Prepared in cooperation with the Bureau of Land Management, U.S. Department of the Interior

Rainfall-Runoff and Erosion Data from the Mancos Shale Formation in the Gunnison Gorge National Conservation Area, Southwestern Colorado, 2003–2006

Open-File Report 2007–1002G

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Conversion Factors, Abbreviations, and Datums

Multiply	By	To obtain
millimeter (mm)	0.03937	inch (in.)
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)
square meter (m ²)	10.76	square foot (ft ²)
hectare (ha)	2.471	acre
square kilometer (km ²)	247.1	acre
hectare (ha)	0.003861	square mile (mi ²)
square kilometer (km ²)	0.3861	square mile (mi ²)
liter (L)	33.82	ounce, fluid (fl. oz)
liter (L)	0.2642	gallon (gal)
liter (L)	61.02	cubic inch (in ³)
cubic meter (m ³)	35.31	cubic foot (ft ³)
gram (g)	0.03527	ounce, avoirdupois (oz)
kilogram (kg)	2.205	pound avoirdupois (lb)
megagram (Mg)	1.102	ton, short (2,000 lb)
kilopascal (kPa)	0.1450	pound per square inch (lb/in ²)
inch (in.)	25.4	millimeter (mm)
gallon (gal)	3.785	liter (L)
gallon per minute (gal/min)	0.06309	liter per second (L/s)
pound per square inch (lb/in ²)	6.895	kilopascal (kPa)

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:

$$^{\circ}\text{F}=(1.8\times^{\circ}\text{C})+32$$

Temperature in degrees Fahrenheit (°F) may be converted to degrees Celsius (°C) as follows:

$$^{\circ}\text{C}=(^{\circ}\text{F}-32)/1.8$$

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88).

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Altitude, as used in this report, refers to distance above the vertical datum.

Rainfall-Runoff and Erosion Data from the Mancos Shale Formation in the Gunnison Gorge National Conservation Area, Southwestern Colorado, 2003–2006

By John G. Elliott¹, James R. Herring², George P. Ingersoll¹, John Kosovich³, and Juli Fahy⁴

Abstract

Data were collected and experiments were conducted from 2003 to 2006 by the U.S. Geological Survey, in cooperation with the Bureau of Land Management, to support research into understanding processes that liberate, disperse, and concentrate erosion byproducts in Mancos Shale landscapes. The study area was the Gunnison Gorge National Conservation Area near Montrose and Delta, Colorado. This report includes data collected from 24, small-plot, rainfall-runoff simulations, 6 hillslope-erosion monitoring plots, 20 hillslope-creep monitoring sites, and 3 precipitation gages. Small-plot rainfall-runoff simulations were performed on paired (undisturbed and disturbed) plots to examine the effect of off-highway vehicle use on runoff and erosion. These data were collected in conjunction with several other studies done by the U.S. Geological Survey in the Gunnison Gorge National Conservation Area. Data collected in companion studies are published in separate open-file reports.

Introduction

Mancos Shale landscapes of the Western United States, especially in the upper Colorado River Basin, have become a focal point for the need for science information that will support sound land-use policy development. This need has become more prominent primarily because of (1) increased and changing demands for land use and (2) issues related to selenium, salinity, and sediment. Also, there is an increased awareness within the scientific community of the need to better understand processes leading to the concentration or dispersal of both economically important and environmentally sensitive elements in widely dispersed black shale regions, including the Mancos Shale in southwestern Colorado.

An understanding of the processes leading to the concentration of organic matter, elements of economic importance, and environmentally sensitive elements is fundamental to developing predictive models that can be used to evaluate black shale landscapes for their mineral resource potential and their environmental sensitivity. In many instances, geomorphic, geologic, hydrologic, biologic, and land-use data are insufficient for resource and land managers to formulate scientifically supportable policies for (1) the sustainable development of mineral and energy resources contained in black shale terrains and (2) the multiple uses of public resources in black shale landscapes. There is a lack of detailed understanding of the relations and processes required to create predictive models that can effectively take into account changes in land use, climate, national resource need, or a variety of other factors.

The study was done in cooperation with the Bureau of Land Management in the Gunnison Gorge National Conservation Area (GGNCA) near Montrose and Delta, Colorado (fig. 1). The Mancos Shale in GGNCA outcrops between the southern and western rims of the Black Canyon and Gunnison Gorge and, beyond the GGNCA boundary, extends westward into the Uncompahgre River valley (Kellogg, 2004). Climate of the study area is semiarid, with a mean maximum annual temperature of 17.4° C (63.3° F), a mean minimum annual temperature of 1.4° C (34.6° F), and mean annual precipitation of 242 mm (9.53 in.) at Montrose (National Oceanic and Atmospheric Administration, 2007). Forty-four percent of the mean annual precipitation occurs as rain in July through October, but measurable snow can occur from October through April. The 2-year, 1-hour rainfall total is 15 mm (0.59 in.) and the 100-year, 1-hour rainfall total is 38 mm (1.51 in.) (Miller and others, 1973).

¹U.S. Geological Survey, Box 25046, MS 415, DFC, Lakewood, CO 80225.

²U.S. Geological Survey, Box 25046, MS 973, DFC, Lakewood, CO 80225.

³U.S. Geological Survey, Box 25046, MS 516, DFC, Lakewood, CO 80225.

⁴Bureau of Reclamation, Box 25007, MS 86-68520, Lakewood, CO 80225.

The study sites were located in the area of exposed Mancos Shale in GGNCA. Data were collected from small-plot rainfall-runoff simulations, hillslope-erosion monitoring plots, hillslope-creep measurements, and precipitation gages from 2003 to 2006 to support research into understanding processes that liberate, disperse, and concentrate erosion byproducts in Mancos Shale landscapes.

Purpose and Scope

The purpose of this report is to present data from several measurements and onsite simulations done as a part of this study. The report includes data collected from 2003 to 2006 from small-plot rainfall-runoff simulations, hillslope-erosion monitoring plots, hillslope-creep measurements, and precipitation gages located in the Gunnison Gorge National Conservation Area (GGNCA) near Montrose and Delta, Colorado (fig. 1).

Acknowledgments

The authors are grateful for the assistance received in collecting and processing the data presented in this report. Michael R. Stevens, Steven J. Char, Heather Sproule Eppler, Anthony J. Ranalli, Barbara C. Ruddy, and Paul von Guerard of the U.S. Geological Survey (USGS) provided assistance with rainfall-runoff simulations, hillslope creep measurements, and microtopographic measurements. James R. Herring, USGS (retired), collected simulated rain blanks and runoff samples for geochemical analyses. Mike Stevens and Steve Char also assisted with construction of silt fences used in the long-term, hillslope-erosion monitoring plots and with topographic surveying. Heather Sproule Eppler processed runoff and sediment samples from the rainfall simulations. Dave Catts, formerly of the USGS, made reconnaissance maps and computed initial geomorphic characteristics of the GGNCA.

Dennis Murphy, Bureau of Land Management (BLM), Montrose, assisted with installation and maintenance of the rain gages in GGNCA and provided earlier precipitation data from a nearby gage. Karen Tucker, BLM, Montrose, arranged for access to GGNCA through privately owned land. Glen Neigenfind, Clyde Waller, Al Griffin, Nora Hamilton, and Chad Greiner of BLM carefully disturbed the 1-m² treatment plots with their motorcycles before the rainfall-runoff simulations on disturbed soils. Marc Catlin, Uncompahgre Valley Water Users Canal, graciously provided a source of water for the rainfall simulations. Timothy Ward, University of New Mexico (Albuquerque), and Bruce Byars, Baylor University Center for Applied Geography and Spatial Research (Waco, Tex.), provided helpful discussions in the design modification and operation of the rainfall simulator. John Moody, USGS, provided design assistance and materials for the rainfall-runoff collection device and for microtopographic measuring equipment. Richard Grauch and Michele Tuttle, USGS, provided technical insights regarding study site locations. Concurrent, co-located data collection and analyses were conducted by James Herring, Richard Grauch, Michele Tuttle, Geneva Chong, John Kosovich, and Eric Livo, USGS.

Methods

Quantification of a variety of geomorphic and hydrologic processes in the Gunnison Gorge National Conservation Area (GGNCA) required several types of measurements, surveys, simulations, and instrumentation. Data from this study are presented in a “Supplemental Information” section at the end of this report. A co-located study of Mancos Shale rock material and shale-derived soil is published in a companion report by Tuttle and others (2007). Other co-located studies included the geochemistry of the simulated rainfall runoff and sediment (J.R. Herring, U.S. Geological Survey, oral commun., 2003–2006), Mancos Shale geology (R.I. Grauch, U.S. Geological Survey, oral commun., 2003–2006), vegetation and biological soil crusts (G.W. Chong, U.S. Geological Survey, oral commun., 2003–2006), and geospatial data (J.J. Kosovich, U.S. Geological Survey, oral commun., 2004–2006).

Site Selection and Preparation

Study sites in the upper reaches of Elephant Skin Wash and on hillslopes in the Candy Lane area were chosen for sampling, monitoring, and experiments because of their relative remoteness and infrequent human visitation (figs. 2 and 3). Study sites were selected to represent a range of geomorphic settings in GGNCA with emphasis directed to characteristic areas where off-highway vehicular (OHV) use was a potential. Based on observations and BLM officials, steep hillslopes attract occasional to frequent motorcycle use in GGNCA and were presumed to be more affected by this type of land use than were low-gradient

Figure 2. LIDAR image showing location of sampling sites in the upper Elephant Skin Wash study area.

Figure 3. LIDAR image showing location of sampling sites in the Candy Lane study area.

valley floors and less-steep hillslopes. Consequently, hillslopes with gradients between approximately 20 to 38 degrees occurring over a range of aspects (direction toward which hillslope faces) were selected for study (tables 1 and 2 at the end of this report).

All study sites initially were undisturbed or minimally disturbed by human or livestock activity. Rainfall-runoff simulations were performed on paired plots to test the effect of land-use change from undisturbed (control plot) to OHV disturbed (treatment plot). The control plot was systematically disturbed by a BLM employee on an off-road motorcycle.

Topographic Surveys

Rainfall-runoff simulations, small-plot microtopography, hillslope creep, and large-plot hillslope erosion measurements were made on hillslopes in GGNCA from 2003 to 2006. Topographic surveys from 2003 to 2005 determined geomorphic characteristics of the hillslopes (profile, gradient, aspect) on which these simulations and measurements were made (table 1). Because hillslope profile, gradient, and aspect can be extracted from digital elevation models for a larger geographic area using geographic information system (GIS) techniques, site characteristics, erosion processes, and other variables dependent on these geomorphic characteristics and quantified in this study can be extrapolated to other, non-instrumented locations.

Permanent bench marks (aluminum caps set in concrete) and survey reference marks (steel concrete-form stakes) were installed at the upper Elephant Skin Wash and Candy Lane study areas to facilitate relocation and replicate measurements at the study sites. Bench-mark and reference-mark coordinates originally were determined with a variety of hand-held GPS receivers and recorded in, or converted to, the Universal Transverse Mercator (UTM) projection, Zone 13 N coordinates, horizontal datum North American Datum of 1983 (NAD 83), and vertical datum North American Vertical Datum of 1988 (NAVD 88). Horizontal position error estimates for the GPS-determined coordinates ranged from plus or minus 4 to 12 m. Consequently, reference-mark and other study-site monument coordinates are reported to a one-meter accuracy in tables 1 and 2, and are intended only to assist in relocating the study sites. All bench marks, reference marks, and other study-site monuments subsequently were surveyed to 0.003 m (0.01 ft) horizontal and vertical accuracy using a Topcon GTS-3B geodetic total station, a local, rectangular coordinate system, and an arbitrary, local vertical datum.

Personnel from the USGS National Geospatial Technical Operations Center II and Rocky Mountain Geographic Science Center conducted an onsite GPS survey in August and September 2005 to more precisely determine the coordinates and elevations of the two bench marks. These data were collected with dual frequency Ashtech Z-12 Global Positioning System receivers using static survey methods and, later, were postprocessed using Ashtech Office Suite (AOS) 2.0 software (J.J. Kosovich, U.S. Geological Survey, oral commun., September 2005). Bench-mark coordinates and elevations are presented to accuracies of 0.01 m in tables 1 and 2.

Hillslope profile and hillslope gradient were determined by surveying a longitudinal profile from a high point at the top of the hillslope, down the relatively steep part, to the bottom of the hillslope where the gradient lessened abruptly using a Topcon GTS-3B geodetic total station. Topographic points down the hillslope were surveyed at approximately 3-m spacing along the transects. Hillslope aspect was determined onsite using a hand-held Brunton compass adjusted for local magnetic declination published on the most recent USGS 1:24,000-scale topographic map.

Cross sections and a longitudinal profile also were surveyed for one arroyo in the valley floor of the Candy Lane study area to estimate the headcut migration rate for this type of erosion (fig. 4). The arroyo cross sections were located to quantify the channel geometry of an unincised, a recently incised, and an older incised segment of the drainage system.

Rainfall-Runoff Simulation

Twenty-one small-plot, rainfall-runoff simulations were performed to characterize infiltration, runoff, and erosion on the study hillslopes. Simulations were performed on paired 1-m² plots to test the effect of land-use change from undisturbed (control plot) to OHV disturbed (treatment plot). The control plot was undisturbed with naturally occurring soil-crust structure and vegetation, whereas the paired treatment plot was carefully disturbed by a BLM motorcyclist making 12 passes through the plot. Simulated rainfall was designed to approximate the 100-year, 1-hour rainfall rate (38 mm, or 1.51 in.) for the Montrose, Colorado, region (Miller and others, 1973).

The simulated rainfall-delivery device was a modified design that was based primarily on the designs of previously used portable, small-plot devices (Wilcox and others, 1986; Byars and others, 1996; Benavidez-Solorio and MacDonald, 2001). A rectangular scaffold (Byars and others, 1996) with adjustable legs suitable for installation on variable-gradient hillslopes was constructed from 19-mm (3/4 in.) polyvinyl chloride (PVC) pipe and telescoping tent poles and set up onsite. The scaffold was enclosed with plastic tarps before the simulation began to reduce wind disturbance (fig. 5).

Simulated rainfall was delivered through a single Spraying Systems “Full Jet” FL-15 VS nozzle suspended approximately 2.0 m above the center of the 1-m² plot (Wilcox and others, 1986, fig. 1). The nozzle delivered droplets in a full-cone pattern

Figure 4. LIDAR image showing location of arroyo headcut in the Candy Lane study area.

Figure 5. Simulated rainfall-runoff device set up on 1-square meter plot.

with a 120-degree angle. The nozzle was rated to deliver 1.5 gal/min, with a droplet size of approximately 0.94-mm diameter with 40 lb/in² water pressure.

Water used in the simulations was withdrawn from approximately 200 m downstream from the discharge point of the Gunnison Tunnel into the South Canal, approximately 9 km east of Montrose, Colorado (fig. 1). This water was transported by truck to the study sites in a 200-gal polyethylene tank and applied to the study plot under pressure from a Wayne Water System ½ HP impeller-type water pump powered by electricity from a gasoline generator. Pressure was regulated manually with a valve at a gage on the scaffold and was kept between 38 and 40 lb/in² throughout the simulation.

The 1-m² rainfall-runoff simulation plot was chosen to be representative of the overall conditions of the larger study hillslope. Most 1-m² plots were located on a lower hillslope position, upslope from the hillslope foot or toe, due to water-supply proximity and upslope pumping limitations. A 3-m long section of 100-mm wide galvanized garden edging, folded at two corners formed three sides of the 1-m² plot border frame and was carefully tapped into the soil about 50 mm. The fourth and downhill side of the plot was left unbordered where a 250-mm wide section of galvanized flashing was fitted between the frame sides to collect surface runoff from the plot. A slotted 100-mm diameter PVC pipe, placed horizontally across the hillslope and slightly sloping to one side or the other, received runoff from the flashing and directed it to a collection bucket adjacent to the scaffold. The collection apparatus was identical to the device used by Moody and Martin (2001, fig. 4.1) for their hillslope-runoff measurements.

Most rainfall simulations lasted for 90 minutes, a time sufficient to generate runoff from the test plots. Runoff and entrained sediment were collected in 500-mL bottles for size analysis, concentration measurement, hydrograph computation, and chemical analysis. When the runoff rate was relatively slow or the discharge low, the entire runoff was collected in several bottles for analysis. At higher rates and discharges, only part of the runoff was collected for analysis, but all runoff volume was measured in the field for total runoff computation.

Runoff and Sediment Analysis

Runoff from the rainfall simulations was collected to compute instantaneous discharge, total runoff hydrograph, suspended-sediment concentration, percentage of silt-and clay content, and chemical characteristics (J.R. Herring, U.S. Geological Survey, oral commun., 2003–2006). Soil crusts from within the 1-m² plots also were collected for particle-size analysis and Munsell color notation (Munsell Color, 1992) was recorded.

Runoff from Rainfall Simulations

Runoff collected in bottles onsite from the rainfall simulations was analyzed at the USGS Colorado Water Science Center Sediment Laboratory in Lakewood, Colorado. Bottle tare weight (recorded before the simulation) was subtracted from the gross (filled) bottle weight to determine the net sample (water and entrained sediment) weight and total runoff volume. The total runoff volume for each bottle was divided by the bottle-collection time to determine an instantaneous discharge. Instantaneous discharges throughout the simulation were plotted against elapsed simulation time to create the total runoff (water plus entrained sediment) hydrograph (Frasier and others, 1998, fig. 1).

Sediment Entrained in Runoff from Rainfall Simulations

Supernatant water in the runoff samples was decanted after settling; the residual sediment was dried in an oven at 100°C for at least 24 hours and weighed to get the total sediment weight for each sample bottle (Guy, 1969). Sediment concentration in the runoff of each bottle was calculated as the dry weight of sediment divided by the residual of total runoff weight minus dry sediment weight. Instantaneous sediment concentrations were plotted against elapsed simulation time to create sediment concentration hydrographs, and the average sediment concentration for the entire simulation was computed. Total sediment yield for the simulation was the sum of all instantaneous sediment weights, plus an amount estimated for any unsampled runoff. The volume of onsite discarded runoff was known and was assumed to have a concentration equal to the simulation average concentration.

The residual sediment from three samples from each simulation were further analyzed to determine the size characteristics of sediment in the runoff from the rainfall simulation. These samples were deflocculated with a solution of sodium hexametaphosphate to aid in clay dispersal (Guy, 1969) and wet sieved through a 0.0625-mm sieve to determine the percentages of sediment that were sand size or larger or finer than sand size (silt and clay). Samples from different times in each simulation (early-, middle-, and late-hydrograph periods) were analyzed to determine whether the sediment size characteristics changed as the simulation progressed. Because the total rainfall-simulation time differed from site to site, samples collected at approximately the 25th (early hydrograph), 50th (middle hydrograph), and 75th (late hydrograph) percentiles of the total, elapsed simulation time were analyzed.

Sediment in Soil Crusts

Dry soil crusts, approximately 10 to 30 mm thick, were collected onsite from the rainfall-runoff simulation plots and were analyzed for particle size and percentage of silt-and-clay content at the Bureau of Reclamation Soil Laboratory in Lakewood, Colorado. Grain-size data were obtained using a Coulter LS 100 Particle Size Analyzer, which is a laser-diffraction system capable of measuring particles between 0.0004 mm and 0.9 mm that are suspended in liquid. Particles may be any type of material including (but not limited to) sediment, soil, or biological samples. The particle-size analyzer is computer controlled and consists of a water-filled sample vessel with a built-in sonicator to disperse the particles, a laser-light source, lenses, and sample-cell window. The suspended particles flow through the sample cell where the laser beam illuminates the dispersed sample. The particles scatter the light in patterns determined by their sizes. Arrays of photodetectors measure the intensity of the scattered light, and the particle sizes are determined by diffraction patterns using a Fourier lens. Volume calculations are automatically made from that data, but results may be customized to include volumes, surface-area distribution, statistical parameters, and comparative charts. Data may be presented as actual-size measurements or as sieve sizes.

The optimum amount of sample needed for particle-size measurement should be enough to provide a high signal-to-noise ratio but not enough to create problems with multiple scattering. One-half to 2 g of dry material are usually sufficient to provide an adequate sample. Larger samples may be characterized by analyzing subsamples and combining the results.

Dry samples were prepared for size analysis by physically disaggregating the soil crusts by hand as much as possible without causing grain-size reduction. The disaggregated material then was placed in a slurry consisting of sample, water, and sodium hexametaphosphate (to aid in clay dispersal), initially well mixed, stirred occasionally thereafter, and left for a minimum of 24 hours. Individual samples were poured through a #35 sieve (0.5 mm) to remove larger particles such as fossil and gypsum fragments to avoid scratching the lenses; however, very little material was removed from any sample by this process.

