	46.4
E042.1	8/22/11 15:48	UF	WTLAP-11-15720	49,300	43.9
E042.1	8/22/11 16:23	UF	WTLAP-11-15684	42,700	20.4
E042.1	8/22/11 16:23	UF	WTLAP-11-25604	42,700	20.4
E042.1	8/22/11 16:28	UF	WTLAP-11-16005	41,800	19.1
E042.1	8/22/11 16:48	UF	WTLAP-11-15970	31,600	16
E042.1	8/22/11 17:08	UF	WTLAP-11-15691	55,300	13.4
E042.1	8/22/11 17:08	UF	WTLAP-11-15990	55,300	13.4
E042.1	8/22/11 17:08	UF	WTLAP-11-25627	55,300	13.4
E042.1	9/4/11 19:19	UF	WTLAP-11-15951	56,300	113
E042.1	9/4/11 19:22	UF	WTLAP-11-15986	64,500	159
E042.1	9/4/11 19:25	UF	WTLAP-11-16009	99,500	185
E042.1	9/4/11 19:28	UF	WTLAP-11-15957	73,100	192
E042.1	9/4/11 19:31	UF	WTLAP-11-16019	72,600	198
E042.1	9/4/11 19:34	UF	WTLAP-11-15717	80,700	204
E042.1	9/4/11 19:40	UF	WTLAP-11-15956	96,800	173
E042.1	9/4/11 19:43	UF	WTLAP-11-15949	81,800	150
E042.1	9/4/11 19:44	UF	WTLAP-11-15675	76,800	142
E042.1	9/4/11 19:45	UF	WTLAP-11-15685	71,900	134
E042.1	9/4/11 19:46	UF	WTLAP-11-15705	66,900	129
E042.1	9/4/11 19:47	UF	WTLAP-11-15709	61,900	124
E042.1	9/4/11 19:48	F	WTLAP-11-15671	56,900	118
E042.1	9/4/11 19:48	UF	WTLAP-11-15713	56,900	118
E042.1	9/4/11 19:49	UF	WTLAP-11-16017	51,900	113

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E042.1	9/4/11 20:09	UF	WTLAP-11-16011	39,000	67.3
E042.1	9/4/11 20:29	UF	WTLAP-11-15932	38,200	31
E042.1	9/4/11 20:44	UF	WTLAP-11-15677	33,800	24.7
E042.1	9/4/11 20:44	UF	WTLAP-11-25574	33,800	24.7
E042.1	9/4/11 20:49	UF	WTLAP-11-15934	32,400	22.8
E042.1	9/4/11 21:29	UF	WTLAP-11-15681	26,100	11.9
E042.1	9/4/11 21:29	UF	WTLAP-11-25595	26,100	11.9
E042.1	9/4/11 21:49	UF	WTLAP-11-15987	23,000	7.86
E042.1	9/4/11 22:09	UF	WTLAP-11-15992	22,600	4.67
E042.1	9/4/11 22:14	UF	WTLAP-11-15690	22,800	4.02
E042.1	9/4/11 22:14	UF	WTLAP-11-25632	22,800	4.02
E042.1	9/4/11 22:29	UF	WTLAP-11-15937	23,200	2.28
E042.1	9/4/11 22:49	UF	WTLAP-11-16004	15,800	0.73
E042.1	9/7/11 14:43	UF	WTLAP-11-15997	57,800	11
E042.1	9/7/11 14:46	UF	WTLAP-11-16010	45,700	17.5
E042.1	9/7/11 14:49	F	WTLAP-11-15672	31,200	17.3
E042.1	9/7/11 14:49	UF	WTLAP-11-15715	31,200	17.3
E042.1	9/7/11 14:52	UF	WTLAP-11-15972	16,700	16.7
E042.1	9/7/11 14:54	UF	WTLAP-11-15676	15,500	16.2
E042.1	9/7/11 14:55	UF	WTLAP-11-15991	14,900	15.9
E042.1	9/7/11 14:56	UF	WTLAP-11-15687	14,300	15.7
E042.1	9/7/11 14:57	UF	WTLAP-11-15707	13,700	15.4
E042.1	9/7/11 14:57	UF	WTLAP-11-15711	13,700	15.4
E042.1	9/7/11 15:01	UF	WTLAP-11-15719	11,200	14.5
E042.1	9/7/11 15:04	UF	WTLAP-11-15967	9420	13.8
E042.1	9/10/11 1:24	UF	WTLAP-11-27776	5660	10.7
E042.1	9/10/11 1:26	UF	WTLAP-11-27809	4380	10.5
E042.1	9/10/11 1:27	UF	WTLAP-11-27671	4030	10.5
E042.1	9/10/11 1:28	UF	WTLAP-11-27907	3820	10.4
E042.1	9/10/11 1:29	UF	WTLAP-11-27791	3570	10.3
E042.1	9/10/11 1:30	UF	WTLAP-11-27706	3220	10.3
E042.1	9/15/11 19:49	UF	WTLAP-11-27673	1570	18.7
E042.1	10/2/11 16:14	UF	WTLAP-11-27817	21,900	30.2
E042.1	10/2/11 16:15	F	WTLAP-11-27699	21,800	29.8
E042.1	10/2/11 16:15	UF	WTLAP-11-27660	21,800	29.8
E042.1	10/2/11 16:15	UF	WTLAP-11-27767	21,800	29.8
E042.1	10/2/11 16:16	UF	WTLAP-11-27647	21,800	29.4

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E042.1	10/2/11 16:17	UF	WTLAP-11-27719	21,700	29
E042.1	10/2/11 16:18	UF	WTLAP-11-27709	21,600	28.6
E042.1	10/2/11 17:14	UF	WTLAP-11-27652	17,900	14.2
E042.1	10/2/11 17:14	UF	WTLAP-11-27750	17,900	14.2
E042.1	10/4/11 21:58	UF	WTLAP-11-27731	18,300	3.71
E042.1	10/4/11 22:01	UF	WTLAP-11-27729	20,100	6.75
E042.1	10/4/11 22:04	UF	WTLAP-11-27887	15,400	8.44
E042.1	10/4/11 22:07	UF	WTLAP-11-27834	10,300	8.77
E042.1	10/4/11 22:10	UF	WTLAP-11-27810	10,200	8.4
E042.1	10/4/11 22:13	F	WTLAP-11-27857	10,100	8.03
E042.1	10/4/11 22:13	UF	WTLAP-11-27666	10,100	8.03
E042.1	10/4/11 22:13	UF	WTLAP-11-27869	10,100	8.03
E042.1	10/4/11 22:14	UF	WTLAP-11-27816	10,100	7.9
E042.1	10/4/11 22:15	UF	WTLAP-11-27923	10,100	7.78
E042.1	10/4/11 22:17	UF	WTLAP-11-27815	10,000	7.56
E042.1	10/4/11 22:18	UF	WTLAP-11-27841	9990	7.44
E042.1	10/4/11 22:19	UF	WTLAP-11-27917	9960	7.33
E042.1	10/4/11 22:22	UF	WTLAP-11-27845	9410	7.12
E042.1	10/4/11 22:25	UF	WTLAP-11-27637	9190	6.96
E042.1	10/4/11 22:28	UF	WTLAP-11-27856	10,000	6.65
E050.1	8/21/11 17:11	UF	WTLAP-11-16088	2520	59.4
E050.1	8/21/11 17:14	UF	WTLAP-11-16064	3030	68.4
E050.1	8/21/11 17:17	UF	WTLAP-11-16092	2930	72.7
E050.1	8/21/11 17:20	UF	WTLAP-11-16047	2650	74.7
E050.1	8/21/11 17:23	UF	WTLAP-11-16111	2760	74.7
E050.1	8/21/11 17:32	UF	WTLAP-11-16107	3100	72.5
E050.1	8/21/11 17:35	UF	WTLAP-11-16078	3090	70.5
E050.1	8/21/11 17:38	UF	WTLAP-11-16059	2840	68.6
E050.1	8/21/11 17:41	UF	WTLAP-11-16036	3000	66.5
E050.1	8/21/11 18:31	UF	WTLAP-11-15722	2160	24.6
E050.1	8/21/11 18:32	UF	WTLAP-11-15754	2140	24.2
E050.1	8/21/11 18:34	UF	WTLAP-11-15740	2110	23.4
E050.1	8/21/11 18:35	UF	WTLAP-11-15739	2090	23
E050.1	8/21/11 18:35	UF	WTLAP-11-15739	2090	23
E050.1	8/21/11 18:41	UF	WTLAP-11-16112	1990	20.6
E050.1	8/21/11 19:01	UF	WTLAP-11-16021	2160	14.2
E050.1	8/21/11 19:31	F	WTLAP-11-15761	1400	10.5

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E050.1	8/21/11 19:31	UF	WTLAP-11-15723	1400	10.5
E050.1	8/21/11 19:31	UF	WTLAP-11-15757	1400	10.5
E050.1	8/21/11 19:41	UF	WTLAP-11-16060	1140	9.43
E050.1	8/21/11 20:01	UF	WTLAP-11-16090	53	7.18
E050.1	8/21/11 20:16	UF	WTLAP-11-15742	448	6.37
E050.1	8/21/11 20:16	UF	WTLAP-11-25605	448	6.37
E050.1	8/21/11 20:21	UF	WTLAP-11-16076	580	6.05
E050.1	8/21/11 20:41	UF	WTLAP-11-16026	780	4.6
E050.1	8/21/11 21:01	UF	WTLAP-11-15755	778	3.77
E050.1	8/21/11 21:01	UF	WTLAP-11-25614	778	3.77
E050.1	8/21/11 21:21	UF	WTLAP-11-16051	775	3.17
E050.1	8/21/11 21:41	UF	WTLAP-11-16062	815	2.8
E050.1	8/21/11 22:01	UF	WTLAP-11-16034	720	2.49
E050.1	8/22/11 14:41	UF	WTLAP-11-16049	16,800	83
E050.1	8/22/11 14:44	UF	WTLAP-11-16083	21,200	87.4
E050.1	8/22/11 14:47	UF	WTLAP-11-16043	40,400	88.4
E050.1	8/22/11 14:50	UF	WTLAP-11-16050	27,800	87.9
E050.1	8/22/11 14:56	UF	WTLAP-11-16093	47,500	87.9
E050.1	8/22/11 14:59	UF	WTLAP-11-16086	53,500	87.9
E050.1	8/22/11 15:02	UF	WTLAP-11-16080	37,100	87.9
E050.1	8/22/11 15:05	UF	WTLAP-11-16033	42,500	87.9
E050.1	8/22/11 15:08	UF	WTLAP-11-16029	53,300	89.5
E050.1	8/22/11 15:11	UF	WTLAP-11-16061	24,000	89.2
E050.1	8/22/11 15:31	UF	WTLAP-11-16030	56,700	67
E050.1	8/22/11 15:51	UF	WTLAP-11-16063	35,300	45.4
E050.1	8/22/11 16:11	UF	WTLAP-11-16057	47,000	32.6
E050.1	8/22/11 16:31	UF	WTLAP-11-15744	33,200	26.3
E050.1	8/22/11 16:31	UF	WTLAP-11-15764	33,200	26.3
E050.1	8/22/11 16:32	UF	WTLAP-11-15767	32,600	26.2
E050.1	8/22/11 16:33	UF	WTLAP-11-15724	31,900	26.1
E050.1	8/22/11 16:34	UF	WTLAP-11-15759	31,200	26
E050.1	8/22/11 16:35	F	WTLAP-11-15758	30,500	25.9
E050.1	8/22/11 16:35	UF	WTLAP-11-15747	30,500	25.9
E050.1	8/22/11 16:51	UF	WTLAP-11-16079	19,500	22.9
E050.1	8/22/11 17:11	UF	WTLAP-11-16108	18,000	19.6
E050.1	8/22/11 17:31	UF	WTLAP-11-15749	16,700	17.1
E050.1	8/22/11 17:31	UF	WTLAP-11-16101	16,700	17.1

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E050.1	8/22/11 17:31	UF	WTLAP-11-25590	16,700	17.1
E050.1	8/22/11 18:11	UF	WTLAP-11-16071	14,000	13.9
E050.1	8/22/11 18:16	UF	WTLAP-11-15751	13,500	13.8
E050.1	8/22/11 18:16	UF	WTLAP-11-25594	13,500	13.8
E050.1	8/22/11 18:31	UF	WTLAP-11-16110	11,900	12.8
E050.1	8/22/11 18:51	UF	WTLAP-11-16106	17,400	11.9
E050.1	8/22/11 19:01	UF	WTLAP-11-15771	13,800	11.3
E050.1	8/22/11 19:01	UF	WTLAP-11-25629	13,800	11.3
E050.1	8/22/11 19:11	UF	WTLAP-11-16098	10,300	10.9
E050.1	8/22/11 19:31	UF	WTLAP-11-16073	5270	9.94
E050.1	9/4/11 19:36	UF	WTLAP-11-16027	29,600	54.4
E050.1	9/4/11 19:39	UF	WTLAP-11-16089	29,200	127
E050.1	9/4/11 19:42	UF	WTLAP-11-16055	34,100	166
E050.1	9/4/11 19:45	UF	WTLAP-11-16103	44,900	188
E050.1	9/4/11 19:48	UF	WTLAP-11-16045	39,000	182
E050.1	9/4/11 19:51	UF	WTLAP-11-16069	33,200	173
E050.1	9/4/11 19:57	UF	WTLAP-11-16031	59,200	147
E050.1	9/4/11 20:00	UF	WTLAP-11-16081	49,700	136
E050.1	9/4/11 20:03	UF	WTLAP-11-16104	46,900	127
E050.1	9/4/11 20:06	UF	WTLAP-11-16038	42,800	120
E050.1	9/4/11 20:26	UF	WTLAP-11-16054	38,100	83.8
E050.1	9/4/11 20:46	UF	WTLAP-11-16075	38,900	59
E050.1	9/4/11 21:06	UF	WTLAP-11-16052	20,700	36.7
E050.1	9/4/11 21:26	UF	WTLAP-11-16070	19,800	30
E050.1	9/4/11 21:41	UF	WTLAP-11-15732	17,400	26.9
E050.1	9/4/11 21:43	UF	WTLAP-11-15753	17,000	26.7
E050.1	9/4/11 21:44	UF	WTLAP-11-15728	16,900	26.6
E050.1	9/4/11 21:45	UF	WTLAP-11-15750	16,700	26.4
E050.1	9/4/11 22:06	UF	WTLAP-11-16091	13,300	23.3
E050.1	9/4/11 22:26	UF	WTLAP-11-16105	8460	20.9
E050.1	9/4/11 22:41	F	WTLAP-11-15756	8940	18.7
E050.1	9/4/11 22:41	UF	WTLAP-11-15737	8940	18.7
E050.1	9/4/11 22:41	UF	WTLAP-11-15768	8940	18.7
E050.1	9/4/11 22:46	UF	WTLAP-11-16023	9100	17.8
E050.1	9/4/11 23:06	UF	WTLAP-11-16077	10,500	14.9
E050.1	9/4/11 23:26	UF	WTLAP-11-15743	8870	13.1
E050.1	9/4/11 23:26	UF	WTLAP-11-16109	8870	13.1

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E050.1	9/4/11 23:26	UF	WTLAP-11-25613	8870	13.1
E050.1	9/4/11 23:46	UF	WTLAP-11-16048	5430	11.9
E050.1	9/5/11 0:06	UF	WTLAP-11-16037	5230	11
E050.1	9/5/11 0:11	UF	WTLAP-11-15762	5170	10.9
E050.1	9/5/11 0:11	UF	WTLAP-11-25622	5170	10.9
E050.1	9/5/11 0:26	UF	WTLAP-11-16032	4980	9.94
E050.1	9/7/11 12:41	UF	WTLAP-11-16102	8640	5.55
E050.1	9/7/11 12:44	UF	WTLAP-11-16099	11,500	6
E050.1	9/7/11 12:46	UF	WTLAP-11-15725	10,500	5.86
E050.1	9/7/11 12:47	F	WTLAP-11-15772	9960	5.57
E050.1	9/7/11 12:47	UF	WTLAP-11-15726	9960	5.57
E050.1	9/7/11 12:48	UF	WTLAP-11-15760	9450	5.27
E050.1	9/7/11 12:49	UF	WTLAP-11-15748	8930	4.98
E050.1	9/7/11 12:50	UF	WTLAP-11-15735	8420	4.69
E050.1	9/7/11 12:50	UF	WTLAP-11-15770	8420	4.69
E050.1	9/7/11 12:53	UF	WTLAP-11-16095	6880	4.83
E050.1	9/7/11 12:56	UF	WTLAP-11-16072	5340	4.7
E050.1	9/7/11 13:02	UF	WTLAP-11-16082	4370	3.57
E050.1	9/7/11 13:05	UF	WTLAP-11-16097	3270	3.21
E050.1	9/7/11 13:08	UF	WTLAP-11-16024	3490	2.88
E050.1	9/7/11 13:46	UF	WTLAP-11-16022	1790	2.01
E050.1	9/7/11 14:31	UF	WTLAP-11-16100	870	1.86
E050.1	9/7/11 15:11	UF	WTLAP-11-16028	1070	3.18
E050.1	9/7/11 15:16	UF	WTLAP-11-15769	1600	4.13
E050.1	9/7/11 15:16	UF	WTLAP-11-25630	1600	4.13
E050.1	9/7/11 15:31	UF	WTLAP-11-16041	3200	7.82
E050.1	9/7/11 15:51	UF	WTLAP-11-16096	2180	10.3
E050.1	9/7/11 16:11	UF	WTLAP-11-16042	1290	10.2
E050.1	9/7/11 16:31	UF	WTLAP-11-16044	1760	9.62
E050.1	9/7/11 16:51	UF	WTLAP-11-16066	1900	9
E050.1	9/7/11 17:11	UF	WTLAP-11-16058	1630	7.75
E050.1	9/7/11 17:31	UF	WTLAP-11-16065	3040	6.64
E050.1	9/10/11 1:46	UF	WTLAP-11-27291	815	5.36
E050.1	9/10/11 1:49	UF	WTLAP-11-27301	755	5.95
E050.1	9/10/11 1:51	UF	WTLAP-11-27493	771	6.2
E050.1	9/10/11 1:52	UF	WTLAP-11-27536	779	6.26
E050.1	9/10/11 1:52	UF	WTLAP-11-27565	779	6.26

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E050.1	9/10/11 1:54	UF	WTLAP-11-27549	795	6.37
E050.1	9/10/11 1:55	F	WTLAP-11-27571	802	6.42
E050.1	9/10/11 1:55	UF	WTLAP-11-27471	802	6.42
E050.1	9/10/11 1:55	UF	WTLAP-11-27583	802	6.42
E050.1	9/10/11 1:58	UF	WTLAP-11-27485	826	6.91
E050.1	9/10/11 2:01	UF	WTLAP-11-27333	850	7.47
E050.1	9/10/11 2:07	UF	WTLAP-11-27352	627	8.63
E050.1	9/10/11 2:10	UF	WTLAP-11-27326	860	9
E050.1	9/10/11 2:10	UF	WTLAP-11-27326	860	9
E050.1	9/10/11 2:13	UF	WTLAP-11-27336	855	9.37
E050.1	9/10/11 2:16	UF	WTLAP-11-27404	550	9.62
E050.1	9/10/11 2:36	UF	WTLAP-11-27410	945	10
E050.1	9/10/11 2:51	UF	WTLAP-11-27499	681	9.94
E050.1	9/10/11 2:51	UF	WTLAP-11-27533	681	9.94
E050.1	9/10/11 2:56	UF	WTLAP-11-27366	593	9.94
E050.1	9/10/11 3:16	UF	WTLAP-11-27402	875	9.62
E050.1	9/10/11 3:36	UF	WTLAP-11-27380	1020	9.37
E050.1	9/10/11 3:36	UF	WTLAP-11-27515	1020	9.37
E050.1	9/10/11 3:36	UF	WTLAP-11-27539	1020	9.37
E050.1	9/10/11 3:56	UF	WTLAP-11-27399	1410	12.17
E050.1	9/10/11 4:16	UF	WTLAP-11-27396	1480	13.5
E050.1	9/10/11 4:21	UF	WTLAP-11-27511	1570	13.4
E050.1	9/10/11 4:21	UF	WTLAP-11-27553	1570	13.4
E050.1	9/10/11 4:36	UF	WTLAP-11-27393	1850	13.1
E050.1	9/10/11 4:56	UF	WTLAP-11-27429	1450	13.2
E050.1	9/10/11 5:16	UF	WTLAP-11-27448	1780	15.1
E050.1	9/10/11 5:36	UF	WTLAP-11-27422	1260	13.8
E050.1	9/10/11 5:56	UF	WTLAP-11-27432	1590	12.7
E050.1	9/10/11 6:16	UF	WTLAP-11-27466	1470	11.2
E050.1	9/10/11 6:36	UF	WTLAP-11-27465	1340	10.2
E050.1	9/15/11 20:01	UF	WTLAP-11-27292	560	5.8
E050.1	9/15/11 20:04	UF	WTLAP-11-27304	540	6.27
E050.1	9/15/11 20:06	UF	WTLAP-11-27489	534	6.64
E050.1	9/15/11 20:07	F	WTLAP-11-27572	531	6.86
E050.1	9/15/11 20:07	UF	WTLAP-11-27542	531	6.86
E050.1	9/15/11 20:07	UF	WTLAP-11-27584	531	6.86
E050.1	9/15/11 20:09	UF	WTLAP-11-27545	525	7.3

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E050.1	9/15/11 20:10	UF	WTLAP-11-27472	522	7.52
E050.1	9/15/11 20:10	UF	WTLAP-11-27561	522	7.52
E050.1	9/15/11 20:13	UF	WTLAP-11-27481	513	8.41
E050.1	9/15/11 20:16	UF	WTLAP-11-27335	504	9.12
E050.1	9/15/11 20:22	UF	WTLAP-11-27327	558	9.88
E050.1	9/15/11 20:25	UF	WTLAP-11-27337	690	10.3
E050.1	9/15/11 20:28	UF	WTLAP-11-27338	680	10.5
E050.1	9/15/11 20:31	UF	WTLAP-11-27365	723	10.7
E050.1	9/15/11 20:51	UF	WTLAP-11-27394	585	11.2
E050.1	9/15/11 21:06	UF	WTLAP-11-27500	531	10.5
E050.1	9/15/11 21:06	UF	WTLAP-11-27541	531	10.5
E050.1	9/15/11 21:11	UF	WTLAP-11-27372	513	10.3
E050.1	9/15/11 21:31	UF	WTLAP-11-27417	473	9.56
E050.1	9/15/11 21:51	UF	WTLAP-11-27382	423	8.33
E050.1	9/15/11 21:51	UF	WTLAP-11-27516	423	8.33
E050.1	9/15/11 21:51	UF	WTLAP-11-27525	423	8.33
E050.1	9/15/11 22:11	UF	WTLAP-11-27375	400	7.18
E050.1	9/15/11 22:31	UF	WTLAP-11-27377	345	6.15
E050.1	9/15/11 22:36	UF	WTLAP-11-27507	342	6.15
E050.1	9/15/11 22:36	UF	WTLAP-11-27558	342	6.15
E050.1	9/15/11 22:51	UF	WTLAP-11-27391	333	6.1
E050.1	9/15/11 23:11	UF	WTLAP-11-27431	304	4.87
E050.1	9/15/11 23:31	UF	WTLAP-11-27423	288	3.98
E050.1	9/15/11 23:51	UF	WTLAP-11-27433	270	3.41
E050.1	9/16/11 0:11	UF	WTLAP-11-27434	290	3.02
E050.1	9/16/11 0:31	UF	WTLAP-11-27463	290	3.02
E050.1	9/16/11 0:51	UF	WTLAP-11-27455	278	3.02
E050.1	10/2/11 17:06	UF	WTLAP-11-27293	6320	5.35
E050.1	10/2/11 17:09	UF	WTLAP-11-27305	5280	5.95
E050.1	10/2/11 17:11	UF	WTLAP-11-27487	5150	6.31
E050.1	10/2/11 17:12	F	WTLAP-11-27573	5090	6.47
E050.1	10/2/11 17:12	UF	WTLAP-11-27524	5090	6.47
E050.1	10/2/11 17:12	UF	WTLAP-11-27585	5090	6.47
E050.1	10/2/11 17:13	UF	WTLAP-11-27543	5030	6.63
E050.1	10/2/11 17:14	UF	WTLAP-11-27473	4960	6.79
E050.1	10/2/11 17:15	UF	WTLAP-11-27559	4900	6.95
E050.1	10/2/11 17:18	UF	WTLAP-11-27479	4710	7.81

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E050.1	10/2/11 17:21	UF	WTLAP-11-27334	4520	8.63
E050.1	10/2/11 17:27	UF	WTLAP-11-27348	4440	9.88
E050.1	10/2/11 17:30	UF	WTLAP-11-27332	5060	10.3
E050.1	10/2/11 17:33	UF	WTLAP-11-27347	4960	10.5
E050.1	10/2/11 17:36	UF	WTLAP-11-27395	2980	10.6
E050.1	10/2/11 17:56	UF	WTLAP-11-27383	7400	10.6
E050.1	10/2/11 18:11	UF	WTLAP-11-27495	9650	10.2
E050.1	10/2/11 18:11	UF	WTLAP-11-27534	9650	10.2
E050.1	10/2/11 18:16	UF	WTLAP-11-27363	10,400	10.1
E050.1	10/2/11 18:36	UF	WTLAP-11-27408	4320	9.44
E050.1	10/2/11 18:56	UF	WTLAP-11-27360	4840	8.61
E050.1	10/2/11 18:56	UF	WTLAP-11-27512	4840	8.61
E050.1	10/2/11 18:56	UF	WTLAP-11-27526	4840	8.61
E050.1	10/2/11 19:16	UF	WTLAP-11-27401	3940	7.4
E050.1	10/2/11 19:36	UF	WTLAP-11-27403	4160	6.28
E050.1	10/2/11 19:41	UF	WTLAP-11-27514	4050	6.2
E050.1	10/2/11 19:41	UF	WTLAP-11-27551	4050	6.2
E050.1	10/2/11 19:56	UF	WTLAP-11-27413	3720	5.64
E050.1	10/2/11 20:16	UF	WTLAP-11-27430	5260	4.6
E050.1	10/2/11 20:36	UF	WTLAP-11-27444	3800	3.88
E050.1	10/2/11 20:56	UF	WTLAP-11-27428	3820	3.25
E050.1	10/2/11 21:16	UF	WTLAP-11-27443	3900	2.82
E050.1	10/2/11 21:36	UF	WTLAP-11-27456	3480	2.55
E050.1	10/2/11 21:56	UF	WTLAP-11-27461	3720	2.2
E050.1	10/4/11 23:31	UF	WTLAP-11-27294	2460	4.76
E050.1	10/4/11 23:34	UF	WTLAP-11-27302	2250	4.98
E050.1	10/4/11 23:36	UF	WTLAP-11-27492	2320	5.14
E050.1	10/4/11 23:37	F	WTLAP-11-27574	2350	5.22
E050.1	10/4/11 23:37	UF	WTLAP-11-27520	2350	5.22
E050.1	10/4/11 23:37	UF	WTLAP-11-27586	2350	5.22
E050.1	10/4/11 23:39	UF	WTLAP-11-27548	2410	5.37
E050.1	10/4/11 23:40	UF	WTLAP-11-27474	2440	5.45
E050.1	10/4/11 23:40	UF	WTLAP-11-27564	2440	5.45
E050.1	10/4/11 23:43	UF	WTLAP-11-27484	2540	5.55
E050.1	10/4/11 23:46	UF	WTLAP-11-27343	2640	5.69
E050.1	10/4/11 23:52	UF	WTLAP-11-27340	2440	6.08
E050.1	10/4/11 23:55	UF	WTLAP-11-27351	2080	6.18

