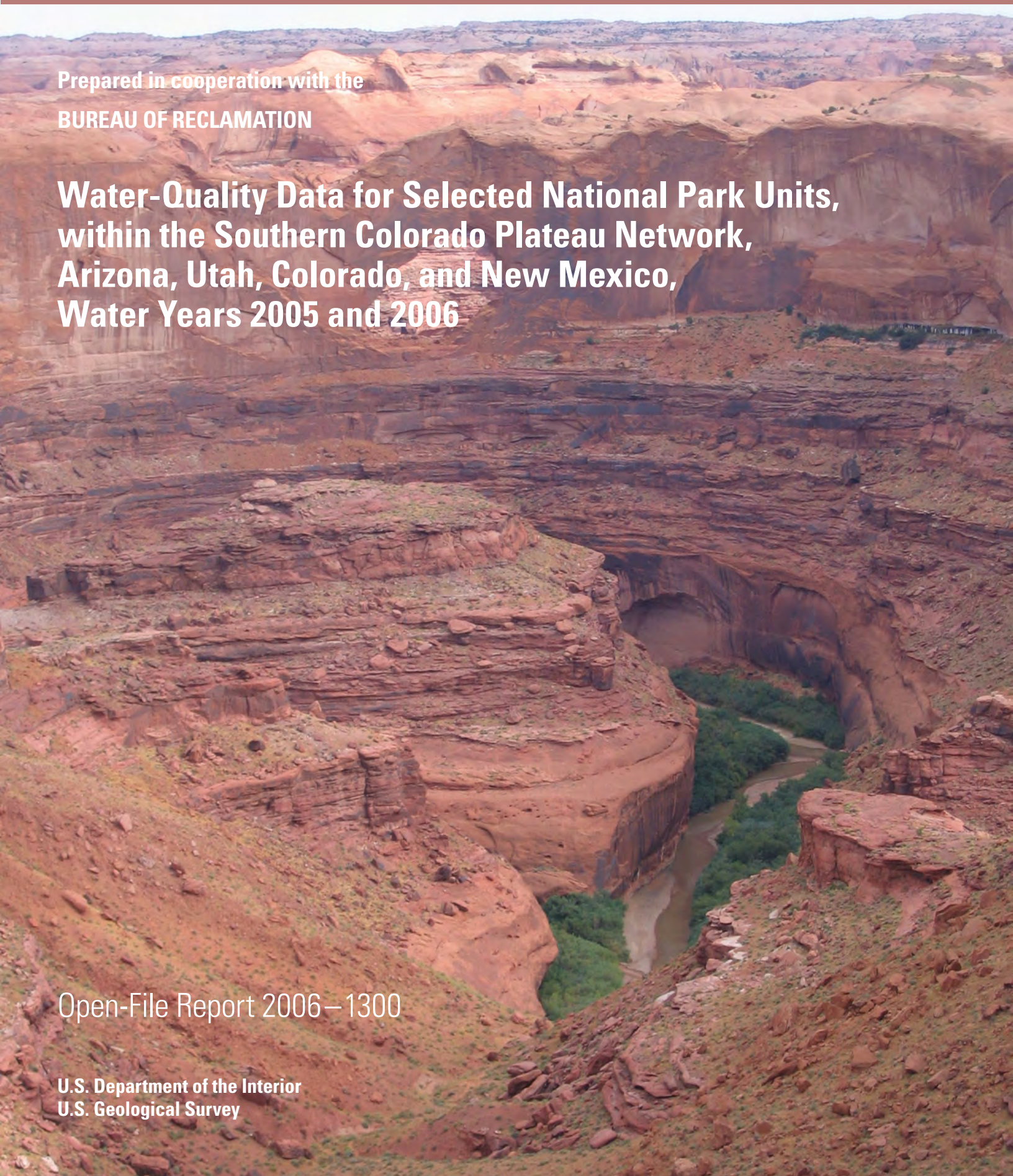


Prepared in cooperation with the

BUREAU OF RECLAMATION

Water-Quality Data for Selected National Park Units, within the Southern Colorado Plateau Network, Arizona, Utah, Colorado, and New Mexico, Water Years 2005 and 2006

Open-File Report 2006–1300

U.S. Department of the Interior
U.S. Geological Survey

Cover photograph: View of the Escalante River in Glen Canyon Recreation Area

Water-Quality Data for Selected National Park Units within the Southern Colorado Plateau Network, Arizona, Utah, Colorado, and New Mexico, Water Years 2005 and 2006

By Jamie P. Macy and Stephen A. Monroe[1]

Prepared in cooperation with the
NATIONAL PARK SERVICE

Open-File Report 2006–1300

U.S. Department of the Interior
U.S. Geological Survey

[1]National Park Service, Flagstaff, Arizona

U.S. Department of the Interior
DIRK KEMPTHORNE, Secretary

U.S. Geological Survey
Mark Meyers, Director

U.S. Geological Survey, Reston, Virginia: 2006

For product and ordering information:
World Wide Web: http://www.usgs.gov/pubprod
Telephone: 1-888-ASK-USGS

For more information on the USGS—the Federal source for science about the Earth, its natural and living resources, natural hazards, and the environment:
World Wide Web: http://www.usgs.gov
Telephone: 1-888-ASK-USGS

Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Although this report is in the public domain, permission must be secured from the individual copyright owners to reproduce any copyrighted materials contained within this report.

Suggested citation:
Macy, J.P., and Monroe, S.A., 2006, Water-quality data for selected National Park units in the southern Colorado Plateau network, Arizona, Utah, Colorado, and New Mexico, water years 2005 and 2006: U.S. Geological Survey Open-File Report 2006–1300, 84 p.

Contents

Abstract 1
Introduction 1
    Purpose and Scope 2
    Site Selection and Sampling 2
Methods and Protocols 12
Quality Control 12
Water Quality Data 21
Summary 82
References Cited 83

Figures

1. Map showing locations of National Park units included in the Level 1 Water-Quality Inventory, Southern Colorado Plateau Inventory and Monitoring Network 3
2. Maps showing locations of water-quality sampling points.
   A, Aztec Ruins National Monument....6
   B, Bandelier National Monument 6
   C, Canyon de Chelly National Monument 7
   D, Chaco Culture National Historic Park....7
   E, El Morro National Monument....8
   F, El Malpais National Monument 8
   G, Glen Canyon National Recreation Area and Rainbow Bridge National Monument....9
   H, Grand Canyon National Park....9
   I, Mesa Verde National Park....10
   J, Petrified Forest National Park 10
   K, Petroglyph National Monument....11
   L, Yucca House National Monument....11
3. Distribution of constituent concentrations of water samples collected from wells, springs, seeps, tinajas, rivers, a lake, and an irrigation ditch in National Parks in the Southern Colorado Plateau Inventory and Monitoring Network as part of a Level I water-quality inventory, water years 2005 and 2006 72
4. Relative compositions of water that discharges from wells, springs, seeps, tinajas, rivers, a lake, and an irrigation ditch in National Parks in the Southern Colorado Plateau Inventory and Monitoring Network, 2005.
   A, Aztec Ruins National Monument....73
   B, Bandelier National Monument 74
   C, Canyon de Chelly National Monument 75
   D, El Morro National Monument, El Malpais National Monument, Petrified Forest National Park, and Petroglyph National Monument 76
   E, Glen Canyon National Recreation Area and Rainbow Bridge National Monument....77
   F, Grand Canyon National Park....78
   G, Mesa Verde National Park and Yucca House National Monument 79

Tables

1. Level 1 water-quality sample sites; location, altitude, number of times sampled and water use 4
2. General site characteristics of National Park units from Southern Colorado Plateau Inventory and Monitoring Network selected for Level 1 water-quality sampling 5
3. Results of field blank and field replicate analyses....13
4. Water Quality data for key water bodies at selected National Park units from the Southern Colorado Inventory and Monitoring Network....22
5. U.S. Environmental Protection Agency Primary and Secondary Drinking Water Maximum Contaminant Levels 80

Conversion Factors and Datums

Multiply	By	To obtain
	Length	
inch (in.)	2.54	centimeter (cm)
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
square mile (mi^2)	2.590	square kilometer (km^2)
acre	4,047	square meter (m^2)
	Volume	
gallon (gal)	3.785	liter (L)
cubic inch (in^3)	16.39	cubic centimeter (cm^3)
cubic inch (in^3)	0.01639	liter (L)
cubic foot (ft^3)	0.02832	cubic meter (m^3)
	Flow rate	
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
gallon per minute (gal/min)	0.06309	liter per second (L/s)
gallon per day (gal/d)	0.003785	cubic meter per day (m^3/d)
	Mass	
ounce, avoirdupois (oz)	28.35	gram (g)
	Pressure	
atmosphere, standard (atm)	101.3	kilopascal (kPa)
bar	100	kilopascal (kPa)
inch of mercury at 60ºF (in Hg)	3.377	kilopascal (kPa)
	Radioactivity	
picocurie per liter (pCi/L)	0.037	becquerel per liter (Bq/L)

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

$$°F=(1.8\times°C)+32$$

Vertical coordinate information is referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29).

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.

ABBREVIATED WATER-QUALITY UNITS

Chemical concentrations and water temperature are given only in metric units. Chemical concentration in water is given in milligrams per liter (mg/L) or micrograms per liter (µg/L). Milligrams per liter is a unit expressing the solute mass (milligrams) per unit volume (liter) of water. One thousand micrograms per liter is equivalent to 1 milligram per liter. For concentrations lower than 7,000 milligrams per liter, the numerical value is about the same as for concentrations in parts per million. Specific conductance is given in microsiemens per centimeter at 25 degrees Celsius (µs/cm at 25° C).

Water-Quality Data for Selected National Park Units within the Southern Colorado Plateau Network, Arizona, Utah, Colorado, and New Mexico, Water Years 2005 and 2006

By Jamie P. Macy, and Stephen A. Monroe

Abstract

The National Park Service initiated a Level 1 Water-Quality Inventory program to provide water-quality data to park managers so informed natural resource management decisions could be made. Level 1 water-quality data were collected by the U.S. Geological Survey Arizona Water Science Center at 57 sites in 13 National Park units located in the Southern Colorado Plateau Inventory and Monitoring network in water years 2005 and 2006. These data describe the current water-quality at selected sites within the park units and provide information for monitoring future trends. Water samples were collected three times at each type of site including wells, springs, seeps, tinajas, rivers, a lake, and an irrigation ditch. Field measurements were taken at each site and they included pH, specific conductance, temperature, barometric pressure, dissolved oxygen, alkalinity, turbidity, and discharge rates where applicable. Water samples collected were sent to the U.S. Geological Survey National Water Quality Laboratory and analyzed for major ions, trace elements, and nutrients. The National Water Quality Laboratory also analyzed selected samples for mercury and petroleum hydrocarbons. Additional samples at selected sites were collected and analyzed for cyanide, radiochemistry, and suspended sediment by U.S. Geological Survey contract labs. Fecal-indicator bacteria (*Escherichia coli*) were sampled for at selected sites as another indicator of water quality. Quality control for this study was achieved through proper training of field personnel, use of standard U.S. Geological Survey field and laboratory protocols, collection of sample blanks and replicates, and a thorough review of the water-quality analyses.

Measured field pH ranged from 6.0 to 8.8, within normal range for springs and rivers, at most sites. Concentrations of dissolved solids ranged from 48 to 8,680 mg/L and the majority of samples had concentrations of dissolved solids below 900 mg/L. Trace-element concentrations at most sites were at or near the laboratory reporting levels. The highest overall trace-element concentrations were found at U.S. Highway 160 Spring near Park Entrance to Mesa Verde National Park. Concentrations of uranium in samples at all sites ranged from below the detection limit to 55.7 µg/L. Water samples from selected sites were analyzed for total petroleum hydrocarbons and concentrations of total petroleum hydrocarbons were at or above the laboratory detection limit in samples at six National Park units. Ten sites were sampled for Escherichia coli and positive counts were found at 9 out of the ten sites, the highest colony counts were found at Chinle Creek at Chinle, AZ in Canyon de Chelly National Monument. Measured concentrations of dissolved ammonia, nitrite, and nitrate were at or near laboratory reporting levels at most sites; nitrate concentrations ranged from below the reporting limit (0.047 mg/L) to 9.77 mg/L. Samples that were analyzed for mercury had concentrations below or at the laboratory reporting level. Concentrations of cyanide were less than the laboratory reporting level for all samples except two, Spruce Tree House Spring in Mesa Verde National Park and Pine Tree Canyon Tinaja in Canyon de Chelly National Monument, which had average concentrations of .042 and .011 µg/L respectively. Gross alpha/beta radioactivity counts were below the U.S. Environmental Protection Agency maximum contaminant level except for samples from Casa Chiquita Well – Middle at Chaco Culture National Historical Park which averaged 35 pCi/L. Suspended-sediment concentrations were variable and ranged from 10 to 150,000 mg/L.

Introduction

The Level 1 Water-Quality Inventory is part of a nationwide program supported by the National Park Service (NPS) Water Resources Division (WRD) with the objective of developing baseline water-quality information for key water bodies at NPS units throughout the United States. This information is used to describe the current chemistry and quality of the waters and provide baseline information to monitor future trends. Key water bodies for Level 1 purposes

are defined as those waters that are essential to the central cultural, historical, or natural resource management themes of the unit and (or) that provide habitats for threatened or endangered plants and animals (fig. 1 and table 1; Thomas, 2003a and b). In 2004, the U.S. Geological Survey (USGS), in cooperation with the NPS, began studies of 13 NPS units within the Southern Colorado Plateau Inventory and Monitoring Network (SCPN). The basic chemical character and water quality of water bodies for 57 sites are described in this report.

The SCPN is one of 32 networks in the NPS Inventory and Monitoring Program. The SCPN is made up of 19 NPS units in northern Arizona, northern New Mexico, southwestern Colorado, and southeastern Utah. This Level 1 Water-Quality Inventory collected samples at 57 sites in 13 NPS SCPN units in water years 2005 and 2006. Each site was sampled three times when possible and sites included wells, springs, seeps, tinajas, rivers, a lake, and an irrigation ditch. The SCPN encompasses a broad geographical region and physiographic and climatic features vary widely from park to park (table 2).

All of the park units for this Level 1 Water-Quality Inventory lie within the Southern Colorado Plateau network and Arizona and New Mexico regions of the National Park Service Inventory and Monitoring Networks (fig. 1). SCPN park units include a total of almost 3 million acres of land area, span 232 miles from east to west, 135 miles from north to south, and cover 8,957 feet of vertical relief. Thirty-five percent of total SCPN park area is between 2,500 and 3,300 feet above sea level, with some areas as low as 800 feet and others as high as 10,000 feet. More than 1.8 million acres are designated or proposed as wilderness areas.

The Colorado Plateau region is typified by aridity, relatively high temperatures with seasonal variations, and unpredictable seasonal, annual, and multi-decadal precipitation levels (Hereford and others, 2002; Noy-Meir, 1973). The regional arid and semiarid conditions are important because of the impact that limited or irregular water availability has on ecosystem characteristics such as soil moisture, surface conditions, plant productivity, and faunal distribution. Rainfall and snowmelt on the Plateau are generally low, highly variable throughout the year, and occurs during infrequent, isolated events. Over 90 percent of annual precipitation received in the region is lost to evapotranspiration, with little surplus water and a scarcity of perennial streams (Fletcher and Bender, 1961). Water is an important limiting factor in biological processes throughout the Colorado Plateau region and an essential link between biotic and abiotic components of SCPN park ecosystems.

Purpose and Scope

This project was undertaken to provide NPS with water-quality information which will assist in the development of a long-term monitoring program and inform the park's resource management on how best to manage each park and plan for the future. This report presents the results of sampling and analyses of surface-water and ground-water quality at 57 key water bodies in 13 of 19 NPS units in the SCPN during water years 2005 and 2006. Results of the water-quality inventory were compared to U.S. Environmental Protection Agency (USEPA) primary and secondary drinking water standards.

Water-quality data were collected during the spring, the summer, and the fall time periods. Brief descriptions of the data collection for each of the time periods follow.

- March to June, 2005—Water samples were collected at 55 sites and analyzed for concentrations of major ions, trace elements, and nutrients. Bacteria samples were collected at 8 sites and gross alpha/beta samples were collected at 3 sites. Total petroleum hydrocarbons samples were collected at 10 sites.

- July to September, 2005—Water samples were collected at 48 sites and analyzed for concentrations of major ions, trace elements, nutrients, mercury, and cyanide. Bacteria samples were collected at 4 sites and gross alpha/beta samples were collected at 3 sites. Total petroleum hydrocarbons samples were collected at 9 sites.

- October to December, 2005—Water samples were collected at 51 sites and analyzed for concentrations of major ions, trace elements, nutrients, mercury, and cyanide. Bacteria samples were collected at 8 sites and gross alpha/beta samples were collected at 5 sites. Total petroleum hydrocarbons samples were collected at 10 sites.

Site Selection and Sampling

Fifty-seven sites at 13 NPS park units were included in this Level 1 baseline water-quality inventory (figs. 2a, b, c, d, e, f, g, h, i, j, k, and l). These sites were selected with input from NPS Natural Resource managers representing each park unit. Sites that were selected for inclusion in the Level 1 inventory are essential to the central cultural, historical, and (or) natural resource management themes of the park units and may provide habitats for threatened and endangered plants and animals. Further details of each sampling site including a site description, hydrologic unit code, and source of geographic data can be found on a supplemental CD provided to NPS park mangers and available at http://az.water.usgs.gov.

Three sampling events were planned for each water body in order to capture seasonal variation in water chemistry. Sampling trips were scheduled at each site to include one sample each from the relatively wet spring-runoff and fall periods, and the relatively dry summer period. Some sites could not be sampled during all three time periods because the sites were dry. Forty-three of the 57 sites were sampled 3 times, and 12 sites were sampled twice because of dry conditions, Cattail Spring in Mesa Verde National Park was only sampled once because it was dry during other times and the Ladera Arroyo at Petroglyph National Monument was never sampled because this arroyo did not have runoff suitable for sampling during the study period (figs. 1, 2i, 2k and table 1).

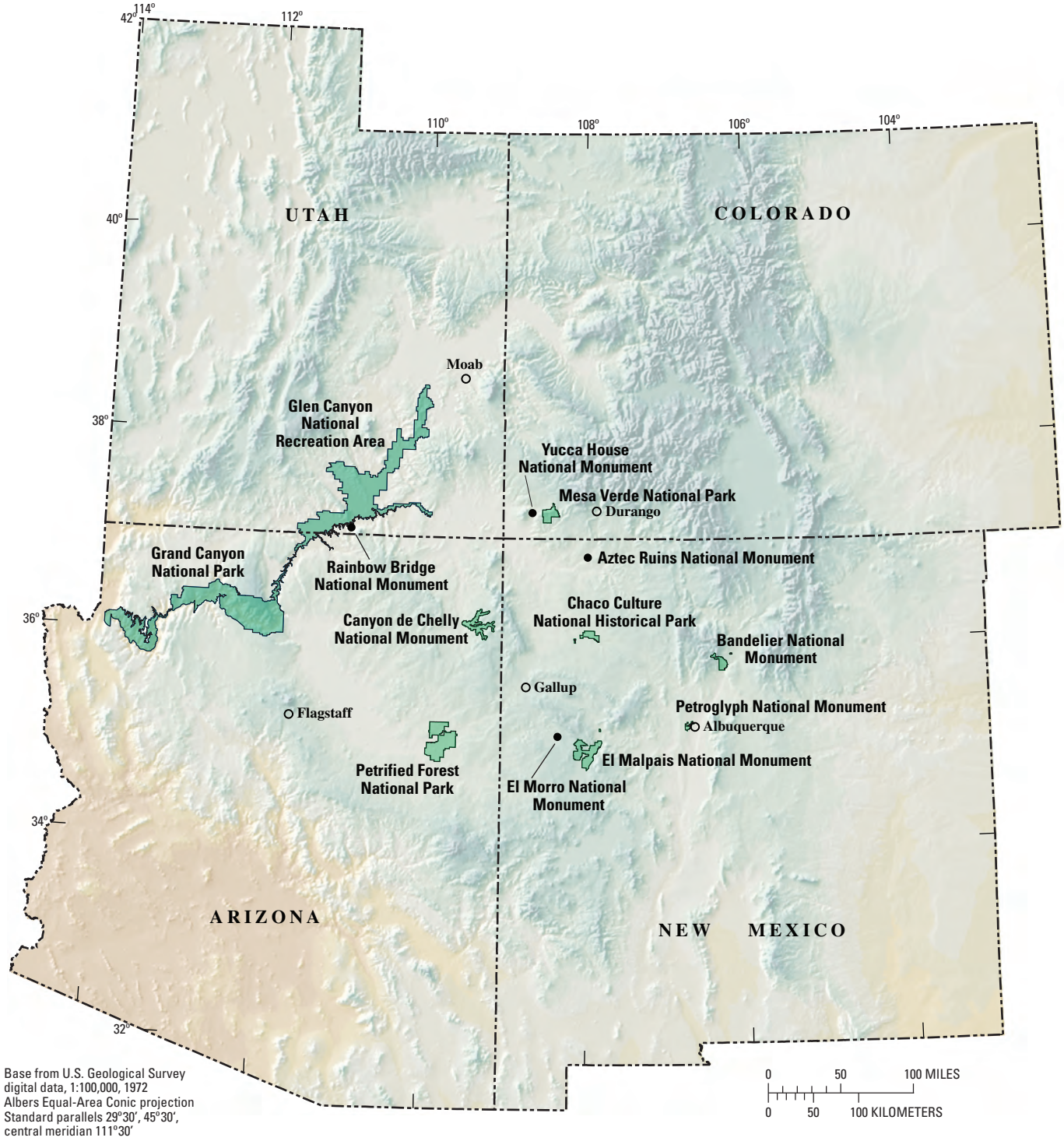


Figure 1. Locations of National Park units included in the Level 1 Water-Quality Inventory, Southern Colorado Plateau Inventory and Monitoring Network.

Table 1. Level 1 water-quality sample sites; location, altitude, number of times sampled, and water use.

[Aztec Ruins, Aztec Ruins National Monument; A, agriculture; W, wildlife; NM, New Mexico; Bandelier, Bandelier National Monument; R, recreation; HQ, Headquaters; Canyon de Chelly, Canyon de Chelly National Monument; AZ, Arizona; DW, drinking water; Chaco, Chaco Culture National Historical Park; U, unused; El Morro, El Morro National Monument; El Malpais, El Malpais National Monument; Glen Canyon, Glen Canyon National Recreation Area; Tr, Trail; UT, Utah; Spr. Spring; Rd, Road; Grand Canyon, Grand Canyon National Park; Mesa Verde, Mesa Verde National Park; NP, National Park; Petrified Forest, Petrified Forest National Park; Petroglyph, Petroglyph National Monument; Rainbow Bridge, Rainbow Bridge National Monument; Br., Bridge; Yucca House, Yucca House National Monument]

Site name	Park unit	USGS site identifier	Latitude	Longitude	Land-surface altitude (feet above sea level)	Number of samples	Water use
Animas River	Aztec Ruins	364958107594500	364958	1075945	5,595	3	A, W
Farmer's Ditch	Aztec Ruins	365024107594600	365024	1075946	5,665	3	A
Rito de los Frijoles Near Los Alamos, NM	Bandelier	08313300	354855	1062135	7,000	3	W, R
Rito de los Frijoles at the HQ gaging station	Bandelier	08313350	354635	1061606	6,140	3	W, R
Rito de los Frijoles below Frijoles Falls, NM	Bandelier	354511106151010	354530	1061528	5,410	3	W, R
Frijoles Spring along Rio Grande	Bandelier	354502106152701	354502	1061527	5,370	3	W
Alamo Springs Grazing Exclosure	Bandelier	354928106260401	354928	1062604	8,700	3	W
Alamo Canyon above Ponderosa Trail Crossing	Bandelier	354733106210300	354733	1062103	6,840	3	W, R
Capulin Creek below Base Camp	Bandelier	364526106194301	354526	1061944	6,200	3	W, R
Turkey Springs	Bandelier	354411106212001	354411	1062120	6,575	3	W, R
Tsaile Lake	Canyon de Chelly	361621109121300	361622	1091213	6,990	3	R
Tsaile Creek below Tsaile Lake	Canyon de Chelly	361624109122400	361624	1091224	6,980	3	W
Tsaile Creek at Bare Rock Trail Crossing	Canyon de Chelly	360908109282201	360908	1092822	5,675	2	A, W, R
Chinle Wash below White House Ruins	Canyon de Chelly	360800109282700	360800	1092827	5,650	2	A, W, R
Chinle Creek at Chinle, AZ	Canyon de Chelly	09379025	360918	1093215	5,550	2	A, W, R
Many Cherry Spring	Canyon de Chelly	361008109232801	361008	1092328	6,495	2	W
Bubbling Spring in Spring Canyon	Canyon de Chelly	360627109270101	360627	1092701	5,780	3	W
Pine Tree Canyon Tinaja	Canyon de Chelly	361607109210601	361607	1092106	6,640	2	W
NPS Canyon de Chelly Well No. 2	Canyon de Chelly	360847109321201	360847	1093212	5,550	3	DW
Chaco Wash at Chaco Canyon National Monument, NM	Chaco	09367680	360143	1075504	6,140	2	W
Gambler's Spring	Chaco	360435107573601	360435	1075736	6,290	2	W
Wijijji Spring	Chaco	360057107522501	360057	1075225	6,280	3	W
Historic Masonry Well - Middle	Chaco	360146107551401	360146	1075514	6,150	3	U
Casa Chiquita Well - Middle	Chaco	360402107583901	360402	1075839	6,070	3	U
South Side of Historic Pool at El Morro NM	El Morro	350225108210601	350225	1082106	7,370	3	W
El Morro Water Supply Well	El Morro	350246108215001	350246	1082150	7,158	3	DW
El Malpais Water Supply Well	El Malpais	345934108021501	345934	1080215	7,450	3	DW
San Juan River near Clay Hills Crossing	Glen Canyon	371734110235900	371734	1102359	3,635	3	W, R
Lake Canyon at Hole in the Rock Tr. nr Hite, UT	Glen Canyon	372315110372600	372315	1103726	3,845	3	W, R
Dirty Devil River abv Poison Spr. nr Hanksville, UT	Glen Canyon	09333500	380539	1102424	3,850	3	W, R
Escalante River abv Stevens Canyon	Glen Canyon	372610110585201	372610	1105852	3,715	3	W, R
Coyote Gulch abv Escalante River	Glen Canyon	372541110591100	372541	1105911	3,715	3	W, R
Last Chance Canyon at Burning Hills Rd, UT	Glen Canyon	371105111220600	371105	1112206	3,838	3	W, R
Paria River at Lees Ferry	Glen Canyon	09382000	365220	1113538	3,124	3	W, R
Schmutz Spring	Grand Canyon	362143112551201	362143	1125512	4,620	3	W, R
Cottonwood Creek North Rim Grand Canyon	Grand Canyon	361947112550200	361947	1125502	4,040	2	W, R
Saddle Horse Spring	Grand Canyon	361344113032001	361344	1130320	4,350	3	W, R
Buckhorn Spring	Grand Canyon	362258112464701	362258	1124647	4,520	2	W, R

Table 1. Level 1 water-quality sample sites; location, altitude, number of times sampled and water use—Continued.

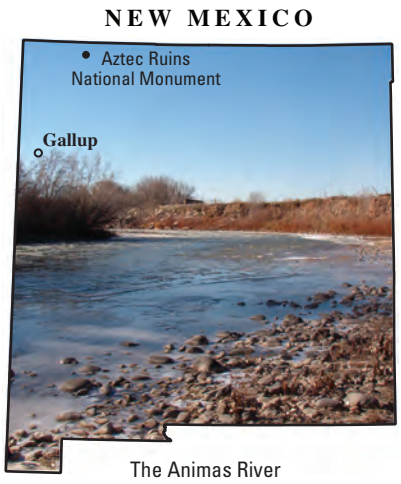
Site name	Park unit	USGS site identifier	Latitude	Longitude	Land-surface altitude (feet above sea level)	Number of samples	Water use
Hotel Spring	Grand Canyon	362157112451601	362157	1124516	3,675	2	W, R
Santa Maria Spring	Grand Canyon	360336112131801	360336	1121318	5,020	3	W, R
Robbers Roost Spring	Grand Canyon	361650112052001	361650	1120520	8,275	3	W
U.S. Highway 160 Spring near Park Entrance	Mesa Verde	372040108245801	372040	1082458	6,830	3	W
Morefield Spring	Mesa Verde	371415108242301	371415	1082423	7,220	3	W
Cattail Spring	Mesa Verde	371607108245501	371607	1082455	7,435	1	W
Spruce Tree House Spring	Mesa Verde	371105108291501	371105	1082915	6,885	3	W
Echo Cliff Drainage Spring	Mesa Verde	370944108295101	370944	1082951	6,100	3	W
Long House Spring	Mesa Verde	371112108320901	371112	1083209	6,980	3	W
Bobcat Spring	Mesa Verde	371102108313101	371102	1083131	6,980	3	W
Mancos River near Park Boundary, Mesa Verde NP	Mesa Verde	371648108214500	371648	1082145	6,440	3	A, W
Puerco River near Adamana, AZ	Petrified Forest	09396500	345845	1094740	5,313	2	W
Kokopelli Spring	Petrified Forest	345726109471101	345726	1094711	5,395	3	W
Puerco Well No. 2	Petrified Forest	345850109475001	345850	1094750	5,320	3	DW
North Boca Negra Arroyo	Petroglyph	350936106431100	350936	1064311	5,182	2	W
Ladera Arroyo	Petroglyph	08329938	350659	1064359	5,312	0	W
Petroglyph NM Well 1	Petroglyph	350809106424901	350809	1064250	5,108	3	U
Rainbow Bridge Cr, at Rainbow Br. N.M, UT	Rainbow Bridge	370439110575400	370439	1105754	3,615	3	W, R
Main Yucca House Spg (YUC06), Yucca Hse Nat Mon	Yucca House	371500108410801	371500	1084109	5,870	3	W

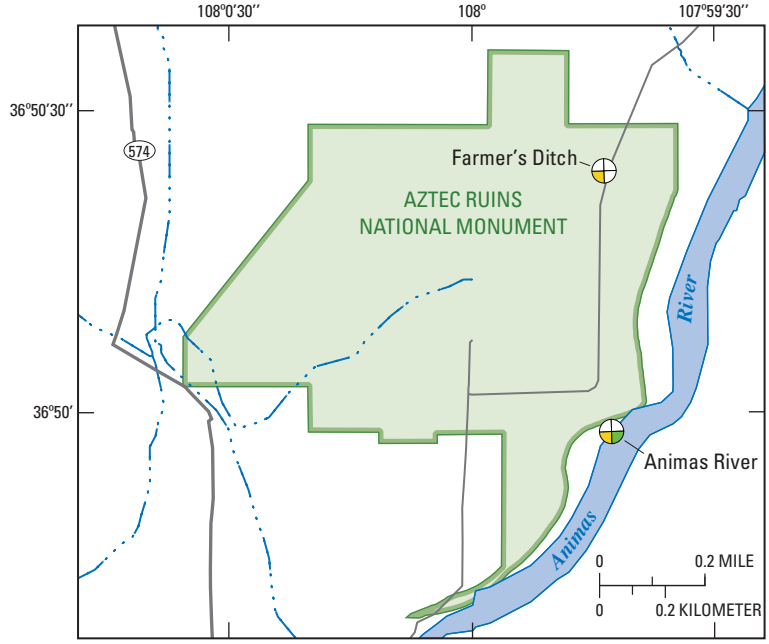
Table 2. General site characteristics of National Park units from Southern Colorado Plateau Inventory and Monitoring Network selected for Level 1 water-quality sampling.

[Source of rainfall data:Western Regional Climate Center, 2005]

Park unit	Geographic setting	Sample altitude(s) (feet)	Mean annual precipitation (altitude, in feet)
Aztec Ruins National Monument	River terrace, grasslands, riparian forest	5,595-5,665	10 inches at altitude of 5,640
Bandelier National Monument	Heavily forested mesas and canyons	5,370-8,700	15 inches at altitude of 6,060
Canyon de Chelly National Monument	Heavily forested uplands, deeply incised canyons with intermittent streams	5,550-6,990	9 inches at altitude of 5,610
Chaco Culture National Historical Park	Plateaus, mesas, buttes, and canyons	6,070-6,290	9 inches at altitude of 6,181
El Morro National Monument	Massive sandstone bluff, piñon-juniper forest	7,158-7,370	14 inches at altitude of 7,231
El Malpais National Monument	Forested lava flows, cinder cones, and sandstone bluffs	7,450	10 inches at altitude of 6,519
Glen Canyon National Recreation Area	Desert canyons and mesas	3,124-3,850	6 inches at altitude of 4,272
Grand Canyon National Park	Deeply incised canyons, raised plateaus, and basins	3,675-8,275	17 inches at altitude of 6,791
Mesa Verde National Park	High alpine mesa, canyons and forests	6,100-7,435	18 inches at altitude of 7,110
Petrified Forest National Park	Plateau grasslands and painted desert vistas	5,313-5,395	10 inches at altitude of 5,449
Petroglyph National Monument	Volcanic basalt escarpment with desert grasslands	5,108-5,312	9 inches at altitude of 5,308
Rainbow Bridge National Monument	Natural arch in canyon	3,615	9 inches at altitude of 6,020
Yucca House National Monument	Foothills with sagebrush, cactus, and greasewood	5,870	13 inches at altitude of 6,211

A. Aztec Ruins National Monument





Bases from U.S. Geological Survey digital data, 1:24,000, 2001
Univeral Transverse Mercator projection, Zone 13
Data from National Park Service

B. Bandelier National Monument

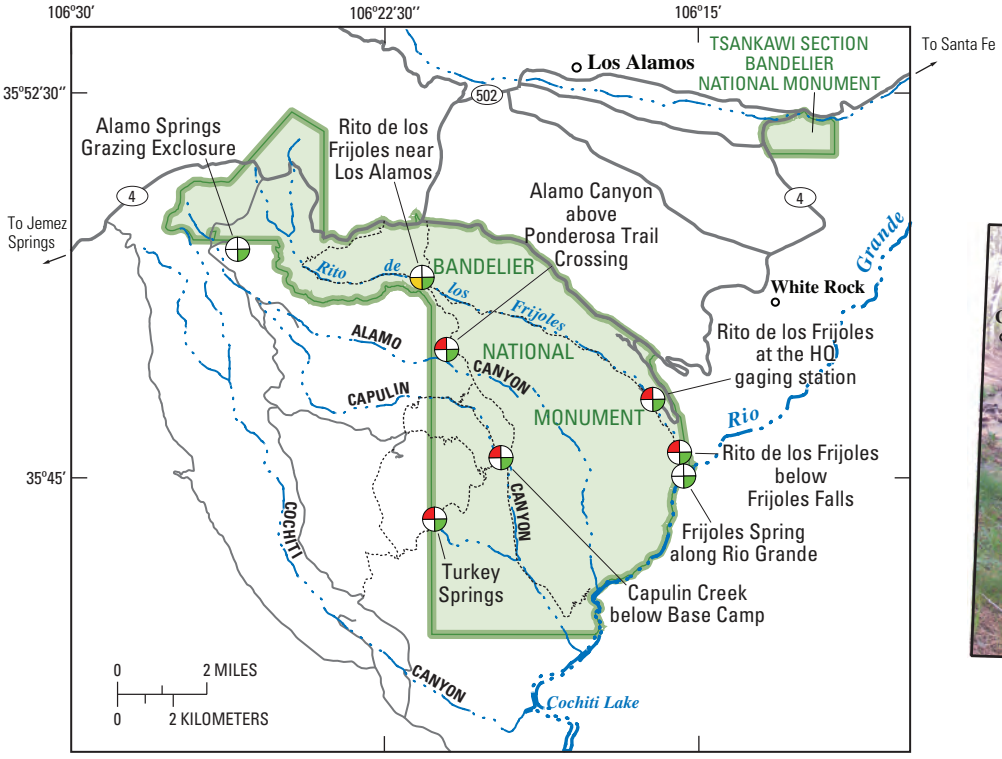
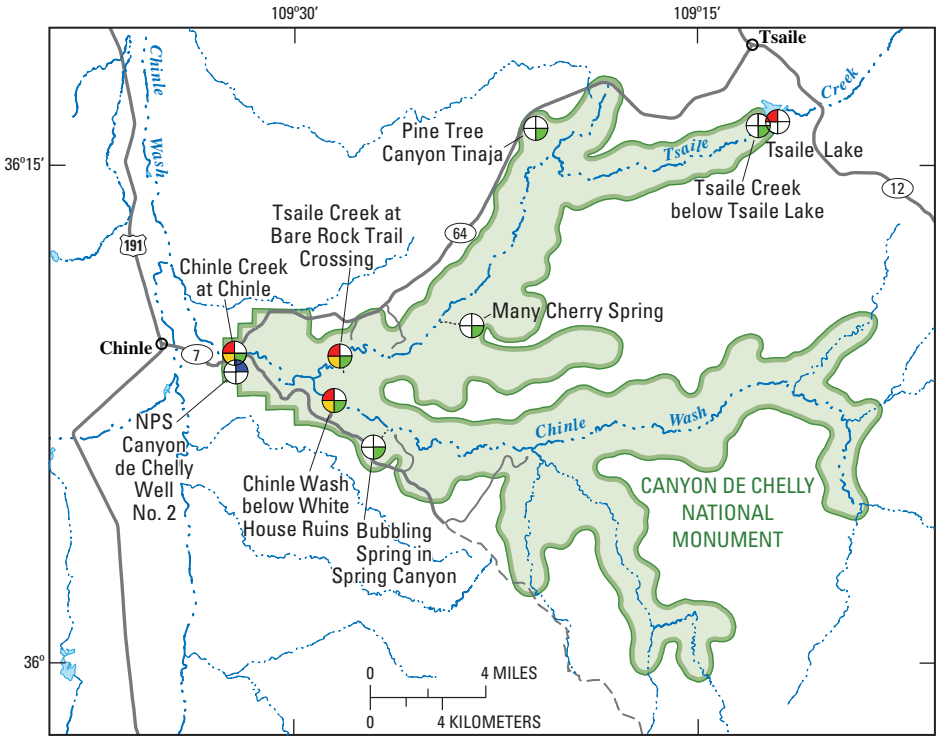


Figure 2. Location of water-quality sampling points. *A*, Aztec Ruins National Monument; *B*, Bandelier National Monument; *C*, Canyon de Chelly National Monument; *D*, Chaco Culture National Historical Park; *E*, El Morro National Monument; *F*, El Malpais National Monument; *G*, Glen Canyon National Recreation Area and Rainbow Bridge National Monument; *H*, Grand Canyon National Park; *I*, Mesa Verde National Park; *J*, Petrified Forest National Park; *K*, Petroglyph National Monument; and *L*, Yucca House National Monument.