Microtopographic Measurement

The soil-surface elevation within the 1-m² rainfall-runoff simulation plots, referred to as the “microtopography,” was measured in detail before and immediately after each rainfall simulation. Microtopographic measurements were made using a portable point-gage device, termed an “erosion bridge” by Moody and Martin (2001, fig. 4.4). The erosion bridge consisted of a 940-mm (37-in.) long, 25x51-mm (1x2-in.) aluminum channel bar with 5-mm (3/16-in.) holes spaced 10-mm (3/8-in.) apart,

attached to a 1,220-mm (48-in.) long, 24x6-mm (1x1/4-in.) aluminum flat bar. The erosion bridge was leveled and clamped at a known reference elevation on permanent 16-mm (5/8-in.) steel concrete-form stakes driven into the ground on either side of the 1-m² plot border frame. Measurement of the soil-surface microtopography was made normal to the downslope direction by carefully lowering a 610-mm (24-in.) long, 5-mm (3/16-in.) diameter stainless-steel rod through every other hole in the erosion bridge until it contacted the soil surface (fig. 6). The length of the rod protruding above the top of the leveled erosion bridge was recorded to the nearest 1 mm and subtracted from the length of the rod; this remainder was subtracted from the elevation of the erosion bar to determine the soil-surface elevation. Forty-nine points were measured along the erosion bridge and within the 1-m² plot to determine a soil-surface profile. The difference in elevations at these discrete points before and after a rainfall simulation was computed, and the net change in microtopography along one-to-three normal-to-slope transects was calculated.

Hillslope-Creep Measurement

Hillslope creep in the upper soil horizons was measured over intervals of several months using 530-mm (20 3/4-in.) long wire flags inserted in the soil uphill from the rainfall-runoff simulation plots (figs. 2 and 3). The method used in this study was a modification of the method used by Godfrey (1997) on Mancos Shale hillslopes in Utah. Six wire flags were installed in a row across the hillslope at a known distance uphill from an aluminum bar attached to the permanent steel concrete-form stakes used in the microtopographic measurements. The uphill distance from the reference stakes ranged from 1.0 to 3.0 m, depending on local soil and vegetation conditions at the time of installation. Uphill distance and the exposed length of the wire flags above the soil surface were recorded. Replicate measurements were made with a metal tape measure from a 1,220-mm (48-in.) long, 25x25-mm (1x1-in.) aluminum angle bar leveled and clamped to the reference stakes to the base of the exposed wire flag. Hillslope creep was calculated as the net change in position of the wire flags over the time interval between measurements (several months) and was reported in units of millimeters per year.

Hillslope-Erosion Measurement

Long-term (several months duration) hillslope erosion on study plots larger than the 1-m² rainfall-runoff plots was measured at six locations adjacent to the rainfall-runoff simulation sites. These hillslope-erosion plots were located in the upper Elephant Skin Wash area on east, southeast, and northwest hillslope aspects (fig. 2) and in the Candy Lane area on south,

Figure 6. Erosion bridge and microtopographic measurement.

west, and north hillslope aspects (fig. 3). The rectangular plots ranged in size from 4x7 m (28 m²) to 5x10 m (50 m²) with the long dimension oriented downslope. Each plot had an impervious plastic barrier on the uphill, cross-slope boundary to prevent upslope runoff from entering the study plot. A 610-mm (24-in.) high, woven silt fence was installed at the downhill plot boundary to collect sediment and pass water derived from within the plot boundaries (fig. 7). The silt-fence fabric was 915-mm (36-in.) wide, and a 305-mm (12-in.) wide portion of the fabric was anchored and buried to prevent sediment and runoff from passing beneath the fence (Robichaud and Brown, 2002, fig. 2). The mesh opening size of the commercial-grade silt-fence fabric was not determined, but onsite examination indicated most of the sediment from the plot was trapped by the fabric.

Sediment trapped behind the silt fence was removed periodically, weighed onsite (“field weight”), air dried in the sediment laboratory, and reweighed to determine the sediment yield (megagrams per hectare) and seasonal erosion rate (megagrams per hectare per year). If the collected sample was large and moist, an aggregate subsample of captured sediment was weighed onsite, dried, and reweighed in the laboratory to determine a moisture correction factor that subsequently was applied to the field sample to calculate the dry sediment weight of the entire collected sample. After the initial silt-fence installation and after periodic removal of accumulated sediment, red carpenter’s chalk was dusted on the ground surface to create a stratigraphic marker visible beneath sediment accumulated in the succeeding runoff period.

Precipitation Measurement

Precipitation was measured in the upper Elephant Skin Wash and Candy Lane study areas using Belfort 5-780 series universal recording rain gages from October 2004 through April 2006. A single gage was located at each study area in a location with minimal topographic or vegetation interference (figs. 2 and 3). These weighing-type gages recorded rain and snow precipitation. Recording charts, showing individual precipitation events as well as the accumulated precipitation as a depth, were retrieved and replaced approximately every 3 to 5 months. The precipitation gage data provided a means to determine the magnitude and duration of individual storms as well as the total precipitation during intervals between the hillslope-creep and hillslope-erosion (silt-fence) measurements.

Precipitation and climate data also are routinely collected at the Montrose #2 climate station by the National Oceanic and Atmospheric Administration’s National Climate Data Center (NCDC). Precipitation data from the Montrose #2 climate station (National Oceanic and Atmospheric Administration, 2007) was compared to data from the upper Elephant Skin Wash precipitation gage (approximately 10 km northeast from the Montrose #2 climate station) and Candy Lane precipitation gage (approximately 14 km north from the Montrose #2 climate station) to determine site-to-site correlations and to provide study-site precipitation estimates for earlier periods (before October 2004) when hillslope-creep measurements were made.

Figure 7. Silt fence at a hillslope-erosion measurement site.

Rainfall-Runoff and Erosion Data

Rainfall-runoff, erosion, and additional data were collected from hillslope study sites in two areas of the Gunnison Gorge National Conservation Area (GGNCA)—the upper Elephant Skin Wash area and the Candy Lane area (fig. 1). Six topographic surveys were made on hillslopes in the upper Elephant Skin Wash area (fig. 2), and five were made in the Candy Lane area (fig. 3). Hillslope profiles were generated from the topographic surveys to determine the longitudinal properties (length, curvature, and so forth), aspect, and the average and local hillslope gradients.

Most hillslopes had a long, straight middle portion with relatively constant gradient, a geomorphic feature referred to as the “valley-side slope” by Hack and Goodlett (1960), or the “backslope” by Ruhe and Walker (1968). All hillslopes also has a convex upper portion (“nose” in the Hack and Goodlett nomenclature, or “shoulder” in the Ruhe and Walker nomenclature), and a concave lower portion (“footslope” in both the Hack and Goodlett and Ruhe and Walker nomenclatures) (fig. 8). Average hillslope gradients were calculated from just below the shoulder to just above the footslope and ranged from 20.2 to 37.9 degrees with a mean gradient of 28.5 degrees (table 3 at the end of this report).

Paired rainfall-runoff simulation plots, undisturbed and disturbed, were located on the lower area of the straight hillslope portion (fig. 8) and were positioned to represent the general geomorphic and vegetation characteristics of the larger hillslope area on which they were located. The gradients of the 1-m² rainfall-runoff simulation plots ranged from 21.8 to 37.5 degrees with a mean of 29.9 degrees on undisturbed (control) plots and from 23.0 to 35.0 degrees with a mean of 29.4 degrees on (treatment) plots disturbed by OHV tracks (table 3). Total vegetation cover in the 1-m² rainfall simulation plots was estimated visually before rainfall simulation and, in the case of the treatment plots intentionally disturbed by motorcycle tracks, after the controlled disturbance and before the rainfall simulation. Vegetation cover ranged from 0 to 25 percent for the undisturbed plots and from 0 to 10 percent for the disturbed plots (table 3).

Rainfall simulations were performed on 21 1-m² plots (one undisturbed plot, CS.24E_U, did not have a paired treatment). Three of the plots (sites ES.40E_U2, ES.40E_D2, and CP.8NW_D2) had a second rainfall simulation performed approximately 24 hours after the first simulation, while the soil was still wet, to simulate rainfall on successive days. Most rainfall simulations were 90 minutes in duration; however, three were shortened due to equipment malfunctions or soil liquefaction (plots ES.40NW_U, CP.8S_U, and CP.8S_D, table 3). Two plots (ES.9SW_D and ES.40NW_D) had 120-minute simulations because initial runoff from these plots did not occur until well into the simulation.

The target simulated-rainfall application rate was the 100-year, 1-hour storm at Montrose, Colorado, or 38 mm; however, most simulations lasted for 90 minutes, and mean rainfall application rates ranged from 38.3 to 74.4 mm/h due to uncontrollable variations in rainfall-simulator hydraulic performance at a constant water pressure (table 3). Total rainfall depth during the simulations ranged from 52.4 to 107.0 mm because of variation in simulation duration and simulator hydraulic performance. Consequently, all runoff, infiltration, and erosion data were normalized to hourly rates using the total applied rainfall to allow site-to-site comparisons.

Figure 8. Surveyed hillslope profile and geomorphic terminology at CP.8W.

Runoff and eroded sediment from the rainfall simulation plots were measured and normalized to hourly rates using the total applied rainfall. The normalized total runoff rate (water and sediment) ranged from 335 to 15,856 mL/m²/h, with a mean of 5,321 mL/m²/h from undisturbed plots, and ranged from 366 to 17,929 mL/m²/h, with a mean of 5,340 mL/m²/h from disturbed plots (table 3). Mean values were calculated only from results of the single-event simulations and the first day of multiple-day simulations; second-day data from the three multiple-day sites (ES.40E_U2, ES.40E_D2, and CP.8NW_D2) were excluded from mean calculations.

Runoff was collected periodically during the simulations, and instantaneous runoff rates were calculated from the sample volume (milliliters) and sample duration (minutes). Hydrographs of total runoff were derived from plots of instantaneous discharge (milliliters per minute) and elapsed simulation time to determine the runoff and infiltration characteristics of each 1-m² simulation plot (fig. 9).

The simulation infiltration volume was calculated as the difference between the total simulation rainfall applied to the 1-m² plot and total runoff from the plot, in milliliters (table 3). Infiltration rates were normalized to the applied rainfall rate and ranged from 22,144 to 37,665 mL/m²/h, with a mean of 32,679 mL/m²/h from undisturbed (control) plots, and from 20,071 to 37,634 mL/m²/h, with a mean of 32,660 mL/m²/h from disturbed (treatment) plots. Most 1-m² plots were excavated at one or two locations after the rainfall simulations to observe the mean wetting-front depth, the depth in the soil profile to which visible wetting during the rainfall simulation had occurred in the otherwise dry soil. Mean wetting front depths generally were greater on plots where normalized total runoff rates were less and ranged from 52.5 to 620.0 mm, with a mean of 238.6 mm beneath undisturbed plots and from 70.0 to 330.0 mm, with a mean of 189.7 mm beneath disturbed plots.

The mean sediment concentration in the runoff ranged from 0.32 to 55.46 g/L, with a mean of 23.86 g/L for the undisturbed plots, and from 0.16 to 75.90 g/L, with a mean of 20.84 g/L for the disturbed plots. Sediment-concentration hydrographs were derived from the instantaneous concentration and elapsed simulation time of each sample (fig. 10). Normalized sediment yield ranged from 0.10 to 816.83 g/m²/h, with a mean of 215.67 g/m²/h for the undisturbed plots, and from 0.14 to 773.73 g/m²/h, with a mean of 217.03 g/m²/h for the disturbed plots (table 3).

A sediment-size analysis was performed on selected samples collected at approximately the 25th (early hydrograph), 50th (mid-hydrograph), and 75th (late hydrograph) percentiles of simulation elapsed time to determine the percentage of sand and percentage of silt and clay content in the runoff. For the undisturbed (control) plots, the mean percentage of silt and clay content in runoff was 91.1, 92.2, and 85.3 percent in the early, mid-, and late hydrograph periods, respectively, with a mean silt and clay content of 89.5 percent (table 3). For the disturbed (treatment) plots, the mean percentage of silt and clay content in runoff was 95.6, 94.4, and 94.9 percent in the early, mid-, and late hydrograph periods, respectively, with a mean silt and clay content of 94.7 percent.

Sediment-size analysis also was performed on the dry soil crust collected from the 1-m² rainfall-runoff simulation plots. The percentage of silt and clay content of the undisturbed plots ranged from 72.8 to 94.3 percent, with a mean of 90.1 percent. The median particle size of soil-crust sediment from undisturbed plots ranged from 0.0035 to 0.0144 mm, with a mean of 0.0065 (table 3). The percentage of silt and clay content of the disturbed plots ranged from 82.6 to 95.8 percent, with a mean of 91.0 percent (table 3). The median particle size of soil-crust sediment from disturbed plots ranged from 0.0050 to 0.0095 mm, with a mean of 0.0065 mm.

Soil-surface microtopographic measurements were made normal to the downslope direction on each 1-m² rainfall-runoff simulation plot before and after each simulation (fig. 11). The elevation difference at 49 discrete points before and after a rainfall simulation was computed along one-to-three transects, and the net change in microtopography along the plot transects was calculated (table 4 at the end of this report).

Negative elevation changes at a point were caused by soil detachment, micro-rill formation, compaction of loose soil particles (ravel), and slumping or solifluction. Positive elevation changes at a point were caused by soil accumulation from upslope erosion, swelling, and slumping or solifluction. Most rainfall-runoff plots showed a combination of elevation increases and decreases at discrete measurement points indicating that multiple processes were active. Net microtopographic elevation changes ranged from -6 to +10 mm in all but one undisturbed (control) plots and from -7 to +8 mm in all but one disturbed (treatment) plots (table 4). One undisturbed plot (CP.8W_U) had a -32 mm net elevation change due to a rapid, downslope, solifluction displacement at the end of the 90-minute rainfall simulation. One disturbed plot (CP.8NW_D2) had a -13 mm net elevation change on the second day of a 2-day experiment after showing no net elevation change on the first day (measurement CP.8NW_D1).

Hillslope creep in the upper soil horizons was measured over intervals of several months at locations 1 to 3 m upslope from each rainfall-runoff simulation site. Seasonal net hillslope-creep rates were calculated as the average net change in position of six wire flags over the time interval between measurements and were reported in units of millimeters per day and millimeters per year (table 5 at the end of this report). Annual net hillslope-creep rates also were calculated for two periods, April or May 2004 to April 2005, and April 2005 to April 2006. Because the wire flag positions were measured from a reference bar to their insertion point in the soil, the precision of creep measurements was affected by changes in soil-surface irregularities and vegetation growth that may have interfered with a straight-line, metal tape measurement from the reference bar.

Figure 9. Total-runoff hydrographs from rainfall simulations.

Figure 9. Total-runoff hydrographs from rainfall simulations.—Continued.

Figure 9. Total-runoff hydrographs from rainfall simulations.—Continued.

Figure 9. Total-runoff hydrographs from rainfall simulations.—Continued.

Figure 9. Total-runoff hydrographs from rainfall simulations.—Continued.

Figure 10. Sediment-concentration hydrographs from rainfall simulations.

Figure 10. Sediment-concentration hydrographs from rainfall simulations.—Continued

Figure 10. Sediment-concentration hydrographs from rainfall simulations.—Continued

Figure 10. Sediment-concentration hydrographs from rainfall simulations.—Continued

Figure 10. Sediment-concentration hydrographs from rainfall simulations.—Continued

Figure 10. Sediment-concentration hydrographs from rainfall simulations.—
Continued

Figure 11. Soil-surface microtopography before and after a rainfall simulation, ES.9SE_U.

Seasonal net hillslope-creep rates ranged from -13.7 to 108 mm/yr at undisturbed (control) plots and from -4.87 to 164 mm/yr at disturbed (treatment) plots (table 5). Annual net hillslope-creep rates ranged from -1.94 to 103 mm/yr at undisturbed plots and from -2.17 to 18.4 mm/yr at disturbed plots. Negative values (apparent upslope movement) could reflect soil swelling, initial or replicate measurement error, or long-term instability of the reference-mark (steel concrete-form stake) position due to deeper soil-horizon creep. Determination of deeper soil-horizon creep was beyond the scope of this report.

Hillslope-erosion plots were located in the upper Elephant Skin Wash study area on east, southeast, and northwest hillslope aspects (fig. 2), and in the Candy Lane study area on south, west, and north hillslope aspects (fig. 3). The erosion plots ranged in size from 4×7 m (28 m²) to 5×10 m (50 m²). Sediment trapped behind the silt fence downslope from each erosion plot was collected and removed periodically, weighed onsite, air dried in the sediment laboratory, and reweighed to determine the sediment yield (megagrams per hectare) and seasonal erosion rate (megagrams per hectare per year) (fig. 7, table 6 at the end of this report). All hillslope-erosion plots were located on undisturbed areas; none had been disturbed previously by OHV use.

Sediment yields and seasonal erosion rates were calculated over several month intervals for: (1) fall and winter 2004/2005, (2) spring 2005, (3) summer 2005, and (4) fall and winter 2005/2006. Because of nonconcurrent sampling dates at the upper Elephant Skin Wash and Candy Lane study areas, seasonal durations varied slightly from site to site. In addition to collecting captured sediment from the silt-fence traps, onsite observations were recorded as to the dominant hillslope-erosion mechanism. These mechanisms included gravity-induced soil-clod detachment and dry-ravel transport, and runoff-induced sheet wash (non-channelized) and rill (channelized) erosion.

Sediment yields ranged from zero during the fall and winter of 2004/2005 to 12.2 Mg/ha during the summer of 2005. Seasonal erosion rates ranged from zero during the fall and winter of 2004/2005 to 32.2 Mg/ha/yr during the summer of 2005. The highest sediment yields and erosion rates were observed on plot ES.9NW after channelized rills formed within the plot. For plots where rills did not form during the monitoring period, the maximum seasonal sediment yield was 6.80 Mg/ha, and the maximum seasonal erosion rate was 14.3 Mg/ha/yr during the summer of 2005.

Precipitation was measured at the upper Elephant Skin Wash and Candy Lane study areas from October 2004 through April 2006 and was compared to precipitation data from the Montrose #2 climate station (National Oceanic and Atmospheric Administration, 2007). Precipitation data collected at the two Mancos Shale study areas provided a means to determine the magnitude and duration of individual storms as well as the total precipitation during intervals between the hillslope-creep and hillslope-erosion (silt-fence) measurements. Precipitation data from the Montrose #2 climate station was compared to data from the upper Elephant Skin Wash and Candy Lane precipitation gages to determine site-to-site correlations and to provide study-site precipitation estimates for periods before installation of the study area precipitation gages in October 2004 when hillslope-creep measurements were made. Daily and cumulative daily precipitation data from the three gages are presented in table 7 at the end of this report. Cumulative daily precipitation curves are presented in figure 12.

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Figure 12. Cumulative precipitation at Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane precipitation gages.

Supplemental Information: Tables

Table 1. Sampling-site locations in upper Elephant Skin Wash study area, Gunnison Gorge National Conservation Area, southwestern Colorado.