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E050.1	10/4/11 23:58	UF	WTLAP-11-27344	2690	6.28
E055.5	8/19/11 14:03	UF	WTLAP-11-15648	2370	0.762
E059	8/19/11 16:04	UF	WTLAP-11-16180	19,600	13.2
E059	8/19/11 16:07	UF	WTLAP-11-25603	17,700	15.6
E059	8/19/11 16:10	UF	WTLAP-11-15790	15,900	16.8
E059	8/19/11 16:13	F	WTLAP-11-15811	14,000	16.8
E059	8/19/11 16:13	UF	WTLAP-11-15775	14,000	16.8
E059	8/19/11 16:16	UF	WTLAP-11-15807	12,200	16.8
E059	8/19/11 16:19	UF	WTLAP-11-16203	10,300	16.8
E059	8/19/11 16:25	UF	WTLAP-11-16151	6600	16.8
E059	8/21/11 16:24	UF	WTLAP-11-15794	21,900	104
E059	8/21/11 16:25	UF	WTLAP-11-16141	21,900	97.4
E059	8/21/11 16:25	UF	WTLAP-11-16141	21,900	97.4
E059	8/21/11 16:26	UF	WTLAP-11-15801	21,600	95
E059	8/21/11 16:27	UF	WTLAP-11-15809	21,400	92.6
E059	8/21/11 16:28	UF	WTLAP-11-15776	21,100	90.3
E059	8/21/11 17:24	UF	WTLAP-11-15798	6580	29.6
E059	8/21/11 17:24	UF	WTLAP-11-16121	6580	29.6
E109.9	7/22/11 15:57	n/a[e]	WTLAP-11-15879	363,000[f]	42.8
E109.9	7/22/11 15:57	n/a	WTLAP-11-15908	n/a	42.8
E109.9	7/22/11 15:58	n/a	WTLAP-11-15894	n/a	41.42
E109.9	7/22/11 15:59	n/a	WTLAP-11-15878	530,000[f]	40
E109.9	7/22/11 16:46	n/a	WTLAP-11-15893	527,000[f]	0.5
E109.9	7/28/11 16:21	UF	WTLAP-11-16319	127,000	12.5
E109.9	7/28/11 16:22	UF	WTLAP-11-16336	182,000	12.3
E109.9	7/28/11 16:23	n/a	WTLAP-11-25815	36,500	12.1
E109.9	7/28/11 16:23	UF	WTLAP-11-16339	36,500	12.1
E109.9	7/28/11 16:25	n/a	WTLAP-11-25899	41,400	11.6
E109.9	7/28/11 16:27	n/a	WTLAP-11-25811	46,300	11.2
E109.9	7/28/11 16:29	UF	WTLAP-11-16326	51,200	10.8
E109.9	7/28/11 16:30	n/a	WTLAP-11-25827	57,100	10.6
E109.9	7/28/11 16:35	n/a	WTLAP-11-25823	86,400	9.94
E109.9	7/28/11 16:37	UF	WTLAP-11-16335	98,200	9.81
E109.9	7/28/11 17:25	n/a	WTLAP-11-25808	124,000	9.62
E109.9	7/28/11 17:25	UF	WTLAP-11-16341	124,000	9.62
E109.9	8/3/11 15:05	UF	WTLAP-11-16306	170,000	0
E109.9	8/3/11 15:07	UF	WTLAP-11-16317	313,000	4.95

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E109.9	8/5/11 15:20	UF	WTLAP-11-16305	125,000	0
E109.9	8/5/11 15:22	UF	WTLAP-11-16318	74,000	3.48
E109.9	8/5/11 15:24	UF	WTLAP-11-16322	163,000	6.95
E109.9	8/5/11 15:26	UF	WTLAP-11-16327	123,000	9.66
E109.9	8/5/11 15:28	UF	WTLAP-11-16329	76,300	11.6
E109.9	8/5/11 15:30	UF	WTLAP-11-16352	41,600	13.5
E109.9	8/5/11 15:32	UF	WTLAP-11-16344	40,700	13.7
E109.9	8/5/11 15:33	F	WTLAP-11-15926	88,400	13.8
E109.9	8/5/11 15:33	UF	WTLAP-11-15881	88,400	13.8
E109.9	8/5/11 15:34	UF	WTLAP-11-15914	136,000	13.8
E109.9	8/5/11 15:34	UF	WTLAP-11-25866	136,000	13.8
E109.9	8/5/11 15:35	UF	WTLAP-11-15924	148,000	13.9
E109.9	8/5/11 15:36	UF	WTLAP-11-16337	161,000	13.9
E109.9	8/5/11 15:38	UF	WTLAP-11-25857	108,000	13.9
E109.9	8/5/11 15:46	UF	WTLAP-11-25855	36,100	18.8
E109.9	8/5/11 15:48	UF	WTLAP-11-16350	156,000	27.7
E109.9	8/5/11 15:50	UF	WTLAP-11-25870	159,000	36.6
E109.9	8/22/11 15:37	UF	WTLAP-11-26590	141,000	n/a
E109.9	8/22/11 15:38	UF	WTLAP-11-26474	134,000	n/a
E109.9	8/22/11 15:39	UF	WTLAP-11-26560	127,000	n/a
E109.9	8/22/11 15:40	UF	WTLAP-11-26487	119,000	n/a
E109.9	8/22/11 15:41	F	WTLAP-11-26580	112,000	n/a
E109.9	8/22/11 15:41	UF	WTLAP-11-26576	112,000	n/a
E109.9	8/22/11 15:42	UF	WTLAP-11-26568	105,000	n/a
E109.9	8/22/11 15:43	UF	WTLAP-11-26600	97,900	n/a
E109.9	8/22/11 15:45	UF	WTLAP-11-26546	83,500	n/a
E109.9	8/22/11 15:46	F	WTLAP-11-26614	76,300	n/a
E109.9	8/22/11 15:47	F	WTLAP-11-26628	69,100	n/a
E109.9	8/22/11 15:48	UF	WTLAP-11-26632	61,900	n/a
E109.9	8/26/11 17:12	UF	WTLAP-11-26591	74,700	2.4
E109.9	8/26/11 17:13	UF	WTLAP-11-26569	74,500	3.16
E109.9	8/26/11 17:14	UF	WTLAP-11-26492	74,300	3.91
E109.9	8/26/11 17:15	UF	WTLAP-11-26561	74,000	4.66
E109.9	8/26/11 17:16	F	WTLAP-11-26579	73,800	4.63
E109.9	8/26/11 17:16	UF	WTLAP-11-26577	73,800	4.63
E109.9	8/26/11 19:20	UF	WTLAP-11-26475	46,900	4.02
E109.9	8/26/11 19:21	UF	WTLAP-11-26547	46,700	4.02

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E109.9	8/26/11 19:22	UF	WTLAP-11-26631	46,500	4.02
E109.9	9/7/11 16:34	UF	WTLAP-11-26477	15,500	4.77
E109.9	9/7/11 16:34	UF	WTLAP-11-26563	15,500	4.77
E109.9	9/7/11 16:34	UF	WTLAP-11-26593	15,500	4.77
E109.9	9/7/11 16:35	UF	WTLAP-11-26500	15,800	4.76
E109.9	9/7/11 16:36	F	WTLAP-11-26582	16,000	4.62
E109.9	9/7/11 16:36	UF	WTLAP-11-26555	16,000	4.62
E109.9	9/7/11 16:36	UF	WTLAP-11-26571	16,000	4.62
E109.9	9/7/11 16:37	UF	WTLAP-11-26549	16,300	4.48
E109.9	9/7/11 16:37	UF	WTLAP-11-26633	16,300	4.48
E109.9	9/10/11 2:06	UF	WTLAP-11-26594	41,900	4.01
E109.9	9/10/11 2:07	UF	WTLAP-11-26478	35,800	4.61
E109.9	9/10/11 2:08	UF	WTLAP-11-26491	29,600	5.22
E109.9	9/10/11 2:08	UF	WTLAP-11-26630	29,600	5.22
E109.9	9/10/11 2:09	UF	WTLAP-11-26550	27,800	5.82
E109.9	9/10/11 2:10	UF	WTLAP-11-26559	26,000	6.42
E109.9	9/10/11 2:10	UF	WTLAP-11-26567	26,000	6.42
E109.9	9/10/11 2:11	F	WTLAP-11-26584	24,300	6.42
E109.9	9/10/11 2:11	UF	WTLAP-11-26575	24,300	6.42
E109.9	9/10/11 2:12	UF	WTLAP-11-26649	22,500	6.42
E109.9	9/10/11 2:14	UF	WTLAP-11-26653	21,300	6.42
E109.9	9/10/11 2:16	F	WTLAP-11-26615	21,600	6.42
E109.9	9/10/11 2:18	UF	WTLAP-11-26679	21,900	6.42
E109.9	9/10/11 2:20	F	WTLAP-11-26627	22,200	6.42
E109.9	9/10/11 2:22	UF	WTLAP-11-26664	22,600	6.42
E109.9	9/10/11 2:24	UF	WTLAP-11-26598	29,000	6.42
E109.9	9/10/11 2:26	UF	WTLAP-11-26663	35,300	6.42
E109.9	9/10/11 2:30	UF	WTLAP-11-26672	25,000	6.42
E109.9	9/10/11 2:32	UF	WTLAP-11-26608	32,300	6.42
E109.9	9/10/11 2:34	UF	WTLAP-11-26752	39,600	6.42
E109.9	9/10/11 2:56	UF	WTLAP-11-26709	31,900	6.69
E109.9	9/10/11 3:07	UF	WTLAP-11-26505	30,100	6.69
E109.9	9/10/11 3:07	UF	WTLAP-11-26507	30,100	6.69
E109.9	9/10/11 3:16	UF	WTLAP-11-26741	28,600	6.69
E109.9	9/10/11 3:36	UF	WTLAP-11-26723	21,900	6.69
E109.9	9/10/11 3:52	UF	WTLAP-11-26521	21,500	6.69
E109.9	9/10/11 3:52	UF	WTLAP-11-26529	21,500	6.69

Table 4.4-1 (continued)

Station	Sample Collection Date and Time	Field Prep	Sample ID	Calculated SSC (mg/L)	Calculated Instantaneous Discharge (cfs)
E109.9	9/10/11 3:56	UF	WTLAP-11-26714	21,400	6.69
E109.9	9/10/11 4:16	UF	WTLAP-11-26736	15,100	6.69

[a] UF = Unfiltered.

[b] na = Not available.

[c] F = Filtered.

[d] SSC estimated from uranium-238 activity, as described in section 4.4.

[e] n/a = Not applicable.

[f] SSC is estimated based on moisture content.

Table 4.4-2
Calculated Sediment Concentrations for Detected Inorganic Chemicals in LA/P 2011 Stormwater Samples

Station	Sample Collection Date and Time	SSC (mg/L)	Silver	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Cobalt	Chromium	Copper	Iron	Mercury	Manganese	Nickel	Lead	Antimony	Selenium	Thallium	Uranium	Vanadium	Zinc
Sediment BV (mg/kg)			**1**	**15400**	**0.83**	**127**	**1.41**	**0.4**	**4.73**	**10.5**	**11.2**	**13800**	**0.1**	**543**	**9.38**	**19.7**	**3.98**	**0.3**	**0.73**	**2.22**	**19.7**	**60.2**
CO101038[a]	10/2/11 14:08	14,900	0.058	7050	1.47	156	0.85	0.39	3.6	3.98	6.8	5890	—[b]	893	5.6	21	—	0.322	0.161	0.88	7.9	58.2
CO111041	8/19/11 13:26	723	—	12,300	3.46	170	1.31	0.93	4.3	15.4	37	7050	—	512	12	44	—	—	—	59.9	16	445
CO115002	10/7/11 23:25	43.1	5.1	57,900	—	1420	—	3.24	35	46.4	109	61,900	—	3570	83	195	—	—	—	8.34	109	547
CO115002	10/27/11 0:37	25.5	13	40,000	—	2410	—	—	—	—	188	59,300	—	4200	126	200	—	—	—	11	153	714
E026[a]	9/4/11 18:05	62,500	0.021	2930	0.5	237	0.96	0.36	4.4	0.89	1.5	1490	—	1980	3.1	4	0.024	0.058	0.078	0.26	2.6	40.3
E030	8/21/11 16:43	4540	0.22	20,500	3.92	311	2.49	0.99	8.3	12.8	21	9920	—	1350	13	60	—	1.01	0.353	2.42	21	173
E030[a]	8/22/11 14:13	46,300	0.071	10,800	1.75	471	0.68	0.56	6.7	3.91	4.6	5870	0.003	3000	5.3	16	0.03	—	0.196	0.99	6.1	64.8
E030[a]	9/4/11 19:13	29,800	0.097	18,200	2.26	472	2.94	0.74	9.4	5.06	6.9	8880	0.0871	2750	8.6	30	—	—	0.399	2.12	11	107
E030[a]	10/2/11 15:28	16,300	0.148	23,900	3.64	713	2.74	1.35	11	9.41	14	16,200	—	4180	14	40	—	0.682	0.332	2.07	19	179
E038	7/2/11 17:51	1360	0.64	35,900	12.2	765	2.94	2.5	22	40.5	151	46,000	—	1700	32	121	3.09	1.25	0.566	5.22	86	1790
E038	7/28/11 14:38	628	0.35	24,700	7.48	387	1.91	1.34	10	33	77	21,000	—	959	20	59	4.78	—	—	1.91	46	896
E038	8/2/11 22:40	182	—	33,600	13.2	418	2.58	1.59	8.8	33.5	109	24,800	—	918	28	79	11	—	—	2.69	57	791
E038	8/13/11 16:04	149	—	20,100	14.1	503	1.95	1.95	11	53.7	167	22,500	—	953	34	68	15.4	—	—	3.02	64	1100
E038	8/19/11 13:47	899	—	10,000	2.67	175	1.34	0.94	3.9	12.5	35	9380	—	464	8.6	44	1.45	—	—	1.11	18	320
E038	9/1/11 18:53	123	—	20,500	—	412	2.2	1.63	9	31.8	95	18,800	—	800	29	69	9.78	—	—	2.04	60	848
E038	9/4/11 18:17	200	—	17,100	—	199	1.75	0.9	7	13	59	11600	—	586	21	49	—	—	—	1.4	30	432
E039.1	8/1/11 12:48	502	—	37,300	9.57	283	3.19	1.24	—	37.1	61	7850	—	785	23	80	2.39	—	—	2.39	27	433
E039.1	8/4/11 16:47	296	—	34,200	11.2	399	2.84	3.25	8.1	34.8	61	30,500	—	876	20	76	5.07	—	—	2.2	56	501
E039.1	8/19/11 14:21	381	—	26,700	8.92	338	2.88	1.23	8.1	27.8	59	22,200	—	920	19	79	3.15	—	—	2.36	43	532
E039.1	9/15/11 18:44	122	—	42,600	18.1	417	2.79	1.07	8.2	42.7	67	19,200	—	1030	—	97	—	—	—	2.71	44	479
E042.1	8/19/11 16:07	6890	0.126	6470	1.84	130	1.32	0.62	3.9	6.34	12	6140	—	525	5.8	34	—	0.348	0.109	1.07	12	111
E042.1[a]	8/22/11 14:42	60,700	0.0346	4800	0.957	218	0.771	0.250	2.95	2.50	4.24	2730	0.0028	1420	4.20	8.19	—	0.0626	0.094	0.521	3.34	38.1
E042.1[a]	9/4/11 19:48	56,900	0.04	9700	1.19	327	1.68	0.49	5.8	3.6	5	4430	0.0012	1720	6.8	22	0.037	0.306	—	1.3	5.9	65
E042.1[a]	9/7/11 14:49	31,200	0.012	2170	0.4	126	0.72	0.27	2.3	0.85	1.8	814	—	615	2.3	5.7	—	0.112	0.048	0.26	3.2	29.9
E042.1[a]	10/2/11 16:15	21,800	0.022	4850	0.91	345	1.44	0.71	5.9	1.6	2.7	1720	0.0073	2360	5.3	7.2	—	0.087	0.073	0.35	5.1	75.1
E042.1[a]	10/4/11 22:13	10,100	0.032	5970	1.2	319	1.4	0.6	5.2	2.47	5.5	6080	—	1670	5.3	17	—	0.247	0.118	0.72	12	78.8
E050.1	8/21/11 19:31	1400	0.444	29,100	8.53	336	3.08	1.51	9.6	23.6	29	27,500	—	1100	22	77	—	—	0.659	2.37	40	261
E050.1[a]	8/22/11 16:35	30,500	0.069	11,300	2.09	564	2.19	0.72	9.9	5.51	8.1	5700	—	3480	9.1	21	—	0.269	0.236	1.26	9.1	121
E050.1	9/4/11 22:41	8940	0.145	24,000	3.48	777	5.77	1.3	13	12.2	19	12,400	—	3210	20	60	—	0.872	0.638	3.85	21	177
E050.1	9/7/11 12:47	9960	—	1320	0.88	155	0.83	0.32	3.1	0.69	2.3	631	—	700	2.7	8.7	—	—	—	0.31	3.5	42.3
E050.1	9/10/11 01:55	802	—	28,300	5.11	396	2.62	0.75	8.1	14.3	22	16,900	—	1280	15	53	—	—	—	2.87	27	177
E050.1	9/15/11 20:07	531	—	12,400	5.84	450	2.26	0.89	7.5	7.34	31	9490	—	1600		48	—	—	—	3.77	22	182
E050.1	10/2/11 17:12	5090	0.108	21,000	3.38	615	2.38	0.94	8.6	7.54	12	12400	—	2340	11	37	—	—	0.314	1.73	19	154
E050.1	10/4/11 23:37	2350	0.273	33,400	7.63	814	3.19	1.36	13	16.1	29	27,900	—	3030	20	70	—	1.41	0.639	2.9	38	244

Table 4.4-2 (continued)

Station	Sample Collection Date and Time	SSC (mg/L)	Silver	Aluminum	Arsenic	Barium	Beryllium	Cadmium	Cobalt	Chromium	Copper	Iron	Mercury	Manganese	Nickel	Lead	Antimony	Selenium	Thallium	Uranium	Vanadium	Zinc
Sediment BV (mg/kg)			**1**	**15400**	**0.83**	**127**	**1.41**	**0.4**	**4.73**	**10.5**	**11.2**	**13800**	**0.1**	**543**	**9.38**	**19.7**	**3.98**	**0.3**	**0.73**	**2.22**	**19.7**	**60.2**
E059[a]	8/19/11 16:13	14,000	0.037	1820	0.49	67.4	0.71	0.21	2	1.3	5.1	1500	—	323	2.2	14	—	—	—	0.51	4.5	42.2
E109.9[a]	8/5/11 15:33	88,400	0.035	—	1.29	156	0.37	0.25	2.1	2.06	4.2	2730	0.002	1180	2.4	9.5	—	0.089	0.069	0.79	3.9	33.1
E109.9[a]	8/22/11 15:41	112,000	0.032	3230	0.89	176	0.28	0.23	1.8	1.15	3.7	2190	0.0014	691	2.2	5.6	—	0.035	0.045	0.58	3.5	23.7
E109.9[a]	8/26/11 17:16	73,800	0.047	6040	1.44	283	0.61	0.31	3.7	3.25	5.3	3120	0.0012	1530	4.5	14	—	0.142	0.091	0.92	5.3	40.5
E109.9[a]	9/7/11 16:36	16,000	0.039	8050	1.09	160	1.14	0.37	4	3.01	4.1	4930	—	579	4.6	8.9	0.125	—	0.087	0.52	7.4	33.2
E109.9[a]	9/10/11 2:11	24,300	0.058	7660	1.26	304	1.38	0.6	7.3	3.61	6.2	8030	—	1380	9	13	0.066	—	0.115	1.12	14	70

Note: Calculated sediment concentrations are in units of mg/kg.

[a] Results with SSC greater than 5000 mg/L were underreported by the analytical laboratory.

[b] — = Result is not detected or rejected.

Table 4.4-3
Calculated Sediment Concentrations for
Detected Radionuclides in LA/P 2011 Stormwater Samples

Station	Sample Collection Date and Time	SSC (mg/L)	Americium-241	Cesium-137	Potassium-40	Plutonium-238	Plutonium-239/240	Radium-226	Radium-228	Strontium-90	Uranium-234	Uranium-238
Sediment BV (pCi/g)			**0.04**	**0.9**	**36.8**	**0.01**	**0.07**	**2.59**	**2.33**	**1.04**	**2.59**	**2.29**
CO101038[a]	10/2/11 14:10	12,600	NA[b]	NA	NA	NA	NA	NA	NA	NA	0.865	0.826
CO111041	8/19/11 14:07	436	NA	NA	NA	NA	NA	NA	NA	NA	23.1	26.6
CO115002	10/7/11 23:35	38.9	NA	NA	NA	NA	NA	NA	NA	NA	2.93	2.93
CO115002	10/27/11 0:43	21.2	NA	NA	NA	NA	NA	NA	NA	NA	nd[c]	nd
E026[a]	9/4/11 18:00	64,400	0.00225	nd	nd	nd	nd	NA	NA	NA	0.0208	0.0227
E026	9/4/11 18:02	63,600	NA	NA	NA	NA	NA	NA	NA	0.407	NA	NA
E030	8/21/11 16:39	5,010	nd	nd	nd	nd	2.25	NA	NA	NA	1.77	1.87
E030	8/21/11 16:40	4,890	NA	NA	NA	NA	NA	NA	NA	0.206	NA	NA
E030[a]	8/22/11 14:09	45,300	nd	nd	nd	nd	nd	NA	NA	NA	0.0113	0.00657
E030	8/22/11 14:10	45,600	NA	NA	NA	NA	NA	NA	NA	0.505	NA	NA
E030[a]	9/4/11 19:09	32,700	0.131	nd	3.15	nd	nd	NA	NA	NA	0.0364	0.0309
E030	9/4/11 19:10	32,000	NA	NA	NA	NA	NA	NA	NA	0.512	NA	NA
E030	10/2/11 15:24	18,400	0.101	nd	17.1	nd	0.42	NA	NA	NA	5.07	5.49
E030	10/2/11 15:25	17,900	NA	NA	NA	NA	NA	NA	NA	0.349	NA	NA
E038	7/2/11 17:47	1,640	NA	nd	nd	nd	0.148	NA	NA	NA	1.27	1.16
E038	7/2/11 17:50	1,410	NA	NA	NA	NA	NA	NA	NA	nd	NA	NA
E038	7/28/11 14:34	825	NA	nd	nd	nd	nd	NA	NA	NA	1.02	1.06
E038	7/28/11 14:39	634	NA	NA	NA	NA	NA	NA	NA	nd	NA	NA
E038	8/2/11 22:34	260	NA	nd	nd	nd	nd	NA	NA	NA	1.66	1.63
E038	8/2/11 22:38	186	NA	NA	NA	NA	NA	NA	NA	nd	NA	NA
E038	8/13/11 15:59	179	NA	NA	NA	NA	NA	NA	NA	nd	NA	NA
E038	8/13/11 16:00	173	NA	nd	nd	nd	nd	NA	NA	NA	1.59	1.79
E038	8/19/11 13:43	1,320	NA	nd	nd	nd	nd	NA	NA	NA	1.22	1.11
E038	8/19/11 13:44	1,170	NA	NA	NA	NA	NA	NA	NA	nd	NA	NA
E038	9/1/11 18:41	206	NA	nd	nd	nd	nd	NA	NA	NA	1.18	1.42
E038	9/1/11 18:44	179	NA	NA	NA	NA	NA	NA	NA	8.38	NA	NA
E038	9/4/11 18:13	217	NA	nd	nd	nd	nd	NA	NA	NA	2.18	1.78
E038	9/4/11 18:14	212	NA	NA	NA	NA	NA	NA	NA	nd	NA	NA
E039.1	8/1/11 12:39	550	NA	nd	nd	nd	1.07	NA	NA	NA	2.13	2.29
E039.1	8/1/11 12:42	547	NA	NA	NA	NA	NA	NA	NA	3.96	NA	NA
E039.1	8/4/11 16:48	285	NA	nd	nd	nd	nd	NA	NA	NA	1.94	2.14
E039.1	8/4/11 16:51	253	NA	NA	NA	NA	NA	NA	NA	nd	NA	NA

Table 4.4-3 (continued)