C. Canyon de Chelly National Monument



Cliff face in
Canyon de Chelly
National Monument

EXPLANATION

SAMPLING SITE—Water use is depicted in four colors: red for recreation, blue for drinking, yellow for agriculture, and green for wildlife. White indicates no use

D. Chaco Culture National Historical Park

Wijiji Spring

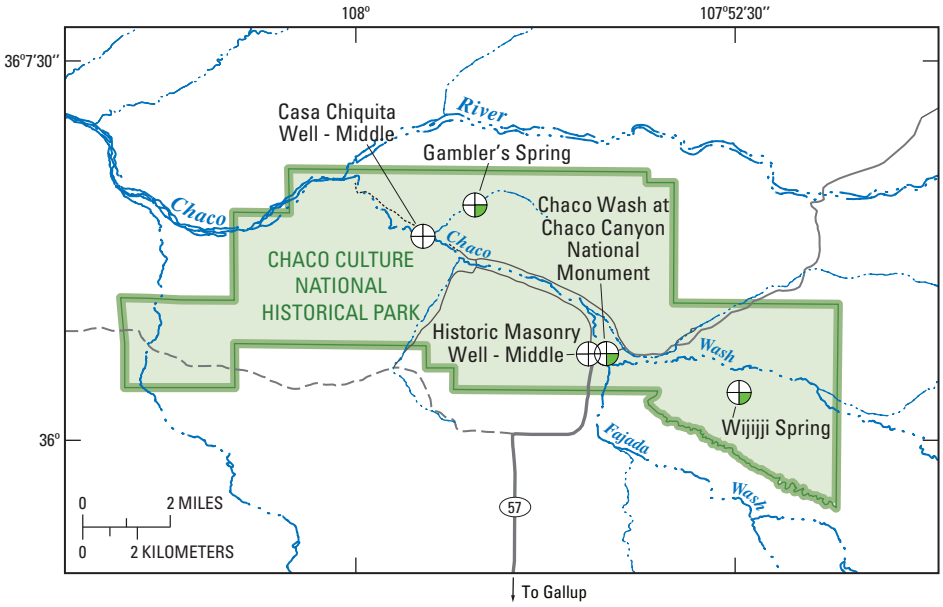
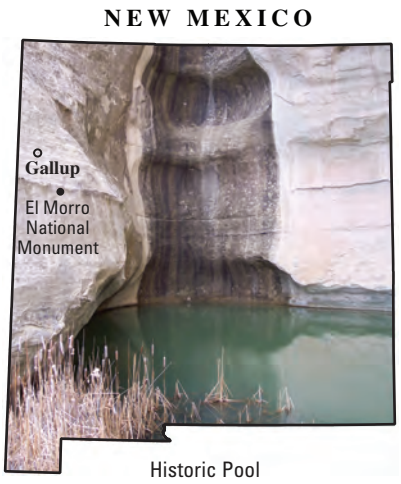
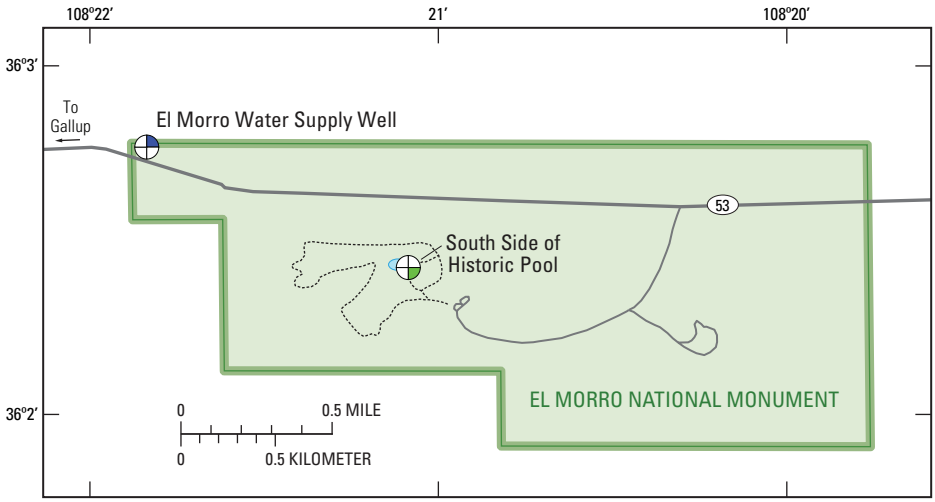


Figure 2. Continued.

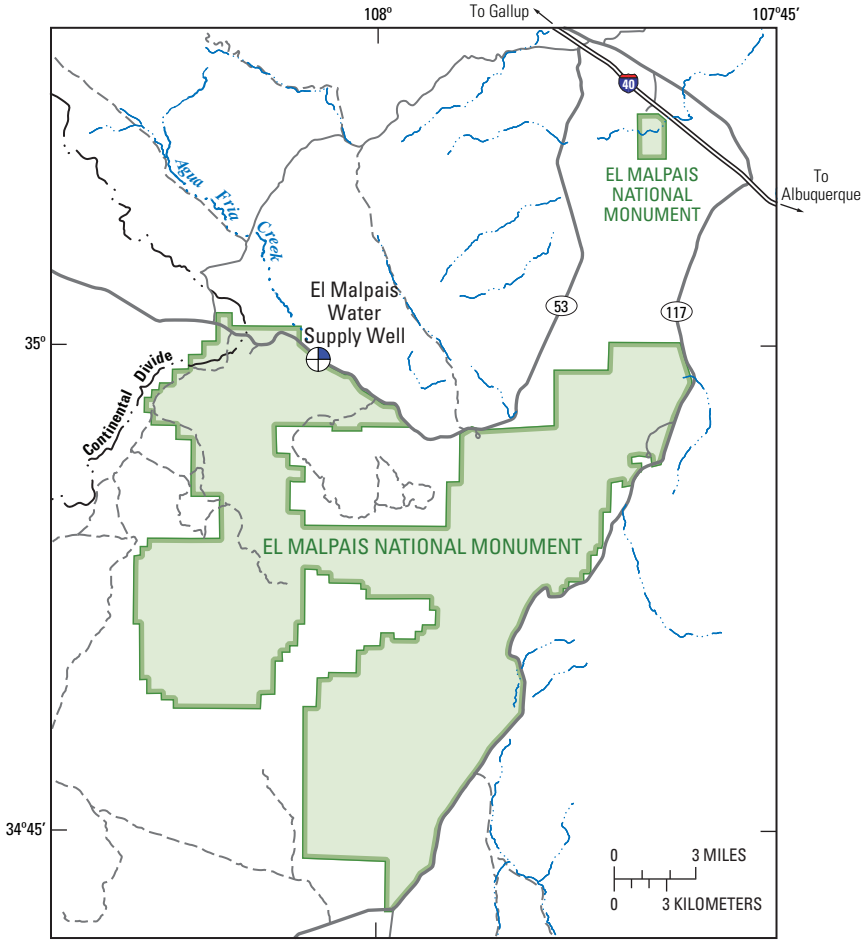
E. El Morro National Monument

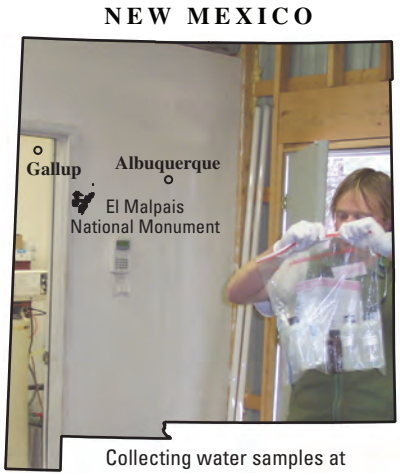




Bases from U.S. Geological Survey digital data, 1:24,000, 2001
Univeral Transverse Mercator projection, Zone 13
Data from National Park Service

F. El Malpais National Monument

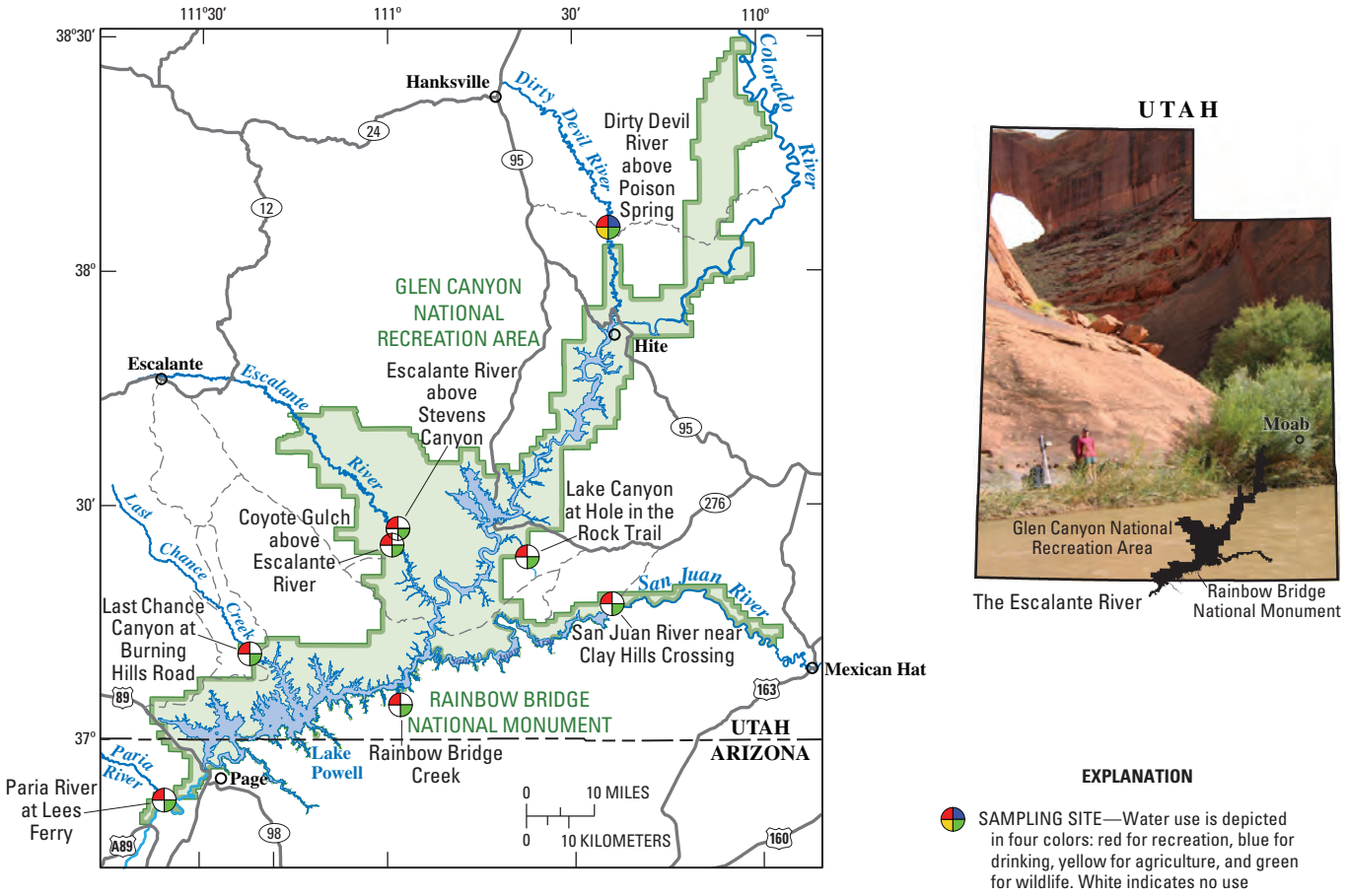




Collecting water samples at El Malpais Water Supply Well

Figure 2. Continued.

G. Glen Canyon National Recreation Area and Rainbow Bridge National Monument



H. Grand Canyon National Park

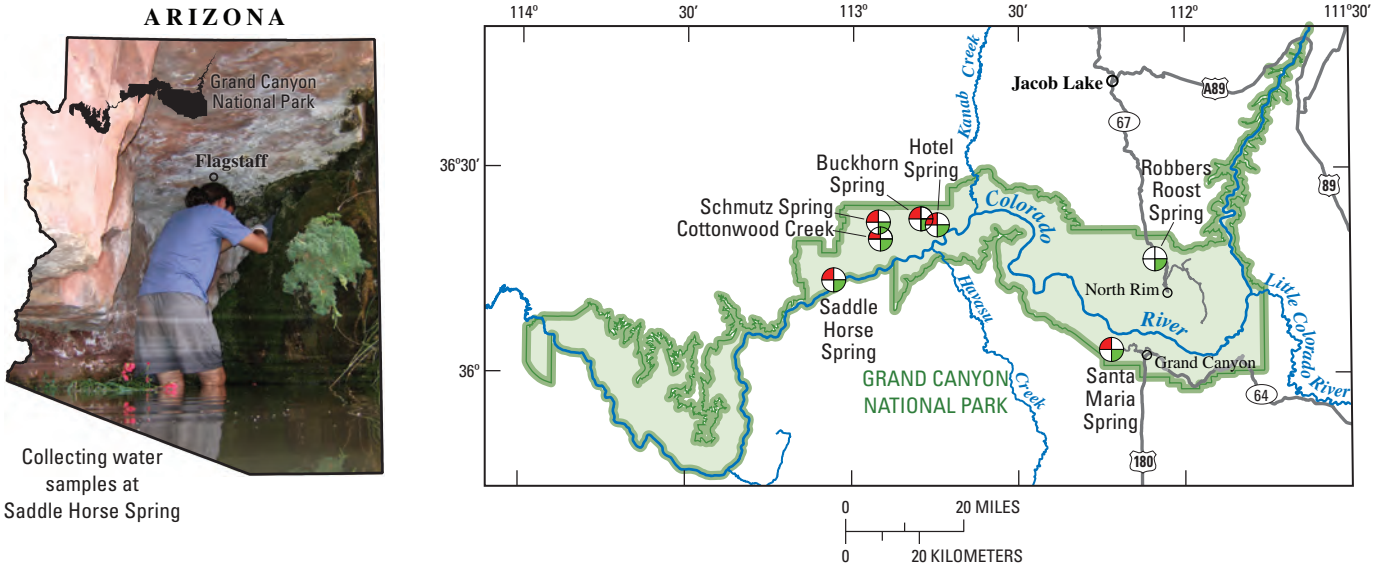
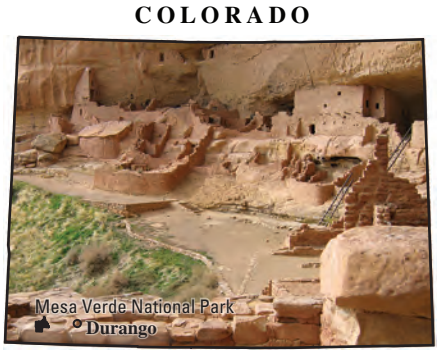
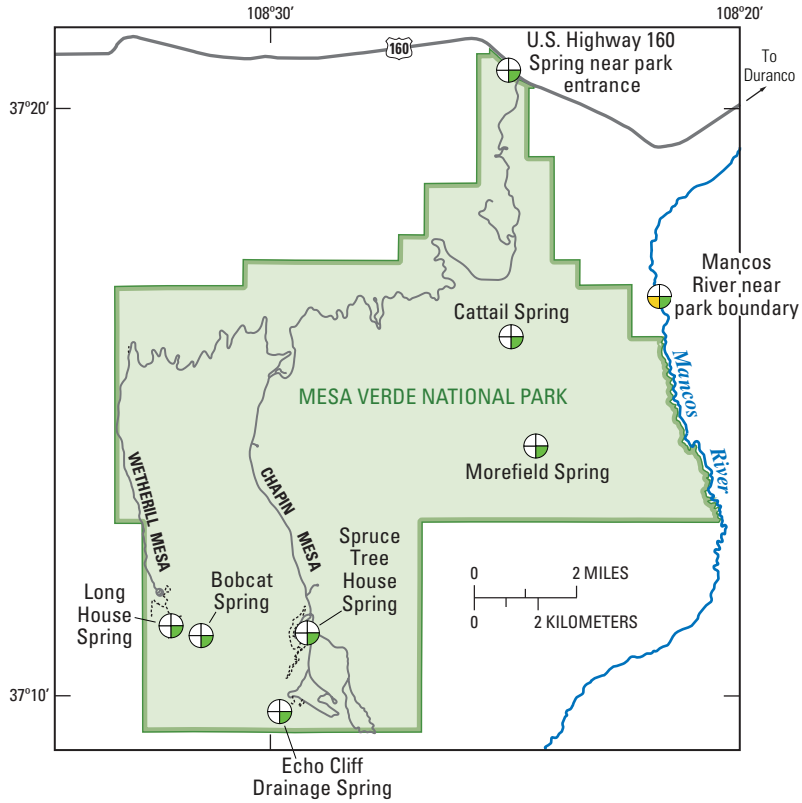


Figure 2. Continued.

I. Mesa Verde National Park

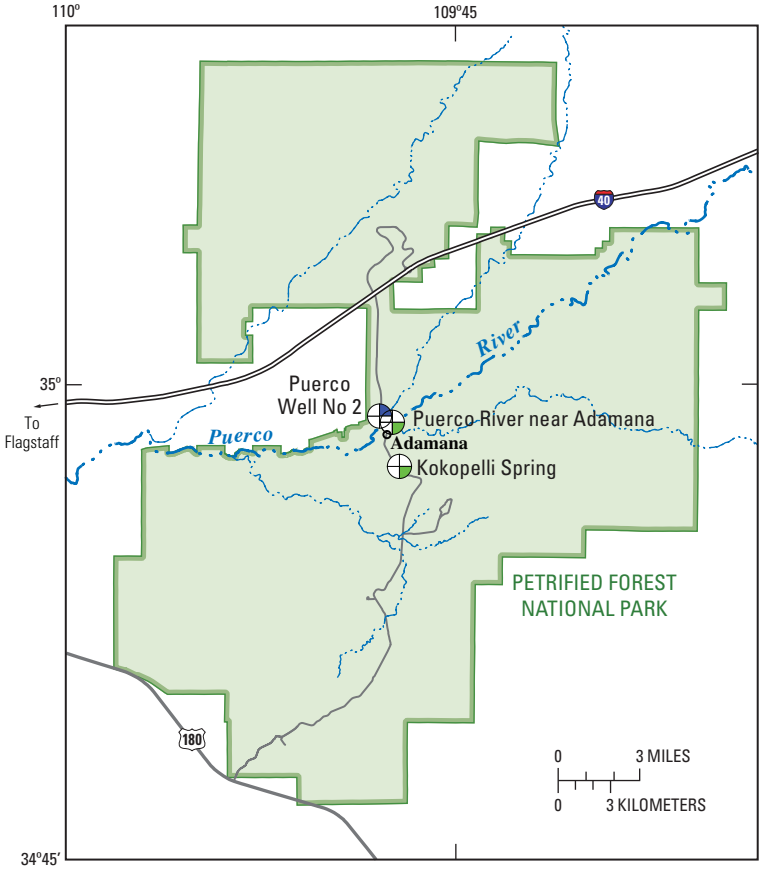


Long House Ruins



Bases from U.S. Geological Survey digital data, 1:24,000, 2001
Univeral Transverse Mercator projection, Zone 13
Data from National Park Service

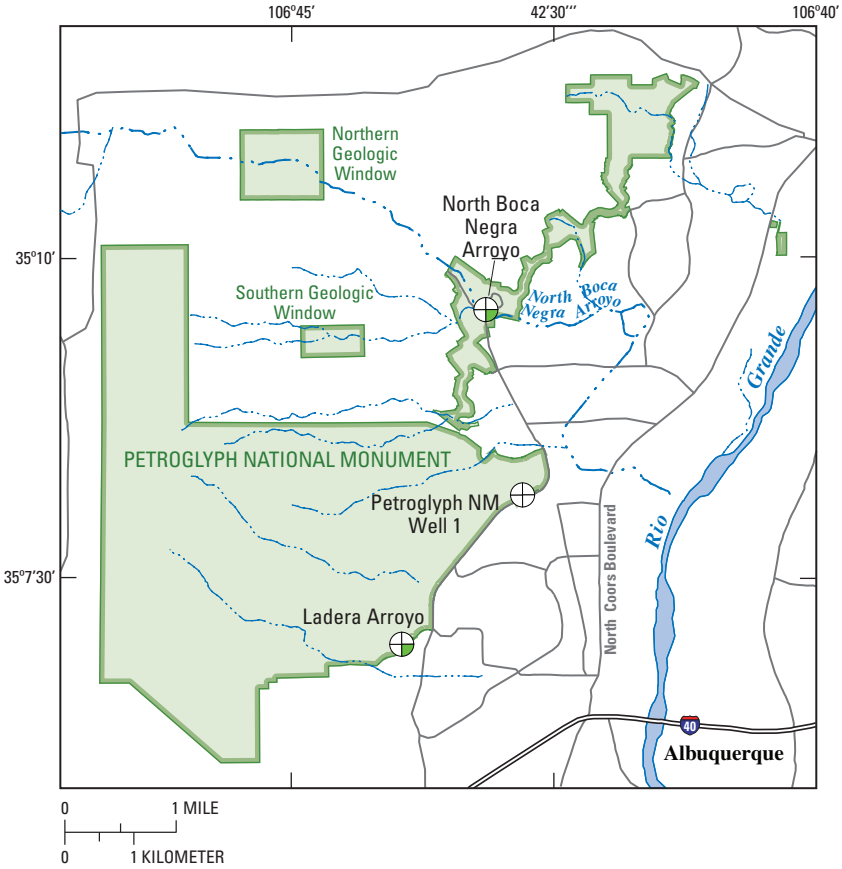
J. Petrified Forest National Park



Kokopelli Spring

Figure 2. Continued.

K. Petroglyph National Monument

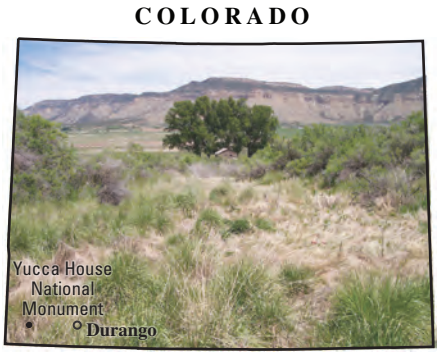


Albuquerque skyline viewed from North Boca Negra Arroyo

EXPLANATION

SAMPLING SITE—Water use is depicted in four colors: red for recreation, blue for drinking, yellow for agriculture, and green for wildlife. White indicates no use

L. Yucca House National Monument



Yucca Spring

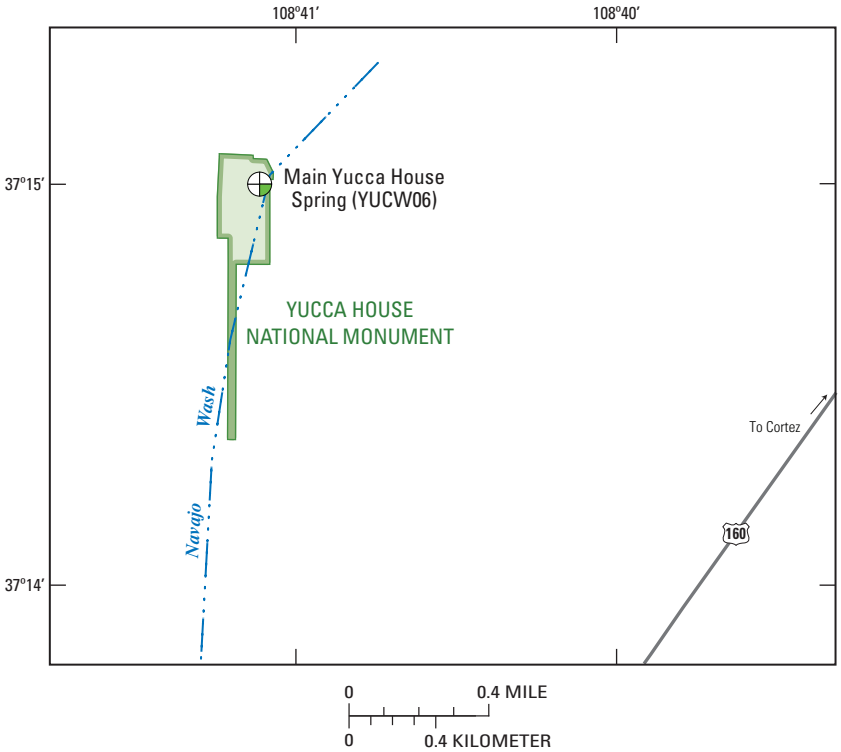


Figure 2. Continued.

Methods and Protocols

The current chemical character and water quality of the water bodies selected for this water-quality inventory were determined by collecting water samples and analyzing those samples for the following properties or constituents: (1) field measurements, (2) major ions, (3) nutrients, (4) trace elements, (5) uranium, (6) cyanide, and (7) mercury. Total petroleum hydrocarbons and gross alpha and gross beta radioactivity samples were collected at selected sites to assess risk to human activity. Fecal-indicator bacteria *Escherichia coli* (*E. coli*) samples were collected at selected sites were to determine whether activities such as grazing or recreation had affected the water quality.

Field measurements were done in accordance with standard USGS protocols documented in the USGS National Field Manual for the Collection of Water-Quality Data and in several USGS Techniques of Water-Resources Investigations Reports (Friedman and Erdmann, 1982; Britton and Greeson, 1988; Koterba and others, 1995; Wilde and others, 1998a, b, c; Wilde and Radtke, 1998; Myers and Wilde, 1999; and Wilde and others, 1999). Field measurements include pH, specific conductance, temperature, barometric pressure, dissolved oxygen, alkalinity, turbidity, and discharge rates where applicable. Field alkalinities were determined using either incremental equivalence or Gran titration (Wilde and Radtke, 1998). Major ion, nutrient, trace element, cyanide, mercury, gross alpha and beta radioactivity and alkalinity samples were filtered through a 0.45-micron pore size filter and preserved according to sampling and analytical protocol. Laboratory analyses for samples other than cyanide and gross alpha and beta radioactivity were done at the USGS National Water Quality Laboratory (NWQL) according to techniques described in Fishman and Friedman (1989), Faires (1993), Fishman (1993), McLain (1993), Struzeski and others (1996), American Public Health Association (1998), Garbarino (1999), and Garbarino and Damrau (2001). Analyses of cyanide samples were done at Severn Trent Laboratories (STL) using USEPA method 335.3. Gross alpha and gross beta radioactivity analyses were done at Eberline Laboratories and followed the USEPA method 900.0.

Three major techniques were used for collecting water-quality samples and determining field parameters. Each technique was appropriate for the type of site being sampled: well, spring, or river. Water samples from wells were collected from a faucet near the wellhead and prior to any water treatment such as disinfection, softening, or filtration. Polyethylene tubing connected the faucet of a well to a splitter that directed water to a flow-through chamber, a sample line and an overflow line. A Hydrolab minisonde multi-parameter probe was used in conjunction with a closed flow-through chamber to determine field parameters. Wells were purged at least three well volumes and until field parameter stability criteria stabilized for two readings at 15 minute intervals; the pH within +/- 0.1 units, temperature +/- 0.2°Celcius, specific conductance ± 5 percent, and dissolved oxygen ± 0.3 mg/L. Following purging, water samples were filtered and collected from the sample line and bacterial samples were collected directly from the faucet.

Water samples collected from springs were collected as close to the source as possible. Teflon tubing was used to direct flow into a sampling bottle when necessary. When no flow was present, but water was pooled, a peristaltic pump was used to pump water directly through filters and into sample bottles. Field parameters were measured using individual hand-held meters.

Rivers, streams, and creeks were sampled using integrated samples when possible. Equal-width-increment or multiple-vertical-integrated samples were collected when possible. Dip or grab samples were collected at some sites because of the lack of water or there were safety concerns. Field parameters were measured with a Hydrolab minisonde multi-parameter probe for larger rivers and streams and individual hand-held meters were used on smaller streams and creeks.

Quality Control

Quality control for this study was maintained through the use of proper training of field personnel, use of standard USGS field and lab protocols, collection of sample blanks and replicates, and a thorough review of the analytical results. All USGS scientists involved with this study have participated in the USGS National Field Quality Assurance Program, which requires participants to successfully determine pH, specific conductance and alkalinity of reference samples supplied by the USGS Branch of Quality Systems. Field crews were trained in water-quality field methods by USGS personnel or through formal instruction at the USGS water-quality-field methods class.

Laboratory analyses were done at the NWQL using methods approved by the USGS or the USEPA. The detection level used by the NWQL for most analytes is the laboratory reporting level (LRL; Childress and others, 1999). This reporting level is determined through a statistical procedure designed to yield a false positive rate of less than one percent at the LRL (Childress and others, 1999), and is twice the long-term method detection level.

During three water-quality sampling rounds, replicate and field blank samples were collected to assure that collection methods and equipment did not yield any contamination. There were no blank samples taken during the first round of sampling (spring of 2005), but each subsequent round was accompanied with a blank sample. Analysis of the blank samples indicated no contamination (table 3). Trace amounts of zinc, 0.5 μg/L and 0.37 μg/L, were detected in both blank samples, but these detection levels are below the reporting level of 0.6 μg/L (table 3). Trace amounts of copper, 0.2 μg/L and 0.3 μg/L, were detected in both blank samples, but the detections were below the reporting limit of 0.4 μg/L.

Table 3. Results of field blank and field replicate analyses

[ID, identification; cfs, cubic feet per second; NTU, Nephelometric turbidity units; mmHg, millimeters of mercury; mg/L, milligrams per liter; °C, degrees Celsius; ---, indicate no data; <, less than; *E. coli, Escherichia coli*; cols. per 100 mL, colonies per 100 milliliters; µg/L, micrograms per liter; pCi/L, picocuries per liter; dashes indicate no data; ND, no detection; E before any value indicates estimated]

Site name	USGS ID number	Date of sample	Instantaneous discharge (cfs)	Turbidity (NTU)	Barometric pressure, (mmHg)	Dissolved oxygen, field (mg/L)	pH, field (units)	Specific conductance field (uS/cm)	Water temperature, field (°C)
Replicates									
Bandelier National Monument									
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	6.1	25	740	8.8	7.5	115	8.6
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	6.1	25	740	8.8	7.5	115	8.6
Glen Canyon National Recreation Area									
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	500	19	673	12.3	8.1	973	-0.1
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	500	19	673	12.3	8.1	973	-0.1
Grand Canyon National Park									
Saddle Horse Spring	361344113032001	09/08/2005	.0008	.1	649	8.2	8.1	570	21.8
Saddle Horse Spring	361344113032001	09/08/2005	.0008	.1	649	8.2	8.1	570	21.8
Santa Maria Spring	360336112131801	12/30/2005	---	4.3	635	7.5	8	475	13.3
Santa Maria Spring	360336112131801	12/30/2005	---	4.3	635	7.5	8	475	13.3
Petroglyph National Monument									
Petroglyph Well 1	350809106424901	09/28/2005	---	.1	636	2.6	7.9	388	23.7
Petroglyph Well 1	350809106424901	09/28/2005	---	.1	636	2.6	7.9	388	23.7
Canyon de Chelly National Monument									
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	---	---	623	2	7.2	997	15.7
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	---	---	623	2	7.2	997	15.7
Blanks									
Glen Canyon National Recreation Area									
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	---	---	---	---	---	---	---
Canyon de Chelly National Monument									
Many Cherry Spring	361008109232801	10/21/2005	---	---	---	---	---	---	---

Table 3. Results of field blank and field replicate analyses—Continued.

Site name	USGS ID number	Date of sample	Calcium, dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Potassium, dissolved (mg/l as K)	Sodium, dissolved (mg/L as Na)	Alkalinity, water filtered, Gran titration, field (mg/L as $CaCO_3$)	Alkalinity, water filtered, incremental equivalence titration, field (mg/L as CaCO3)
Replicates								
Bandelier National Monument								
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	7.61	2.66	2.25	9.49	---	35
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	7.86	2.75	2.27	9.67	---	34
Glen Canyon National Recreation Area								
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	116	28.8	3.23	67	---	174
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	118	28.8	3.25	68.1	---	174
Grand Canyon National Park								
Saddle Horse Spring	361344113032001	09/08/2005	64.1	35.2	1.29	6.4	---	278
Saddle Horse Spring	361344113032001	09/08/2005	66.4	35.5	1.37	6.38	---	278
Santa Maria Spring	360336112131801	12/30/2005	30.7	42	4.43	13.9	---	191
Santa Maria Spring	360336112131801	12/30/2005	31	42.4	4.53	14	---	191
Petroglyph National Monument								
Petroglyph Well 1	350809106424901	09/28/2005	28.1	4.86	8.22	38.5	---	121
Petroglyph Well 1	350809106424901	09/28/2005	29	5.12	---	44.7	---	121
Canyon de Chelly National Monument								
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	159	33	5.49	26.8	---	226
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	162	33.5	5.48	25.8	---	226
Blanks								
Glen Canyon National Recreation Area								
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	<.02	<.008	<.16	<.20	---	---
Canyon de Chelly National Monument								
Many Cherry Spring	361008109232801	10/21/2005	<.02	<.008	<.16	<.20	---	---

Table 3. Results of field blank and field replicate analyses—Continued.

Site name	USGS ID number	Date of sample	Bicarbonate, water filtered, Gran titration, field (mg/L as HCO_3)	Bicarbonate, water filtered, incremental equivalence titration, field (mg/L as HCO_3)	Carbonate, water filtered, incremental equivalence titration, field (mg/L as CO_3)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Silica, dissolved (mg/L as SiO_2)
Replicates								
Bandelier National Monument								
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	---	43	---	10.1	.1	45.9
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	---	42	---	10.2	.1	46.4
Glen Canyon National Recreation Area								
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	---	193	9	25.3	.4	8.21
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	---	193	9	25.5	.4	8.37
Grand Canyon National Park								
Saddle Horse Spring	361344113032001	09/08/2005	---	339	---	8.54	.1	11.9
Saddle Horse Spring	361344113032001	09/08/2005	---	339	---	8.46	.1	11.8
Santa Maria Spring	360336112131801	12/30/2005	---	232	---	29.2	.5	12.5
Santa Maria Spring	360336112131801	12/30/2005	---	232	---	29.2	.5	12.6
Petroglyph National Monument								
Petroglyph Well 1	350809106424901	09/28/2005	---	148	---	13.2	.8	75.4
Petroglyph Well 1	350809106424901	09/28/2005	---	148	---	13.2	.8	72.1
Canyon de Chelly National Monument								
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	---	276	---	25.8	.3	14.2
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	---	276	---	25.8	.3	13.3
Blanks								
Glen Canyon National Recreation Area								
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	---	---	---	<.20	<.1	<.04
Canyon de Chelly National Monument								
Many Cherry Spring	361008109232801	10/21/2005	---	---	---	<.20	<.1	<.04

Table 3. Results of field blank and field replicate analyses—Continued.

Site name	USGS ID number	Date of sample	Sulfate, dissolved (mg/L as SO4)	Dissolved solids, residue at 180°C (mg/L)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, nitrite + nitrate, dissolved (mg/L as N)	Nitrogen, nitrite, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)	*E. coli* (colonies per 100 ml)
Replicates									
Bandelier National Monument									
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	5.9	105	<.04	<.06	<.008	<.02	
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	5.9	106	<.04	<.06	<.008	<.02	
Glen Canyon National Recreation Area									
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	316	674	<.04	.54	<.008	<.02	0
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	316	677	<.04	.53	<.008	<.02	0
Grand Canyon National Park									
Saddle Horse Spring	361344113032001	09/08/2005	29.6	328	<.04	.98	<.008	<.02	
Saddle Horse Spring	361344113032001	09/08/2005	29.6	283	<.04	.97	<.008	<.02	
Santa Maria Spring	360336112131801	12/30/2005	25.8	284	<.04	1.22	<.008	<.02	
Santa Maria Spring	360336112131801	12/30/2005	25.8	274	<.04	1.22	<.008	<.02	
Petroglyph National Monument									
Petroglyph Well 1	350809106424901	09/28/2005	49.6	295	<.04	.69	<.008	<.02	
Petroglyph Well 1	350809106424901	09/28/2005	49.6	300	<.04	.69	<.008	<.02	
Canyon de Chelly National Monument									
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	285	688	E.02	.31	<.008	<.02	
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	285	690	E.03	.31	<.008	<.02	
Blanks									
Glen Canyon National Recreation Area									
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	<.2		<.04	<.06	<.008	<.02	---
Canyon de Chelly National Monument									
Many Cherry Spring	361008109232801	10/21/2005	<.2		<.04	<.06	<.008	<.02	---

Table 3. Results of field blank and field replicate analyses—Continued.

Site name	USGS ID number	Date of sample	Aluminum dissolved (µg/L as Al)	Antimony, dissolved (µg/L as Sb)	Arsenic, dissolved (µg/L as As)	Barium, dissolved (µg/L as Ba)	Beryllium, dissolved (µg/L as Be)	Boron, dissolved (µg/L as B)	Cadmium, dissolved (µg/L as Cd)
Replicates									
Bandelier National Monument									
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	6	<.20	0.5	18	E.03	7.2	<.04
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	6	<.20	.5	18	<.06	7.1	<.04
Glen Canyon National Recreation Area									
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	2	<.20	.64	121	.13	68	.05
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	2	<.20	.64	120	.1	70	.04
Grand Canyon National Park									
Saddle Horse Spring	361344113032001	09/08/2005	<2	<.20	.72	89	<.06	31	<.04
Saddle Horse Spring	361344113032001	09/08/2005	<2	<.20	.64	88	<.06	30	<.04
Santa Maria Spring	360336112131801	12/30/2005	---	<.20	12.1	237	.22	170	.06
Santa Maria Spring	360336112131801	12/30/2005	---	<.20	12.1	235	.2	172	.06
Petroglyph National Monument									
Petroglyph Well 1	350809106424901	09/28/2005	<3	E.11	9.9	70	<.06	109	.05
Petroglyph Well 1	350809106424901	09/28/2005	<3	E.10	9.8	70.1	<.06	106	E0.02
Canyon de Chelly National Monument									
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	<2	<.20	.8	36	<.06	56	<.04
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	<2	<.20	.9	36	<.06	55	<.04
Blanks									
Glen Canyon National Recreation Areat									
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	<2	<.20	<.2	<.2	<.06	<7.0	<.04
Canyon de Chelly National Monument									
Many Cherry Spring	361008109232801	10/21/2005	<2	<.20	<.12	<.2	<.06	<7.0	<.04

Table 3. Results of field blank and field replicate analyses—Continued.

Site name	USGS ID number	Date of sample	Chromium, dissolved (µg/L as Cr)	Cobalt, dissolved (µg/L as Co)	Copper, dissolved (µg/L as Cu)	Cyanide, dissolved (mg/L as Cyanide)	Iron, dissolved (µg/L as Fe)	Lead, dissolved (µg/L as Pb)	Lithium, dissolved (µg/L as L)
Replicates									
Bandelier National Monument									
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	<.8	.089	0.7	---	20	<.08	9.5
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	<.8	.091	.7	---	22	<.08	9.2
Glen Canyon National Recreation Area									
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	.05	.229	2.3	<0.010	8	<.08	42.1
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	.06	.243	2.1	<.010	7	<.08	41.6
Grand Canyon National Park									
Saddle Horse Spring	361344113032001	09/08/2005	.18	<.04		<.010	<6	<.08	3.3
Saddle Horse Spring	361344113032001	09/08/2005	.18	<.04		---	<6	<.08	3.2
Santa Maria Spring	360336112131801	12/30/2005	.29	.076	.8	---	<6	<.08	10.3
Santa Maria Spring	360336112131801	12/30/2005	.27	.075	.7	---	<6	<.08	10.5
Petroglyph National Monument									
Petroglyph Well 1	350809106424901	09/28/2005	1.9	<.04	<.40	<.010	<6	E.07	50
Petroglyph Well 1	350809106424901	09/28/2005	1.9	<.04	<.40		E4	<.08	50.2
Canyon de Chelly National Monument									
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	<.8	.567	1.1	---	422	E.05	37.7
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	<.8	.615	1.2	---	436	E.05	37.9
Blanks									
Glen Canyon National Recreation Area									
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	<.8	<.014	E.2	---	<6	<.08	<.6
Canyon de Chelly National Monument									
Many Cherry Spring	361008109232801	10/21/2005	<.04	<.04	E.3	---	<6	<.08	<.6

Table 3. Results of field blank and field replicate analyses—Continued.