[UTM, Universal Transverse Mercator projection, Zone 13 N coordinates (meters), North American Datum of 1983; UTM, Universal Transverse Mercator projection; GPS, global positioning system; OPUS, National Geodetic Survey Online Positioning Users Service; USGS, U.S. Geological Survey; LIDAR, light detecting and ranging; BM, bench mark; RM, reference mark; Sta, survey station number; U, undisturbed plot; D, disturbed plot; m, meters; N, north; E, east; S, south; W, west; aprx, approximately]

Hillslope or watershed identification code	Bench mark reference mark, or site identification code	UTM easting (meters)	UTM northing (meters)	Elevation (meters)	Horizontal error estimate (meters)	Date of GPS measurement	Time	Remarks
Bench mark:								
Elephant Skin	BM-1 ES	255,208.27	4,271,051.84	1,874.66	0.01	30 Aug 05	16:53	Aluminum USGS cap set in concrete Coordinates and elevation determined by OPUS, August 2005
Survey reference marks:								
Basin ES.9	Hub-1	255,298.0	4,271,117.0	1,881.2	5.0	29 Jly 03	10:12	Rebar, valley floor near basin 9 alluvial fan head
Basin ES.40	Hub-2	255,093.0	4,271,021.0	1,874.2	7.0	30 Jly 03	8:58	Rebar, valley floor of basin 40
Hillslope survey monuments:								
ES.9SE	Sta 0+00	255,295.0	4,271,206.0	1,920.5	5.0	29 Apr 03	9:51	Rebar, top left, northwest corner of hillslope plot
ES.9SE	Sta 2+00	255,323.0	4,271,167.0	1,885.8	8.0	29 Apr 03	12:04	Rebar, southwest corner of hillslope plot
ES.9NW	Sta 0+00	255,386.0	4,271,128.0	1,911.4	5.0	29 Apr 03	15:07	Rebar, top right corner of hillslope plot
ES.9NW	Sta 2+00	255,341.0	4,271,150.0	1,884.0	5.0	29 Apr 03	14:51	Rebar, bottom right corner of hillslope plot
ES.9SW	Sta 0+00	255,263.0	4,271,180.0	1,912.3	6.0	30 Jly 03	15:14	Rebar, ridge crest motorcycle track
ES.9SW	Sta 3+00	255,228.0	4,271,108.0	1,878.2	7.6	30 Jly 03	16:20	Rebar, foot of hillslope
ES.40NW	Sta 0+00	255,098.0	4,270,963.0	1,891.0	8.0	9 Jun 05		Rebar, top left of hillslope plot
ES.40NW	Sta 0+60	255,087.0	4,270,975.0	1,901.0	7.0	6 Jun 05	17:13	Rebar, bottom left of hillslope plot
ES.40E	Sta 0+00	255,021.0	4,271,004.0	1,895.9	9.0	30 Apr 03	10:17	Rebar, top right of hillslope plot
ES.40E	Sta 1+00	255,045.0	4,270,998.0	1,895.0	5.0	27 Apr 05	12:07	Rebar, bottom right of hillslope plot
ES.38NE	none	255,177.0	4,270,974.0	1,877.0	5.0	26 Apr 06	11:44	Carsonite post, top of "Elevator to Hell Trail"
ES.38NE	none	255,075.0	4,270,819.0	1,965.0	5.0	26 Apr 06	12:00	Carsonite post, bottom of "Elevator to Hell Trail"
Photo monuments:								
Basin ES.9	PM-01	255,368.0	4,271,113.0	1,904.1	7.0	29 Apr 03	12:47	Wood stake on upper hillslope ES.9NW
Basin ES.9	PM-02	255,281.0	4,271,188.0	1,906.2	4.0	29 Apr 03	17:30	Wood stake on upper hillslope ES.9SE
Basin ES.40	PM-03	255,098.0	4,270,980.0	1,879.7	5.0	30 Apr 03	12:01	Wood stake, 15 m left (NE) of rainfall plot ES.40NW_D
Basin ES.40	PM-04	255,066.0	4,270,982.0	1,881.5	4.0	30 Apr 03	16:53	Wood stake
Basin ES.8	PM-07	255,310.0	4,271,235.0	1,927.9	8.0	1 May 03	15:32	Wired flag, east of ES.9NW Sta 0+00
Basin ES.10	PM-08	255,385.0	4,271,102.0	1,907.4	6.0	1 May 03	16:09	Wired flag, basin 10, W hillslope, near ridge crest
Basin ES.10	PM-09	255,487.0	4,271,075.0	1,913.2	8.0	1 May 03	16:50	Wired flag, basin 10, E hillslope, near ridge crest
Basin ES.11	PM-10	255,518.0	4,271,103.0	1,917.5	4.4	1 May 03	17:07	Wired flag, basin 11, W hillslope, near ridge crest

Table 1. Sampling-site locations in upper Elephant Skin Wash study area, Gunnison Gorge National Conservation Area, southwestern Colorado.—Continued

[UTM, Universal Transverse Mercator projection, Zone 13 N coordinates (meters), North American Datum of 1983; UTM, Universal Transverse Mercator projection; GPS, global positioning system; OPUS, National Geodetic Survey Online Positioning Users Service; USGS, U.S. Geological Survey; LIDAR, light detecting and ranging; BM, bench mark; RM, reference mark; Sta, survey station number; U, undisturbed plot; D, disturbed plot; m, meters; N, north; E, east; S, south; W, west; aprx, approximately]

Hillslope or watershed identification code	Bench mark reference mark, or site identification code	UTM easting (meters)	UTM northing (meters)	Elevation (meters)	Horizontal error estimate (meters)	Date of GPS measurement	Time	Remarks
Rainfall - runoff simulation plots:								Elevation from bare earth LIDAR, January 2006
ES.9SE	ES.9SE_U	255,329.0	4,271,173.0	1,890.9	6.0	27 Apr 05	13:48	On plot
ES.9SE	ES.9SE_D	255,313.0	4,271,159.0	1,888.4	6.0	27 Apr 05	14:05	On plot
ES.9NW	ES.9NW_U	255,334.0	4,271,143.0	1,887.6	8.0	27 Apr 05	14:26	On plot
ES.9NW	ES.9NW_D	255,332.0	4,271,133.0	1,888.0	6.0	27 Apr 05	14:51	On plot
ES.9SW	ES.9SW_U	255,221.0	4,271,107.0	1,878.3	4.0	27 Apr 05	15:22	On plot
ES.9SW	ES.9SW_D	255,225.0	4,271,105.0	1,878.5	4.0	27 Apr 05	15:48	On plot
ES.38NE	ES.38NE_U	255,168.0	4,270,966.0	1,879.2	5.0	27 Apr 05	10:55	GPS between U (2.5 m right) and D (2.5 m left) plots
ES.38NE	ES.38NE_D	255,172.0	4,270,962.0	1,879.2	5.0	27 Apr 05	10:55	GPS between U (2.5 m right) and D (2.5 m left) plots
ES.40E	ES.40E_U	255,045.0	4,270,998.0	1,887.2	5.0	27 Apr 05	12:07	At Sta 1+00 rebar, just below ES.40E_U plot
ES.40E	ES.40E_D	255,050.0	4,271,008.0	1,885.9	6.0	27 Apr 05	12:30	Just below ES.40E_D plot
ES.40NW	ES.40NW_U	255,087.0	4,270,972.0	1,882.2	6.0	6 Jun 05	17:26	On plot
ES.40NW	ES.40NW_D	255,090.0	4,270,976.0	1,885.4	7.0	9 Jun 05	8:19	On lower scaffold plank, left end
Rain gage:								
Elephant Skin	ES-RG1	255,243.0	4,270,999.0	1,880.0	6.71	19 Oct 04	11:00	Upstream from uppermost, cross-valley dam
Hillslope erosion silt fence:								
ES.9SE	none	255,337.2	4,271,178.8	1,889.2	9.14	20 Oct 04	16:55	At silt fence, plot size 5 x 10 m
ES.9NW	none	255,342.1	4,271,147.1	1,895.6	11.89	21 Oct 04	12:01	At silt fence, plot size 5 x 10 m
ES.40E	none	255,038.0	4,270,985.0	1,892.0	7.00	7 Jun 05	17:17	At silt fence, plot size 4 x 7 m

Table 2. Sampling-site locations in Candy Lane study area, Gunnison Gorge National Conservation Area, southwestern Colorado.

[UTM, Universal Transverse Mercator projection, Zone 13 N coordinates (meters), North American Datum of 1983; UTM, Universal Transverse Mercator projection; GPS, global positioning system; OPUS, National Geodetic Survey Online Positioning Users Service; USGS, U.S. Geological Survey; LIDAR, light detecting and ranging; BM, bench mark; RM, reference mark; Sta, survey station number; U, undisturbed plot; D, disturbed plot; m, meters; N, north; E, east; S, south; W, west; aprx, approximately]

Hillslope or watershed identification code	Bench mark reference mark, or site identification code	UTM easting (meters)	UTM northing (meters)	Elevation (meters)	Horizontal error estimate (meters)	Date of GPS measurement	Time	Remarks
Bench mark:								
Candy Lane	BM-1 CL	247,360.29	4,278,124.61	1,755.04	0.02	31 Aug 05	13:51	Aluminum USGS cap set in concrete OPUS solution August 2005
Survey reference marks:								
Basin CP.8	Hub-1	247,499.0	4,278,297.0	1,759.0	5.2	27 Apr 04	9:58	Rebar on ridge between S- and N-facing hillslopes
Basin CS.24	Hub-3	247,178.0	4,278,023.0	1,747.0	4.6	27 Apr 04	16:48	Rebar on valley floor
Basin CS.24	RM-5	247,131.0	4,278,023.0	1,748.0	5.2	27 Apr 04	16:58	Boulder with chisled "X" mark
Basin CS.24	RM-6	247,155.0	4,277,978.0	1,747.0	6.4	27 Apr 04	17:13	Boulder with chisled "X" mark
Basin CS.24	SW corner	247,213.0	4,278,029.0	1,743.0	4.3	27 Apr 04	17:23	SW corner post on enclosure area
Basin CS.24	NW corner	247,172.5	4,278,152.6	1,739.2	4.3	27 Apr 04	17:28	NW corner post, on enclosure area
Basin CS.24	RM-4 NE corner	247,224.0	4,278,175.0	1,742.0	4.0	27 Apr 04	17:31	NE corner post on enclosure area
Basin CS.24	SE corner	247,266.7	4,278,053.3	1,742.8	4.3	27 Apr 04	17:45	SE corner post on enclosure area
Hillslope survey monuments:								
CP.8S	Sta 0+00	247,487.0	4,278,391.0	1,788.0	4.9	27 Apr 04	10:37	Rebar, top of hillslope
CP.8S	Sta 2+50	247,485.0	4,278,326.0	1,759.0	4.6	27 Apr 04	12:17	Rebar, foot of hillslope
CP.8W	Sta 0+00	247,579.0	4,278,376.0	1,798.0	5.2	27 Apr 04	11:23	Rebar, top of hillslope
CP.8W	Sta 3+00	247,514.0	4,278,337.0	1,751.0	4.3	27 Apr 04	12:23	Rebar, foot of hillslope
CP.8NW	Sta 0+00	247,572.0	4,278,272.0	1,790.0	4.0	24 Apr 06	13:47	Rebar, top of hillslope
CP.8NW	Sta 3+26.5	247,518.0	4,278,342.0	1,741.0	7.0	24 Apr 06	13:37	Rebar, foot of hillslope
CP.8N	Sta 0+00	247,473.0	4,278,134.0	1,789.0	4.6	27 Apr 04	12:52	Rebar, top of hillslope
CP.8N	Sta 3+10	247,472.0	4,278,214.0	1,760.0	4.3	27 Apr 04	13:57	Rebar, foot of hillslope
CS.24E	Sta 0+00	247,106.0	4,277,997.0	1,762.0	4.3	27 Apr 04	16:32	Rebar, top of hillslope
CS.24E	Sta 2+20	247,169.0	4,278,003.0	1,731.0	5.0	24 Apr 06	16:38	Rebar, foot of hillslope

Table 2. Sampling-site locations in Candy Lane study area, Gunnison Gorge National Conservation Area, southwestern Colorado.—Continued

[UTM, Universal Transverse Mercator projection, Zone 13 N coordinates (meters), North American Datum of 1983; UTM, Universal Transverse Mercator projection; GPS, global positioning system; OPUS, National Geodetic Survey Online Positioning Users Service; USGS, U.S. Geological Survey; LIDAR, light detecting and ranging; BM, bench mark; RM, reference mark; Sta, survey station number; U, undisturbed plot; D, disturbed plot; m, meters; N, north; E, east; S, south; W, west; aprx, approximately]

Hillslope or watershed identification code	Bench mark reference mark, or site identification code	UTM easting (meters)	UTM northing (meters)	Elevation (meters)	Horizontal error estimate (meters)	Date of GPS measurement	Time	Remarks
Photo monument:								
Basin CL.8	PM-01	247,243.0	4,278,213.0	1,741.0	4.3	27 Apr 04	17:38	Earth mound near Candy Lane road
Rainfall - runoff simulation plots:								
CP.8S	CP.8S_U	247,475.0	4,278,349.0	1,748.3	4.6	27 Apr 04	12:17	23 m N, 10 m W of waypoint 59, Sta 2+50
CP.8S	CP.8S_D	247,480.0	4,278,349.0	1,747.5	4.6	27 Apr 04	12:17	23 m N, 5 m W of waypoint 59
CP.8W	CP.8W_U	247,531.0	4,278,357.0	1,752.2	4.3	27 Apr 04	12:23	25 m E, 9 m N of waypoint 60, Sta 3+00
CP.8W	CP.8W_D	247,539.0	4,278,344.0	1,753.9	4.3	27 Apr 04	12:23	25 m E, 6 m S of waypoint 60
CP.8NW	CP.8NW_U	247,533.0	4,278,327.0	1,755.0	5.0	2 May 05	8:22	On scaffold plank below plot
CP.8NW	CP.8NW_D1	247,522.0	4,278,324.0	1,752.4	6.0	4 May 05	8:40	On lower left corner of plot
CP.8N	CP.8N_U	247,478.0	4,278,201.0	1,752.8	9.0	3 Apr 05	18:35	On plot
CP.8N	CP.8N_D	247,475.0	4,278,201.0	1,752.5	none	3 Apr 05	18:25	On plot
CS.24E	CS.24E_U	247,143.0	4,277,997.2	1,736.5	4.3	27 Apr 04	16:32	37 m E of waypoint 63, Sta 0+00
Rain gage:								
Basin CP.8	CL-RG1	247,474.0	4,278,254.0	1,743.0	4.0	3 Apr 05	18:12	Relocated to here 23 March 2005
Hillslope erosion silt fence:								
CP.8S	none	247,488.0	4,278,357.0	1,771.0	5.0	6 May 05	9:30	At silt fence, plot size 4 x 7 m
CP.8W	none	247,531.0	4,278,382.0	1,777.0	6.0	5 May 05	17:21	5 m downslope from fence, plot size 5 x 10 m
CP.8N	none	247,470.0	4,278,202.0	1,751.0	5.0	3 Apr 05	18:22	At silt fence, plot size 5 x 10 m

Table 2. Sampling-site locations in Candy Lane study area, Gunnison Gorge National Conservation Area, southwestern Colorado.—Continued

[UTM, Universal Transverse Mercator projection, Zone 13 N coordinates (meters), North American Datum of 1983; UTM, Universal Transverse Mercator projection; GPS, global positioning system; OPUS, National Geodetic Survey Online Positioning Users Service; USGS, U.S. Geological Survey; LIDAR, light detecting and ranging; BM, bench mark; RM, reference mark; Sta, survey station number; U, undisturbed plot; D, disturbed plot; m, meters; N, north; E, east; S, south; W, west; aprx, approximately]

Hillslope or watershed identification code	Bench mark reference mark, or site identification code	UTM easting (meters)	UTM northing (meters)	Elevation (meters)	Horizon- tal error estimate (meters)	Date of GPS meas- urement	Time	Remarks
Arroyo survey reference marks:								
CL Arroyo	RM-1, PM	246,886.0	4,279,535.0	1,745.0	4.9	28 Apr 04	9:38	Rebar on pediment aprx 300m NW of headcut
CL Arroyo	Hub-1, PM	246,985.0	4,279,515.0	1,724.0	4.9	28 Apr 04	10:39	Rebar on 3rd arroyo dam aprx 80m bel headcut
CL Arroyo	RM-4	247,125.0	4,279,381.0	1,735.0	4.9	28 Apr 04	10:30	Rebar on low round hill E of arroyo
CL Arroyo	Grid North	246,990.0	4,279,606.0	1,724.0	5.0	25 Apr 06	8:55	Rebar
CL Arroyo	LHP-1	246,950.0	4,279,461.0	1,716.0	4.6	28 Apr 04	14:14	Rebar, arroyo cross section 1
CL Arroyo	RHP-1	247,039.0	4,279,443.0	1,724.0	6.0	25 Apr 06	9:23	Rebar
CL Arroyo	LHP-2	246,950.0	4,279,479.0	1,713.0	4.6	28 Apr 04	14:48	Rebar, arroyo cross section 2
CL Arroyo	RHP-2	247,035.0	4,279,474.0	1,723.0	6.0	25 Apr 06	9:18	Rebar
CL Arroyo	LHP-3	246,932.3	4,279,556.4	1,714.0	5.2	28 Apr 04	14:52	Rebar, arroyo cross section 3
CL Arroyo	RHP-3	246,997.0	4,279,549.0	1,714.0	4.6	28 Apr 04	15:02	Rebar

Table 3. Rainfall-runoff and ancillary data from Gunnison Gorge National Conservation Area, southwestern Colorado.

[Sim., simulation; no., number; concn., concentration; Normal., normalized; rel 100 yr, variable is normalized to the 100-year rainfall rate of 38 mm per hour; &, and; min, minute; mm, millimeter, mm/h, millimeter per hour; mL, milliliter; mL/m²/h, milliliter per square meter per hour; g/L, grams per liter; g, grams; g/m²/h; grams per square meter per hour; mL/h; milliliter per hour; na, not applicable or no data; Yellow highlighted fields are from second-day rainfall simulations]

Rainfall-runoff plot identification code	Sim no.	Hillslope aspect (degrees)	Slope length above plot (meters)	Surveyed hillslope gradient (degrees)	Plot gradient (degrees)	Plot vegetation cover (percent)	Sim. rainfall duration (min)	Sim. total rainfall depth (mm)	Sim. mean rainfall rate (mm/hr)	Sim. total rainfall on plot (mL)	Sim. total runoff from plot ¹ (mL)	Total runoff rate (mL/m ² /hr)	Sim. runoff (percent)
Undisturbed plots:													
ES.9SE_U	1	146	69.8	32.5	37.5	0	90	58.2	38.8	58,200	5,982	3,988	10.3
ES.9NW_U	3	297	70.2	26.8	26.5	25	90	77.0	51.3	77,000	11,759	7,839	15.3
ES.9SW_U	7	207	91.4	23.8	24.0	6	90	81.2	54.1	81,200	11,275	7,517	13.9
ES.38NE_U	5	40	115.0	26.0	27.0	25	90	68.0	45.3	68,000	20,627	13,751	30.3
ES.40E_U1	9	103	33.4	28.3	29.3	3	90	68.0	45.3	68,000	600	400	0.9
ES.40NW_U	23	328	9.0	26.5	34.0	10	70	86.8	74.4	86,800	1,274	1,092	1.5
CP.8S_U	13	186	51.8	37.9	35.0	0	82	52.4	38.3	52,400	21,864	15,998	41.7
CP.8W_U	15	251	64.0	36.2	36.5	1	90	89.4	59.6	89,400	1,497	998	1.7
CP.8NW_U	20	322	76.2	28.2	28.2	7	90	103.4	68.9	103,400	9,188	6,125	8.9
CP.8N_U	17	5	75.0	26.8	29.0	10	90	80.0	53.3	80,000	22,883	15,255	28.6
CS.24E_U	19	86	39.3	20.2	21.8	25	90	91.2	60.8	91,200	925	617	1.0
ES.40E_U2	10	103	33.4	28.3	29.3	3	90	69.6	46.4	69,600	1,287	858	1.8
Mean (1-day simulations)				28.5	29.9				53.7			6,689	14.0
Disturbed plots:													
ES.9SE_D	2	146	69.8	32.5	33.5	0	90	73.4	48.9	73,400	7,829	5,219	10.7
ES.9NW_D	4	297	69.2	26.8	23.5	10	90	75.0	50.0	75,000	35,387	23,591	47.2
ES.9SW_D	8	206	91.4	23.8	26.3	1	120	107.0	53.5	107,000	1,031	516	1.0
ES.38NE_D	6	40	115.0	26.0	23.0	2	90	76.2	50.8	76,200	22,352	14,901	29.3
ES.40E_D1	11	103	33.4	28.3	32.0	2	90	73.6	49.1	73,600	1,210	807	1.6
ES.40NW_D	24	320	9.0	26.5	31.0	6	120	95.6	47.8	95,600	2,150	1,075	2.2
CP.8S_D	14	186	51.8	37.9	35.0	0	85	80.8	57.0	80,750	21,738	15,344	26.9
CP.8W_D	16	240	64.0	36.2	35.0	0	90	76.6	51.1	76,600	3,634	2,423	4.7
CP.8NW_D1	21	316	77.7	28.2	28.0	2	90	82.6	55.1	82,600	10,974	7,316	13.3
CP.8N_D	18	6	75.0	26.8	26.8	2	90	70.6	47.1	70,600	2,489	1,659	3.5
ES.40E_D2	12	103	33.4	28.3	32.0	2	90	70.8	47.2	70,800	2,538	1,692	3.6
CP.8NW_D2	22	316	77.7	28.2	28.0	2	90	90.2	60.1	90,200	25,706	17,137	28.5
Mean (1-day simulations)				29.3	29.4				51.0			7,285	14.1

Table 3. Rainfall-runoff and ancillary data from Gunnison Gorge National Conservation Area, southwestern Colorado.—Continued

[Sim., simulation; no., number; concn., concentration; Normal., normalized; rel 100 yr, variable is normalized to the 100-year rainfall rate of 38 mm per hour; &, and; min, minute; mm, millimeter, mm/h, millimeter per hour; mL, milliliter; mL/m²/h, milliliter per square meter per hour; g/L, grams per liter; g, grams; g/m²/h, grams per square meter per hour; mL/h, milliliter per hour; na, not applicable or no data; Yellow highlighted fields are from second-day rainfall simulations]