Station	Sample Collection Date and Time	SSC (mg/L)	Americium-241	Cesium-137	Potassium-40	Plutonium-238	Plutonium-239/240	Radium-226	Radium-228	Strontium-90	Uranium-234	Uranium-238
Sediment BV (pCi/g)			**0.04**	**0.9**	**36.8**	**0.01**	**0.07**	**2.59**	**2.33**	**1.04**	**2.59**	**2.29**
E039.1	8/19/11 14:17	617	nd	nd	nd	nd	nd	NA	NA	NA	1.6	1.45
E039.1	8/19/11 14:18	547	NA	NA	NA	NA	NA	NA	NA	4.26	NA	NA
E039.1	9/15/11 18:40	147	NA	nd	nd	nd	nd	NA	NA	NA	2.78	2.35
E039.1	9/15/11 18:41	141	NA	NA	NA	NA	NA	NA	NA	11.4	NA	NA
E042.1	8/19/11 16:04	7,050	1.49	nd	nd	0.0864	0.817	NA	NA	NA	1.48	1.14
E042.1	8/19/11 16:05	7,000	NA	NA	NA	NA	NA	NA	NA	2.32	NA	NA
E042.1	8/22/11 14:39	60,700[d]	0.257	nd	1.81	0.0588	1.63	NA	NA	NA	6.55	6.59
E042.1	8/22/11 14:40	60,700[d]	NA	NA	NA	NA	NA	NA	NA	0.568	NA	NA
E042.1	8/22/11 15:38	51,100	0.235	nd	nd	0.0465	0.665	NA	NA	NA	7.76	7.94
E042.1	8/22/11 16:23	42,700	0.233	nd	nd	nd	0.594	NA	NA	NA	6.18	6.55
E042.1	8/22/11 17:08	55,300	0.139	nd	2.93	nd	0.4	NA	NA	NA	5.14	5.28
E042.1	9/4/11 19:43	81,800	NA	NA	NA	NA	NA	0.609	0.207	NA	NA	NA
E042.1	9/4/11 19:45	71,900	0.08	nd	nd	nd	0.216	NA	NA	NA	2.69	2.59
E042.1	9/4/11 19:46	66,900	NA	NA	NA	NA	NA	NA	NA	0.229	NA	NA
E042.1	9/4/11 20:44	33,800	nd	nd	nd	nd	0.247	NA	NA	NA	4.25	4.22
E042.1	9/4/11 21:29	26,100	nd	nd	nd	nd	0.32	NA	NA	NA	5.13	4.97
E042.1	9/4/11 22:14	22,800	0.104	nd	6.2	nd	0.207	NA	NA	NA	3.16	3.17
E042.1	9/7/11 14:55	14,900	NA	NA	NA	NA	NA	0.501	1.38	NA	NA	NA
E042.1[a]	9/7/11 14:56	14,300	0.0715	nd	5.67	nd	0.356	NA	NA	NA	0.371	0.329
E042.1	9/7/11 14:57	13,700	NA	NA	NA	NA	NA	NA	NA	nd	NA	NA
E042.1	10/2/11 16:16	21,800	NA	NA	NA	NA	NA	NA	NA	0.171	NA	NA
E042.1	10/2/11 16:18	21,600	nd	1.03	20.1	nd	0.283	NA	NA	NA	3.01	3.12
E042.1	10/4/11 22:10	10,200	NA	NA	NA	NA	NA	0.686	0.368	NA	NA	NA
E042.1	10/4/11 22:15	10,100	0.042	1.17	12.4	nd	0.137	NA	NA	NA	1.08	1.04
E042.1	10/4/11 22:17	10,000	NA	NA	NA	NA	NA	NA	NA	0.335	NA	NA
E050.1	8/21/11 17:23	2,760	NA	NA	NA	NA	NA	0.974	1.97	NA	NA	NA
E050.1	8/21/11 18:32	2,140	0.616	nd	nd	0.0287	0.294	NA	NA	NA	0.714	0.63
E050.1	8/21/11 18:34	2,110	NA	NA	NA	NA	NA	NA	NA	2.84	NA	NA
E050.1	8/21/11 20:16	448	1.61	nd	nd	0.0652	0.91	NA	NA	NA	2.04	1.85
E050.1	8/21/11 21:01	778	0.88	nd	nd	nd	0.329	NA	NA	NA	1.01	0.967
E050.1[a]	8/22/11 16:32	32,600	0.00786	nd	nd	nd	nd	NA	NA	NA	0.0617	0.051
E050.1	8/22/11 16:33	31,900	NA	NA	NA	NA	NA	NA	NA	0.941	NA	NA
E050.1[a]	8/22/11 17:31	16,700	nd	nd	nd	nd	nd	0.816	0.798	NA	0.0732	0.0684

Table 4.4-3 (continued)

Station	Sample Collection Date and Time	SSC (mg/L)	Americium-241	Cesium-137	Potassium-40	Plutonium-238	Plutonium-239/240	Radium-226	Radium-228	Strontium-90	Uranium-234	Uranium-238
Sediment BV (pCi/g)			**0.04**	**0.9**	**36.8**	**0.01**	**0.07**	**2.59**	**2.33**	**1.04**	**2.59**	**2.29**
E050.1[a]	8/22/11 18:16	13,500	0.024	nd	nd	nd	nd	NA	NA	NA	0.128	0.125
E050.1[a]	8/22/11 19:01	13,800	0.0232	nd	nd	nd	nd	NA	NA	NA	0.168	0.141
E050.1	9/4/11 19:48	39,000	NA	NA	NA	NA	NA	1.05	0.241	NA	NA	NA
E050.1[a]	9/4/11 21:43	17,000	0.0193	nd	nd	nd	nd	NA	NA	NA	0.244	0.22
E050.1	9/4/11 21:44	16,900	NA	NA	NA	NA	NA	NA	NA	0.676	NA	NA
E050.1[a]	9/4/11 23:26	8,870	0.0316	nd	nd	nd	nd	NA	NA	NA	0.484	0.414
E050.1[a]	9/5/11 0:11	5,170	0.0453	nd	nd	nd	nd	NA	NA	NA	0.73	0.625
E050.1[a]	9/7/11 12:48	9,450	0.0125	nd	nd	nd	nd	NA	NA	NA	0.183	0.179
E050.1	9/7/11 12:49	8,930	NA	NA	NA	NA	NA	NA	NA	0.194	NA	NA
E050.1	9/7/11 12:53	6,880	NA	NA	NA	NA	NA	0.529	1.32	NA	NA	NA
E050.1	9/7/11 15:16	1,600	0.05	nd	nd	nd	nd	NA	NA	NA	1.17	0.973
E050.1	9/7/11 15:51	2,180	NA	NA	NA	NA	NA	1.38	1.51	NA	NA	NA
E050.1	9/10/11 01:52	779	nd	nd	nd	nd	0.187	NA	NA	NA	1.28	0.958
E050.1	9/10/11 01:54	795	0.31	nd	nd	nd	0.456	NA	NA	5.22	2.28	1.76
E050.1	9/10/11 01:58	826	NA	NA	NA	NA	NA	1.31	4.13	NA	NA	NA
E050.1	9/10/11 02:51	681	nd	nd	nd	nd	0.238	NA	NA	NA	1.46	1.4
E050.1	9/10/11 03:36	1,020	0.255	nd	nd	nd	0.428	NA	NA	NA	2.25	2.07
E050.1	9/10/11 04:21	1,570	nd	nd	nd	nd	0.0801	NA	NA	nd	1.28	1.33
E050.1	9/15/11 20:07	531	0.478	nd	nd	nd	0.889	NA	NA	NA	3.48	3.31
E050.1	9/15/11 20:09	525	NA	NA	NA	NA	NA	NA	NA	8.67	NA	NA
E050.1	9/15/11 20:13	513	NA	NA	NA	NA	NA	1.12	nd	NA	NA	NA
E050.1	9/15/11 21:06	531	0.623	nd	nd	nd	0.925	NA	NA	NA	2.58	2.5
E050.1	9/15/11 21:51	423	0.551	nd	nd	nd	0.78	NA	NA	NA	2.72	2.43
E050.1	9/15/11 22:36	342	0.693	nd	nd	nd	0.833	NA	NA	NA	2.88	2.76
E050.1	10/2/11 17:12	5,090	0.0992	2.24	nd	nd	0.322	NA	NA	NA	3.61	3.67
E050.1	10/2/11 17:13	5,030	NA	NA	NA	NA	NA	NA	NA	0.549	NA	NA
E050.1	10/2/11 17:18	4,710	NA	NA	NA	NA	NA	1.67	0.533	NA	NA	NA
E050.1	10/2/11 18:11	9,650	nd	0.798	nd	nd	0.109	NA	NA	NA	0.952	1.08
E050.1	10/2/11 18:56	4,840	nd	2.98	52.1	nd	0.194	NA	NA	NA	2.4	2.23
E050.1	10/2/11 19:41	4,050	nd	3.43	37.5	nd	0.215	NA	NA	NA	2.42	2.54
E050.1	10/4/11 23:37	2,350	0.0937	3.8	57.1	nd	0.222	NA	NA	NA	2.56	2.54
E050.1	10/4/11 23:39	2,410	NA	NA	NA	NA	NA	NA	NA	0.775	NA	NA
E050.1	10/4/11 23:43	2,540	NA	NA	NA	NA	NA	1.64	0.743	NA	NA	NA
E059[a]	8/19/11 16:07	17,700	0.0486	nd	nd	nd	0.0975	NA	NA	NA	0.133	0.132

Table 4.4-3 (continued)

Station	Sample Collection Date and Time	SSC (mg/L)	Americium-241	Cesium-137	Potassium-40	Plutonium-238	Plutonium-239/240	Radium-226	Radium-228	Strontium-90	Uranium-234	Uranium-238
Sediment BV (pCi/g)			**0.04**	**0.9**	**36.8**	**0.01**	**0.07**	**2.59**	**2.33**	**1.04**	**2.59**	**2.29**
E059	8/19/11 16:10	15,900	NA	NA	NA	NA	NA	NA	NA	0.0957	NA	NA
E059	8/19/11 16:19	10,300	NA	NA	NA	NA	NA	0.333	0.46	NA	NA	NA
E059[a]	8/21/11 16:26	21,600	0.0878	nd	nd	nd	0.0744	NA	NA	NA	0.198	0.179
E059	8/21/11 16:28	21,100	NA	NA	NA	NA	NA	NA	NA	0.08	NA	NA
E109.9	8/5/11 15:34	136,000	0.0438	nd	nd	nd	0.124	NA	NA	NA	1.94	1.85
E109.9	8/22/11 15:40	119,000	0.114	nd	1.05	0.0418	0.314	NA	NA	NA	3.12	3.38
E109.9	8/22/11 15:43	97,900	NA	NA	NA	NA	NA	0.561	0.554	NA	NA	NA
E109.9	8/22/11 15:45	83,500	NA	NA	NA	NA	NA	NA	NA	0.558	NA	NA
E109.9[a]	8/26/11 17:14	74,300	0.00438	nd	nd	nd	nd	NA	NA	NA	0.0316	0.0306
E109.9	8/26/11 19:21	46,700	NA	NA	NA	NA	NA	NA	NA	0.569	NA	NA
E109.9[a]	9/7/11 16:35	15,800	0.00901	nd	nd	nd	nd	NA	NA	NA	0.127	0.119
E109.9	9/7/11 16:37	16,300	NA	NA	NA	NA	NA	NA	NA	0.209	NA	NA
E109.9[a]	9/10/11 2:08	29,600	0.00325	nd	nd	nd	nd	NA	NA	NA	0.137	0.103
E109.9	9/10/11 2:09	27,800	NA	NA	NA	NA	NA	NA	NA	0.296	NA	NA
E109.9	9/10/11 2:24	29,000	NA	NA	NA	NA	NA	0.542	0.839	NA	NA	NA
E109.9	9/10/11 2:32	32,300	NA	NA	NA	NA	NA	0.926	0.858	NA	NA	NA
E109.9[a]	9/10/11 3:07	30,100	0.00927	nd	nd	nd	nd	NA	NA	NA	0.1	0.0854
E109.9[a]	9/10/11 3:52	21,500	0.00767	nd	nd	nd	nd	NA	NA	NA	0.137	0.111

Note: Calculated sediment concentrations are in units of pCi/g.

[a] Isotopic americium, plutonium, and uranium concentrations are underestimated in samples with sediment concentrations greater than 5000 mg/L and unmodified sample preparation procedures.

[b] NA = Not analyzed.

[c] nd = Not detected.

[d] SSC estimated from uranium-238 activity, as described in section 4.4.

Table 4.4-4
Calculated Sediment Concentrations for Total PCBs in LA/P 2011 Stormwater Samples

Station	Sample Collection Date and Time	SSC (mg/L)	Total PCBs (pg/g)
CO101038	10/2/11 14:11	11,400	1010
CO111041	8/19/11 14:09	426	21,300,000
CO115002	10/7/11 23:27	42.3	85,800
CO115002	10/27/11 0:39	24.1	280,000
E026	9/4/11 17:59	64,800	2390
E030	8/21/11 16:37	5250	14,400
E030	8/22/11 14:07	44,800	21,300
E030	9/4/11 19:07	34,200	6790
E030	10/2/11 15:22	19,500	1310
E038	7/2/11 17:48	1520	66,400
E038	7/28/11 14:32	905	47,100
E038	8/2/11 22:32	296	64,500
E038	8/13/11 15:57	191	48,400
E038	8/19/11 13:41	1510	16,100
E038	9/4/11 18:11	225	49,200
E039.1	8/4/11 16:45	317	55,800
E039.1	8/19/11 14:19	478	45,800
E039.1	9/15/11 18:38	160	79,500
E042.1	8/19/11 17:03	3950	38,000
E042.1	8/22/11 14:38	60,700*	11,000
E042.1	8/22/11 15:38	51,100	10,400
E042.1	8/22/11 16:23	42,700	2810
E042.1	8/22/11 17:08	55,300	1880
E042.1	9/4/11 19:44	76,800	2320
E042.1	9/4/11 20:44	33,800	4870
E042.1	9/4/11 21:29	26,100	7650
E042.1	9/4/11 22:14	22,800	14,900
E042.1	9/7/11 14:54	15,500	1610
E042.1	10/2/11 16:17	21,700	1000
E042.1	10/4/11 22:14	10,100	5820
E050.1	8/21/11 18:31	2160	66,300
E050.1	8/21/11 20:16	448	475,000
E050.1	8/21/11 21:01	778	207,000
E050.1	8/22/11 16:31	33,200	12,200
E050.1	8/22/11 17:31	16,700	9540
E050.1	8/22/11 18:16	13,500	15,700
E050.1	9/4/11 21:41	17,400	11,900

Table 4.4-4 (continued)

Station	Sample Collection Date and Time	SSC (mg/L)	Total PCBs (pg/g)
E050.1	9/4/11 23:26	8870	6140
E050.1	9/5/11 0:11	5170	2090
E050.1	9/7/11 12:46	10,500	2210
E050.1	9/7/11 15:16	1600	9170
E050.1	9/10/11 01:51	771	35,800
E050.1	9/10/11 02:51	681	57,700
E050.1	9/10/11 03:36	1020	36,600
E050.1	9/10/11 04:21	1570	16,500
E050.1	9/15/11 20:06	534	55,100
E050.1	9/15/11 21:06	531	60,300
E050.1	9/15/11 21:51	423	88,900
E050.1	9/15/11 22:36	342	119,000
E050.1	10/2/11 17:11	5150	2450
E050.1	10/2/11 18:11	9650	1100
E050.1	10/2/11 18:56	4840	2170
E050.1	10/2/11 19:41	4050	2280
E050.1	10/4/11 23:36	2320	7990
E055.5	8/19/11 14:05	2370	25,500
E059	8/21/11 16:24	21,900	78,500
E059	8/21/11 17:24	6580	35,000
E109.9	8/22/11 15:38	134,000	1990
E109.9	8/26/11 19:20	46,900	6430
E109.9	9/7/11 16:34	15,500	364
E109.9	9/10/11 2:07	35,800	1380
E109.9	9/10/11 3:07	30,100	499
E109.9	9/10/11 3:52	21,500	791

* SSC estimated from uranium-238 activity, as described in section 4.4.

Table 4.5-1
Analytical Results Obtained below the SWMU 01-001(f) Drainage

Sample Location	Analyte	Sample ID	Field Prep	Result[a]	Unit
CO101038	Aluminum	WTLAP-11-25928	F[b]	168	µg/L
CO101038	Aluminum	WTLAP-11-25932	UF[c]	105,000	µg/L
CO101038	Antimony	WTLAP-11-25928	F	<1	µg/L
CO101038	Antimony	WTLAP-11-25932	UF	<1	µg/L
CO101038	Arsenic	WTLAP-11-25928	F	2	µg/L
CO101038	Arsenic	WTLAP-11-25932	UF	21.9	µg/L
CO101038	Barium	WTLAP-11-25928	F	82.5	µg/L
CO101038	Barium	WTLAP-11-25932	UF	2330	µg/L
CO101038	Beryllium	WTLAP-11-25928	F	<0.2	µg/L
CO101038	Beryllium	WTLAP-11-25932	UF	12.6	µg/L
CO101038	Boron	WTLAP-11-25928	F	24.2	µg/L
CO101038	Boron	WTLAP-11-25932	UF	66.8	µg/L
CO101038	Cadmium	WTLAP-11-25928	F	<0.11	µg/L
CO101038	Cadmium	WTLAP-11-25932	UF	5.8	µg/L
CO101038	Calcium	WTLAP-11-25928	F	35.4	mg/L
CO101038	Calcium	WTLAP-11-25932	UF	122	mg/L
CO101038	Chromium	WTLAP-11-25928	F	<2	µg/L
CO101038	Chromium	WTLAP-11-25932	UF	59.3	µg/L
CO101038	Cobalt	WTLAP-11-25928	F	3.1	µg/L
CO101038	Cobalt	WTLAP-11-25932	UF	53.5	µg/L
CO101038	Copper	WTLAP-11-25928	F	1.3	µg/L
CO101038	Copper	WTLAP-11-25932	UF	101	µg/L
CO101038	Gross alpha	WTLAP-11-25936	UF	37.9	pCi/L
CO101038	Gross beta	WTLAP-11-25936	UF	81.7	pCi/L
CO101038	Hardness	WTLAP-11-25928	F	117	mg/L
CO101038	Hardness	WTLAP-11-25932	UF	423	mg/L
CO101038	Iron	WTLAP-11-25928	F	102	µg/L
CO101038	Iron	WTLAP-11-25932	UF	87,800	µg/L
CO101038	Lead	WTLAP-11-25928	F	<0.5	µg/L
CO101038	Lead	WTLAP-11-25932	UF	309	µg/L
CO101038	Magnesium	WTLAP-11-25928	F	6.91	mg/L
CO101038	Magnesium	WTLAP-11-25932	UF	28.9	mg/L
CO101038	Manganese	WTLAP-11-25928	F	19.8	µg/L
CO101038	Manganese	WTLAP-11-25932	UF	13,300	µg/L
CO101038	Mercury	WTLAP-11-25928	F	<0.066	µg/L
CO101038	Mercury	WTLAP-11-25932	UF	<0.066	µg/L
CO101038	Nickel	WTLAP-11-25928	F	1.8	µg/L
CO101038	Nickel	WTLAP-11-25932	UF	82.8	µg/L

Table 4.5-1 (continued)

Sample Location	Analyte	Sample ID	Field Prep	Result[a]	Unit
CO101038	Potassium	WTLAP-11-25928	F	7.73	mg/L
CO101038	Potassium	WTLAP-11-25932	UF	26.6	mg/L
CO101038	Selenium	WTLAP-11-25928	F	<1.5	µg/L
CO101038	Selenium	WTLAP-11-25932	UF	4.8	µg/L
CO101038	Silver	WTLAP-11-25928	F	<0.2	µg/L
CO101038	Silver	WTLAP-11-25932	UF	0.87	µg/L
CO101038	Sodium	WTLAP-11-25928	F	63.5	mg/L
CO101038	Sodium	WTLAP-11-25932	UF	68.8	mg/L
CO101038	SSC	WTLAP-11-25940	UF	17,200	mg/L
CO101038	SSC	WTLAP-11-25946	UF	9140	mg/L
CO101038	Thallium	WTLAP-11-25928	F	<0.45	µg/L
CO101038	Thallium	WTLAP-11-25932	UF	2.4	µg/L
CO101038	Total Organic Carbon	WTLAP-12-14	UF	9.99	mg/L
CO101038	Total PCB	WTLAP-11-25950	UF	0.0116	µg/L
CO101038	Uranium	WTLAP-11-25928	F	1.7	µg/L
CO101038	Uranium	WTLAP-11-25932	UF	13.1	µg/L
CO101038	Uranium-234	WTLAP-11-25952	UF	10.9	pCi/L
CO101038	Uranium-235/236	WTLAP-11-25952	UF	0.573	pCi/L
CO101038	Uranium-238	WTLAP-11-25952	UF	10.4	pCi/L
CO101038	Vanadium	WTLAP-11-25928	F	1.6	µg/L
CO101038	Vanadium	WTLAP-11-25932	UF	118	µg/L
CO101038	Zinc	WTLAP-11-25928	F	<3.3	µg/L
CO101038	Zinc	WTLAP-11-25932	UF	867	µg/L
CO111041	Aluminum	WTLAP-11-25977	F	206	µg/L
CO111041	Aluminum	WTLAP-11-25961	UF	8860	µg/L
CO111041	Antimony	WTLAP-11-25977	F	<2.3	µg/L
CO111041	Antimony	WTLAP-11-25961	UF	<3.1	µg/L
CO111041	Arsenic	WTLAP-11-25977	F	<1.7	µg/L
CO111041	Arsenic	WTLAP-11-25961	UF	2.5	µg/L
CO111041	Barium	WTLAP-11-25977	F	18	µg/L
CO111041	Barium	WTLAP-11-25961	UF	123	µg/L
CO111041	Beryllium	WTLAP-11-25977	F	<0.2	µg/L
CO111041	Beryllium	WTLAP-11-25961	UF	0.95	µg/L
CO111041	Boron	WTLAP-11-25977	F	<15	µg/L
CO111041	Boron	WTLAP-11-25961	UF	<15	µg/L
CO111041	Cadmium	WTLAP-11-25977	F	<0.11	µg/L
CO111041	Cadmium	WTLAP-11-25961	UF	0.67	µg/L
CO111041	Calcium	WTLAP-11-25977	F	7.07	mg/L

Table 4.5-1 (continued)

Sample Location	Analyte	Sample ID	Field Prep	Result[a]	Unit
CO111041	Calcium	WTLAP-11-25961	U	12.3	mg/L
CO111041	Chromium	WTLAP-11-25977	F	2.2	µg/L
CO111041	Chromium	WTLAP-11-25961	UF	11.1	µg/L
CO111041	Cobalt	WTLAP-11-25977	F	<1	µg/L
CO111041	Cobalt	WTLAP-11-25961	UF	3.1	µg/L
CO111041	Copper	WTLAP-11-25977	F	4.2	µg/L
CO111041	Copper	WTLAP-11-25961	UF	27	µg/L
CO111041	Gross alpha	WTLAP-11-25957	UF	41.3	pCi/L
CO111041	Gross beta	WTLAP-11-25957	UF	58.3	pCi/L
CO111041	Hardness	WTLAP-11-25977	F	20.6	mg/L
CO111041	Hardness	WTLAP-11-25961	UF	40.2	mg/L
CO111041	Iron	WTLAP-11-25977	F	122	µg/L
CO111041	Iron	WTLAP-11-25961	UF	5100	µg/L
CO111041	Lead	WTLAP-11-25977	F	<0.5	µg/L
CO111041	Lead	WTLAP-11-25961	UF	31.9	µg/L
CO111041	Magnesium	WTLAP-11-25977	F	0.72	mg/L
CO111041	Magnesium	WTLAP-11-25961	UF	2.32	mg/L
CO111041	Manganese	WTLAP-11-25977	F	4.6	µg/L
CO111041	Manganese	WTLAP-11-25961	UF	370	µg/L
CO111041	Mercury	WTLAP-11-25977	F	<0.066	µg/L
CO111041	Mercury	WTLAP-11-25961	UF	<0.066	µg/L
CO111041	Nickel	WTLAP-11-25977	F	1.3	µg/L
CO111041	Nickel	WTLAP-11-25961	UF	8.4	µg/L
CO111041	Potassium	WTLAP-11-25977	F	2.25	mg/L
CO111041	Potassium	WTLAP-11-25961	UF	4.07	mg/L
CO111041	Selenium	WTLAP-11-25977	F	<1.5	µg/L
CO111041	Selenium	WTLAP-11-25961	UF	<1.5	µg/L
CO111041	Silver	WTLAP-11-25977	F	<0.2	µg/L
CO111041	Silver	WTLAP-11-25961	UF	<0.2	µg/L
CO111041	Sodium	WTLAP-11-25977	F	3.81	mg/L
CO111041	Sodium	WTLAP-11-25961	UF	4.5	mg/L
CO111041	SSC	WTLAP-11-25976	UF	936	mg/L
CO111041	SSC	WTLAP-11-25975	UF	652	mg/L
CO111041	SSC	WTLAP-11-26460	UF	404	mg/L
CO111041	Thallium	WTLAP-11-25977	F	<0.45	µg/L
CO111041	Thallium	WTLAP-11-25961	UF	<0.45	µg/L
CO111041	Total Organic Carbon	WTLAP-11-26459	UF	6.76	mg/L
CO111041	Total PCB	WTLAP-11-25978	UF	9.07	µg/L

Table 4.5-1 (continued)

Sample Location	Analyte	Sample ID	Field Prep	Result[a]	Unit
CO111041	Uranium	WTLAP-11-25977	F	0.99	µg/L
CO111041	Uranium	WTLAP-11-25961	UF	43.3	µg/L
CO111041	Uranium-234	WTLAP-11-25979	UF	10.1	pCi/L
CO111041	Uranium-235/236	WTLAP-11-25979	UF	0.312	pCi/L
CO111041	Uranium-238	WTLAP-11-25979	UF	11.6	pCi/L
CO111041	Vanadium	WTLAP-11-25977	F	1.9	µg/L
CO111041	Vanadium	WTLAP-11-25961	UF	11.4	µg/L
CO111041	Zinc	WTLAP-11-25977	F	25.5	µg/L
CO111041	Zinc	WTLAP-11-25961	UF	322	µg/L

[a] < = Nondetected result.

[b] F= Filtered.

[c] UF= Unfiltered.