Site name	USGS ID number	Date of sample	Manganese, dissolved (µg/L as Mn)	Mercury, dissolved (µg/L as Hg)	Molybdenum, dissolved (µg/L as Mo)	Nickel, dissolved (µg/L as Ni)	Selenium, dissolved (µg/L as Se)	Silver, dissolved (µg/L as Ag)
Replicates								
Bandelier National Monument								
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	9.7	---	.6	.28	E.3	<.2
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	9.8	---	.6	.27	E.2	<.2
Glen Canyon National Recreation Area								
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	7.1	<.01	2.1	1.76	1.2	<.2
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	7.2	<.01	2	1.96	1.1	<.2
Grand Canyon National Park								
Saddle Horse Spring	361344113032001	09/08/2005	<.2	<.01	E.3	.07	.53	<.2
Saddle Horse Spring	361344113032001	09/08/2005	<.2	E.01	E.3	.07	.51	<.2
Santa Maria Spring	360336112131801	12/30/2005	<.2	<.01	4.8	.47	8	<.2
Santa Maria Spring	360336112131801	12/30/2005	<.2	<.01	4.6	.49	7.9	<.2
Petroglyph National Monument								
Petroglyph Well 1	350809106424901	09/28/2005	.4	<.01	1.7	.06	3.1	<.2
Petroglyph Well 1	350809106424901	09/28/2005	<.2	<.01	1.7	.08	3.3	<.2
Canyon de Chelly National Monument								
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	196	---	.4	5.06	2.1	<.2
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	203	---	.4	5.64	2.2	<.2
Blanks								
Glen Canyon National Recreation Area								
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	<.2	---	<.4	<.06	<.4	<.2
Canyon de Chelly National Monument								
Many Cherry Spring	361008109232801	10/21/2005	<.2	<.01	<.4	<.06	<.08	<.2

Table 3. Results of field blank and field replicate analyses—Continued.

Site name	USGS ID number	Date of sample	Strontium, dissolved (µg/L as Sr)	Thallium, dissolved (µg/L as Tl)	Vanadium, dissolved (µg/L as V)	Zinc, dissolved (µg/L as Z)	Petroleum hydrocarbons, total (mg/L)	Uranium, natural, dissolved (µg/L as U)
Replicates								
Bandelier National Monument								
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	57.6	<.04	2.9	.6	---	.08
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	56.9	<.04	2.9	E.4	---	.08
Glen Canyon National Recreation Area								
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	1,370	<.04	.92	1.4	2	3.1
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	1,350	<.04	.95	1.2	---	3.09
Grand Canyon National Park								
Saddle Horse Spring	361344113032001	09/08/2005	109	<.04	8	---	---	.52
Saddle Horse Spring	361344113032001	09/08/2005	107	<.04	8	---	---	.52
Santa Maria Spring	360336112131801	12/30/2005	222	<.04	7.5	.7	---	4.39
Santa Maria Spring	360336112131801	12/30/2005	222	<.04	7.5	E.6	---	4.39
Petroglyph National Monument								
Petroglyph Well 1	350809106424901	09/28/2005	394	<.04	18.7	---	---	3.03
Petroglyph Well 1	350809106424901	09/28/2005	390	<.04	18.5	1.3	---	3.04
Canyon de Chelly National Monument								
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	1,330	<.04	.7	1.6	<2	6.5
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	1,340	<.04	1.4	1.4	---	6.57
Blanks								
Glen Canyon National Recreation Area								
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	<.40	<.04	<.1	E.5	---	<.04
Canyon de Chelly National Monument								
Many Cherry Spring	361008109232801	10/21/2005	<.40	<.04	<.10	E.37	<2	<.04

Replicate samples indicate the variability in the sampling and analytical processes. Two pairs of replicate samples were taken during each of the three water-quality sampling rounds, for a total of six replicate pairs (table 3). Replicate pairs were collected concurrently in individual containers using the same sampler. Previous Level 1 Water-Quality Inventory studies have used a criteria of 5 percent to evaluate validity of replicate samples (Brown, 2005). To conclude that a difference exists between a replicate sample and an environmental sample for the purpose of this study, the following two statements must be true; a) the percent difference between the two samples must be greater than 5 percent and b) mathematically the average concentration of the analyte must be greater than 20 times the precision of the reported data in order to detect differences at increments of 5 percent or smaller. For example, environmental and replicate samples from San Juan River near Clay Hills Crossing have chromium concentrations of 0.05 and 0.06 µg/L. The difference in concentrations between these two samples is 18 percent and statement a) of the criteria is true. The precision of the reported data for chromium is 0.01 µg/L and the average of the concentrations of the analyte is 0.055 µg/L, therefore statement b) of the criteria is not true and there is no difference between the two samples. Using the above criteria that both statements must be true, there were only 5 occurrences out of 220 possible pairs where replicate pairs were not in accordance (table 3). For major ions, one replicate sample pair had two analytes exceed the replicate accordance criteria. Environmental and replicate samples from Petroglyph Well 1 had magnesium values that differed by 5.2 percent and sodium values that differed by 15 percent (table 3). For trace-elements, there were 3 occurrences where replicate samples exceeded our criteria. At NPS Canyon de Chelly Well No. 2 in Canyon de Chelly National Monument, nickel values differed by 11 percent and vanadium values differed by 60 percent between environmental and replicate samples (table 3). Nickel values between environmental and replicate samples for San Juan River near Clay Hills Crossing in Glen Canyon National Recreation Area also were greater than our criteria, 11 percent (table 3). Percentages were calculated by taking the difference between the two concentrations and dividing by the average of the environmental and replicate values. Trace-element variability was greatest at or near the laboratory reporting level for each element (table 3).

Water-Quality Data

Water quality and site description data collected through the Level 1 Water-Quality Inventory program will provide baseline information on water chemistry and quality to help facilitate the management of water resources in park units in the SCPN. The concentrations of dissolved constituents at the sites sampled for this study were compared to USEPA drinking water standards (USEPA, 2002; tables 4 and 5). Exceedances of USEPA drinking water standards at sites sampled for this study do not necessarily render them unsuitable for their respective water uses (figs. 2a–l and table 1). Samples were collected from wells that supply public water systems in Canyon de Chelly National Monument (fig. 2c), El Malpais National Monument (fig 2e), and El Morro National Monument (fig. 2f). Water-quality data collected for the Level 1 Water-Quality Inventory program complement regulatory samples collected by State or Tribal agencies for these sites.

Field pH values ranged from 6.0 to 8.8 and were within the USEPA secondary maximum contaminant level (SMCL) at most sites (table 4). The upper USEPA SMCL for pH of 8.5 was exceeded at Tsaile Lake (fig. 2c and table 4). The lower USEPA SMCL for pH of 6.5 was exceeded at Alamo Springs Grazing Exclosure near Bandelier National Monument (fig. 2b and table 4) and U.S. Highway 160 Spring near Mesa Verde National Park (fig. 2i, table 4). Water temperatures varied seasonally at most springs and streams. Water temperatures were typically cool in spring, warm in summer and fall, and cold in winter. The lowest and highest water temperature range was measured at San Juan River near Clay Hills Crossing in Glen Canyon National Recreation Area (fig. 2g); 0.1°C in December 2005 and 31.2°C in July, 2005. Water temperatures at Hotel Spring in Grand Canyon National Park (fig. 2h) ranged from 4.3°C to 32.6°C (table 4).

All samples collected for this study were analyzed for dissolved concentrations of major cations and anions present in the water. The major-ion composition is in large part a reflection of the water-rock interactions that occur as water moves from a recharge area to the point at which it is sampled. Major-ion composition of water may vary in response to runoff in streams or recharge conditions in springs and wells. The major cations detected in water sampled during this study were calcium, magnesium, and sodium. Major anions detected in water samples were bicarbonate, sulfate, and chloride. Concentrations and compositions of the major ions in water sampled during the study varied widely from site to site (figs. 3 and 4).

The USEPA SMCL for sulfate of 250 mg/L was exceeded at multiple sites. High concentrations of sulfate were identified at Casa Chiquita Well – Middle (5,140 to 5,390 mg/L) in Chaco Culture National Historical Park; Last Chance Canyon at Burning Hills Road (1,680 to 2,080 mg/L) in Glen Canyon National Recreation Area; Cottonwood Creek North Rim Grand Canyon (1,950 to 2,410 mg/L) and Buckhorn Spring (1,910 to 2,070 mg/L) in Grand Canyon National Park; U.S. Highway 160 Spring near Park Entrance (3,320 mg/L), Cattail Spring (2,930 to 3,250 mg/L), and Echo Cliff Drainage Spring in Mesa Verde National Park; Main Yucca House Spring (809 to 1,390 mg/L) in Mesa Verde National Park (figs. 2d, g, h, i and tables 4 and 5).

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network

[USGS, U.S. Geological Survey; ID, identification; cfs, cubic feet per second; NTU, nephelometric turbidity units; mmHg, millimeters of mercury; mg/L, milligrams per liter; µS/cm, microsiemens per centimeter; °C, degrees Celsius; *E. coli, Escherichia coli*; cols. per 100 mL, colonies per 100 milliliters; µg/L, micrograms per liter; pCi/L, picocuries per liter; <, less than; >, greater than; ---, indicate no data; ND, no detection; E before any value indicates estimated because the value is below the reporting level, but above the minimum detection level]

Site name	USGS ID number	Date of sample	Instantaneous discharge (cfs)	Turbidity (NTU)	Barometric pressure, (mmHg)	Dissolved oxygen, field (mg/L)	pH, field (units)	Specific conductance, field (µS/cm)	Water temperature, field (°C)
Aztec Ruins National Monument									
Animas River	364958107594500	04/05/2005	E1,100	130	758	8.9	8.3	421	9.5
Animas River	364958107594500	08/31/2005	---	5.5	622	8.4	8	565	20.3
Animas River	364958107594500	11/03/2005	403	7.4	623	9.4	8.4	520	8
Farmer's Ditch	365024107594600	04/05/2005	---	150	770	9	8.3	414	9.8
Farmer's Ditch	365024107594600	08/31/2005	---	17	618	8.3	7.9	556	20.4
Farmer's Ditch	365024107594600	11/03/2005	27	11	623	9.8	8.4	501	7.2
Bandelier National Monument									
Rito de los Frijoles near Los Alamos, NM	8313300	04/26/2005	6.5	14	736	9.2	7.3	100	10
Rito de los Frijoles near Los Alamos, NM	8313300	08/26/2005	1.1	1.5	630	7.9	8.1	125	15.1
Rito de los Frijoles near Los Alamos, NM	8313300	11/18/2005	1.4	1	597	9.7	7.9	116	5.5
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	6.1	25	740	8.8	7.5	115	8.6
Rito de los Frijoles at Headquarters Gaging Station	8313350	08/23/2005	.7	3.6	630	7.5	8.1	132	17.9
Rito de los Frijoles at Headquarters Gaging Station	8313350	11/15/2005	.7	1.4	630	9.8	7.8	125	5.5
Rito de los Frijoles below Freijoles Falls, NM	354511106151010	04/29/2005	4.3	26	778	10	8.3	120	8.2
Rito de los Frijoles below Freijoles Falls, NM	354511106151010	08/23/2005	.52	11	630	7.5	8.2	145	19.6
Rito de los Frijoles below Freijoles Falls, NM	354511106151010	11/15/2005	.55	1.9	631	10.6	8.1	129	7.1
Frijoles Spring along Rio Grande	354502106152701	04/29/2005	.1	3.1	781	6.8	8.4	148	18.6
Frijoles Spring along Rio Grande	354502106152701	08/23/2005	---	3.9	650	6.4	7.9	138	22.5
Frijoles Spring along Rio Grande	354502106152701	11/15/2005	---	61.3	634	3.8	7.4	158	18.8
Alamo Springs Grazing Exclosure	354928106260401	04/27/2005	0.002	17	690	9	6.4	47	8.8
Alamo Springs Grazing Exclosure	354928106260401	08/24/2005	---	29	558	2.6	6	55	11
Alamo Springs Grazing Exclosure	354928106260401	11/16/2005	---	22	559	6.7	6.1	63	6.5
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	04/26/2005	4.1	17	742	9.4	7.4	70	11.9
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	08/26/2005	.09	.6	599	7.6	7.8	139	13.8
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	11/18/2005	.11	.4	602	10.2	7.8	119	3.7
Capulin Creek below Base Camp	354526106194400	06/02/2005	.71	3.5	760	7.9	7.9	149	15.5
Capulin Creek below Base Camp	354526106194400	08/24/2005	.56	.9	609	8.2	8	167	17.3
Capulin Creek below Base Camp	354526106194400	11/16/2005	.42	.5	617	10.6	8	163	4.2
Turkey Springs	354411106212001	04/28/2005	.1	6	746	8.6	7.9	264	9.4
Turkey Springs	354411106212001	08/25/2005	.05	.3	603	7.1	7.8	263	17.4
Turkey Springs	354411106212001	11/17/2005	.09	.6	605	9	8.1	288	8.2
Canyon de Chelly National Monument									
Tsaile Lake	361621109121300	04/22/2005	---	33	770	9	8.1	202	10.7
Tsaile Lake	361621109121300	08/23/2005	---	7.1	598	8.8	8.8	171	21.1
Tsaile Lake	361621109121300	10/19/2005	---	29	593	6	8.6	180	11.8

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Instantaneous discharge (cfs)	Turbidity (NTU)	Barometric pressure, (mmHg)	Dissolved oxygen, field (mg/L)	pH, field (units)	Specific conductance, field (µS/cm)	Water temperature, field (°C)
Canyon de Chelly National Monument—Continued									
Tsaile Creek below Tsaile Lake	361624109122400	04/22/2005	22	50	770	9.7	8	193	8.5
Tsaile Creek below Tsaile Lake	361624109122400	08/23/2005	.1	7.1	598	14	8.5	376	22.4
Tsaile Creek below Tsaile Lake	361624109122400	10/19/2005	---	7.5	593	4.6	7.5	371	9.9
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	05/10/2005	56	600	767	8.4	8.1	191	16
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	12/08/2005	E<0.1	37.2	627	12	8.4	471	.4
Chinle Wash below White House Ruins	360800109282700	04/23/2005	149	630	776	9.7	8	131	16
Chinle Wash below White House Ruins	360800109282700	12/07/2005	---	23.2	623	6.8	8.1	723	2.4
Chinle Creek at Chinle, AZ	9379025	04/23/2005	E167	1,150	780	8.4	8.1	153	17.3
Chinle Creek at Chinle, AZ	9379025	08/17/2005	2.3	827	626	6.3	7.9	209	28.3
Many Cherry Spring	361008109232801	05/11/2005	---	2.8	749	1.7	7.3	603	10.2
Many Cherry Spring	361008109232801	10/18/2005	---	3.3	600	8	8.1	512	12.8
Bubbling Spring in Spring Canyon	360627109270101	05/12/2005	.001	.8	773	6.6	7.4	380	10.7
Bubbling Spring in Spring Canyon	360627109270101	07/25/2005	---	2.8	619	.4	6.7	376	20.5
Bubbling Spring in Spring Canyon	360627109270101	10/18/2005	---	3.2	621	2	7.3	376	13.4
Pine Tree Canyon Tinaja	361607109210601	05/15/2005	---	8.1	748	7.3	8.3	166	16.8
Pine Tree Canyon Tinaja	361607109210601	10/20/2005	---	22	603	7	8	108	7.6
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	---	---	623	2	7.2	997	15.7
NPS Canyon de Chelly Well No. 2	360847109321201	08/17/2005	---	1.9	626	2	6.8	964	15.5
NPS Canyon de Chelly Well No. 2	360847109321201	10/19/2005	---	3.7	626	1.7	7.2	904	15.4
Chaco Culture National Historical Park									
Chaco Wash at Chaco Canyon National Monument, NM	9367680	5/5/2005	.7	45,600	770	7.2	8.4	840	15.8
Chaco Wash at Chaco Canyon National Monument, NM	9367680	08/16/2005	3.91	---	796	6.8	8.4	412	22.1
Gambler's Spring	360435107573601	04/12/2005	.00001	.4	620	7.6	8.3	384	4.3
Gambler's Spring	360435107573601	08/17/2005	---	11	630	7.1	8.2	376	14.8
Wijijji Spring	360057107522501	04/12/2005	.00001	0.8	760	11.6	8.1	2,180	.6
Wijijji Spring	360057107522501	08/17/2005	---	1.1	630	6.8	8.4	2,370	24.7
Wijijji Spring	360057107522501	12/06/2005	---	990	606	7.9	7.3	2,020	3.3
Historic Masonry Well - Middle	360146107551401	04/13/2005	---	>1,000	760	3.2	7.6	1,340	15.6
Historic Masonry Well - Middle	360146107551401	08/17/2005	---	3.3	630	0.6	7.3	1,600	17.4
Historic Masonry Well - Middle	360146107551401	12/05/2005	---	3.4	611	3.2	7.8	1,700	7.5
Casa Chiquita Well - Middle	360402107583901	04/13/2005	---	>1,000	760	1.1	7.6	894	14
Casa Chiquita Well - Middle	360402107583901	08/18/2005	---	7.2	616	0.5	7.2	8,160	17.9
Casa Chiquita Well - Middle	360402107583901	12/06/2005	---	7.48	610	1.2	7.9	8,960	9.6
El Morro National Monument									
South Side of Historic Pool at El Morro, NM	350225108210601	3/29/2005	---	8.1	581	8.4	7.1	63	5.8
South Side of Historic Pool at El Morro, NM	350225108210601	08/10/2005	---	1.47	588	4.1	7	84	21.9
South Side of Historic Pool at El Morro, NM	350225108210601	12/22/2005	---	1.2	591	6.9	7.5	94	4.1
El Morro Water Supply Well	350246108215001	03/30/2005	---	---	585	7.3	7.9	415	13.4
El Morro Water Supply Well	350246108215001	08/11/2005	---	1.6	590	6.7	7.5	408	13.5
El Morro Water Supply Well	350246108215001	12/22/2005	---	0.2	591	5	7.7	431	14.3

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Instantaneous discharge (cfs)	Turbidity (NTU)	Barometric pressure, (mmHg)	Dissolved oxygen, field (mg/L)	pH, field (units)	Specific conductance, field (µS/cm)	Water temperature, field (°C)
El Malpais National Monument									
El Malpais Water Supply Well	345934108021501	03/30/2005	---	---	577	5.4	7.3	444	10.9
El Malpais Water Supply Well	345934108021501	08/11/2005	---	1.2	584	2.7	7.1	440	11.4
El Malpais Water Supply Well	345934108021501	12/21/2005	---	16.3	588	2.6	7.4	443	11.6
Glen Canyon National Recreation Area									
San Juan River near Clay Hills Crossing	371734110235900	05/18/2005	---	650	667	7.9	7.9	355	15.8
San Juan River near Clay Hills Crossing	371734110235900	07/20/2005	---	110	661	6.2	8	483	31.2
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	E500	19	673	12.3	8.1	973	-.1
Lake Canyon at Hole in the Rock Trail	372315110372600	05/17/2005	.95	51	652	6.9	8.2	227	19.5
Lake Canyon at Hole in the Rock Trail	372315110372600	07/20/2005	.75	100	662	6.4	7.9	302	25.8
Lake Canyon at Hole in the Rock Trail	372315110372600	12/01/2005	.95	56	663	7.5	8.2	402	9.6
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	05/05/2005	51	---	661	7.2	8	1,690	21.8
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	.91	1.3	662	6	7.9	2,610	31.6
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	12/14/2005	98	360	668	13.2	8	1,440	0
Escalante River above Stevens Canyon	372610110585201	06/13/2005	---	2,150	768	8.4	8.3	319	18.1
Escalante River above Stevens Canyon	372610110585201	09/20/2005	73	44	670	8.7	8.4	406	18.7
Escalante River above Stevens Canyon	372610110585201	11/22/2005	117	84	676	11.6	8.5	474	3.4
Coyote Gulch above Escalante River	372541110591100	06/14/2005	E.50	11	777	7	8.5	256	29.1
Coyote Gulch above Escalante River	372541110591100	09/20/2005	1.3	3.2	672	9.3	8.4	234	16.1
Coyote Gulch above Escalante River	372541110591100	11/22/2005	2.5	38	673	11.8	8.5	329	4.1
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	05/04/2005	.86	1,000	667	6.4	8.2	3,820	27.4
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	08/26/2005	.01	28.3	665	6.7	8	3,440	26
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	11/29/2005	.01	.8	668	7.8	8	4,010	6.5
Paria River at Lees Ferry, AZ	9382000	06/27/2005	8.2	3,160	682	7.8	8.4	840	24.7
Paria River at Lees Ferry, AZ	9382000	08/24/2005	5.7	790	676	6.3	7.8	765	29.1
Paria River at Lees Ferry, AZ	9382000	11/29/2005	8.9	620	682	8.8	8.3	930	6.7
Grand Canyon National Park									
Schmutz Spring	362143112551201	05/26/2005	---	.6	775	7.8	7.4	1,710	16.3
Schmutz Spring	362143112551201	09/09/2005	---	.5	647	7.6	7.5	1,700	20.4
Schmutz Spring	362143112551201	11/30/2005	---	.9	646	7	7.7	1,650	14.8
Cottonwood Creek North Rim Grand Canyon	361947112550200	05/26/2005	.01	.3	762	6.7	7.5	3,630	22
Cottonwood Creek North Rim Grand Canyon	361947112550200	11/30/2005	.01	1.3	661	9.8	8.1	3,240	7.4
Saddle Horse Spring	361344113032001	05/24/2005	.0006	.2	832	7.3	7.9	565	20.1
Saddle Horse Spring	361344113032001	09/08/2005	.0008	.1	649	8.2	8.1	570	21.8
Saddle Horse Spring	361344113032001	12/01/2005	.0007	.21	653	8.2	8.4	577	12.2
Buckhorn Spring	362258112464701	05/23/2005	.0004	.3	821	6.7	7.7	3,130	15.3
Buckhorn Spring	362258112464701	11/29/2005	---	2.7	649	7.7	8.1	3,010	6.7

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Instantaneous discharge (cfs)	Turbidity (NTU)	Barometric pressure, (mmHg)	Dissolved oxygen, field (mg/L)	pH, field (units)	Specific conductance, field (µS/cm)	Water temperature, field (°C)
Grand Canyon National Park—Continued									
Hotel Spring	362157112451601	05/23/2005	E.00	1.8	859	9.9	8.1	1,090	32.6
Hotel Spring	362157112451601	11/29/2005	.00001	1.9	668	11.6	8.2	1,030	4.3
Santa Maria Spring	360336112131801	06/20/2005	.0018	1.79	785	6.9	7.8	583	16.7
Santa Maria Spring	360336112131801	09/29/2005	.0012	.47	641	7.1	7.7	499	18.9
Santa Maria Spring	360336112131801	12/30/2005	.0006	4.3	635	7.5	8	475	13.3
Robber's Roost Spring	361650112052001	05/27/2005	E.50	3.6	770	5.8	7.1	197	4.2
Robber's Roost Spring	361650112052001	09/07/2005	.02	1	570	8.5	7.5	381	5.3
Robber's Roost Spring	361650112052001	10/25/2005	.006	.6	569	7.9	7.5	384	5.7
Mesa Verde National Park									
U.S. Highway 160 Spring near Park Entrance	372040108245801	05/17/2005	.01	.8	738	1.3	4.2	5,540	9.3
U.S. Highway 160 Spring near Park Entrance	372040108245801	09/15/2005	---	.4	600	.8	4.3	6,150	11.1
U.S. Highway 160 Spring near Park Entrance	372040108245801	11/09/2005	---	.51	601	.7	4.3	7,010	10.4
Morefield Spring	371415108242301	05/19/2005	.0002	120	761	4.9	8.1	2,690	10.7
Morefield Spring	371415108242301	09/13/2005	---	17	593	8	8.3	2,890	12.1
Morefield Spring	371415108242301	11/08/2005	---	34.4	592	8.4	8.3	2,930	8.5
Cattail Spring	371607108245501	05/19/2005	---	120	756	3.2	7.8	5,150	23.6
Spruce Tree House Spring	371105108291501	05/18/2005	.002	.1	767	9.1	8	425	8
Spruce Tree House Spring	371105108291501	09/14/2005	---	.7	595	8.5	7.8	410	11.7
Spruce Tree House Spring	371105108291501	11/09/2005	---	.21	600	8.1	7.8	419	10
Echo Cliff Drainage Spring	370944108295101	05/18/2005	.00006	1.9	788	6	7.7	6,490	16.8
Echo Cliff Drainage Spring	370944108295101	09/14/2005	---	22	605	6	7.6	6,230	13.6
Echo Cliff Drainage Spring	370944108295101	11/09/2005	---	9.15	617	8.8	7.6	6,470	6.4
Long House Spring	371112108320901	05/19/2005	---	<.1	767	8.5	8.1	346	9.8
Long House Spring	371112108320901	09/13/2005	---	---	593	8.1	8.4	355	12.9
Long House Spring	371112108320901	11/08/2005	---	2.94	597	10.4	8.5	312	10.6
Bobcat Spring	371102108313101	05/19/2005	---	1	767	8.1	7.4	239	10.1
Bobcat Spring	371102108313101	09/13/2005	---	.6	593	6.9	8	252	10.6
Bobcat Spring	371102108313101	11/08/2005	---	.73	596	8.6	8.2	263	6.3
Mancos River at Gaging Station	371648108214500	06/03/2005	---	82	754	9.4	8.1	300	9
Mancos River at Gaging Station	371648108214500	09/12/2005	36	110	605	7.1	8.2	983	18.4
Mancos River at Gaging Station	371648108214500	11/07/2005	18	82.4	608	9.3	8.5	1,300	8.8
Petrified Forest National Park									
Puerco River near Adamana, AZ	9396500	03/21/2005	---	26,320	735	8.6	7.8	917	11.6
Puerco River near Adamana, AZ	9396500	08/08/2005	275	860	628	3.2	7.3	1,020	25.4
Kokopelli Spring	345726109471101	03/17/2005	---	>1,000	622	7.4	8.8	394	6.7
Kokopelli Spring	345726109471101	08/09/2005	---	200	626	3.8	8.3	568	19.1
Kokopelli Spring	345726109471101	10/26/2005	---	790	628	1.8	7.9	464	8
Puerco Well No. 2	345850109475001	03/17/2005	---	---	628	8.4	7.6	2,580	15.8
Puerco Well No. 2	345850109475001	08/09/2005	---	14	634	6.8	7.5	2,400	15.9
Puerco Well No. 2	345850109475001	10/26/2005	---	2.7	631	6.5	7.5	2,320	14.4

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Instantaneous discharge (cfs)	Turbidity (NTU)	Barometric pressure, (mmHg)	Dissolved oxygen, field (mg/L)	pH, field (units)	Specific conductance, field (µS/cm)	Water temperature, field (°C)
Petroglyph National Monument									
North Boca Negra Arroyo	350936106431100	09/28/2005	---	1,362	633	8.2	8.3	111	18.6
North Boca Negra Arroyo	350936106431100	10/04/2005	---	4,240	634	8.4	7.9	248	15.9
Petroglyph Well 1	350809106424901	06/23/2005	---	.06	632	2.4	7.8	394	23.8
Petroglyph Well 1	350809106424901	09/28/2005	---	.1	636	2.6	7.9	388	23.7
Petroglyph Well 1	350809106424901	12/13/2005	---	10	633	2.2	7.8	394	21.7
Rainbow Bridge National Monument									
Rainbow Bridge Creek	370439110575400	05/03/2005	.31	.5	666	6.3	8.6	444	20.2
Rainbow Bridge Creek	370439110575400	08/25/2005	.02	.3	669	6.5	7.9	334	27
Rainbow Bridge Creek	370439110575400	11/30/2005	.05	.6	669	8.8	8.2	441	5.4
Yucca House National Monument									
Main Yucca House Spring (YUCW06)	371500108410801	05/20/2005	---	2	798	2.7	7	1,960	12
Main Yucca House Spring (YUCW06)	371500108410801	08/30/2005	---	18	616	.6	6.7	3,030	13.5
Main Yucca House Spring (YUCW06)	371500108410801	11/03/2005	---	10	617	.9	6.9	2,730	12.4

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Calcium, dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Potassium, dissolved (mg/l as K)	Sodium, dissolved (mg/L as Na)	Alkalinity, Water filtered, Gran titration, field (mg/L as $CaCO^3$)	Alkalinity, water filtered, incremental equivalence titration, field (mg/L as $CaCO^3$)
Aztec Ruins National Monument								
Animas River	364958107594500	04/05/2005	58.5	11.1	1.78	11.3	---	128
Animas River	364958107594500	08/31/2005	77.7	13.3	2.83	25.2	---	141
Animas River	364958107594500	11/03/2005	69.2	12	2.47	21	---	131
Farmer's Ditch	365024107594600	04/05/2005	59	11.3	1.76	11.2	---	137
Farmer's Ditch	365024107594600	08/31/2005	78	13.1	2.88	23.8	---	143
Farmer's Ditch	365024107594600	11/03/2005	65.1	11.5	2.43	19.1	---	122
Bandelier National Monument								
Rito de los Frijoles near Los Alamos, NM	8313300	04/26/2005	6.86	2.32	2.22	8.11	---	26
Rito de los Frijoles near Los Alamos, NM	8313300	08/26/2005	8.52	2.95	1.81	11.2	---	52
Rito de los Frijoles near Los Alamos, NM	8313300	11/18/2005	8.14	2.97	1.67	11	---	50
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	7.61	2.66	2.25	9.49	---	35
Rito de los Frijoles at Headquarters Gaging Station	8313350	08/23/2005	9.29	3.09	2.16	12.1	---	51
Rito de los Frijoles at Headquarters Gaging Station	8313350	11/15/2005	9.84	3.47	1.78	13	---	54
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	04/29/2005	8.25	2.87	2.28	9.97	---	32
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	08/23/2005	11.1	3.4	2.36	12.7	---	58
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	11/15/2005	9.53	3.31	1.98	12.1	---	53
Frijoles Spring along Rio Grande	354502106152701	04/29/2005	13	3.17	1.78	11.8	---	71
Frijoles Spring along Rio Grande	354502106152701	08/23/2005	13.2	3.13	1.94	12.3	---	67
Frijoles Spring along Rio Grande	354502106152701	11/15/2005	13.2	3.27	2.04	12.3	---	71
Alamo Springs Grazing Exclosure	354928106260401	04/27/2005	4.24	1.12	1.6	2.22	---	12
Alamo Springs Grazing Exclosure	354928106260401	08/24/2005	5.58	1.5	2.01	2.79	---	21
Alamo Springs Grazing Exclosure	354928106260401	11/16/2005	5.67	1.6	1.8	2.85	---	26
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	04/26/2005	6.41	1.65	2.26	4.12	---	23
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	08/26/2005	12.4	3.04	3.32	8.98	---	54
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	11/18/2005	10.8	3.02	2.67	8.95	---	50
Capulin Creek below Base Camp	354526106194400	06/02/2005	14.1	4.05	3.29	9.75	---	60
Capulin Creek below Base Camp	354526106194400	08/24/2005	17.1	4.29	3.84	10.4	---	74
Capulin Creek below Base Camp	354526106194400	11/16/2005	15.2	4.31	2.68	10.6	---	70
Turkey Springs	354411106212001	04/28/2005	30.6	7.95	2.15	14.9	---	121
Turkey Springs	354411106212001	08/25/2005	30.2	7.44	2.42	14.8	---	127
Turkey Springs	354411106212001	11/17/2005	29.4	8.02	2.2	16	---	133
Canyon de Chelly National Monument								
Tsaile Lake	361621109121300	04/22/2005	30.7	5	1.57	4.22	---	94
Tsaile Lake	361621109121300	08/23/2005	27.7	4.8	1.59	4.1	---	100
Tsaile Lake	361621109121300	10/19/2005	29.9	5.53	1.93	4.76	---	105
Tsaile Creek below Tsaile Lake	361624109122400	04/22/2005	28.8	4.64	1.56	3.85	---	85

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Calcium, dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Potassium, dissolved (mg/l as K)	Sodium, dissolved (mg/L as Na)	Alkalinity, water filtered, Gran titration, field (mg/L as $CaCO^3$)	Alkalinity, water filtered, incremental equivalence titration, field (mg/L as $CaCO^3$)
Canyon de Chelly National Monument—Continued								
Tsaile Creek below Tsaile Lake	361624109122400	08/23/2005	57.7	12.7	1.73	12.1	---	202
Tsaile Creek below Tsaile Lake	361624109122400	10/19/2005	60.6	13.6	2.25	12	---	227
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	05/10/2005	28.5	4.7	1.5	3.71	---	85
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	12/08/2005	72.1	14.9	4.35	12.3	---	246
Chinle Wash below White House Ruins	360800109282700	04/23/2005	19	3.74	1.37	2.88	---	59
Chinle Wash below White House Ruins	360800109282700	12/07/2005	89.4	24.8	5.15	32.9	---	325
Chinle Creek at Chinle, AZ	9379025	04/23/2005	21.7	4.37	1.49	3.25	---	67
Chinle Creek at Chinle, AZ	9379025	08/17/2005	27.5	4.51	3.6	6.28	---	89
Many Cherry Spring	361008109232801	05/11/2005	103	11	1.26	13.5	---	276
Many Cherry Spring	361008109232801	10/18/2005	75.5	8.94	1.82	8.54	---	179
Bubbling Spring in Spring Canyon	360627109270101	05/12/2005	54.1	11.6	2.09	8.37	---	178
Bubbling Spring in Spring Canyon	360627109270101	07/25/2005	53.9	10.3	2.82	9.1	---	155
Bubbling Spring in Spring Canyon	360627109270101	10/18/2005	59.6	10.3	2.27	6.97	---	186
Pine Tree Canyon Tinaja	361607109210601	05/15/2005	29.6	1.74	1.12	0.99	---	78
Pine Tree Canyon Tinaja	361607109210601	10/20/2005	18.7	1.08	1.35	0.52	---	50
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	159	33	5.49	26.8	---	226
NPS Canyon de Chelly Well No. 2	360847109321201	08/17/2005	144	32.3	5.41	24.6	---	230
NPS Canyon de Chelly Well No. 2	360847109321201	10/19/2005	145	32.2	5.52	23.9	---	224
Chaco Culture National Historical Park								
Chaco Wash at Chaco Canyon National Monument, NM	9367680	5/5/2005	4.14	0.264	1.84	170	---	204
Chaco Wash at Chaco Canyon National Monument, NM	9367680	08/16/2005	3.44	.2	1.76	79.2	---	141
Gambler's Spring	360435107573601	04/12/2005	49.1	15.7	1.05	12.2	---	153
Gambler's Spring	360435107573601	08/17/2005	45.2	15.1	2.41	10.1	---	161
Wijijji Spring	360057107522501	04/12/2005	235	196	2.42	89.1	---	210
Wijijji Spring	360057107522501	08/17/2005	277	196	4.07	96.9	---	106
Wijijji Spring	360057107522501	12/06/2005	208	148	2.4	73.9	---	219
Historic Masonry Well - Middle	360146107551401	04/13/2005	50.3	13.1	3.53	240	---	315
Historic Masonry Well - Middle	360146107551401	08/17/2005	53.1	16.9	2.52	308	---	289
Historic Masonry Well - Middle	360146107551401	12/05/2005	51.5	16.6	2.67	325	---	290
Casa Chiquita Well - Middle	360402107583901	04/13/2005	400	221	3.61	2,070	---	545
Casa Chiquita Well - Middle	360402107583901	08/18/2005	372	200	2.38	1,910	---	459
Casa Chiquita Well - Middle	360402107583901	12/06/2005	375	196	3.59	1,910	---	474

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Calcium, dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Potassium, dissolved (mg/L as K)	Sodium, dissolved (mg/L as Na)	Alkalinity, water filtered, Gran titration, field (mg/L as $CaCO^3$)	Alkalinity, water filtered, incremental equivalence titration, field (mg/L as $CaCO^3$)
El Morro National Monument								
South Side of Historic Pool at El Morro, NM	350225108210601	03/29/2005	11.8	1.16	0.78	0.65	---	34
South Side of Historic Pool at El Morro, NM	350225108210601	08/10/2005	16.9	1.31	1.14	.63	---	56
South Side of Historic Pool at El Morro, NM	350225108210601	12/22/2005	17.2	1.46	1.48	.93	---	48
El Morro Water Supply Well	350246108215001	03/30/2005	32	10.8	3.2	40.8	---	174
El Morro Water Supply Well	350246108215001	08/11/2005	33.6	11.3	3.26	44.1	---	184
El Morro Water Supply Well	350246108215001	12/22/2005	33.2	11	3.28	44	---	165
El Malpais National Monument								
El Malpais Water Supply Well	345934108021501	03/30/2005	66.7	12.3	3.26	15.7	---	214
El Malpais Water Supply Well	345934108021501	08/11/2005	33	11.1	3.19	42.4	---	210
El Malpais Water Supply Well	345934108021501	12/21/2005	66	12.7	3.34	16.3	---	203
Glen Canyon National Recreation Area								
San Juan River near Clay Hills Crossing	371734110235900	05/18/2005	42.4	8.78	1.98	17.4	---	110
San Juan River near Clay Hills Crossing	371734110235900	07/20/2005	54.3	10.9	1.99	25.4	---	99
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	116	28.8	3.23	67	---	174
Lake Canyon at Hole in the Rock Trail	372315110372600	05/17/2005	38.2	16.6	1.8	7.04	---	152
Lake Canyon at Hole in the Rock Trail	372315110372600	07/20/2005	32.6	13	1.24	5.51	---	136
Lake Canyon at Hole in the Rock Trail	372315110372600	12/01/2005	45.8	19.8	2.44	8.11	---	164
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	05/05/2005	155	42.4	6.84	145	---	137
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	202	71.2	8.87	276	---	150
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	12/14/2005	147	38	5.67	116	---	184
Escalante River above Stevens Canyon	372610110585201	06/13/2005	34.4	13.2	2.21	11.6	---	104
Escalante River above Stevens Canyon	372610110585201	09/20/2005	55.6	17.8	2.66	21.5	---	144
Escalante River above Stevens Canyon	372610110585201	11/22/2005	46.5	18.6	2.45	22.9	---	145
Coyote Gulch above Escalante River	372541110591100	06/14/2005	39.5	11.5	1.62	2.62	---	138
Coyote Gulch above Escalante River	372541110591100	09/20/2005	43.1	10.5	1.66	2.22	---	146
Coyote Gulch above Escalante River	372541110591100	11/22/2005	47.9	13	1.6	3.19	---	163
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	05/04/2005	226	200	15.9	508	---	191
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	08/26/2005	274	127	16.1	416	---	250
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	11/29/2005	323	164	14.3	510	---	303
Paria River at Lees Ferry, AZ	9382000	06/27/2005	59.5	39.3	4.58	53.4	---	133
Paria River at Lees Ferry, AZ	9382000	08/24/2005	54.7	20.2	6.27	71	---	114
Paria River at Lees Ferry, AZ	9382000	11/29/2005	72.8	40.5	3.9	68.9	---	160