Rainfall-runoff plot identification code	Mean sediment concn. (g/L)	Sim. total sediment from plot (g)	Total sediment yield (g/m ² /hr)	Normal. rainfall rate rel 100yr ² (mm/hr)	Normal. runoff rate rel 100yr (mL/m ² /hr)	Normal. sediment yield rel 100yr (g/m ² /hr)	Sim. infiltration volume (mL)	Sim. infiltration (percent)	Infiltration rate (mL/hr)	Normal. infiltrat. rate rel 100yr (mL/m ² /hr)	Mean wetting front depth (mm)
Undisturbed plots:											
ES.9SE_U	43.74	263	176	1.02	3,906	172	52,218	89.7	34,812	34,094	190.0
ES.9NW_U	26.93	317	211	1.35	5,803	157	65,241	84.7	43,494	32,197	111.3
ES.9SW_U	5.97	68.7	45.8	1.42	5,276	32.1	69,925	86.1	46,617	32,724	240.0
ES.38NE_U	55.46	1,147	764	1.19	11,527	641	47,373	69.7	31,582	26,473	200.0
ES.40E_U1	0.32	0.18	0.12	1.19	335	0.10	67,400	99.1	44,933	37,665	na
ES.40NW_U	1.16	1.60	1.37	1.96	558	0.70	85,526	98.5	73,308	37,442	240.0
CP.8S_U	50.96	1,126	824	1.01	15,856	817	30,536	58.3	22,343	22,144	52.5
CP.8W_U	8.45	14.22	9.48	1.57	636	6.04	87,903	98.3	58,602	37,364	300.0
CP.8NW_U	24.44	216	144	1.81	3,377	79.3	94,212	91.1	62,808	34,623	222.5
CP.8N_U	43.97	985	656	1.40	10,869	468	57,117	71.4	38,078	27,131	210.0
CS.24E_U	1.07	0.97	0.65	1.60	385	0.40	90,275	99.0	60,183	37,615	620.0
ES.40E_U2	2.36	4.34	2.89	1.22	703	2.37	68,313	98.2	45,542	37,297	345.0
Mean (1-day simulations)	23.86			1.41	5,321	216		86.0	46,978	32,679	238.6
Disturbed plots											
ES.9SE_D	12.40	97.2	64.8	1.29	4,053	50.3	65,571	89.3	43,714	33,947	155.0
ES.9NW_D	27.87	999	666	1.32	17,929	506	39,613	52.8	26,409	20,071	105.0
ES.9SW_D	0.81	0.88	0.44	1.41	366	0.31	105,969	99.0	52,985	37,634	270.0
ES.38NE_D	67.52	1,513	1,008	1.34	11,147	754	53,848	70.7	35,899	26,853	201.3
ES.40E_D1	0.68	0.78	0.52	1.29	625	0.40	72,390	98.4	48,260	37,375	na
ES.40NW_D	0.16	0.36	0.18	1.26	855	0.14	93,450	97.8	46,725	37,145	330.0
CP.8S_D	75.90	1,644	1,161	1.50	10,230	774	59,012	73.1	41,656	27,770	70.0
CP.8W_D	1.88	7.97	5.31	1.34	1,803	3.95	72,966	95.3	48,644	36,197	195.0
CP.8NW_D1	16.41	161	108	1.45	5,049	74.3	71,626	86.7	47,751	32,951	na
CP.8N_D	4.75	12.7	8.45	1.24	1,340	6.82	68,111	96.5	45,407	36,660	191.3
ES.40E_D2	0.97	2.47	1.65	1.24	1,362	1.33	68,262	96.4	45,508	36,638	460.0
CP.8NW_D2	6.53	164	109	1.58	10,830	69.1	64,494	71.5	42,996	27,170	na
Mean (1-day simulations)	20.84			1.34	5,340	217		85.9	43,745	32,660	189.7

Table 3. Rainfall-runoff and ancillary data from Gunnison Gorge National Conservation Area, southwestern Colorado.—Continued

[Sim., simulation; no., number; concn., concentration; Normal., normalized; rel 100 yr, variable is normalized to the 100-year rainfall rate of 38 mm per hour; &, and; min, minute; mm, millimeter, mm/h, millimeter per hour; mL, milliliter; mL/m²/h, milliliter per square meter per hour; g/L, grams per liter; g, grams; g/m²/h; grams per square meter per hour; mL/h; milliliter per hour; na, not applicable or no data; Yellow highlighted fields are from second-day rainfall simulations]

Rainfall-runoff plot identification code	Early sim. runoff silt & clay content ³ (percent)	Mid. sim. runoff silt & clay content ³ (percent)	Late sim. runoff silt & clay content ³ (percent)	Mean runoff silt & clay content (percent)	Plot crust silt & clay content (percent)	Plot crust median size (mm)	Plot soil color, Munsell color notation, larger area ⁴ [smaller area]	Plot soil color, Munsell color name, larger area ⁴	Remark
Undisturbed plots:									
ES.9SE_U	92.1	92.9	85.6	90.2	93.8	0.0056	10YR 8/2	Very pale brown	
ES.9NW_U	96.6	97.1	70.9	88.2	92.6	0.0041	10YR 7.5/2 [10YR 6/2]	Very pale brown	
ES.9SW_U	84.2	88.4	84.2	85.6	92.4	0.0046	10YR 8/2 [10YR 7/3]	Very pale brown	
ES.38NE_U	97.5	96.4	95.9	96.6	92.4	0.0057	7.5YR 7/2	Pinkish gray	
ES.40E_U1	na	na	na	na	87.7	0.0097	10YR 7/2 [7.5YR 8/1]	Light gray	Not excavated
ES.40NW_U	93.3	100.0	72.2	88.5	91.8	0.0060	7.5YR 7/2 [7.5YR 7/1]	Pinkish gray	70-minute simulation
CP.8S_U	86.4	86.2	76.9	83.2	94.3	0.0053	7.5YR 7/1	Light gray	82-minute simulation
CP.8W_U	76.9	80.3	83.9	80.3	94.3	0.0052	10YR 7.5/3	Very pale brown	
CP.8NW_U	96.4	95.2	96.6	96.1	88.8	0.0070	10YR 8/2 [10YR 7/2]	Very pale brown	
CP.8N_U	95.8	93.4	94.1	94.4	89.9	0.0035	10YR 8/2	Very pale brown	
CS.24E_U	92.3	91.7	92.3	92.1	72.8	0.0144	na	na	
ES.40E_U2	na	na	na	99.2	na	na	na	na	Second-day simulation
Mean (1-day simulations)	91.1	92.2	85.3	89.5	90.1	0.0065			Means exclude second day sample
Disturbed plots									
ES.9SE_D	98.3	95.7	93.1	95.7	95.4	0.0050	10YR 6/2 [10YR 7.5/2]	Light brownish gray	
ES.9NW_D	97.0	97.1	97.0	97.0	85.4	0.0095	10YR 8/2	Very pale brown	
ES.9SW_D	na	na	na	na	92.2	0.0057	10YR 7/3	Very pale brown	120-minute simulation
ES.38NE_D	93.3	93.1	94.5	93.6	93.2	0.0056	7.5YR 7/1	Light gray	
ES.40E_D1	na	na	na	na	93.5	0.0065	10YR 7/2	Light gray	Not excavated
ES.40NW_D	100.0	100.0	100.0	100.0	90.5	0.0060	7.5YR 7/2	Pinkish gray	120-minute simulation
CP.8S_D	92.2	90.3	91.6	91.4	95.7	0.0050	10YR 7/2	Light gray	85-minute simulation
CP.8W_D	na	na	na	93.4	95.8	0.0051	10YR 7.5/3	Very pale brown	
CP.8NW_D1	92.8	90.4	93.0	92.1	85.5	0.0084	10YR 7/2	Light gray	Not excavated
CP.8N_D	na	na	na	94.1	82.6	0.0084	10YR 7/2	Light gray	
ES.40E_D2	na	na	na	na	na	na	na	na	Second-day simulation
CP.8NW_D2	89.1	92.6	93.6	91.8	86.9	0.0078	na	na	Second-day simulation
Mean (1-day simulations)	95.6	94.4	94.9	94.7	91.0	0.0065			Means exclude second day sample

¹Simulation total rainfall on plot = 1 m² × duration of rainfall, with 1 mL = cm³, or rainfall (mm) × 1,000 = mL.

²Normalized rainfall = 60 minutes mean rainfall / 38 mm 100-yr design storm.

³Early, mid-, and late samples for percent silt and clay taken at 25, 50, and 75 percent of the runoff hydrograph duration.

⁴Soil colors are for dry soil onsite (Munsell Color, 1992).

Table 4. Rainfall-runoff and ancillary data from Gunnison Gorge National Conservation Area, southwestern Colorado.

[Sim., simulation; no., number; trav, microtopography traverse; mm, millimeter, mm/h, millimeter per hour; mL, milliliter; mL/m²/h, milliliter per square meter per hour; g, grams; g/m²/h, grams per square meter per hour; mL/h; milliliter per hour; na, not applicable or no data]

Plot identification code	Sim. no.	Sim. mean rainfall rate (mm/h)	Total runoff rate (mL/m ² /h)	Sim. runoff (percent)	Sim. total sediment from plot ¹ (g)	Total sediment yield (g/m ² /h)	Infiltra- tion rate (mL/h)	Mean wetting front depth (mm)	Net elevation change trav A ^{2,3} (mm)	Net elevation change trav B ^{2,3} (mm)	Net elevation change trav C ^{2,3} (mm)	Average elevation change all trav (mm)	Remark
Undisturbed plots:													
ES.9SE_U	1	38.8	3,988	10.3	263	176	34,812	190.0	-5	4	-6	-2.3	
ES.9NW_U	3	51.3	7,839	15.3	317	211	43,494	111.3	2	1	-5	-0.7	
ES.9SW_U	7	54.1	7,517	13.9	68.7	45.8	46,617	240.0	0	1	0	0.3	
ES.38NE_U	5	45.3	13,751	30.3	1,147	764	31,582	200.0	1	3	0	1.3	
ES.40E_U1	9	45.3	400	0.9	0.18	0.12	44,933	na	10	6	5	7.0	Not excavated
ES.40NW_U	23	74.4	1,092	1.5	1.60	1.37	73,308	240.0	-3	na	na	na	70-minute simulation
CP.8S_U	13	38.3	15,998	41.7	1,126	824	22,343	52.5	1	-1	12	4.0	82-minute simulation
CP.8W_U	15	59.6	998	1.7	14.2	9.48	58,602	300.0	-32	-29	-26	-29	300-mm downslope displacement
CP.8NW_U	20	68.9	6,125	8.9	216	144	62,808	222.5	-3	na	na	na	
CP.8N_U	17	53.3	15,255	28.6	985	656	38,078	210.0	1	-3	1	-0.3	
CS.24E_U	19	60.8	617	1.0	0.97	0.65	60,183	620.0	-1	-3	0	-1.3	
ES.40E_U2	10	46.4	858	1.8	4.34	2.89	45,542	345.0	1	3	2	2.0	Second-day simulation
Mean (1-day simulations)									0.3	1.0	0.9	1.0	Means exclude second-day simulation and plot CP.8W_U
Disturbed plots:													
ES.9SE_D	2	48.9	5,219	10.7	97.2	64.8	43,714	155.0	-2	5	-7	-1.3	
ES.9NW_D	4	50.0	23,591	47.2	999	666	26,409	105.0	-1	-2	-4	-2.3	
ES.9SW_D	8	53.5	516	1.0	0.88	0.44	52,985	270.0	3	na	na	na	120-minute simulation
ES.38NE_D	6	50.8	14,901	29.3	1,513	1,008	35,899	201.3	8	7	4	6.3	Established trail
ES.40E_D1	11	49.1	807	1.6	0.78	0.52	48,260	na	na	na	na	na	Not excavated
ES.40NW_D	24	47.8	1,075	2.2	0.36	0.18	46,725	330.0	7	na	na	na	120-minute simulation
CP.8S_D	14	57.0	15,344	26.9	1,644	1,161	41,656	70.0	-7	na	na	na	85-minute simulation, excludes slump area
CP.8W_D	16	51.1	2,423	4.7	7.97	5.31	48,644	195.0	-1	na	na	na	Adjusted for unlevel bar
CP.8NW_D1	21	55.1	7,316	13.3	161	108	47,751	na	0	na	na	na	Not excavated
CP.8N_D	18	47.1	1,659	3.5	12.7	8.45	45,407	191.3	8	na	na	na	
ES.40E_D2	12	47.2	1,692	3.6	2.47	1.65	45,508	460.0	na	na	na	na	Second-day simulation
CP.8NW_D2	22	60.1	17,137	28.5	164	109	42,996	na	-13	na	na	na	Second-day simulation
Mean (1-day simulations)									1.7	3.3	-2.3	0.9	Means exclude second-day simulation

¹ Simulation total rainfall on plot = 1 m² X duration of rainfall, with 1 mL = 1 cm³, or rainfall (mm) x 1,000 = mL.

² Traverse A located 250 mm from plot upper boundary; Traverse B located 500 mm from plot upper boundary; Traverse C located 750 mm from plot upper boundary.

³ Each microtopographic traverse consisted of 49 point-elevation measurements.

Table 5. Hillslope-creep rates and ancillary data from Gunnison Gorge National Conservation Area, southwestern Colorado.

[Creep monitors are wired flags inserted upslope from rainfall-runoff simulation plot microtopographic reference stakes; mm, millimeters; mm/d, millimeters per day; mm/yr, millimeters per year; ~, approximately; na, not applicable or no data]

							Late summer, fall and winter 2003 / 2004 (since August 2003, ~8 months)					
Rainfall-runoff plot identification code	Date creep flags installed	Julian day since January 2003	Surveyed hillslope aspect	Hillslope length upslope from rainfall plot, approximate	Surveyed hillslope gradient	Rainfall plot gradient	Date observed	Julian day since January 2003	Elapsed number of days	Mean downslope creep distance	Mean creep rate	Seasonal creep rate
										(mm)	(mm/d)	(mm/yr)
Undisturbed plots:												
ES.9SE_U	13 Aug 03	225	146	69.8	32.6	37.5	15 Apr 04	471	246	70.8	0.288	105
ES.9NW_U	14 Aug 03	226	297	70.2	26.8	26.5	15 Apr 04	471	245	72.2	0.295	108
ES.9SW_U	15 Apr 04	471	207	91.4	23.8	24.0	15 Apr 04	471	0	na	na	na
ES.38NE_U	20 Aug 03	232	40	115.0	26.0	27.0	15 Apr 04	471	239	-9.00	-0.038	-13.7
ES.40E_U	4 Aug 04	582	103	33.4	28.3	29.3						
ES.40NW_U	8 Jun 05	890	328	9.0	26.5	34.0						
CP.8S_U	4 May 04	490	186	51.8	37.9	35.0						
CP.8W_U	5 May 04	491	251	64.0	36.2	36.5						
CP.8NW_U	3 May 05	854	322	76.2	28.2	28.2						
CP.8N_U	6 May 04	492	5	75.0	26.8	29.0						
CS.24E_U	7 May 04	493	86	39.3	20.2	21.8						
Mean undisturbed					28.5	29.9	66.3					
Disturbed plots:												
ES.9SE_D	19 Aug 03	231	146	69.8	32.5	33.5	15 Apr 04	471	240	62.2	0.259	94.6
ES.9NW_D	22 Aug 03	234	297	69.2	26.8	23.5	15 Apr 04	471	237	38.7	0.163	59.6
ES.9SW_D	13 Aug 04	591	206	91.4	23.8	26.3						
ES.38NE_D	none	na	40	115.0	26.0	23.0	na	na	na	na	na	na
ES.40E_D	6 Aug 04	584	103	33.4	28.3	32.0						
ES.40NW_D	9 Jun 05	891	320	9.0	26.5	31.0						
CP.8S_D	10 Aug 04	588	186	51.8	37.9	35.0						
CP.8W_D	11 Aug 04	589	240	64.0	36.2	35.0						
CP.8NW_D	4 May 05	855	316	77.7	28.2	28.0						
CP.8N_D	12 Aug 04	590	6	75.0	26.8	26.8						
Mean disturbed					29.3	29.4	77.1					

Table 5. Hillslope-creep rates and ancillary data from Gunnison Gorge National Conservation Area, southwestern Colorado.—Continued

[Creep monitors are wired flags inserted upslope from rainfall-runoff simulation plot microtopographic reference stakes; mm, millimeters; mm/d, millimeters per day; mm/yr, millimeters per year; ~, approximately; na, not applicable or no data]

		Full year April 2004 - April 2005 (since April 2004 ~12 months, since May 2004 ~11 months)						Late summer, fall and winter 2004 / 2005 (since August 2004, ~8 months)											
Rainfall-runoff plot identification code	Date creep flags installed	Date observed or installed	Julian day since January 2003	Elapsed number of days	Mean downslope creep distance	Mean creep rate	Annual creep rate	Date observed	Julian day since January 2003	Elapsed number of days	Mean downslope creep distance	Mean creep rate	Seasonal creep rate						
		(mm)					(mm/d)	(mm/yr)	(mm)					(mm/d)	(mm/yr)				
Undisturbed plots:																			
ES.9SE_U	13 Aug 03	27 Apr 05	848	377	12.8	0.034	12.4	27 Apr 05	848	266	38.8	0.146	53.2						
ES.9NW_U	14 Aug 03	27 Apr 05	848	377	10.2	0.027	9.88												
ES.9SW_U	15 Apr 04	27 Apr 05	848	377	na	na	na												
ES.38NE_U	20 Aug 03	27 Apr 05	848	377	-2.00	-0.005	-1.94												
ES.40E_U	4 Aug 04																		
ES.40NW_U	8 Jun 05	8 Jun 05	890	0	na	na	na												
CP.8S_U	4 May 04	9 Apr 05	830	340	85.2	0.251	91.5												
CP.8W_U	5 May 04	9 Apr 05	830	339	95.5	0.282	103												
CP.8NW_U	3 May 05	3 May 05	854	0	na	na	na												
CP.8N_U	6 May 04	3 Apr 05	824	332	0.0	0.000	0.000												
CS.24E_U	7 May 04	9 Apr 05	830	337	40.5	0.120	43.9												
Mean undisturbed								36.9	53.2										
Disturbed plots:																			
ES.9SE_D	19 Aug 03	27 Apr 05	848	377	19.0	0.050	18.4	27 Apr 05	848	257	39.2	0.153	55.7						
ES.9NW_D	22 Aug 03	27 Apr 05	848	377	3.8	0.010	3.68												
ES.9SW_D	13 Aug 04						na							na	na	na	na	na	
ES.38NE_D	none	na	na	na	na	na	na							na	na	na	na	na	
ES.40E_D	6 Aug 04																		
ES.40NW_D	9 Jun 05	9 Jun 05	891	0	na	na	na												
CP.8S_D	10 Aug 04													9 Apr 05	830	242	105	0.432	158
CP.8W_D	11 Aug 04													9 Apr 05	830	241	108	0.449	164
CP.8NW_D	4 May 05	4 May 05	855	0	na	na	na												
CP.8N_D	12 Aug 04													3 Apr 05	824	234	21.2	0.091	33.1
Mean disturbed								11.0	87.2										

Table 5. Hillslope-creep rates and ancillary data from Gunnison Gorge National Conservation Area, southwestern Colorado.—Continued

[Creep monitors are wired flags inserted upslope from rainfall-runoff simulation plot microtopographic reference stakes; mm, millimeters; mm/d, millimeters per day; mm/yr, millimeters per year; ~, approximately; na, not applicable or no data]

		Spring and summer 2005 (since April and May 2005 ~6 months, or June ~4.6 months)						Fall and winter 2005 / 2006 (since October or November 2005 ~5.5 to 6 months)					
Rainfall-runoff plot identification code	Date creep flags installed	Date observed	Julian day since January 2003	Elapsed number of days	Mean downslope creep distance	Mean creep rate	Seasonal creep rate	Date observed	Julian day since January 2003	Elapsed number of days	Mean downslope creep distance	Mean creep rate	Seasonal creep rate
					(mm)	(mm/d)	(mm/yr)				(mm)	(mm/d)	(mm/yr)
Undisturbed plots:													
ES.9SE_U	13 Aug 03	25 Oct 05	1,029	181	8.00	0.0442	16.1	26 Apr 06	1212	183	3.70	0.0202	7.38
ES.9NW_U	14 Aug 03	25 Oct 05	1,029	181	7.00	0.0387	14.1	26 Apr 06	1212	183	3.50	0.0191	6.98
ES.9SW_U	15 Apr 04	25 Oct 05	1,029	181	13.2	0.0729	26.6	26 Apr 06	1212	183	2.00	0.0109	3.99
ES.38NE_U	20 Aug 03	25 Oct 05	1,029	181	12.7	0.0702	25.6	26 Apr 06	1212	183	0.700	0.00383	1.40
ES.40E_U	4 Aug 04	25 Oct 05	1,029	181	12.0	0.0663	24.2	26 Apr 06	1212	183	5.40	0.0295	10.8
ES.40NW_U	8 Jun 05	25 Oct 05	1,029	139	15.3	0.110	40.2	26 Apr 06	1212	183	0.50	0.00273	0.997
CP.8S_U	4 May 04	10 Nov 05	1,045	215	4.30	0.0200	7.30	24 Apr 06	1210	165	1.50	0.00909	3.32
CP.8W_U	5 May 04	10 Nov 05	1,045	215	3.30	0.0153	5.60	24 Apr 06	1210	165	2.30	0.0139	5.09
CP.8NW_U	3 May 05	10 Nov 05	1,045	191	7.80	0.0408	14.9	24 Apr 06	1210	165	-1.30	-0.00788	-2.88
CP.8N_U	6 May 04	10 Nov 05	1,045	221	7.70	0.0348	12.7	24 Apr 06	1210	165	-0.500	-0.00303	-1.11
CS.24E_U	7 May 04	10 Nov 05	1,045	215	5.50	0.0256	9.34	24 Apr 06	1210	165	1.20	0.00727	2.65
Mean undisturbed		17.9						3.51					
Disturbed plots:													
ES.9SE_D	19 Aug 03	25 Oct 05	1,029	181	8.70	0.048	17.5	26 Apr 06	1212	183	4.00	0.0219	7.98
ES.9NW_D	22 Aug 03	25 Oct 05	1,029	181	3.00	0.017	6.05	26 Apr 06	1212	183	2.70	0.0148	5.39
ES.9SW_D	13 Aug 04	25 Oct 05	1,029	181	0.500	0.003	1.01	26 Apr 06	1212	183	-1.20	-0.00656	-2.39
ES.38NE_D	none	na	na	na	na	na	na	na	na	na	na	na	na
ES.40E_D	6 Aug 04	25 Oct 05	1,029	181	3.20	0.018	6.45	26 Apr 06	1212	183	0.200	0.00109	0.399
ES.40NW_D	9 Jun 05	25 Oct 05	1,029	138	12.2	0.088	32.3	26 Apr 06	1212	183	1.00	0.00546	1.99
CP.8S_D	10 Aug 04	10 Nov 05	1,045	215	3.80	0.018	6.45	24 Apr 06	1210	165	0.400	0.00242	0.885
CP.8W_D	11 Aug 04	10 Nov 05	1,045	215	4.50	0.021	7.64	24 Apr 06	1210	165	-1.80	-0.0109	-3.98
CP.8NW_D	4 May 05	10 Nov 05	1,045	190	na	na	na	24 Apr 06	1210	165	na	na	na
CP.8N_D	12 Aug 04	10 Nov 05	1,045	221	-0.200	-0.001	-0.330	24 Apr 06	1210	165	-2.20	-0.0133	-4.87
Mean disturbed		9.6						0.675					