Table 4.5-2
Analytical Results from Graduation Canyon

Sample Location	Analyte	Sample ID	Field Prep	Result[a]	Unit
CO115002	Aluminum	WTLAP-11-28066	F[b]	247	µg/L
CO115002	Aluminum	WTLAP-11-28065	F[c]	960	µg/L
CO115002	Aluminum	WTLAP-11-28069	UF	2500	µg/L
CO115002	Aluminum	WTLAP-11-28070	UF	1020	µg/L
CO115002	Antimony	WTLAP-11-28065	F	<1	µg/L
CO115002	Antimony	WTLAP-11-28066	F	<1	µg/L
CO115002	Antimony	WTLAP-11-28069	UF	<1	µg/L
CO115002	Antimony	WTLAP-11-28070	UF	<1	µg/L
CO115002	Arsenic	WTLAP-11-28066	F	<1.7	µg/L
CO115002	Arsenic	WTLAP-11-28065	F	<1.7	µg/L
CO115002	Arsenic	WTLAP-11-28069	UF	<1.7	µg/L
CO115002	Arsenic	WTLAP-11-28070	UF	<1.7	µg/L
CO115002	Barium	WTLAP-11-28066	F	49.2	µg/L
CO115002	Barium	WTLAP-11-28065	F	39.8	µg/L
CO115002	Barium	WTLAP-11-28070	UF	61.4	µg/L
CO115002	Barium	WTLAP-11-28069	UF	61.2	µg/L
CO115002	Beryllium	WTLAP-11-28065	F	<0.2	µg/L
CO115002	Beryllium	WTLAP-11-28066	F	<0.2	µg/L
CO115002	Beryllium	WTLAP-11-28069	UF	<0.2	µg/L
CO115002	Beryllium	WTLAP-11-28070	UF	<0.2	µg/L
CO115002	Boron	WTLAP-11-28065	F	16.1	µg/L
CO115002	Boron	WTLAP-11-28066	F	17.9	µg/L

Table 4.5-2 (continued)

Sample Location	Analyte	Sample ID	Field Prep	Result[a]	Unit
CO115002	Boron	WTLAP-11-28069	UF	17.5	µg/L
CO115002	Boron	WTLAP-11-28070	UF	17.4	µg/L
CO115002	Cadmium	WTLAP-11-28066	F	<0.11	µg/L
CO115002	Cadmium	WTLAP-11-28065	F	<0.11	µg/L
CO115002	Cadmium	WTLAP-11-28069	UF	0.14	µg/L
CO115002	Cadmium	WTLAP-11-28070	UF	<0.11	µg/L
CO115002	Calcium	WTLAP-11-28066	F	13.5	mg/L
CO115002	Calcium	WTLAP-11-28065	F	11.4	mg/L
CO115002	Calcium	WTLAP-11-28070	UF	13.5	mg/L
CO115002	Calcium	WTLAP-11-28069	UF	11.5	mg/L
CO115002	Chromium	WTLAP-11-28065	F	<2	µg/L
CO115002	Chromium	WTLAP-11-28066	F	<2	µg/L
CO115002	Chromium	WTLAP-11-28069	UF	2	µg/L
CO115002	Chromium	WTLAP-11-28070	UF	<2	µg/L
CO115002	Cobalt	WTLAP-11-28066	F	3.6	µg/L
CO115002	Cobalt	WTLAP-11-28065	F	3.8	µg/L
CO115002	Cobalt	WTLAP-11-28070	UF	<1	µg/L
CO115002	Cobalt	WTLAP-11-28069	UF	1.5	µg/L
CO115002	Copper	WTLAP-11-28065	F	3.1	µg/L
CO115002	Copper	WTLAP-11-28066	F	4.3	µg/L
CO115002	Copper	WTLAP-11-28070	UF	4.8	µg/L
CO115002	Copper	WTLAP-11-28069	UF	4.7	µg/L
CO115002	Gross alpha	WTLAP-11-28089	UF	<1.86	pCi/L
CO115002	Gross alpha	WTLAP-11-28092	UF	<0.941	pCi/L
CO115002	Gross beta	WTLAP-11-28092	UF	7.35	pCi/L
CO115002	Gross beta	WTLAP-11-28089	UF	6.05	pCi/L
CO115002	Hardness	WTLAP-11-28065	F	34.6	mg/L
CO115002	Hardness	WTLAP-11-28066	F	41	mg/L
CO115002	Hardness	WTLAP-11-28069	UF	35.8	mg/L
CO115002	Hardness	WTLAP-11-28070	UF	41.2	mg/L
CO115002	Iron	WTLAP-11-28065	F	943	µg/L
CO115002	Iron	WTLAP-11-28066	F	582	µg/L
CO115002	Iron	WTLAP-11-28070	UF	1510	µg/L
CO115002	Iron	WTLAP-11-28069	UF	2670	µg/L
CO115002	Lead	WTLAP-11-28065	F	2	µg/L
CO115002	Lead	WTLAP-11-28066	F	1.3	µg/L
CO115002	Lead	WTLAP-11-28069	UF	8.4	µg/L
CO115002	Lead	WTLAP-11-28070	UF	5.1	µg/L

Table 4.5-2 (continued)

Sample Location	Analyte	Sample ID	Field Prep	Result[a]	Unit
CO115002	Magnesium	WTLAP-11-28066	F	1.75	mg/L
CO115002	Magnesium	WTLAP-11-28065	F	1.5	mg/L
CO115002	Magnesium	WTLAP-11-28070	UF	1.83	mg/L
CO115002	Magnesium	WTLAP-11-28069	UF	1.74	mg/L
CO115002	Manganese	WTLAP-11-28066	F	13.8	µg/L
CO115002	Manganese	WTLAP-11-28065	F	11.2	µg/L
CO115002	Manganese	WTLAP-11-28070	UF	107	µg/L
CO115002	Manganese	WTLAP-11-28069	UF	154	µg/L
CO115002	Mercury	WTLAP-11-28066	F	<0.066	µg/L
CO115002	Mercury	WTLAP-11-28065	F	<0.066	µg/L
CO115002	Mercury	WTLAP-11-28070	UF	<0.066	µg/L
CO115002	Mercury	WTLAP-11-28069	UF	<0.066	µg/L
CO115002	Nickel	WTLAP-11-28065	F	3.1	µg/L
CO115002	Nickel	WTLAP-11-28066	F	3.1	µg/L
CO115002	Nickel	WTLAP-11-28069	UF	3.6	µg/L
CO115002	Nickel	WTLAP-11-28070	UF	3.2	µg/L
CO115002	Potassium	WTLAP-11-28065	F	3.34	mg/L
CO115002	Potassium	WTLAP-11-28066	F	3.43	mg/L
CO115002	Potassium	WTLAP-11-28070	UF	3.52	mg/L
CO115002	Potassium	WTLAP-11-28069	UF	3.64	mg/L
CO115002	Selenium	WTLAP-11-28066	F	<1.5	µg/L
CO115002	Selenium	WTLAP-11-28065	F	<1.5	µg/L
CO115002	Selenium	WTLAP-11-28069	UF	<1.5	µg/L
CO115002	Selenium	WTLAP-11-28070	UF	<1.5	µg/L
CO115002	Silver	WTLAP-11-28065	F	<0.2	µg/L
CO115002	Silver	WTLAP-11-28066	F	<0.2	µg/L
CO115002	Silver	WTLAP-11-28070	UF	0.33	µg/L
CO115002	Silver	WTLAP-11-28069	UF	0.22	µg/L
CO115002	Sodium	WTLAP-11-28066	F	48.3	mg/L
CO115002	Sodium	WTLAP-11-28065	F	45.2	mg/L
CO115002	Sodium	WTLAP-11-28070	UF	46.9	mg/L
CO115002	Sodium	WTLAP-11-28069	UF	44	mg/L
CO115002	SSC	WTLAP-11-28079	UF	15.5	mg/L
CO115002	SSC	WTLAP-11-28077	UF	18.4	mg/L
CO115002	SSC	WTLAP-11-28073	UF	44	mg/L
CO115002	SSC	WTLAP-11-28076	UF	27.6	mg/L
CO115002	Thallium	WTLAP-11-28066	F	<0.45	µg/L
CO115002	Thallium	WTLAP-11-28065	F	<0.45	µg/L

Table 4.5-2 (continued)

Sample Location	Analyte	Sample ID	Field Prep	Result[a]	Unit
CO115002	Thallium	WTLAP-11-28070	UF	<0.45	µg/L
CO115002	Thallium	WTLAP-11-28069	UF	<0.45	µg/L
CO115002	Total Organic Carbon	WTLAP-11-28089	UF	12.8	mg/L
CO115002	Total Organic Carbon	WTLAP-11-28092	UF	18.2	mg/L
CO115002	Total PCB	WTLAP-11-28084	UF	0.00673	µg/L
CO115002	Total PCB	WTLAP-11-28081	UF	0.00363	µg/L
CO115002	Uranium	WTLAP-11-28065	F	0.17	µg/L
CO115002	Uranium	WTLAP-11-28066	F	0.16	µg/L
CO115002	Uranium	WTLAP-11-28069	UF	0.36	µg/L
CO115002	Uranium	WTLAP-11-28070	UF	0.28	µg/L
CO115002	Uranium-234	WTLAP-11-28088	UF	<0.0491	pCi/L
CO115002	Uranium-234	WTLAP-11-28085	UF	0.114	pCi/L
CO115002	Uranium-235/236	WTLAP-11-28085	UF	<0.022	pCi/L
CO115002	Uranium-235/236	WTLAP-11-28088	UF	<0	pCi/L
CO115002	Uranium-238	WTLAP-11-28088	UF	<0.0339	pCi/L
CO115002	Uranium-238	WTLAP-11-28085	UF	0.114	pCi/L
CO115002	Vanadium	WTLAP-11-28066	F	2.4	µg/L
CO115002	Vanadium	WTLAP-11-28065	F	2.1	µg/L
CO115002	Vanadium	WTLAP-11-28069	UF	4.7	µg/L
CO115002	Vanadium	WTLAP-11-28070	UF	3.9	µg/L
CO115002	Zinc	WTLAP-11-28066	F	9.9	µg/L
CO115002	Zinc	WTLAP-11-28065	F	8.8	µg/L
CO115002	Zinc	WTLAP-11-28070	UF	18.2	µg/L
CO115002	Zinc	WTLAP-11-28069	UF	23.6	µg/L

[a] < = Nondetected result.

[b] F= Filtered.

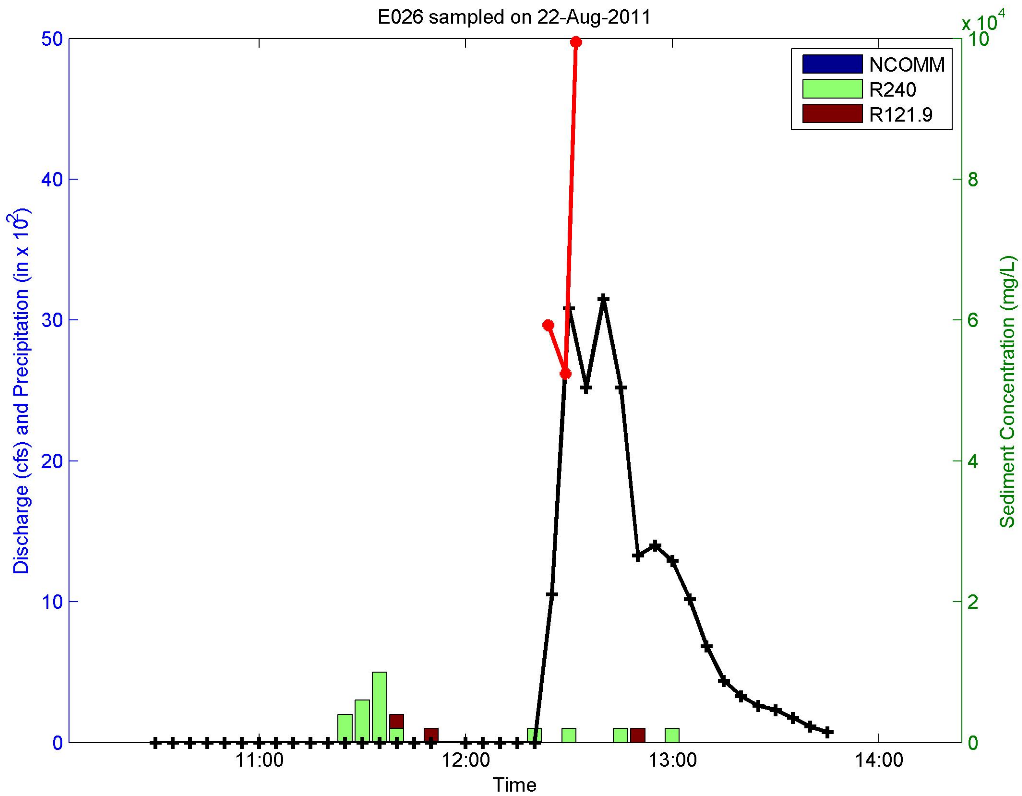
[c] UF= Unfiltered.

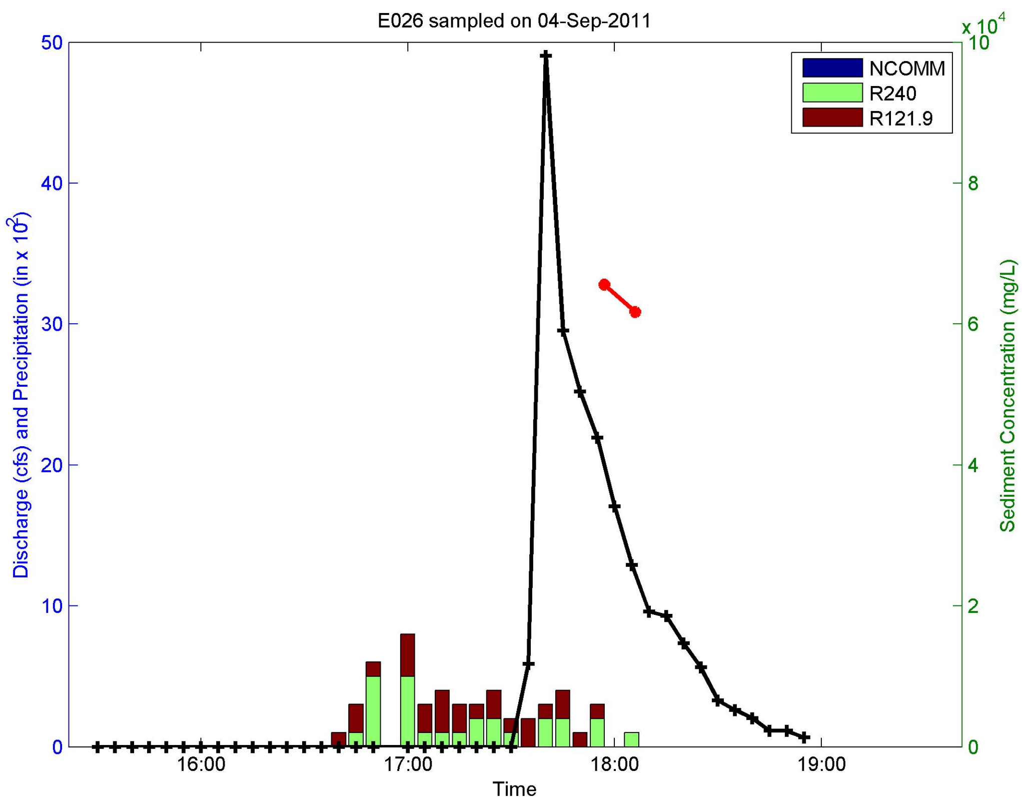
Appendix A

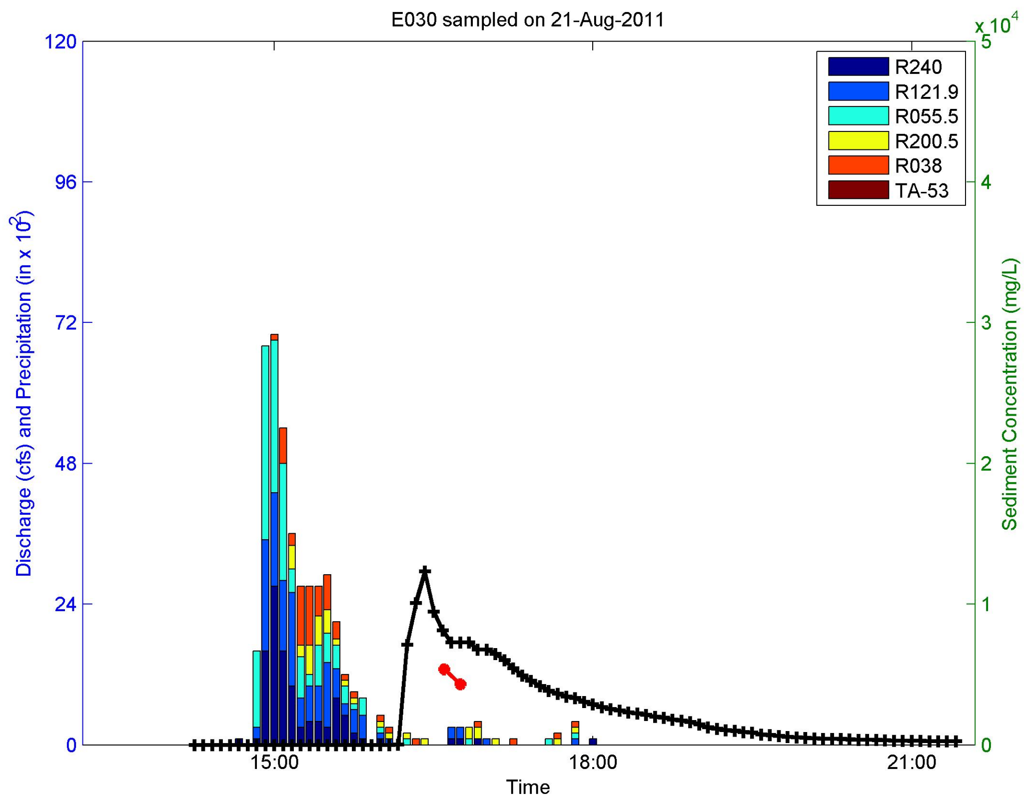
Hydrographs, Hyetographs, and Sedigraphs for Samples Collected

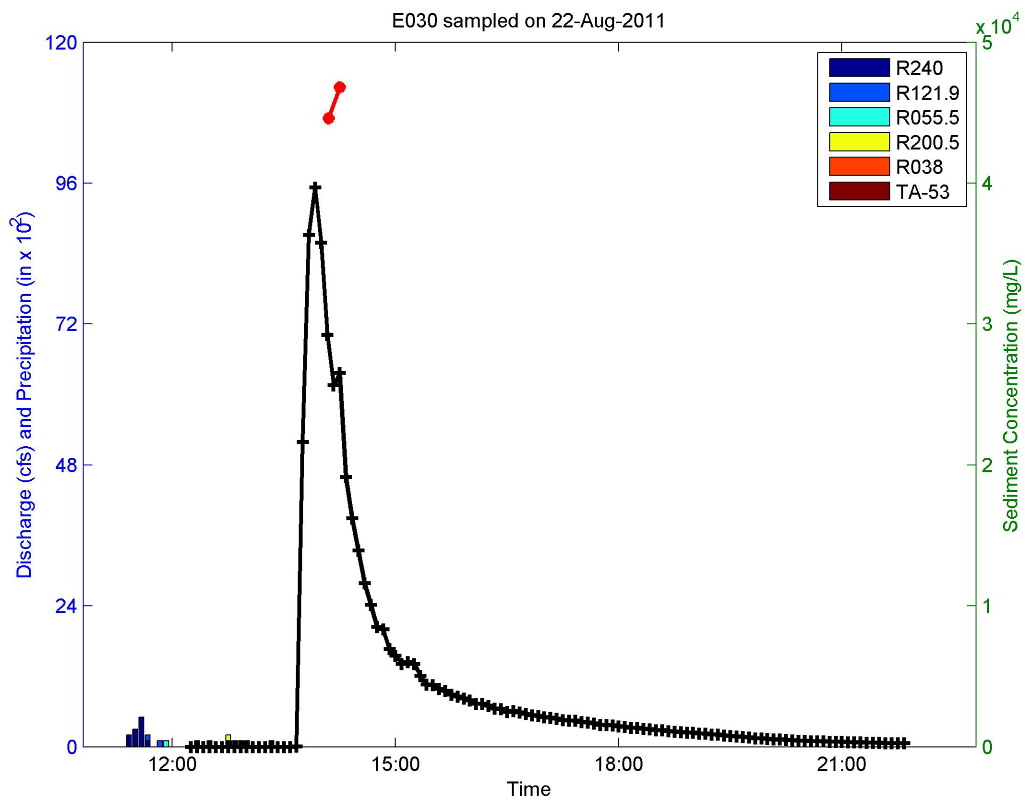
This appendix summarizes the relationships between precipitation, discharge, and suspended sediment concentration (SSC) determined for each storm runoff event sampled. Plots of discharge versus time (hydrographs) at gages from each storm runoff event resulting in sample collection are presented, with the exception of events with missing or questionable discharge data as stated in section 2.2. These hydrographs are overlaid with precipitation measured at associated rain gages (hyetographs) and SSC measured from stormwater samples collected during runoff events (sedigraphs).

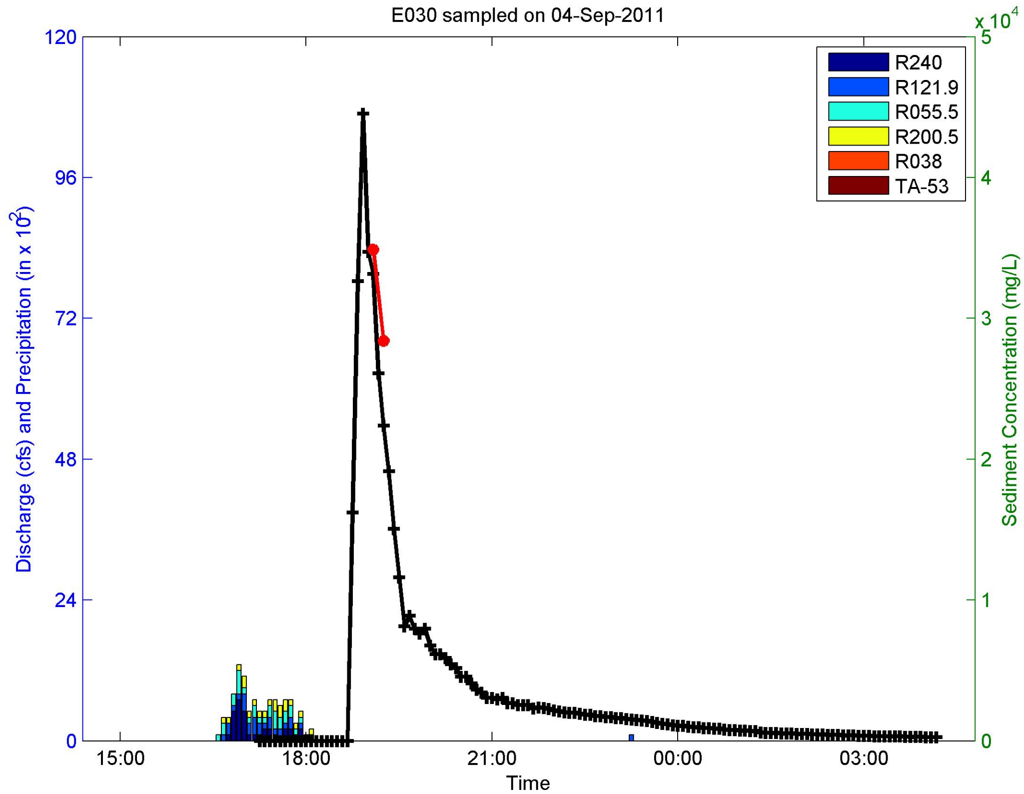
Hydrographs (**+**), hyetographs (assorted colors of stacked bars), and sedigraphs (●) for storm runoff events during which sampling was performed are displayed.

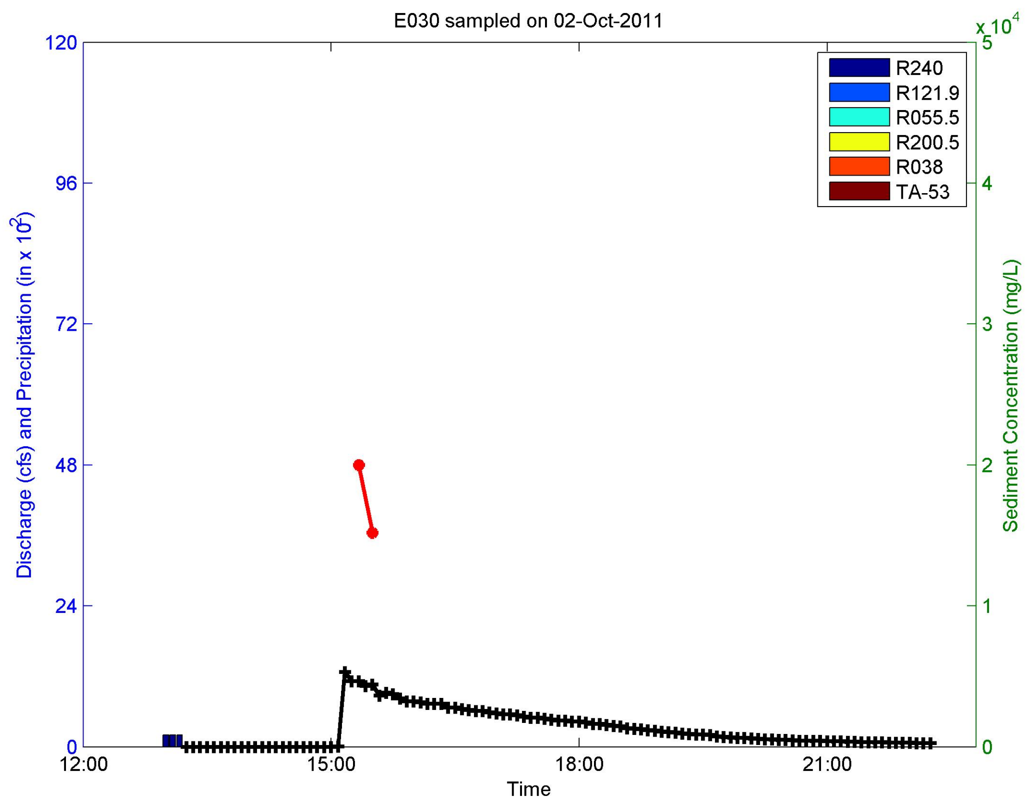

E026 sampled on 22-Aug-2011
NCOMM
R240
R121.9
Discharge (cfs) and Precipitation (in x 10^2)
Sediment Concentration (mg/L)
x 10^4
0
10
20
30
40
50
0
2
4
6
8
10
11:00
12:00
13:00
14:00
Time

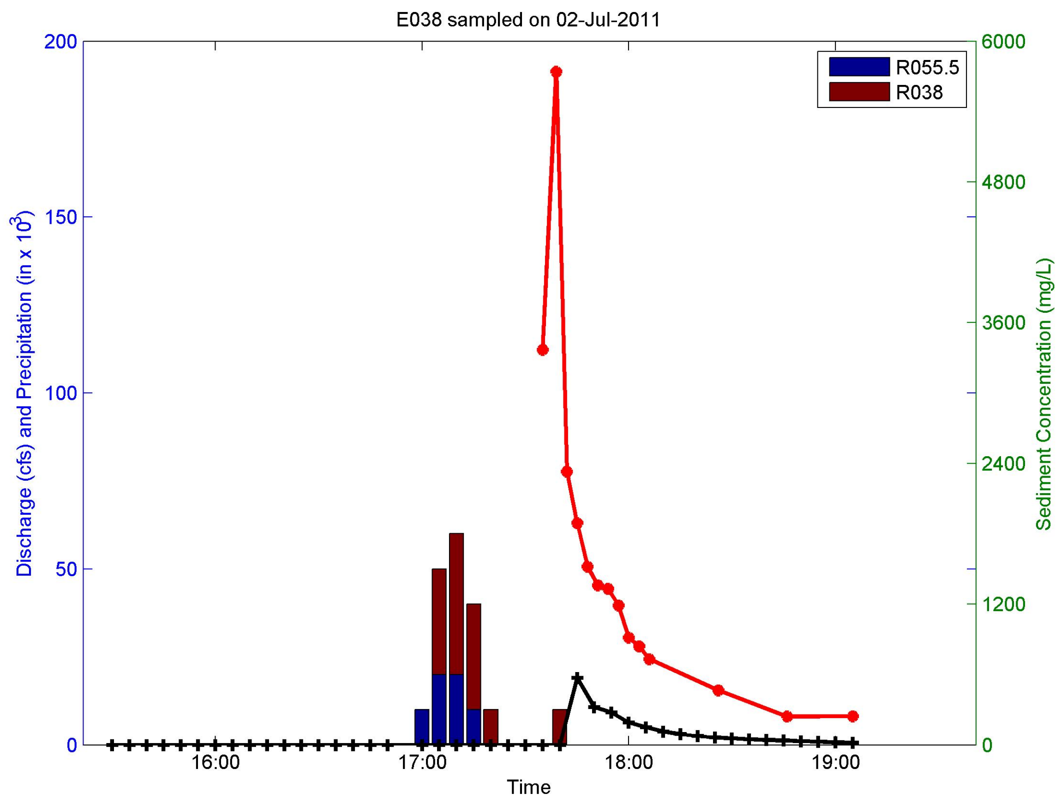

E026 sampled on 04-Sep-2011
NCOMM
R240
R121.9
Discharge (cfs) and Precipitation (in x 10^2)
Sediment Concentration (mg/L)
x 10^4
0
10
20
30
40
50
0
2
4
6
8
10
16:00
17:00
18:00
19:00
Time