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Calcium, dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Potassium, dissolved (mg/l as K)	Sodium, dissolved (mg/L as Na)	Alkalinity, water filtered, Gran titration, field (mg/L as $CaCO^3$)	Alkalinity, water filtered, incremental equivalence titration, field (mg/L as $CaCO^3$)
Grand Canyon National Park								
Schmutz Spring	362143112551201	05/26/2005	276	94.1	3.99	19	---	106
Schmutz Spring	362143112551201	09/09/2005	253	87.5	3.56	13.9	---	104
Schmutz Spring	362143112551201	11/30/2005	244	81	3.38	13.9	---	105
Cottonwood Creek North Rim Grand Canyon	361947112550200	05/26/2005	646	256	12.9	63.8	---	197
Cottonwood Creek North Rim Grand Canyon	361947112550200	11/30/2005	516	200	7.51	39	---	199
Saddle Horse Spring	361344113032001	05/24/2005	64.1	36.6	1.42	6.5	---	272
Saddle Horse Spring	361344113032001	09/08/2005	64.1	35.2	1.29	6.4	---	278
Saddle Horse Spring	361344113032001	12/01/2005	53.5	36.5	1.55	7.25	---	263
Buckhorn Spring	362258112464701	05/23/2005	602	217	6.41	22.8	---	148
Buckhorn Spring	362258112464701	11/29/2005	567	172	7.61	17.7	---	165
Hotel Spring	362157112451601	05/23/2005	109	63.3	9.06	31.2	---	216
Hotel Spring	362157112451601	11/29/2005	99.4	60.8	7.87	30	---	242
Santa Maria Spring	360336112131801	06/20/2005	32.9	48.6	4.51	15.9	---	203
Santa Maria Spring	360336112131801	09/29/2005	30.8	42.2	4.38	13.1	---	194
Santa Maria Spring	360336112131801	12/30/2005	30.7	42	4.43	13.9	---	191
Robber's Roost Spring	361650112052001	05/27/2005	25.6	11.7	.59	.76	---	113
Robber's Roost Spring	361650112052001	09/07/2005	51.1	20.9	.51	.84	---	200
Robber's Roost Spring	361650112052001	10/25/2005	51.8	21.4	.55	.87	---	205
Mesa Verde National Park								
U.S. Highway 160 Spring near Park Entrance	372040108245801	05/17/2005	424	348	4.66	541	---	16
U.S. Highway 160 Spring near Park Entrance	372040108245801	09/15/2005	442	414	5.51	764	0	---
U.S. Highway 160 Spring near Park Entrance	372040108245801	11/09/2005	425	396	5.55	783	101	---
Morefield Spring	371415108242301	05/19/2005	33.7	31.5	2.02	624	---	907
Morefield Spring	371415108242301	09/13/2005	23.2	15.1	1.76	636	---	995
Morefield Spring	371415108242301	11/08/2005	21.5	14.4	2.06	650	---	995
Cattail Spring	371607108245501	05/19/2005	719	370	29.6	357	---	400
Spruce Tree House Spring	371105108291501	05/18/2005	61	15.6	1.09	1.87	---	188
Spruce Tree House Spring	371105108291501	09/14/2005	65	16.2	1.03	2.29	---	188
Spruce Tree House Spring	371105108291501	11/09/2005	62.6	17.7	1.08	2.44	---	178
Echo Cliff Drainage Spring	370944108295101	05/18/2005	259	339	13.3	1,040	---	753
Echo Cliff Drainage Spring	370944108295101	09/14/2005	255	269	13.9	988	---	659
Echo Cliff Drainage Spring	370944108295101	11/09/2005	251	268	11.9	1,100	---	665
Long House Spring	371112108320901	05/19/2005	45.8	14.8	.44	4.96	---	154
Long House Spring	371112108320901	09/13/2005	46.2	14.1	.94	4.84	---	156
Long House Spring	371112108320901	11/08/2005	41	14.8	.75	4.78	---	145

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Calcium, dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Potassium, dissolved (mg/L as K)	Sodium, dissolved (mg/L as Na)	Alkalinity, water filtered, Gran titration, field (mg/L as $CaCO^3$)	Alkalinity, water filtered, incremental equivalence titration, field (mg/L as $CaCO^3$)
Mesa Verde National Park—Continued								
Bobcat Spring	371102108313101	05/19/2005	34.9	10.3	0.57	1.98	---	113
Bobcat Spring	371102108313101	09/13/2005	37.3	8.57	.65	1.17	---	130
Bobcat Spring	371102108313101	11/08/2005	37.1	9.18	.64	1.59	---	125
Mancos River at Gaging Station	371648108214500	06/03/2005	35.4	11.1	1.12	9.52	---	69
Mancos River at Gaging Station	371648108214500	09/12/2005	130	40.6	2.62	31.6	---	194
Mancos River at Gaging Station	371648108214500	11/07/2005	174	62.9	2.81	56.1	---	222
Petrified Forest National Park								
Puerco River near Adamana, AZ	9396500	03/21/2005	38.9	7.03	3.51	146	---	165
Puerco River near Adamana, AZ	9396500	08/08/2005	34	5.63	4.5	131	---	170
Kokopelli Spring	345726109471101	03/17/2005	1.61	.095	.82	85.8	---	112
Kokopelli Spring	345726109471101	08/09/2005	11.9	.641	1.84	107	---	197
Kokopelli Spring	345726109471101	10/26/2005	8.32	.511	1.63	90.6	---	166
Puerco Well No. 2	345850109475001	03/17/2005	46.9	13.4	2.35	512	---	494
Puerco Well No. 2	345850109475001	08/09/2005	40.5	10.9	2.03	425	---	484
Puerco Well No. 2	345850109475001	10/26/2005	43.8	11.5	2.31	450	---	520
Petroglyph National Monument								
North Boca Negra Arroyo	350936106431100	9/28/2005	14.8	0.979	4.02	7.99	---	52
North Boca Negra Arroyo	350936106431100	10/4/2005	32.3	2.09	5.54	17.1	---	94
Petroglyph Well 1	350809106424901	06/23/2005	28.3	5.21	8.68	42.6	---	120
Petroglyph Well 1	350809106424901	09/28/2005	28.1	4.86	8.22	38.5	---	121
Petroglyph Well 1	350809106424901	12/13/2005	28.6	5.12	8.81	40.4	---	120
Rainbow Bridge National Monument								
Rainbow Bridge Creek	370439110575400	05/03/2005	46.5	24.7	2.94	15.7	---	191
Rainbow Bridge Creek	370439110575400	08/25/2005	34.2	16.4	3.81	9.17	---	166
Rainbow Bridge Creek	370439110575400	11/30/2005	45.6	23.2	2.84	12.7	---	211
Yucca House National Monument								
Main Yucca House Spring (YUCW06)	371500108410801	05/20/2005	287	89.3	1.38	79.3	---	347
Main Yucca House Spring (YUCW06)	371500108410801	08/30/2005	398	143	5.37	126	---	441
Main Yucca House Spring (YUCW06)	371500108410801	11/03/2005	326	117	2.04	114	---	402

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Bicarbonate, water filtered, Gran titration, field (mg/L as HCO^3)	Bicarbonate, water filtered, incremental equivalence titration, field (mg/L as HCO^3)	Carbonate, water filtered, incremental equivalence titration, field (mg/L as CO^3)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Silica, dissolved (mg/L as SiO^2)
Aztec Ruins National Monument								
Animas River	364958107594500	04/05/2005	---	132	12	7.57	.3	7.3
Animas River	364958107594500	08/31/2005	---	166	3	18.2	.4	5.7
Animas River	364958107594500	11/03/2005	---	144	8	15.1	.4	6.12
Farmer's Ditch	365024107594600	04/05/2005	---	168	---	7.38	.2	7.88
Farmer's Ditch	365024107594600	08/31/2005	---	169	2	17.9	.4	5.91
Farmer's Ditch	365024107594600	11/03/2005	---	143	2	14.5	.4	6.18
Bandelier National Monument								
Rito de los Frijoles near Los Alamos, NM	8313300	04/26/2005	---	32	---	9.74	E.1	41.7
Rito de los Frijoles near Los Alamos, NM	8313300	08/26/2005	---	63	---	5.04	0.1	67.2
Rito de los Frijoles near Los Alamos, NM	8313300	11/18/2005	---	60	---	4.81	.1	68.4
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	---	43	---	10.1	.1	45.9
Rito de los Frijoles at Headquarters Gaging Station	8313350	08/23/2005	---	63	---	6.25	.2	65.4
Rito de los Frijoles at Headquarters Gaging Station	8313350	11/15/2005	---	65	---	5.81	.2	65.6
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	04/29/2005	---	39	---	10.2	.2	48.4
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	08/23/2005	---	71	---	7.12	.2	67.4
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	11/15/2005	---	64	---	6.03	.2	67.4
Frijoles Spring along Rio Grande	354502106152701	04/29/2005	---	86	---	2.11	.5	72.5
Frijoles Spring along Rio Grande	354502106152701	08/23/2005	---	82	---	2.15	.5	70.3
Frijoles Spring along Rio Grande	354502106152701	11/15/2005	---	86	---	2.11	.5	71.5
Alamo Springs Grazing Exclosure	354928106260401	04/27/2005	---	15	---	1.25	<.1	20.8
Alamo Springs Grazing Exclosure	354928106260401	08/24/2005	---	25	---	1.33	<.1	27.1
Alamo Springs Grazing Exclosure	354928106260401	11/16/2005	---	32	---	1.14	<.1	24.8
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	04/26/2005	---	28	---	1.71	E.1	34.3
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	08/26/2005	---	66	---	2.34	.2	55.8
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	11/18/2005	---	61	---	2.42	.2	55.2
Capulin Creek below Base Camp	354526106194400	06/02/2005	---	73	---	2.6	.2	62.4
Capulin Creek below Base Camp	354526106194400	08/24/2005	---	90	---	2.85	.2	57.9
Capulin Creek below Base Camp	354526106194400	11/16/2005	---	85	---	2.79	.2	59
Turkey Springs	354411106212001	04/28/2005	---	148	---	5.5	.3	70.1
Turkey Springs	354411106212001	08/25/2005	---	155	---	4.92	.3	76
Turkey Springs	354411106212001	11/17/2005	---	162	---	5.88	.3	68.4
Canyon de Chelly National Monument								
Tsaile Lake	361621109121300	04/22/2005	---	115	---	2.31	0.1	19.3
Tsaile Lake	361621109121300	08/23/2005	---	108	6	2.27	.1	20.5
Tsaile Lake	361621109121300	10/19/2005	---	118	5	2.48	.1	14.3
Tsaile Creek below Tsaile Lake	361624109122400	04/22/2005	---	104	---	2.13	.1	21.6

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Bicarbonate, water filtered, Gran titration, field (mg/L as HCO^3)	Bicarbonate, water filtered, incremental equivalence titration, field (mg/L as HCO^3)	Carbonate, water filtered, incremental equivalence titration, field (mg/L as CO^3)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Silica, dissolved (mg/L as SiO^2)
Canyon de Chelly National Monument—Continued								
Tsaile Creek below Tsaile Lake	361624109122400	08/23/2005	---	230	8	4.7	0.2	27.6
Tsaile Creek below Tsaile Lake	361624109122400	10/19/2005	---	277	---	5.58	.3	24
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	05/10/2005	---	104	---	2.15	E.1	19
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	12/08/2005	---	299	0	6.27	.2	29.2
Chinle Wash below White House Ruins	360800109282700	04/23/2005	---	72	---	1.82	E.1	16.7
Chinle Wash below White House Ruins	360800109282700	12/07/2005	---	396	---	14.5	.3	31.9
Chinle Creek at Chinle, AZ	9379025	04/23/2005	---	81	---	1.92	.1	18.9
Chinle Creek at Chinle, AZ	9379025	08/17/2005	---	106	1	2.58	.3	14.2
Many Cherry Spring	361008109232801	05/11/2005	---	336	---	25.2	.3	11.2
Many Cherry Spring	361008109232801	10/18/2005	---	218	---	28.8	.3	11.4
Bubbling Spring in Spring Canyon	360627109270101	05/12/2005	---	217	---	5.87	.5	9.21
Bubbling Spring in Spring Canyon	360627109270101	07/25/2005	---	189	0	9.12	.5	10.2
Bubbling Spring in Spring Canyon	360627109270101	10/18/2005	---	226	---	6.49	.5	9.33
Pine Tree Canyon Tinaja	361607109210601	05/15/2005	---	95	---	1.18	E.1	1.62
Pine Tree Canyon Tinaja	361607109210601	10/20/2005	---	61	---	.47	E.1	1.01
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	---	276	---	25.8	.3	14.2
NPS Canyon de Chelly Well No. 2	360847109321201	08/17/2005	---	281	0	25.3	.3	13.9
NPS Canyon de Chelly Well No. 2	360847109321201	10/19/2005	---	273	---	25.4	.3	12.1
Chaco Culture National Historical Park								
Chaco Wash at Chaco Canyon National Monument, NM	9367680	5/5/2005	---	240	4	6.76	1.3	13.4
Chaco Wash at Chaco Canyon National Monument, NM	9367680	08/16/2005	---	170	1	1.89	0.7	10.3
Gambler's Spring	360435107573601	04/12/2005	---	186	---	5.17	.3	15.2
Gambler's Spring	360435107573601	08/17/2005	---	197	---	4.16	.3	23.9
Wijijji Spring	360057107522501	04/12/2005	---	256	---	12.1	.5	18.3
Wijijji Spring	360057107522501	08/17/2005	---	122	3	13.3	.5	20.5
Wijijji Spring	360057107522501	12/06/2005	---	267	---	11.5	.5	14.3
Historic Masonry Well - Middle	360146107551401	04/13/2005	---	384	---	13.2	1.1	13.6
Historic Masonry Well - Middle	360146107551401	08/17/2005	---	352	---	14.4	1.1	12
Historic Masonry Well - Middle	360146107551401	12/05/2005	---	353	---	15.4	1.2	10.7
Casa Chiquita Well - Middle	360402107583901	04/13/2005	---	665	---	59.5	1	13.4
Casa Chiquita Well - Middle	360402107583901	08/18/2005	---	560	---	60.8	1	14.6
Casa Chiquita Well - Middle	360402107583901	12/06/2005	---	578	---	60.8	1.1	14

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Bicarbonate, water filtered, Gran titration, field (mg/L as HCO^3)	Bicarbonate, water filtered, incremental equivalence titration, field (mg/L as HCO^3)	Carbonate, water filtered, incremental equivalence titration, field (mg/L as CO^3)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Silica, dissolved (mg/L as SiO^2)
El Morro National Monument								
South Side of Historic Pool at El Morro, NM	350225108210601	03/29/2005	---	42	---	0.49	0.1	0.66
South Side of Historic Pool at El Morro, NM	350225108210601	08/10/2005	---	67	0	E.11	E.1	1.23
South Side of Historic Pool at El Morro, NM	350225108210601	12/22/2005	---	58	---	.9	.1	2.09
El Morro Water Supply Well	350246108215001	03/30/2005	---	212	---	14.5	.2	36.3
El Morro Water Supply Well	350246108215001	08/11/2005	---	222	1	14.7	.2	33.2
El Morro Water Supply Well	350246108215001	12/22/2005	---	201	---	14.5	.2	34
El Malpais National Monument								
El Malpais Water Supply Well	345934108021501	03/30/2005	---	261	---	6.85	0.8	27.4
El Malpais Water Supply Well	345934108021501	08/11/2005	---	256	0	6.89	.8	33.2
El Malpais Water Supply Well	345934108021501	12/21/2005	---	248	---	7.6	.8	25.6
Glen Canyon National Recreation Area								
San Juan River near Clay Hills Crossing	371734110235900	05/18/2005	---	132	1	5.37	0.2	9.13
San Juan River near Clay Hills Crossing	371734110235900	07/20/2005	---	117	2	10.3	.3	3.65
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	---	193	9	25.3	.4	8.21
Lake Canyon at Hole in the Rock Trail	372315110372600	05/17/2005	---	176	5	4.59	.2	16.4
Lake Canyon at Hole in the Rock Trail	372315110372600	07/20/2005	---	162	2	4	.2	13.4
Lake Canyon at Hole in the Rock Trail	372315110372600	12/01/2005	---	197	2	5.3	.2	15.9
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	05/05/2005	---	164	1	139	.3	18
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	---	178	2	286	.3	18.7
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	12/14/2005	---	202	11	126	.3	29.2
Escalante River above Stevens Canyon	372610110585201	06/13/2005	---	127	---	9.65	.2	19.8
Escalante River above Stevens Canyon	372610110585201	09/20/2005	---	170	3	26.6	.2	23.9
Escalante River above Stevens Canyon	372610110585201	11/22/2005	---	168	4	22.2	.2	22.4
Coyote Gulch above Escalante River	372541110591100	06/14/2005	---	152	8	2.04	.2	10.1
Coyote Gulch above Escalante River	372541110591100	09/20/2005	---	155	12	1.95	.2	8.85
Coyote Gulch above Escalante River	372541110591100	11/22/2005	---	188	6	2.49	.2	9.76
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	05/04/2005	---	227	3	78.7	.6	11.3
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	08/26/2005	---	299	3	57.5	.5	17.5
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	11/29/2005	---	368	0	76.3	.5	14.3
Paria River at Lees Ferry, AZ	9382000	06/27/2005	---	160	1	12.2	.3	13.1
Paria River at Lees Ferry, AZ	9382000	08/24/2005	---	135	2	12.7	.4	10.1
Paria River at Lees Ferry, AZ	9382000	11/29/2005	---	193	1	14.8	.2	10.2

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Bicarbonate, water filtered, Gran titration, field (mg/L as HCO^3)	Bicarbonate, water filtered, incremental equivalence titration, field (mg/L as HCO^3)	Carbonate, water filtered, incremental equivalence titration, field (mg/L as CO^3)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Silica, dissolved (mg/L as SiO^2)
Grand Canyon National Park								
Schmutz Spring	362143112551201	05/26/2005	---	129	---	30.6	0.6	12.3
Schmutz Spring	362143112551201	09/09/2005	---	127	---	21.8	.5	13.2
Schmutz Spring	362143112551201	11/30/2005	---	128	---	19.9	.6	11.2
Cottonwood Creek North Rim Grand Canyon	361947112550200	05/26/2005	---	240	---	62.8	.9	20.1
Cottonwood Creek North Rim Grand Canyon	361947112550200	11/30/2005	---	242	---	34.3	.7	15.4
Saddle Horse Spring	361344113032001	05/24/2005	---	331	---	7.67	.2	12.3
Saddle Horse Spring	361344113032001	09/08/2005	---	339	---	8.54	.1	11.9
Saddle Horse Spring	361344113032001	12/01/2005	---	313	4	9.03	.2	11.9
Buckhorn Spring	362258112464701	05/23/2005	---	181	---	22.6	.4	16.6
Buckhorn Spring	362258112464701	11/29/2005	---	202	---	19	.4	15
Hotel Spring	362157112451601	05/23/2005	---	264	---	52.7	.4	10.4
Hotel Spring	362157112451601	11/29/2005	---	274	10	53.1	.5	11.5
Santa Maria Spring	360336112131801	06/20/2005	---	248	---	39.3	.5	12.3
Santa Maria Spring	360336112131801	09/29/2005	---	237	---	31.5	.5	12.2
Santa Maria Spring	360336112131801	12/30/2005	---	232	---	29.2	.5	12.5
Robber's Roost Spring	361650112052001	05/27/2005	---	138	---	0.62	E.1	5.08
Robber's Roost Spring	361650112052001	09/07/2005	---	244	---	.87	E.1	4.89
Robber's Roost Spring	361650112052001	10/25/2005	---	250	---	.77	.1	5.06
Mesa Verde National Park								
U.S. Highway 160 Spring near Park Entrance	372040108245801	05/17/2005	---	20	---	198	2.7	29.5
U.S. Highway 160 Spring near Park Entrance	372040108245801	09/15/2005	2	---	---	162	2.6	25.3
U.S. Highway 160 Spring near Park Entrance	372040108245801	11/09/2005	123	---	---	163	2.4	24.6
Morefield Spring	371415108242301	05/19/2005	---	1,110	---	23.8	0.9	12.9
Morefield Spring	371415108242301	09/13/2005	---	1,210	---	19.7	.8	10.1
Morefield Spring	371415108242301	11/08/2005	---	1,180	17	20.3	.8	10.3
Cattail Spring	371607108245501	05/19/2005	---	488	---	86.9	.2	8.04
Spruce Tree House Spring	371105108291501	05/18/2005	---	229	---	1.14	E.1	11.6
Spruce Tree House Spring	371105108291501	09/14/2005	---	227	1	1.39	.1	12.8
Spruce Tree House Spring	371105108291501	11/09/2005	---	216	---	1.33	.1	13.4
Echo Cliff Drainage Spring	370944108295101	05/18/2005	---	919	---	68.6	.7	9.93
Echo Cliff Drainage Spring	370944108295101	09/14/2005	---	799	2	63.9	.7	11
Echo Cliff Drainage Spring	370944108295101	11/09/2005	---	811	---	65.9	.7	11.1
Long House Spring	371112108320901	05/19/2005	---	187	---	3.14	.1	15.9
Long House Spring	371112108320901	09/13/2005	---	188	1	3.69	.1	15.5
Long House Spring	371112108320901	11/08/2005	---	163	7	4.15	E.1	10.5

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Bicarbonate, water filtered, Gran titration, field (mg/L as HCO^3)	Bicarbonate, water filtered, incremental equivalence titration, field (mg/L as HCO^3)	Carbonate, water filtered, incremental equivalence titration, field (mg/L as CO^3)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Silica, dissolved (mg/L as SiO^2)
Mesa Verde National Park—Continued								
Bobcat Spring	371102108313101	05/19/2005	---	138	---	0.81	.1	10.1
Bobcat Spring	371102108313101	09/13/2005	---	157	0	.8	.1	10.3
Bobcat Spring	371102108313101	11/08/2005	---	153	---	.84	E.1	9.89
Mancos River at Gaging Station	371648108214500	06/03/2005	---	84	---	1.62	.1	8.01
Mancos River at Gaging Station	371648108214500	09/12/2005	---	183	26	5.84	.2	10.4
Mancos River at Gaging Station	371648108214500	11/7/2005	---	247	12	9.07	.2	9.4
Petrified Forest National Park								
Puerco River near Adamana, AZ	9396500	03/21/2005	---	201	---	59.6	0.8	8.19
Puerco River near Adamana, AZ	9396500	08/08/2005	---	205	0	39.6	.9	8.74
Kokopelli Spring	345726109471101	03/17/2005	---	107	14	5.85	.6	7.2
Kokopelli Spring	345726109471101	08/09/2005	---	226	7	10.3	.6	8.59
Kokopelli Spring	345726109471101	10/26/2005	---	202	---	9.24	.7	10.8
Puerco Well No. 2	345850109475001	03/17/2005	---	603	---	331	1.2	17
Puerco Well No. 2	345850109475001	08/09/2005	---	585	2	299	1.2	15.4
Puerco Well No. 2	345850109475001	10/26/2005	---	634	---	293	1.2	15.8
Petroglyph National Monument								
North Boca Negra Arroyo	350936106431100	09/28/2005	---	64	---	3.3	0.1	3.44
North Boca Negra Arroyo	350936106431100	10/4/2005	---	115	---	12.7	.2	7.16
Petroglyph Well 1	350809106424901	06/23/2005	---	147	---	12.9	.8	81
Petroglyph Well 1	350809106424901	09/28/2005	---	148	---	13.2	.8	75.4
Petroglyph Well 1	350809106424901	12/13/2005	---	146	---	13.2	.8	77
Rainbow Bridge National Monument								
Rainbow Bridge Creek	370439110575400	05/03/2005	---	222	5	11.5	0.3	11.1
Rainbow Bridge Creek	370439110575400	08/25/2005	---	199	2	7.89	.3	8.45
Rainbow Bridge Creek	370439110575400	11/30/2005	---	251	3	10.3	.2	10.4
Yucca House National Monument								
Main Yucca House Spring (YUCW06)	371500108410801	05/20/2005	---	424	---	40.3	0.4	23.1
Main Yucca House Spring (YUCW06)	371500108410801	08/30/2005	---	537	0	104	.4	25.8
Main Yucca House Spring (YUCW06)	371500108410801	11/03/2005	---	491	---	66.8	.4	25.8

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Sulfate, dissolved (mg/L as SO_4)	Dissolved Solids, residue at 180°C (mg/L)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, nitrite + nitrate, dissolved (mg/L as N)	Nitrogen, nitrite, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)
Aztec Ruins National Monument								
Animas River	364958107594500	04/05/2005	70.3	263	E.03	0.18	<.008	<0.02
Animas River	364958107594500	08/31/2005	119	342	<.04	<.06	<.008	<.02
Animas River	364958107594500	11/03/2005	119	321	<.04	<.06	<.008	<.18
Farmer's Ditch	365024107594600	04/05/2005	68.8	256	<.04	.18	<.008	<.02
Farmer's Ditch	365024107594600	08/31/2005	113	339	<.04	<.06	<.008	<.02
Farmer's Ditch	365024107594600	11/03/2005	114	317	<.04	<.06	<.008	<.18
Bandelier National Monument								
Rito de los Frijoles near Los Alamos, NM	8313300	04/26/2005	5.6	120	<0.04	<0.06	<.008	<0.02
Rito de los Frijoles near Los Alamos, NM	8313300	08/26/2005	2.1	131	<.04	.08	<.008	<.02
Rito de los Frijoles near Los Alamos, NM	8313300	11/18/2005	2	128	<.04	.12	<.008	.02
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	5.9	122	<.04	<.06	<.008	<.02
Rito de los Frijoles at Headquarters Gaging Station	8313350	08/23/2005	2.3	137	<.04	<.06	<.008	<.02
Rito de los Frijoles at Headquarters Gaging Station	8313350	11/15/2005	2.1	126	<.04	<.06	<.008	.02
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	04/29/2005	5.2	129	<.04	<.06	<.008	E.01
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	08/23/2005	2.4	151	<.04	<.06	<.008	E.01
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	11/15/2005	2.2	141	<.04	<.06	<.008	.03
Frijoles Spring along Rio Grande	354502106152701	04/29/2005	1.8	156	<.04	.4	<.008	.03
Frijoles Spring along Rio Grande	354502106152701	08/23/2005	2.2	146	<.04	.24	<.008	<.02
Frijoles Spring along Rio Grande	354502106152701	11/15/2005	2.2	146	.11	.31	<.008	.04
Alamo Springs Grazing Exclosure	354928106260401	04/27/2005	4.5	89	<.04	E.04	<.008	<.02
Alamo Springs Grazing Exclosure	354928106260401	08/24/2005	5.4	71	<.04	.12	<.008	<.02
Alamo Springs Grazing Exclosure	354928106260401	11/16/2005	3.9	61	<.04	.24	<.008	<.04
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	04/26/2005	7	89	<.04	<.06	<.008	<.02
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	08/26/2005	5.8	139	<.04	<.06	<.008	<.02
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	11/18/2005	5.4	126	<.04	<.06	<.008	.04
Capulin Creek below Base Camp	354526106194400	06/02/2005	8.8	148	<.04	<.06	<.008	.05
Capulin Creek below Base Camp	354526106194400	08/24/2005	5.6	149	<.04	<.06	<.008	.06
Capulin Creek below Base Camp	354526106194400	11/16/2005	4.7	147	<.04	<.06	<.008	.03
Turkey Springs	354411106212001	04/28/2005	8.6	224	<.04	<.06	<.008	.08
Turkey Springs	354411106212001	08/25/2005	4.7	222	<.04	<.06	<.008	.05
Turkey Springs	354411106212001	11/17/2005	8.4	220	<.04	<.06	<.008	.09
Canyon de Chelly National Monument								
Tsaile Lake	361621109121300	04/22/2005	5.2	135	E0.02	0.06	<0.008	E0.01
Tsaile Lake	361621109121300	08/23/2005	4.6	137	E.02	<.06	<.008	.02
Tsaile Lake	361621109121300	10/19/2005	4.8	142	<.04	<.06	E.004	E.01
Tsaile Creek below Tsaile Lake	361624109122400	04/22/2005	5.1	161	E.03	.07	E.007	.04

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Sulfate, dissolved (mg/L as SO_4)	Dissolved Solids, residue at 180°C (mg/L)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, nitrite + nitrate, dissolved (mg/L as N)	Nitrogen, nitrite, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)
Canyon de Chelly National Monument—Continued								
Tsaile Creek below Tsaile Lake	361624109122400	08/23/2005	7.7	254	<0.04	<0.06	<0.008	0.07
Tsaile Creek below Tsaile Lake	361624109122400	10/19/2005	9.5	276	E.03	<.06	<.008	.02
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	05/10/2005	6.7	138	<.04	<.06	<.008	E.02
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	12/08/2005	21.2	338	<.04	<.06	<.008	<.02
Chinle Wash below White House Ruins	360800109282700	04/23/2005	5.1	97	<.04	E.04	<.008	.05
Chinle Wash below White House Ruins	360800109282700	12/07/2005	54.6	487	<.04	<.06	<.008	<.02
Chinle Creek at Chinle, AZ	9379025	04/23/2005	5.6	100	<.04	E.04	<.008	.05
Chinle Creek at Chinle, AZ	9379025	08/17/2005	6.2	140	<.04	.15	<.008	.06
Many Cherry Spring	361008109232801	05/11/2005	15.1	360	<.04	<.06	<.008	<.02
Many Cherry Spring	361008109232801	10/18/2005	29.8	279	<.04	.21	<.008	E.02
Bubbling Spring in Spring Canyon	360627109270101	05/12/2005	14.8	207	<.04	<.06	<.008	<.02
Bubbling Spring in Spring Canyon	360627109270101	07/25/2005	22.8	232	<.04	<.06	<.008	<.02
Bubbling Spring in Spring Canyon	360627109270101	10/18/2005	12.3	222	<.04	<.06	<.008	<.02
Pine Tree Canyon Tinaja	361607109210601	05/15/2005	2.8	108	<.04	<.06	<.008	<.02
Pine Tree Canyon Tinaja	361607109210601	10/20/2005	2.3	65	<.04	<.06	<.008	<.02
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	285	709	E.02	.31	<.008	<.02
NPS Canyon de Chelly Well No. 2	360847109321201	08/17/2005	266	684	<.04	.32	<.008	<.02
NPS Canyon de Chelly Well No. 2	360847109321201	10/19/2005	268	665	E.03	.34	<.008	<.02
Chaco Culture National Historical Park								
Chaco Wash at Chaco Canyon National Monument, NM	9367680	5/5/2005	138	504	1.02	4.98	0.013	0.18
Chaco Wash at Chaco Canyon National Monument, NM	9367680	08/16/2005	52.3	255	<0.04	0.81	.01	.06
Gambler's Spring	360435107573601	04/12/2005	48.4	247	<.04	.31	<.008	<.02
Gambler's Spring	360435107573601	08/17/2005	24.1	231	.15	.97	<.008	.07
Wijijji Spring	360057107522501	04/12/2005	1,240	2,070	<.04	<.06	<.008	<.02
Wijijji Spring	360057107522501	08/17/2005	1,420	2,270	<.04	<.06	<.008	<.02
Wijijji Spring	360057107522501	12/06/2005	1,140	1,940	.06	<.06	<.008	<.02
Historic Masonry Well - Middle	360146107551401	04/13/2005	355	894	.34	.42	E.004	<.02
Historic Masonry Well - Middle	360146107551401	08/17/2005	540	1,130	.1	.57	E.006	<.02
Historic Masonry Well - Middle	360146107551401	12/05/2005	569	1,170	.09	.44	E.006	<.02
Casa Chiquita Well - Middle	360402107583901	04/13/2005	5,390	8,680	.16	<.06	<.008	<.02
Casa Chiquita Well - Middle	360402107583901	08/18/2005	5,230	8,370	.09	<.06	<.008	<.02
Casa Chiquita Well - Middle	360402107583901	12/06/2005	5,140	8,400	.09	<.06	<.008	<.02

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Sulfate, dissolved (mg/L as SO_4)	Dissolved Solids, residue at 180°C (mg/L)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, nitrite + nitrate, dissolved (mg/L as N)	Nitrogen, nitrite, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)
El Morro National Monument								
South Side of Historic Pool at El Morro, NM	350225108210601	03/29/2005	1.2	48	<0.04	<0.06	<0.008	<0.02
South Side of Historic Pool at El Morro, NM	350225108210601	08/10/2005	0.8	57	<.04	<.06	<.008	<.02
South Side of Historic Pool at El Morro, NM	350225108210601	12/22/2005	1.8	58	.13	.07	<.008	<.02
El Morro Water Supply Well	350246108215001	03/30/2005	14.3	257	<.04	2.15	<.008	.04
El Morro Water Supply Well	350246108215001	08/11/2005	15.8	268	<.04	2.15	<.008	.04
El Morro Water Supply Well	350246108215001	12/22/2005	15.6	255	<.04	2.15	<.008	.04
El Malpais National Monument								
El Malpais Water Supply Well	345934108021501	03/30/2005	13.8	276	<0.04	0.43	<0.008	0.1
El Malpais Water Supply Well	345934108021501	08/11/2005	14.8	270	<.04	.43	<.008	.1
El Malpais Water Supply Well	345934108021501	12/21/2005	14.7	265	<.04	.43	<.008	.1
Glen Canyon National Recreation Area								
San Juan River near Clay Hills Crossing	371734110235900	05/18/2005	71.8	224	<0.04	0.23	<0.008	<0.02
San Juan River near Clay Hills Crossing	371734110235900	07/20/2005	123	307	<.04	<.06	<.008	<.02
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	316	716	<.04	.54	<.008	<.02
Lake Canyon at Hole in the Rock Trail	372315110372600	05/17/2005	20.3	213	.08	.46	.026	.07
Lake Canyon at Hole in the Rock Trail	372315110372600	07/20/2005	13.7	183	<.04	.48	.031	.07
Lake Canyon at Hole in the Rock Trail	372315110372600	12/01/2005	36.7	244	<.04	.86	.012	.04
Dirty Devil River above Poison Spring near Hanksville, UT	9333500	05/05/2005	534	1,220	<.04	.08	<.008	<.02
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	824	1,910	<.04	<.06	<.008	<.02
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	12/14/2005	412	1,050	E.02	.63	<.008	<.02
Escalante River above Stevens Canyon	372610110585201	06/13/2005	32.9	204	<.04	.07	<.008	<.02
Escalante River above Stevens Canyon	372610110585201	09/20/2005	67.8	312	<.04	<.06	<.008	E.01
Escalante River above Stevens Canyon	372610110585201	11/22/2005	65	293	<.04	.07	<.008	<.02
Coyote Gulch above Escalante River	372541110591100	06/14/2005	9	152	<.04	<.06	<.008	<.02
Coyote Gulch above Escalante River	372541110591100	09/20/2005	8.7	167	<.04	<.06	<.008	<.02
Coyote Gulch above Escalante River	372541110591100	11/22/2005	11.1	189	<.04	.07	<.008	<.02
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	05/04/2005	1,890	3,390	<.04	.11	<.008	<.02
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	08/26/2005	1,680	2,990	<.04	<.06	<.008	<.02
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	11/29/2005	2,080	3,650	E.02	<.06	<.008	<.02
Paria River at Lees Ferry, AZ	9382000	06/27/2005	260	557	<.04	1.16	<.008	<.02
Paria River at Lees Ferry, AZ	9382000	08/24/2005	237	512	<.04	1.04	.01	<.02
Paria River at Lees Ferry, AZ	9382000	11/29/2005	308	671	<.04	1.01	<.008	<.02

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Sulfate, dissolved (mg/L as SO_4)	Dissolved Solids, residue at 180°C (mg/L)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, nitrite + nitrate, dissolved (mg/L as N)	Nitrogen, nitrite, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)
Grand Canyon National Park								
Schmutz Spring	362143112551201	05/26/2005	905	1,540	E0.03	0.84	<0.008	<0.02
Schmutz Spring	362143112551201	09/09/2005	808	1,370	<.04	.76	<.008	<.09
Schmutz Spring	362143112551201	11/30/2005	787	1,300	<.04	.8	<.008	<.02
Cottonwood Creek North Rim Grand Canyon	361947112550200	05/26/2005	2,410	4,040	E.03	<.06	<.008	<.02
Cottonwood Creek North Rim Grand Canyon	361947112550200	11/30/2005	1,950	3,210	<.04	<.06	<.008	<.02
Saddle Horse Spring	361344113032001	05/24/2005	29	331	<.04	1.19	<.008	<.02
Saddle Horse Spring	361344113032001	09/08/2005	29.6	331	<.04	.98	<.008	<.02
Saddle Horse Spring	361344113032001	12/01/2005	30.4	290	<.04	.9	<.008	<.02
Buckhorn Spring	362258112464701	05/23/2005	2,070	3,330	E.02	.65	<.008	<.02
Buckhorn Spring	362258112464701	11/29/2005	1,910	3140	<.04	2.04	.04	<.02
Hotel Spring	362157112451601	05/23/2005	277	722	<.04	.27	<.008	<.02
Hotel Spring	362157112451601	11/29/2005	238	677	<.04	.7	<.008	<.02
Santa Maria Spring	360336112131801	06/20/2005	37	355	<.04	1.4	<.008	<.02
Santa Maria Spring	360336112131801	09/29/2005	28	282	<.04	1.28	<.008	<.02
Santa Maria Spring	360336112131801	12/30/2005	25.8	284	<.04	1.22	<.008	<.02
Robber's Roost Spring	361650112052001	05/27/2005	1.9	119	<.04	<.06	<.008	.05
Robber's Roost Spring	361650112052001	09/07/2005	2.4	199	<.04	.06	<.008	.06
Robber's Roost Spring	361650112052001	10/25/2005	2.1	189	<.04	.09	<.008	.09
Mesa Verde National Park								
U.S. Highway 160 Spring near Park Entrance	372040108245801	05/17/2005	3,540	5,880	<0.04	9.12	<0.008	E0.02
U.S. Highway 160 Spring near Park Entrance	372040108245801	09/15/2005	4,170	6,790	<.04	9.77	E.004	.02
U.S. Highway 160 Spring near Park Entrance	372040108245801	11/09/2005	4,200	6,530	<.04	8.43	<.008	.02
Morefield Spring	371415108242301	05/19/2005	528	1850	<.04	0.44	<.008	---
Morefield Spring	371415108242301	09/13/2005	587	1930	<.04	.08	E.004	<.02
Morefield Spring	371415108242301	11/08/2005	601	1990	<.04	.09	<.008	<.02
Cattail Spring	371607108245501	05/19/2005	3320	5520	.21	<.06	<.008	<.02
Spruce Tree House Spring	371105108291501	05/18/2005	24.4	244	<.04	1.62	<.008	<.02
Spruce Tree House Spring	371105108291501	09/14/2005	31.5	243	<.04	1.99	<.008	<.02
Spruce Tree House Spring	371105108291501	11/09/2005	32.7	242	<.04	1.51	<.008	<.02
Echo Cliff Drainage Spring	370944108295101	05/18/2005	3,250	5,700	<.04	<.06	<.008	.02
Echo Cliff Drainage Spring	370944108295101	09/14/2005	2,930	5,000	.27	.11	.019	.02
Echo Cliff Drainage Spring	370944108295101	11/09/2005	3,080	5,290	<.04	<.06	<.008	<.04
Long House Spring	371112108320901	05/19/2005	15	201	<.04	E.04	<.008	<.02
Long House Spring	371112108320901	09/13/2005	16.3	200	E.03	.19	E.004	E.01
Long House Spring	371112108320901	11/08/2005	16.9	179	<.04	.07	<.008	<.04