Table 5. Hillslope-creep rates and ancillary data from Gunnison Gorge National Conservation Area, southwestern Colorado.—Continued

[Creep monitors are wired flags inserted upslope from rainfall-runoff simulation plot microtopographic reference stakes; mm, millimeters; mm/d, millimeters per day; mm/yr, millimeters per year; ~, approximately; na, not applicable or no data]

		Full year April 2005 - April 2006 (since April 2005 ~12 months)						
Rainfall-runoff plot identification code	Date creep flags installed	Date observed	Julian day since January 2003	Elapsed number of days	Mean downslope creep distance	Mean creep rate	Annual creep rate	Remark
					(mm)	(mm/d)	(mm/yr)	
Undisturbed plots:								Bar in different location before April 2005. Five wires bent by 25 October 2005. Only two flags measured 15 April 2004. R250 reference pin reestablished 27 April 2005. Number 4 wire out by 27 April 2005.
ES.9SE_U	13 Aug 03	26 Apr 06	1212	364	11.7	0.0321	11.7	
ES.9NW_U	14 Aug 03	26 Apr 06	1212	364	10.5	0.0288	10.5	
ES.9SW_U	15 Apr 04	26 Apr 06	1212	364	15.2	0.0418	15.2	
ES.38NE_U	20 Aug 03	26 Apr 06	1212	364	13.3	0.0365	13.3	
ES.40E_U	4 Aug 04	26 Apr 06	1212	364	17.4	0.0478	17.4	
ES.40NW_U	8 Jun 05	26 Apr 06	1212	322	15.8	0.0491	17.9	
CP.8S_U	4 May 04	24 Apr 06	1210	380	5.80	0.0153	5.57	
CP.8W_U	5 May 04	24 Apr 06	1210	380	5.70	0.0150	5.48	
CP.8NW_U	3 May 05	24 Apr 06	1210	356	6.50	0.0183	6.66	
CP.8N_U	6 May 04	24 Apr 06	1210	386	7.20	0.0187	6.81	
CS.24E_U	7 May 04	24 Apr 06	1210	380	5.40	0.0142	5.19	
Mean undisturbed		10.5						
Disturbed plots:								Number 8 wire out by 25 October 2005. Number 10 wire disturbed by 26 April 2006. Established trail, no flags installed for safety issues. 6 August 2004 installation notes missing, assume 1,800 mm initial distance. Number 10 wire disturbed by footprint before 9 April 2005. Installation measurement error? Reference pin creep? All creep values negative.
ES.9SE_D	19 Aug 03	26 Apr 06	1212	364	12.7	0.0349	12.7	
ES.9NW_D	22 Aug 03	26 Apr 06	1212	364	5.70	0.0157	5.72	
ES.9SW_D	13 Aug 04	26 Apr 06	1212	364	-0.750	-0.00206	-0.752	
ES.38NE_D	none	na	na	na	na	na	na	
ES.40E_D	6 Aug 04	26 Apr 06	1212	364	3.30	0.00907	3.31	
ES.40NW_D	9 Jun 05	26 Apr 06	1212	321	13.2	0.0411	15.0	
CP.8S_D	10 Aug 04	24 Apr 06	1210	380	4.20	0.0111	4.03	
CP.8W_D	11 Aug 04	24 Apr 06	1210	380	2.70	0.0071	2.59	
CP.8NW_D	4 May 05	24 Apr 06	1210	na	na	na	na	
CP.8N_D	12 Aug 04	24 Apr 06	1210	386	-2.30	-0.00596	-2.17	
Mean disturbed		5.06						

[m², square meters; kg, kilogram; kg/m², kilograms per square meter; Mg/ha, megagrams per hectare; Mg/ha/d, megagrams per hectare per day; Mg/ha/yr, megagrams per hectare per year; ~, approximately; na, not applicable or no data]

							Fall and winter 2004 / 2005 (since October 2004, 5 months)								
Hillslope- erosion plot identification code	Date silt fence installed	Julian day since January 2004	Erosion plot area	Surveyed hillslope gradient	Erosion plot aspect	Erosion plot vegetation cover	Date observed	Julian day since January 2004	Elapsed number of days	Dry sediment weight ¹	Sediment yield	Sediment yield	Daily erosion rate	Seasonal erosion rate	
			(m ²)	(degrees)	(degrees)	(percent)				(kg)	(kg/m ²)	(Mg/ha)	(Mg/ha/d)	(Mg/ha/yr)	
ES.9SE	20 Oct 04	294	50	36.5	163	0	23 Mar 05	448	154	0.0	0.0	0.0	0.0	0.0	
ES.9NW	21 Oct 04	295	50	28.0	296	15	23 Mar 05	448	153	0.0	0.0	0.0	0.0	0.0	
ES.40E	7 Jun 05	524	28	33.0	103	10									
CP.8S	6 May 05	492	28	38.0	179	0									
CP.8W	5 May 05	491	50	40.0	240	0									
CP.8N	21 Oct 04	295	50	32.0	14	10	23 Mar 05	448	153	0.0	0.0	0.0	0.0	0.0	
Mean															0.0

Table 6. Hillslope-erosion data from silt-fence traps on undisturbed areas at Gunnison Gorge National Conservation Area, southwestern Colorado.—Continued

[m², square meters; kg, kilogram; kg/m², kilograms per square meter; Mg/ha, megagrams per hectare; Mg/ha/d, megagrams per hectare per day; Mg/ha/yr, megagrams per hectare per year; ~, approximately; na, not applicable or no data]

							Spring 2005 (since March 2005, ~1.5 to 2.6 months)								
Hillslope-erosion plot identification code	Date silt fence installed	Julian day since January 2004	Erosion plot area	Surveyed hillslope gradient	Erosion plot aspect	Erosion plot vegetation cover	Date observed or installed	Julian day since January 2004	Elapsed number of days	Dry sediment weight ^{1,2}	Sediment yield	Sediment yield	Daily erosion rate	Seasonal erosion rate	
			(m ²)	(degrees)	(degrees)	(percent)				(kg)	(kg/m ²)	(Mg/ha)	(Mg/ha/d)	(Mg/ha/yr)	
ES.9SE	20 Oct 04	294	50	36.5	163	0	9 Jun 05	526	78	0.0	0.0	0.0	0.0	0.0	
ES.9NW	21 Oct 04	295	50	28.0	296	15	9 Jun 05	526	78	0.464	0.00927	0.0927	0.00119	0.434	
ES.40E	7 Jun 05	524	28	33.0	103	10	7 Jun 05	524	0	na	na	na	na	na	
CP.8S	6 May 05	492	28	38.0	179	0	6 May 05	492	0	na	na	na	na	na	
CP.8W	5 May 05	491	50	40.0	240	0	5 May 05	491	0	na	na	na	na	na	
CP.8N	21 Oct 04	295	50	32.0	14	10	6 May 05	492	44	1.10	0.0220	0.220	0.00500	1.83	
Mean															0.753

[m², square meters; kg, kilogram; kg/m², kilograms per square meter; Mg/ha, megagrams per hectare; Mg/ha/d, megagrams per hectare per day; Mg/ha/yr, megagrams per hectare per year; ~, approximately; na, not applicable or no data]

							Summer 2005 (since May 2005 ~5.8 months; since June 2005 ~4.6 months)								
Hillslope- erosion plot identification code	Date silt fence installed	Julian day since January 2004	Erosion plot area	Surveyed hillslope gradient	Erosion plot aspect	Erosion plot vegetation cover	Date observed	Julian day since January 2004	Elapsed number of days	Dry sediment weight ^{1,2,3}	Sediment yield	Sediment yield	Daily erosion rate	Seasonal erosion rate	
			(m ²)	(degrees)	(degrees)	(percent)				(kg)	(kg/m ²)	(Mg/ha)	(Mg/ha/d)	(Mg/ha/yr)	
ES.9SE	20 Oct 04	294	50	36.5	163	0	25 Oct 05	664	138	3.24	0.0648	0.648	0.00470	1.72	
ES.9NW	21 Oct 04	295	50	28.0	296	15	25 Oct 05	664	138	60.9	1.22	12.2	0.0882	32.2	
ES.40E	7 Jun 05	524	28	33.0	103	10	25 Oct 05	664	140	2.92	0.104	1.04	0.00744	2.72	
CP.8S	6 May 05	492	28	38.0	179	0	26 Oct 05	665	173	8.19	0.293	2.93	0.0169	6.17	
CP.8W	5 May 05	491	50	40.0	240	0	26 Oct 05	665	174	34.0	0.680	6.80	0.0391	14.3	
CP.8N	21 Oct 04	295	50	32.0	14	10	26 Oct 05	665	173	0.875	0.0175	0.175	0.00101	0.369	
Mean															9.57

Table 6. Hillslope-erosion data from silt-fence traps on undisturbed areas at Gunnison Gorge National Conservation Area, southwestern Colorado.—Continued

[m², square meters; kg, kilogram; kg/m², kilograms per square meter; Mg/ha, megagrams per hectare; Mg/ha/d, megagrams per hectare per day; Mg/ha/yr, megagrams per hectare per year; ~, approximately; na, not applicable or no data]

Hillslope- erosion plot identification code	Date silt fence installed	Julian day since January 2004	Erosion plot area	Surveyed hillslope gradient	Erosion plot aspect	Erosion plot vegetation cover	Fall and winter 2005 / 2006 (since October 2005 6 mos)							
							Date observed	Julian day since January 2004	Elapsed number of days	Dry sediment weight ^{1,2,3}	Sediment yield	Sediment yield	Daily erosion rate	Seasonal erosion rate
			(m ²)	(degrees)	(degrees)	(percent)				(kg)	(kg/m ²)	(Mg/ha)	(Mg/ha/d)	(Mg/ha/yr)
ES.9SE	20 Oct 04	294	50	36.5	163	0	26 Apr 06	847	183	7.50	0.150	1.50	0.00820	2.99
ES.9NW	21 Oct 04	295	50	28.0	296	15	26 Apr 06	847	183	2.01	0.0403	0.403	0.00220	0.803
ES.40E	7 Jun 05	524	28	33.0	103	10	26 Apr 06	847	183	0.568	0.0203	0.203	0.00111	0.405
CP.8S	6 May 05	492	28	38.0	179	0	25 Apr 06	846	181	11.6	0.414	4.14	0.0229	8.35
CP.8W	5 May 05	491	50	40.0	240	0	25 Apr 06	846	181	26.0	0.520	5.20	0.0287	10.5
CP.8N	21 Oct 04	295	50	32.0	14	10	25 Apr 06	846	181	na	na	na	na	na
Mean							4.61							

¹Dry sediment weights—Samples were collected (1) dry onsite, (2) air dried for several weeks in the laboratory, or (3) weight adjusted by using a moisture correction factor determined from an air-dried subsample.

²Yellow highlighted weights—All captured sediment was collected onsite, dried, and weighted in the laboratory to the nearest 0.001 kg.

³Pink highlighted weights—All captured sediment was collected and weighted onsite to the nearest 0.0 kg. If the field sample was large and moist, a subsample of captured sediment was dried and weighted in laboratory to the nearest 0.001 kg. A moisture correction factor from the dried subsample was applied to the field sample to determine a dry sediment weight to the nearest 0.1 kg.

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
213	0.00	0.00	0.00	0									1 August 2003
214	0.00	0.00	0.00	0									
215	0.00	0.00	0.00	0									
216	0.10	0.10	2.54	3									
217	0.00	0.10	0.00	3									
218	0.00	0.10	0.00	3									
219	0.02	0.12	0.51	3									
220	0.03	0.15	0.76	4									
221	0.00	0.15	0.00	4									
222	0.00	0.15	0.00	4									
223	0.00	0.15	0.00	4									
224	0.00	0.15	0.00	4									
225	0.00	0.15	0.00	4									
226	0.00	0.15	0.00	4									
227	0.26	0.41	6.60	10									
228	0.00	0.41	0.00	10									
229	0.00	0.41	0.00	10									
230	0.05	0.46	1.27	12									
231	0.00	0.46	0.00	12									
232	0.00	0.46	0.00	12									
233	0.00	0.46	0.00	12									
234	Trace	0.46	Trace	12									
235	0.13	0.59	3.30	15									
236	0.00	0.59	0.00	15									
237	0.00	0.59	0.00	15									
238	0.06	0.65	1.52	17									
239	0.00	0.65	0.00	17									
240	0.19	0.84	4.83	21									
241	0.00	0.84	0.00	21									
242	0.00	0.84	0.00	21									
243	0.05	0.89	1.27	23									1 September 2003
244	0.00	0.89	0.00	23									
245	0.00	0.89	0.00	23									
246	Trace	0.90	Trace	23									
247	0.00	0.90	0.00	23									
248	0.00	0.90	0.00	23									
249	0.33	1.23	8.38	31									
250	0.20	1.43	5.08	36									
251	Trace	1.43	Trace	36									
252	0.00	1.43	0.00	36									
253	0.85	2.28	21.59	58									
254	0.39	2.67	9.91	68									
255	0.00	2.67	0.00	68									
256	0.00	2.67	0.00	68									
257	0.00	2.67	0.00	68									

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
258	0.00	2.67	0.00	68									
259	0.00	2.67	0.00	68									
260	0.00	2.67	0.00	68									
261	0.00	2.67	0.00	68									
262	0.00	2.67	0.00	68									
263	0.00	2.67	0.00	68									
264	0.00	2.67	0.00	68									
265	0.00	2.67	0.00	68									
266	0.00	2.67	0.00	68									
267	0.00	2.67	0.00	68									
268	0.00	2.67	0.00	68									
269	0.00	2.67	0.00	68									
270	0.00	2.67	0.00	68									
271	0.00	2.67	0.00	68									
272	0.00	2.67	0.00	68									
273	0.00	2.67	0.00	68									
274	0.00	2.67	0.00	68									
275	0.03	2.70	0.76	69									
276	0.28	2.98	7.11	76									
277	0.20	3.18	5.08	81									
278	0.00	3.18	0.00	81									
279	0.00	3.18	0.00	81									
280	0.00	3.18	0.00	81									
281	0.00	3.18	0.00	81									
282	0.00	3.18	0.00	81									
283	0.00	3.18	0.00	81									
284	0.15	3.33	3.81	85									
285	0.00	3.33	0.00	85									
286	0.00	3.33	0.00	85									
287	0.00	3.33	0.00	85									
288	0.00	3.33	0.00	85									
289	0.00	3.33	0.00	85									
290	0.00	3.33	0.00	85									
291	0.00	3.33	0.00	85									
292	0.00	3.33	0.00	85									
293	0.00	3.33	0.00	85									
294	0.00	3.33	0.00	85									
295	0.00	3.33	0.00	85									
296	0.00	3.33	0.00	85									
297	0.00	3.33	0.00	85									
298	0.00	3.33	0.00	85									
299	0.00	3.33	0.00	85									
300	0.00	3.33	0.00	85									
301	0.00	3.33	0.00	85									
302	0.00	3.33	0.00	85									

1 October 2003

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
303	0.00	3.33	0.00	85									1 November 2003
304	0.00	3.33	0.00	85									
305	0.00	3.33	0.00	85									
306	Trace	3.34	Trace	85									
307	0.10	3.44	2.54	87									
308	0.00	3.44	0.00	87									
309	0.00	3.44	0.00	87									
310	0.00	3.44	0.00	87									
311	0.00	3.44	0.00	87									
312	0.00	3.44	0.00	87									
313	0.00	3.44	0.00	87									
314	0.10	3.54	2.54	90									
315	0.03	3.57	0.76	91									
316	0.00	3.57	0.00	91									
317	0.05	3.62	1.27	92									
318	0.15	3.77	3.81	96									
319	0.00	3.77	0.00	96									
320	0.00	3.77	0.00	96									
321	0.00	3.77	0.00	96									
322	0.06	3.83	1.52	97									
323	0.00	3.83	0.00	97									
324	0.00	3.83	0.00	97									
325	0.00	3.83	0.00	97									
326	0.00	3.83	0.00	97									
327	0.11	3.94	2.79	100									
328	0.00	3.94	0.00	100									
329	0.00	3.94	0.00	100									
330	Trace	3.94	Trace	100									1 December 2003
331	0.00	3.94	0.00	100									
332	0.00	3.94	0.00	100									
333	0.00	3.94	0.00	100									
334	0.00	3.94	0.00	100									
335	0.00	3.94	0.00	100									
336	0.00	3.94	0.00	100									
337	0.00	3.94	0.00	100									
338	0.00	3.94	0.00	100									
339	0.00	3.94	0.00	100									
340	0.00	3.94	0.00	100									
341	0.00	3.94	0.00	100									
342	0.21	4.15	5.33	105									
343	0.16	4.31	4.06	109									
344	0.00	4.31	0.00	109									
345	0.00	4.31	0.00	109									
346	0.00	4.31	0.00	109									
347	0.00	4.31	0.00	109									

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
348	0.00	4.31	0.00	109									
349	0.13	4.44	3.30	113									
350	0.00	4.44	0.00	113									
351	0.00	4.44	0.00	113									
352	0.00	4.44	0.00	113									
353	0.00	4.44	0.00	113									
354	0.00	4.44	0.00	113									
355	0.00	4.44	0.00	113									
356	0.11	4.55	2.79	116									
357	0.00	4.55	0.00	116									
358	0.00	4.55	0.00	116									
359	0.00	4.55	0.00	116									
360	Trace	4.55	Trace	116									
361	Trace	4.56	Trace	116									
362	0.00	4.56	0.00	116									
363	0.00	4.56	0.00	116									
364	Trace	4.56	Trace	116									
365	0.04	4.60	1.02	117									
366	0.00	4.60	0.00	117									
367	0.00	4.60	0.00	117									
368	0.35	4.95	8.89	126									
369	0.11	5.06	2.79	129									
370	0.00	5.06	0.00	129									
371	0.00	5.06	0.00	129									
372	0.00	5.06	0.00	129									
373	0.00	5.06	0.00	129									
374	0.00	5.06	0.00	129									
375	0.00	5.06	0.00	129									
376	0.00	5.06	0.00	129									
377	0.00	5.06	0.00	129									
378	0.00	5.06	0.00	129									
379	0.00	5.06	0.00	129									
380	0.00	5.06	0.00	129									
381	0.00	5.06	0.00	129									
382	0.00	5.06	0.00	129									
383	0.00	5.06	0.00	129									
384	0.00	5.06	0.00	129									
385	0.03	5.09	0.76	129									
386	0.00	5.09	0.00	129									
387	0.00	5.09	0.00	129									
388	0.00	5.09	0.00	129									
389	0.00	5.09	0.00	129									
390	0.00	5.09	0.00	129									
391	Trace	5.10	Trace	129									
392	0.00	5.10	0.00	129									

1 January 2004

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
393	0.00	5.10	0.00	129									1 February 2004
394	0.00	5.10	0.00	129									
395	0.00	5.10	0.00	129									
396	0.00	5.10	0.00	129									
397	0.20	5.30	5.08	135									
398	0.00	5.30	0.00	135									
399	0.00	5.30	0.00	135									
400	0.13	5.43	3.30	138									
401	0.13	5.56	3.30	141									
402	0.00	5.56	0.00	141									
403	0.00	5.56	0.00	141									
404	0.00	5.56	0.00	141									
405	0.00	5.56	0.00	141									
406	0.00	5.56	0.00	141									
407	0.00	5.56	0.00	141									
408	0.03	5.59	0.76	142									
409	0.00	5.59	0.00	142									
410	0.00	5.59	0.00	142									
411	0.00	5.59	0.00	142									
412	0.00	5.59	0.00	142									
413	0.00	5.59	0.00	142									
414	0.00	5.59	0.00	142									
415	0.00	5.59	0.00	142									
416	0.22	5.81	5.59	147									
417	0.00	5.81	0.00	147									
418	0.05	5.86	1.27	149									
419	0.00	5.86	0.00	149									
420	0.00	5.86	0.00	149									
421	0.00	5.86	0.00	149									
422	0.00	5.86	0.00	149									
423	0.00	5.86	0.00	149									
424	0.20	6.06	5.08	154									1 March 2004
425	Trace	6.06	Trace	154									
426	0.00	6.06	0.00	154									
427	0.00	6.06	0.00	154									
428	0.03	6.09	0.76	155									
429	0.00	6.09	0.00	155									
430	0.09	6.18	2.29	157									
431	0.00	6.18	0.00	157									
432	0.00	6.18	0.00	157									
433	0.00	6.18	0.00	157									
434	0.00	6.18	0.00	157									
435	0.00	6.18	0.00	157									
436	0.00	6.18	0.00	157									
437	0.00	6.18	0.00	157									