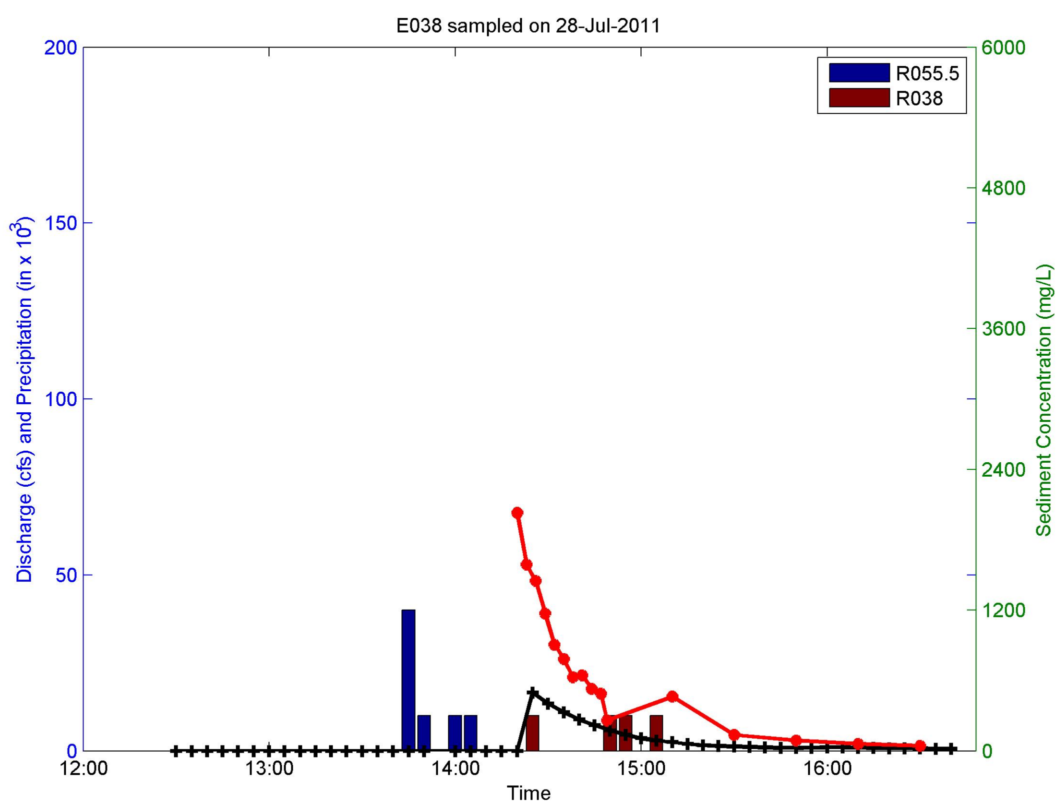

E030 sampled on 21-Aug-2011
Discharge (cfs) and Precipitation (in x 10^2)
Sediment Concentration (mg/L)
x 10^4
R240
R121.9
R055.5
R200.5
R038
TA-53
Time
0
24
48
72
96
120
0
1
2
3
4
5
15:00
18:00
21:00

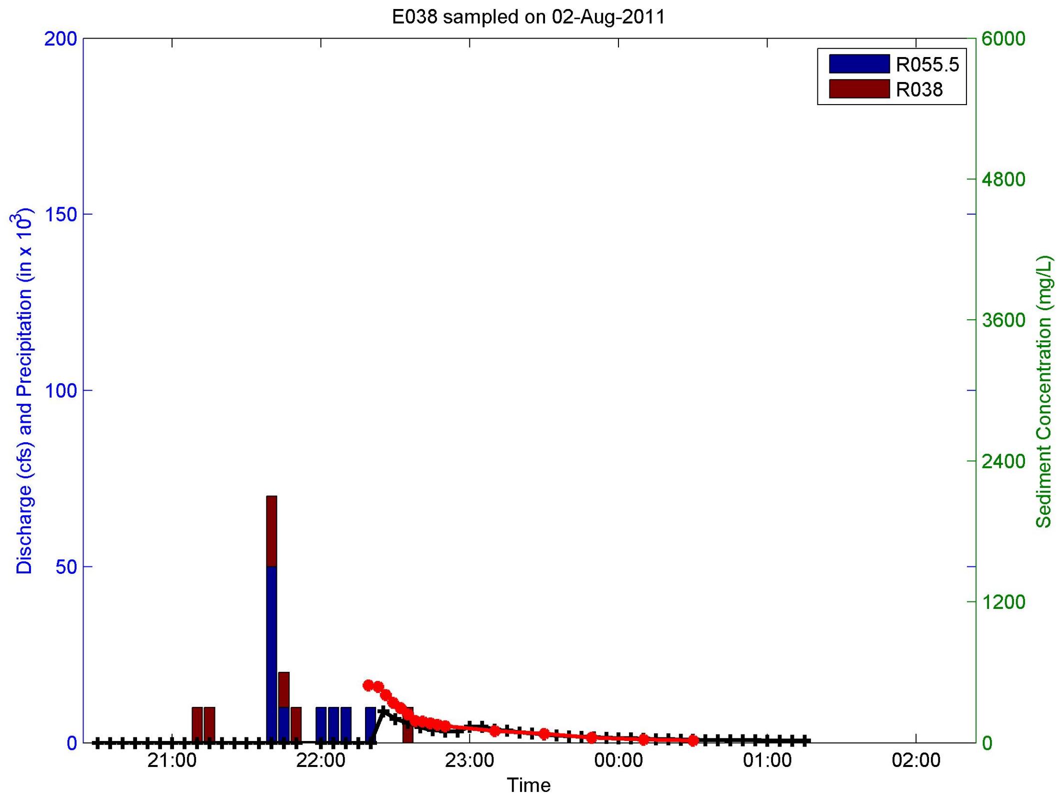

E030 sampled on 22-Aug-2011
Discharge (cfs) and Precipitation (in x 10^2)
Sediment Concentration (mg/L)
x 10^4
R240
R121.9
R055.5
R200.5
R038
TA-53
Time
0
24
48
72
96
120
0
1
2
3
4
5
12:00
15:00
18:00
21:00

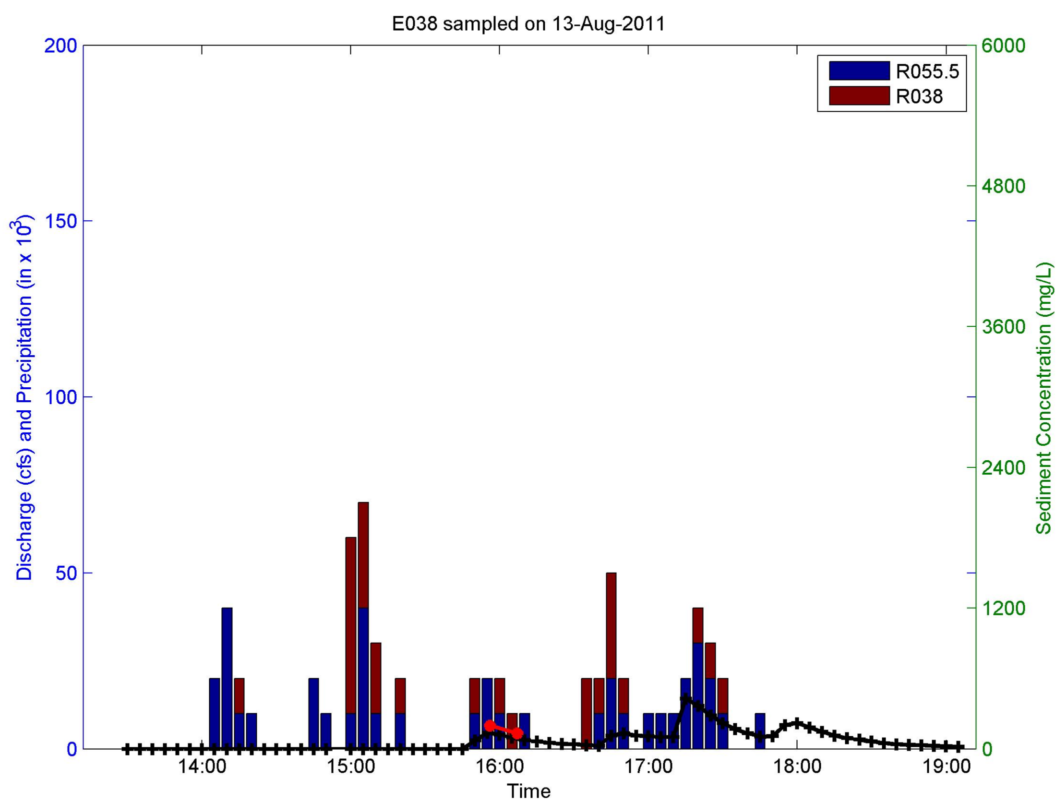

E030 sampled on 04-Sep-2011
Discharge (cfs) and Precipitation (in x 10^2)
Sediment Concentration (mg/L)
x 10^4
R240
R121.9
R055.5
R200.5
R038
TA-53
0
24
48
72
96
120
0
1
2
3
4
5
15:00
18:00
21:00
00:00
03:00
Time

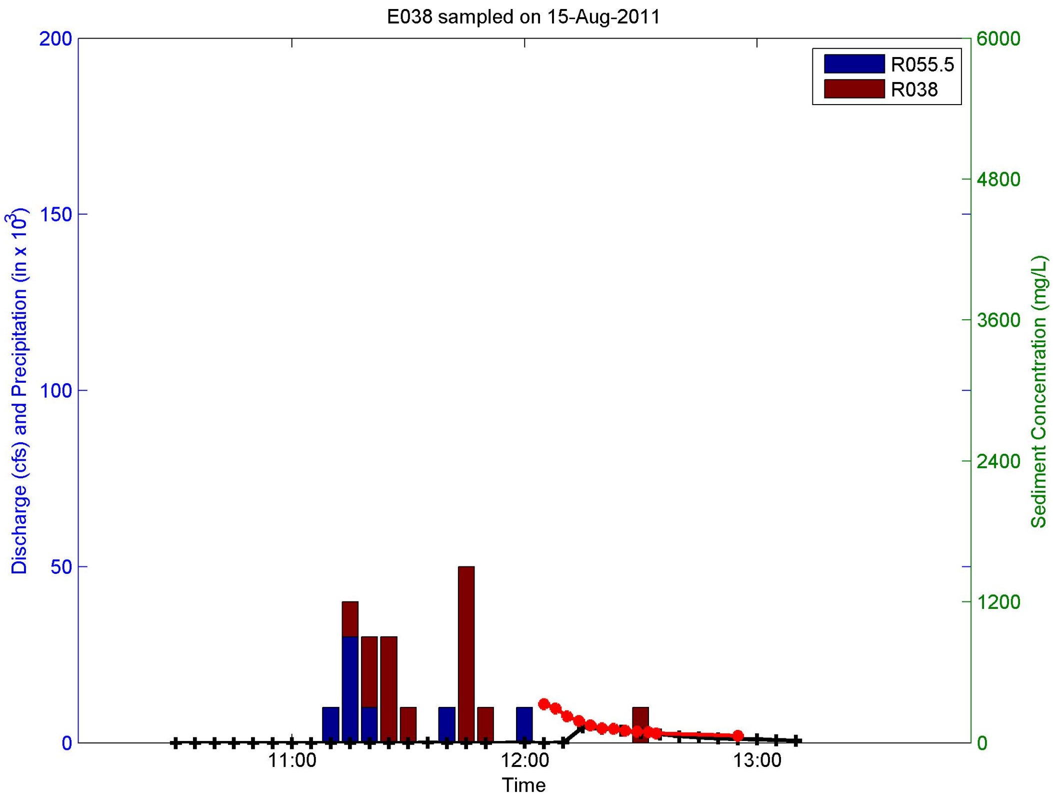

E030 sampled on 02-Oct-2011
Discharge (cfs) and Precipitation (in x 10^2)
Sediment Concentration (mg/L)
x 10^4
R240
R121.9
R055.5
R200.5
R038
TA-53
0
24
48
72
96
120
0
1
2
3
4
5
12:00
15:00
18:00
21:00
Time

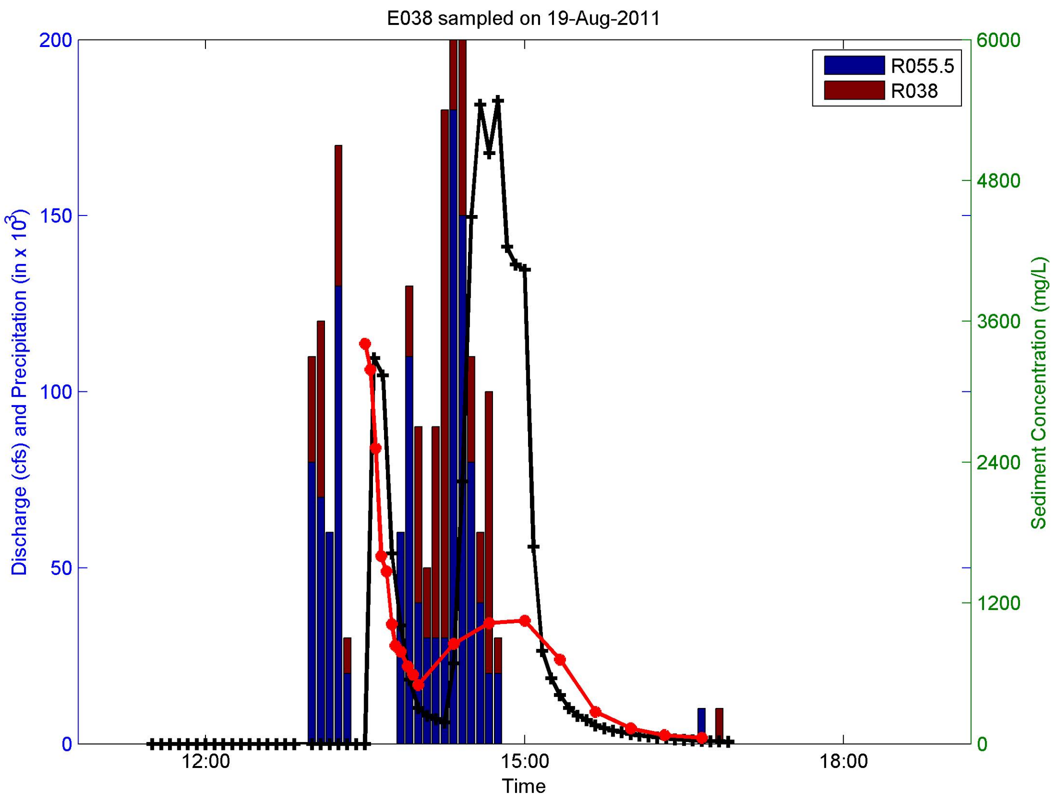

E038 sampled on 02-Jul-2011
R055.5
R038
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
Time
0
50
100
150
200
0
1200
2400
3600
4800
6000
16:00
17:00
18:00
19:00

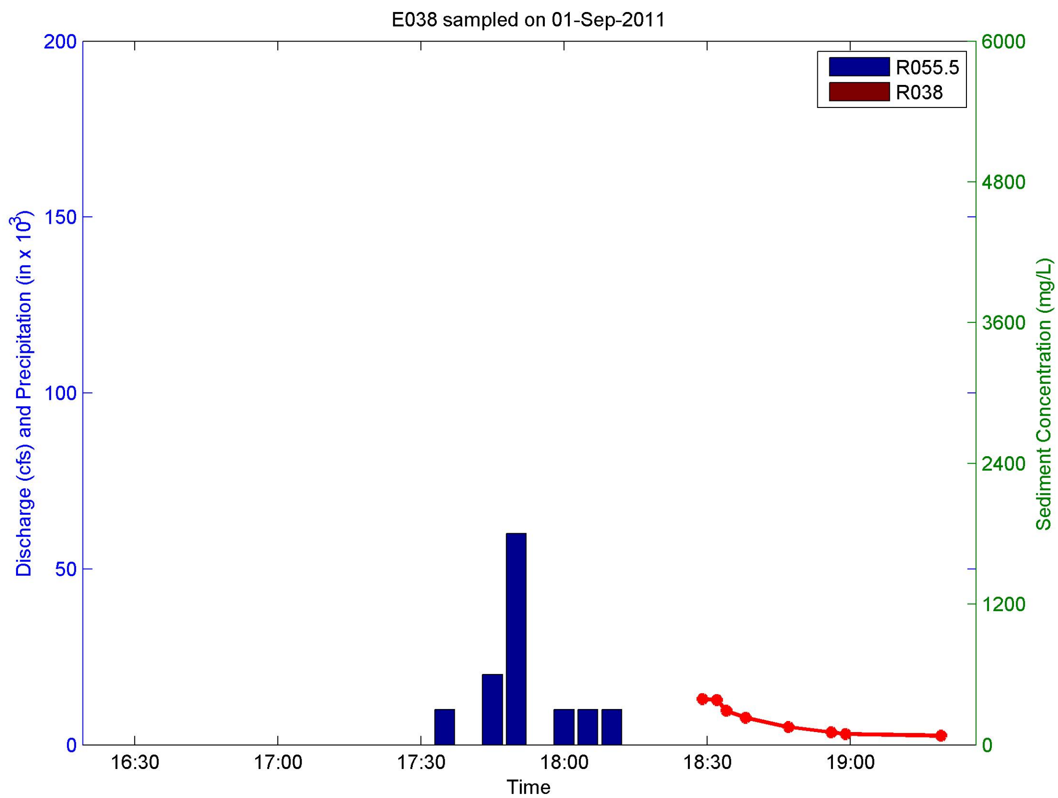

E038 sampled on 28-Jul-2011
R055.5
R038
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
Time
0
50
100
150
200
0
1200
2400
3600
4800
6000
12:00
13:00
14:00
15:00
16:00

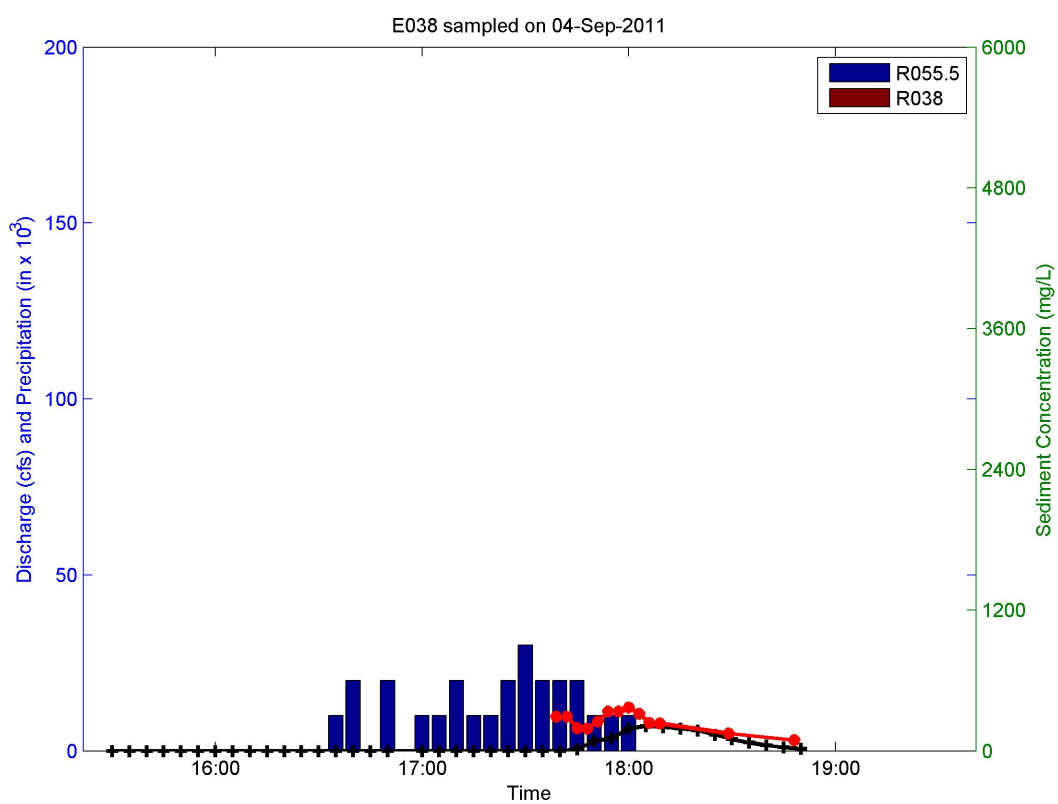

E038 sampled on 02-Aug-2011
R055.5
R038
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
Time
200
150
100
50
0
6000
4800
3600
2400
1200
0
21:00
22:00
23:00
00:00
01:00
02:00

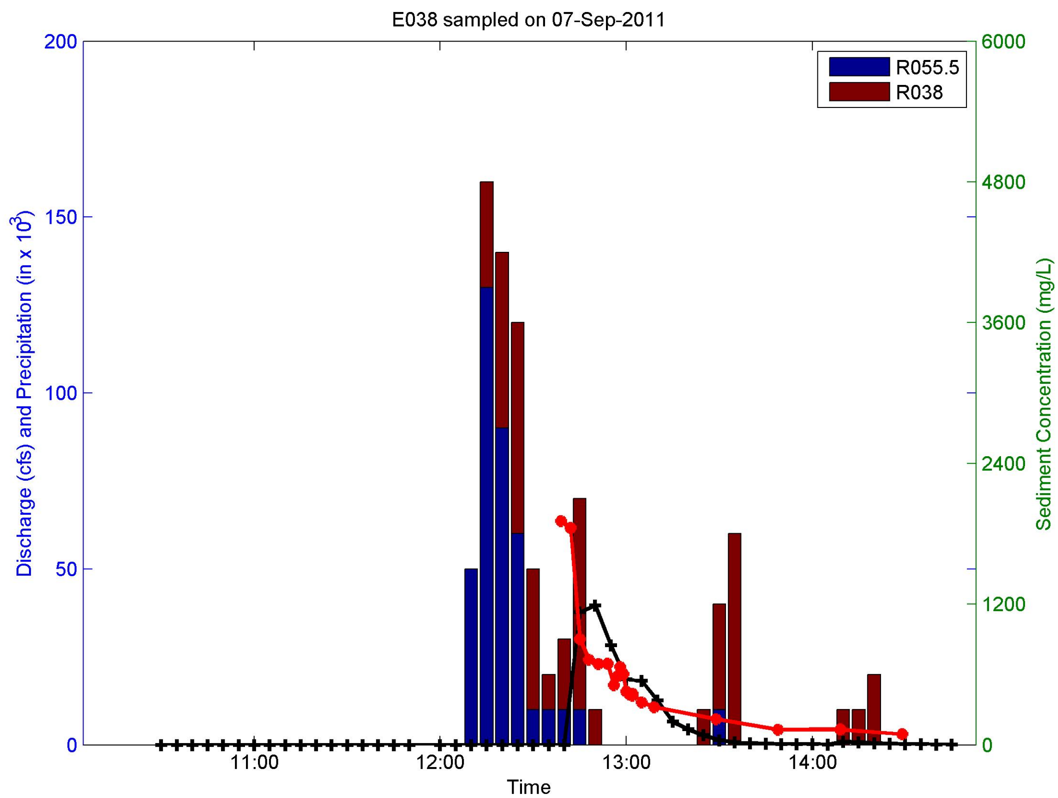

E038 sampled on 13-Aug-2011
R055.5
R038
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
Time
200
150
100
50
0
6000
4800
3600
2400
1200
0
14:00
15:00
16:00
17:00
18:00
19:00

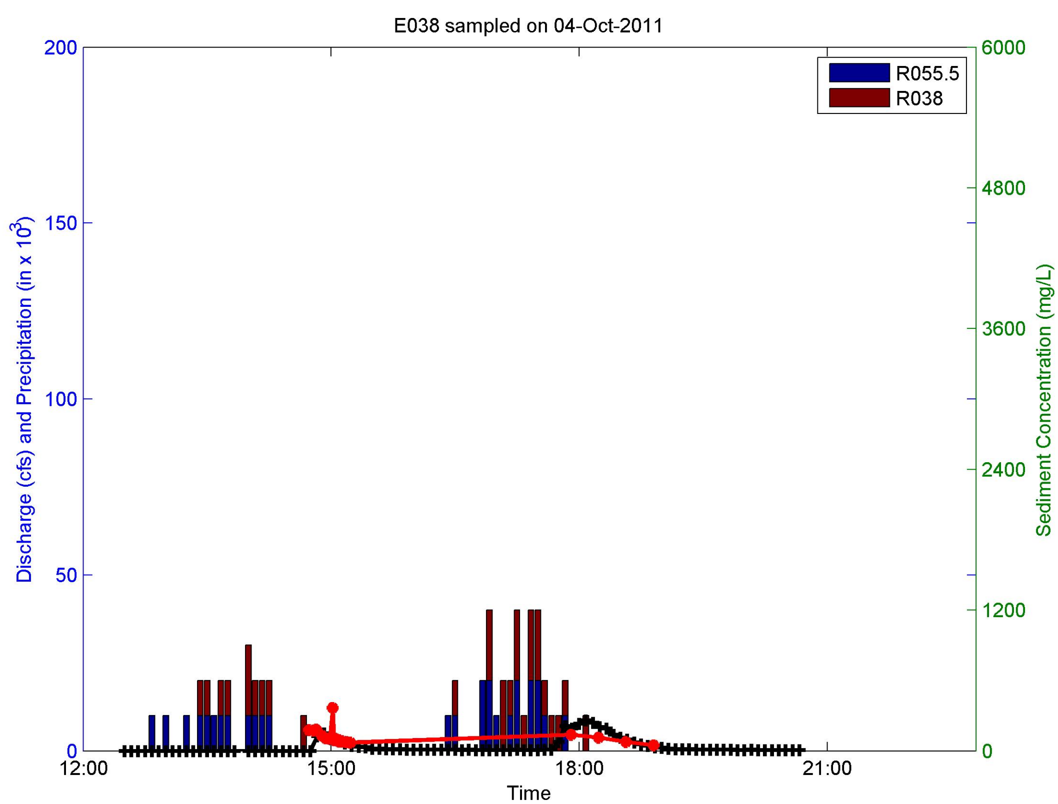

E038 sampled on 15-Aug-2011
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
Time
R055.5
R038
0
50
100
150
200
0
1200
2400
3600
4800
6000
11:00
12:00
13:00