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Sulfate, dissolved (mg/L as SO_4)	Dissolved Solids, residue at 180°C (mg/L)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, nitrite + nitrate, dissolved (mg/L as N)	Nitrogen, nitrite, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)
Mesa Verde National Park—Continued								
Bobcat Spring	371102108313101	05/19/2005	7.1	137	<0.04	0.37	<0.008	0.02
Bobcat Spring	371102108313101	09/13/2005	8	130	<.04	.43	E.005	.04
Bobcat Spring	371102108313101	11/08/2005	8.3	144	<.04	.42	<.008	E.03
Mancos River at Gaging Station	371648108214500	06/03/2005	77.4	196	<.04	.1	<.008	<.02
Mancos River at Gaging Station	371648108214500	09/12/2005	334	705	<.04	<.06	<.008	<.02
Mancos River at Gaging Station	371648108214500	11/07/2005	540	1,010	<.04	<.06	<.008	<.04
Petrified Forest National Park								
Puerco River near Adamana, AZ	9396500	03/21/2005	169	573	E0.03	2.43	E0.007	<0.02
Puerco River near Adamana, AZ	9396500	08/08/2005	270	699	.06	1.7	.054	<.02
Kokopelli Spring	345726109471101	03/17/2005	59.4	272	E.04	1.74	.009	<.02
Kokopelli Spring	345726109471101	08/09/2005	75.2	357	<.04	<.06	<.008	<.02
Kokopelli Spring	345726109471101	10/26/2005	44.5	282	E.03	E.03	E.005	.02
Puerco Well No. 2	345850109475001	03/17/2005	300	1,550	.53	<.06	<.008	.05
Puerco Well No. 2	345850109475001	08/09/2005	284	1,450	.54	<.06	<.008	.07
Puerco Well No. 2	345850109475001	10/26/2005	285	1,450	.56	<.06	<.008	.11
Petroglyph National Monument								
North Boca Negra Arroyo	350936106431100	09/28/2005	3.1	83	0.15	0.29	0.014	0.07
North Boca Negra Arroyo	350936106431100	10/04/2005	7.7	188	.07	.34	.013	.03
Petroglyph Well 1	350809106424901	06/23/2005	48.8	302	<.04	.62	<.008	<.02
Petroglyph Well 1	350809106424901	09/28/2005	49.6	301	<.04	.69	<.008	<.02
Petroglyph Well 1	350809106424901	12/13/2005	48.6	299	<.04	.69	<.008	E.01
Rainbow Bridge National Monument								
Rainbow Bridge Creek	370439110575400	05/3/2005	31.4	262	<0.04	<0.06	<.008	<0.02
Rainbow Bridge Creek	370439110575400	08/25/2005	7.2	202	E.04	<.06	<.008	<.02
Rainbow Bridge Creek	370439110575400	11/30/2005	23.2	255	<.04	E.06	<.008	<.02
Yucca House National Monument								
Main Yucca House Spring (YUCW06)	371500108410801	05/20/2005	809	1,700	<0.04	2.64	<0.008	<0.02
Main Yucca House Spring (YUCW06)	371500108410801	08/30/2005	1,390	2,770	.09	.73	.01	<.02
Main Yucca House Spring (YUCW06)	371500108410801	11/03/2005	1,120	2,190	<.04	.76	E.004	<.18

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	*E. coli* (colonies per 100 ml)	Aluminum, dissolved (µg/L as Al)	Antimony, dissolved (µg/L as Sb)	Arsenic, dissolved (µ/L as As)	Barium, dissolved (µg/L as Ba)	Beryllium, dissolved (µg/L as Be)
Aztec Ruins National Monument								
Animas River	364958107594500	04/05/2005	---	17	E0.10	0.4	98	<0.06
Animas River	364958107594500	08/31/2005	---	9	E.16	.5	81	<.06
Animas River	364958107594500	11/03/2005	---	18	<.20	.39	88	<.06
Farmer's Ditch	365024107594600	04/05/2005	---	156	E.12	.5	104	<.06
Farmer's Ditch	365024107594600	08/31/2005	---	11	E.17	.5	89	<.06
Farmer's Ditch	365024107594600	11/03/2005	---	17	E.13	.25	87	<.06
Bandelier National Monument								
Rito de los Frijoles near Los Alamos, NM	8313300	04/26/2005	---	6	<0.20	0.4	19	<0.06
Rito de los Frijoles near Los Alamos, NM	8313300	08/26/2005	---	4	<.20	.7	12	<.06
Rito de los Frijoles near Los Alamos, NM	8313300	11/18/2005	---	2	<.20	.64	11	<.06
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	E4	6	<.20	.5	18	E.03
Rito de los Frijoles at Headquarters Gaging Station	8313350	08/23/2005	32	5	<.20	.9	15	<.06
Rito de los Frijoles at Headquarters Gaging Station	8313350	11/15/2005	E2	3	<.20	.59	12	<.06
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	04/29/2005	0	10	<.20	.5	18	<.06
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	08/23/2005	E8	7	<.20	1	18	<.06
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	11/15/2005	E2	3	<.20	.63	13	<.06
Frijoles Spring along Rio Grande	354502106152701	04/29/2005	---	3	<.20	1.7	11	<.06
Frijoles Spring along Rio Grande	354502106152701	08/23/2005	---	E1	<.20	1.6	11	<.06
Frijoles Spring along Rio Grande	354502106152701	11/15/2005	---	2	<.20	1.6	17	<.06
Alamo Springs Grazing Exclosure	354928106260401	04/27/2005	E1	25	<.20	.2	23	E.04
Alamo Springs Grazing Exclosure	354928106260401	08/24/2005	30	49	<.20	E.2	34	.09
Alamo Springs Grazing Exclosure	354928106260401	11/16/2005	E13	21	<.20	.14	29	E.04
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	04/26/2005	---	15	<.20	.4	18	<.06
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	08/26/2005	---	7	<.20	.8	23	E.03
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	11/18/2005	---	3	<.20	.57	19	<.06
Capulin Creek below Base Camp	354526106194400	06/02/2005	E1	4	<.20	1.3	43	<.06
Capulin Creek below Base Camp	354526106194400	08/24/2005	32	6	<.20	2	47	<.06
Capulin Creek below Base Camp	354526106194400	11/16/2005	E4	7	<.20	1.3	41	<.06
Turkey Springs	354411106212001	04/28/2005	---	3	<.20	2.2	37	<.06
Turkey Springs	354411106212001	08/25/2005	---	2	<.20	2.4	38	<.06
Turkey Springs	354411106212001	11/17/2005	---	2	<.20	2.2	34	<.06
Canyon de Chelly National Monument								
Tsaile Lake	361621109121300	04/22/2005	E18	E2	<0.20	0.9	90	<0.06
Tsaile Lake	361621109121300	08/23/2005	---	77	E.12	2.4	82	<.06
Tsaile Lake	361621109121300	10/19/2005	E11	E1	E.10	2.2	86	<.06
Tsaile Creek below Tsaile Lake	361624109122400	04/22/2005	E29	336	<.20	1	87	E.05

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	*E. coli* (colonies per 100 ml)	Aluminum, dissolved (µg/L as Al)	Antimony, dissolved (µg/L as Sb)	Arsenic, dissolved (µ/L as As)	Barium, dissolved (µg/L as Ba)	Beryllium, dissolved (µg/L as Be)
Canyon de Chelly National Monument—Continued								
Tsaile Creek below Tsaile Lake	361624109122400	08/23/2005	---	2	<0.20	5	208	<0.06
Tsaile Creek below Tsaile Lake	361624109122400	10/19/2005	E6	M	<.20	2.8	352	<.06
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	05/10/2005	280	2	<.20	1.4	101	<.06
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	12/08/2005	---	E1	E.15	3.3	224	E.03
Chinle Wash below White House Ruins	360800109282700	04/23/2005	E41	3	<.20	1.1	61	<.06
Chinle Wash below White House Ruins	360800109282700	12/07/2005	---	2	<.20	2.4	303	E.03
Chinle Creek at Chinle, AZ	9379025	04/23/2005	E100	3	E.10	1.5	73	<.06
Chinle Creek at Chinle, AZ	9379025	08/17/2005	---	8	E.19	3.4	95	<.06
Many Cherry Spring	361008109232801	05/11/2005	---	E1	<.20	1.1	282	<.06
Many Cherry Spring	361008109232801	10/18/2005	---	M	<.20	3.9	225	E.04
Bubbling Spring in Spring Canyon	360627109270101	05/12/2005	---	3	<.20	0.6	256	<.06
Bubbling Spring in Spring Canyon	360627109270101	07/25/2005	---	<2	<.20	.7	246	<.06
Bubbling Spring in Spring Canyon	360627109270101	10/18/2005	---	3	<.20	.74	241	<.06
Pine Tree Canyon Tinaja	361607109210601	05/15/2005	---	10	<.20	1.3	92	<.06
Pine Tree Canyon Tinaja	361607109210601	10/20/2005	---	12	<.20	.7	50	<.06
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	---	<2	<.20	.8	36	<.06
NPS Canyon de Chelly Well No. 2	360847109321201	08/17/2005	---	<2	<.20	.5	43	<.06
NPS Canyon de Chelly Well No. 2	360847109321201	10/19/2005	<1	<2	<.20	.44	37	<.06
Chaco Culture National Historical Park								
Chaco Wash at Chaco Canyon National Monument, NM	9367680	5/5/2005	---	459	0.52	14.2	21	<0.06
Chaco Wash at Chaco Canyon National Monument, NM	9367680	08/16/2005	---	10	.37	6.5	14	E.03
Gambler's Spring	360435107573601	04/12/2005	---	4	<.20	0.4	50	<.06
Gambler's Spring	360435107573601	08/17/2005	---	61	<.20	1.7	51	<.06
Wijijji Spring	360057107522501	04/12/2005	---	3	<.20	.4	5	<.06
Wijijji Spring	360057107522501	08/17/2005	---	3	E.11	.7	8	<.06
Wijijji Spring	360057107522501	12/06/2005	---	2	<.20	E.07	9	E.04
Historic Masonry Well - Middle	360146107551401	04/13/2005	---	184	.33	3.9	140	<.06
Historic Masonry Well - Middle	360146107551401	08/17/2005	---	E1	<.20	2.3	39	<.06
Historic Masonry Well - Middle	360146107551401	12/05/2005	---	E1	<.20	.3	38	E.03
Casa Chiquita Well - Middle	360402107583901	04/13/2005	---	<6	<.80	<.8	<0.8	<.24
Casa Chiquita Well - Middle	360402107583901	08/18/2005	---	<6	<.80	2.7	11	<.24
Casa Chiquita Well - Middle	360402107583901	12/06/2005	---	<6	<.80	.38	13	.92

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	*E. coli* (colonies per 100 ml)	Aluminum, dissolved (µg/L as Al)	Antimony, dissolved (µg/L as Sb)	Arsenic, dissolved (µ/L as As)	Barium, dissolved (µg/L as Ba)	Beryllium, dissolved (µg/L as Be)
El Morro National Monument								
South Side of Historic Pool at El Morro, NM	350225108210601	03/29/2005	---	3	<.20	.3	50	<.06
South Side of Historic Pool at El Morro, NM	350225108210601	08/10/2005	---	3	<.20	.4	52	<.06
South Side of Historic Pool at El Morro, NM	350225108210601	12/22/2005	---	E1	<.20	.29	85	<.06
El Morro Water Supply Well	350246108215001	03/30/2005	---	3	<.20	1.1	20	<.06
El Morro Water Supply Well	350246108215001	08/11/2005	---	3	<.20	1	20	<.06
El Morro Water Supply Well	350246108215001	12/22/2005	---	2	<.20	1.1	23	<.06
El Malpais National Monument								
El Malpais Water Supply Well	345934108021501	03/30/2005	---	<2	<0.20	7.7	178	<0.06
El Malpais Water Supply Well	345934108021501	08/11/2005	---	<2	<.20	8.3	169	<.06
El Malpais Water Supply Well	345934108021501	12/21/2005	---	<2	<.20	8.2	178	<.06
Glen Canyon National Recreation Area								
San Juan River near Clay Hills Crossing	371734110235900	05/18/2005	---	6	E0.15	0.7	68	<0.06
San Juan River near Clay Hills Crossing	371734110235900	07/20/2005	---	19	.2	.7	92	<.06
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	---	2	<.20	.64	121	.13
Lake Canyon at Hole in the Rock Trail	372315110372600	05/17/2005	---	6	E.13	.7	67	<.06
Lake Canyon at Hole in the Rock Trail	372315110372600	07/20/2005	---	3	<.20	3.1	85	<.06
Lake Canyon at Hole in the Rock Trail	372315110372600	12/01/2005	---	2	E.13	2.6	102	<.06
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	05/05/2005	---	3	.24	3.1	80	<.06
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	---	19	E.20	.8	91	<.12
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	12/14/2005	---	M	E.16	3.1	39	<.06
Escalante River above Stevens Canyon	372610110585201	06/13/2005	---	4	E.12	2.5	63	<.06
Escalante River above Stevens Canyon	372610110585201	09/20/2005	---	4	<.20	4.2	69	<.06
Escalante River above Stevens Canyon	372610110585201	11/22/2005	---	E1	<.20	2.3	70	<.06
Coyote Gulch above Escalante River	372541110591100	06/14/2005	---	2	<.20	1.9	219	<.06
Coyote Gulch above Escalante River	372541110591100	09/20/2005	---	E2	<.20	1.6	200	<.06
Coyote Gulch above Escalante River	372541110591100	11/22/2005	---	M	<.20	.92	184	<.06
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	05/04/2005	---	4	E.26	1.3	64	<.12
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	08/26/2005	---	E2	<.40	1.6	62	<.12
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	11/29/2005	---	<3	<.40	.55	39	<.12
Paria River at Lees Ferry, AZ	9382000	06/27/2005	---	4	E.13	2.4	98	<.06
Paria River at Lees Ferry, AZ	9382000	08/24/2005	---	8	E.17	2.2	90	<.06
Paria River at Lees Ferry, AZ	9382000	11/29/2005	---	E1	<.20	1.3	54	<.06

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	*E. coli* (colonies per 100 ml)	Aluminum, dissolved (µg/L as Al)	Antimony, dissolved (µg/L as Sb)	Arsenic, dissolved (µg/L as As)	Barium, dissolved (µg/L as Ba)	Beryllium, dissolved (µg/L as Be)
Grand Canyon National Park								
Schmutz Spring	362143112551201	05/26/2005	---	<2	<0.20	3.6	9	<0.06
Schmutz Spring	362143112551201	09/09/2005	---	<2	<.20	1.8	8	<.06
Schmutz Spring	362143112551201	11/30/2005	---	<2	<.20	1.8	8	<.06
Cottonwood Creek North Rim Grand Canyon	361947112550200	05/26/2005	---	E2	<.40	2.4	48	<.12
Cottonwood Creek North Rim Grand Canyon	361947112550200	11/30/2005	---	<5	<.40	0.95	32	<.12
Saddle Horse Spring	361344113032001	05/24/2005	---	<2	<.20	.8	87	<.06
Saddle Horse Spring	361344113032001	09/08/2005	---	<2	<.20	.72	89	<.06
Saddle Horse Spring	361344113032001	12/01/2005	---	<2	<.20	.73	82	<.06
Buckhorn Spring	362258112464701	05/23/2005	---	<3	<.40	2.8	14	<.12
Buckhorn Spring	362258112464701	11/29/2005	---	<5	<.40	.56	20	<.18
Hotel Spring	362157112451601	05/23/2005	---	E2	<.20	7.8	78	<.06
Hotel Spring	362157112451601	11/29/2005	---	<2	<.20	6.8	63	<.06
Santa Maria Spring	360336112131801	06/20/2005	---	2	<.20	13.7	260	<.06
Santa Maria Spring	360336112131801	09/29/2005	---	<3	<.20	12.6	252	<.06
Santa Maria Spring	360336112131801	12/30/2005	---	---	<.20	12.1	237	.22
Robber's Roost Spring	361650112052001	05/27/2005	---	107	<.20	.3	7	<.06
Robber's Roost Spring	361650112052001	09/07/2005	---	<2	<.20	.37	11	<.06
Robber's Roost Spring	361650112052001	10/25/2005	---	E1	<.20	.43	11	<.06
Mesa Verde National Park								
U.S. Highway 160 Spring near Park Entrance	372040108245801	05/17/2005	---	26,100	<0.60	2.1	5	10.8
U.S. Highway 160 Spring near Park Entrance	372040108245801	09/15/2005	---	28,000	<.20	3.4	7	10.3
U.S. Highway 160 Spring near Park Entrance	372040108245801	11/09/2005	---	27,500	<.60	2.5	5	7.18
Morefield Spring	371415108242301	05/19/2005	---	E2	.2	1.2	27	<0.12
Morefield Spring	371415108242301	09/13/2005	---	<3	<.20	0.59	22	<.06
Morefield Spring	371415108242301	11/08/2005	---	<3	<.40	.52	22	<.12
Cattail Spring	371607108245501	05/19/2005	---	8	E1.17	3.8	90	<.18
Spruce Tree House Spring	371105108291501	05/18/2005	---	<2	<.20	E.1	73	<.06
Spruce Tree House Spring	371105108291501	09/14/2005	---	---	<.20	.15	72	<.06
Spruce Tree House Spring	371105108291501	11/09/2005	---	<2	<.20	.18	61	<.06
Echo Cliff Drainage Spring	370944108295101	05/18/2005	---	19	E.53	.9	56	<.18
Echo Cliff Drainage Spring	370944108295101	09/14/2005	---	4	.61	1.7	56	<.36
Echo Cliff Drainage Spring	370944108295101	11/09/2005	---	<5	E.58	.73	22	<.18
Long House Spring	371112108320901	05/19/2005	---	<2	<.20	.2	61	<.06
Long House Spring	371112108320901	09/13/2005	---	<2	<.20	.48	52	<.06
Long House Spring	371112108320901	11/08/2005	---	<2	<.20	.25	45	<.06

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	*E. coli* (colonies per 100 ml)	Aluminum, dissolved (µg/L as Al)	Antimony, dissolved (µg/L as Sb)	Arsenic, dissolved (µg/L as As)	Barium, dissolved (µg/L as Ba)	Beryllium, dissolved (µg/L as Be)
Mesa Verde National Park—Continued								
Bobcat Spring	371102108313101	05/19/2005	---	<2	<0.20	0.2	32	<0.06
Bobcat Spring	371102108313101	09/13/2005	---	E1	<.20	.42	32	<.06
Bobcat Spring	371102108313101	11/08/2005	---	2	<.20	.32	28	<.06
Mancos River at Gaging Station	371648108214500	06/03/2005	---	20	<.20	.3	31	<.06
Mancos River at Gaging Station	371648108214500	09/12/2005	---	2	<.20	.6	41	<.06
Mancos River at Gaging Station	371648108214500	11/7/2005	---	2	<.20	.46	47	<.06
Petrified Forest National Park								
Puerco River near Adamana, AZ	9396500	03/21/2005	---	7	0.4	2	80	<0.06
Puerco River near Adamana, AZ	9396500	08/08/2005	---	39	0.58	0.9	82	<.06
Kokopelli Spring	345726109471101	03/17/2005	---	80	E.15	3.5	12	<.06
Kokopelli Spring	345726109471101	08/09/2005	---	7	.21	2.9	69	<.06
Kokopelli Spring	345726109471101	10/26/2005	---	8	.24	5	61	<.06
Puerco Well No. 2	345850109475001	03/17/2005	---	<2	<.20	1.3	102	<.06
Puerco Well No. 2	345850109475001	08/09/2005	---	<2	<.20	.6	106	<.06
Puerco Well No. 2	345850109475001	10/26/2005	---	E2	<.20	1.2	108	<.06
Petroglyph National Monument								
North Boca Negra Arroyo	350936106431100	09/28/2005	---	12	0.3	1.2	40	<0.06
North Boca Negra Arroyo	350936106431100	10/04/2005	---	7	.66	2.1	84	<.06
Petroglyph Well 1	350809106424901	06/23/2005	---	2	E.12	10.4	67	<.06
Petroglyph Well 1	350809106424901	09/28/2005	---	<3	E.11	9.9	70	<.06
Petroglyph Well 1	350809106424901	12/13/2005	---	M	<.20	10.8	68	E.05
Rainbow Bridge National Monument								
Rainbow Bridge Creek	370439110575400	05/03/2005	---	2	E.16	2.9	210	<0.06
Rainbow Bridge Creek	370439110575400	08/25/2005	---	3	<0.20	9.5	210	<.06
Rainbow Bridge Creek	370439110575400	11/30/2005	---	<2	<.20	3.1	213	<.06
Yucca House National Monument								
Main Yucca House Spring (YUCW06)	371500108410801	05/20/2005	---	<2	<0.20	0.8	27	<0.06
Main Yucca House Spring (YUCW06)	371500108410801	08/30/2005	---	<3	<.40	2.5	42	<.12
Main Yucca House Spring (YUCW06)	371500108410801	11/03/2005	---	2	<.40	.35	27	<.06

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Boron, dissolved (µg/L as B)	Cadmium, disolved (µg/L as Cd)	Chromium, dissolved (µg/L as Cr)	Cobalt, dissolved (µg/L as Co)	Copper, dissolved (µg/L as Cu)	Cyanide, dissolved (mg/L as cyanide)
Aztec Ruins National Monument								
Animas River	364958107594500	04/05/2005	22	<0.04	<0.8	0.2	1.2	---
Animas River	364958107594500	08/31/2005	56	<.04	<.04	.209	1.6	ND
Animas River	364958107594500	11/03/2005	48	.08	<.04	.08	5.8	ND
Farmer's Ditch	365024107594600	04/05/2005	22	E.03	E.4	.268	1.6	---
Farmer's Ditch	365024107594600	08/31/2005	57	E.03	<.04	.216	1.4	<0.010
Farmer's Ditch	365024107594600	11/03/2005	47	.07	<.04	.07	1.6	ND
Bandelier National Monument								
Rito de los Frijoles near Los Alamos, NM	8313300	04/26/2005	E5.1	<0.04	E.5	0.052	0.6	---
Rito de los Frijoles near Los Alamos, NM	8313300	08/26/2005	E6.7	<.04	E.6	.024	E.2	ND
Rito de los Frijoles near Los Alamos, NM	8313300	11/18/2005	E6.8	<.04	0.77	E.021	<.4	<.010
Ritode los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	7.2	<.04	<.8	.089	.7	---
Rito de los Frijoles at Headquarters Gaging Station	8313350	08/23/2005	8.7	<.04	<.8	.045	E.3	ND
Rito de los Frijoles at Headquarters Gaging Station	8313350	11/15/2005	7.9	<.04	.27	.045	.6	<.010
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	04/29/2005	9.5	<.04	<.8	.074	.9	---
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	08/23/2005	8.3	<.04	<.8	.083	.4	ND
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	11/15/2005	8.4	<.04	.15	.06	E.2	ND
Frijoles Spring along Rio Grande	354502106152701	04/29/2005	13	<.04	2.6	.021	.4	---
Frijoles Spring along Rio Grande	354502106152701	08/23/2005	11	<.04	2.2	.023	E.2	<.010
Frijoles Spring along Rio Grande	354502106152701	11/15/2005	12	<.04	1.5	.059	<.4	<.010
Alamo Springs Grazing Exclosure	354928106260401	04/27/2005	E4.3	<.04	<.8	.105	.8	---
Alamo Springs Grazing Exclosure	354928106260401	08/24/2005	7	<.04	<.8	.066	.6	ND
Alamo Springs Grazing Exclosure	354928106260401	11/16/2005	E4.8	<.04	.07	.048	<.4	ND
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	04/26/2005	E6.3	<.04	<.8	.083	.9	---
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	08/26/2005	12	<.04	<.8	.05	.5	<.010
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	11/18/2005	9.8	<.04	.11	E.037	<.4	ND
Capulin Creek below Base Camp	354526106194400	06/02/2005	13	<.04	<.8	.1	.6	---
Capulin Creek below Base Camp	354526106194400	08/24/2005	12	<.04	<.8	.099	.6	ND
Capulin Creek below Base Camp	354526106194400	11/16/2005	10	<.04	.16	.062	<.4	ND
Turkey Springs	354411106212001	04/28/2005	14	<.04	<.8	.06	.6	---
Turkey Springs	354411106212001	08/25/2005	14	<.04	<.8	.074	.4	ND
Turkey Springs	354411106212001	11/17/2005	13	<.04	.15	.078	.7	<.010
Canyon de Chelly National Monument								
Tsaile Lake	361621109121300	04/22/2005	16	<.04	<.8	.131	.8	---
Tsaile Lake	361621109121300	08/23/2005	20	<.04	<.8	.301	.6	<.010
Tsaile Lake	361621109121300	10/19/2005	19	<.04	.05	.21	1.0	<.010
Tsaile Creek below Tsaile Lake	361624109122400	04/22/2005	15	<.04	2.5	.265	1.3	---

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Boron, dissolved (µg/L as B)	Cadmium, disolved (µg/L as Cd)	Chromium, dissolved (µg/L as Cr)	Cobalt, dissolved (µg/L as Co)	Copper, dissolved (µg/L as Cu)	Cyanide, dissolved (mg/L as cyanide)
Canyon de Chelly National Monument—Continued								
Tsaile Creek below Tsaile Lake	361624109122400	08/23/2005	44	<.04	<.8	.464	E.4	<.010
Tsaile Creek below Tsaile Lake	361624109122400	10/19/2005	41	<.04	E.03	.26	1.0	<.010
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	05/10/2005	17	<.04	<.8	.136	1.5	---
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	12/08/2005	43	<.04	.1	.629	2.8	ND
Chinle Wash below White House Ruins	360800109282700	04/23/2005	13	<.04	<.8	.118	1.0	---
Chinle Wash below White House Ruins	360800109282700	12/07/2005	76	<.04	.08	.598	2.8	ND
Chinle Creek at Chinle, AZ	9379025	04/23/2005	14	<.04	<.8	.126	1.2	---
Chinle Creek at Chinle, AZ	9379025	08/17/2005	43	<.04	<.8	.156	2.7	ND
Many Cherry Spring	361008109232801	05/11/2005	19	<.04	<.8	.87	.4	---
Many Cherry Spring	361008109232801	10/18/2005	16	0.07	.21	<.04	1.3	<.010
Bubbling Spring in Spring Canyon	360627109270101	05/12/2005	63	<.04	<.8	.209	E.3	---
Bubbling Spring in Spring Canyon	360627109270101	07/25/2005	64	0.33	<.8	.202	.6	ND
Bubbling Spring in Spring Canyon	360627109270101	10/18/2005	48	<.04	E.03	.23	.4	<.010
Pine Tree Canyon Tinaja	361607109210601	05/15/2005	11	<.04	<.8	.414	1.0	---
Pine Tree Canyon Tinaja	361607109210601	10/20/2005	7.1	<.04	E.03	.07	2.3	.011
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	56	<.04	<.8	.567	1.1	---
NPS Canyon de Chelly Well No. 2	360847109321201	08/17/2005	51	<.04	<.8	.534	1.7	ND
NPS Canyon de Chelly Well No. 2	360847109321201	10/19/2005	49	<.04	.28	.29	1.6	ND
Chaco Culture National Historical Park								
Chaco Wash at Chaco Canyon National Monument, NM	9367680	5/5/2005	105	E.04	E.7	.304	17.0	---
Chaco Wash at Chaco Canyon National Monument, NM	9367680	08/16/2005	31	<.04	<.8	.183	7.1	ND
Gambler's Spring	360435107573601	04/12/2005	16	<.04	<.8	.195	.6	---
Gambler's Spring	360435107573601	08/17/2005	25	<.04	<.8	.226	.7	ND
Wijijji Spring	360057107522501	04/12/2005	65	<.04	<.8	.525	3.9	---
Wijijji Spring	360057107522501	08/17/2005	101	<.04	E.4	.655	8.3	ND
Wijijji Spring	360057107522501	12/06/2005	53	E.03	E.02	.731	7.8	ND
Historic Masonry Well - Middle	360146107551401	04/13/2005	83	<.04	<.8	.461	1.3	---
Historic Masonry Well - Middle	360146107551401	08/17/2005	77	<.04	<.8	.316	3.3	ND
Historic Masonry Well - Middle	360146107551401	12/05/2005	75	<.04	E.03	.286	5.4	ND
Casa Chiquita Well - Middle	360402107583901	04/13/2005	160	<.16	<.8	<.056	<1.6	---
Casa Chiquita Well - Middle	360402107583901	08/18/2005	150	<.16	<.8	3.76	17.6	ND
Casa Chiquita Well - Middle	360402107583901	12/06/2005	159	<.16	E.04	4.46	16.4	<.010

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Boron, dissolved (µg/L as B)	Cadmium, dissolved (µg/L as Cd)	Chromium, dissolved (µg/L as Cr)	Cobalt, dissolved (µg/L as Co)	Copper, dissolved (µg/L as Cu)	Cyanide, dissolved (mg/L as cyanide)
El Morro National Monument								
South Side of Historic Pool at El Morro, NM	350225108210601	03/29/2005	7.8	<0.04	<0.8	0.047	0.4	---
South Side of Historic Pool at El Morro, NM	350225108210601	08/10/2005	11	<.04	<.8	.074	E.4	ND
South Side of Historic Pool at El Morro, NM	350225108210601	12/22/2005	11	<.04	E.02	.058	.5	<0.010
El Morro Water Supply Well	350246108215001	03/30/2005	55	<.04	10	.056	E.3	---
El Morro Water Supply Well	350246108215001	08/11/2005	47	<.04	9.5	.043	.6	ND
El Morro Water Supply Well	350246108215001	12/22/2005	48	<.04	8.8	E.038	.5	ND
El Malpais National Monument								
El Malpais Water Supply Well	345934108021501	03/30/2005	48	<0.04	8.8	E0.038	0.5	ND
El Malpais Water Supply Well	345934108021501	08/11/2005	29	<.04	<.8	.109	8.2	---
El Malpais Water Supply Well	345934108021501	12/21/2005	47	<.04	<.8	.084	1.2	ND
Glen Canyon National Recreation Area								
San Juan River near Clay Hills Crossing	371734110235900	05/18/2005	26	<0.04	0.06	0.073	0.9	<0.010
San Juan River near Clay Hills Crossing	371734110235900	07/20/2005	25	<.04	<.8	.156	3.3	---
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	35	<.04	<.8	.152	1.9	---
Lake Canyon at Hole in the Rock Trail	372315110372600	05/17/2005	68	.05	.05	.229	2.3	<.010
Lake Canyon at Hole in the Rock Trail	372315110372600	07/20/2005	25	<.04	<.8	.159	2.8	---
Lake Canyon at Hole in the Rock Trail	372315110372600	12/01/2005	21	<.04	<.8	.154	1.0	---
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	05/05/2005	26	<.04	.27	.232	.8	ND
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	142	<.04	<.8	.426	2.5	---
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	12/14/2005	236	<.08	<.8	.17	2.1	---
Escalante River above Stevens Canyon	372610110585201	06/13/2005	106	E.02	.07	.306	1.9	<.010
Escalante River above Stevens Canyon	372610110585201	09/20/2005	29	<.04	<.8	.099	1.1	---
Escalante River above Stevens Canyon	372610110585201	11/22/2005	39	<.04	.13	.115	4.0	<.010
Coyote Gulch above Escalante River	372541110591100	06/14/2005	37	<.04	.14	.086	.7	<.010
Coyote Gulch above Escalante River	372541110591100	09/20/2005	22	<.04	<.8	.095	.6	---
Coyote Gulch above Escalante River	372541110591100	11/22/2005	22	<.04	.05	.092	1.0	0.010
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	05/04/2005	20	<.04	.05	.132	E.4	ND
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	08/26/2005	476	<.08	<.8	.66	5.3	---
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	11/29/2005	345	<.08	<.8	1.63	6.3	ND
Paria River at Lees Ferry, AZ	9382000	06/27/2005	284	.11	.09	1.41	6.5	ND
Paria River at Lees Ferry, AZ	9382000	08/24/2005	97	<.04	E.4	.159	1.4	---
Paria River at Lees Ferry, AZ	9382000	11/29/2005	98	<.04	<.8	.194	3.7	ND

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Boron, dissolved (µg/L as B)	Cadmium, dissolved (µg/L as Cd)	Chromium, dissolved (µg/L as Cr)	Cobalt, dissolved (µg/L as Co)	Copper, dissolved (µg/L as Cu)	Cyanide, dissolved (mg/L as cyanide)
Grand Canyon National Park								
Schmutz Spring	362143112551201	05/26/2005	86	<0.04	0.31	0.156	2.0	<0.010
Schmutz Spring	362143112551201	09/09/2005	111	E.03	E.8	.51	3.2	---
Schmutz Spring	362143112551201	11/30/2005	114	E.02	.42	<.04	2.7	ND
Cottonwood Creek North Rim Grand Canyon	361947112550200	05/26/2005	92	E.03	.49	.374	4.3	ND
Cottonwood Creek North Rim Grand Canyon	361947112550200	11/30/2005	373	<.08	<.8	2.19	7.9	---
Saddle Horse Spring	361344113032001	05/24/2005	211	<.08	.11	.52	6.4	<.010
Saddle Horse Spring	361344113032001	09/08/2005	33	<.04	<.8	.14	E0.4	---
Saddle Horse Spring	361344113032001	12/01/2005	31	<.04	.18	<.04	0.5	<.010
Buckhorn Spring	362258112464701	05/23/2005	28	<.04	.22	.103	.6	ND
Buckhorn Spring	362258112464701	11/29/2005	117	<.08	.9	2.86	7.8	---
Hotel Spring	362157112451601	05/23/2005	88	.12	.36	.73	6.5	ND
Hotel Spring	362157112451601	11/29/2005	217	E.03	E.5	.435	1.5	---
Santa Maria Spring	360336112131801	06/20/2005	147	E.02	.34	.32	1.8	ND
Santa Maria Spring	360336112131801	09/29/2005	198	<.04	<.8	.093	.6	---
Santa Maria Spring	360336112131801	12/30/2005	174	.06	.36	.04	1.0	<.01
Robber's Roost Spring	361650112052001	05/27/2005	170	.06	.29	.076	.8	---
Robber's Roost Spring	361650112052001	09/07/2005	7.7	.07	<.8	.126	.6	---
Robber's Roost Spring	361650112052001	10/25/2005	7.9	.09	.48	E.02	E0.3	ND
Mesa Verde National Park								
U.S. Highway 160 Spring near Park Entrance	372040108245801	05/17/2005	E5.6	0.1	0.81	<0.04	<0.40	ND
U.S. Highway 160 Spring near Park Entrance	372040108245801	09/15/2005	215	23.8	<.8	77.4	35.7	---
U.S. Highway 160 Spring near Park Entrance	372040108245801	11/09/2005	264	17.8	.2	87.7	16.9	<0.010
Morefield Spring	371415108242301	05/19/2005	235	20.3	.17	83.4	18.8	<.010
Morefield Spring	371415108242301	09/13/2005	444	<.08	<.8	.29	7.3	---
Morefield Spring	371415108242301	11/08/2005	549	<.04	.12	.07	E0.3	ND
Cattail Spring	371607108245501	05/19/2005	510	<.08	.07	.17	6.0	ND
Spruce Tree House Spring	371105108291501	05/18/2005	464	<.12	<.8	8.15	34.3	---
Spruce Tree House Spring	371105108291501	09/14/2005	19	<.04	<.8	.186	.6	---
Spruce Tree House Spring	371105108291501	11/09/2005	20	<.04	.23	.118	1.0	.014
Echo Cliff Drainage Spring	370944108295101	05/18/2005	16	<.04	.15	.17	.6	.071
Echo Cliff Drainage Spring	370944108295101	09/14/2005	584	<.12	<.8	.88	34.2	---
Echo Cliff Drainage Spring	370944108295101	11/09/2005	589	.05	.08	5.1	8.6	ND
Long House Spring	371112108320901	05/19/2005	464	<.12	E.02	1.48	10.8	ND
Long House Spring	371112108320901	09/13/2005	13	<.04	<.8	.155	.6	---
Long House Spring	371112108320901	11/08/2005	14	<.04	.18	.125	.4	ND

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Boron, dissolved (µg/L as B)	Cadmium, dissolved (µg/L as Cd)	Chromium, dissolved (µg/L as Cr)	Cobalt, dissolved (µg/L as Co)	Copper, dissolved (µg/L as Cu)	Cyanide, dissolved (mg/L as cyanide)
Mesa Verde National Park—Continued								
Bobcat Spring	371102108313101	05/19/2005	10	<0.04	0.19	0.119	E0.3	ND
Bobcat Spring	371102108313101	09/13/2005	7	<.04	<.8	.109	0.4	---
Bobcat Spring	371102108313101	11/08/2005	E6.9	<.04	.21	.082	E0.3	ND
Mancos River at Gaging Station	371648108214500	06/03/2005	E5.3	<.04	.2	.108	E.3	ND
Mancos River at Gaging Station	371648108214500	09/12/2005	13	<.04	<.8	.174	5.9	---
Mancos River at Gaging Station	371648108214500	11/7/2005	49	<.04	E.02	.456	2.4	ND
Petrified Forest National Park								
Puerco River near Adamana, AZ	9396500	03/21/2005	51	<0.04	E0.02	0.698	4.2	ND
Puerco River near Adamana, AZ	9396500	08/08/2005	140	.17	E.6	.998	13.4	---
Kokopelli Spring	345726109471101	03/17/2005	204	.09	<.8	.628	41.4	<0.010
Kokopelli Spring	345726109471101	08/09/2005	31	E.02	1.2	.1	11.6	---
Kokopelli Spring	345726109471101	10/26/2005	68	<.04	<.8	.119	3.7	ND
Puerco Well No. 2	345850109475001	03/17/2005	87	E.02	.14	.15	4.5	ND
Puerco Well No. 2	345850109475001	08/09/2005	556	.04	<.8	.294	1.0	---
Puerco Well No. 2	345850109475001	10/26/2005	507	.05	<.8	.243	1.7	ND
Petroglyph National Monument								
North Boca Negra Arroyo	350936106431100	09/28/2005	524	0.13	0.04	0.18	0.4	ND
North Boca Negra Arroyo	350936106431100	10/04/2005	15	E.03	.34	.33	4.5	<0.010
Petroglyph Well 1	350809106424901	06/23/2005	24	<.04	.86	.326	5.8	<.010
Petroglyph Well 1	350809106424901	09/28/2005	114	<.04	1.7	.053	.5	---
Petroglyph Well 1	350809106424901	12/13/2005	109	.05	1.9	<.04	<.40	<.010
Rainbow Bridge National Monument								
Rainbow Bridge Creek	370439110575400	05/03/2005	41	<0.04	<0.8	0.125	0.5	---
Rainbow Bridge Creek	370439110575400	08/25/2005	40	<.04	<.8	.181	.6	<0.010
Rainbow Bridge Creek	370439110575400	11/30/2005	28	<.04	.13	.121	.5	ND
Yucca House National Monument								
Main Yucca House Spring (YUCW06)	371500108410801	05/20/2005	189	E0.02	<0.8	0.833	10.0	---
Main Yucca House Spring (YUCW06)	371500108410801	08/30/2005	315	<.08	<.04	2.92	6.7	<0.010
Main Yucca House Spring (YUCW06)	371500108410801	11/03/2005	306	.04	<.04	.22	0.8	ND