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
438	0.00	6.18	0.00	157									
439	0.00	6.18	0.00	157									
440	0.00	6.18	0.00	157									
441	0.00	6.18	0.00	157									
442	0.00	6.18	0.00	157									
443	0.00	6.18	0.00	157									
444	0.00	6.18	0.00	157									
445	0.00	6.18	0.00	157									
446	0.00	6.18	0.00	157									
447	0.00	6.18	0.00	157									
448	0.00	6.18	0.00	157									
449	0.00	6.18	0.00	157									
450	0.00	6.18	0.00	157									
451	0.00	6.18	0.00	157									
452	0.00	6.18	0.00	157									
453	0.00	6.18	0.00	157									
454	0.00	6.18	0.00	157									
455	0.00	6.18	0.00	157									
456	0.00	6.18	0.00	157									
457	0.00	6.18	0.00	157									
458	0.00	6.18	0.00	157									
459	0.00	6.18	0.00	157									
460	0.05	6.23	1.27	158									
461	0.90	7.13	22.86	181									
462	0.02	7.15	0.51	182									
463	Trace	7.15	Trace	182									
464	0.42	7.57	10.67	192									
465	0.24	7.81	6.10	198									
466	0.10	7.91	2.54	201									
467	0.15	8.06	3.81	205									
468	Trace	8.07	Trace	205									
469	0.00	8.07	0.00	205									
470	0.00	8.07	0.00	205									
471	0.00	8.07	0.00	205									
472	0.00	8.07	0.00	205									
473	0.00	8.07	0.00	205									
474	0.04	8.11	1.02	206									
475	0.00	8.11	0.00	206									
476	0.00	8.11	0.00	206									
477	0.00	8.11	0.00	206									
478	0.02	8.13	0.51	206									
479	0.38	8.51	9.65	216									
480	0.02	8.53	0.51	217									
481	0.02	8.55	0.51	217									
482	0.00	8.55	0.00	217									

1 April 2004

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
483	0.00	8.55	0.00	217									1 May 2004
484	0.00	8.55	0.00	217									
485	0.00	8.55	0.00	217									
486	0.47	9.02	11.94	229									
487	0.13	9.15	3.30	232									
488	0.00	9.15	0.00	232									
489	0.00	9.15	0.00	232									
490	0.00	9.15	0.00	232									
491	0.00	9.15	0.00	232									
492	0.00	9.15	0.00	232									
493	0.00	9.15	0.00	232									
494	0.00	9.15	0.00	232									
495	0.00	9.15	0.00	232									
496	0.00	9.15	0.00	232									
497	0.00	9.15	0.00	232									
498	0.00	9.15	0.00	232									
499	0.12	9.27	3.05	235									
500	0.04	9.31	1.02	236									
501	0.00	9.31	0.00	236									
502	0.00	9.31	0.00	236									
503	0.00	9.31	0.00	236									
504	0.00	9.31	0.00	236									
505	0.00	9.31	0.00	236									
506	0.00	9.31	0.00	236									
507	0.00	9.31	0.00	236									
508	0.00	9.31	0.00	236									
509	0.00	9.31	0.00	236									
510	0.00	9.31	0.00	236									
511	0.00	9.31	0.00	236									
512	0.00	9.31	0.00	236									
513	0.00	9.31	0.00	236									
514	0.00	9.31	0.00	236									
515	0.00	9.31	0.00	236									
516	0.00	9.31	0.00	236									
517	0.00	9.31	0.00	236									1 June 2004
518	0.00	9.31	0.00	236									
519	0.00	9.31	0.00	236									
520	0.00	9.31	0.00	236									
521	0.00	9.31	0.00	236									
522	0.00	9.31	0.00	236									
523	0.00	9.31	0.00	236									
524	0.00	9.31	0.00	236									
525	0.00	9.31	0.00	236									
526	0.00	9.31	0.00	236									
527	0.00	9.31	0.00	236									

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
528	0.00	9.31	0.00	236									
529	0.00	9.31	0.00	236									
530	0.00	9.31	0.00	236									
531	0.00	9.31	0.00	236									
532	0.00	9.31	0.00	236									
533	0.00	9.31	0.00	236									
534	0.00	9.31	0.00	236									
535	0.03	9.34	0.76	237									
536	0.12	9.46	3.05	240									
537	0.00	9.46	0.00	240									
538	0.00	9.46	0.00	240									
539	0.12	9.58	3.05	243									
540	0.00	9.58	0.00	243									
541	0.00	9.58	0.00	243									
542	0.00	9.58	0.00	243									
543	0.03	9.61	0.76	244									
544	0.00	9.61	0.00	244									
545	0.00	9.61	0.00	244									
546	0.07	9.68	1.78	246									
547	0.29	9.97	7.37	253									
548	0.04	10.01	1.02	254									
549	0.00	10.01	0.00	254									
550	0.00	10.01	0.00	254									
551	0.00	10.01	0.00	254									
552	0.00	10.01	0.00	254									
553	0.00	10.01	0.00	254									
554	0.00	10.01	0.00	254									
555	Trace	10.01	Trace	254									
556	0.00	10.01	0.00	254									
557	0.02	10.03	0.51	255									
558	0.00	10.03	0.00	255									
559	0.00	10.03	0.00	255									
560	0.00	10.03	0.00	255									
561	0.00	10.03	0.00	255									
562	0.00	10.03	0.00	255									
563	Trace	10.04	Trace	255									
564	0.00	10.04	0.00	255									
565	Trace	10.04	Trace	255									
566	0.02	10.06	0.51	256									
567	0.00	10.06	0.00	256									
568	0.01	10.07	0.25	256									
569	0.00	10.07	0.00	256									
570	0.00	10.07	0.00	256									
571	0.04	10.11	1.02	257									
572	0.00	10.11	0.00	257									

1 July 2004

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
573	0.00	10.11	0.00	257									MA missing data
574	md	10.11	md	257									
575	0.00	10.11	0.00	257									
576	0.00	10.11	0.00	257									
577	0.00	10.11	0.00	257									
578	0.00	10.11	0.00	257									
579	0.00	10.11	0.00	257									
580	0.00	10.11	0.00	257									
581	0.00	10.11	0.00	257									
582	0.00	10.11	0.00	257									
583	Trace	10.11	Trace	257									1 August 2004
584	0.04	10.15	1.02	258									
585	0.08	10.23	2.03	260									
586	0.00	10.23	0.00	260									
587	0.00	10.23	0.00	260									
588	0.00	10.23	0.00	260									
589	0.00	10.23	0.00	260									
590	0.00	10.23	0.00	260									
591	0.00	10.23	0.00	260									
592	0.00	10.23	0.00	260									
593	0.00	10.23	0.00	260									
594	0.02	10.25	0.51	260									
595	0.00	10.25	0.00	260									
596	0.07	10.32	1.78	262									
597	0.04	10.36	1.02	263									
598	0.16	10.52	4.06	267									
599	0.02	10.54	0.51	268									
600	0.12	10.66	3.05	271									
601	0.02	10.68	0.51	271									
602	0.00	10.68	0.00	271									
603	0.00	10.68	0.00	271									
604	0.00	10.68	0.00	271									
605	0.00	10.68	0.00	271									
606	0.00	10.68	0.00	271									
607	0.00	10.68	0.00	271									
608	0.00	10.68	0.00	271									
609	0.00	10.68	0.00	271									
610	0.00	10.68	0.00	271									1 September 2004
611	0.00	10.68	0.00	271									
612	0.00	10.68	0.00	271									
613	0.21	10.89	5.33	277									
614	0.25	11.14	6.35	283									
615	0.00	11.14	0.00	283									
616	0.00	11.14	0.00	283									
617	0.00	11.14	0.00	283									

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
618	0.00	11.14	0.00	283									
619	0.05	11.19	1.27	284									
620	0.00	11.19	0.00	284									
621	0.00	11.19	0.00	284									
622	0.00	11.19	0.00	284									
623	0.00	11.19	0.00	284									
624	0.00	11.19	0.00	284									
625	0.00	11.19	0.00	284									
626	0.00	11.19	0.00	284									
627	0.00	11.19	0.00	284									
628	0.07	11.26	1.78	286									
629	0.42	11.68	10.67	297									
630	0.65	12.33	16.51	313									
631	0.58	12.91	14.73	328									
632	0.04	12.95	1.02	329									
633	0.00	12.95	0.00	329									
634	0.00	12.95	0.00	329									
635	0.00	12.95	0.00	329									
636	0.00	12.95	0.00	329									
637	0.00	12.95	0.00	329									
638	0.04	12.99	1.02	330									
639	0.23	13.22	5.84	336									
640	0.23	13.45	5.84	342									1 October 2004
641	0.00	13.45	0.00	342									
642	0.00	13.45	0.00	342									
643	0.00	13.45	0.00	342									
644	0.05	13.50	1.27	343									
645	0.07	13.57	1.78	345									
646	0.02	13.59	0.51	345									
647	0.00	13.59	0.00	345									
648	0.00	13.59	0.00	345									
649	0.00	13.59	0.00	345									
650	0.00	13.59	0.00	345									
651	0.00	13.59	0.00	345									
652	0.23	13.82	5.84	351									
653	0.00	13.82	0.00	351									
654	0.00	13.82	0.00	351									
655	0.00	13.82	0.00	351									
656	0.00	13.82	0.00	351									
657	0.02	13.84	0.51	352									
658	0.00	13.84	0.00	352	0.00	0.00	0.00	0	0.00	0.00	0.00	0	19 October 2004, ES and CL rain gages installed
659	0.00	13.84	0.00	352	0.00	0.00	0.00	0	0.00	0.00	0.00	0	
660	0.00	13.84	0.00	352	0.00	0.00	0.00	0	0.04	0.04	1.02	1	
661	0.00	13.84	0.00	352	0.00	0.00	0.00	0	0.02	0.06	0.51	2	
662	0.02	13.86	0.51	352	0.00	0.00	0.00	0	0.00	0.06	0.00	2	

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
663	0.00	13.86	0.00	352	0.00	0.00	0.00	0	0.07	0.13	1.78	3	1 November 2004
664	0.00	13.86	0.00	352	0.19	0.19	4.83	5	0.00	0.13	0.00	3	
665	0.13	13.99	3.30	355	0.00	0.19	0.00	5	0.02	0.15	0.51	4	
666	0.00	13.99	0.00	355	0.00	0.19	0.00	5	0.26	0.41	6.60	10	
667	0.03	14.02	0.76	356	0.35	0.54	8.89	14	0.00	0.41	0.00	10	
668	0.34	14.36	8.64	365	0.00	0.54	0.00	14	0.00	0.41	0.00	10	
669	0.00	14.36	0.00	365	0.00	0.54	0.00	14	0.00	0.41	0.00	10	
670	0.00	14.36	0.00	365	0.16	0.70	4.06	18	0.01	0.42	0.25	11	
671	0.12	14.48	3.05	368	0.00	0.70	0.00	18	0.00	0.42	0.00	11	
672	0.00	14.48	0.00	368	0.00	0.70	0.00	18	0.00	0.42	0.00	11	
673	0.00	14.48	0.00	368	0.00	0.70	0.00	18	0.00	0.42	0.00	11	
674	0.00	14.48	0.00	368	0.00	0.70	0.00	18	0.00	0.42	0.00	11	
675	0.00	14.48	0.00	368	0.00	0.70	0.00	18	0.00	0.42	0.00	11	
676	0.00	14.48	0.00	368	0.00	0.70	0.00	18	0.00	0.42	0.00	11	
677	0.00	14.48	0.00	368	0.00	0.70	0.00	18	0.00	0.42	0.00	11	
678	0.00	14.48	0.00	368	0.13	0.83	3.30	21	0.00	0.42	0.00	11	
679	0.08	14.56	2.03	370	0.00	0.83	0.00	21	0.14	0.56	3.56	14	
680	0.01	14.57	0.25	370	0.00	0.83	0.00	21	0.00	0.56	0.00	14	
681	0.00	14.57	0.00	370	0.00	0.83	0.00	21	0.00	0.56	0.00	14	
682	0.00	14.57	0.00	370	0.00	0.83	0.00	21	0.00	0.56	0.00	14	
683	Trace	14.58	Trace	370	0.09	0.92	2.29	23	0.00	0.56	0.00	14	
684	0.66	15.24	16.76	387	0.00	0.92	0.00	23	0.09	0.65	2.29	17	
685	0.00	15.24	0.00	387	0.00	0.92	0.00	23	0.00	0.65	0.00	17	
686	0.00	15.24	0.00	387	0.00	0.92	0.00	23	0.00	0.65	0.00	17	
687	0.00	15.24	0.00	387	0.00	0.92	0.00	23	0.00	0.65	0.00	17	
688	0.00	15.24	0.00	387	0.00	0.92	0.00	23	0.00	0.65	0.00	17	
689	0.00	15.24	0.00	387	0.17	1.09	4.32	28	0.00	0.65	0.00	17	
690	0.00	15.24	0.00	387	0.28	1.37	7.11	35	0.08	0.73	2.03	19	
691	0.50	15.74	12.70	400	0.00	1.37	0.00	35	0.40	1.13	10.16	29	
692	0.02	15.76	0.51	400	0.00	1.37	0.00	35	0.01	1.14	0.25	29	
693	0.00	15.76	0.00	400	0.00	1.37	0.00	35	0.00	1.14	0.00	29	
694	0.00	15.76	0.00	400	0.00	1.37	0.00	35	0.00	1.14	0.00	29	
695	0.00	15.76	0.00	400	0.19	1.56	4.83	40	0.00	1.14	0.00	29	
696	0.06	15.82	1.52	402	0.00	1.56	0.00	40	0.15	1.29	3.81	33	
697	0.00	15.82	0.00	402	0.35	1.91	8.89	49	0.00	1.29	0.00	33	
698	0.15	15.97	3.81	406	0.17	2.08	4.32	53	0.06	1.35	1.52	34	
699	0.17	16.14	4.32	410	0.01	2.09	0.25	53	0.05	1.40	1.27	36	
700	Trace	16.14	Trace	410	0.00	2.09	0.00	53	0.00	1.40	0.00	36	1 December 2004
701	0.00	16.14	0.00	410	0.00	2.09	0.00	53	0.00	1.40	0.00	36	
702	0.00	16.14	0.00	410	0.00	2.09	0.00	53	0.00	1.40	0.00	36	
703	0.00	16.14	0.00	410	0.00	2.09	0.00	53	0.00	1.40	0.00	36	
704	0.00	16.14	0.00	410	0.02	2.11	0.51	54	0.00	1.40	0.00	36	
705	0.18	16.32	4.57	415	0.11	2.22	2.79	56	0.18	1.58	4.57	40	
706	Trace	16.33	Trace	415	0.00	2.22	0.00	56	0.00	1.58	0.00	40	
707	0.00	16.33	0.00	415	0.01	2.23	0.25	57	0.00	1.58	0.00	40	

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
708	0.00	16.33	0.00	415	0.01	2.24	0.25	57	0.03	1.61	0.76	41	1 January 2005
709	Trace	16.33	Trace	415	0.00	2.24	0.00	57	0.00	1.61	0.00	41	
710	0.00	16.33	0.00	415	0.00	2.24	0.00	57	0.00	1.61	0.00	41	
711	0.00	16.33	0.00	415	0.00	2.24	0.00	57	0.00	1.61	0.00	41	
712	0.00	16.33	0.00	415	0.00	2.24	0.00	57	0.00	1.61	0.00	41	
713	0.00	16.33	0.00	415	0.00	2.24	0.00	57	0.00	1.61	0.00	41	
714	0.00	16.33	0.00	415	0.00	2.24	0.00	57	0.00	1.61	0.00	41	
715	0.00	16.33	0.00	415	0.00	2.24	0.00	57	0.00	1.61	0.00	41	
716	0.00	16.33	0.00	415	0.00	2.24	0.00	57	0.00	1.61	0.00	41	
717	0.00	16.33	0.00	415	0.00	2.24	0.00	57	0.00	1.61	0.00	41	
718	0.00	16.33	0.00	415	0.00	2.24	0.00	57	0.00	1.61	0.00	41	
719	0.00	16.33	0.00	415	0.00	2.24	0.00	57	0.00	1.61	0.00	41	
720	0.00	16.33	0.00	415	0.00	2.24	0.00	57	0.00	1.61	0.00	41	
721	0.00	16.33	0.00	415	0.00	2.24	0.00	57	0.00	1.61	0.00	41	
722	0.00	16.33	0.00	415	0.02	2.26	0.51	57	0.00	1.61	0.00	41	
723	0.01	16.34	0.25	415	0.00	2.26	0.00	57	0.00	1.61	0.00	41	
724	0.00	16.34	0.00	415	0.00	2.26	0.00	57	0.00	1.61	0.00	41	
725	0.00	16.34	0.00	415	0.00	2.26	0.00	57	0.00	1.61	0.00	41	
726	0.00	16.34	0.00	415	0.00	2.26	0.00	57	0.00	1.61	0.00	41	
727	0.00	16.34	0.00	415	0.00	2.26	0.00	57	0.00	1.61	0.00	41	
728	0.00	16.34	0.00	415	0.20	2.46	5.08	62	0.00	1.61	0.00	41	
729	0.03	16.37	0.76	416	0.00	2.46	0.00	62	0.31	1.92	7.87	49	
730	0.15	16.52	3.81	420	0.00	2.46	0.00	62	0.00	1.92	0.00	49	
731	0.00	16.52	0.00	420	0.00	2.46	0.00	62	0.00	1.92	0.00	49	
732	0.00	16.52	0.00	420	0.00	2.46	0.00	62	0.00	1.92	0.00	49	
733	0.00	16.52	0.00	420	0.00	2.46	0.00	62	0.00	1.92	0.00	49	
734	0.00	16.52	0.00	420	0.16	2.62	4.06	67	0.00	1.92	0.00	49	
735	0.03	16.55	0.76	420	0.01	2.63	0.25	67	0.19	2.11	4.83	54	
736	0.14	16.69	3.56	424	0.01	2.64	0.25	67	0.01	2.12	0.25	54	
737	Trace	16.69	Trace	424	0.00	2.64	0.00	67	0.00	2.12	0.00	54	
738	0.00	16.69	0.00	424	0.00	2.64	0.00	67	0.00	2.12	0.00	54	
739	0.00	16.69	0.00	424	0.00	2.64	0.00	67	0.00	2.12	0.00	54	
740	0.00	16.69	0.00	424	0.00	2.64	0.00	67	0.00	2.12	0.00	54	
741	0.02	16.71	0.51	425	0.01	2.65	0.25	67	0.00	2.12	0.00	54	
742	0.01	16.72	0.25	425	0.18	2.83	4.57	72	0.12	2.24	3.05	57	
743	0.15	16.87	3.81	429	0.12	2.95	3.05	75	0.15	2.39	3.81	61	
744	0.00	16.87	0.00	429	0.00	2.95	0.00	75	0.00	2.39	0.00	61	
745	0.00	16.87	0.00	429	0.00	2.95	0.00	75	0.00	2.39	0.00	61	
746	0.00	16.87	0.00	429	0.00	2.95	0.00	75	0.00	2.39	0.00	61	
747	0.00	16.87	0.00	429	0.00	2.95	0.00	75	0.00	2.39	0.00	61	
748	0.00	16.87	0.00	429	0.00	2.95	0.00	75	0.00	2.39	0.00	61	
749	0.00	16.87	0.00	429	0.00	2.95	0.00	75	0.00	2.39	0.00	61	
750	0.00	16.87	0.00	429	0.00	2.95	0.00	75	0.00	2.39	0.00	61	
751	0.00	16.87	0.00	429	0.00	2.95	0.00	75	0.00	2.39	0.00	61	
752	0.00	16.87	0.00	429	0.00	2.95	0.00	75	0.00	2.39	0.00	61	