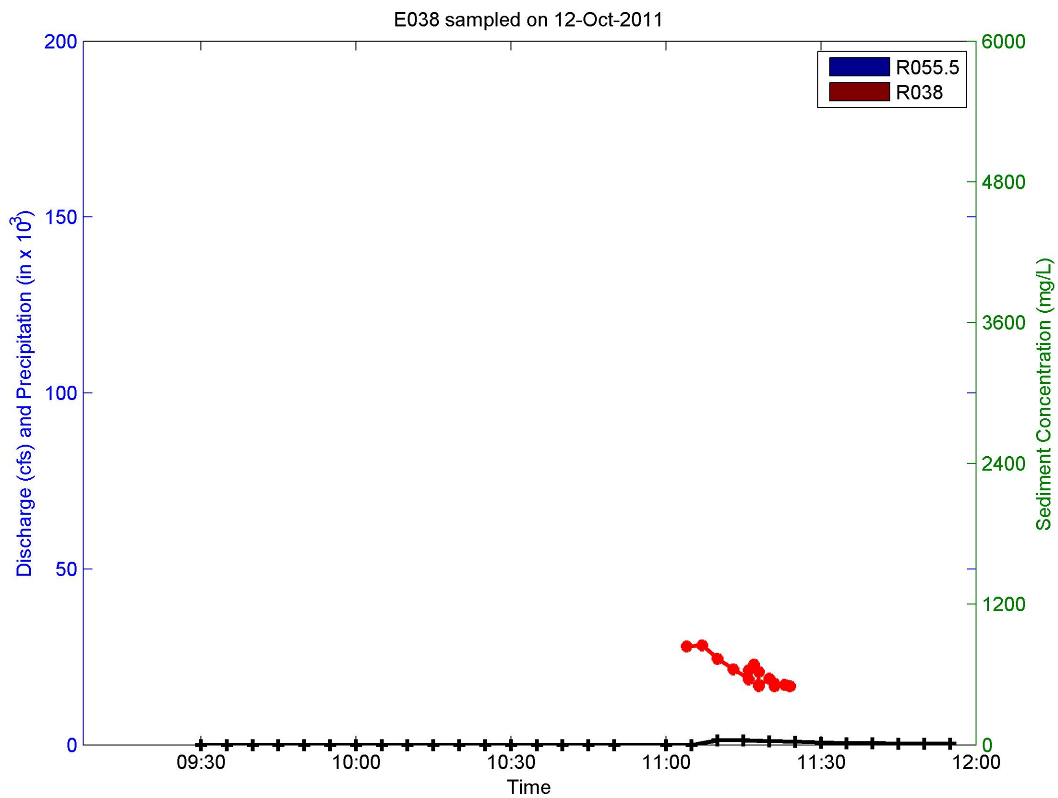

E038 sampled on 19-Aug-2011
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
Time
R055.5
R038
0
50
100
150
200
0
1200
2400
3600
4800
6000
12:00
15:00
18:00

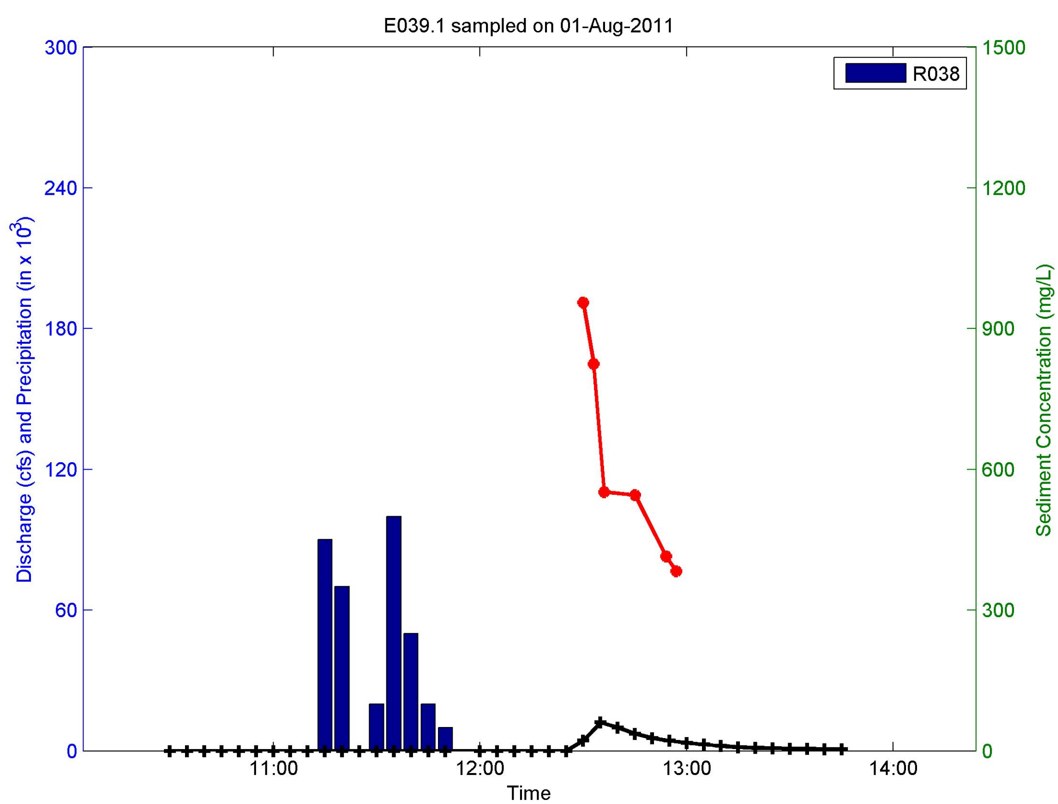

E038 sampled on 01-Sep-2011
Discharge (cfs) and Precipitation (in x 10³)
Sediment Concentration (mg/L)
Time
R055.5
R038
200
150
100
50
0
6000
4800
3600
2400
1200
0
16:30
17:00
17:30
18:00
18:30
19:00

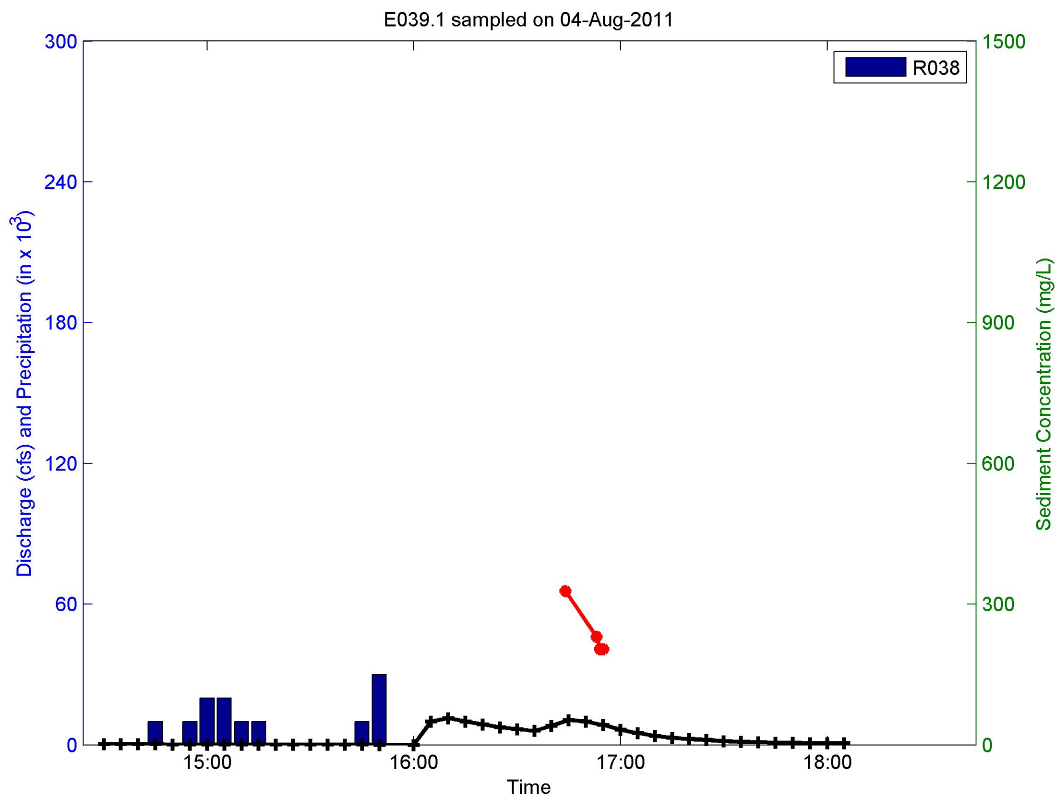

E038 sampled on 04-Sep-2011
Discharge (cfs) and Precipitation (in x 10³)
Sediment Concentration (mg/L)
Time
R055.5
R038
200
150
100
50
0
6000
4800
3600
2400
1200
0
16:00
17:00
18:00
19:00

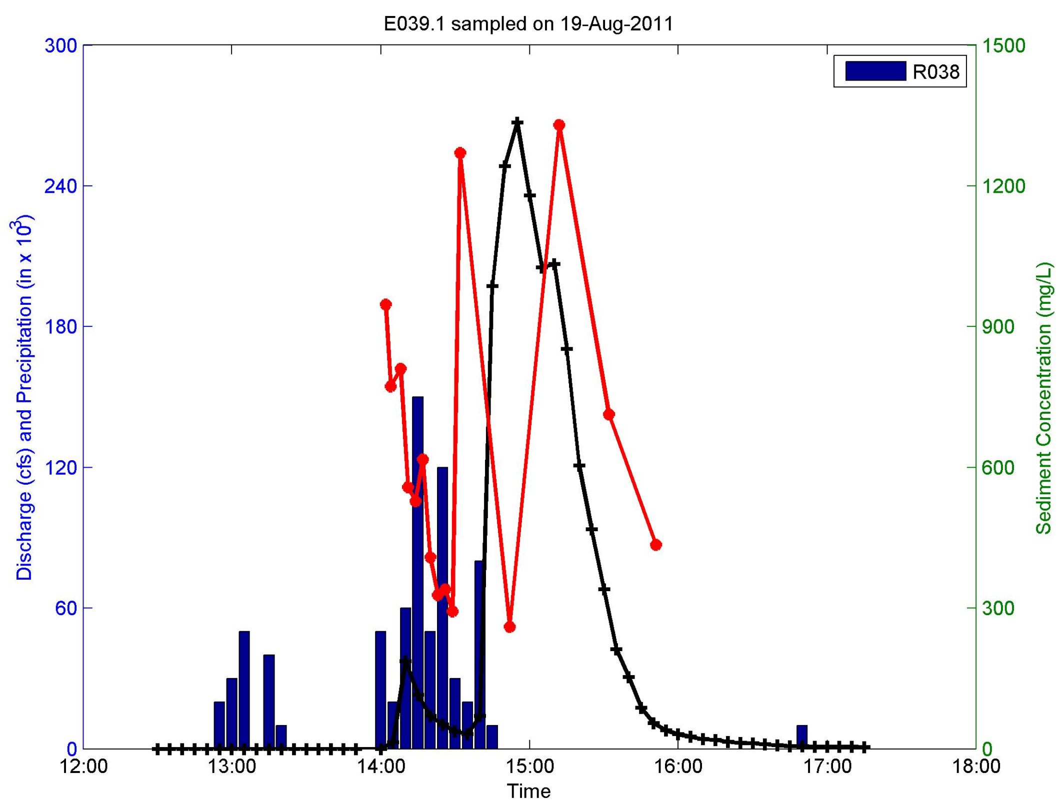

E038 sampled on 07-Sep-2011
R055.5
R038
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
Time
200
150
100
50
0
6000
4800
3600
2400
1200
0
11:00
12:00
13:00
14:00

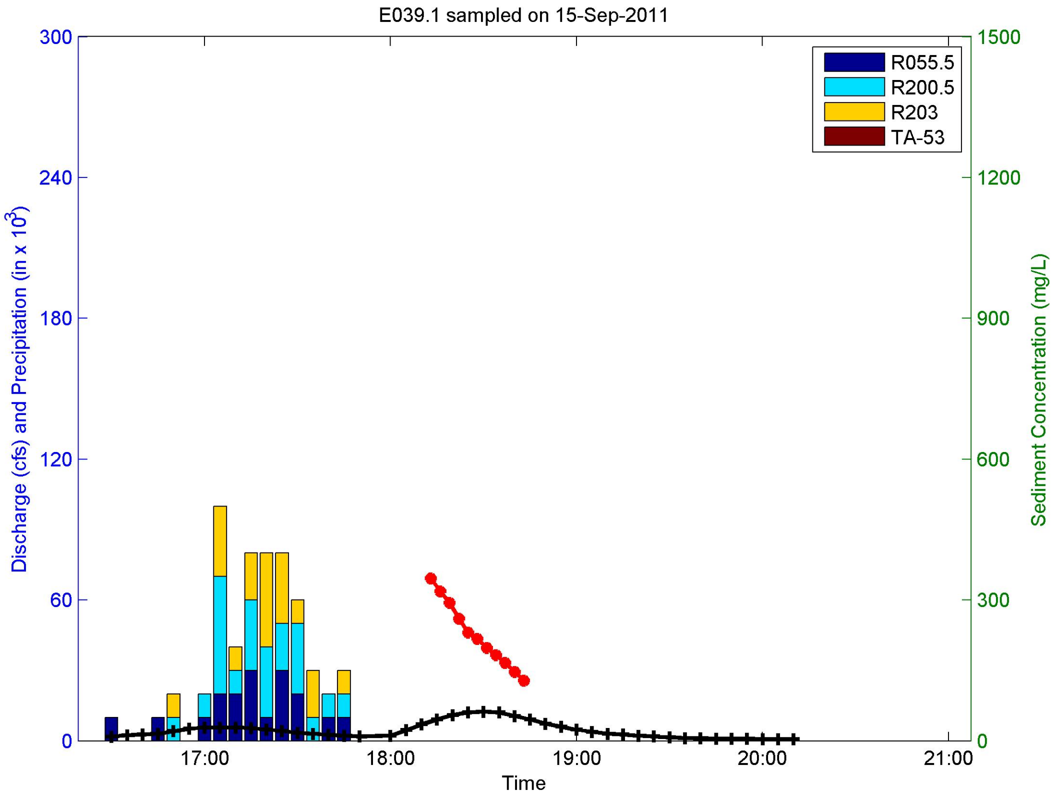

E038 sampled on 04-Oct-2011
R055.5
R038
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
Time
200
150
100
50
0
6000
4800
3600
2400
1200
0
12:00
15:00
18:00
21:00

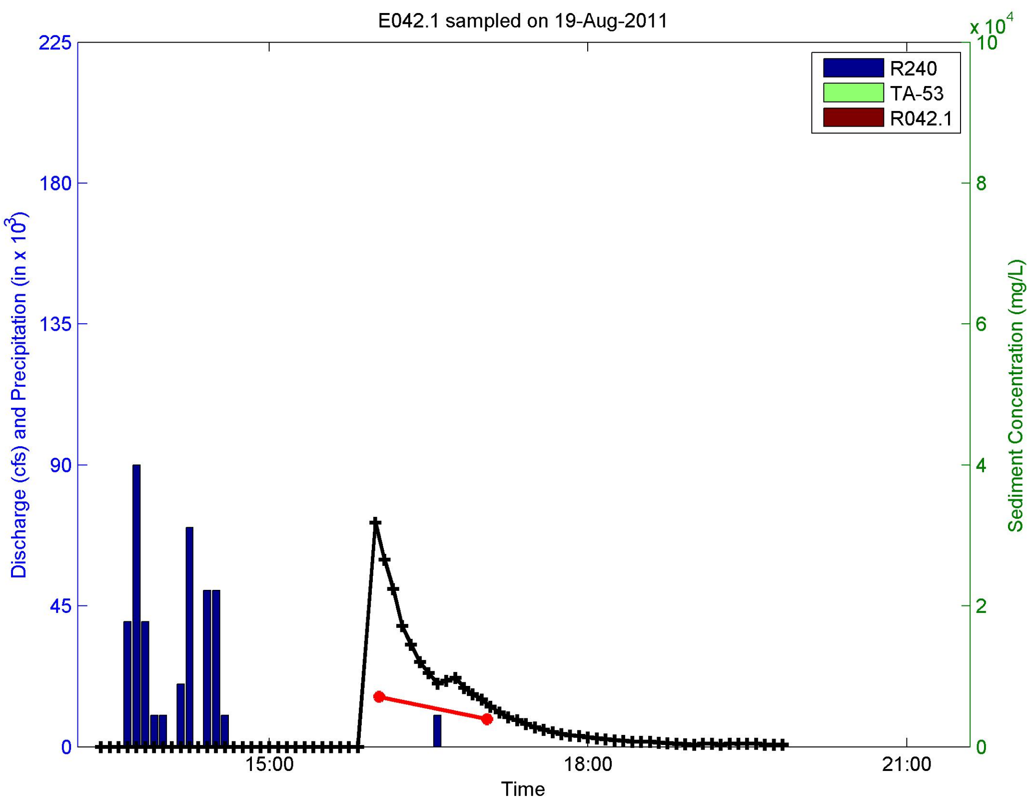

E038 sampled on 12-Oct-2011
R055.5
R038
Discharge (cfs) and Precipitation (in x 10³)
Sediment Concentration (mg/L)
Time
0
50
100
150
200
0
1200
2400
3600
4800
6000
09:30
10:00
10:30
11:00
11:30
12:00

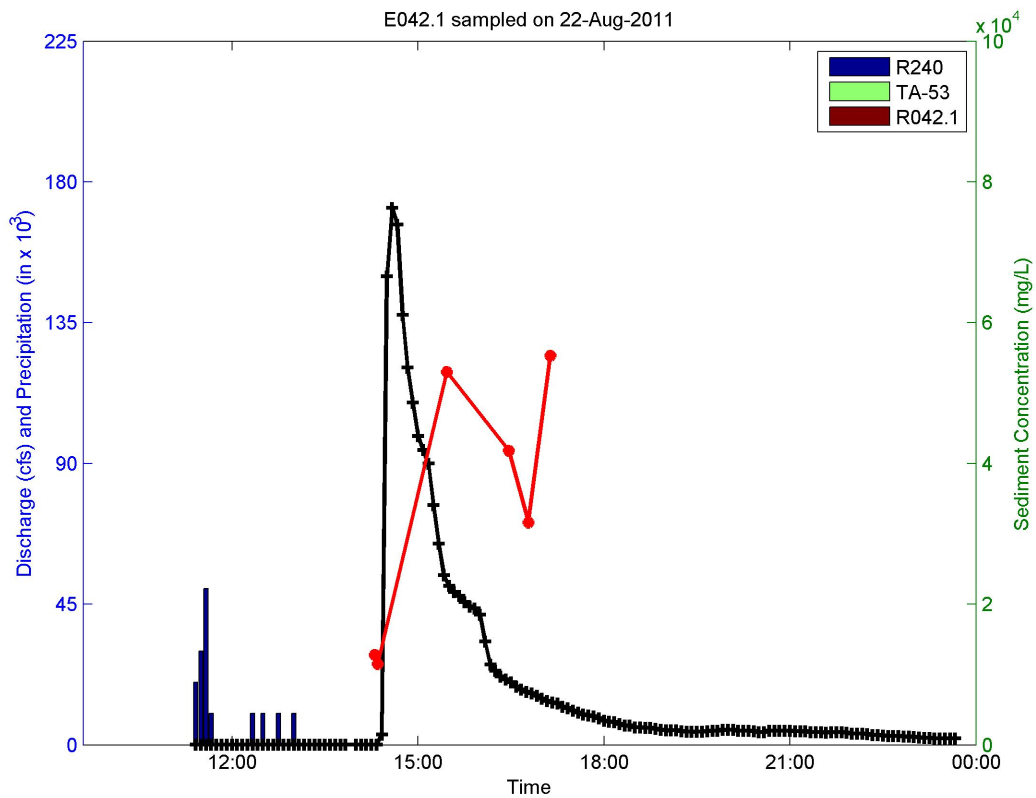

E039.1 sampled on 01-Aug-2011
R038
Discharge (cfs) and Precipitation (in x 10³)
Sediment Concentration (mg/L)
Time
0
60
120
180
240
300
0
300
600
900
1200
1500
11:00
12:00
13:00
14:00

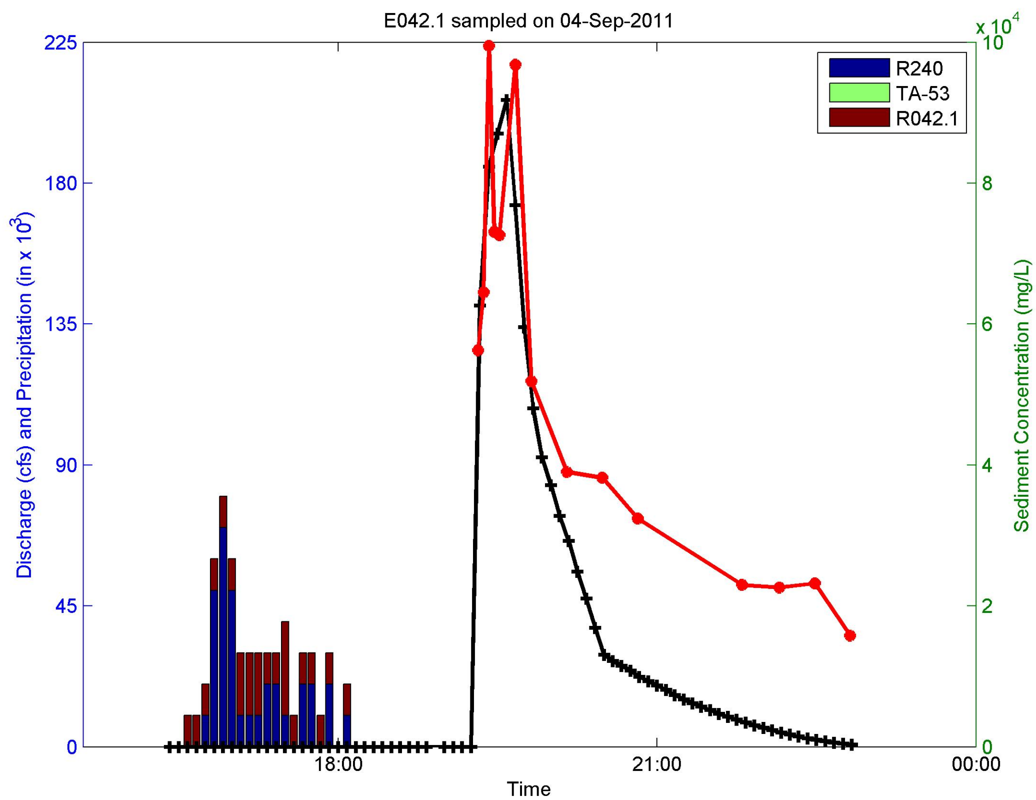

E039.1 sampled on 04-Aug-2011
R038
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
Time
0
60
120
180
240
300
0
300
600
900
1200
1500
15:00
16:00
17:00
18:00

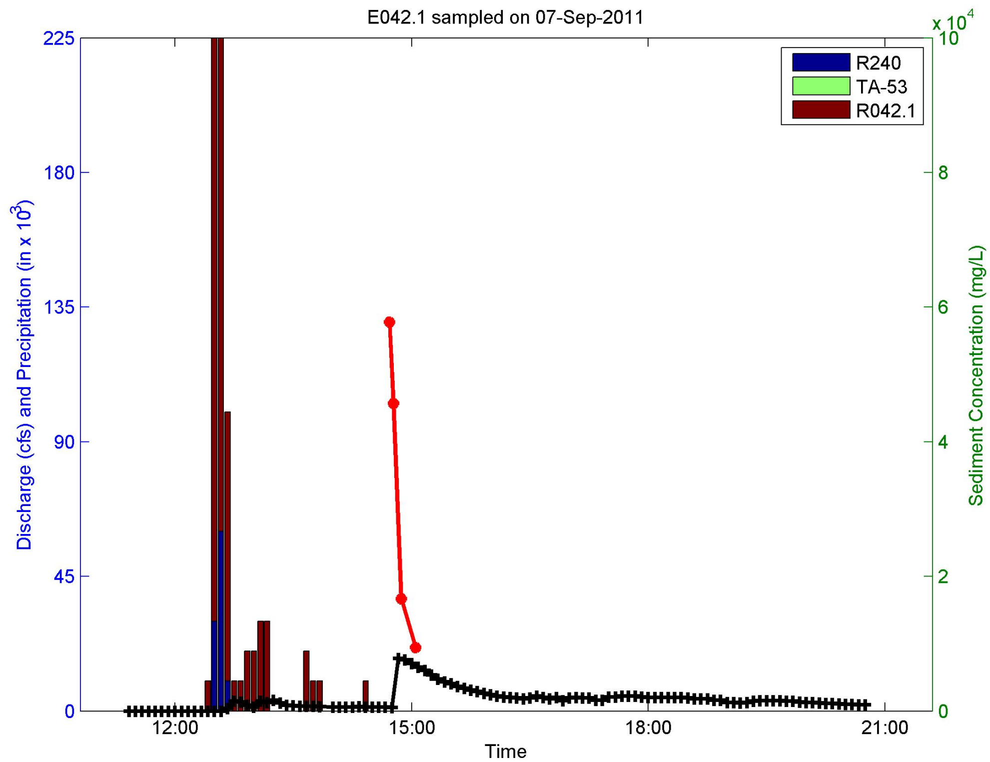

E039.1 sampled on 19-Aug-2011
R038
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
Time
0
60
120
180
240
300
0
300
600
900
1200
1500
12:00
13:00
14:00
15:00
16:00
17:00
18:00

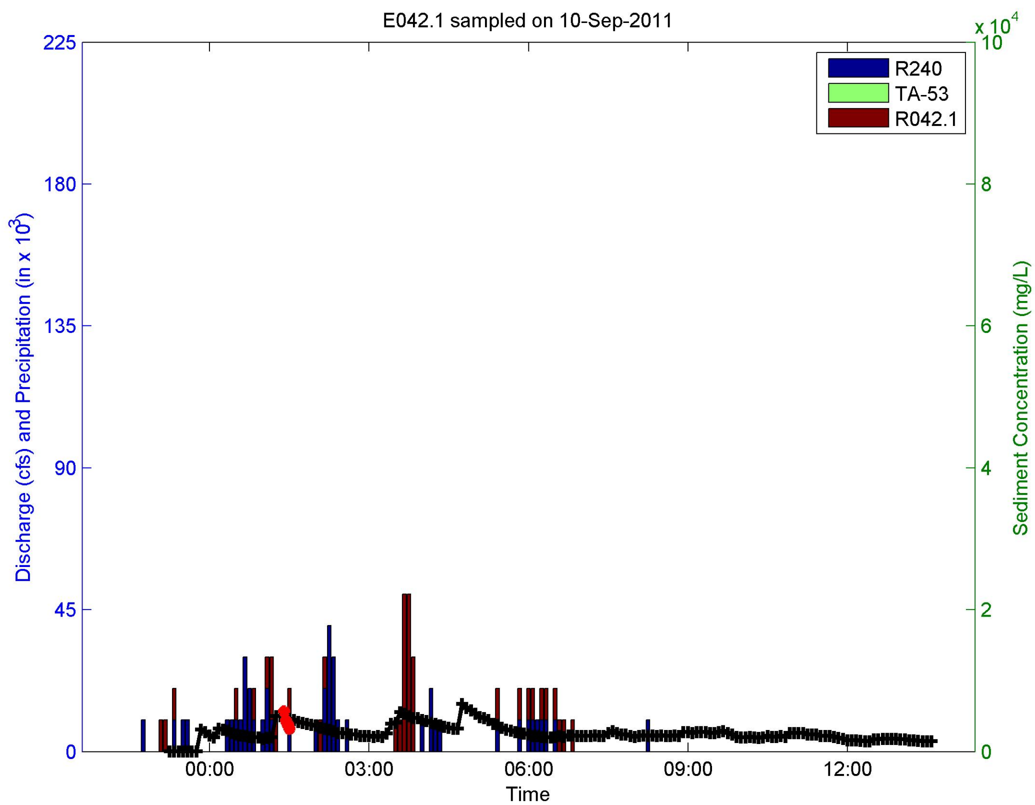

E039.1 sampled on 15-Sep-2011
R055.5
R200.5
R203
TA-53
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
300
240
180
120
60
0
1500
1200
900
600
300
0
17:00
18:00
19:00
20:00
21:00
Time