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Iron, dissolved (µg/L as Fe)	Lead, dissolved (µg/L as Pb)	Lithium, dissolved (µg/L as L)	Manganese, dissolved (µg/L as Mn)	Mercury, dissolved (µg/L as Hg)	Molybdenum, dissolved (µg/L as Mo)
Aztec Ruins National Monument								
Animas River	364958107594500	04/05/2005	<6	E0.05	19.3	9.8	---	0.9
Animas River	364958107594500	08/31/2005	7	.29	39	20.7	<0.01	1.8
Animas River	364958107594500	11/03/2005	11	.25	33	23.8	<.01	<.4
Farmer's Ditch	365024107594600	04/05/2005	116	.54	19.6	18.1	---	.9
Farmer's Ditch	365024107594600	08/31/2005	11	.09	42.1	12.8	<.01	1.9
Farmer's Ditch	365024107594600	11/03/2005	10	.28	33.1	16.2	<.01	<.4
Bandelier National Monument								
Rito de los Frijoles near Los Alamos, NM	8313300	04/26/2005	13	E0.04	6.5	0.9	---	0.4
Rito de los Frijoles near Los Alamos, NM	8313300	08/26/2005	8	<.08	21.9	.6	<0.01	.9
Rito de los Frijoles near Los Alamos, NM	8313300	11/18/2005	E3	<.08	17.6	.4	<.01	.9
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	20	<.08	9.5	9.7	---	.6
Rito de los Frijoles at Headquarters Gaging Station	8313350	08/23/2005	55	E.04	17.8	7.8	<.01	1.2
Rito de los Frijoles at Headquarters Gaging Station	8313350	11/15/2005	68	.1	17.5	9.3	<.01	1
Rito de lLos Frijoles below Frijoles Falls, NM	354511106151010	04/29/2005	26	E.05	10.5	8.4	---	.6
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	08/23/2005	114	E.08	17.9	14.6	<.01	1.2
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	11/15/2005	109	<.08	17.6	10	<.01	1
Frijoles Spring along Rio Grande	354502106152701	04/29/2005	<6	<.08	23.4	1.5	---	1.2
Frijoles Spring along Rio Grande	354502106152701	08/23/2005	<6	<.08	24.1	.9	<.01	1.2
Frijoles Spring along Rio Grande	354502106152701	11/15/2005	E6	<.08	24.8	23.6	<.01	1.3
Alamo Springs Grazing Exclosure	354928106260401	04/27/2005	38	<.08	.8	4.1	---	<.4
Alamo Springs Grazing Exclosure	354928106260401	08/24/2005	42	.12	1.4	2.3	E.01	<.4
Alamo Springs Grazing Exclosure	354928106260401	11/16/2005	20	E.05	1	2	<.01	<.4
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	04/26/2005	22	E.05	2.6	2	---	E.3
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	08/26/2005	14	<.08	11.7	4.5	<.01	1
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	11/18/2005	8	<.08	8.8	.6	<.01	.9
Capulin Creek below Base Camp	354526106194400	06/02/2005	31	<.08	10.7	13.9	---	.8
Capulin Creek below Base Camp	354526106194400	08/24/2005	33	<.08	11.5	11.2	E.01	1.3
Capulin Creek below Base Camp	354526106194400	11/16/2005	22	<.08	9.6	8.2	<.01	.9
Turkey Springs	354411106212001	04/28/2005	9	<.08	11.5	1.2	---	1.5
Turkey Springs	354411106212001	08/25/2005	10	<.08	12.6	2.8	<.01	1.4
Turkey Springs	354411106212001	11/17/2005	47	<.08	12	.5	<.01	1.6
Canyon de Chelly National Monument								
Tsaile Lake	361621109121300	04/22/2005	6	<.08	5.1	3.8	---	E.3
Tsaile Lake	361621109121300	08/23/2005	73	.12	6.2	11.2	<.01	E.3
Tsaile Lake	361621109121300	10/19/2005	<6	.11	6.7	1.1	<.01	E.4
Tsaile Creek below Tsaile Lake	361624109122400	04//22/2005	208	.54	5.4	21.7	---	E.2

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Iron, dissolved (µg/L as Fe)	Lead, dissolved (µg/L as Pb)	Lithium, dissolved (µg/L as L)	Manganese, dissolved (µg/L as Mn)	Mercury, dissolved (µg/L as Hg)	Molybdenum, dissolved (µg/L as Mo)
Canyon de Chelly National Monument—Continued								
Tsaile Creek below Tsaile Lake	361624109122400	08/23/2005	16	<0.08	12.9	220	<0.01	1
Tsaile Creek below Tsaile Lake	361624109122400	10/19/2005	8	E.06	12.9	469	<.01	1
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	05/10/2005	7	<.08	4.8	3	---	E0.3
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	12/08/2005	17	<.08	17.2	36	<.01	.9
Chinle Wash below White House Ruins	360800109282700	04/23/2005	13	.08	4	4.4	---	E.4
Chinle Wash below White House Ruins	360800109282700	12/07/2005	48	E.08	51.1	48.1	<.01	1.2
Chinle Creek at Chinle, AZ	9379025	04/23/2005	23	<.08	4.6	2.9	---	.5
Chinle Creek at Chinle, AZ	9379025	08/17/2005	E5	<.08	8.9	1.6	<.01	.9
Many Cherry Spring	361008109232801	05/11/2005	28	<.08	10.5	420	---	E.3
Many Cherry Spring	361008109232801	10/18/2005	<6	<.08	7.6	0.5	<.01	1.1
Bubbling Spring in Spring Canyon	360627109270101	05/12/2005	89	<.08	11.1	42.6	---	1.5
Bubbling Spring in Spring Canyon	360627109270101	07/25/2005	E6	E.05	12.2	64.2	<.01	1.7
Bubbling Spring in Spring Canyon	360627109270101	10/18/2005	80	.09	9.8	343	<.01	1
Pine Tree Canyon Tinaja	361607109210601	05/15/2005	18	<.08	1.1	77.5	---	.5
Pine Tree Canyon Tinaja	361607109210601	10/20/2005	14	.45	0.8	1	E.01	E.2
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	422	E.05	37.7	196	---	.4
NPS Canyon de Chelly Well No. 2	360847109321201	08/17/2005	346	<.08	45.8	215	<.01	.5
NPS Canyon de Chelly Well No. 2	360847109321201	10/19/2005	472	<.08	39.7	225	<.01	.4
Chaco Culture National Historical Park								
Chaco Wash at Chaco Canyon National Monument, NM	9367680	5/5/2005	173	0.62	8.1	3.3	---	5.3
Chaco Wash at Chaco Canyon National Monument, NM	9367680	08/16/2005	15	.1	5.7	.4	0.01	3.1
Gambler's Spring	360435107573601	04/12/2005	E5	<.08	9.8	2.1	---	0.7
Gambler's Spring	360435107573601	08/17/2005	77	E.06	13.2	12.4	<.01	.9
Wijijji Spring	360057107522501	04/12/2005	<18	<.08	36	3.3	---	1.9
Wijijji Spring	360057107522501	08/17/2005	<18	<.08	55.2	3.9	E.01	2.8
Wijijji Spring	360057107522501	12/06/2005	111	.14	28.1	36.1	<.01	1.1
Historic Masonry Well - Middle	360146107551401	04/13/2005	209	.4	26.7	606	---	2.4
Historic Masonry Well - Middle	360146107551401	08/17/2005	E4	<.08	38.7	236	<.01	1
Historic Masonry Well - Middle	360146107551401	12/05/2005	37	E.06	36.9	226	<.01	1.1
Casa Chiquita Well - Middle	360402107583901	04/13/2005	E41	<.32	<2.4	<.8	---	<1.6
Casa Chiquita Well - Middle	360402107583901	08/18/2005	E29	<.32	99.2	2,880	<.01	7.3
Casa Chiquita Well - Middle	360402107583901	12/06/2005	<30	<.32	135	3,180	<.01	7

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Iron, dissolved (µg/L as Fe)	Lead, dissolved (µg/L as Pb)	Lithium, dissolved, (µg/L as L)	Manganese, dissolved (µg/L as Mn)	Mercury, dissolved (µg/L as Hg)	Molybdenum, dissolved (µg/L as Mo)
El Morro National Monument								
South Side of Historic Pool at El Morro, NM	350225108210601	03/29/2005	73	0.14	E.5	19.6	---	<0.4
South Side of Historic Pool at El Morro, NM	350225108210601	08/10/2005	106	E.04	.6	52.4	<0.01	E.3
South Side of Historic Pool at El Morro, NM	350225108210601	12/22/2005	66	<.08	.6	29.6	<.01	<.4
El Morro Water Supply Well	350246108215001	03/30/2005	<6	.32	7.5	<.2	---	1.5
El Morro Water Supply Well	350246108215001	08/11/2005	<6	.38	7.1	<.2	<.01	1.5
El Morro Water Supply Well	350246108215001	12/22/2005	<6	.09	7.9	<.2	<.01	1.5
El Malpais National Monument								
El Malpais Water Supply Well	345934108021501	03/30/2005	14	0.31	22.1	2.4	---	4.9
El Malpais Water Supply Well	345934108021501	08/11/2005	<6	.32	21.9	2.3	<0.01	4.8
El Malpais Water Supply Well	345934108021501	12/21/2005	32	<.08	24	3.9	<.01	4.7
Glen Canyon National Recreation Area								
San Juan River near Clay Hills Crossing	371734110235900	05/18/2005	E4	E0.07	16	2	---	1.5
San Juan River near Clay Hills Crossing	371734110235900	07/20/2005	<6	<.08	21.8	1.6	---	1.7
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	8	<.08	42.1	7.1	<0.01	2.1
Lake Canyon at Hole in the Rock Trail	372315110372600	05/17/2005	10	E.04	6.7	1.9	---	1.5
Lake Canyon at Hole in the Rock Trail	372315110372600	07/20/2005	E6	.28	5.5	1.6	---	1.1
Lake Canyon at Hole in the Rock Trail	372315110372600	12/01/2005	21	E.05	6.9	16.7	<.01	1.9
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	05/05/2005	<6	<.08	29.7	1.3	---	3.3
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	<18	<.16	21.3	1.9	---	1.7
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	12/14/2005	<6	<.08	24.5	6.7	<.01	2.2
Escalante River above Stevens Canyon	372610110585201	06/13/2005	E4	<.08	10	E0.2	---	0.8
Escalante River above Stevens Canyon	372610110585201	09/20/2005	E3	.1	7.8	1.2	<.01	.8
Escalante River above Stevens Canyon	372610110585201	11/22/2005	7	<.08	8.2	1.1	<.01	.6
Coyote Gulch above Escalante River	372541110591100	06/14/2005	<6	<.08	9.3	.5	---	.6
Coyote Gulch above Escalante River	372541110591100	09/20/2005	9	<.08	6.9	5.2	<.01	.7
Coyote Gulch above Escalante River	372541110591100	11/22/2005	<6	<.08	6.9	14.9	<.01	.6
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	05/04/2005	<18	<.16	107	30.2	---	3.5
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	08/26/2005	<18	<.16	101	387	<.01	4.3
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	11/29/2005	E15	<.16	79.1	436	<.01	3.2
Paria River at Lees Ferry, AZ	9382000	06/27/2005	<6	<.08	34.4	1.3	---	1.7
Paria River at Lees Ferry, AZ	9382000	08/24/2005	E3	.89	19.4	3	<.01	1.7
Paria River at Lees Ferry, AZ	9382000	11/29/2005	E3	<.08	33.6	1.6	<.01	1.3

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Iron, dissolved (µg/L as Fe)	Lead, dissolved (µg/L as Pb)	Lithium, dissolved (µg/L as L)	Manganese, dissolved (µg/L as Mn)	Mercury, dissolved (µg/L as Hg)	Molybdenum, dissolved (µg/L as Mo)
Grand Canyon National Park								
Schmutz Spring	362143112551201	05/26/2005	E4	<0.08	32.4	1.1	---	9
Schmutz Spring	362143112551201	09/09/2005	<6	<.08	27.3	1.2	E0.01	8.7
Schmutz Spring	362143112551201	11/30/2005	E5	<.08	23.6	0.2	<0.01	9
Cottonwood Creek North Rim Grand Canyon	361947112550200	05/26/2005	57	<.16	120	118	---	7.4
Cottonwood Creek North Rim Grand Canyon	361947112550200	11/30/2005	26	<.16	68.7	48.6	<.01	5.1
Saddle Horse Spring	361344113032001	05/24/2005	<6	<.08	2.8	<.2	---	E0.3
Saddle Horse Spring	361344113032001	09/08/2005	<6	<.08	3.3	<.2	<.01	E.3
Saddle Horse Spring	361344113032001	12/01/2005	<6	<.08	3.1	<.2	<.01	E.4
Buckhorn Spring	362258112464701	05/23/2005	<18	<.16	72.2	7.2	---	6.2
Buckhorn Spring	362258112464701	11/29/2005	61	<.16	25.3	47.8	<.01	5.4
Hotel Spring	362157112451601	05/23/2005	E5	<.08	23.5	6.8	---	8.1
Hotel Spring	362157112451601	11/29/2005	<6	<.08	20.5	24.1	<.01	9.6
Santa Maria Spring	360336112131801	06/20/2005	<6	<.08	12.7	.3	---	5.4
Santa Maria Spring	360336112131801	09/29/2005	<6	.15	11	.2	<.01	4.7
Santa Maria Spring	360336112131801	12/30/2005	<6	<.08	10.3	<.2	<.01	4.8
Robber's Roost Spring	361650112052001	05/27/2005	50	E.05	<0.6	1.6	---	<.4
Robber's Roost Spring	361650112052001	09/07/2005	<6	<.08	<.6	<.2	E.01	<.4
Robber's Roost Spring	361650112052001	10/25/2005	<6	<.08	E.6	<.2	<.01	<.4
Mesa Verde National Park								
U.S. Highway 160 Spring near Park Entrance	372040108245801	05/17/2005	28	E0.17	573	805	---	<1.2
U.S. Highway 160 Spring near Park Entrance	372040108245801	09/15/2005	102	.19	412	812	<0.01	<1.2
U.S. Highway 160 Spring near Park Entrance	372040108245801	11/09/2005	47	E.17	463	950	<.01	<1.2
Morefield Spring	371415108242301	05/19/2005	<18	<.16	58.5	3.1	---	1.1
Morefield Spring	371415108242301	09/13/2005	<18	<.08	53.4	4	<.01	0.7
Morefield Spring	371415108242301	11/08/2005	E12	.75	48.7	8.7	<.01	E.7
Cattail Spring	371607108245501	05/19/2005	E11	<.24	29.3	5,660	---	15
Spruce Tree House Spring	371105108291501	05/18/2005	45	<.08	1.9	1.8	---	E.3
Spruce Tree House Spring	371105108291501	09/14/2005	43	<.08	2.6	1.3	<.01	E.3
Spruce Tree House Spring	371105108291501	11/09/2005	44	<.08	2.6	5.5	<.01	E.3
Echo Cliff Drainage Spring	370944108295101	05/18/2005	67	<.24	188	12.1	---	1.5
Echo Cliff Drainage Spring	370944108295101	09/14/2005	47	<.08	149	1,290	<.01	2.9
Echo Cliff Drainage Spring	370944108295101	11/09/2005	E26	<.24	152	338	<.01	2.4
Long House Spring	371112108320901	05/19/2005	<6	<.08	2.1	<0.2	---	<.4
Long House Spring	371112108320901	09/13/2005	8	<.08	2.3	.5	<.01	<.4
Long House Spring	371112108320901	11/08/2005	E5	<.08	2.1	<.2	<.01	<.4

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Iron, dissolved (µg/L as Fe)	Lead, dissolved (µg/L as Pb)	Lithium, dissolved (µg/L as L)	Manganese, dissolved (µg/L as Mn)	Mercury, dissolved (µg/L as Hg)	Molybdenum, dissolved (µg/L as Mo)
Mesa Verde National Park—Continued								
Bobcat Spring	371102108313101	05/19/2005	<6	<0.08	0.7	E0.2	---	<0.4
Bobcat Spring	371102108313101	09/13/2005	<6	<.08	1.1	0.7	<0.01	<.4
Bobcat Spring	371102108313101	11/08/2005	<6	<.08	.7	E.2	<.01	<.4
Mancos River at Gaging Station	371648108214500	06/03/2005	9	<.08	6.6	30	---	.8
Mancos River at Gaging Station	371648108214500	09/12/2005	<6	<.08	25.5	27.2	<.01	1.9
Mancos River at Gaging Station	371648108214500	11/7/2005	32	.08	43	67.3	<.01	2
Petrified Forest National Park								
Puerco River near Adamana, AZ	9396500	03/21/2005	16	0.71	12.5	1.8	---	5
Puerco River near Adamana, AZ	9396500	08/08/2005	31	1.26	8.9	1.2	E0.01	6.3
Kokopelli Spring	345726109471101	03/17/2005	35	.79	3	1.2	---	2.8
Kokopelli Spring	345726109471101	08/09/2005	<6	.12	4.3	0.4	E.01	4.6
Kokopelli Spring	345726109471101	10/26/2005	10	.09	4.2	8.2	0.01	5.6
Puerco Well No. 2	345850109475001	03/17/2005	116	<.08	35.7	283	---	20.6
Puerco Well No. 2	345850109475001	08/09/2005	795	<.08	28.8	275	<.01	20.7
Puerco Well No. 2	345850109475001	10/26/2005	840	<.08	34.6	280	E.01	21.4
Petroglyph National Monument								
North Boca Negra Arroyo	350936106431100	09/28/2005	11	0.13	2.4	2.8	E0.01	.90
North Boca Negra Arroyo	350936106431100	100/4/2005	<6	.11	6.3	0.5	E.01	2.6
Petroglyph Well 1	350809106424901	06/23/2005	<6	<.08	49.9	<.2	<.01	1.6
Petroglyph Well 1	350809106424901	09/28/2005	<6	E.07	50	0.4	<.01	1.7
Petroglyph Well 1	350809106424901	12/13/2005	E5	<.08	48.6	<.2	<.01	1.6
Rainbow Bridge National Monument								
Rainbow Bridge Creek	370439110575400	05/03/2005	23	<.080	38.5	17.3	---	1.6
Rainbow Bridge Creek	370439110575400	08/25/2005	11	.11	24.7	134	<0.01	1.9
Rainbow Bridge Creek	370439110575400	11/30/2005	9	<.08	31.2	66.3	<.01	1.3
Yucca House National Monument								
Main Yucca House Spring (YUCW06)	371500108410801	05/20/2005	<6	<0.08	91.8	0.7	---	3.1
Main Yucca House Spring (YUCW06)	371500108410801	08/30/2005	764	<.16	128	312	<0.01	4
Main Yucca House Spring (YUCW06)	371500108410801	11/03/2005	84	<.08	105	30	<.01	2.9

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Nickel, dissolved (µg/L as Ni)	Selenium, dissolved (µg/L as Se)	Silver, dissolved (µg/L as Ag)	Strontium, dissolved (µg/L as Sr)	Thallium, dissolved (µg/L as Tl)	Vanadium, dissolved (µg/L as V)
Aztec Ruins National Monument								
Animas River	364958107594500	04/05/2005	4.35	0.9	<.2	642	<.04	0.6
Animas River	364958107594500	08/31/2005	3.37	E.05	<.2	828	<.04	.8
Animas River	364958107594500	11/03/2005	3.31	.43	<.2	800	<.04	.28
Farmer's Ditch	365024107594600	04/05/2005	4.54	.9	<.2	646	<.04	.8
Farmer's Ditch	365024107594600	08/31/2005	3.27	E.06	<.2	868	<.04	.8
Farmer's Ditch	365024107594600	11/03/2005	3.45	.43	<.2	749	<.04	.26
Bandelier National Monument								
Rito de los Frijoles near Los Alamos, NM	8313300	04/26/2005	0.23	<0.4	<0.2	52.6	<0.04	2.2
Rito de los Frijoles near Los Alamos, NM	8313300	08/26/2005	.43	<.08	<.2	41.9	<.04	6.9
Rito de los Frijoles near Los Alamos, NM	8313300	11/18/2005	.33	0.16	<.2	44.9	<.04	4.8
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	.28	E.3	<.2	57.6	<.04	2.9
Rito de los Frijoles at Headquarters Gaging Station	8313350	08/23/2005	.35	0.7	<.2	64.6	<.04	4.9
Rito de los Frijoles at Headquarters Gaging Station	8313350	11/15/2005	.33	E.05	<.2	48.9	<.04	3.1
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	04/29/2005	.27	E.2	<.2	59	<.04	2.7
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	08/23/2005	.54	.7	<.2	71.8	<.04	4
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	11/15/2005	.52	E.06	<.2	50.1	<.04	2.7
Frijoles Spring along Rio Grande	354502106152701	04/29/2005	<.06	E.3	<.2	62.1	<.04	10
Frijoles Spring along Rio Grande	354502106152701	08/23/2005	.29	.7	<.2	64.7	<.04	11.2
Frijoles Spring along Rio Grande	354502106152701	11/15/2005	.49	.3	<.2	53.2	<.04	10.6
Alamo Springs Grazing Exclosure	354928106260401	04/27/2005	.3	<.4	<.2	32.9	<.04	0.3
Alamo Springs Grazing Exclosure	354928106260401	08/24/2005	.31	.09	<.2	48.6	<.04	1.5
Alamo Springs Grazing Exclosure	354928106260401	11/16/2005	.38	.15	<.2	40.4	<.04	.15
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	04/26/2005	.3	<.4	<.2	42.8	<.04	.9
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	08/26/2005	.84	.11	<.2	56.9	<.04	2.6
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	11/18/2005	.54	.09	<.2	57.7	<.04	1.5
Capulin Creek below Base Camp	354526106194400	06/02/2005	1.01	E.3	<.2	102	<.04	4.4
Capulin Creek below Base Camp	354526106194400	08/24/2005	1.29	.12	<.2	116	E.03	4.8
Capulin Creek below Base Camp	354526106194400	11/16/2005	.72	E.07	<.2	105	<.04	2.4
Turkey Springs	354411106212001	04/28/2005	E.06	.8	<.2	152	<.04	9.9
Turkey Springs	354411106212001	08/25/2005	.89	.6	<.2	159	<.04	8.2
Turkey Springs	354411106212001	11/17/2005	1.31	.4	.2	145	<.04	8.2
Canyon de Chelly National Monument								
Tsaile Lake	361621109121300	04/22/2005	0.86	E0.3	<.2	224	<.04	3.4
Tsaile Lake	361621109121300	08/23/2005	2.16	E.3	<.2	223	<.04	5
Tsaile Lake	361621109121300	10/19/2005	.8	.11	<.2	245	<.04	3.9
Tsaile Creek below Tsaile Lake	361624109122400	04/22/2005	.95	<.4	<.2	205	<.04	3.9

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Nickel, dissolved (µg/L as Ni)	Selenium, dissolved (µg/L as Se)	Silver, dissolved (µg/L as Ag)	Strontium, dissolved (µg/L as Sr)	Thallium, dissolved (µg/L as Tl)	Vanadium, dissolved (µg/L as V)
Canyon de Chelly National Monument—Continued								
Tsaile Creek below Tsaile Lake	361624109122400	08/23/2005	3.33	0.5	<0.2	515	<0.04	2.3
Tsaile Creek below Tsaile Lake	361624109122400	10/19/2005	0.67	E.04	<.2	590	<.04	0.57
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	05/10/2005	1.13	<.4	<.2	210	<.04	3.6
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	12/08/2005	2.65	.24	<.2	557	<.04	3.6
Chinle Wash below White House Ruins	360800109282700	04/23/2005	1.25	<.4	<.2	144	<.04	4
Chinle Wash below White House Ruins	360800109282700	12/07/2005	2.39	.48	<.2	897	<.04	2.8
Chinle Creek at Chinle, AZ	9379025	04/23/2005	1.3	<.4	<.2	172	<.04	4.7
Chinle Creek at Chinle, AZ	9379025	08/17/2005	1.97	E.3	<.2	286	<.04	11.9
Many Cherry Spring	361008109232801	05/11/2005	1.48	E.3	<.2	555	<.04	.7
Many Cherry Spring	361008109232801	10/18/2005	.66	1.5	<.2	462	<.04	1.2
Bubbling Spring in Spring Canyon	360627109270101	05/12/2005	.74	E.3	<.2	515	<.04	.5
Bubbling Spring in Spring Canyon	360627109270101	07/25/2005	2.36	E.3	<.2	502	<.04	.3
Bubbling Spring in Spring Canyon	360627109270101	10/18/2005	.18	.09	<.2	481	<.04	E.09
Pine Tree Canyon Tinaja	361607109210601	05/15/2005	.94	E.2	<.2	129	<.04	1
Pine Tree Canyon Tinaja	361607109210601	10/20/2005	.43	.09	<.2	74.6	<.04	.99
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	5.06	2.1	<.2	1,330	<.04	.7
NPS Canyon de Chelly Well No. 2	360847109321201	08/17/2005	5.62	1.5	<.2	1,290	<.04	.5
NPS Canyon de Chelly Well No. 2	360847109321201	10/19/2005	.25	1	<.2	1,330	<.04	.23
Chaco Culture National Historical Park								
Chaco Wash at Chaco Canyon National Monument, NM	9367680	5/5/2005	3.42	17.1	<0.2	72.1	<0.04	11.7
Chaco Wash at Chaco Canyon National Monument, NM	9367680	08/16/2005	1.56	2.5	<.2	49.2	<.04	7
Gambler's Spring	360435107573601	04/12/2005	1.38	0.8	<.2	250	<.04	0.7
Gambler's Spring	360435107573601	08/17/2005	2.1	.6	<.2	227	<.04	1.2
Wijijji Spring	360057107522501	04/12/2005	5.24	1.3	<.2	1,180	<.04	1.1
Wijijji Spring	360057107522501	08/17/2005	10.6	1.5	<.2	1,370	.09	1.1
Wijijji Spring	360057107522501	12/06/2005	4.79	.11	<.2	1,010	E.04	.42
Historic Masonry Well - Middle	360146107551401	04/13/2005	2.11	32.1	<.2	765	<.04	3.3
Historic Masonry Well - Middle	360146107551401	08/17/2005	2.25	37.8	<.2	814	<.04	.4
Historic Masonry Well - Middle	360146107551401	12/05/2005	1.35	22.8	<.2	794	<.04	.1
Casa Chiquita Well - Middle	360402107583901	04/13/2005	<0.24	<1.6	<.8	<1.60	<.16	3.9
Casa Chiquita Well - Middle	360402107583901	08/18/2005	20.1	8.7	<.8	9,740	<.16	2.9
Casa Chiquita Well - Middle	360402107583901	12/06/2005	6.05	E.14	<.8	9,730	<.16	.32

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Nickel, dissolved (µg/L as Ni)	Selenium, dissolved (µg/L as Se)	Silver, dissolved (µg/L as Ag)	Strontium, dissolved (µg/L as Sr)	Thallium, dissolved (µg/L as Tl)	Vanadium, dissolved (µg/L as V)
El Morro National Monument								
South Side of Historic Pool at El Morro, NM	350225108210601	03/29/2005	0.3	E.2	<0.2	42.4	<0.04	0.2
South Side of Historic Pool at El Morro, NM	350225108210601	08/10/2005	.45	<.4	<.2	57.4	<.04	.1
South Side of Historic Pool at El Morro, NM	350225108210601	12/22/2005	.31	.09	<.2	55.3	<.04	<.10
El Morro Water Supply Well	350246108215001	03/30/2005	.52	2.8	<.2	200	<.04	9.6
El Morro Water Supply Well	350246108215001	08/11/2005	.67	2.7	<.2	194	<.04	8.8
El Morro Water Supply Well	350246108215001	12/22/2005	.38	2.4	<.2	180	<.04	9.6
El Malpais National Monument								
El Malpais Water Supply Well	345934108021501	03/30/2005	0.98	0.6	<0.2	248	<0.04	2.8
El Malpais Water Supply Well	345934108021501	08/11/2005	1.21	.6	<.2	255	<.04	2.1
El Malpais Water Supply Well	345934108021501	12/21/2005	.75	.45	<.2	238	<.04	1.9
Glen Canyon National Recreation Area								
San Juan River near Clay Hills Crossing	371734110235900	05/18/2005	0.97	0.8	<0.2	482	<0.04	1.4
San Juan River near Clay Hills Crossing	371734110235900	07/20/2005	2.45	.8	<.2	670	<.04	1.4
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	1.76	1.2	<.2	1,370	<.04	0.92
Lake Canyon at Hole in the Rock Trail	372315110372600	05/17/2005	.77	.5	<.2	259	<.04	1.4
Lake Canyon at Hole in the Rock Trail	372315110372600	07/20/2005	1.92	.5	<.2	241	<.04	7.7
Lake Canyon at Hole in the Rock Trail	372315110372600	12/01/2005	1.26	.41	<.2	292	<.04	6.4
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	05/05/2005	5.84	2.6	<.2	2,270	<.04	4
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	2.95	E.8	<.4	3,740	<.08	1.3
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	12/14/2005	3	.83	<.2	1,850	<.04	3.3
Escalante River above Stevens Canyon	372610110585201	06/13/2005	1.64	.5	<.2	224	<.04	2.7
Escalante River above Stevens Canyon	372610110585201	09/20/2005	1.16	.19	<.2	410	<.04	2.4
Escalante River above Stevens Canyon	372610110585201	11/22/2005	.97	.21	<.2	352	<.04	1.6
Coyote Gulch above Escalante River	372541110591100	06/14/2005	1.56	E.3	<.2	385	<.04	2.1
Coyote Gulch above Escalante River	372541110591100	09/20/2005	.93	.11	<.2	530	<.04	.93
Coyote Gulch above Escalante River	372541110591100	11/22/2005	1.09	.08	<.2	536	<.04	.46
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	05/04/2005	5.18	3.8	<.4	3,130	E.06	.9
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	08/26/2005	8.25	1.1	<.4	3,250	E.05	.8
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	11/29/2005	3.76	.14	<.4	4,070	E.04	.16
Paria River at Lees Ferry, AZ	9382000	06/27/2005	3.62	1.9	<.2	1,410	<.04	3.1
Paria River at Lees Ferry, AZ	9382000	08/24/2005	2.79	1.5	<.2	865	<.04	4.4
Paria River at Lees Ferry, AZ	9382000	11/29/2005	1.77	1.2	<.2	1,460	<.04	1.1

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Nickel, dissolved (µg/L as Ni)	Selenium, dissolved (µg/L as Se)	Silver, dissolved (µg/L as Ag)	Strontium, dissolved (µg/L as Sr)	Thallium, dissolved (µg/L as Tl)	Vanadium, dissolved (µg/L as V)
Grand Canyon National Park								
Schmutz Spring	362143112551201	05/26/2005	15.5	38.9	<0.2	2,790	0.11	0.9
Schmutz Spring	362143112551201	09/09/2005	.26	34.4	<.2	2,440	.08	.51
Schmutz Spring	362143112551201	11/30/2005	4.11	31.5	<.2	2,420	.09	.54
Cottonwood Creek North Rim Grand Canyon	361947112550200	05/26/2005	39.1	4	<.4	7,750	<.08	1.1
Cottonwood Creek North Rim Grand Canyon	361947112550200	11/30/2005	4.54	1.6	<.6	5,890	<.08	.34
Saddle Horse Spring	361344113032001	05/24/2005	2.76	0.7	<.2	120	<.04	8.8
Saddle Horse Spring	361344113032001	09/08/2005	0.07	.53	<.2	109	<.04	8
Saddle Horse Spring	361344113032001	12/01/2005	1.02	.5	<.2	114	<.04	8
Buckhorn Spring	362258112464701	05/23/2005	72.4	26.7	<.4	5,980	<.08	6.5
Buckhorn Spring	362258112464701	11/29/2005	3.57	26.6	<.6	3,820	<.08	1.1
Hotel Spring	362157112451601	05/23/2005	6.14	4.2	<.2	924	E.03	8.8
Hotel Spring	362157112451601	11/29/2005	2.47	5.9	<.2	858	<.04	9
Santa Maria Spring	360336112131801	06/20/2005	1.72	11.3	<.2	253	<.04	8.8
Santa Maria Spring	360336112131801	09/29/2005	.13	10.3	<.2	227	<.04	8
Santa Maria Spring	360336112131801	12/30/2005	.47	8	<.2	222	<.04	7.5
Robber's Roost Spring	361650112052001	05/27/2005	1.85	<.4	<.2	20.8	<.04	.9
Robber's Roost Spring	361650112052001	09/07/2005	.1	.16	<.2	35.1	<.04	.93
Robber's Roost Spring	361650112052001	10/25/2005	.09	.15	<.2	30.6	<.04	1.1
Mesa Verde National Park								
U.S. Highway 160 Spring near Park Entrance	372040108245801	05/17/2005	372	45.4	<0.6	3,050	0.34	0.6
U.S. Highway 160 Spring near Park Entrance	372040108245801	09/15/2005	376	43.8	<.2	3,720	.40	E.05
U.S. Highway 160 Spring near Park Entrance	372040108245801	11/09/2005	305	40.2	<2.2	2,250	.40	E.05
Morefield Spring	371415108242301	05/19/2005	1.03	6.4	<.4	651	<.08	1.8
Morefield Spring	371415108242301	09/13/2005	0.18	0.59	<.2	550	<.04	.63
Morefield Spring	371415108242301	11/08/2005	1.24	.48	<.4	480	<.08	.71
Cattail Spring	371607108245501	05/19/2005	7.97	2	<.6	3,930	<.12	4.1
Spruce Tree House Spring	371105108291501	05/18/2005	.3	.5	<.2	201	<.04	.6
Spruce Tree House Spring	371105108291501	09/14/2005	2.66	.5	<.2	202	<.04	.13
Spruce Tree House Spring	371105108291501	11/09/2005	3.04	.49	<.2	176	<.04	.18
Echo Cliff Drainage Spring	370944108295101	05/18/2005	5.19	3.1	<.6	3,980	<.12	2.5
Echo Cliff Drainage Spring	370944108295101	09/14/2005	16.5	.5	<.2	4,060	E.02	.68
Echo Cliff Drainage Spring	370944108295101	11/09/2005	10.2	.4	<.6	3,710	<.12	.32
Long House Spring	371112108320901	05/19/2005	.11	.6	<.2	115	<.04	.4
Long House Spring	371112108320901	09/13/2005	1.86	.32	<.2	125	<.04	.28
Long House Spring	371112108320901	11/08/2005	1.95	.36	<.2	109	<.04	.28

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Nickel, dissolved (µg/L as Ni)	Selenium, dissolved (µg/L as Se)	Silver, dissolved (µg/L as Ag)	Strontium, dissolved (µg/L as Sr)	Thallium, dissolved (µg/L as Tl)	Vanadium, dissolved (µg/L as V)
Mesa Verde National Park—Continued								
Bobcat Spring	371102108313101	05/19/2005	0.14	<0.4	<0.2	57.8	<0.04	0.3
Bobcat Spring	371102108313101	09/13/2005	1.55	.2	<.2	58	<.04	.31
Bobcat Spring	371102108313101	11/08/2005	1.71	.17	<.2	50.1	<.04	.3
Mancos River at Gaging Station	371648108214500	06/03/2005	2.07	.7	<.2	283	<.04	.3
Mancos River at Gaging Station	371648108214500	09/12/2005	6.46	.79	<.2	1,080	<.04	.44
Mancos River at Gaging Station	371648108214500	11/07/2005	10	1.4	<.2	1,350	E.02	.21
Petrified Forest National Park								
Puerco River near Adamana, AZ	9396500	03/21/2005	3.21	1.8	<0.02	615	<0.04	3.9
Puerco River near Adamana, AZ	9396500	08/08/2005	3.98	1.2	<.2	517	<.04	3.3
Kokopelli Spring	345726109471101	03/17/2005	1.96	0.6	<.2	30.7	<.04	28.6
Kokopelli Spring	345726109471101	08/09/2005	0.84	E.3	<.2	259	<.04	6.7
Kokopelli Spring	345726109471101	10/26/2005	1	.27	<.2	190	<.04	12.2
Puerco Well No. 2	345850109475001	03/17/2005	2.08	.7	<.2	1,450	<.04	0.2
Puerco Well No. 2	345850109475001	08/09/2005	2.04	<.4	<.2	1,380	<.04	0.7
Puerco Well No. 2	345850109475001	10/26/2005	1.7	E.06	<.2	1,340	.05	.57
Petroglyph National Monument								
North Boca Negra Arroyo	350936106431100	09/28/2005	0.83	1.2	<0.2	63.3	<.04	11.8
North Boca Negra Arroyo	350936106431100	10/04/2005	2.46	0.19	<.2	120	<.04	16.6
Petroglyph Well 1	350809106424901	06/23/2005	1.25	1.9	<.2	401	E.03	19.7
Petroglyph Well 1	350809106424901	09/28/2005	0.06	3.1	<.2	394	<.04	18.7
Petroglyph Well 1	350809106424901	12/13/2005	.48	1.9	<.2	387	<.04	20.7
Rainbow Bridge National Monument								
Rainbow Bridge Creek	370439110575400	05/03/2005	1.52	E0.3	<0.2	283	0.09	2.2
Rainbow Bridge Creek	370439110575400	08/25/2005	0.96	E.4	<.2	193	.15	1.8
Rainbow Bridge Creek	370439110575400	11/30/2005	0.96	.11	<.2	249	.06	0.95
Yucca House National Monument								
Main Yucca House Spring (YUCW06)	371500108410801	05/20/2005	2.02	14.5	<0.2	3,050	0.05	1.7
Main Yucca House Spring (YUCW06)	371500108410801	08/30/2005	21.8	30.6	<.4	4,480	E.07	1.3
Main Yucca House Spring (YUCW06)	371500108410801	11/03/2005	18	16.9	<.2	3,580	.07	0.93

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Zinc, dissolved (µg/L as Z)	Petroleum hydrocarbons, total (mg/L)	Radioactivity, gross-alpha 30 day, dissolved (pCi/L as 230Th)	Radioactivity, gross-alpha 72 hour, dissolved (pCi/L as 230Th)	Radioactivity, gross-beta 30 day, dissolved pCi/(L as 137Cs)
Aztec Ruins National Monument							
Animas River	364958107594500	04/05/2005	3.7	---	---	---	---
Animas River	364958107594500	08/31/2005	3.7	4	---	---	---
Animas River	364958107594500	11/03/2005	7.5	---	---	---	---
Farmer's Ditch	365024107594600	04/05/2005	8.1	---	---	---	---
Farmer's Ditch	365024107594600	08/31/2005	1.7	---	---	---	---
Farmer's Ditch	365024107594600	11/03/2005	5.8	---	---	---	---
Bandelier National Monument							
Rito de los Frijoles near Los Alamos, NM	8313300	04/26/2005	14.6	---	---	---	---
Rito de los Frijoles near Los Alamos, NM	8313300	08/26/2005	E0.4	---	---	---	---
Rito de los Frijoles near Los Alamos, NM	8313300	11/18/2005	E.4	---	---	---	---
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	0.6	---	---	---	---
Rito de los Frijoles at Headquarters Gaging Station	8313350	08/23/2005	E.4	---	---	---	---
Rito de los Frijoles at Headquarters Gaging Station	8313350	11/15/2005	1.6	---	---	---	---
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	04/29/2005	.7	---	---	---	---
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	08/23/2005	<.6	---	---	---	---
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	11/15/2005	E.4	---	---	---	---
Frijoles Spring along Rio Grande	354502106152701	04/29/2005	.6	---	---	---	---
Frijoles Spring along Rio Grande	354502106152701	08/23/2005	<.6	---	---	---	---
Frijoles Spring along Rio Grande	354502106152701	11/15/2005	<.6	---	---	---	---
Alamo Springs Grazing Exclosure	354928106260401	04/27/2005	1.3	---	---	---	---
Alamo Springs Grazing Exclosure	354928106260401	08/24/2005	E.5	---	---	---	---
Alamo Springs Grazing Exclosure	354928106260401	11/16/2005	E.5	---	---	---	---
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	04/26/2005	.8	---	---	---	---
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	08/26/2005	E.4	---	---	---	---
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	11/18/2005	E.3	---	---	---	---
Capulin Creek below Base Camp	354526106194400	06/02/2005	E.5	---	---	---	---
Capulin Creek below Base Camp	354526106194400	08/24/2005	<.6	---	---	---	---
Capulin Creek below Base Camp	354526106194400	11/16/2005	<.6	---	---	---	---
Turkey Springs	354411106212001	04/28/2005	<.6	---	---	---	---
Turkey Springs	354411106212001	08/25/2005	<.6	---	---	---	---
Turkey Springs	354411106212001	11/17/2005	E.4	---	---	---	---
Canyon de Chelly National Monument							
Tsaile Lake	361621109121300	04/22/2005	<0.6	3	---	---	---
Tsaile Lake	361621109121300	08/23/2005	E.4	---	---	---	---
Tsaile Lake	361621109121300	10/19/2005	.62	4	---	---	---
Tsaile Creek below Tsaile Lake	361624109122400	04/22/2005	2.4	2	---	---	---