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
753	0.00	16.87	0.00	429	0.00	2.95	0.00	75	0.00	2.39	0.00	61	24 January 2005, CL rain gage shot
754	0.00	16.87	0.00	429	0.00	2.95	0.00	75	0.00	2.39	0.00	61	
755	0.00	16.87	0.00	429	0.00	2.95	0.00	75	md	md	md	md	
756	0.00	16.87	0.00	429	0.00	2.95	0.00	75	md	md	md	md	
757	0.00	16.87	0.00	429	0.00	2.95	0.00	75	md	md	md	md	
758	0.00	16.87	0.00	429	0.10	3.05	2.54	77	md	md	md	md	
759	0.12	16.99	3.05	432	0.00	3.05	0.00	77	md	md	md	md	
760	0.00	16.99	0.00	432	0.00	3.05	0.00	77	md	md	md	md	
761	0.00	16.99	0.00	432	0.00	3.05	0.00	77	md	md	md	md	
762	0.03	17.02	0.76	432	0.07	3.12	1.78	79	md	md	md	md	
763	0.00	17.03	0.10	433	0.02	3.14	0.51	80	md	md	md	md	
764	0.00	17.03	0.00	433	0.00	3.14	0.00	80	md	md	md	md	
765	0.00	17.03	0.00	433	0.00	3.14	0.00	80	md	md	md	md	
766	0.00	17.03	0.00	433	0.00	3.14	0.00	80	md	md	md	md	
767	0.00	17.03	0.00	433	0.00	3.14	0.00	80	md	md	md	md	
768	0.00	17.03	0.00	433	0.00	3.14	0.00	80	md	md	md	md	
769	0.00	17.03	0.00	433	0.00	3.14	0.00	80	md	md	md	md	
770	0.02	17.05	0.51	433	0.04	3.18	1.02	81	md	md	md	md	
771	0.00	17.05	0.00	433	0.00	3.18	0.00	81	md	md	md	md	
772	0.00	17.05	0.00	433	0.00	3.18	0.00	81	md	md	md	md	
773	0.00	17.05	0.00	433	0.00	3.18	0.00	81	md	md	md	md	
774	Trace	17.05	Trace	433	0.03	3.21	0.76	82	md	md	md	md	
775	0.05	17.10	1.27	434	0.01	3.22	0.25	82	md	md	md	md	
776	0.00	17.10	0.00	434	0.00	3.22	0.00	82	md	md	md	md	
777	Trace	17.11	Trace	434	0.01	3.23	0.25	82	md	md	md	md	
778	0.05	17.16	1.27	436	0.22	3.45	5.59	88	md	md	md	md	
779	0.10	17.26	2.54	438	0.01	3.46	0.25	88	md	md	md	md	
780	0.00	17.26	0.00	438	0.00	3.46	0.00	88	md	md	md	md	
781	0.05	17.31	1.27	440	0.03	3.49	0.76	89	md	md	md	md	
782	0.04	17.35	1.02	441	0.10	3.59	2.54	91	md	md	md	md	
783	0.04	17.39	1.02	442	0.00	3.59	0.00	91	md	md	md	md	
784	0.00	17.39	0.00	442	0.00	3.59	0.00	91	md	md	md	md	1 March 2005
785	Trace	17.39	Trace	442	0.00	3.59	0.00	91	md	md	md	md	
786	0.00	17.39	0.00	442	0.02	3.61	0.51	92	md	md	md	md	
787	0.00	17.39	0.00	442	0.00	3.61	0.00	92	md	md	md	md	
788	0.07	17.46	1.78	443	0.10	3.71	2.54	94	md	md	md	md	
789	0.00	17.46	0.00	443	0.01	3.72	0.25	94	md	md	md	md	
790	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
791	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
792	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
793	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
794	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
795	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
796	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
797	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
798	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	Equate CL cumulative precipitation to ES 23 March 2005, CL rain gage relocated
799	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
800	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
801	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
802	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
803	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
804	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
805	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
806	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
807	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
808	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
809	0.00	17.46	0.00	443	0.00	3.72	0.00	94	md	md	md	md	
810	Trace	17.46	Trace	444	0.03	3.75	0.76	95	md	md	md	md	
811	0.05	17.51	1.27	445	0.15	3.90	3.81	99	md	md	md	md	
812	0.00	17.51	0.00	445	0.00	3.90	0.00	99	md	md	md	md	
813	0.00	17.51	0.00	445	0.10	4.00	2.54	102	0.00	3.90	0.00	99	1 April 2005
814	0.03	17.54	0.76	446	0.00	4.00	0.00	102	0.22	4.12	5.59	105	
815	0.04	17.58	1.02	447	0.05	4.05	1.27	103	0.03	4.15	0.76	105	
816	0.05	17.63	1.27	448	0.00	4.05	0.00	103	0.00	4.15	0.00	105	
817	0.00	17.63	0.00	448	0.00	4.05	0.00	103	0.00	4.15	0.00	105	
818	0.00	17.63	0.00	448	0.00	4.05	0.00	103	0.00	4.15	0.00	105	
819	0.00	17.63	0.00	448	0.41	4.46	10.41	113	0.08	4.23	2.03	107	
820	0.27	17.90	6.86	455	0.01	4.47	0.25	114	0.10	4.33	2.54	110	
821	0.06	17.96	1.52	456	0.00	4.47	0.00	114	0.00	4.33	0.00	110	
822	0.00	17.96	0.00	456	0.00	4.47	0.00	114	0.00	4.33	0.00	110	
823	0.00	17.96	0.00	456	0.00	4.47	0.00	114	0.00	4.33	0.00	110	
824	0.00	17.96	0.00	456	0.00	4.47	0.00	114	0.00	4.33	0.00	110	
825	0.00	17.96	0.00	456	0.00	4.47	0.00	114	0.00	4.33	0.00	110	
826	0.00	17.96	0.00	456	0.07	4.54	1.78	115	0.00	4.33	0.00	110	
827	0.00	17.96	0.00	456	0.00	4.54	0.00	115	0.00	4.33	0.00	110	
828	0.00	17.96	0.00	456	0.00	4.54	0.00	115	0.00	4.33	0.00	110	
829	0.00	17.96	0.00	456	0.00	4.54	0.00	115	0.00	4.33	0.00	110	
830	0.00	17.96	0.00	456	0.00	4.54	0.00	115	0.00	4.33	0.00	110	
831	0.10	18.06	2.54	459	0.06	4.60	1.52	117	0.00	4.33	0.00	110	
832	Trace	18.07	Trace	459	0.00	4.60	0.00	117	0.00	4.33	0.00	110	
833	0.00	18.07	0.00	459	0.00	4.60	0.00	117	0.00	4.33	0.00	110	
834	0.00	18.07	0.00	459	0.00	4.60	0.00	117	0.00	4.33	0.00	110	
835	0.00	18.07	0.00	459	0.00	4.60	0.00	117	0.00	4.33	0.00	110	
836	0.00	18.07	0.00	459	0.00	4.60	0.00	117	0.00	4.33	0.00	110	
837	0.00	18.07	0.00	459	0.00	4.60	0.00	117	0.00	4.33	0.00	110	
838	0.00	18.07	0.00	459	0.00	4.60	0.00	117	0.12	4.45	3.05	113	
839	0.00	18.07	0.00	459	0.00	4.60	0.00	117	0.00	4.45	0.00	113	
840	0.00	18.07	0.00	459	0.00	4.60	0.00	117	0.00	4.45	0.00	113	
841	0.00	18.07	0.00	459	0.11	4.71	2.79	120	0.05	4.50	1.27	114	
842	0.09	18.16	2.29	461	0.00	4.71	0.00	120	0.00	4.50	0.00	114	

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
843	0.00	18.16	0.00	461	0.00	4.71	0.00	120	0.00	4.50	0.00	114	1 May 2005
844	0.00	18.16	0.00	461	0.00	4.71	0.00	120	0.00	4.50	0.00	114	
845	0.02	18.18	0.51	462	0.14	4.85	3.56	123	0.14	4.64	3.56	118	
846	0.21	18.39	5.33	467	0.02	4.87	0.51	124	0.02	4.66	0.51	118	
847	0.01	18.40	0.25	467	0.00	4.87	0.00	124	0.00	4.66	0.00	118	
848	0.00	18.40	0.00	467	0.00	4.87	0.00	124	0.00	4.66	0.00	118	
849	0.02	18.42	0.51	468	0.00	4.87	0.00	124	0.00	4.66	0.00	118	
850	0.00	18.42	0.00	468	0.04	4.91	1.02	125	0.02	4.68	0.51	119	
851	0.04	18.46	1.02	469	0.05	4.96	1.27	126	0.03	4.71	0.76	120	
852	0.10	18.56	2.54	471	0.00	4.96	0.00	126	0.00	4.71	0.00	120	
853	0.01	18.57	0.25	472	0.00	4.96	0.00	126	0.00	4.71	0.00	120	
854	0.02	18.59	0.51	472	0.00	4.96	0.00	126	0.00	4.71	0.00	120	
855	0.00	18.59	0.00	472	0.00	4.96	0.00	126	0.00	4.71	0.00	120	
856	0.00	18.59	0.00	472	0.00	4.96	0.00	126	0.00	4.71	0.00	120	
857	0.00	18.59	0.00	472	0.00	4.96	0.00	126	0.02	4.73	0.51	120	MA missing data
858	Trace	18.59	Trace	472	0.00	4.96	0.00	126	0.02	4.75	0.51	121	
859	md	18.59	md	472	0.00	4.96	0.00	126	0.00	4.75	0.00	121	MA missing data
860	0.00	18.59	0.00	472	0.00	4.96	0.00	126	0.00	4.75	0.00	121	
861	0.00	18.59	0.00	472	0.03	4.99	0.76	127	0.00	4.75	0.00	121	
862	md	18.59	md	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
863	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
864	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
865	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
866	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
867	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
868	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
869	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
870	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
871	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
872	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
873	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
874	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
875	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
876	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
877	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
878	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
879	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.00	4.75	0.00	121	
880	0.00	18.59	0.00	472	0.00	4.99	0.00	127	0.03	4.78	0.76	121	1 June 2005
881	0.00	18.59	0.00	472	0.04	5.03	1.02	128	0.06	4.84	1.52	123	
882	0.04	18.63	1.02	473	0.00	5.03	0.00	128	0.00	4.84	0.00	123	
883	0.00	18.63	0.00	473	0.00	5.03	0.00	128	0.00	4.84	0.00	123	
884	0.00	18.63	0.00	473	0.00	5.03	0.00	128	0.00	4.84	0.00	123	
885	0.02	18.65	0.51	474	0.03	5.06	0.76	129	0.06	4.90	1.52	124	
886	0.03	18.68	0.76	475	0.00	5.06	0.00	129	0.00	4.90	0.00	124	
887	0.00	18.68	0.00	475	0.02	5.08	0.51	129	0.00	4.90	0.00	124	

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
888	0.00	18.68	0.00	475	0.00	5.08	0.00	129	0.00	4.90	0.00	124	1 July 2005
889	0.00	18.68	0.00	475	0.00	5.08	0.00	129	0.00	4.90	0.00	124	
890	0.00	18.68	0.00	475	0.00	5.08	0.00	129	0.00	4.90	0.00	124	
891	0.00	18.68	0.00	475	0.04	5.12	1.02	130	0.03	4.93	0.76	125	
892	0.02	18.70	0.51	475	0.13	5.25	3.30	133	0.42	5.35	10.67	136	
893	0.21	18.91	5.33	480	0.22	5.47	5.59	139	0.07	5.42	1.78	138	
894	0.17	19.08	4.32	485	0.03	5.50	0.76	140	0.00	5.42	0.00	138	
895	0.03	19.11	0.76	485	0.00	5.50	0.00	140	0.00	5.42	0.00	138	
896	0.00	19.11	0.00	485	0.00	5.50	0.00	140	0.00	5.42	0.00	138	
897	0.00	19.11	0.00	485	0.00	5.50	0.00	140	0.00	5.42	0.00	138	
898	0.00	19.11	0.00	485	0.00	5.50	0.00	140	0.00	5.42	0.00	138	
899	0.00	19.11	0.00	485	0.00	5.50	0.00	140	0.00	5.42	0.00	138	
900	0.00	19.11	0.00	485	0.00	5.50	0.00	140	0.00	5.42	0.00	138	
901	0.00	19.11	0.00	485	0.00	5.50	0.00	140	0.00	5.42	0.00	138	
902	0.00	19.11	0.00	485	0.00	5.50	0.00	140	0.00	5.42	0.00	138	
903	0.00	19.11	0.00	485	0.00	5.50	0.00	140	0.00	5.42	0.00	138	
904	0.00	19.11	0.00	485	0.00	5.50	0.00	140	0.01	5.43	0.25	138	
905	0.08	19.19	2.03	487	0.05	5.55	1.27	141	0.01	5.44	0.25	138	
906	Trace	19.20	Trace	488	0.00	5.55	0.00	141	0.00	5.44	0.00	138	
907	0.00	19.20	0.00	488	0.23	5.78	5.84	147	0.03	5.47	0.76	139	
908	0.00	19.20	0.00	488	0.00	5.78	0.00	147	0.00	5.47	0.00	139	
909	0.07	19.27	1.78	489	0.00	5.78	0.00	147	0.00	5.47	0.00	139	
910	0.00	19.27	0.00	489	0.21	5.99	5.33	152	0.05	5.52	1.27	140	
911	0.18	19.45	4.57	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
912	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
913	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
914	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
915	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
916	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
917	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
918	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
919	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
920	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
921	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
922	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
923	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
924	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
925	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
926	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
927	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
928	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
929	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
930	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
931	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
932	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
933	0.00	19.45	0.00	494	0.00	5.99	0.00	152	0.00	5.52	0.00	140	1 August 2005
934	0.06	19.51	1.52	495	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
935	0.00	19.51	0.00	495	0.00	5.99	0.00	152	0.00	5.52	0.00	140	
936	0.00	19.51	0.00	495	0.01	6.00	0.25	152	0.00	5.52	0.00	140	
937	0.03	19.54	0.76	496	0.30	6.30	7.62	160	0.04	5.56	1.02	141	
938	0.46	20.00	11.68	508	0.00	6.30	0.00	160	0.59	6.15	14.99	156	
939	0.00	20.00	0.00	508	0.00	6.30	0.00	160	0.00	6.15	0.00	156	
940	0.00	20.00	0.00	508	0.00	6.30	0.00	160	0.00	6.15	0.00	156	
941	0.00	20.00	0.00	508	0.00	6.30	0.00	160	0.00	6.15	0.00	156	
942	0.00	20.00	0.00	508	0.00	6.30	0.00	160	0.00	6.15	0.00	156	
943	0.00	20.00	0.00	508	0.00	6.30	0.00	160	0.00	6.15	0.00	156	
944	0.00	20.00	0.00	508	0.00	6.30	0.00	160	0.00	6.15	0.00	156	
945	0.01	20.01	0.25	508	0.01	6.31	0.25	160	0.00	6.15	0.00	156	
946	0.46	20.47	11.68	520	0.00	6.31	0.00	160	0.00	6.15	0.00	156	
947	0.04	20.51	1.02	521	0.02	6.33	0.51	161	0.00	6.15	0.00	156	
948	0.20	20.71	5.08	526	0.02	6.35	0.51	161	0.04	6.19	1.02	157	
949	0.02	20.73	0.51	526	0.01	6.36	0.25	162	0.00	6.19	0.00	157	
950	0.00	20.73	0.00	526	0.00	6.36	0.00	162	0.00	6.19	0.00	157	
951	0.00	20.73	0.00	526	0.00	6.36	0.00	162	0.00	6.19	0.00	157	
952	0.00	20.73	0.00	526	0.03	6.39	0.76	162	0.00	6.19	0.00	157	
953	0.01	20.74	0.25	527	0.07	6.46	1.78	164	0.06	6.25	1.52	159	
954	0.11	20.85	2.79	529	0.03	6.49	0.76	165	0.04	6.29	1.02	160	
955	Trace	20.85	Trace	530	0.01	6.50	0.25	165	0.00	6.29	0.00	160	
956	0.00	20.85	0.00	530	0.00	6.50	0.00	165	0.01	6.30	0.25	160	
957	0.01	20.86	0.25	530	0.00	6.50	0.00	165	0.00	6.30	0.00	160	
958	0.00	20.86	0.00	530	0.00	6.50	0.00	165	0.00	6.30	0.00	160	
959	0.10	20.96	2.54	532	0.26	6.76	6.60	172	0.05	6.35	1.27	161	
960	0.76	21.72	19.30	552	0.12	6.88	3.05	175	0.04	6.39	1.02	162	
961	0.22	21.94	5.59	557	0.00	6.88	0.00	175	0.00	6.39	0.00	162	
962	0.00	21.94	0.00	557	0.04	6.92	1.02	176	0.00	6.39	0.00	162	
963	0.50	22.44	12.70	570	0.00	6.92	0.00	176	0.00	6.39	0.00	162	
964	0.00	22.44	0.00	570	0.00	6.92	0.00	176	0.00	6.39	0.00	162	
965	0.01	22.45	0.25	570	0.00	6.92	0.00	176	0.00	6.39	0.00	162	
966	0.02	22.47	0.51	571	0.00	6.92	0.00	176	0.00	6.39	0.00	162	
967	Trace	22.47	Trace	571	0.00	6.92	0.00	176	0.05	6.44	1.27	164	
968	Trace	22.48	Trace	571	0.03	6.95	0.76	177	0.00	6.44	0.00	164	
969	0.43	22.91	10.92	582	0.00	6.95	0.00	177	0.01	6.45	0.25	164	
970	0.02	22.93	0.51	582	0.00	6.95	0.00	177	0.00	6.45	0.00	164	
971	0.00	22.93	0.00	582	0.00	6.95	0.00	177	0.00	6.45	0.00	164	
972	0.00	22.93	0.00	582	0.00	6.95	0.00	177	0.00	6.45	0.00	164	
973	0.00	22.93	0.00	582	0.00	6.95	0.00	177	0.00	6.45	0.00	164	
974	0.00	22.93	0.00	582	0.00	6.95	0.00	177	0.00	6.45	0.00	164	
975	0.00	22.93	0.00	582	0.00	6.95	0.00	177	0.01	6.46	0.25	164	1 September 2005
976	0.00	22.93	0.00	582	0.00	6.95	0.00	177	0.00	6.46	0.00	164	
977	0.00	22.93	0.00	582	0.00	6.95	0.00	177	0.00	6.46	0.00	164	

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
978	0.25	23.18	6.35	589	0.17	7.12	4.32	181	0.14	6.60	3.56	168	1 October 2005
979	0.00	23.18	0.00	589	0.00	7.12	0.00	181	0.16	6.76	4.06	172	
980	0.05	23.23	1.27	590	0.04	7.16	1.02	182	0.00	6.76	0.00	172	
981	0.00	23.23	0.00	590	0.00	7.16	0.00	182	0.00	6.76	0.00	172	
982	0.00	23.23	0.00	590	0.10	7.26	2.54	184	0.01	6.77	0.25	172	
983	0.08	23.31	2.03	592	0.20	7.46	5.08	189	0.19	6.96	4.83	177	
984	0.20	23.51	5.08	597	0.00	7.46	0.00	189	0.07	7.03	1.78	179	
985	0.00	23.51	0.00	597	0.00	7.46	0.00	189	0.00	7.03	0.00	179	
986	0.00	23.51	0.00	597	0.00	7.46	0.00	189	0.00	7.03	0.00	179	
987	Trace	23.51	Trace	597	0.00	7.46	0.00	189	0.00	7.03	0.00	179	
988	0.00	23.51	0.00	597	0.00	7.46	0.00	189	0.00	7.03	0.00	179	
989	0.00	23.51	0.00	597	0.00	7.46	0.00	189	0.00	7.03	0.00	179	
990	0.00	23.51	0.00	597	0.00	7.46	0.00	189	0.00	7.03	0.00	179	
991	0.00	23.51	0.00	597	0.00	7.46	0.00	189	0.00	7.03	0.00	179	
992	0.00	23.51	0.00	597	0.00	7.46	0.00	189	0.00	7.03	0.00	179	
993	0.00	23.51	0.00	597	0.00	7.46	0.00	189	0.00	7.03	0.00	179	
994	0.00	23.51	0.00	597	0.00	7.46	0.00	189	0.00	7.03	0.00	179	
995	0.00	23.51	0.00	597	0.22	7.68	5.59	195	0.10	7.13	2.54	181	
996	0.53	24.04	13.46	611	0.35	8.03	8.89	204	0.33	7.46	8.38	189	
997	0.05	24.09	1.27	612	0.00	8.03	0.00	204	0.03	7.49	0.76	190	
998	0.00	24.09	0.00	612	0.00	8.03	0.00	204	0.00	7.49	0.00	190	
999	0.00	24.09	0.00	612	0.00	8.03	0.00	204	0.00	7.49	0.00	190	
1000	0.00	24.09	0.00	612	0.00	8.03	0.00	204	0.00	7.49	0.00	190	
1001	Trace	24.10	Trace	612	0.11	8.14	2.79	207	0.03	7.52	0.76	191	
1002	0.64	24.74	16.26	628	0.58	8.72	14.73	221	0.60	8.12	15.24	206	
1003	0.23	24.97	5.84	634	0.00	8.72	0.00	221	0.11	8.23	2.79	209	
1004	Trace	24.97	Trace	634	0.00	8.72	0.00	221	0.00	8.23	0.00	209	
1005	0.00	24.97	0.00	634	0.00	8.72	0.00	221	0.00	8.23	0.00	209	
1006	0.00	24.97	0.00	634	0.00	8.72	0.00	221	0.00	8.23	0.00	209	
1007	0.00	24.97	0.00	634	0.00	8.72	0.00	221	0.00	8.23	0.00	209	
1008	Trace	24.97	Trace	634	0.03	8.75	0.76	222	0.09	8.32	2.29	211	
1009	0.03	25.00	0.76	635	0.00	8.75	0.00	222	0.00	8.32	0.00	211	
1010	0.00	25.00	0.00	635	0.00	8.75	0.00	222	0.00	8.32	0.00	211	
1011	0.00	25.00	0.00	635	0.00	8.75	0.00	222	0.57	8.89	14.48	226	
1012	0.00	25.00	0.00	635	0.00	8.75	0.00	222	0.06	8.95	1.52	227	
1013	0.56	25.56	14.22	649	0.74	9.49	18.80	241	0.01	8.96	0.25	228	
1014	0.41	25.97	10.41	660	0.06	9.55	1.52	243	0.00	8.96	0.00	228	
1015	Trace	25.98	Trace	660	0.00	9.55	0.00	243	0.00	8.96	0.00	228	
1016	0.00	25.98	0.00	660	0.00	9.55	0.00	243	0.00	8.96	0.00	228	
1017	0.00	25.98	0.00	660	0.00	9.55	0.00	243	0.00	8.96	0.00	228	
1018	0.00	25.98	0.00	660	0.00	9.55	0.00	243	0.00	8.96	0.00	228	
1019	0.00	25.98	0.00	660	0.00	9.55	0.00	243	0.00	8.96	0.00	228	
1020	0.00	25.98	0.00	660	0.00	9.55	0.00	243	0.00	8.96	0.00	228	
1021	0.00	25.98	0.00	660	0.00	9.55	0.00	243	0.00	8.96	0.00	228	
1022	0.00	25.98	0.00	660	0.00	9.55	0.00	243	0.00	8.96	0.00	228	