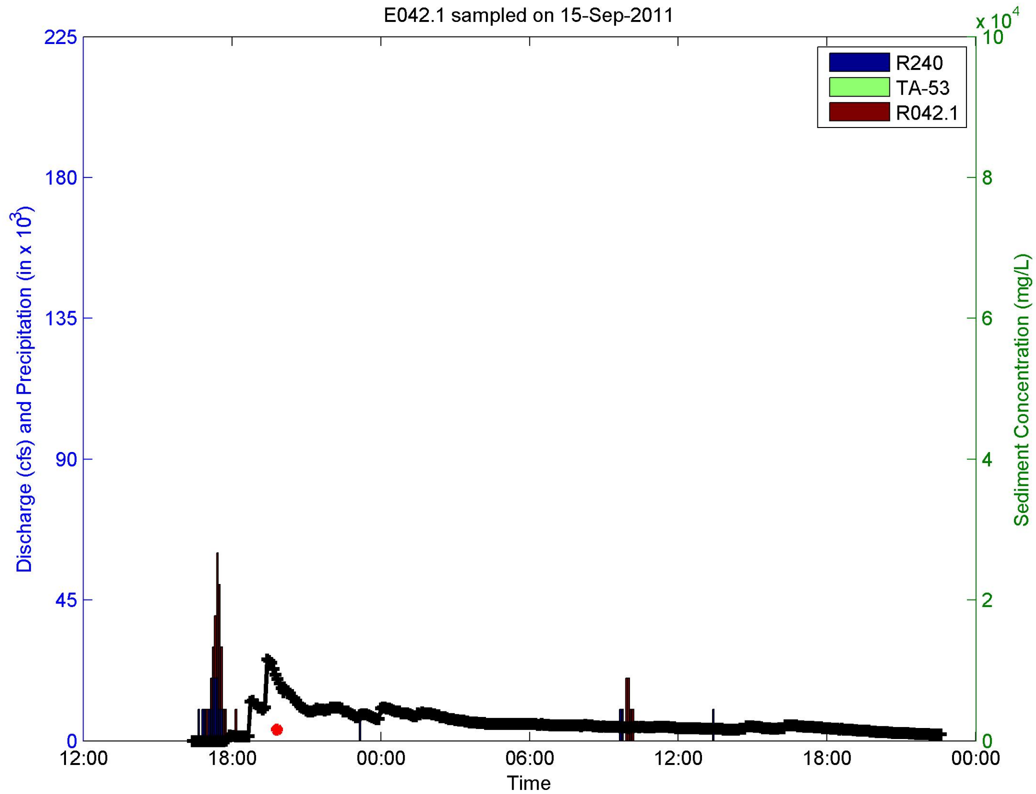

E042.1 sampled on 19-Aug-2011
R240
TA-53
R042.1
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^4
225
180
135
90
45
0
10
8
6
4
2
0
15:00
18:00
21:00
Time

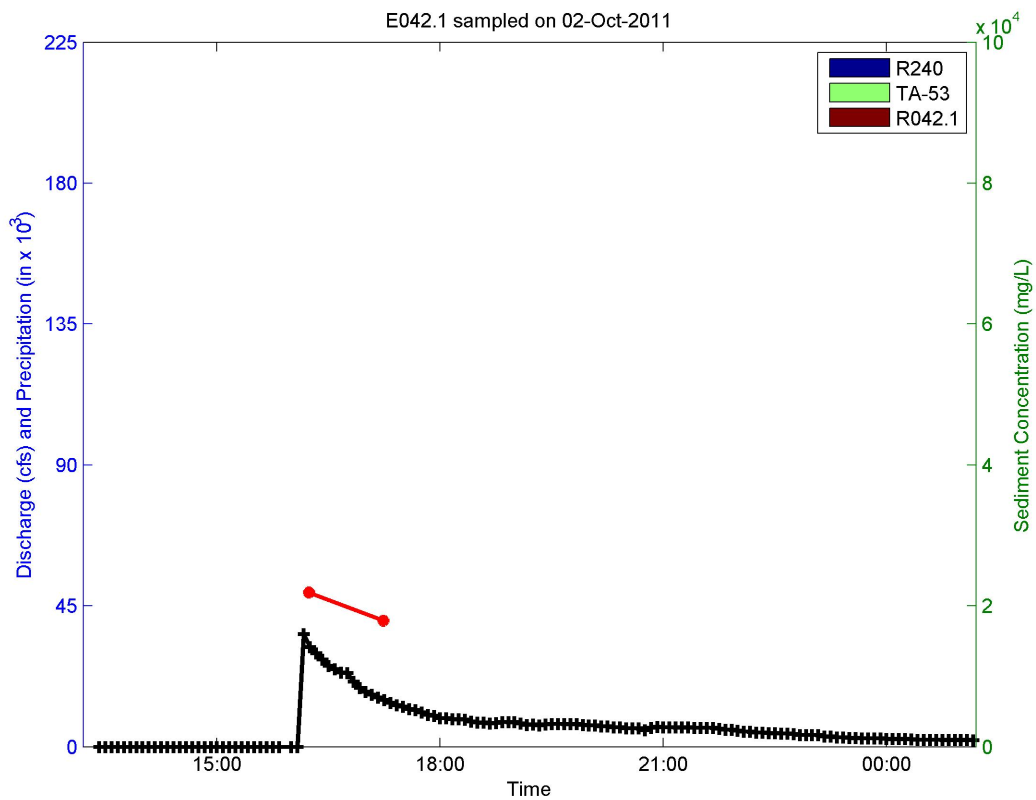

E042.1 sampled on 22-Aug-2011
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^4
Time
12:00
15:00
18:00
21:00
00:00
R240
TA-53
R042.1

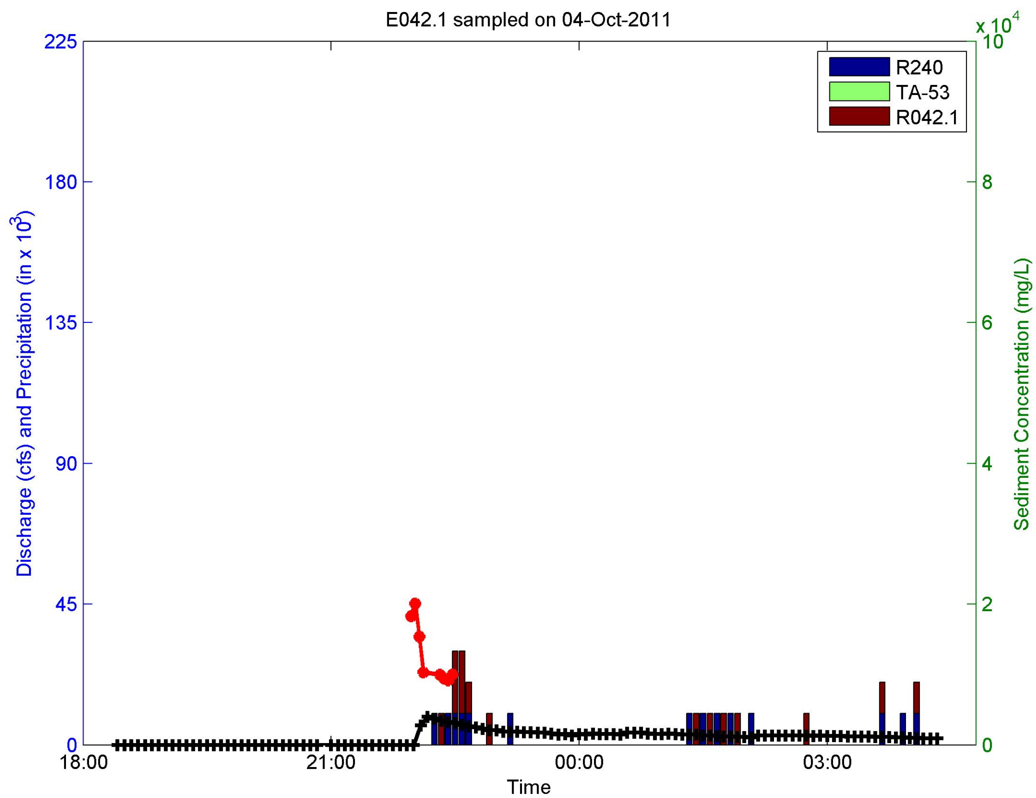

E042.1 sampled on 04-Sep-2011
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^4
Time
18:00
21:00
00:00
R240
TA-53
R042.1

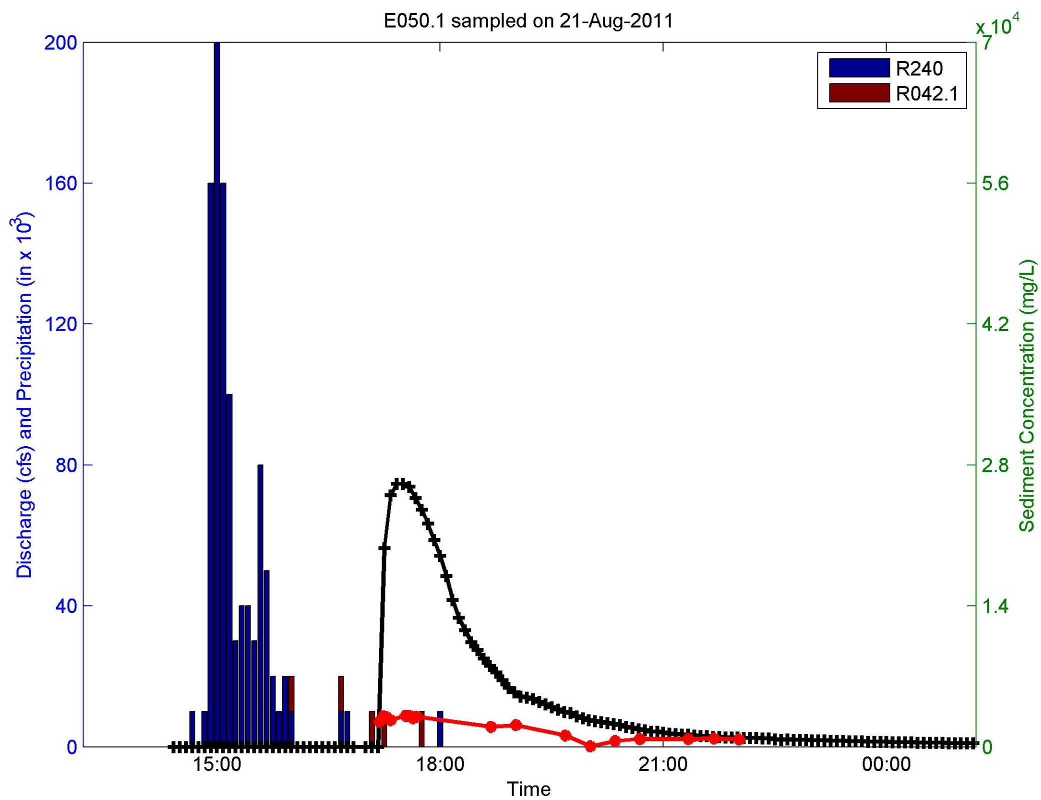

E042.1 sampled on 07-Sep-2011
R240
TA-53
R042.1
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^4
225
180
135
90
45
0
10
8
6
4
2
0
12:00
15:00
18:00
21:00
Time

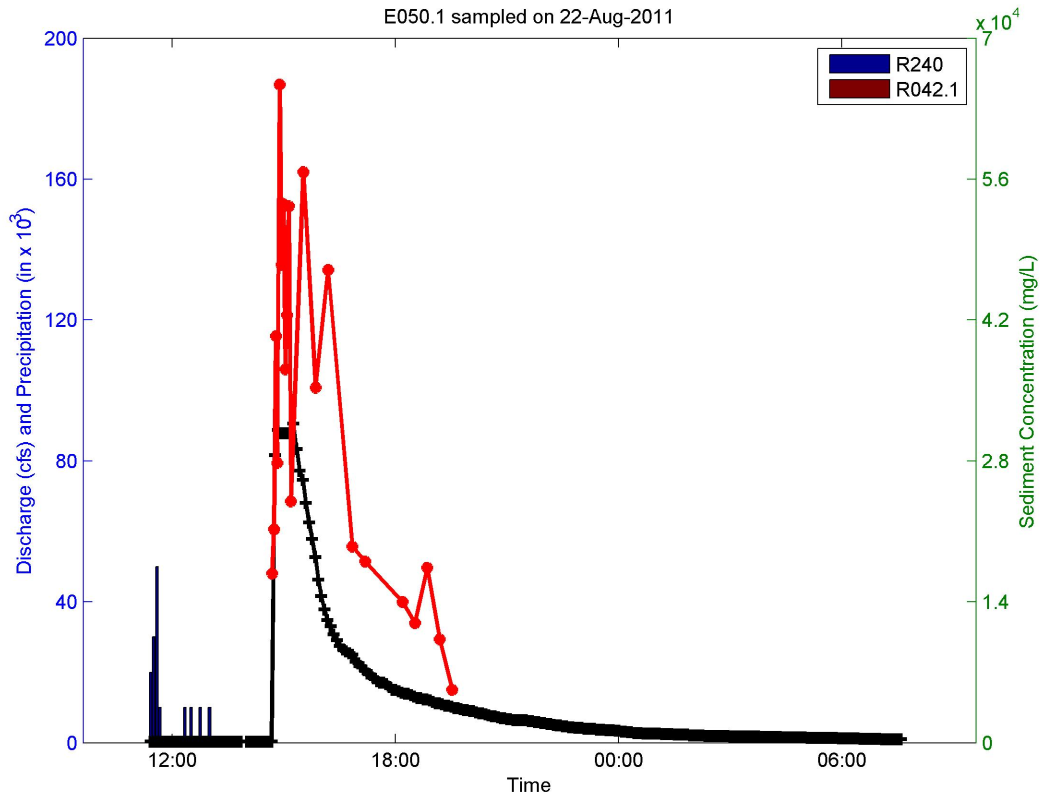

E042.1 sampled on 10-Sep-2011
R240
TA-53
R042.1
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^4
225
180
135
90
45
0
10
8
6
4
2
0
00:00
03:00
06:00
09:00
12:00
Time

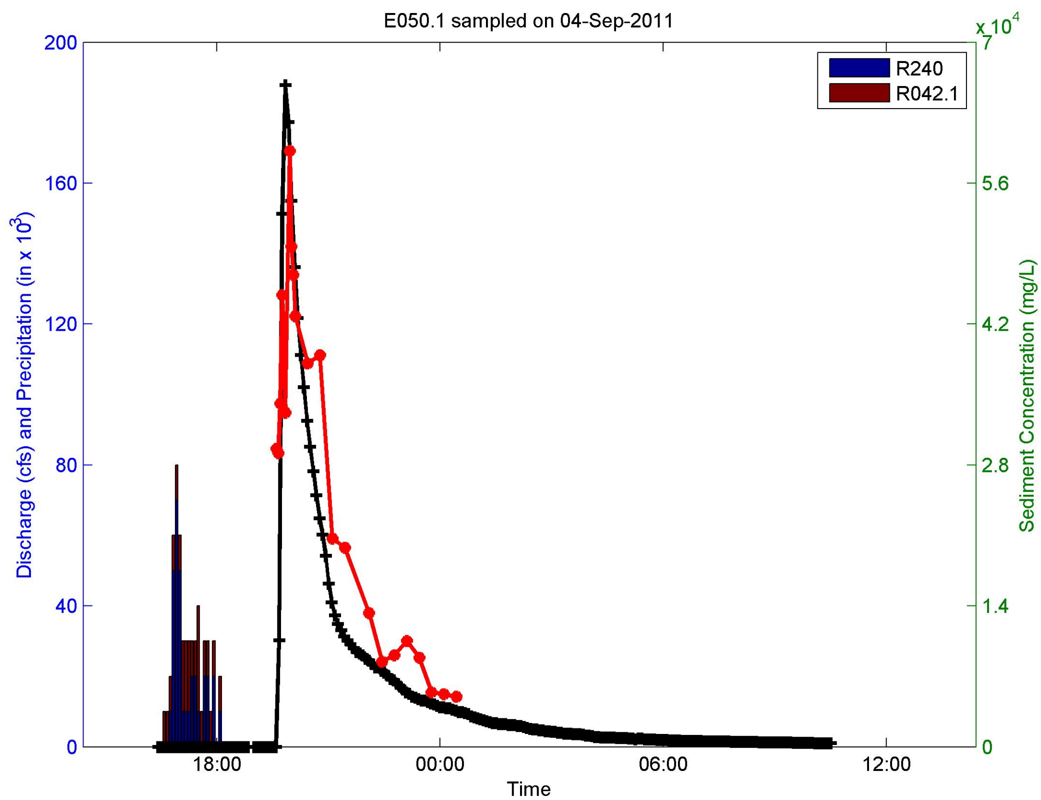

E042.1 sampled on 15-Sep-2011
225
180
135
90
45
0
Discharge (cfs) and Precipitation (in x 10^3)
x 10^4
10
8
6
4
2
0
Sediment Concentration (mg/L)
R240
TA-53
R042.1
12:00
18:00
00:00
06:00
12:00
18:00
00:00
Time

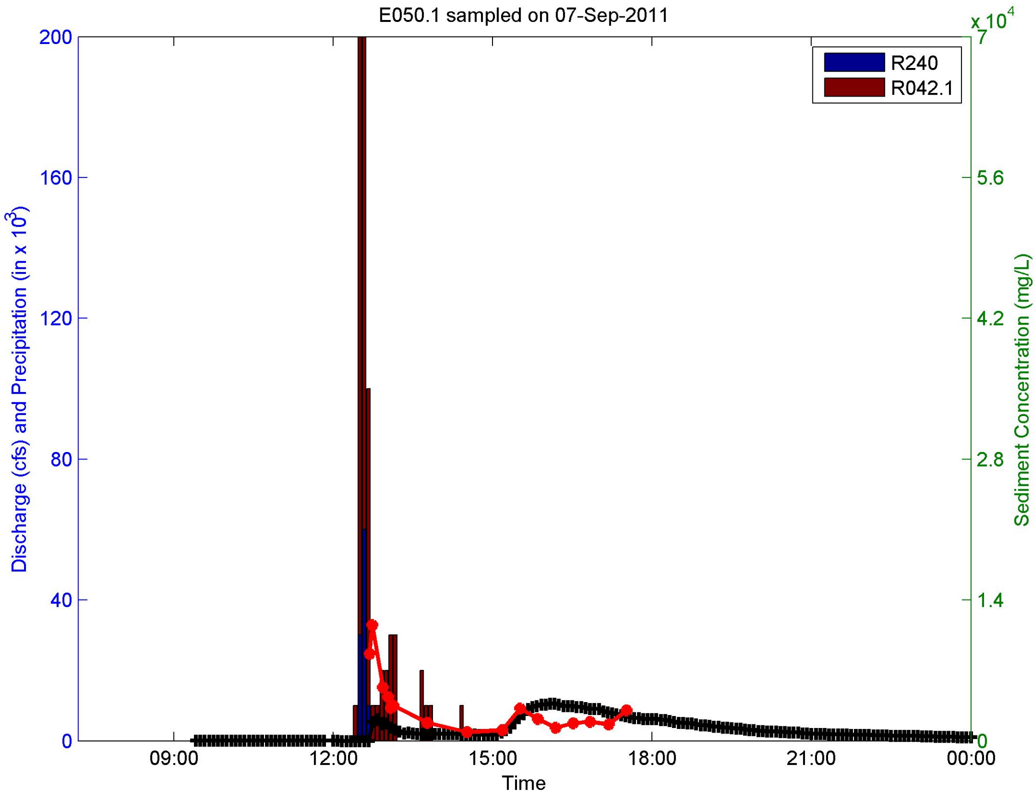

E042.1 sampled on 02-Oct-2011
225
180
135
90
45
0
Discharge (cfs) and Precipitation (in x 10^3)
x 10^4
10
8
6
4
2
0
Sediment Concentration (mg/L)
R240
TA-53
R042.1
15:00
18:00
21:00
00:00
Time

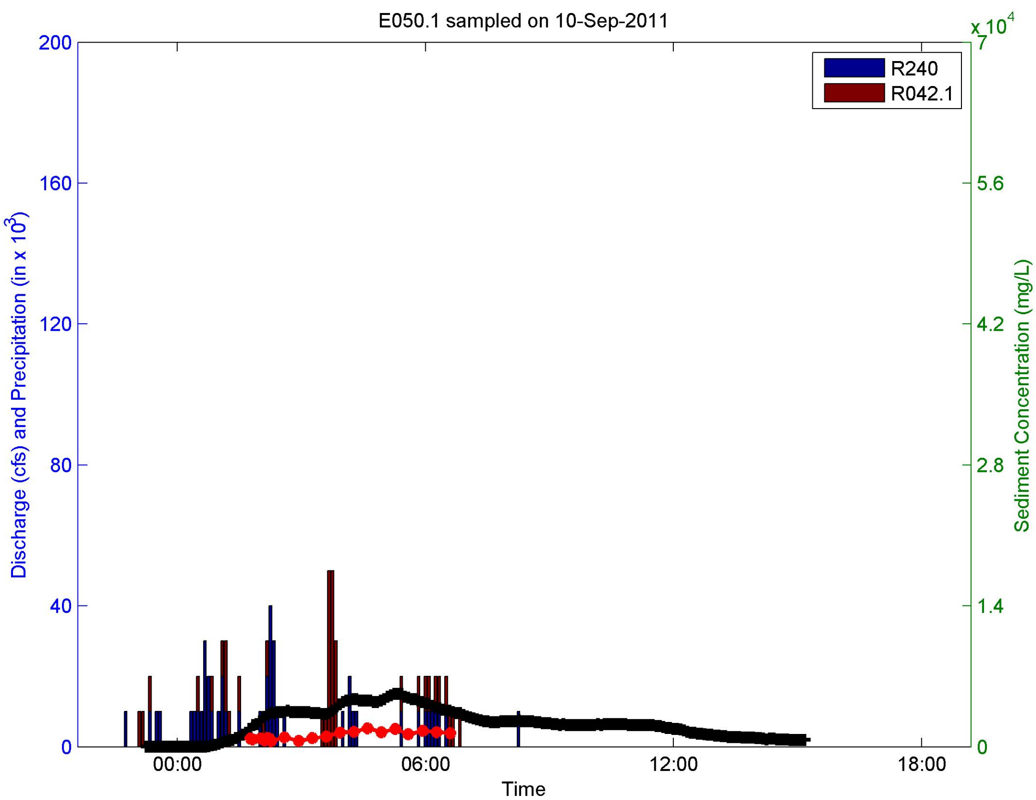

E042.1 sampled on 04-Oct-2011
R240
TA-53
R042.1
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^4
225
180
135
90
45
0
10
8
6
4
2
0
18:00
21:00
00:00
03:00
Time

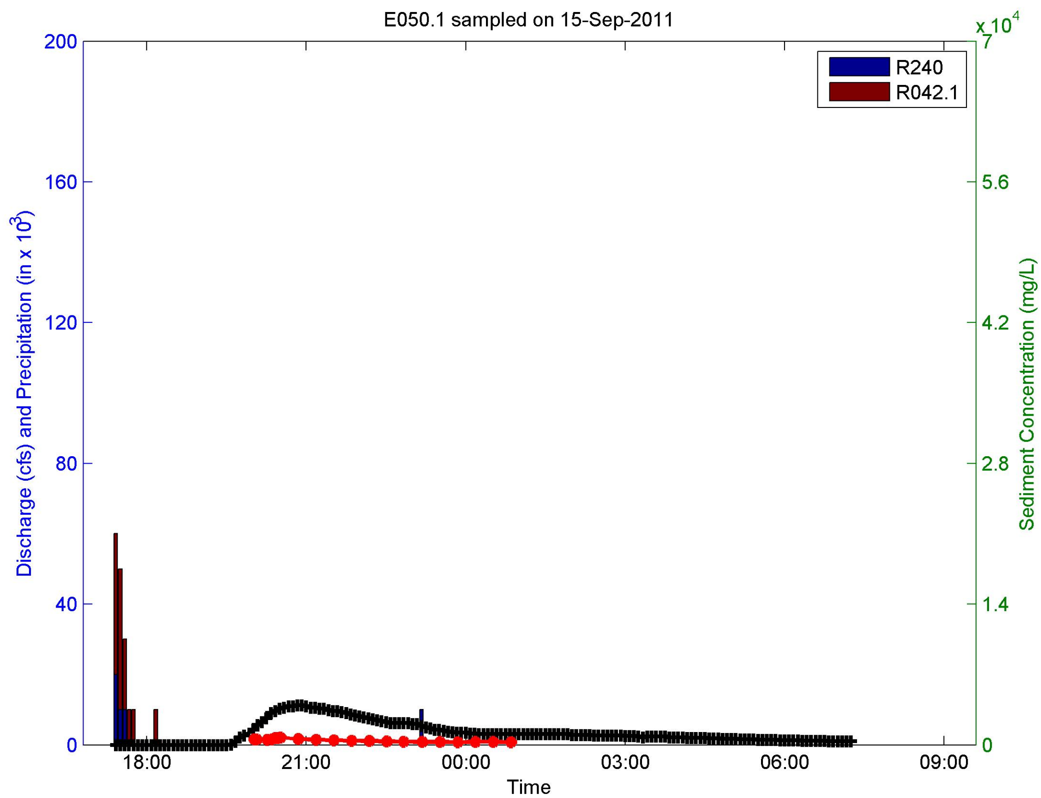

E050.1 sampled on 21-Aug-2011
R240
R042.1
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^4
200
160
120
80
40
0
7
5.6
4.2
2.8
1.4
0
15:00
18:00
21:00
00:00
Time