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Zinc, dissolved (µg/L as Z)	Petroleum hydrocarbons, total (mg/L)	Radioactivity, gross-alpha 30 day, dissolved (pCi/L as 230Th)	Radioactivity, gross-alpha 72 hour, dissolved (pCi/L as 230Th)	Radioactivity, gross-beta 30 day, dissolved (pCi/L as 137Cs)
Canyon de Chelly National Monument—Continued							
Tsaile Creek below Tsaile Lake	361624109122400	08/23/2005	0.6	---	---	---	---
Tsaile Creek below Tsaile Lake	361624109122400	10/19/2005	1.3	3	---	---	---
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	05/10/2005	<.6	2	0.9	0.9	2.1
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	12/08/2005	<.6	<2	1.9	-.3	5.5
Chinle Wash below White House Ruins	360800109282700	04/23/2005	0.9	3	---	---	---
Chinle Wash below White House Ruins	360800109282700	12/07/2005	1.4	3	2.6	.9	0.9
Chinle Creek at Chinle, AZ	9379025	04/23/2005	E.3	<2	---	---	---
Chinle Creek at Chinle, AZ	9379025	08/17/2005	E.4	---	---	---	---
Many Cherry Spring	361008109232801	05/11/2005	.7	---	---	---	---
Many Cherry Spring	361008109232801	10/18/2005	3	---	---	---	---
Bubbling Spring in Spring Canyon	360627109270101	05/12/2005	.7	---	---	---	---
Bubbling Spring in Spring Canyon	360627109270101	07/25/2005	1.5	---	---	---	---
Bubbling Spring in Spring Canyon	360627109270101	10/18/2005	.93	---	---	---	---
Pine Tree Canyon Tinaja	361607109210601	05/15/2005	<.6	---	---	---	---
Pine Tree Canyon Tinaja	361607109210601	10/20/2005	1.6	---	---	---	---
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	1.6	<2	---	---	---
NPS Canyon de Chelly Well No. 2	360847109321201	08/17/2005	5.7	---	---	---	---
NPS Canyon de Chelly Well No. 2	360847109321201	10/19/2005	2.8	---	---	---	---
Chaco Culture National Historical Park							
Chaco Wash at Chaco Canyon National Monument, NM	9367680	5/5/2005	10.2	---	---	---	---
Chaco Wash at Chaco Canyon National Monument, NM	9367680	08/16/2005	0.8	2	---	---	---
Gambler's Spring	360435107573601	04/12/2005	E.3	---	---	---	---
Gambler's Spring	360435107573601	08/17/2005	1.3	---	---	---	---
Wijijji Spring	360057107522501	04/12/2005	4.2	---	---	---	---
Wijijji Spring	360057107522501	08/17/2005	5.4	---	---	---	---
Wijijji Spring	360057107522501	12/06/2005	7.3	---	---	---	---
Historic Masonry Well - Middle	360146107551401	04/13/2005	1.6	2	---	---	---
Historic Masonry Well - Middle	360146107551401	08/17/2005	2.5	<2	5.8	14	6.6
Historic Masonry Well - Middle	360146107551401	12/05/2005	3.4	2	2.3	3.1	5.4
Casa Chiquita Well - Middle	360402107583901	04/13/2005	<2.4	<2	---	---	---
Casa Chiquita Well - Middle	360402107583901	08/18/2005	13.9	<2	24	32	15
Casa Chiquita Well - Middle	360402107583901	12/06/2005	17.3	3	35.1	48.3	13.4

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Zinc, dissolved (µg/L as Z)	Petroleum hydrocarbons, total (mg/L)	Radioactivity, gross-alpha 30 day, dissolved (pCi/L as 230Th)	Radioactivity, gross-alpha 72 hour, dissolved (pCi/L as 230Th)	Radioactivity, gross-beta 30 day, dissolved (pCi/L as 137Cs)
El Morro National Monument							
South Side of Historic Pool at El Morro, NM	350225108210601	03/29/2005	<0.6	---	---	---	---
South Side of Historic Pool at El Morro, NM	350225108210601	08/10/2005	1.2	---	---	---	---
South Side of Historic Pool at El Morro, NM	350225108210601	12/22/2005	<.6	---	---	---	---
El Morro Water Supply Well	350246108215001	03/30/2005	2.1	---	---	---	---
El Morro Water Supply Well	350246108215001	08/11/2005	1.2	---	---	---	---
El Morro Water Supply Well	350246108215001	12/22/2005	<.6	---	---	---	---
El Malpais National Monument							
El Malpais Water Supply Well	345934108021501	03/30/2005	133	---	---	---	---
El Malpais Water Supply Well	345934108021501	08/11/2005	38.3	---	---	---	---
El Malpais Water Supply Well	345934108021501	12/21/2005	61.3	---	---	---	---
Glen Canyon National Recreation Area							
San Juan River near Clay Hills Crossing	371734110235900	05/18/2005	4.9	---	---	---	---
San Juan River near Clay Hills Crossing	371734110235900	07/20/2005	1.2	5	---	---	---
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	1.4	2	---	---	---
Lake Canyon at Hole in the Rock Trail	372315110372600	05/17/2005	2.9	---	---	---	---
Lake Canyon at Hole in the Rock Trail	372315110372600	07/20/2005	9.3	---	---	---	---
Lake Canyon at Hole in the Rock Trail	372315110372600	12/01/2005	1	---	---	---	---
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	05/05/2005	1.1	---	---	---	---
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	1.4	5	3.1	2	13
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	12/14/2005	0.7	3	---	---	---
Escalante River above Stevens Canyon	372610110585201	06/13/2005	E.4	---	---	---	---
Escalante River above Stevens Canyon	372610110585201	09/20/2005	1.3	---	---	---	---
Escalante River above Stevens Canyon	372610110585201	11/22/2005	E.4	---	---	---	---
Coyote Gulch above Escalante River	372541110591100	06/14/2005	<.6	---	---	---	---
Coyote Gulch above Escalante River	372541110591100	09/20/2005	.4	---	---	---	---
Coyote Gulch above Escalante River	372541110591100	11/22/2005	<.6	---	---	---	---
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	05/04/2005	4.1	---	---	---	---
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	08/26/2005	5.4	---	---	---	---
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	11/29/2005	6.3	---	---	---	---
Paria River at Lees Ferry, AZ	9382000	06/27/2005	.7	---	---	---	---
Paria River at Lees Ferry, AZ	9382000	08/24/2005	4.9	---	---	---	---
Paria River at Lees Ferry, AZ	9382000	11/29/2005	1.3	---	---	---	---

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Zinc, dissolved (µg/L as Z)	Petroleum hydrocarbons, total (mg/L)	Radioactivity, gross-alpha 30 day, dissolved (pCi/L as 230Th)	Radioactivity, gross-alpha 72 hour, dissolved (pCi/L as 230Th)	Radioactivity, gross-beta 30 day, dissolved (pCi/L as 137Cs)
Grand Canyon National Park							
Schmutz Spring	362143112551201	05/26/2005	5.7	---	---	---	---
Schmutz Spring	362143112551201	09/09/2005	4.4	---	---	---	---
Schmutz Spring	362143112551201	11/30/2005	24.8	---	---	---	---
Cottonwood Creek North Rim Grand Canyon	361947112550200	05/26/2005	5.9	---	---	---	---
Cottonwood Creek North Rim Grand Canyon	361947112550200	11/30/2005	5.4	---	---	---	---
Saddle Horse Spring	361344113032001	05/24/2005	E0.3	---	---	---	---
Saddle Horse Spring	361344113032001	09/08/2005	E.5	---	---	---	---
Saddle Horse Spring	361344113032001	12/01/2005	0.8	---	---	---	---
Buckhorn Spring	362258112464701	05/23/2005	6.4	---	---	---	---
Buckhorn Spring	362258112464701	11/29/2005	9.5	---	---	---	---
Hotel Spring	362157112451601	05/23/2005	1.2	---	---	---	---
Hotel Spring	362157112451601	11/29/2005	4.1	---	---	---	---
Santa Maria Spring	360336112131801	06/20/2005	E.6	---	---	---	---
Santa Maria Spring	360336112131801	09/29/2005	1.1	---	---	---	---
Santa Maria Spring	360336112131801	12/30/2005	.7	---	---	---	---
Robber's Roost Spring	361650112052001	05/27/2005	.7	---	---	---	---
Robber's Roost Spring	361650112052001	09/07/2005	.6	---	---	---	---
Robber's Roost Spring	361650112052001	10/25/2005	<.60	---	---	---	---
Mesa Verde National Park							
U.S. Highway 160 Spring near Park Entrance	372040108245801	05/17/2005	659	---	---	---	---
U.S. Highway 160 Spring near Park Entrance	372040108245801	09/15/2005	370	---	---	---	---
U.S. Highway 160 Spring near Park Entrance	372040108245801	11/09/2005	678	---	---	---	---
Morefield Spring	371415108242301	05/19/2005	2.8	---	---	---	---
Morefield Spring	371415108242301	09/13/2005	<0.60	---	---	---	---
Morefield Spring	371415108242301	11/08/2005	6.9	---	---	---	---
Cattail Spring	371607108245501	05/19/2005	13.1	---	---	---	---
Spruce Tree House Spring	371105108291501	05/18/2005	<.6	---	---	---	---
Spruce Tree House Spring	371105108291501	09/14/2005	<.60	---	---	---	---
Spruce Tree House Spring	371105108291501	11/09/2005	.7	---	---	---	---
Echo Cliff Drainage Spring	370944108295101	05/18/2005	14.8	---	---	---	---
Echo Cliff Drainage Spring	370944108295101	09/14/2005	1.9	---	---	---	---
Echo Cliff Drainage Spring	370944108295101	11/09/2005	6.9	---	---	---	---
Long House Spring	371112108320901	05/19/2005	<.6	---	---	---	---
Long House Spring	371112108320901	09/13/2005	<.60	---	---	---	---
Long House Spring	371112108320901	11/08/2005	<.6	---	---	---	---

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Zinc, dissolved (µg/L as Z)	Petroleum hydrocarbons, total (mg/L)	Radioactivity, gross-alpha 30 day, dissolved (pCi/L as 230Th)	Radioactivity, gross-alpha 72 hour, dissolved (pCi/L as 230Th)	Radioactivity, gross-beta 30 day, dissolved (pCi/L as 137Cs)
Mesa Verde National Park—Continued							
Bobcat Spring	371102108313101	05/19/2005	<0.6	---	---	---	---
Bobcat Spring	371102108313101	09/13/2005	<.60	---	---	---	---
Bobcat Spring	371102108313101	11/08/2005	E.3	---	---	---	---
Mancos River at Gaging Station	371648108214500	06/03/2005	.6	2	---	---	---
Mancos River at Gaging Station	371648108214500	09/12/2005	<.60	<2	---	---	---
Mancos River at Gaging Station	371648108214500	11/07/2005	2.3	<2	---	---	---
Petrified Forest National Park							
Puerco River near Adamana, AZ	9396500	03/21/2005	15.9	---	4.9	5	7.3
Puerco River near Adamana, AZ	9396500	08/08/2005	20.7	5	---	---	---
Kokopelli Spring	345726109471101	03/17/2005	12.3	---	---	---	---
Kokopelli Spring	345726109471101	08/09/2005	1.3	---	---	---	---
Kokopelli Spring	345726109471101	10/26/2005	E.34	---	---	---	---
Puerco Well No. 2	345850109475001	03/17/2005	27	---	–.4	–1.7	1.8
Puerco Well No. 2	345850109475001	08/09/2005	18.7	---	---	---	---
Puerco Well No. 2	345850109475001	10/26/2005	27.3	---	–4	–4	1.9
Petroglyph National Monument							
North Boca Negra Arroyo	350936106431100	09/28/2005	2.3	<2	---	---	---
North Boca Negra Arroyo	350936106431100	10/4/2005	1.3	---	---	---	---
Petroglyph Well 1	350809106424901	06/23/2005	E0.3	<2	---	---	---
Petroglyph Well 1	350809106424901	09/28/2005	86.6	---	---	---	---
Petroglyph Well 1	350809106424901	12/13/2005	<.6	<2	---	---	---
Rainbow Bridge National Monument							
Rainbow Bridge Creek	370439110575400	05/03/2005	3.8	---	---	---	---
Rainbow Bridge Creek	370439110575400	08/25/2005	1	---	---	---	---
Rainbow Bridge Creek	370439110575400	11/30/2005	<0.6	---	---	---	---
Yucca House National							
Main Yucca House Spring (YUCW06)	371500108410801	05/20/2005	4.2	---	---	---	---
Main Yucca House Spring (YUCW06)	371500108410801	08/30/2005	5.2	---	---	---	---
Main Yucca House Spring (YUCW06)	371500108410801	11/03/2005	0.97	---	---	---	---

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Radioactivity, gross-beta 72 hour, dissolved (pCi/L as 137Cs)	Uranium, natural, dissolved (µg/L as U)	Suspended sediment, percent smaller than 0.063 mm	Suspended sediment concentration (mg/L)
Aztec Ruins National Monument						
Animas River	364958107594500	04/05/2005	---	1.41	73	362
Animas River	364958107594500	08/31/2005	---	1.33	92	25
Animas River	364958107594500	11/03/2005	---	1.39	41	58
Farmer's Ditch	365024107594600	04/05/2005	---	1.46	94	253
Farmer's Ditch	365024107594600	08/31/2005	---	1.35	---	---
Farmer's Ditch	365024107594600	11/03/2005	---	1.3	---	---
Bandelier National Monument						
Rito de los Frijoles near Los Alamos, NM	8313300	04/26/2005	---	0.09	---	---
Rito de los Frijoles near Los Alamos, NM	8313300	08/26/2005	---	.13	---	---
Rito de los Frijoles near Los Alamos, NM	8313300	11/18/2005	---	.14	---	---
Rito de los Frijoles at Headquarters Gaging Station	8313350	04/27/2005	---	.08	---	---
Rito de los Frijoles at Headquarters Gaging Station	8313350	08/23/2005	---	.09	---	---
Rito de los Frijoles at Headquarters Gaging Station	8313350	11/15/2005	---	.05	---	---
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	04/29/2005	---	.09	---	---
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	08/23/2005	---	.07	---	---
Rito de los Frijoles below Frijoles Falls, NM	354511106151010	11/15/2005	---	.06	---	---
Frijoles Spring along Rio Grande	354502106152701	04/29/2005	---	.61	---	---
Frijoles Spring along Rio Grande	354502106152701	08/23/2005	---	.53	---	---
Frijoles Spring along Rio Grande	354502106152701	11/15/2005	---	.54	---	---
Alamo Springs Grazing Exclosure	354928106260401	04/27/2005	---	.06	---	---
Alamo Springs Grazing Exclosure	354928106260401	08/24/2005	---	.07	---	---
Alamo Springs Grazing Exclosure	354928106260401	11/16/2005	---	E.03	---	---
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	04/26/2005	---	.05	---	---
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	08/26/2005	---	.04	---	---
Alamo Canyon above Ponderosa Trail Crossing	354733106210300	11/18/2005	---	E.04	---	---
Capulin Creek below Base Camp	354526106194400	06/02/2005	---	.07	---	---
Capulin Creek below Base Camp	354526106194400	08/24/2005	---	.09	---	---
Capulin Creek below Base Camp	354526106194400	11/16/2005	---	.07	---	---
Turkey Springs	354411106212001	04/28/2005	---	.51	---	---
Turkey Springs	354411106212001	08/25/2005	---	.25	---	---
Turkey Springs	354411106212001	11/17/2005	---	.47	---	---
Canyon de Chelly National Monument						
Tsaile Lake	361621109121300	04/22/2005	---	.9	---	---
Tsaile Lake	361621109121300	08/23/2005	---	.85	93	20
Tsaile Lake	361621109121300	10/19/2005	---	.9	96	32
Tsaile Creek below Tsaile Lake	361624109122400	04/22/2005	---	.85	---	---

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Radioactivity, gross-beta 72 hour, dissolved (pCi/L as 137Cs)	Uranium, natural, dissolved (µg/L as U)	Suspended sediment, percent smaller than 0.063 mm	Suspended sediment concentration (mg/L)
Canyon de Chelly National Monument—Continued						
Tsaile Creek below Tsaile Lake	361624109122400	08/23/2005	---	0.57	98	14
Tsaile Creek below Tsaile Lake	361624109122400	10/19/2005	---	.61	94	10
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	05/10/2005	1.9	.73	38	2,350
Tsaile Creek at Bare Rock Trail Crossing	360908109282201	12/08/2005	0.2	2.31	---	---
Chinle Wash below White House Ruins	360800109282700	04/23/2005	---	.73	43	1,850
Chinle Wash below White House Ruins	360800109282700	12/07/2005	1.3	3.24	---	---
Chinle Creek at Chinle, AZ	9379025	04/23/2005	---	.92	65	2,160
Chinle Creek at Chinle, AZ	9379025	08/17/2005	---	1.14	---	---
Many Cherry Spring	361008109232801	05/11/2005	---	3.05	---	---
Many Cherry Spring	361008109232801	10/18/2005	---	32.5	---	---
Bubbling Spring in Spring Canyon	360627109270101	05/12/2005	---	2.44	---	---
Bubbling Spring in Spring Canyon	360627109270101	07/25/2005	---	2.2	---	---
Bubbling Spring in Spring Canyon	360627109270101	10/18/2005	---	1.54	---	---
Pine Tree Canyon Tinaja	361607109210601	05/15/2005	---	1.03	---	---
Pine Tree Canyon Tinaja	361607109210601	10/20/2005	---	.17	---	---
NPS Canyon de Chelly Well No. 2	360847109321201	04/11/2005	---	6.5	---	---
NPS Canyon de Chelly Well No. 2	360847109321201	08/17/2005	---	5.64	---	---
NPS Canyon de Chelly Well No. 2	360847109321201	10/19/2005	---	5.63	---	---
Chaco Culture National Historical Park						
Chaco Wash at Chaco Canyon National Monument, NM	9367680	5/5/2005	---	10.2	100	38,200
Chaco Wash at Chaco Canyon National Monument, NM	9367680	08/16/2005	---	1.59	99	16,300
Gambler's Spring	360435107573601	04/12/2005	---	1.9	---	---
Gambler's Spring	360435107573601	08/17/2005	---	1.54	---	---
Wijijji Spring	360057107522501	04/12/2005	---	1.06	---	---
Wijijji Spring	360057107522501	08/17/2005	---	0.77	---	---
Wijijji Spring	360057107522501	12/06/2005	---	.99	---	---
Historic Masonry Well - Middle	360146107551401	04/13/2005	---	10.1	---	---
Historic Masonry Well - Middle	360146107551401	08/17/2005	6	6.56	---	---
Historic Masonry Well - Middle	360146107551401	12/05/2005	0.3	6.9	---	---
Casa Chiquita Well - Middle	360402107583901	04/13/2005	---	<.16	---	---
Casa Chiquita Well - Middle	360402107583901	08/18/2005	3	34.6	---	---
Casa Chiquita Well - Middle	360402107583901	12/06/2005	7.8	45.1	---	---

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Radioactivity, gross-beta 72 hour, dissolved (pCi/L as 137Cs)	Uranium, natural, dissolved (µg/L as U)	Suspended sediment, percent smaller than 0.063 mm	Suspended sediment concentration (mg/L)
El Morro National Monument						
South Side of Historic Pool at El Morro, NM	350225108210601	03/29/2005	---	0.05	---	---
South Side of Historic Pool at El Morro, NM	350225108210601	08/10/2005	---	.09	---	---
South Side of Historic Pool at El Morro, NM	350225108210601	12/22/2005	---	.05	---	---
El Morro Water Supply Well	350246108215001	03/30/2005	---	2.54	---	---
El Morro Water Supply Well	350246108215001	08/11/2005	---	2.5	---	---
El Morro Water Supply Well	350246108215001	12/22/2005	---	2.79	---	---
El Malpais National Monument						
El Malpais Water Supply Well	345934108021501	03/30/2005	---	21.8	---	---
El Malpais Water Supply Well	345934108021501	08/11/2005	---	22.8	---	---
El Malpais Water Supply Well	345934108021501	12/21/2005	---	25.2	---	---
Glen Canyon National Recreation Area						
San Juan River near Clay Hills Crossing	371734110235900	05/18/2005	---	1.27	---	---
San Juan River near Clay Hills Crossing	371734110235900	07/20/2005	---	1.42	89	50
San Juan River near Clay Hills Crossing	371734110235900	12/15/2005	---	3.1	25	447
Lake Canyon at Hole in the Rock Trail	372315110372600	05/17/2005	---	1.28	---	---
Lake Canyon at Hole in the Rock Trail	372315110372600	07/20/2005	---	1.44	22	1,440
Lake Canyon at Hole in the Rock Trail	372315110372600	12/01/2005	---	3.48	16	829
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	05/05/2005	---	4.84	90	2,820
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	07/21/2005	12.7	3.52	81	13
Dirty Devil River above Poison Springs near Hanksville, UT	9333500	12/14/2005	---	4.96	38	1,290
Escalante River above Stevens Canyon	372610110585201	06/13/2005	---	1.36	85	2,690
Escalante River above Stevens Canyon	372610110585201	09/20/2005	---	0.94	39	415
Escalante River above Stevens Canyon	372610110585201	11/22/2005	---	1.11	30	575
Coyote Gulch above Escalante River	372541110591100	06/14/2005	---	.31	---	---
Coyote Gulch above Escalante River	372541110591100	09/20/2005	---	.3	---	---
Coyote Gulch above Escalante River	372541110591100	11/22/2005	---	.4	---	---
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	05/04/2005	---	10.4	99	1,010
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	08/26/2005	---	5.82	98	77
Last Chance Canyon at Burning Hills Rd, UT	371105111220600	11/29/2005	---	8.31	78	12
Paria River at Lees Ferry, AZ	9382000	06/27/2005	---	3.57	---	---
Paria River at Lees Ferry, AZ	9382000	08/24/2005	---	3.29	---	---
Paria River at Lees Ferry, AZ	9382000	11/29/2005	---	4.22	66	749

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Radioactivity, gross-beta 72 hour, dissolved (pCi/L as 137Cs)	Uranium, natural, dissolved (µg/L as U)	Suspended sediment, percent smaller than 0.063 mm	Suspended sediment concentration (mg/L)
Grand Canyon National Park						
Schmutz Spring	362143112551201	05/26/2005	---	5.98	---	---
Schmutz Spring	362143112551201	09/09/2005	---	4.52	---	---
Schmutz Spring	362143112551201	11/30/2005	---	4.64	---	---
Cottonwood Creek North Rim Grand Canyon	361947112550200	05/26/2005	---	4.82	---	---
Cottonwood Creek North Rim Grand Canyon	361947112550200	11/30/2005	---	5	---	---
Saddle Horse Spring	361344113032001	05/24/2005	---	0.55	---	---
Saddle Horse Spring	361344113032001	09/08/2005	---	.52	---	---
Saddle Horse Spring	361344113032001	12/01/2005	---	.56	---	---
Buckhorn Spring	362258112464701	05/23/2005	---	10.3	---	---
Buckhorn Spring	362258112464701	11/29/2005	---	10.6	---	---
Hotel Spring	362157112451601	05/23/2005	---	2.87	---	---
Hotel Spring	362157112451601	11/29/2005	---	4.17	---	---
Santa Maria Spring	360336112131801	06/20/2005	---	5.29	---	---
Santa Maria Spring	360336112131801	09/29/2005	---	4.67	---	---
Santa Maria Spring	360336112131801	12/30/2005	---	4.39	---	---
Robber's Roost Spring	361650112052001	05/27/2005	---	.11	---	---
Robber's Roost Spring	361650112052001	09/07/2005	---	.43	---	---
Robber's Roost Spring	361650112052001	10/25/2005	---	.5	---	---
Mesa Verde National Park						
U.S. Highway 160 Spring near Park Entrance	372040108245801	05/17/2005	---	0.26	---	---
U.S. Highway 160 Spring near Park Entrance	372040108245801	09/15/2005	---	.27	---	---
U.S. Highway 160 Spring near Park Entrance	372040108245801	11/09/2005	---	.25	---	---
Morefield Spring	371415108242301	05/19/2005	---	4.81	---	---
Morefield Spring	371415108242301	09/13/2005	---	1.55	---	---
Morefield Spring	371415108242301	11/08/2005	---	1.38	---	---
Cattail Spring	371607108245501	05/19/2005	---	55.7	---	---
Spruce Tree House Spring	371105108291501	05/18/2005	---	.87	---	---
Spruce Tree House Spring	371105108291501	09/14/2005	---	.74	---	---
Spruce Tree House Spring	371105108291501	11/09/2005	---	.6	---	---
Echo Cliff Drainage Spring	370944108295101	05/18/2005	---	15	---	---
Echo Cliff Drainage Spring	370944108295101	09/14/2005	---	11.3	---	---
Echo Cliff Drainage Spring	370944108295101	11/09/2005	---	14	---	---
Long House Spring	371112108320901	05/19/2005	---	.17	---	---
Long House Spring	371112108320901	09/13/2005		.15		
Long House Spring	371112108320901	11/08/2005		.15		

Table 4. Water-Quality data for key water bodies at selected National Park units from the Southern Colorado Plateau Inventory and Monitoring Network—Continued.

Site name	USGS ID number	Date of sample	Radioactivity, gross-beta 72 hour, dissolved (pCi/L as 137Cs)	Uranium, natural, dissolved (µg/L as U)	Suspended sediment, percent smaller than 0.063 mm	Suspended sediment concentration (mg/L)
Mesa Verde National Park—Continued						
Bobcat Spring	371102108313101	05/19/2005	---	0.09	---	---
Bobcat Spring	371102108313101	09/13/2005	---	.08	---	---
Bobcat Spring	371102108313101	11/08/2005	---	.08	---	---
Mancos River at Gaging Station	371648108214500	06/03/2005	---	.52	---	---
Mancos River at Gaging Station	371648108214500	09/12/2005	---	2.31	81	583
Mancos River at Gaging Station	371648108214500	11/07/2005	---	3.36	97	30
Petrified Forest National Park						
Puerco River near Adamana, AZ	9396500	03/21/2005	6.1	7.46	100	15,600
Puerco River near Adamana, AZ	9396500	08/08/2005	---	4.07	94	150,000
Kokopelli Spring	345726109471101	03/17/2005	---	5.48	---	---
Kokopelli Spring	345726109471101	08/09/2005	---	5.25	---	---
Kokopelli Spring	345726109471101	10/26/2005	---	3.27	---	---
Puerco Well No. 2	345850109475001	03/17/2005	1.4	.29	---	---
Puerco Well No. 2	345850109475001	08/09/2005	---	.27	---	---
Puerco Well No. 2	345850109475001	10/26/2005	2.4	.27	---	---
Petroglyph National Monument						
North Boca Negra Arroyo	350936106431100	09/28/2005	---	.17	---	---
North Boca Negra Arroyo	350936106431100	10/04/2005	---	.35	---	---
Petroglyph Well 1	350809106424901	06/23/2005	---	2.8	---	---
Petroglyph Well 1	350809106424901	09/28/2005	---	3.03	---	---
Petroglyph Well 1	350809106424901	12/13/2005	---	2.84	---	---
Rainbow Bridge National Monument						
Rainbow Bridge Creek	370439110575400	05/03/2005	---	1.49	85	10
Rainbow Bridge Creek	370439110575400	08/25/2005	---	.33	91	11
Rainbow Bridge Creek	370439110575400	11/30/2005	---	1.33	---	---
Yucca House National Monument						
Main Yucca House Spring (YUCW06)	371500108410801	05/20/2005	---	13.5	---	---
Main Yucca House Spring (YUCW06)	371500108410801	08/30/2005	---	18.1	---	---
Main Yucca House Spring (YUCW06)	371500108410801	11/03/2005	---	17.4	---	---

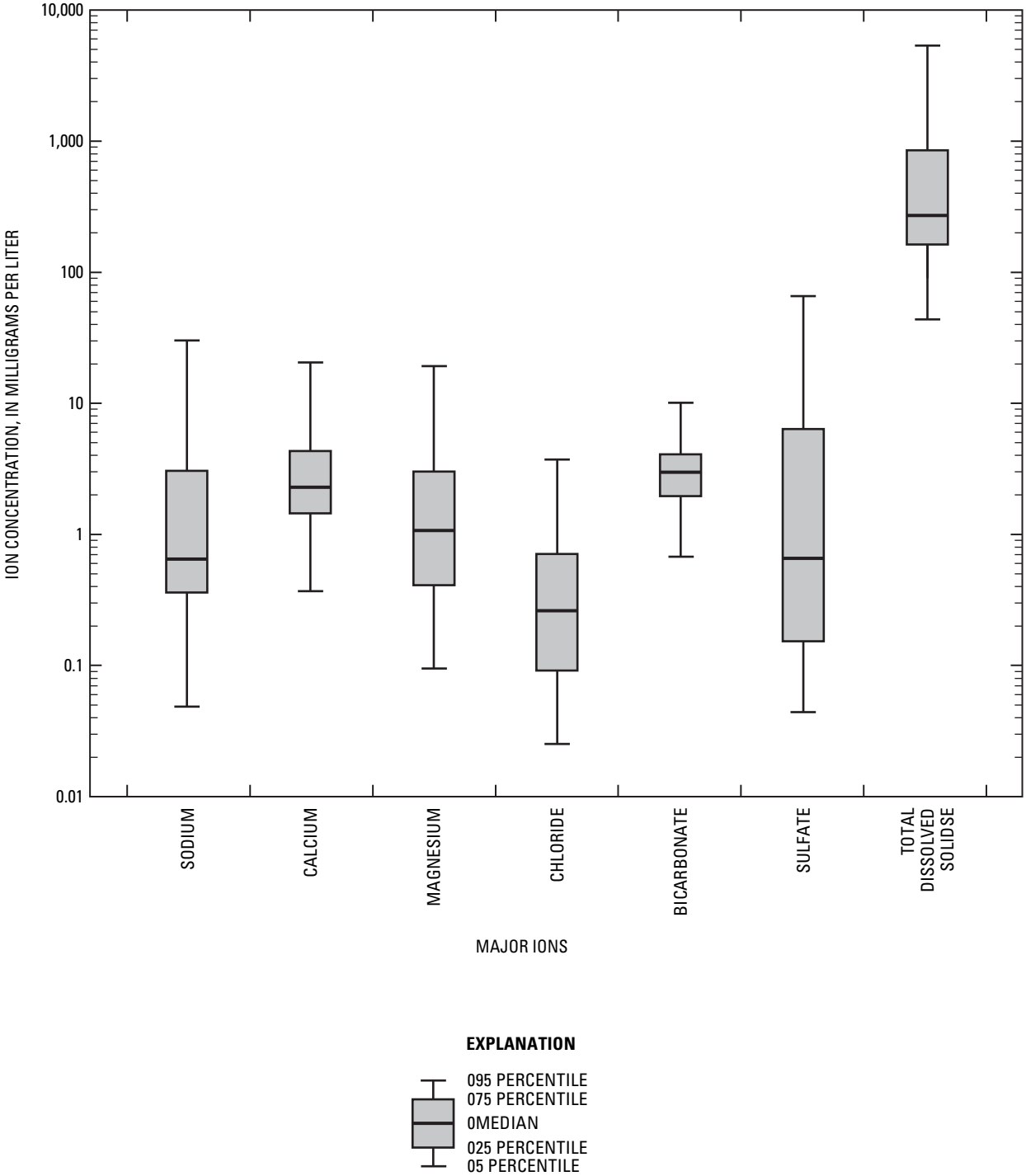


Figure 3. Distribution of major ions of water samples collected from wells, springs, seeps, tinajas, rivers, a lake, and an irrigation ditch in National Parks in the Southern Colorado Plateau Inventory and Monitoring Network, water years 2005 and 2006.

A. Aztec Ruins National Monument and Chaco Culture National Historical Park

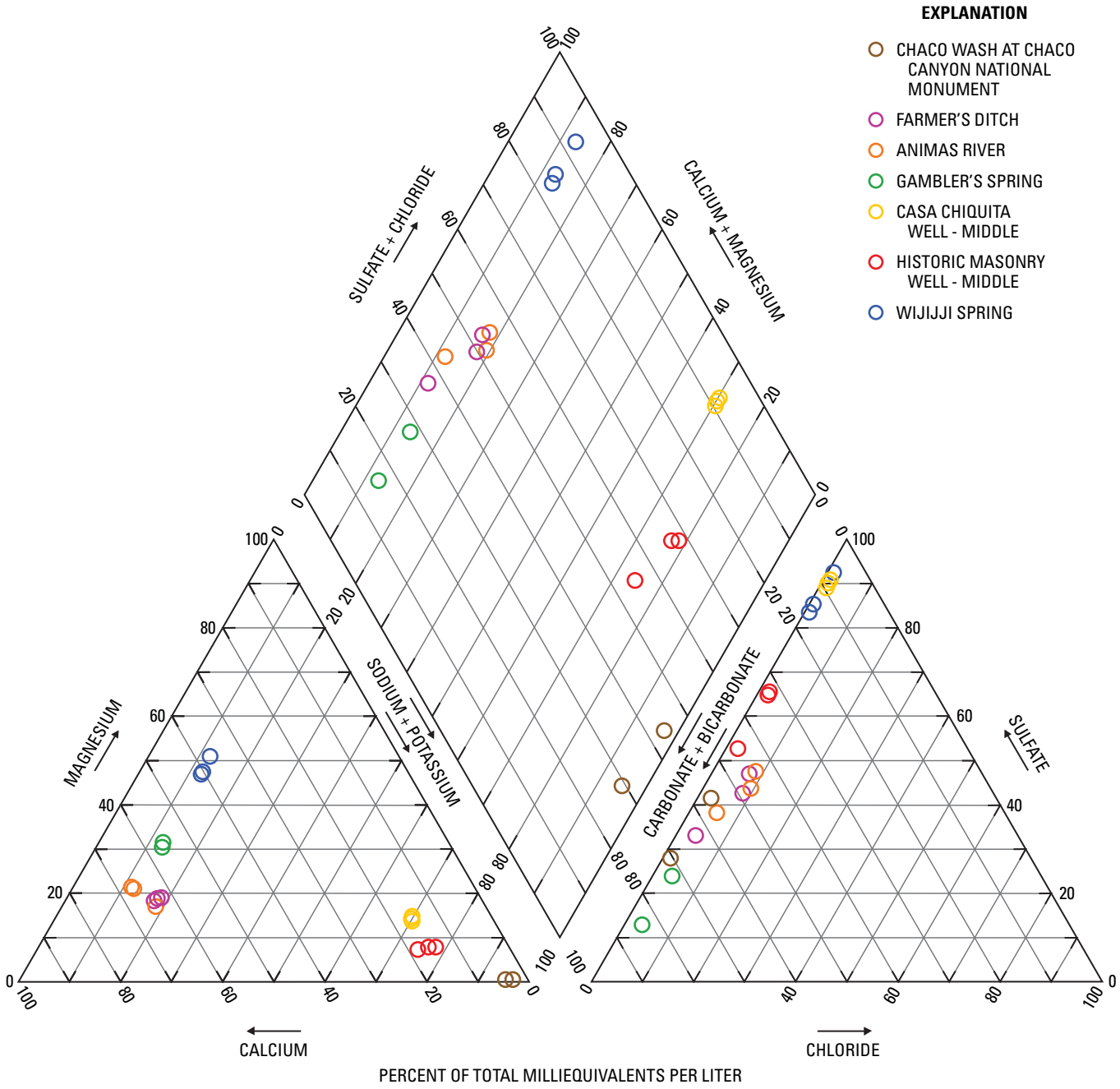


Figure 4. Relative compositions of water that discharges from wells, springs, seeps, tinajas, rivers, a lake, and an irrigation ditch in National Parks in the Southern Colorado Plateau Inventory and Monitoring Network, water years 2005 and 2006. A, Aztec Ruins National Monument and Chaco Culture National Historic Park; B, Bandelier National Monument; C, Canyon de Chelly National Monument; D, El Morro National Monument, El Malpais National Monument, Petrified Forest National Park, and Petroglyph National Monument; E, Glen Canyon National Recreation Area and Rainbow Bridge National Monument; F, Grand Canyon National Park; G, Mesa Verde National Park and Yucca House National Monument.

B. Bandelier National Monument

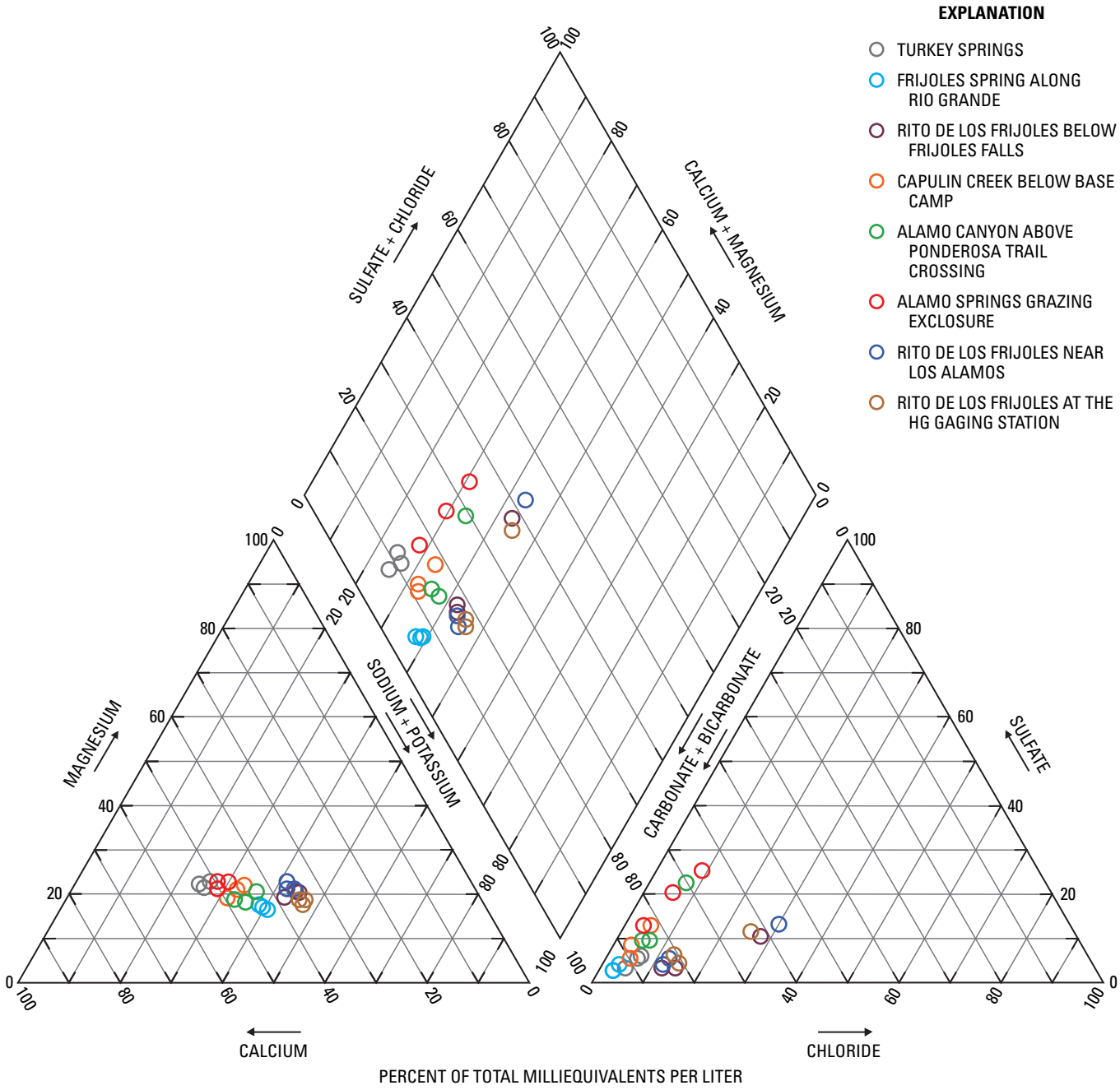


Figure 4. Continued.