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
1023	0.27	26.25	6.86	667	0.13	9.68	3.30	246	md	md	md	md	19 October 2005, CL rain gage pen fails to return
1024	0.00	26.25	0.00	667	0.00	9.68	0.00	246	md	md	md	md	
1025	0.00	26.25	0.00	667	0.00	9.68	0.00	246	md	md	md	md	
1026	0.00	26.25	0.00	667	0.00	9.68	0.00	246	md	md	md	md	
1027	0.00	26.25	0.00	667	0.00	9.68	0.00	246	md	md	md	md	
1028	0.00	26.25	0.00	667	0.00	9.68	0.00	246	md	md	md	md	
1029	0.00	26.25	0.00	667	0.00	9.68	0.00	246	md	md	md	md	
1030	0.00	26.25	0.00	667	0.00	9.68	0.00	246	0.00	9.68	0.00	246	Equate CL cumulative precipitation to ES
1031	0.00	26.25	0.00	667	0.00	9.68	0.00	246	0.00	9.68	0.00	246	
1032	0.00	26.25	0.00	667	0.00	9.68	0.00	246	0.00	9.68	0.00	246	1 November 2005
1033	0.00	26.25	0.00	667	0.01	9.69	0.25	246	0.05	9.73	1.27	247	
1034	0.04	26.29	1.02	668	0.06	9.75	1.52	248	0.07	9.80	1.78	249	
1035	0.13	26.42	3.30	671	0.00	9.75	0.00	248	0.00	9.80	0.00	249	
1036	0.00	26.42	0.00	671	0.00	9.75	0.00	248	0.00	9.80	0.00	249	
1037	0.00	26.42	0.00	671	0.00	9.75	0.00	248	0.00	9.80	0.00	249	
1038	0.00	26.42	0.00	671	0.00	9.75	0.00	248	0.00	9.80	0.00	249	
1039	0.00	26.42	0.00	671	0.00	9.75	0.00	248	0.00	9.80	0.00	249	
1040	0.00	26.42	0.00	671	0.00	9.75	0.00	248	0.00	9.80	0.00	249	
1041	0.00	26.42	0.00	671	0.00	9.75	0.00	248	0.00	9.80	0.00	249	
1042	0.00	26.42	0.00	671	0.00	9.75	0.00	248	0.00	9.80	0.00	249	
1043	0.00	26.42	0.00	671	0.00	9.75	0.00	248	0.00	9.80	0.00	249	
1044	0.00	26.42	0.00	671	0.00	9.75	0.00	248	0.00	9.80	0.00	249	
1045	0.00	26.42	0.00	671	0.00	9.75	0.00	248	0.00	9.80	0.00	249	
1046	0.00	26.42	0.00	671	0.12	9.87	3.05	251	0.08	9.88	2.03	251	
1047	0.15	26.57	3.81	675	0.01	9.88	0.25	251	0.00	9.88	0.00	251	
1048	0.00	26.57	0.00	675	0.00	9.88	0.00	251	0.00	9.88	0.00	251	
1049	0.00	26.57	0.00	675	0.07	9.95	1.78	253	0.06	9.94	1.52	252	
1050	0.12	26.69	3.05	678	0.00	9.95	0.00	253	0.00	9.94	0.00	252	
1051	0.00	26.69	0.00	678	0.00	9.95	0.00	253	0.00	9.94	0.00	252	
1052	0.00	26.69	0.00	678	0.00	9.95	0.00	253	0.00	9.94	0.00	252	
1053	0.00	26.69	0.00	678	0.00	9.95	0.00	253	0.00	9.94	0.00	252	
1054	0.00	26.69	0.00	678	0.00	9.95	0.00	253	0.00	9.94	0.00	252	
1055	0.00	26.69	0.00	678	0.00	9.95	0.00	253	0.00	9.94	0.00	252	
1056	0.00	26.69	0.00	678	0.00	9.95	0.00	253	0.00	9.94	0.00	252	
1057	0.00	26.69	0.00	678	0.00	9.95	0.00	253	0.00	9.94	0.00	252	
1058	0.00	26.69	0.00	678	0.00	9.95	0.00	253	0.00	9.94	0.00	252	
1059	0.00	26.69	0.00	678	0.00	9.95	0.00	253	0.00	9.94	0.00	252	
1060	0.00	26.69	0.00	678	0.00	9.95	0.00	253	0.00	9.94	0.00	252	
1061	0.00	26.69	0.00	678	0.00	9.95	0.00	253	0.00	9.94	0.00	252	
1062	0.00	26.69	0.00	678	0.00	9.95	0.00	253	0.00	9.94	0.00	252	
1063	0.00	26.69	0.00	678	0.00	9.95	0.00	253	0.00	9.94	0.00	252	
1064	0.00	26.69	0.00	678	0.39	10.34	9.91	263	0.00	9.94	0.00	252	1 December 2005
1065	0.00	26.69	0.00	678	0.02	10.36	0.51	263	0.00	9.94	0.00	252	
1066	0.00	26.69	0.00	678	0.02	10.38	0.51	264	0.00	9.94	0.00	252	
1067	0.00	26.69	0.00	678	0.00	10.38	0.00	264	0.17	10.11	4.32	257	

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
1068	0.28	26.97	7.11	685	0.00	10.38	0.00	264	0.04	10.15	1.02	258	1 January 2006
1069	0.04	27.01	1.02	686	0.00	10.38	0.00	264	0.00	10.15	0.00	258	
1070	Trace	27.01	Trace	686	0.00	10.38	0.00	264	0.00	10.15	0.00	258	
1071	Trace	27.02	Trace	686	0.00	10.38	0.00	264	0.00	10.15	0.00	258	
1072	0.00	27.02	0.00	686	0.03	10.41	0.76	264	0.01	10.16	0.25	258	
1073	0.00	27.02	0.00	686	0.00	10.41	0.00	264	0.01	10.17	0.25	258	
1074	0.00	27.02	0.00	686	0.00	10.41	0.00	264	0.00	10.17	0.00	258	
1075	0.00	27.02	0.00	686	0.00	10.41	0.00	264	0.00	10.17	0.00	258	
1076	0.00	27.02	0.00	686	0.00	10.41	0.00	264	0.00	10.17	0.00	258	
1077	0.00	27.02	0.00	686	0.00	10.41	0.00	264	0.00	10.17	0.00	258	
1078	Trace	27.02	Trace	686	0.04	10.45	1.02	265	0.04	10.21	1.02	259	
1079	0.00	27.02	0.00	686	0.00	10.45	0.00	265	0.02	10.23	0.51	260	
1080	0.00	27.02	0.00	686	0.00	10.45	0.00	265	0.00	10.23	0.00	260	
1081	0.00	27.02	0.00	686	0.00	10.45	0.00	265	0.00	10.23	0.00	260	
1082	0.00	27.02	0.00	686	0.00	10.45	0.00	265	0.01	10.24	0.25	260	
1083	0.00	27.02	0.00	686	0.00	10.45	0.00	265	0.00	10.24	0.00	260	
1084	0.02	27.04	0.51	687	0.00	10.45	0.00	265	0.04	10.28	1.02	261	
1085	Trace	27.04	Trace	687	0.00	10.45	0.00	265	0.00	10.28	0.00	261	
1086	0.00	27.04	0.00	687	0.10	10.55	2.54	268	0.00	10.28	0.00	261	
1087	0.00	27.04	0.00	687	0.00	10.55	0.00	268	0.00	10.28	0.00	261	
1088	0.00	27.04	0.00	687	0.02	10.57	0.51	268	0.00	10.28	0.00	261	
1089	0.00	27.04	0.00	687	0.00	10.57	0.00	268	0.00	10.28	0.00	261	
1090	0.00	27.04	0.00	687	0.01	10.58	0.25	269	0.00	10.28	0.00	261	
1091	0.00	27.04	0.00	687	0.06	10.64	1.52	270	0.00	10.28	0.00	261	
1092	0.02	27.06	0.51	687	0.00	10.64	0.00	270	0.05	10.33	1.27	262	
1093	0.00	27.06	0.00	687	0.02	10.66	0.51	271	0.00	10.33	0.00	262	
1094	0.00	27.06	0.00	687	0.00	10.66	0.00	271	0.02	10.35	0.51	263	
1095	0.00	27.06	0.00	687	0.00	10.66	0.00	271	0.00	10.35	0.00	263	
1096	0.00	27.06	0.00	687	0.00	10.66	0.00	271	0.02	10.37	0.51	263	
1097	Trace	27.07	Trace	688	0.00	10.66	0.00	271	0.03	10.40	0.76	264	
1098	0.00	27.07	0.00	688	0.00	10.66	0.00	271	0.00	10.40	0.00	264	
1099	Trace	27.07	Trace	688	0.00	10.66	0.00	271	0.00	10.40	0.00	264	
1100	0.00	27.07	0.00	688	0.00	10.66	0.00	271	0.00	10.40	0.00	264	
1101	0.00	27.07	0.00	688	0.00	10.66	0.00	271	0.00	10.40	0.00	264	
1102	0.00	27.07	0.00	688	0.00	10.66	0.00	271	0.00	10.40	0.00	264	
1103	0.00	27.07	0.00	688	0.00	10.66	0.00	271	0.00	10.40	0.00	264	
1104	0.00	27.07	0.00	688	0.00	10.66	0.00	271	0.00	10.40	0.00	264	
1105	0.00	27.07	0.00	688	0.03	10.69	0.76	272	0.00	10.40	0.00	264	
1106	0.00	27.07	0.00	688	0.29	10.98	7.37	279	0.00	10.40	0.00	264	
1107	0.00	27.07	0.00	688	0.00	10.98	0.00	279	0.00	10.40	0.00	264	
1108	0.00	27.07	0.00	688	0.00	10.98	0.00	279	0.00	10.40	0.00	264	
1109	0.00	27.07	0.00	688	0.07	11.05	1.78	281	0.00	10.40	0.00	264	
1110	0.00	27.07	0.00	688	0.02	11.07	0.51	281	0.00	10.40	0.00	264	
1111	0.00	27.07	0.00	688	0.00	11.07	0.00	281	0.02	10.42	0.51	265	
1112	0.22	27.29	5.59	693	0.00	11.07	0.00	281	0.27	10.69	6.86	272	

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
1113	Trace	27.30	Trace	693	0.00	11.07	0.00	281	0.00	10.69	0.00	272	1 February 2006
1114	0.00	27.30	0.00	693	0.00	11.07	0.00	281	0.00	10.69	0.00	272	
1115	0.03	27.33	0.76	694	0.00	11.07	0.00	281	0.00	10.69	0.00	272	
1116	Trace	27.33	Trace	694	0.03	11.10	0.76	282	0.09	10.78	2.29	274	
1117	0.00	27.33	0.00	694	0.00	11.10	0.00	282	0.00	10.78	0.00	274	
1118	0.00	27.33	0.00	694	0.04	11.14	1.02	283	0.02	10.80	0.51	274	
1119	0.00	27.33	0.00	694	0.06	11.20	1.52	284	0.00	10.80	0.00	274	
1120	0.00	27.33	0.00	694	0.00	11.20	0.00	284	0.00	10.80	0.00	274	
1121	0.00	27.33	0.00	694	0.00	11.20	0.00	284	0.00	10.80	0.00	274	
1122	Trace	27.33	Trace	694	0.00	11.20	0.00	284	0.10	10.90	2.54	277	
1123	0.00	27.33	0.00	694	0.08	11.28	2.03	287	0.00	10.90	0.00	277	
1124	0.00	27.33	0.00	694	0.00	11.28	0.00	287	0.03	10.93	0.76	278	
1125	0.05	27.38	1.27	696	0.00	11.28	0.00	287	0.06	10.99	1.52	279	
1126	Trace	27.39	Trace	696	0.00	11.28	0.00	287	0.00	10.99	0.00	279	
1127	0.00	27.39	0.00	696	0.00	11.28	0.00	287	0.00	10.99	0.00	279	
1128	0.00	27.39	0.00	696	0.00	11.28	0.00	287	0.00	10.99	0.00	279	
1129	0.05	27.44	1.27	697	0.00	11.28	0.00	287	0.04	11.03	1.02	280	
1130	Trace	27.44	Trace	697	0.00	11.28	0.00	287	0.01	11.04	0.25	280	
1131	0.00	27.44	0.00	697	0.00	11.28	0.00	287	0.00	11.04	0.00	280	
1132	0.00	27.44	0.00	697	0.00	11.28	0.00	287	0.00	11.04	0.00	280	
1133	0.00	27.44	0.00	697	0.00	11.28	0.00	287	0.00	11.04	0.00	280	
1134	0.00	27.44	0.00	697	0.00	11.28	0.00	287	0.00	11.04	0.00	280	
1135	0.00	27.44	0.00	697	0.00	11.28	0.00	287	0.00	11.04	0.00	280	
1136	0.00	27.44	0.00	697	0.00	11.28	0.00	287	0.00	11.04	0.00	280	
1137	0.00	27.44	0.00	697	0.00	11.28	0.00	287	0.00	11.04	0.00	280	
1138	0.00	27.44	0.00	697	0.00	11.28	0.00	287	0.00	11.04	0.00	280	
1139	0.00	27.44	0.00	697	0.00	11.28	0.00	287	0.00	11.04	0.00	280	
1140	0.00	27.44	0.00	697	0.01	11.29	0.25	287	0.00	11.04	0.00	280	
1141	0.00	27.44	0.00	697	0.05	11.34	1.27	288	0.00	11.04	0.00	280	
1142	0.00	27.44	0.00	697	0.00	11.34	0.00	288	0.00	11.04	0.00	280	
1143	0.00	27.44	0.00	697	0.00	11.34	0.00	288	0.00	11.04	0.00	280	
1144	0.00	27.44	0.00	697	0.00	11.34	0.00	288	0.00	11.04	0.00	280	
1145	0.00	27.44	0.00	697	0.00	11.34	0.00	288	0.00	11.04	0.00	280	
1146	0.00	27.44	0.00	697	0.00	11.34	0.00	288	0.00	11.04	0.00	280	
1147	0.03	27.47	0.76	698	0.00	11.34	0.00	288	0.05	11.09	1.27	282	
1148	0.00	27.47	0.00	698	0.00	11.34	0.00	288	0.01	11.10	0.25	282	
1149	0.00	27.47	0.00	698	0.00	11.34	0.00	288	0.00	11.10	0.00	282	
1150	0.00	27.47	0.00	698	0.00	11.34	0.00	288	0.00	11.10	0.00	282	
1151	0.00	27.47	0.00	698	0.00	11.34	0.00	288	0.00	11.10	0.00	282	
1152	0.00	27.47	0.00	698	0.00	11.34	0.00	288	0.00	11.10	0.00	282	
1153	0.00	27.47	0.00	698	0.00	11.34	0.00	288	0.00	11.10	0.00	282	
1154	0.00	27.47	0.00	698	0.00	11.34	0.00	288	0.00	11.10	0.00	282	
1155	0.00	27.47	0.00	698	0.00	11.34	0.00	288	0.00	11.10	0.00	282	
1156	0.00	27.47	0.00	698	0.00	11.34	0.00	288	0.00	11.10	0.00	282	1 March 2006
1157	0.00	27.47	0.00	698	0.14	11.48	3.56	292	0.00	11.10	0.00	282	

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
1158	0.00	27.47	0.00	698	0.00	11.48	0.00	292	0.01	11.11	0.25	282	4 March 2006, CL rain gage shot
1159	0.00	27.47	0.00	698	0.25	11.73	6.35	298	0.00	11.11	0.00	282	
1160	0.00	27.47	0.00	698	0.19	11.92	4.83	303	md	md	md	md	
1161	0.00	27.47	0.00	698	0.06	11.98	1.52	304	md	md	md	md	
1162	0.00	27.47	0.00	698	0.02	12.00	0.51	305	md	md	md	md	
1163	0.02	27.49	0.51	698	0.00	12.00	0.00	305	md	md	md	md	
1164	0.03	27.52	0.76	699	0.00	12.00	0.00	305	md	md	md	md	
1165	0.14	27.66	3.56	703	0.00	12.00	0.00	305	md	md	md	md	
1166	0.12	27.78	3.05	706	0.00	12.00	0.00	305	md	md	md	md	
1167	Trace	27.79	Trace	706	0.07	12.07	1.78	307	md	md	md	md	
1168	0.02	27.81	0.51	706	0.00	12.07	0.00	307	md	md	md	md	
1169	0.00	27.81	0.00	706	0.00	12.07	0.00	307	md	md	md	md	
1170	0.00	27.81	0.00	706	0.00	12.07	0.00	307	md	md	md	md	
1171	0.00	27.81	0.00	706	0.00	12.07	0.00	307	md	md	md	md	
1172	0.00	27.81	0.00	706	0.00	12.07	0.00	307	md	md	md	md	
1173	0.00	27.81	0.00	706	0.00	12.07	0.00	307	md	md	md	md	
1174	0.03	27.84	0.76	707	0.00	12.07	0.00	307	md	md	md	md	
1175	0.00	27.84	0.00	707	0.00	12.07	0.00	307	md	md	md	md	
1176	0.00	27.84	0.00	707	0.00	12.07	0.00	307	md	md	md	md	
1177	0.00	27.84	0.00	707	0.00	12.07	0.00	307	md	md	md	md	
1178	0.00	27.84	0.00	707	0.02	12.09	0.51	307	md	md	md	md	
1179	0.00	27.84	0.00	707	0.16	12.25	4.06	311	md	md	md	md	1 April 2006
1180	0.00	27.84	0.00	707	0.00	12.25	0.00	311	md	md	md	md	
1181	0.00	27.84	0.00	707	0.00	12.25	0.00	311	md	md	md	md	
1182	0.00	27.84	0.00	707	0.05	12.30	1.27	312	md	md	md	md	
1183	0.00	27.84	0.00	707	0.00	12.30	0.00	312	md	md	md	md	
1184	0.00	27.84	0.00	707	0.00	12.30	0.00	312	md	md	md	md	
1185	0.21	28.05	5.33	712	0.00	12.30	0.00	312	md	md	md	md	
1186	0.00	28.05	0.00	712	0.06	12.36	1.52	314	md	md	md	md	
1187	0.00	28.05	0.00	712	0.00	12.36	0.00	314	md	md	md	md	
1188	0.03	28.08	0.76	713	0.00	12.36	0.00	314	md	md	md	md	
1189	0.00	28.08	0.00	713	0.00	12.36	0.00	314	md	md	md	md	
1190	0.00	28.08	0.00	713	0.00	12.36	0.00	314	md	md	md	md	
1191	0.00	28.08	0.00	713	0.00	12.36	0.00	314	md	md	md	md	
1192	0.01	28.09	0.25	713	0.00	12.36	0.00	314	md	md	md	md	
1193	0.00	28.09	0.00	713	0.00	12.36	0.00	314	md	md	md	md	
1194	0.00	28.09	0.00	713	0.00	12.36	0.00	314	md	md	md	md	
1195	0.00	28.09	0.00	713	0.03	12.39	0.76	315	md	md	md	md	
1196	0.00	28.09	0.00	713	0.00	12.39	0.00	315	md	md	md	md	
1197	0.00	28.09	0.00	713	0.00	12.39	0.00	315	md	md	md	md	
1198	0.00	28.09	0.00	713	0.00	12.39	0.00	315	md	md	md	md	
1199	0.00	28.09	0.00	713	0.00	12.39	0.00	315	md	md	md	md	
1200	0.00	28.09	0.00	713	0.00	12.39	0.00	315	md	md	md	md	
1201	0.03	28.12	0.76	714	0.00	12.39	0.00	315	md	md	md	md	
1202	0.00	28.12	0.00	714	0.00	12.39	0.00	315	md	md	md	md	

Table 7. Daily and cumulative precipitation at the Montrose #2 climate station, upper Elephant Skin Wash, and Candy Lane rain gages, southwestern Colorado.—Continued

[in., inch; mm, millimeter; md, missing data due to equipment malfunction or vandalism; MA, Montrose #2 climate station; ES, upper Elephant Skin Wash; CL, Candy Lane]

Julian day since 1 January 2003	Montrose #2 climate station rain gage				Upper Elephant Skin Wash rain gage				Candy Lane rain gage				Remark
	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	Precip- itation	Cumu- lative precip- itation	
	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	(in.)	(in.)	(mm)	(mm)	
1203	0.00	28.12	0.00	714	0.00	12.39	0.00	315	md	md	md	md	25 April 2006 CL rain gage discontinued 26 April 2006 ES rain gage discontinued
1204	0.00	28.12	0.00	714	0.00	12.39	0.00	315	md	md	md	md	
1205	0.00	28.12	0.00	714	0.00	12.39	0.00	315	md	md	md	md	
1206	0.00	28.12	0.00	714	0.00	12.39	0.00	315	md	md	md	md	
1207	0.00	28.12	0.00	714	0.00	12.39	0.00	315	md	md	md	md	
1208	0.00	28.12	0.00	714	0.00	12.39	0.00	315	md	md	md	md	
1209	0.00	28.12	0.00	714	0.00	12.39	0.00	315	md	md	md	md	
1210	0.00	28.12	0.00	714	0.00	12.39	0.00	315	md	md	md	md	
1211	0.00	28.12	0.00	714	0.00	12.39	0.00	315	md	md	md	md	
1212	0.00	28.12	0.00	714	0.00	12.39	0.00	315	md	md	md	md	