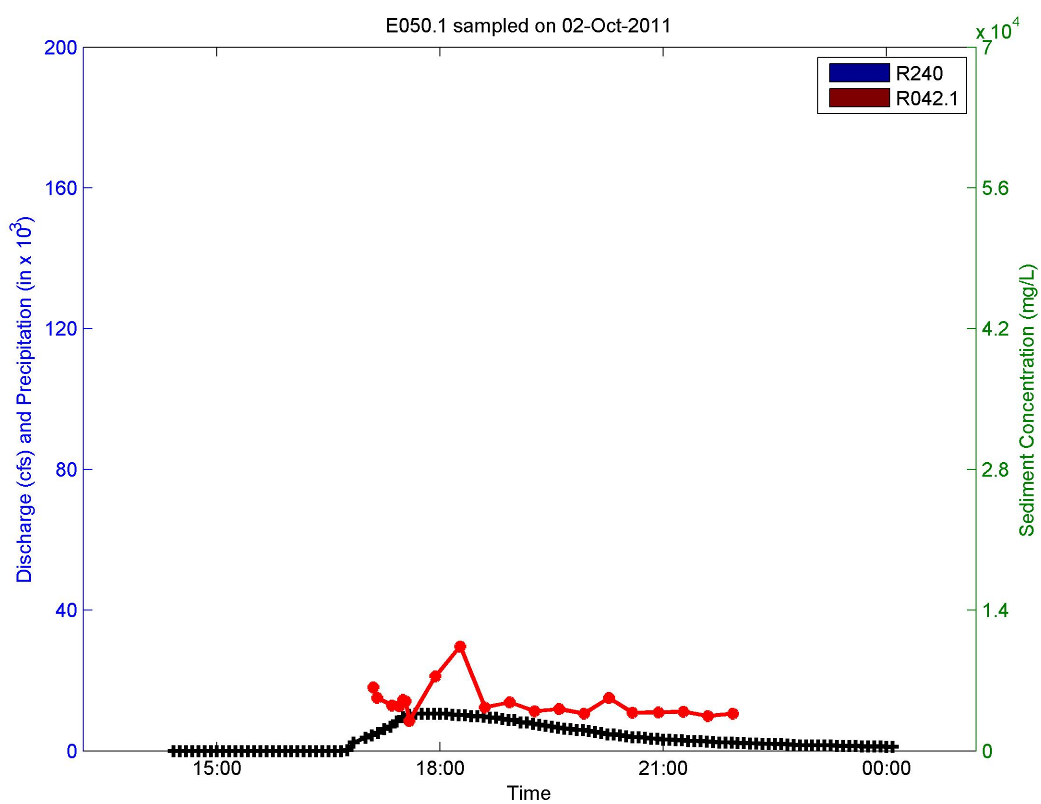

E050.1 sampled on 22-Aug-2011
R240
R042.1
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^4
200
160
120
80
40
0
7
5.6
4.2
2.8
1.4
0
12:00
18:00
00:00
06:00
Time

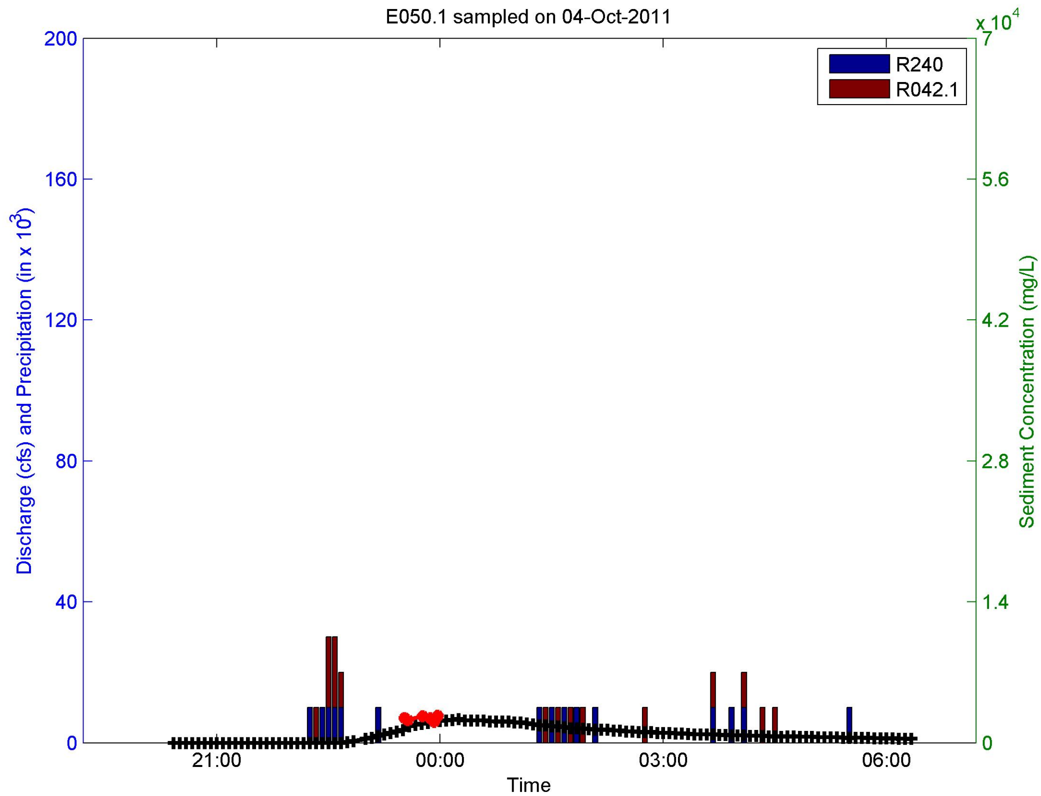

E050.1 sampled on 04-Sep-2011
R240
R042.1
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^4
200
160
120
80
40
0
7
5.6
4.2
2.8
1.4
0
18:00
00:00
06:00
12:00
Time

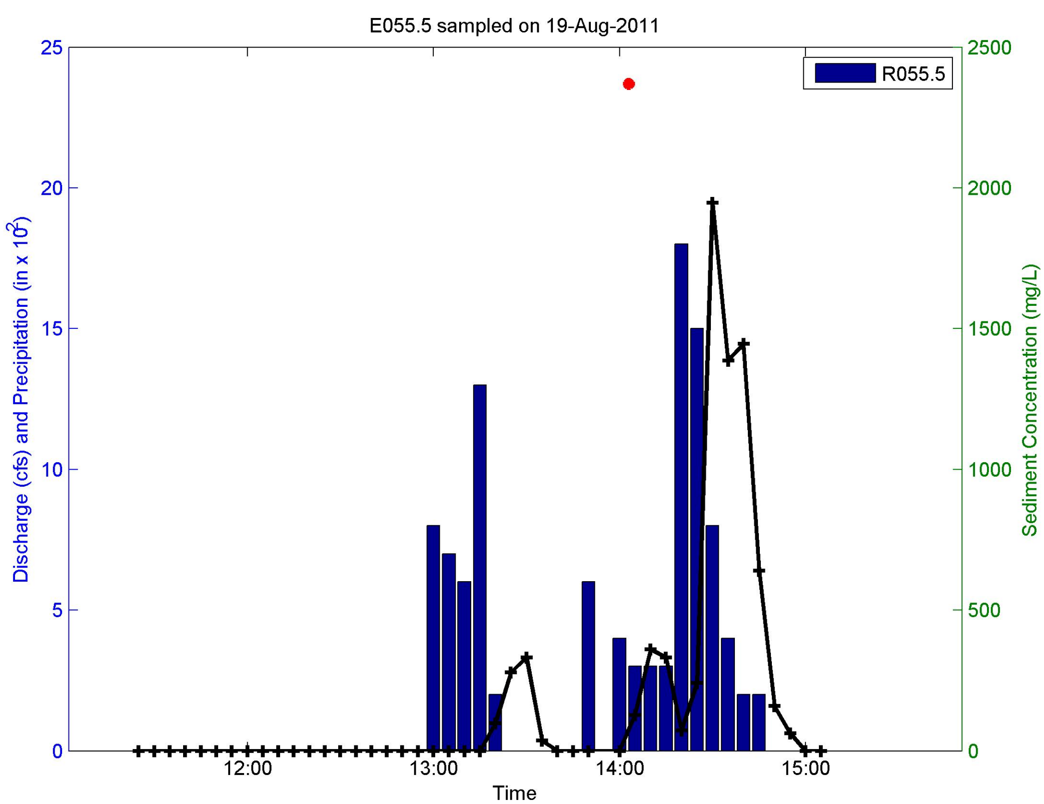

E050.1 sampled on 07-Sep-2011
R240
R042.1
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^4
200
160
120
80
40
0
7
5.6
4.2
2.8
1.4
0
09:00
12:00
15:00
18:00
21:00
00:00
Time

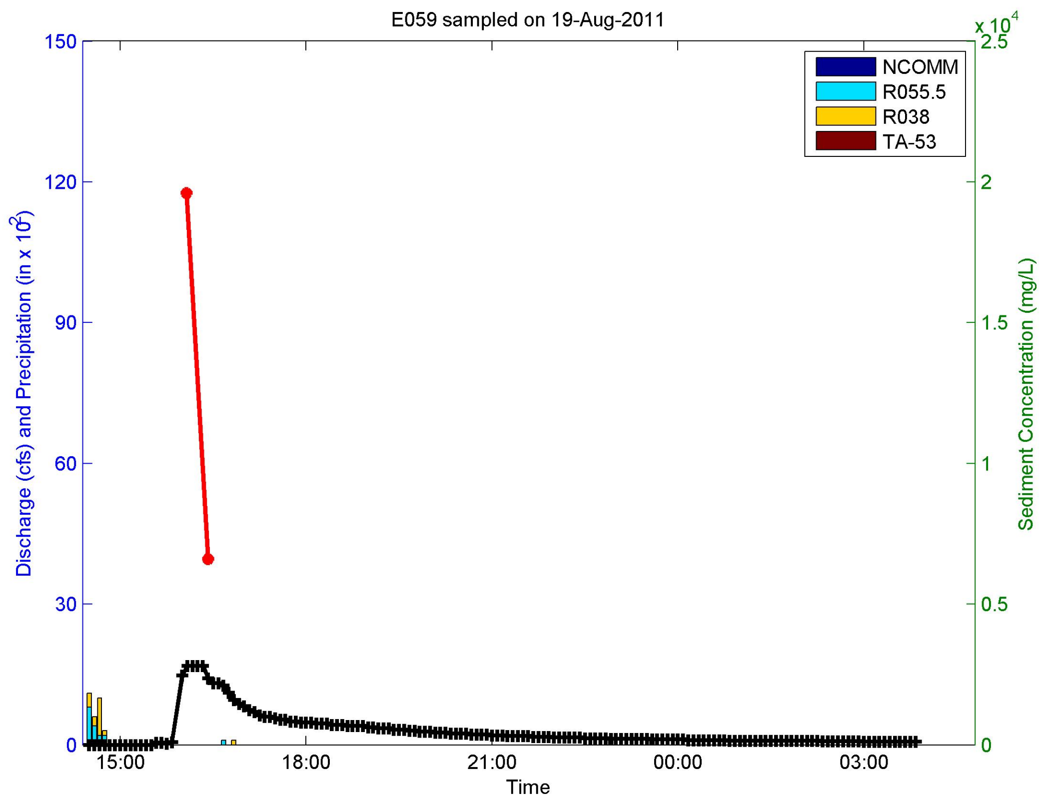

E050.1 sampled on 10-Sep-2011
R240
R042.1
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^4
200
160
120
80
40
0
7
5.6
4.2
2.8
1.4
0
00:00
06:00
12:00
18:00
Time

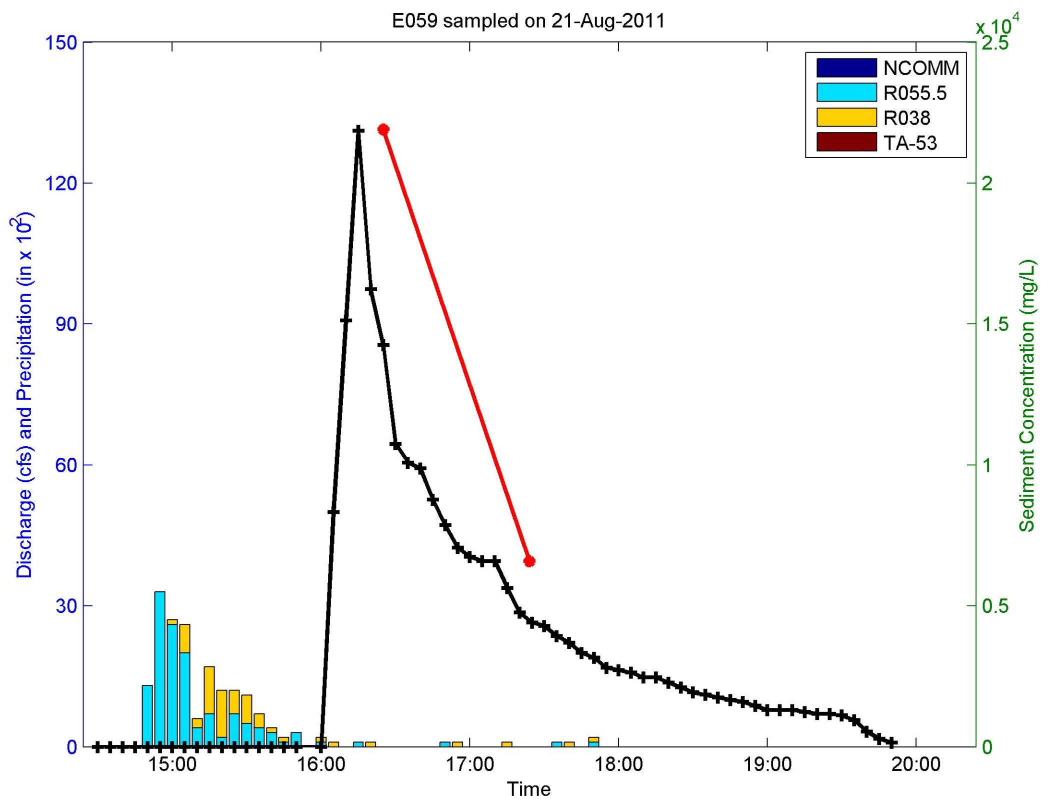

E050.1 sampled on 15-Sep-2011
R240
R042.1
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^4
200
160
120
80
40
0
7
5.6
4.2
2.8
1.4
0
18:00
21:00
00:00
03:00
06:00
09:00
Time

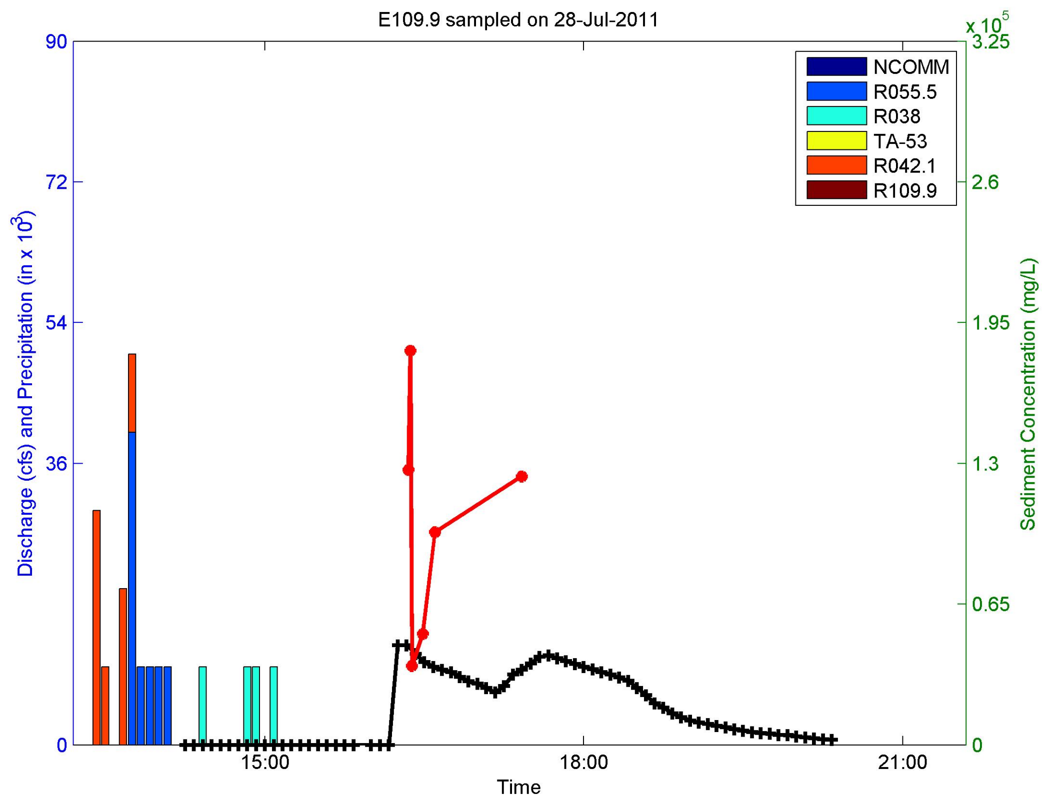

E050.1 sampled on 02-Oct-2011
R240
R042.1
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^4
200
160
120
80
40
0
7
5.6
4.2
2.8
1.4
0
15:00
18:00
21:00
00:00
Time

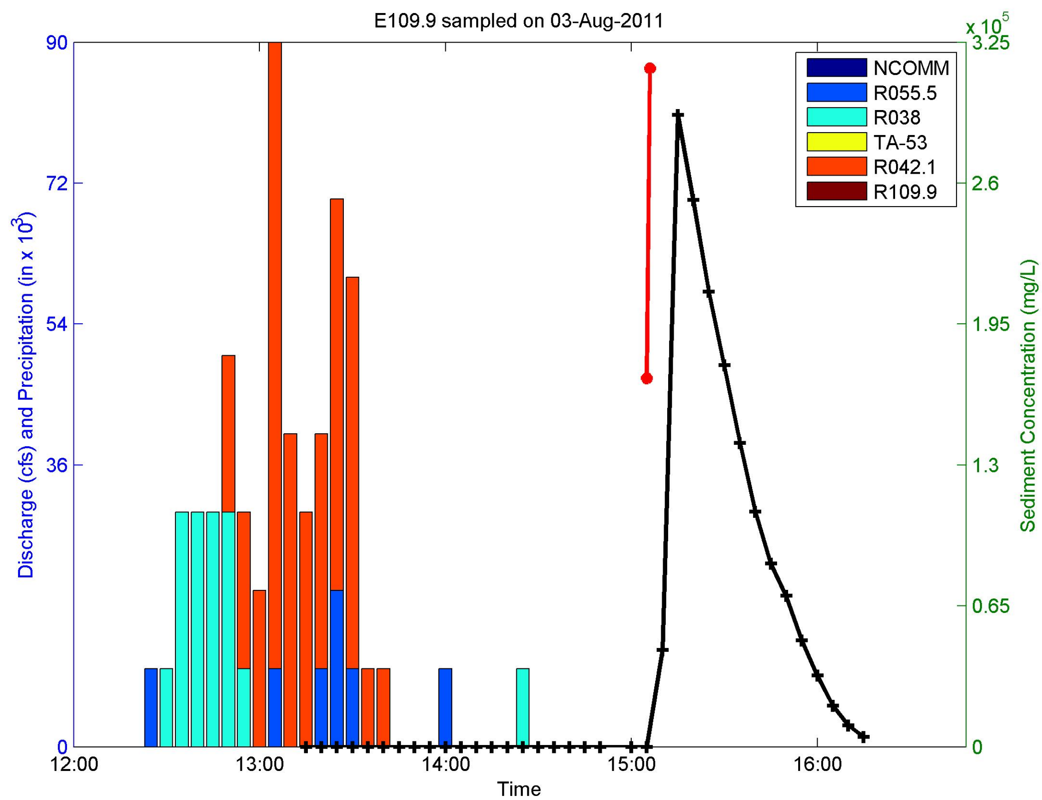

E050.1 sampled on 04-Oct-2011
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^4
R240
R042.1
200
160
120
80
40
0
7
5.6
4.2
2.8
1.4
0
21:00
00:00
03:00
06:00
Time

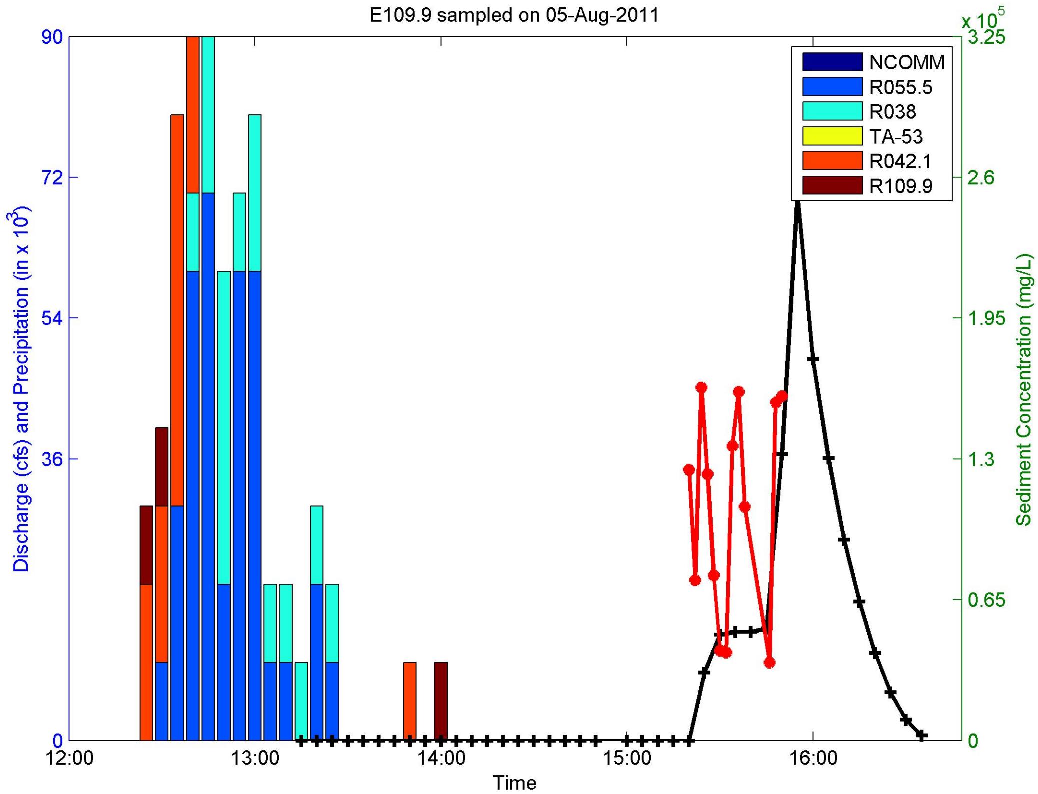

E055.5 sampled on 19-Aug-2011
Discharge (cfs) and Precipitation (in x 10^2)
Sediment Concentration (mg/L)
R055.5
25
20
15
10
5
0
2500
2000
1500
1000
500
0
12:00
13:00
14:00
15:00
Time

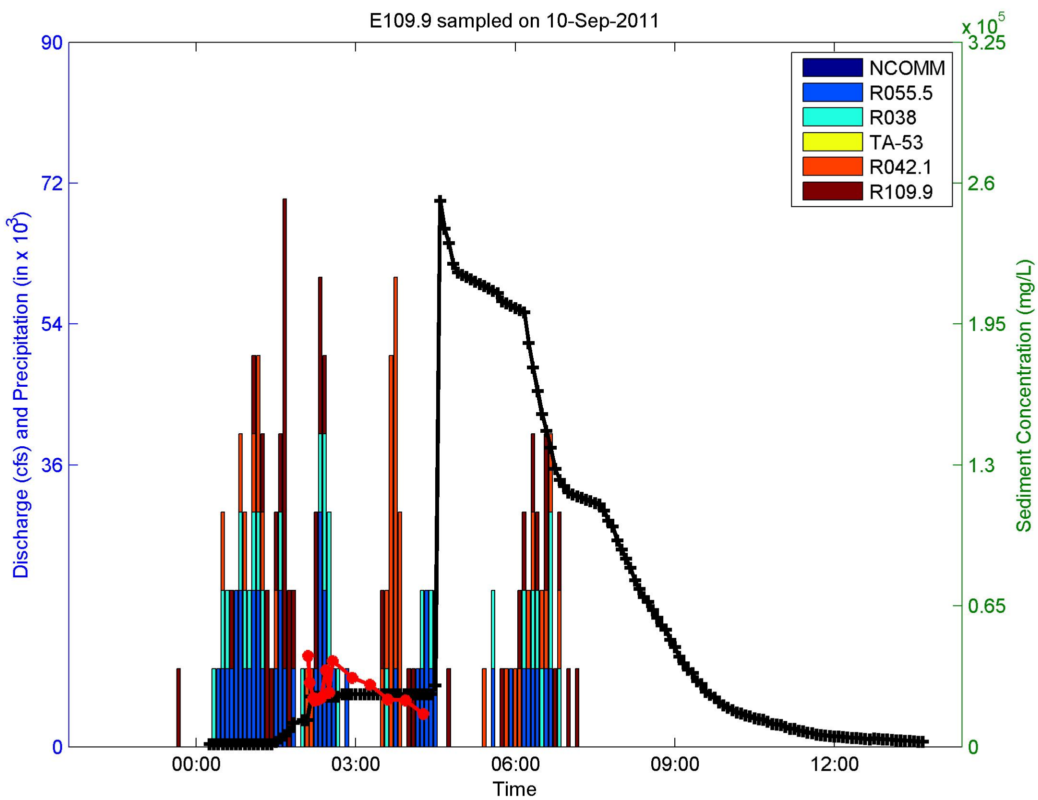

E059 sampled on 19-Aug-2011
Discharge (cfs) and Precipitation (in x 10^2)
Sediment Concentration (mg/L)
x 10^4
NCOMM
R055.5
R038
TA-53
150
120
90
60
30
0
2.5
2
1.5
1
0.5
0
15:00
18:00
21:00
00:00
03:00
Time


E059 sampled on 21-Aug-2011
Discharge (cfs) and Precipitation (in x 10^2)
Sediment Concentration (mg/L)
x 10^4
NCOMM
R055.5
R038
TA-53
150
120
90
60
30
0
2.5
2
1.5
1
0.5
0
15:00
16:00
17:00
18:00
19:00
20:00
Time


E109.9 sampled on 28-Jul-2011
NCOMM
R055.5
R038
TA-53
R042.1
R109.9
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^5
0
36
54
72
90
0.65
1.3
1.95
2.6
3.25
15:00
18:00
21:00
Time


E109.9 sampled on 03-Aug-2011
NCOMM
R055.5
R038
TA-53
R042.1
R109.9
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^5
0
36
54
72
90
0.65
1.3
1.95
2.6
3.25
12:00
13:00
14:00
15:00
16:00
Time


E109.9 sampled on 05-Aug-2011
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^5
Time
NCOMM
R055.5
R038
TA-53
R042.1
R109.9
0
36
54
72
90
0
0.65
1.3
1.95
2.6
3.25
12:00
13:00
14:00
15:00
16:00


E109.9 sampled on 10-Sep-2011
Discharge (cfs) and Precipitation (in x 10^3)
Sediment Concentration (mg/L)
x 10^5
Time
NCOMM
R055.5
R038
TA-53
R042.1
R109.9
0
36
54
72
90
0
0.65
1.3
1.95
2.6
3.25
00:00
03:00
06:00
09:00
12:00

Appendix B

Analytical Results, Analytical Reports,
and 5-Minute Discharge Results
(on DVD included with this document)

This appendix presents (on DVD included with this report) the analytical results and analytical reports for stormwater sampling conducted in the Los Alamos and Pueblo watershed during 2011. Separate files are included for analytical results of samples analyzed as water and samples analyzed as sediment, the latter necessitated by the high sediment content of some ash-rich samples at gaging station E109.9 that were derived from the Las Conchas burn area. Also presented are 5-min discharge data at each gage for the period from June 1, 2011, through October 30, 2011. The monitoring period also included May 2011, but no runoff events occurred in this watershed during that month.