C. Canyon de Chelly National Monument

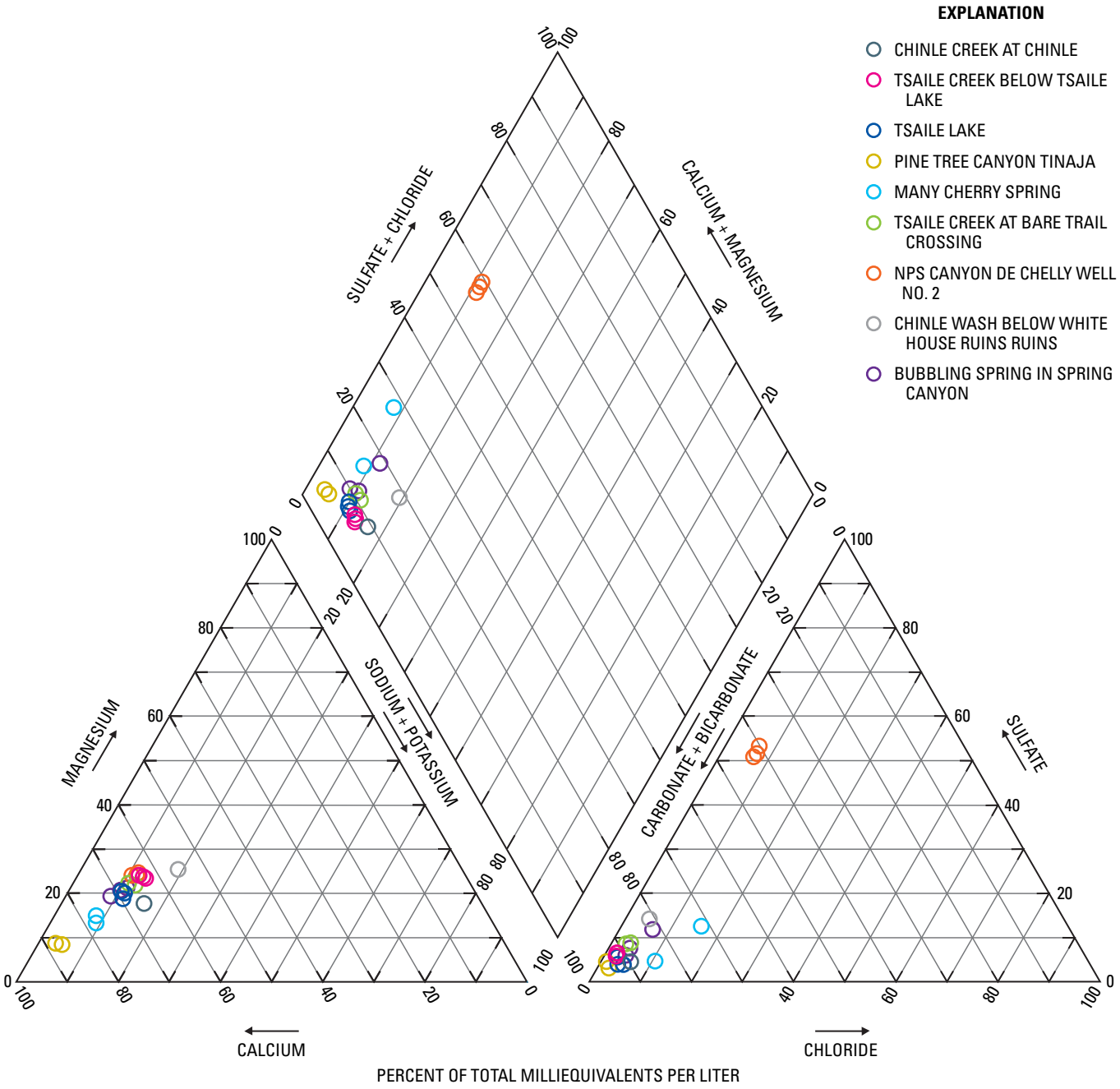


Figure 4. Continued.

D. El Morro National Monument, El Malpais National Monument, Petrified Forest National Park, and Petroglyph National Monument

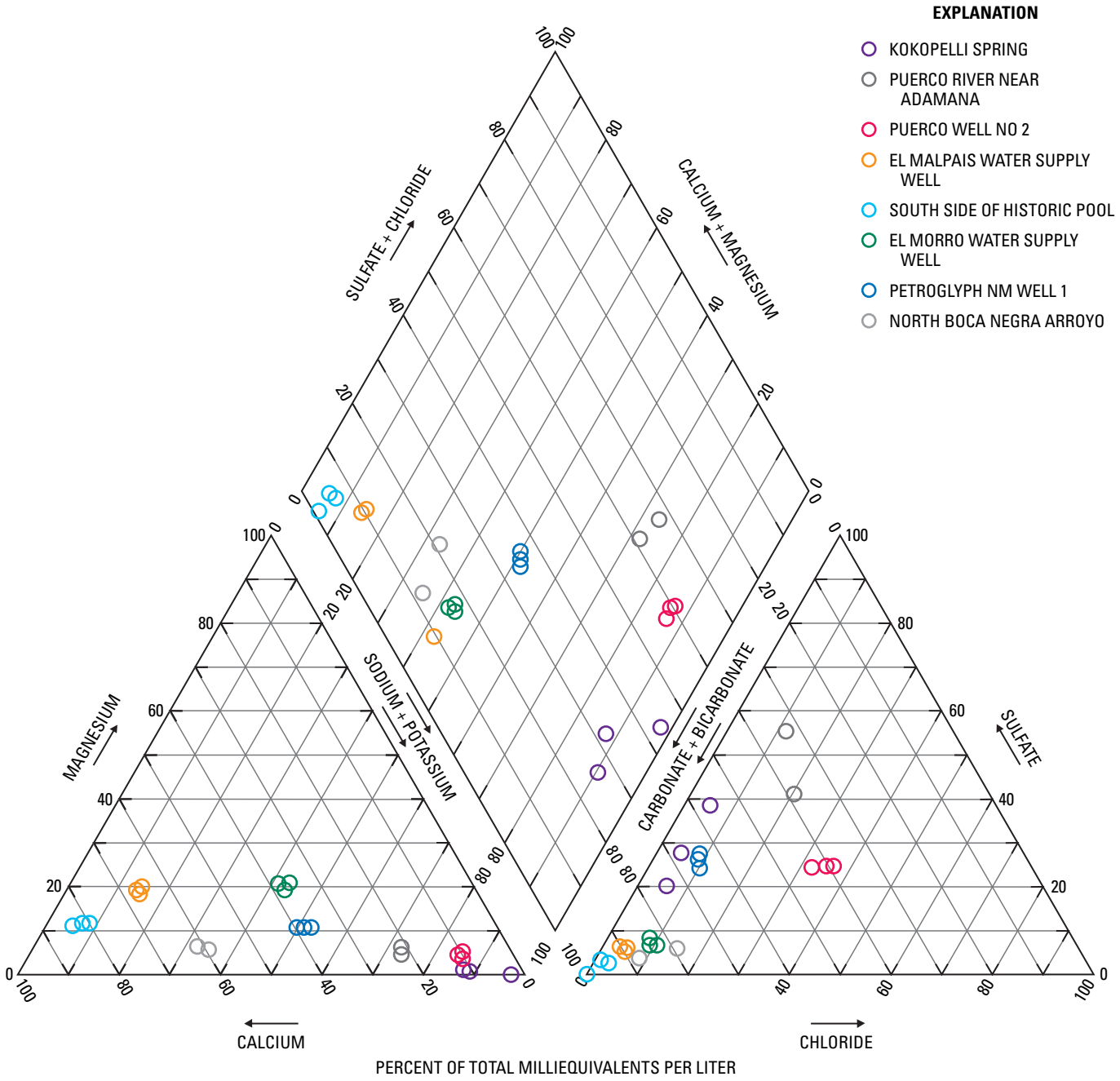


Figure 4. Continued.

E. Glen Canyon National Recreation Area and Rainbow Bridge National Monument

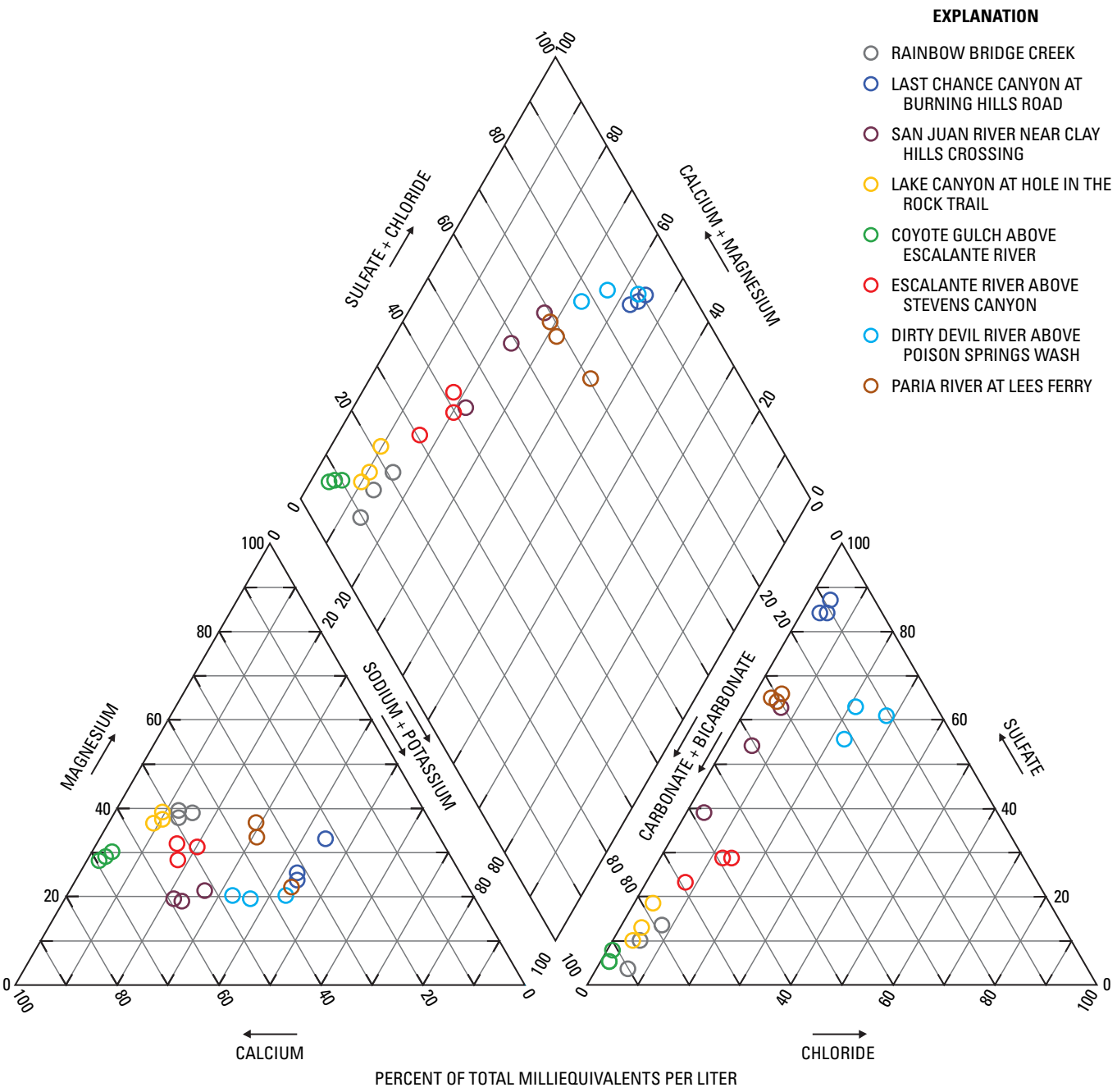


Figure 4. Continued.

F. Grand Canyon National Park

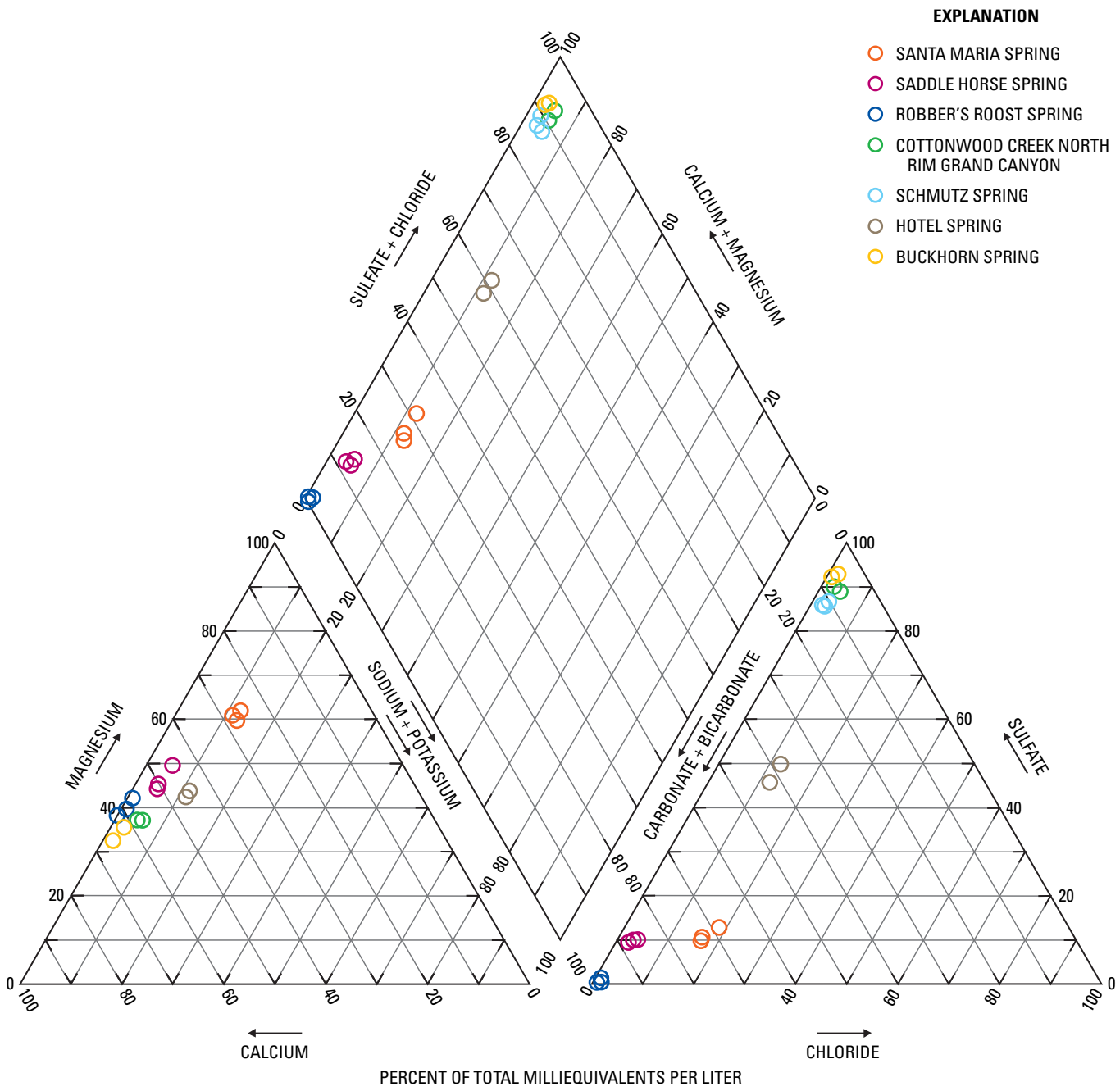


Figure 4. Continued.

G. Mesa Verde National Park and Yucca House National Monument

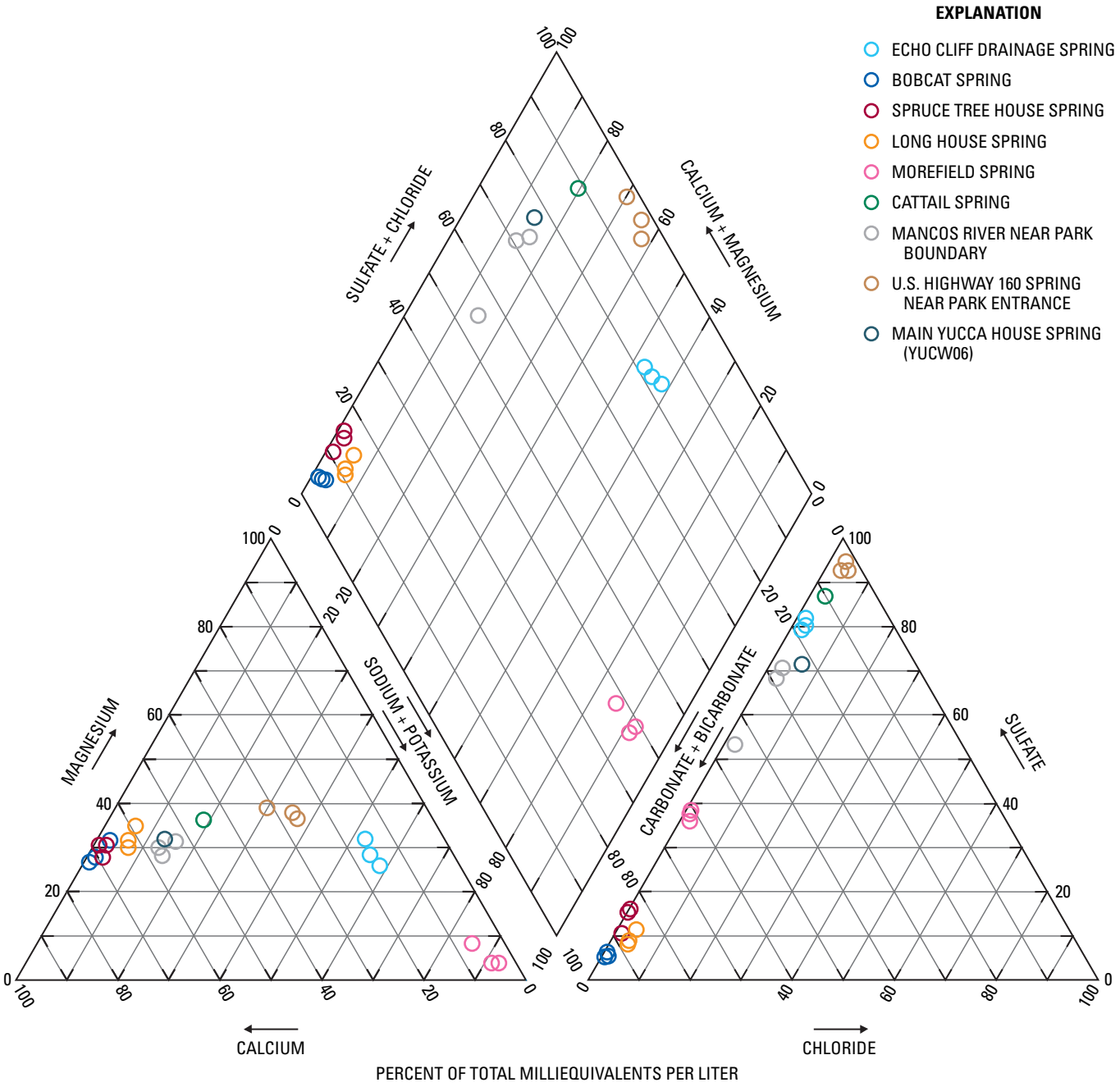


Figure 4. Continued.

Table 5. U.S. Environmental Protection Agency Primary and Secondary Drinking Water Maximum Contaminant Levels (U.S. Environmental Protection Agency, 2006).

[MCLG, Maximum Contaminant Level Goal—an MCLG is a non-enforceable, public-health goal. MCLGs are levels of contaminants below which there is no known or expected risk to health; MCL, Maximum Contaminant Level—the maximum level of a contaminant that is allowed in drinking water. MCLs are enforceable levels for drinking water. SMCL, Secondary Maximum Contamination Level is the maximum contaminant level for contaminants that may cause cosmetic effects (skin or tooth discoloration) or aesthetic effects (taste, odor, color) in drinking water. SMCLs are non-enforceable unless applied by an individual state. ---, no standard; mg/L, milligram per liter; µg/l, micrograms per liter; pCi/L, picocuries per liter.]

Constituent	Units	MCLG	MCL	SMCL	Remarks
pH	standard units	---	---	6.5-8.5	SMCL is exceeded when pH is below 6.5 or above 8.5
Escherichia coli bacteria (*E. Coli*)	number of samples	---	1		From human or animal fecal waste
Chloride	mg/L	---	---	250	
Cyanide	mg/L	200	200		
Dissolved solids	mg/L	---	---	500	
Fluoride	mg/L	---	---	2.0	
Nitrogen, nitrite	mg/L	1	1	---	
Nitrogen, nitrite + nitrate	mg/L	10	10	---	
Sulfate	mg/L	---	---	250	
Aluminum	µg/L	---	---	50-200	
Antimony	µg/L	6	6	---	
Arsenic	µg/L	0	10	---	
Barium	µg/L	2,000	2,000	---	
Beryllium	µg/L	4	4	---	
Cadmium	µg/L	5	5	---	
Chromium	µg/L	100	100	---	
Copper	µg/L	1,300	1,300	---	Regulated by treatment technique that requires systems to control the corrosiveness of the water
Iron	µg/L	---	---	300	
Lead	µg/L	0	15	---	Regulated by treatment technique that requires systems to control the corrosiveness of the water
Manganese	µg/L	---	---	50	
Selenium	µg/L	50	50	---	
Silver	µg/L	---	---	100	
Thallium	µg/L	0.5	2	---	
Uranium, natural	µg/L	0	30	---	
Zinc	µg/L	---	---	5,000	
Mercury	µg/L	2	2		
Iron	µg/L	---	---	300	
Alpha	pCi/L	0	15	---	
Beta	pCi/L	0	4 millirems	---	

The USEPA's MCL of 2.0 mg/L for fluoride was exceeded at U.S. Highway 160 Spring near Park Entrance to Mesa Verde National Park (fig. 2i) in all three samples collected at the site (table 4). Fluoride may be locally present in some geologic units and is used by some municipalities as a water additive to promote dental health.

Manganese was present in samples of water from many sites. The USEPA SMCL for manganese of 50 µg/L was exceeded at many sites in SCPN parks such as Canyon de Chelly National Monument, Chaco Culture National Historical Park, Glen Canyon National Recreation Area, Mesa Verde National Park, Petrified Forest National Park, Rainbow Bridge National Monument and Yucca House National Monument (tables 4 and 5).

Total dissolved-solids (TDS) concentrations ranged from 48 to 8,680 mg/L. Most values, however, fell into a much narrower range (fig. 3). Out of a total of 154 samples, 116 yielded concentrations of less than 900 mg/L and 12 had concentrations greater than 3,600 mg/L. The USEPA SMCL of 500 mg/L for TDS was exceeded at twenty one sites (tables 4 and 5).

High concentrations of suspended sediment are possible indicators of activities such as grazing, mining, or agriculture, or can result from natural phenomena, such as wildfires or natural runoff. Samples from selected streams in Aztec Ruins National Monument (fig. 2a), Canyon de Chelly National Monument (fig 2c), Chaco Culture National Historical Park (fig. 2d), Glen Canyon National Recreation Area (fig. 2g), Mesa Verde National Park (fig. 2i), Petrified Forest National Park (fig. 2j), and Rainbow Bridge National Monument (fig. 2g) were analyzed for suspended-sediment concentrations. Measured concentrations ranged from 10 to 150,000 mg/L (table 4). Samples with the greatest concentrations were from the Puerco River near Adamana, Ariz., in Petrified Forest National Park (fig. 2j).

Turbidity is a measure of water clarity affected by the proportion of suspended particles in the water column. Turbidity concentrations may be affected by biological activity, natural runoff processes, or by other near-stream or watershed disturbances (Davies-Colley and others, 2003). At sites in Aztec Ruins National Monument (fig. 2a), Bandelier National Monument (fig. 2b), Canyon de Chelly National Monument (fig. 2c), Chaco Culture National Historical Park (fig. 2d), El Morro National Monument (fig 2f), Glen Canyon National Recreation Area (fig. 2g), Mesa Verde National Park (fig. 2i), Petrified Forest National Park (fig. 2j), Petroglyph National Monument (fig. 2k), and Yucca House National Monument (fig. 2l) turbidity concentrations were greater than the USEPA MCL of 5 NTU (nephelolometric turbidity units) (table 4). High concentrations of turbidity can raise water temperatures, reduce dissolved-oxygen concentrations and photosynthesis rates, and alter substrate habitat required for fish and aquatic macroinvertebrate species (USEPA, 2006c).

Trace-element concentrations at most sites were at or near LRLs. Elevated concentrations of aluminum were detected at several sites. The USEPA SMCL of 50 to 200 µg/L for aluminum was exceeded in samples from U.S. Highway 160 Spring near Park Entrance to Mesa Verde National Park, Tsaile Creek below Tsaile Lake in Canyon de Chelly National Monument, Chaco Wash in Chaco Culture National Historical Park (figs. 2c, d, i, and tables 4 and 5). Concentrations of arsenic may occur from geologic sources as a result of erosion and runoff, but may also result from application of pesticides containing arsenic, or from electronics production wastes (Hem, 1985). The USEPA MCL for arsenic (10 µg/L) was exceeded in water samples from Chaco Wash in Chaco Culture National Historical Park, Santa Maria Spring in Grand Canyon National Park, and Petroglyph Well 1 in Petroglyph National Monument (figs. 2d, h, k, and table 4). Cadmium and beryllium are metals that naturally occur in some geologic deposits and are used for many industrial purposes. The USEPA MCL of 5 µg/L for cadmium and the USEPA MCL of 4 µg/L for beryllium were exceeded at U.S. Highway 160 Spring near Park Entrance to Mesa Verde National Park, where concentrations for these constituents ranged from 7.18 to 10.8 µg/L and 20.3 to 23.8 µg/L respectively (fig. 2i and tables 4 and 5).

Samples were collected for cyanide analysis at all sites. Concentrations of cyanide were less than the LRL of 0.01 mg/L for all analyses with the exception of samples collected at Spruce Tree House Spring in Mesa Verde National Park and Pine Tree Canyon Tinaja in Canyon de Chelly National Monument (figs. 2c, i, and table 4). However, the analytical results did not exceed the USEPA MCL of 200 mg/L for cyanide. Cyanide concentrations in water can result from mining or industrial activities. Other potential sources of cyanide in the environment include land-fills, road salts, or chlorination treatment of some wastewaters (USEPA, 2006a).

Samples were collected for iron analysis at all sites. The USEPA SMCL for iron of 300 µg/L was exceeded at NPS Canyon De Chelly Well No. 2 in Canyon de Chelly National Monument, Puerco Well No. 2 in Petrified Forest National Park, and Main Yucca House Spring in Yucca House National Monument (figs. 2c, j, k, and table 4).

Selenium was sampled for at all sites and concentrations of selenium were low or near the LDL in most samples (table 4). Samples from the Historic Masonry Well - Middle in Chaco Culture National Historical Park (fig. 2d), Schmutz and Buckhorn Springs in Grand Canyon National Park (fig. 2h), and U.S. Highway 160 Spring near Park Entrance to Mesa Verde National Park (fig. 2i) approached but did not exceed the USEPA MCL of 50 µg/L for selenium. Selenium occurs in some geologic deposits and is used in a variety of industrial applications (USEPA, 2006c).

The expected range of uranium in natural waters is 0.1 to 10 µg/L (Hem, 1985) and the USEPA MCL for uranium is 30 µg/L (table 5). Uranium can be present in water as a result of mining activity or at background levels derived from naturally occurring geologic sources. All sites were sampled

and analyzed for concentrations of uranium. The USEPA MCL for uranium was exceeded at seven out of eight sites sampled in Canyon de Chelly National Monument (fig. 2c). At Many Cherry Spring in Canyon de Chelly National Monument (fig. 2c), the concentration of dissolved uranium was 32.5 µg/L, slightly above the USEPA MCL. At Casa Chiquita Well - Middle in Chaco Culture National Historical Park (fig. 2d), concentrations ranged from less than 0.16 to 45.1 µg/L and Cattail Spring in Mesa Verde National Park (fig. 2i) had a dissolved uranium concentration of 55.7 µg/L (table 4).

Gross alpha and beta radioactivity samples were collected at seven sites. Gross alpha counts exceeded the USEPA MCL of 15 pCi/L in one sample from Casa Chiquita Well—Middle at Chaco Culture National Historical Park (fig. 2d and table 4).

Total petroleum hydrocarbons (TPHs) were collected from selected sites where potential impacts from vehicles, natural gas development, or other commercial or industrial activities was a concern. Concentrations of TPHs at or above the LDL of 2 mg/L were found in samples from Animas River at Aztec Ruins National Monument; Tsaile Lake, Tsaile Creek below Tsaile Lake, Tsaile Creek at Bare Rock Trail Crossing, and Chinle Wash below White House Ruins in Canyon de Chelly National Monument; Chaco Wash at Chaco Canyon National Monument, Historic Masonry Well – Middle, Casa Chiquita Well – Middle in Chaco Culture National Historical Park; San Juan River Near Clay Hills Crossing, Dirty Devil River above Poison Springs Wash near Hanksville, Utah in Glen Canyon National Recreation Area; Mancos River at Gaging Station in Mesa Verde National Park; and Puerco River near Adamana, AZ in Petrified Forest National Park (figs. 2a, c, d, g, I, j, and table 4). The USEPA has not established a contaminant standard for TPHs.

Bacteria can be an indicator of contamination from human or animal wastes (Hem, 1985; USEPA, 2002). Coliform bacteria are naturally present in the environment and feces, so the presence of total coliforms indicates only possible contamination. Fecal coliform and *E. coli* bacteria only come from warm-blooded animals fecal waste, so the presence of those bacteria indicates contamination from these sources (USEPA, 2002). *E. coli* bacteria colony counts were made at ten sites to determine the possible contamination from human or animal wastes. *E. coli* was detected in water samples from sites in Canyon de Chelly and Bandelier National Monuments (figs. 2b, c, and table 4). Samples collected during summer months had highest bacteria colony counts.

Nutrients samples were collected at all sites concentrations were measured at all sites as possible indicators of human activities. Measured concentrations of dissolved ammonia, nitrite, and nitrate were at or near LRLs at most sites (table 4). Concentrations of dissolved nitrogen ranged from below the LRL 0.047 mg/L to 9.77 mg/L. None of the sample analyses exceeded the USEPA MCL of 10 mg/L for nitrate (as N). Measured concentrations of dissolved orthophosphate were at or near LRL at almost every site. The highest concentrations were found at Chaco Wash at Chaco Culture National Historical Park (fig. 2d), where measured concentrations ranged from 0.19 to 0.57 mg/L.

Summary

The Level 1 Water-Quality Inventory is part of a nationwide program by the NPS, WRD to develop baseline water-quality information for key water bodies at NPS units throughout the United States. Fifty-seven sites were visited within the SCPN as a part of this Level 1 Water-Quality Inventory. To capture seasonal variation, sites were visited during three different sampling time periods. The results from the sample analysis were compared to USEPA primary and secondary drinking water standards.

Seasonal sampling events were completed from March to June, July to September, and October to December, 2005. Each sampling site included analysis for major ions, trace elements and nutrients. Some sites were analyzed for mercury, cyanide, total petroleum hydrocarbons, *E. coli*, gross alpha/beta radioactivity and suspended-sediment concentrations.

Measured field pH ranged from 6.0 to 8.8. Concentrations of dissolved solids ranged from 48 to 8,680 mg/L and the majority of samples had concentrations of dissolved solids below 900 mg/L. Trace-element concentrations at most sites were at or near the LRL. The highest overall trace-element concentrations were found at U.S. Highway 160 Spring near Park Entrance to Mesa Verde National Park. Concentrations of uranium in samples at all sites ranged from below the LDL to 55.7 µg/L. Water samples from selected sites were analyzed for total petroleum hydrocarbons and concentrations were at or above the LDL in samples from six National Park units. Ten sites were sampled for *E. coli* and positive counts were found at nine out of the ten sites. The highest colony counts were found at Chinle Creek at Chinle, AZ in Canyon de Chelly National Monument. Measured concentrations of dissolved ammonia, nitrite, and nitrate were at or near LRLs at most sites; nitrate concentrations ranged from below the reporting limit (0.047 mg/L) to 9.77 mg/L. Samples analyzed for mercury had concentrations below or at the LRL. Concentrations of cyanide were less than the LRL for all samples except two, Spruce Tree House Spring in Mesa Verde National Park and Pine Tree Canyon Tinaja in Canyon de Chelly National Monument, which had average concentrations of .042 and .011 µg/L respectively. Gross alpha/beta radioactivity counts from Casa Chiquita Well – Middle at Chaco Culture National Historical Park exceeded the USEPA MCL and averaged 35 pCi/L. Suspended-sediment concentrations were variable and ranged from 10 to 150,000 mg/L.

References Cited

American Public Health Association, 1998, Standard methods for the examination of water and wastewater (20th ed.): Washington, D.C., American Public Health Association, American Water Works Association, and Water Environment Federation, p. 3-37 to 3-43.

Britton, L.J., and Greeson, P.E., 1988, Methods for collection and analysis of aquatic biological and microbiological samples: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. A4, 685 p.

Brown, James, 2005, Water-quality sata for selected national park units, southern and central Arizona and west-central New Mexico, water years 2003 and 2004: U.S. Geological Survey Open-File Report 2005–1291, 6 p.

Childress, C.J.O., Foreman, W.T., Conner, B.F., and Maloney, T.J., 1999, New reporting procedures based on long-term method detection levels and some considerations for the interpretations of water-quality data provided by the U.S. Geological Survey National Water Quality Laboratory: U.S. Geological Survey Open-File Report 99–193, 19 p.

Davies-Colley, R.J., Vant, W.N., and D.G. Smith, 2003, Color and clarity of natural waters: Science and management of optical water quality: Caldwell, New Jersey, Blackburn Press, 310 p.

Faires, L.M., 1993, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of metals in water by inductively coupled plasma-mass spectrometry: U.S. Geological Survey Open-File Report 92–634, 28 p.

Fishman, M.J., ed., 1993, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of inorganic and organic constituents in water and fluvial sediments: U.S. Geological Survey Open-File Report 93–125, 217 p.

Fishman, M.J., and Friedman, L.C., 1989, Methods for determination of inorganic substances in water and fluvial sediments: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. A1, 545 p.

Fletcher, J.E., and Bender, G.L., eds., 1961, Ecology of groundwater in the Southwestern United States: Tempe, Arizona State University.

Friedman, L.C., and Erdmann, D.E., 1982, Quality assurance practices for the chemical and biological analyses of water and fluvial sediments: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. A6, 181 p.

Garbarino, J.R., 1999, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of dissolve arsenic, boron, lithium, selenium, strontium, thallium, and vanadium using inductively coupled plasma-mass spectrometry: U.S. Geological Survey Open-File Report 99–093, 31 p.

Garbarino, J.R., and Damrau, D.L., 2001, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of organic plus inorganic mercury in filtered and unfiltered natural water with cold vapor-atomic fluorescence spectrometry: U.S. Geological Survey Water-Resources Investigations Report 01–4132, 16 p.

Hem, J.D., 1985, Study and interpretation of the chemical characteristics of natural water, third edition: U.S. Geological Survey Water-Supply Paper 2254, 263 p.

Hereford, R., Webb, R.H., and Graham, S., 2002, Precipitation history of the Colorado Plateau Region, 1900-2000: U.S. Geologic Survey Fact Sheet 119–02.

Koterba, M.T., Wilde, F.D., and Lapham, W.W., 1995, Ground-water data-collection protocols and procedures for the National Water-Quality Assessment Program—Collection and documentation of water-quality samples and related data: U.S. Geological Survey Open-File Report 95–399, 113 p.

McLain, Betty, 1993, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of chromium in water by graphite furnace atomic absorption spectrophotometry: U.S. Geological Survey Open-File Report 93–449, 16 p.

Myers, D.N., and Wilde, F.D., eds., 1999, National field manual for the collection of water-quality data—Biological indicators: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A7, v.p.

Noy-Meir, I., 1973, Desert ecosystems: Environment and producers: Annual Review of Ecology and Systematics, chap. 4, p. 25-51.

Struzeski, T.M., DeGiacomo, W.J., and Zayhowski, E.J., 1996, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of dissolved aluminum and boron in water by inductively coupled plasma-atomic emission spectrometry: U.S. Geological Survey Open-File Report 96–149, 17 p.

Thomas, Blakemore E., 2003a, Water-quality data for Walnut Canyon and Wupatki National Monuments, Arizona—2001–02: U.S. Geological Survey Open-File Report 03–286, 13 p.

Thomas, Blakemore E., 2003b, Water-quality data for Navajo National Monument, Northeastern Arizona— 2001–02: U.S. Geological Survey Open-File Report 03–287, 13 p.

U.S. Environmental Protection Agency, 2002, Current drinking water standards, National Primary and Secondary Drinking Water Regulations, accessed February 15, 2006, at http://www.epa.gov/safewater/mcl.html

U.S. Environmental Protection Agency, 2006a, Consumer factsheet on cyanide, accessed March 3, 2006, at http://www.epa.gov/OGWDW/dwh/c-ioc/cyanide.html

U.S. Environmental Protection Agency, 2006b, Consumer factsheet on selenium, accessed March 3, 2006, at http://www.epa.gov/OGWDW/dwh/c-ioc/selenium.html

U.S. Environmental Protection Agency, 2006c, Monitoring and assessing water quality: Turbidity, accessed on May 31, 2006, at http://www.epa.gov/volunteer/stream/vms55.html

Wilde, F.D., and Radtke, D.B., eds., 1998, National field manual for the collection of water-quality data—Field measurements: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A6, v.p.

Wilde, F.D., Radtke, D.B., Gibs, Jacob, and Iwatsubo, R.T., 1998a, National field manual for the collection of water-quality data—Preparations for water sampling: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A1, 38 p.

Wilde, F.D., Radtke, D.B., Gibs, Jacob, and Iwatsubo, R.T., 1998b, National field manual for the collection of water-quality data—Selection of equipment for water sampling: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A2, 82 p.

Wilde, F.D., Radtke, D.B., Gibs, Jacob, and Iwatsubo, R.T., 1998c, National field manual for the collection of water-quality data—Cleaning of equipment for water sampling: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A3, 65 p.

Wilde, F.D., Radtke, D.B., Gibs, Jacob, and Iwatsubo, R.T., 1999, National field manual for the collection of water-quality data—Collection of water samples: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A4, 103 p.

Manuscript approved for publication, August 30, 2006.

Prepared by the Reports Section, U.S. Geological Survey,
Tucson, Arizona.

USGS Publishing staff
Tracey L. Suzuki, Technical Editor
John Callahan, Illustrator

For more information concerning the research in this report, contact
the Arizona Water Science Center Director,
U.S. Geological Survey, 520 N. Park Ave., Suite 221
Tucson, AZ 85719
http://az.water.usgs.gov